

# DEAD TEETH CAN AFFECT YOUR HEALTH

## FOCAL INFECTION IS REAL

Robert Gammal BDS November 2012

**The dental profession** maintains that it is essential to keep all of your teeth no matter what the cost. Thus all teeth, even dead ones, should be kept. The way to treat the dead ones, we are told, is to do a Root Canal 'Therapy' or 'Treatment' – otherwise known in the industry as RCT.

These words are deceptive as they imply a beneficial outcome for the person and tooth. Sadly this is not the case – *the treatment does not restore life to the tooth and the outcome is far from therapeutic!*

In 2007 the Australian Dental Association published a special supplement to their journal, which ironically, presents all of the reasons why this procedure does not work.<sup>1</sup> Simply stated, **NONE OF THE AIMS OF RC PROCEDURE ARE ACHIEVABLE.** It is impossible to remove all dead tissue from the tooth. At least 30% of the main canal remains untouched no matter what techniques are used to clean them<sup>1</sup>. The main canal represents the smallest amount of dead tissue in the tooth – most is found in the dentine tubules and accessory canals. Neither the dentine tubules nor the accessory canals are even approachable. All of the dead tissue which remains in the tooth breaks down and becomes a highly toxic gangrenous mess - these toxins can be lethal. It is also impossible to seal a tooth (no matter which techniques are used). All of the toxins that are in the tooth will leach out to the rest of the body. This includes the materials which are placed in the tooth as part of the RC Procedure - these materials are at best cytotoxic (they kill cells) and at worst are carcinogenic (cause cancer).<sup>2</sup> None of the root filling cements achieve the purpose for which they are designed.

The fund mental aim of the root canal procedure though, is to sterilize the tooth. It is upon this premise that the procedure supposedly succeeds or fails. In 1920 Dr Weston Price demonstrated that the **only** way to sterilise a tooth was to boil it for half an hour. This of course presents a few logistic problems for the patient.

To date, the dental profession has NOT been able find a method or material which will sterilise a tooth while it is in the mouth. The bacteria which live inside the tooth are anaerobic (requiring little to no oxygen). There have been literally hundreds of different bacterial types found in one dead tooth.<sup>3,4</sup> They produce some of the most potent and deadly toxins known to man. The old belief that these bacteria and their toxins will become 'entombed' in the tooth and thus not have access to the rest of the body, is known to be incorrect.<sup>1</sup> All of these toxins and the bacteria themselves escape from the tooth and circulate throughout the body. The circulating bacteria may localise on a new tissue and cause an infection in a distant part of the body. The Australian Dental Association agrees that it is impossible to sterilize a tooth;<sup>5</sup>

*“predictable eradication of bacteria  
from the root canal  
still remains an elusive goal.”*

<sup>1</sup> Australian Dental Association Endodontic Supplement Vol 52 No 1 March 2007

<sup>2</sup> Material Safety Data Sheet Information on Root Filling Cements <http://www.robertgammal.com/RCT/MSDSsRCT.html>

<sup>3</sup> Cate JM, Zaura E. The numerous microbial species in oral biofilms: how could antibacterial therapy be effective? Adv Dent Res. 2012 Sep;24(2):108-11

<sup>4</sup> ADRIANA L. SANTOS, JOSÉ F. SIQUEIRA JR., ISABELA N. RÔÇAS, EDERSON C. JESUS, ALEXANDRE S. ROSADO, JAMES M. TIEDJE C comparing the bacterial diversity of acute and chronic dental root canal infections november 21, 2011

<sup>5</sup> The Principles Of Techniques For Cleaning Root Canals Young et al, Australian Dental Association Endodontic Supplement Vol 52 No 1 March 2007

To compound this disaster, it is now known that placing antibiotics in the tooth, as part of the root canal procedure, merely causes a dramatic increase in **ANTIBIOTIC RESISTANCE** in these organisms. This could seriously increase the difficulty faced by the medical doctors who treat the systemic infection which spreads from the tooth.

## All root canal procedures produce Foci of Infection

Most endodontists will now admit that they cannot sterilize a tooth. Instead they claim to be able to achieve a state of **“Physiological Balance”**. I have no idea what this means and I have never had an answer to the following questions;

- How do endodontists define “Physiological Balance”?
- As a clinician, how would you know when you have achieved this state?
- What happens to the anaerobic bacteria that remain in the tooth a year after achieving this supposed “Physiological Balance”?

## “Physiological Balance” is a nonsense concept

This supposed “Physiological Balance” is nothing short of an insult to the intelligence of the dentist and the patient. It is an insult to the volumes of research which demonstrate the seriousness of systemic diseases caused by oral bacteria. It is an insult to the thousands of patients whose health (and lives) have been affected by the procedure called *Root Canal Therapy*.

Of equal insult is the proclamation by certain dentists, that the patients are assessed on a ‘case-by-case’ basis to see if they can ‘handle’ a root canal treatment. The only case-by-case assessment done is if you have the money to pay for the dentist’s time. Some claim that a material called Calcium Oxide or ‘Biocalix’ is the panacea which will sterilize a tooth. Sadly there is no support for this claim. There are no materials or techniques that will sterilise a tooth (at time of writing in 2012).

Until this single issue of sterilisation can be resolved,  
all root treated teeth will remain a source of  
potentially life-threatening focal infection

In the words of one of the world’s leading endodontists, Dr George Meinig, Root Canal Treatment is;

“...the story of how a "cast of millions"  
become entrenched inside the structure of teeth  
and end up causing the largest number of diseases  
ever traced to a single source”

This was demonstrated over and over by such great scientists and medical doctors as Rosenow, Billings, Mayo, Price and many others *at the turn of the 20<sup>th</sup> century*. Much of their work was published by 1920. The dental profession has, since that time, tried to denigrate this mountain of research, by claiming that ‘*well controlled reputable studies*’ have shown it *ALL to be wrong*. There is no trace of any of these supposedly reputable studies. Do they exist? Research from the 1960s to the time of writing in November 2012 completely supports the work of the above great scientists.

There is NO 'scientific' or 'evidence based' credibility for Root Canal procedure. It should NOT be called either a 'treatment' or a 'therapy'. Not one medical field would condone leaving dead, infected, gangrenous tissue in the body. Why does dentistry recommend it, knowing that it may cause a range of life threatening diseases?<sup>1</sup>

The pages which follow are a mere sampling of the published, scientific literature demonstrating the reality of Focal Infection and Focal Disease. There is no excuse for dentistry to ignore such important research. The health of the patient must surely come before the collective ignorance of the dental profession. The references which follow demonstrate the need for the medical doctor to look into the mouth before making a diagnosis or treatment and the need for the dental practitioners to take responsibility for doing procedures which harm the health of the patient.

## DEFINITIONS

From the American Dental Association – 60 years ago. In 1951 the problem of focal infection was discussed at length in the Journal of the American Dental Association; 'Mechanism of Focal Infection J Am Dent Assoc Vol 42 June 1951'.

A **Focus of infection** has been defined as; "a circumscribed area infected with micro-organisms which may or may not give rise to clinical manifestations."

A **Focal Infection** has been defined as; "sepsis arising from a focus of infection that initiates a secondary infection in a nearby or distant tissue or organs."

The article states clearly that "**The concept of focal infection in relation to systemic disease is firmly established**" and that "The origin of many toxic or metastatic diseases may be traced to primary local or focal areas of infection".

This article also states that there are two major mechanisms of focal infection:

- "a) an actual metastasis of organisms from a focus
- b) the spread of toxins or toxic products from a remote focus to other tissues by the blood stream."

Once the infection passes the abscess area about the tooth:

- "a) they may multiply in the blood setting up an acute or chronic septicaemia.
- b) they may be carried live to a suitable nidus where they infect the surrounding tissue.
- c) they may produce a slow but progressive atrophy with replacement fibrosis in various organs of the body."

The authors continue to show a relationship to allergic / immune reactions:

- "The bacteria at the focus may undergo autolysis or dissolution. Some of the products of this dissolution, diffusing into the blood or lymph, may sensitise in an allergic sense, various tissues of the body."
- "A later diffusion of these products on reaching the sensitised tissue may call forth an allergic reaction."

The American Dental Association published that information in 1951 – why is this knowledge denied by our current dental teachers and specialists?

What purpose does it serve, to maintain the ignorance of the whole dental profession, at the expense of the patient's health?

# ***DISEASES DISCUSSED BY E.C. Rosenow (1875-1966)***

Evidence of Localised Focal Infection in relation to dead teeth and other dental foci  
S. Hale Shakman,, MEDICINE'S GRANDEST FRAUD PHD (The AUTOMED Project)

InstituteOfScience.com and Createspace.com 16 June 2010

Alcoholism	Goiter	Pernicious anemia
Alkaline phosphatic cystitis	Habit spasm	Pneumonia
Allergies	Hayfever	Pneumococcus infection
Amyotrophic lateral sclerosis	Headache (migraine)	Poliomyelitis
Anemia	Herpes simplex	Portal thrombosis
Angina	Herpes zoster	Prostatitis
Appendicitis	Hiccup,	Puerperal infection
Arthritis	Hodgkin's disease	Pulmonary diseases
Asthma	Hypertension	Pulpitis
Brain tumor	Hypotension	Pyelonephritis
Bronchiectasis	Infertility	Pyemia
Bronchitis	Influenza	Respiratory infection
Bronchopneumonia	Intercostal Neuralgia	Rheumatic fever
Cancer	Lethargy	Rheumatism
Cholecystitis Chorea	Leukemia	Scarlatinal
Colitis	Lobar pneumonia	Scarlet fever
Common Cold	Lupus erythematosus	Schizophrenia
Compulsive violence	Meningitis	Sciatica
Convulsions	Mental Illness	Sclerosis
Coronary heart disease	Mernier's disease	Skin diseases
Cystic ovaries Cystitis	Migraine	Sneeze,
Dermatology	Mononucleosis	Persistent Sore throat
Diabetes	Multiple neuritis	Splenic anemia
Duodenal ulcer	Multiple sclerosis	Stomach ulcer
Embolism	Mumps	Sydenham's Chorea,
Encephalitis	Muscular dystrophy	St. Vitus' dance
Encephalomyelitis	Myasthenia gravis	Thrombosis
Endocarditis	Myocardial lesions	Thyroiditis (exophthalmic)
Endocervitis	Myoclonic encephalitis	Tonsillitis
Epilepsy	Myositis	Torticollis
Erythema	Nephritis	Transverse myelitis
Ether	Nephrolithiasis	Trigeminal neuralgia
Convulsions	Nervous system diseases	Ulcerative colitis
Eye Diseases,	Neuritis	Ulcer
glaucoma	Neuralgia	Urinary calculus, stone,
Iritis	Neurofibromyositis	Tumor
Uveitis	Neuromyositis	Uveitis
Fibrositis	Osteitis deformans	Vagotonic neurosis
Gallbladder disease	Ovaritis	Venous thrombosis
Gallstones	Pancreatic disease	Violent criminality
Gastroenteritis	Parkinsonian encephalitis	Paget's disease
Gastric ulcer	Parotitis Pemphigus	
Gastroduodenal ulcer	Periodic Ophthalmia	

## REVIEWS

REIL B KOBLIN I CATAMNESTIC SURVEYS IN 371 CASES OF ABSCESS OF THE MAXILLOFACIAL REGION IN CHILDHOOD DTSCH ZAHNARZTL Z (1976 FEB) 31(2):182-4

PRED A EG PASETTI P FOCAL PATHOLOGY AND INFECTIOUS DENTAL FOCI. THEORETICAL AND CLINICAL ASPECTS DENT CADMOS (1990 JUL 15) 58(12):34-43

HARSANYI L SCHWEITZER K THE FOCUS OF DENTAL INFECTION . FOGORV SZ (1991 DEC) 84(12):369-74

NEWMAN HN FOCAL INFECTION REVISITED--THE DENTIST AS PHYSICIAN [EDITORIAL] J DENT RES (1992 Nov) 71(11):1854

NEWMAN HN FOCAL INFECTION REVISITED. J WEST SOC PERIODONTAL PERIODONTAL ABSTR (1993) 41(3):73-7

HOLLISTER MC WEINTRAUB JA THE ASSOCIATION OF ORAL STATUS WITH SYSTEMIC HEALTH, QUALITY OF LIFE, AND ECONOMIC PRODUCTIVITY. J DENT EDUC (1993 DEC) 57(12):901-12

Dental disease accounts for many lost work and school days. Lower wage earners and minorities are disproportionately affected.

DEBELIAN GJ OLSEN I TRONSTAD L SYSTEMIC DISEASES CAUSED BY ORAL MICROORGANISMS. ENDOD DENT TRAUMATOL (1994 APR) 10(2):57-65

MEURMAN JH DENTAL INFECTIONS AND GENERAL HEALTH. QUINTESSENCE INT (1997 DEC) 28(12):807-11

WALSH LJ SERIOUS COMPLICATIONS OF ENDODONTIC INFECTIONS: SOME CAUTIONARY TALES. AUST DENT J (1997 JUN) 42(3):156-9

Abstract; While endodontic (dentoalveolar) abscesses can cause significant morbidity, in susceptible individuals they can pose life-threatening problems. This paper provides an overview of the more serious sequelae of endodontic abscesses, and provides examples of 'high risk' situations in practice in which these serious complications are more likely to occur.

He lists the following as Complications of endodontic abscesses;

Osteomyelitis of the mandible, Maxillary sinusitis and orbital abscess, Wound botulism, Ludwig's angina, Necrotizing fasciitis, Cavernous sinus thrombosis, Persistent pyrexia of unknown origin, Septicaemia, Streptococcus milleri and Pseudomonas spp, Septicaemia with disseminated intravascular coagulation, Pulmonary abscess, Pyogenic hepatic abscess, Brain abscess and acute meningitis, Actinomyces viscosus, Paraspinal abscess and paraplegia, Bacterial endocarditis and splenic abscess

MURRAY CA SAUNDERS WP ROOT CANAL TREATMENT AND GENERAL HEALTH: A REVIEW OF THE LITERATURE. INT ENDOD J (2000 JAN) 33(1):1-18

REVIEW: The focal infection theory was prominent in the medical literature during the early 1900s and curtailed the progress of endodontics. This theory proposed that microorganisms, or their toxins, arising from a focus of circumscribed infection within a tissue could disseminate systemically, resulting in the initiation or exacerbation of systemic illness or the damage of a distant tissue site. For example, during the focal infection era rheumatoid arthritis (RA) was identified as having a close relationship with dental health. The theory was eventually discredited because there was only anecdotal evidence to support its claims and few scientifically controlled studies. There has been a renewed interest in the influence that foci of infection within the oral tissues may have on general health. Some current research suggests a possible relationship between dental health and cardiovascular disease and published case reports have cited dental sources as causes for several systemic illnesses. Improved laboratory procedures employing sophisticated molecular biological techniques and enhanced culturing techniques have allowed researchers to confirm that bacteria recovered from the peripheral blood during root canal treatment originated in the root canal. It has been suggested that the bacteraemia, or the associated bacterial endotoxins, subsequent to root canal treatment, may cause potential systemic complications. Further research is required, however, using current sampling and laboratory methods from scientifically controlled population groups to determine if a significant relationship between general health and periradicular infection exists.

XIAOJING LI, KRISTIN M, KOLLTVEIT, LEIF TRONSTAD, INGAR OLSEN. SYSTEMIC DISEASES CAUSED BY ORAL INFECTION CLINICAL MICROBIOLOGY REVIEWS OCT 2000 VOL 13 No 4 2000547-558

The theory of focal infection, which was promulgated during the 19th and early 20th centuries, stated that "foci" of sepsis were responsible for the initiation and progression of a variety of inflammatory diseases such as arthritis, peptic ulcers, and appendicitis (120). In the oral cavity, therapeutic edentulation was common as a result of the popularity of the focal infection theory. Since many teeth were extracted without evidence of infection, thereby providing no relief of symptoms, the theory was discredited and largely ignored for many years. Recent progress in classification and identification of oral microorganisms and the realization that certain microorganisms are normally found only in the oral cavity have opened the way for a more realistic assessment of the importance of oral focal infection. It has become increasingly clear that the oral cavity can act as the site of origin for dissemination of pathogenic organisms to distant body sites, especially in immunocompromised hosts such as patients suffering from malignancies, diabetes, or rheumatoid arthritis or having corticosteroid or other immunosuppressive treatment. A number of epidemiological studies have suggested that oral infection, especially marginal and apical periodontitis, may be a risk factor for systemic diseases.

The teeth are the only nonshedding surfaces in the body, and bacterial levels can reach more than  $10^{11}$  microorganisms per mg of dental plaque. Human endodontal and periodontal infections are associated with complex microfloras in which approximately 200 species (in apical periodontitis) (140) and more than 500 species (in marginal periodontitis) (97) have been encountered. These infections are predominantly anaerobic, with gram-negative rods being the most common isolates. The anatomic closeness of these microfloras to the bloodstream can facilitate bacteremia and systemic spread of bacterial products, components, and immunocomplexes.

They go on to state;

"One recent study by Debelian et al. (26) used phenotypic and genetic methods to trace microorganisms released into the bloodstream during and after endodontic treatment back to their presumed source, the root canal. Microbiological samples were taken from the root canals of 26 patients with asymptomatic apical periodontitis of single-rooted teeth. Blood was drawn from the patients during and 10 min after endodontic therapy. All root canals

contained anaerobic bacteria. In group 1, where the first three root canal reamers were used to a level 2 mm beyond the apical foramen of the tooth, *Propionibacterium acnes*, *Peptostreptococcus prevotii*, *Fusobacterium nucleatum*, *Prevotella intermedia*, and *Saccharomyces cerevisiae* were recovered from the blood. In group 2, where instrumentation ended inside the root canal, *P. intermedia*, *Actinomyces israelii*, *Streptococcus intermedius*, and *Streptococcus sanguis* were isolated from the blood.

PAQUETTE DW THE PERIODONTAL INFECTION-SYSTEMIC DISEASE LINK: A REVIEW OF THE TRUTH OR MYTH. J INT ACAD PERIODONTOL (2002 JUL) 4(3):101-9

Observational studies indicate periodontal infections as a risk factor for systemic conditions like cardiovascular disease and preterm low birth weight. This paper reviews and argues the biological plausibility for a periodontal infection-systemic disease link and reviews the available experimental data from animal models and human intervention trials. Five principal lines of evidence can be used to explain the biological plausibility of a link. First, infection in general has been implicated in the pathogenesis of both atherosclerosis and preterm delivery. Periodontal infection secondly causes transient and low-grade bacteraemias and endotoxaemias in patients. Thirdly, periodontal infection promotes systemic inflammatory and immune responses that may play roles in disease. Periodontal pathogens express specific virulence factors that can affect atherogenic or parturition events. Lastly, periodontal pathogens have also been isolated from non-oral tissues like atheromatous plaques. Experimental data derived from rodent and pig models indicate that infection or bacteraemias with the periodontal pathogen, *Porphyromonas gingivalis*, can increase atheroma size or reduce litter weights as compared to controls. While human intervention data are lacking for patients at risk for cardiovascular disease, early data indicate that periodontal therapy administered to pregnant mothers with periodontitis can reduce the incidence of preterm low birth weight deliveries. Nevertheless, more and larger intervention trials are needed before we can fully accept periodontal infection as a true risk factor in the causal pathways of cardiovascular disease and preterm low birth weight.

SATO FR HAJALA FA FREIRE FILHO FW MOREIRA RW DE MORAES M EIGHT-YEAR RETROSPECTIVE STUDY OF ODONTOGENIC ORIGIN INFECTIONS IN A POSTGRADUATION PROGRAM ON ORAL AND MAXILLOFACIAL SURGERY. J ORAL MAXILLOFAC SURG (2009 MAY) 67(5):1092-7

PURPOSE: Infections are one of the most commonly found conditions in oral and maxillofacial surgery practice. They always represent a risk to patients regardless of whether they are of odontogenic origin or not, and if not treated at an early stage they may rapidly evolve and spread to adjacent anatomical structures, leading to serious complications and, occasionally, to death. For this reason, the objective of this study was to retrospectively analyze data from patients with infections attended by the Department of Oral and Maxillofacial Surgery of the Piracicaba Dental School at the State University of Campinas-Unicamp. PATIENTS AND METHODS: In accordance with date and inclusion criteria, sampling comprised 210 patient reports from January 1999 to March 2007. Patients' demographic data reviewed were gender, age, signs and symptoms, facial spaces affected, and therapy adopted. RESULTS: The mean age of patients was 30 years old (SD = 16.6), and the main origin of infections was odontogenic (79.31%); principal signs and symptoms were trismus (43.33%), fever (28.10%), and dysphagia (25.24%). The main facial spaces affected were the buccal mandibular space (50.00%), submandibular space (31.90%), and buccal maxillary space (19.05%). Surgical drainage was carried out in 46.67% of cases, and 10.95% of these interventions were performed under general anesthetic. Only 3 of all patients developed complications. CONCLUSIONS: Infection patients were basically young adults; no predisposition concerning gender or race was detected. The therapeutic protocol adopted presented very positive results, with a small number of complications.

## TESTING

MARSCHNER G DETECTION OF FOCI AND TROUBLED AREAS BY THE DIRECTED AND REPRODUCIBLE METHOD ACCORDING TO VOLL ZAHNARZTL PRAX (1967 MAY 1) 18(9):

FREYBERGER P ELECTROPOTENTIAL DIFFERENCES IN THE MOUTH AS FACTORS IN DENTAL FOCAL INFECTION AND OTHER DISORDERS ZAHNARZTL PRAX (1967 FEB 15) 18(4):41-2

ROST A [POSSIBILITIES AND LIMITS OF ELECTROACUPUNCTURE IN DENTISTRY] ZAHNARZTL PRAX (1975 MAY 16) 26(10):226-7

SCHUH E CRITICAL EXAMINATION OF ELECTRICAL, THERMAL AND HUMORAL METHODS IN LOCALIZING FOCAL INFECTIONS WIEN MED WOCHENSCHR (1968 JAN 6) 118(1):13-8

ASCHER M [DIAGNOSIS AND THERAPY OF FOCAL INFECTION] ZAHNARZTL PRAX (1969 AUG 1) 20(15):175-7

BERMANOWA G THE ELECTROINDUCTION TEST FOR THE EVALUATION OF THE ACTIVITY OF ODONTOGENIC FOCAL INFECTIONS REUMATOLOGIA (1969) 7(2):151-5

KRAMER F DIAGNOSIS OF FOCAL INFECTION USING THE ELECTROACUPUNCTURE ZAHNARZTL PRAX (1969 AUG 15) 20(16):183-4

DI STEFANO PG A TEST FOR FOCAL INFECTION IN DENTISTRY USING GALVANIC CURRENT ANN STOMATOL (ROMA) (1972 JAN-FEB) 21(1):39-44

LEONHARDT H THE VOLL ELECTRO-ACUPUNCTURE IN DENTISTRY ZAHNARZTL PRAX (1972 JAN 7) 23(1):10-1

MARESCH O LOCUS, RANGE AND REACTION FIELD OF INTERFERENCE AS BASIS FOR ELECTRIC MEASUREMENTS IN FOCAL INFECTION OSTERR Z STOMATOL (1973 MAR) 70(3):110-5

MARESCH O AREA OF DISTURBANCES--REACTION AREA AS BASIS FOR ELECTRICAL IMPULSES IN FOCAL INFECTION OSTERR Z STOMATOL (1973 MAR) 70(3):110-5

REICH H A CASE OF FOCAL INFECTION, DISCOVERED BY MEANS OF THE ELECTROACUPUNCTURE TEST DTSCH ZAHNARZTL Z (1974 NOV) 29(11):1043-4

KRAMER F ELECTROACUPUNCTURE IN DENTISTRY ZAHNARZTL PRAX (1974 DEC 20) 25(24):574-6

SCHWARZ E MECHANISM AND PROCESS OF FOCAL INFECTION: ZAHNARZTL PRAX (1974 APR 5) 25(7):168-72

LEONHARDT H FOCAL PROCESS AND VOLL'S ELECTROACUPUNCTURE IN DENTISTRY ZWR (1974 JUL 10) 83(13):704-5



LAUTENBACH E FOCAL PROCESS AND ELECTRO-SKIN TEST WITH SPECIAL REFERENCE TO STOMATOLOGY  
ZAHN MUND KIEFERHEILKD ZENTRALBL (1975) 63(1):32-41

THERMOGRAPHY AND FOCUS DIAGNOSIS THERMOGRAPHIE UND HERDDIAGNOSTIK ZWR (1975 MAY 25)  
84(10):486-8

ROST A FOCAL INFECTION AND FOCAL DIAGNOSIS FROM THE VIEWPOINT OF THERMOREGULATION FREIE  
ZAHNARZT (1985 Oct) 29(10):82, 84, 86 PASSIM

ROZENFEL'D LG TIMOFEEV AA BORISENKO ON STUPKO TN THERMOGRAPHIC DIAGNOSIS OF DISEASES  
OF THE MAXILLOFACIAL AREA STOMATOLOGIJA (Mosk) (1989 JAN-FEB) 68(1):54-8

## PLEOMORPHIC CHANGE

CHARLTON BR CHANNING-SANTIAGO SE BICKFORD AA CARDONA CJ CHIN RP COOPER GL DROUAL R  
JEFFREY JS METEYER CU SHIVAPRASAD HL ET AL PRELIMINARY CHARACTERIZATION OF A PLEOMORPHIC  
GRAM-NEGATIVE ROD ASSOCIATED WITH AVIAN RESPIRATORY DISEASE. J VET DIAGN INVEST (1993 JAN)  
5(1):47-51

CANTWELL AR VARIABLY ACID-FAST PLEOMORPHIC BACTERIA AS A POSSIBLE CAUSE OF MYCOSIS FUNGOIDES. A  
REPORT OF A NECROPSIED CASE AND TWO LIVING PATIENTS J DERMATOL SURG ONCOL (1982) 8(3):203-213

CANTWELL AR LAWSON JW NECROSCOPIC FINDINGS OF PLEOMORPHIC, VARIABLY ACID-FAST BACTERIA IN A  
FATAL CASE OF KAPOSI'S SARCOMA J DERMATOL SURG ONCOL (1981) 7(11):923-930

EISENBERG RJ MONTGOMERY PC CHARACTERIZATION OF AN ANTIBODY DIRECTED AGAINST A SURFACE  
COMPONENT OF NORMAL AND PLEOMORPHIC CELLS OF STREPTOCOCCUS SANGUIS. INFECT IMMUN (1975 SEP)  
12(3):668-78

MAEDA N ANAEROBIC, GRAM-POSITIVE, PLEOMORPHIC RODS IN HUMAN GINGIVAL CREVICE. BULL TOKYO MED  
DENT UNIV (1980 MAR) 27(1):63-70

ISHIKAWA O AEROBIC GRAM-POSITIVE PLEOMORPHIC RODS ISOLATED FROM DENTAL PLAQUE AND GINGIVAL  
CREVICE. BULL TOKYO MED DENT UNIV (1980 MAR) 27(1):71- 7

BAULD J MARSHALL KC QUANTITATIVE DESCRIPTION OF MORPHOLOGICAL CHANGES DURING GROWTH OF A  
PLEOMORPHIC BUDDING BACTERIUM. ANTONIE VAN LEEUWENHOEK ( 1971) 37(4):401-7

WAINWRIGHT M HIGHLY PLEOMORPHIC STAPHYLOCOCCI AS A CAUSE OF CANCER. MED HYPOTHESES (2000  
JAN) 54(1):91-4

## ROOT CANAL

HUURMAN PM ROOT CANAL THERAPY AND FOCAL INFECTION DTSCH STOMATOL (1965 DEC) 15(12):938-40

LALY C JAVELOT-TERZIEV MJ BEDEL C ROOT CANAL FILLING AND MICROBIAL FLORA. STATISTICAL STUDY WITHIN THE FRAMEWORK OF REMOTE INFECTIONS ACTUAL ODONTOSTOMATOL (PARIS) (1978)(123):357-74

KEREKES K, OLSEN I. SIMILARITIES IN THE MICROFLORAS OF ROOT CANALS AND DEEP PERIODONTAL POCKETS. ENDODONTICS & DENTAL TRAUMATOLOGY 1990 FEBRUARY; VOLUME 6, NUMBER 1, P.P. 1-5.

**Although not universally accepted, retrospective histological, roentgenological and microbiological studies have indicated that cross-infection can occur between infected pulps and deep periodontal pockets. This review provides examples of similarities in the microfloras of these adjacent oral sites, supporting the idea that infection spreads from one site to the other. The organisms most often involved are probably bacilli, streptococci, spirochetes, actinomyces, selenomonas, campylobacter, and peptostreptococci. Important qualities of cross-infecting organisms may be the ability to survive in highly reduced environments and motility. Precautions should be taken to prevent in vivo seeding of such microorganisms, particularly in compromised teeth and hosts.**

MOLVEN O, OLSEN I, KEREKES K. SCANNING ELECTRON MICROSCOPY OF BACTERIA IN THE APICAL PART OF ROOT CANALS IN PERMANENT TEETH WITH PERIAPICAL LESIONS. ENDODONTICS & DENTAL TRAUMATOLOGY 1991 OCTOBER; VOLUME 7, NUMBER 5, PP. 226-229.

The most apical 2 mm of the root canals of periapically diseased roots were examined for microorganisms by scanning electron microscopy (SEM). Bacteria in this area were observed in 10 out of 12 (83.3%) cases. The two remaining cases exhibited bacteria more coronally, with tissue remnants between the bacterial front and the apical foramen. Rod-shaped bacteria dominated, but filaments, spirochetes and cocci were also seen. Cocci and rods sometimes formed micro-colonies. Occasionally, cocci were seen attached to filaments forming "corn-cob"-like structures. Deposits resembling bacterial plaque were also found inside the root canal. SEM is useful for studying microbial topography of the apical root canal.

BAUMGARTNER JC, FALKLER WA JR. BACTERIA IN THE APICAL 5 MM OF INFECTED ROOT CANALS. JOURNAL OF ENDODONTICS 1991 AUGUST; VOLUME 17, NUMBER 8, PP. 380-383.

Ten freshly extracted teeth, which had carious pulpal exposures and periapical lesions contiguous with the root apex, were placed inside an anaerobic chamber and the apical 5 mm of the root canals cultured. In addition to anaerobic incubation, duplicate cultures were incubated aerobically. Fifty strains of bacteria from the 10 root canals were isolated and identified. The most prominent bacteria cultured from the 10 root canals were *Actinomyces*, *Lactobacillus*, black-pigmented *Bacteroides*, *Peptostreptococcus*, non pigmented *Bacteroides*, *Veillonella*, *Enterococcus faecalis*, *Fusobacterium nucleatum*, and *Streptococcus mutans*. Of the 50 bacterial isolates, 34 (68%) were strict anaerobes. This study demonstrates the presence of predominantly anaerobic bacteria in the apical 5 mm of infected root canals in teeth with carious pulpal exposures and periapical lesions.

DRUCKER DB, LILLEY JD, TUCKER D, GIBBS AC. THE ENDODONTIC MICROFLORA REVISITED. MICROBES 1992; VOLUME 71, NUMBERS 288-289, PP. 225-234.

The microbial flora of 35 dental root canals were examined, taking care to maintain the viability of obligate anaerobes which accounted for 45% of total isolations, while streptococcal species accounted for 24% of the total species isolated. Individual root canals yielded a maximum of eight bacterial species. A total of 40 different species was isolated of which the most prevalent were the facultative anaerobe *Streptococcus sanguis* and the obligate anaerobe, *Peptostreptococcus micros* (both in 23% of root canals), followed by *Eubacterium aerofaciens* and the 'Streptococcus milleri group' (both 17%) then *Prevotella melaninogenica* (formerly *Bacteroides melaninogenicus*), *Enterococcus faecalis* and *Prevotella oralis* (formerly *Bacteroides oralis*), which were each isolated from 14% of root canals. Highly significant associations were discovered between four pairs of species, viz *P. melaninogenica* with *I. micros*, *I. melaninogenica* with *P. oralis*, *Prevotella corporis* with *Streptococcus morbillorum* and *Actinomyces odontolyticus* with *E. faecalis*.

ASIKAINEN S, ALALUUSUA S. BACTERIOLOGY OF DENTAL INFECTIONS. EUROPEAN HEART JOURNAL 1993 DECEMBER; VOLUME 14, SUPPLEMENT K, PP. 43-50.

The most common dental diseases, periodontal disease and dental caries, are chronic infections caused by bacteria of normal oral flora. When these bacteria increase in number and irritation exceeds the host defence threshold, disease arises. The human oral flora comprises more than 300 different bacteria. During the last decade approximately 10 species, mainly Gram-negative anaerobes, have been noted as putative pathogens in periodontal disease. The Gram-positive and facultatively anaerobic mutans streptococci are aetiologically the most important bacteria in dental caries. Data have rapidly increased on the association of these bacteria with certain periodontal diseases or caries, on phenotypic and genotypic characteristics, pathogenic mechanisms, antibiotic susceptibility patterns and transmission among family members. Chronic dental infections have been the focus of renewed interest because of recent 'advances in oral microbiology as well as in medicine. We now know that in addition to oral streptococci, recently classified, fastidious periodontal anaerobes can be detected from various extra-oral infections. Oral bacteria may spread into the blood stream through ulcerated epithelium in diseased periodontal pockets and cause transient bacteraemias, which are regarded as increased risk, especially for immunocompromised patients or persons with endoprostheses. In these patients, routine antibiotic prophylaxis is recommended for invasive dental care procedures. Also the new association between dental infections and myocardial/cerebral infarction has offered new challenges for cooperation between dental and medical researchers.

OGUNTEBI BR. DENTINE TUBULE INFECTION AND ENDODONTIC THERAPY IMPLICATIONS. INTERNATIONAL ENDODONTIC JOURNAL 1994 JULY; VOLUME 27, NUMBER 4, PP. 218-222.

A critical review of the literature suggests that the microenvironment of dentinal tubules appears to favour the selection of relatively few bacterial types irrespective of the aetiology of the infection process; coronal dental caries or pulpar necrosis. These bacteria may constitute an important reservoir from which root canal infection and reinfection may occur following pulp necrosis or during and after endodontic treatment. Previous studies of this microflora have utilized microbiological culture techniques, which need to be supplemented by those that allow in situ demonstration as well as identification of the bacteria. Newer treatment strategies that are designed to eliminate this microflora must include agents that can penetrate the dentinal tubules and destroy these microorganisms, since they are located in an area beyond the host defence mechanisms where they cannot be reached by systemically administered antimicrobial agents.

NAGAOKA S, MIYAZAKI Y, LIU HJ, IWAMOTO Y, KITANO M, KAWAGOE M. BACTERIAL INVASION INTO DENTINAL TUBULES OF HUMAN VITAL AND NONVITAL TEETH. JOURNAL OF ENDODONTICS 1995 FEBRUARY; VOLUME 21, NUMBER 2, PP. 70-73

The difference in resistance to bacterial invasion into the dentinal tubules between vital and nonvital teeth has not been determined. This study was conducted to clarify the effect of vital pulp on bacterial invasion into the dentinal tubules. The specimens were 19 intact pairs of bilateral upper third molars of 19 healthy, young adult male volunteers. In each case, 30 or 150 days before extraction, pulpectomies and root canal fillings were carried out unilaterally and a class V cavity involving the dentin was made on the palatal surface of both the pulpectomized tooth and the nonpulpectomized opposite tooth. The cavities were left unprotected to expose them to oral flora until the extractions were done, and the extracted teeth were examined histologically. When extraction followed 150-day exposure to the oral flora, there was a statistically significant difference in the bacterial invasion rate between the vital and nonvital teeth. It was postulated that vital teeth were much more resistant to bacterial invasion into the dentinal tubules than were nonvital teeth, thereby *suggesting* that *the* vital pulp plays some important role in this process.

DEBELIAN GJ, OLSEN I, TRONSTAD L. BACTEREMIA IN CONJUNCTION WITH ENDODONTIC THERAPY. ENDODONTIC.S. & DENTAL TRAUMATOLOGY 1995 JUNE; VOLUME 11, NUMBER 3, PP. 142-149.

This study characterizes oral microorganisms believed to have spread from the root canal into the blood stream during and after endodontic therapy of teeth with asymptomatic apical periodontitis. Microbiological samples were taken under aseptic conditions from the root canal of 26 single-rooted teeth in 26 patients. In the endodontic treatment of 13 of the patients (Group 1), the first 3 reamers, sizes 15, 20 and 25, were used to a level 2 mm beyond the apical foramen. In the other 13 patients (Group 2), the instrumentation ended inside the root canal 1 mm short of the apical foramen. Blood samples were taken from the patients during the instrumentation and 10 min after the treatment was completed. Anaerobic microorganisms were isolated from all root canals. In 7 patients of Group 1, *Propionibacterium acnes*, *Peptostreptococcus prevail*, *Fusobacterium nuclealum*, *Prevotella intermedia* and *Saccharomyces cerevisiae* were recovered from the blood. In 4 patients of Group 2, *P. intermedia*, *Actinomyces israelii*, *Streptococcus intermedius* and *Streptococcus sanguis* were isolated from the blood. Biochemical tests and antibiograms revealed that the isolates from the root canal and blood had identical profiles within the patients, strongly suggesting that the microorganisms isolated from the blood had the root canal as their source.

DEBELIAN GJ, OLSEN I, TRONSTAD L. ELECTROPHORESIS OF WHOLE-CELL SOLUBLE PROTEINS OF MICROORGANISMS ISOLATED FROM BACTEREMIAS IN ENDODONTIC THERAPY. EUROPEAN JOURNAL OF ORAL SCIENCES 1996 OCTOBER-DECEMBER; VOLUME 104, NUMBERS 5-6, PP. 540-546.

We have previously demonstrated that anaerobic bacteria are the microorganisms most frequently isolated from blood following endodontic therapy of teeth with apical periodontitis. Phenotypic characterisation of the isolates suggested that the bacteria in the blood originated from the root canal. The present experiment using sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) was carried out in an effort to verify these findings, and to further study the microorganisms involved in endodontic bacteremias. Soluble cellular proteins were extracted from 11 reference strains and 26 bacterial isolates recovered from the root canal and blood. These included

*Propionibacterium acnes*, *Pep. tostrectococcus prevail*, *Fusobacterhnn nucleatum*, *Prei•otella intermeclia*. *Actinomives israelii*, *Streptococcus nitermedius*, *Streptococcus sanguis*. The electrophoretic patterns mostly confirmed the identity of the isolates as determined by the biochemical and antimicrobial resistance tests. Furthermore, with this typing met<sup>116d</sup> the species *Prevotella intermedia* and *Prevotella nigrescens* could be differentiated. These species had been recovered from both root canal and blood. Also, differences between subspecies of *Fusobacterium mtcleatum* became evident with SDS-PAGE, and the results indicated that the organism recovered from the root canal and blood was *Fusobacterium nucleatum* subsp. *vincentii*. The electrophoretic patterns of the different organisms isolated from the root canal and the blood were similar, providing further evidence that the bacteria found in the blood originated from the root canal.

CHAUDHRY R, KALRA N, TALWAR V, THAKUR R. ANAEROBIC FLORA IN ENDODONTIC INFECTIONS. THE INDIAN JOURNAL OF MEDICAL RESEARCH 1997 JUNE; VOLUME 105, PP. 262-265..

Microbiological and clinical data from 56 patients with endodontic infections were evaluated. Samples were collected using autoclaved paper points. Specimens were processed for isolation of aerobic and anaerobic bacteria. Antimicrobial sensitivity and resistance profiles of the recovered isolates were also performed. Forty-nine positive cultures (87.5%) were obtained from the 56 consecutive necrotic root canal systems, which were sampled. A total of 69 aerobic bacteria and 21 anaerobic bacteria were recovered. Aerobic bacteria were isolated from 35 patients (72%), anaerobic bacteria from 3 (6%) and mixed aerobic and anaerobic bacteria from 11 patients (22%). The most common aerobic isolate was *Klebsiella pneumoniae*. The predominant anaerobic isolate was *Bacteroides* species. One isolate was recovered from 25 patients (51%) whereas in the remaining 24 patients (49%) more than 1 isolate were recovered. These data illustrate the polymicrobial nature of endodontic infections in half the patients studied and the role of anaerobic bacteria in a quarter of them.

MORSE DR. INFECTION-RELATED MENTAL AND INFERIOR ALVEOLAR NERVE PARESTHESIA: LITERATURE REVIEW AND PRESENTATION OF TWO CASES. J ENDOD (1997 JUL) 23(7):457-60

A review of the literature on infection-related mental and inferior alveolar nerve paresthesia is given. This is followed by 2 case reports. The first case is of a mandibular left second molar in which a chloropercha overfill puff occurred in the vicinity of the inferior alveolar canal. The tooth remained asymptomatic until 2 and 1/2 yr later, when the periapical lesion enlarged and swelling, pain, and paresthesia developed. The paresthesia resolved 2 weeks following periapical surgery. The second case is of a mandibular right first premolar in which paresthesia began 1 day after the initial endodontic treatment. The intracanal medication was formocresol on a cotton pellet that was squeezed dry. The paresthesia was treated by irrigation, antibiotics, and dexamethasone. The paresthesia lasted 7 weeks, and when it resolved the root canal was filled with gutta-percha/eucapercha. Almost 9 months later, the tooth remained asymptomatic.

GIULIANA G, AMMATUNA P, PIZZO G, CAPONE F, D'ANGELO M. OCCURRENCE OF INVADING BACTERIA IN RADICULAR DENTIN OF PERIODONTALLY DISEASED TEETH: MICROBIOLOGICAL FINDINGS. JOURNAL OF CLINICAL PERIODONTOLOGY 1997 JULY; VOLUME 24, NUMBER 7, PP. 478-485.

Bacterial invasion in roots of periodontally diseased teeth, which has been recently documented using cultural and microscopic techniques, may be important in the pathogenesis of periodontal disease. The purpose of this investigation was to determine the occurrence and the species of invading bacteria in radicular dentin of periodontally diseased

teeth. Samples were taken from the middle layer of radicular dentin of 26 periodontally diseased teeth. 14 healthy teeth were used as controls. Dentin samples were cultured anaerobically. The chosen methodology allowed the determination of the numbers of bacteria present in both deeper and outer part of dentinal tubules, and the bacterial concentration in dentin samples, expressed as colony forming units per mg of tissue (CFU/mg). Invading bacteria was detected in 14 (53.8%) samples from periodontally diseased teeth. The bacterial concentration ranged from 831.84 to 11971.3 CFU/mg (mean $\pm$ -standard deviation: 3043.15 $\pm$ 1-2763.13). Microorganisms identified included putative periodontal pathogens such as *Prevotella intermedia*, *Porphyromonas gingivalis*, *Actinobacterium nucleatum*, *Bacteroides forsythus*, *Peptostreptococcus micros* and *Streptococcus intermedius*. These findings suggest that radicular dentin could act as bacterial reservoir from which periodontal pathogens can recolonise treated periodontal pockets, contributing to the failure of therapy and recurrence of disease.

DEBELIAN GJ OLSEN I TRONSTAD L ANAEROBIC BACTEREMIA AND FUNGEMIA IN PATIENTS UNDERGOING ENDODONTIC THERAPY: AN OVERVIEW. ANN PERIODONTOL (1998 JUL) 3(1):281-7

Oral focal infection, a concept neglected for several decades, is a subject of controversy. Recent progress in classification and identification of oral microorganisms has renewed interest in focal infection. The aim of this study was to use phenotypic and genetic methods to trace microorganisms released into the bloodstream during and after endodontic treatment back to their presumed source--the root canal. Microbiological samples were taken from the root canals of 26 patients with asymptomatic apical periodontitis of single-rooted teeth. The blood of the patients was drawn during and 10 minutes after endodontic therapy. Microorganisms in blood were collected after anaerobic lysis filtration and cultured anaerobically on blood agar plates. The phenotypic methods used for characterization and tracing of microorganisms in blood and root canals were: biochemical and antimicrobial susceptibility test, SDS-PAGE of whole-cell soluble proteins, and gas chromatography of cellular fatty acids. Phenotypic data were verified by DNA restriction patterns and corresponding ribotypes of the root canal and blood isolates by using a computer-assisted system for gel analysis. All root canals contained anaerobic bacteria. The frequency of bacteremia varied from 31% to 54%. The microorganisms from the root canal and blood presented identical phenotype and genetic characteristics within the patients examined. These characteristics differed between patients. The present study demonstrated that endodontic treatment can be the cause of anaerobic bacteremia and fungemia. The phenotypic and genetic methods used appeared valuable for tracing microorganisms in the blood back to their origin.

BRISMAN DL, BRISMAN AS, MOSES MS. IMPLANT FAILURES ASSOCIATED WITH ASYMPTOMATIC ENDODONTICALLY TREATED TEETH. THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION 2001 FEBRUARY; VOLUME 132, NUMBER 2, 191-195.

Endosseous root-formed implants occasionally fail to osseointegrate. Causes of failure include infection, overheating of the bone, habitual smoking, systemic disease, transmucosal overloading, excessive surgical trauma and implant placement adjacent to teeth demonstrating periapical pathology. CASE DESCRIPTION: In this article, the authors present another possible cause of implant failure. The cases of four patients who received endosseous root-formed implants are discussed. Each patient demonstrated signs of infection after initial implant placement. The common factor in each failing implant was its placement adjacent to an asymptomatic endodontically treated tooth with no clinical or radiographic evidence of pathology. CLINICAL IMPLICATIONS: These patients demonstrate the importance of evaluating and possibly retreating or extracting adjacent endodontically treated teeth before placing implants.

SIQUEIRA JF ENDODONTIC INFECTIONS: CONCEPTS, PARADIGMS, AND PERSPECTIVES. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOLOG ENDOD (2002 SEP) 94(3):281-93

Overwhelming evidence indicates that periradicular diseases are infectious disorders. The question now is no longer whether microorganisms are involved in the pathogenesis of such diseases, but which specific microbial species are. The list of microorganisms involved in periradicular diseases keeps expanding and has the potential to become increasingly more accurate during the next few years. Molecular methods have contributed significantly to the knowledge about the microbial species involved. Undoubtedly, a great deal of additional research is needed to define the specific role played by suspected endodontic pathogens in the etiology of each form of periradicular disease and to determine the best therapeutic measures for the pathogen's eradication. In addition, there is an emergent need to define markers that permit the clinician to know when he or she should conclude the treatment and to predict the outcome of the treatment. Although endodontic procedures and some acute endodontic infections can cause bacteremia, there is no clear evidence that microorganisms from the root canal can cause diseases in remote sites of the body. However, there is a risk in some compromised individuals, and prophylactic measures should be taken. Prescription of systemic antibiotics in endodontic therapy is rarely necessary. Because of the emergence of bacterial resistance against most known antibiotics, their use in endodontics should be highly limited and restricted to a few cases.

ROBERTS G HOLZEL H INTRAVENOUS ANTIBIOTIC REGIMENS AND PROPHYLAXIS OF ODONTOGENIC BACTERAEMIA. BR DENT J (2002 NOV 9) 193(9):525-7; DISCUSSION 518

OBJECTIVES: This study retrospectively examines the efficacy of prophylactic intravenous antibiotic regimens in the prevention of odontogenic bacteraemia in children with severe congenital heart defects receiving comprehensive dental treatment under general anaesthesia. PATIENTS AND METHODS: Blood cultures were taken from children with congenital cardiac defects 30 seconds after completion of dental treatment under general anaesthesia. Antibiotic prophylaxis had been given intravenously immediately before dental treatment. The choice of antibiotics and the extent of dental treatment were recorded. The percentage prevalence of bacteraemia was compared with published data following multiple dental extractions using the same clinical and microbiological methodology. RESULTS: The overall percentage prevalence of positive cultures in children receiving intravenous prophylactic antibiotics was 16%. The percentage of positive blood cultures in cardiac children who received ampicillin alone was not significantly different from that in children having a combination of amikacin and teicoplanin (16.7% v 22.2%) respectively [Chi Square = 0.385, df = 1, P= 0.535]. When compared with multiple extractions, both ampicillin alone and amikacin with teicoplanin were effective in reducing the prevalence of odontogenic bacteraemia. CONCLUSIONS: In children with cardiac defects, bacteraemia after dental treatment is reduced by antibiotics but is still detected on 16% of occasions. In comparison with children receiving ampicillin alone, the combination of amikacin and teicoplanin is as effective in reducing bacteraemia in children who are either allergic to penicillins or who have received them within the previous month.

WU MK WESSELINK PR LOCAL AND POTENTIAL SYSTEMIC CONSEQUENCES OF ENDODONTIC ROOT INFECTION NED TIJDSCHR TANDHEELKD (2005 NOV) 112(11):416-9

In root infections, bacteria are present not only in planktonic cells but also in biofilms, which are more resistant to host defence mechanisms and disinfectants. Apical periodontitis, which may be radiographically undetectable, may develop or persist as a host defence mechanism to prevent the systemic spread of bacteria and their by-products to other sites of the body. The risk of spreading microorganisms and septic emboli is present especially in

compromised hosts; furthermore, long-standing inflammation may have systemic effects and affect general health. Effective procedures should be developed to minimize the burden of root infection.

FOSCHI F IZARD J SASAKI H SAMBRI V PRATI C MÄLLER R STASHENKO P TREPONEMA DENTICOLA IN DISSEMINATING ENDODONTIC INFECTIONS. J DENT RES (2006 AUG) 85(8):761-5

*Treponema denticola* is a consensus periodontal pathogen that has recently been associated with endodontic pathology. In this study, the effect of mono-infection of the dental pulp with *T. denticola* and with polymicrobial "red-complex" organisms (RC) (*Porphyromonas gingivalis*, *Tannerella forsythia*, and *T. denticola*) in inducing disseminating infections in wild-type (WT) and severe-combined-immunodeficiency (SCID) mice was analyzed. After 21 days, a high incidence (5/10) of orofacial abscesses was observed in SCID mice mono-infected with *T. denticola*, whereas abscesses were rare in SCID mice infected with the red-complex organisms or in wild-type mice. Splenomegaly was present in all groups, but only mono-infected SCID mice had weight loss. *T. denticola* DNA was detected in the spleen, heart, and brain of mono-infected SCID mice and in the spleen from mono-infected wild-type mice, which also had more periapical bone resorption. The results indicate that *T. denticola* has high pathogenicity, including dissemination to distant organs, further substantiating its potential importance in oral and linked systemic conditions.

GR YOUNG, P PARASHOS, HH MESSER THE PRINCIPLES OF TECHNIQUES FOR CLEANING ROOT CANALS AUSTRALIAN DENTAL ASSOCIATION ENDODONTIC SUPPLEMENT VOL 52 NO 1 MARCH 2007

#### Conclusion

While measures such as increased apical enlargement or a more effective antimicrobial irrigation regimen may enhance the reduction of the microbial load, predictable eradication of bacteria from the root canal still remains an elusive goal.

CEDERBLOM S ROOT CANAL THERAPY--NOT ONLY AN ODONTOLOGIC PROBLEM LAKARTIDNINGEN (2010 JAN 20-26) 107(3):125-6

BLOUNT CA LESER C MULTISYSTEM COMPLICATIONS FOLLOWING ENDODONTIC THERAPY. J ORAL MAXILLOFAC SURG (2012 MAR) 70(3):527-30

## TOXIN PRODUCING BACTERIA

PERSSON S, EDLUND MB, CLAEISSON R, CARLSSON J. THE FORMATION OF HYDROGEN SULFIDE AND METHYL MERCAPTAN BY ORAL BACTERIA. ORAL MICROBIOLOGY AND IMMUNOLOGY 1990 AUGUST; VOLUME 5, NUMBER 4, PP. 195-201.

The capacity to form volatile sulfur compounds was tested in bacteria isolated from subgingival microbiotas and in a representative number of reference strains. A majority of the 75 tested oral bacterial species and 7 unnamed bacterial taxa formed significant amounts of hydrogen sulfide from L-cysteine. The most active bacteria were found in the genera *Peptostreptococcus*, *Eubacterium*, *Selenomonas*, *Centropeda*, *Bacteroides* and *Fusobacterium*. Methyl mercaptan from L-methionine was formed by some members of the genera *Fusobacterium*, *Bacteroides*, *Porphyromonas*, and *Eubacterium*. When incubated in serum for 7 d, the most potent producers of hydrogen sulfide were *Ireponema denticola* and the black-pigmented species, *Bacteroides intermedius*, *Bacteroides loescheii*, *Porphyromonas endodontalis* and *Poiphyromonas gingivalis*. *P. endodontalis* and *P. gingivalis* also produced significant amounts of methyl mercaptan in serum. No other volatile sul-



fur compound was detected in serum or in the presence of Lcysteine and L-methionine. These findings significantly increase the list of oral bacteria known to produce volatile sulfur compounds.

NIEDERMAN R, BUYLE-RODIN Y, LU BY, NALEWAY C, ROBINSON P, KENT R. THE RELATIONSHIP OF GINGIVAL CREVICULAR FLUID SHORT CHAIN CARBOXYLIC ACID CONCENTRATION TO GINGIVAL INFLAMMATION. JOURNAL OF CLINICAL PERIODONTOLOGY 1996 AUGUST; VOLUME 23, NUMBER 8, PP. 743-749.

Short-chain carboxylic acids (SCCA; C < or = 5; e.g., lactic acid, propionic acid, butyric acid) are metabolic byproducts of bacterial metabolism, which accumulate in the gingival crevice, and exhibit significant biological activity, including the ability to alter gene expression. It has been hypothesized that among the activities of SCCAs are their ability to contribute to gingival inflammation. This concept complements the notion that specific periodontal pathogens are the causative agents of gingival inflammation. To begin testing these 2 hypotheses, we examined the relationship between SCCA concentrations, specific putative periodontal pathogens, and gingival inflammation in medically healthy periodontally diseased subjects. We reasoned that if SCCAs and/or specific periodontal pathogens were causative gingival inflammatory agents, gingival inflammation should increase with increasing concentration of the inflammatory mediator. We also recognized that other clinical variables needed to be controlled for, and an objective quantitative assessment of gingival inflammation used. To accomplish these tasks, sites within subjects were stratified by location and pocket depth, and the following quantified: bacteriapresence; SCCA concentration; and gingival inflammation. The results indicated that gingival inflammation directly and significantly correlated with SCCA concentrations in the maxillary and mandibular molars, incisors and canines (all  $r > \text{or} = 0.47$ ; all  $p < \text{or} = 0.015$ ; too few bicuspids were available for complete analysis). The relationship between gingival inflammation and SCCA concentration was best described by a natural log relationship. Gingival inflammation did not, however, correlate positively with either the total number of specific putative periodontal pathogens, or the sum of subsets of these pathogens ( $-0.31 < \text{or} = r < \text{or} = 0.39$ ;  $0.08 < \text{or} = p < \text{or} = 0.75$ ) for any of the locations. Finally, the SCCA concentration did not correlate with the level of individual or groups of pathogens. These data, together with historical work and other preliminary data, support the hypothesis that SCCA, rather than specific putative periodontal pathogens, may be a causative agent in gingival inflammation. This work may, in part, begin to explain the apparent lack of a direct relationship between current gingival inflammation and the prediction of bacterially mediated periodontal attachment loss.

NIEDERMAN R, BUYLE-BODIN Y, LU BY, ROBINSON 1<sup>3</sup>, NALEWAY C. SHORT-CHAIN CARBOXYLIC ACID CONCENTRATION IN HUMAN GINGIVAL CREVICULAR FLUID. JOURNAL OF DENTAL RESEARCH 1997 JANUARY; VOLUME 76, NUMBER 1, PP. 575-579.

Short-chain carboxylic acids (e.g., lactic acid, propionic acid, butyric acid) are metabolic by-products of bacterial metabolism, which can accumulate in the gingival crevice. It is of no small consequence, therefore, that 1-to 5-mM concentrations of these acids exhibit significant biological activity, including the ability to alter cell proliferation and gene expression in cells of importance to the periodontium. This communication reports on the *in vivo* concentrations of propionic and butyric acid in the gingival crevices of periodontal subjects with severe and mild disease. The results indicated that severely diseased subjects exhibited a > 10-fold increase in the mM concentration of these acids when compared with

mildly diseased subjects (mean propionic acid-severe = 9.5 +/-1.8 mM, and mild = 0.8 +/-0.3 mM; mean butyric acid-severe = 2.6 +/-0.4 mM, and mild = 0.2 +/-0.04 mM). These differences (mean +/-SE) were significant ( $p < 0.0001$ ). The propionic and butyric acid concentrations were below detection limits in healthy sites of mildly diseased subjects. The propionic and butyric acid concentrations also associated significantly with clinical measures of disease severity (e.g., pocket depth, attachment level) and inflammation (e.g., subgingival temperature, % of sites bleeding when probed), and with the total microbial load (all  $p < 0.05$ ). Taken together, these data suggest that short-chain carboxylic acids play a mediating role in periodontal disease pathogenesis.

## DEATH

KLAMMT J LIFE ENDANGERING COMPLICATIONS OF ACUTE ODONTOGENOUS INFECTIONS IN THE ERA OF ANTIBIOTICS DTSCH GESUNDHEITSW (1969 SEP 4) 24(36):1695-8

MCCURDY JA JR MACINNIS EL HAYS LL FATAL MEDIASTINITIS AFTER A DENTAL INFECTION. J ORAL SURG (1977 SEP) 35(9):726-9

The pertinent features of life-threatening complications of dental infections have been briefly reviewed with particular emphasis on the alterations of the clinical features of these conditions induced by antibiotic therapy. The clinician who deals with dental infections must exercise a high index of suspicion to consistently abort the development of these complications, especially when treating debilitated patients or individuals with compromised immune functions.

HENDLER BH QUINN PD FATAL MEDIASTINITIS SECONDARY TO ODONTOGENIC INFECTION. J ORAL SURG (1978 APR) 36(4):308-10

A case of necrotizing mediastinitis that caused death in a 38-year-old man has been reported. The cause of his infection was proved, both radiographically and clinically, to be dental infection associated with the lower molars and their supporting structures. A diffuse cellulitis involving the submandibular, masticator, and parapharyngeal spaces ensued. Sudden onset of severe pleuritic chest pains and a 100% pneumothorax of the left lung developed, which ultimately led to his death.

GOTTE P DEATH AFTER A DENTAL INFECTION MINERVA STOMATOL (1979 JUL-SEP) 28(3):241-3

The pertinent features of life-threatening complications of dental infections have been briefly reviewed with particular emphasis on the alterations of the clinical features of these conditions induced by antibiotic therapy. The clinician who deals with dental infection must exercise a high index of suspicion to consistently abort the development of these complications, especially when treating debilitated patients or individuals with compromised immune functions.

GALLAGHER DM ERICKSON K HOLLIN SA FATAL BRAIN ABSCESS FOLLOWING PERIODONTAL THERAPY: A CASE REPORT. MT SINAI J MED (1981 MAR-APR) 48(2):158-60

LEE SH KIM JS KWACK DH JUNG Y A CASE REPORT OF ODONTOGENIC INFECTION LEADING TO FATAL MEDIASTINITIS TAEHAN CHIKKWA UISA HYOPHOE CHI (1989 MAR) 27(3):279-86

OCAMPO FLORES P LIMON MEJIA AL BUSTILLOS LUCAS J SILVA SANCHEZ V DEATH FROM GENERALIZED SEPSIS OF DENTAL ORIGIN. CONTRIBUTION TO CLINICAL CASUISTRY REV ADM (1991 JAN-FEB) 48(1):45-51

CURRIE WJ HO V AN UNEXPECTED DEATH ASSOCIATED WITH AN ACUTE DENTOALVEOLAR ABSCESS--REPORT OF A CASE. BR J ORAL MAXILLOFAC SURG (1993 OCT) 31(5):296-8

YOUNESSI OJ WALKER DM ELLIS P DWYER DE FATAL STAPHYLOCOCCUS AUREUS INFECTIVE ENDOCARDITIS: THE DENTAL IMPLICATIONS. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOL ENDOD (1998 FEB) 85(2):168-72

Infective endocarditis remains an important and life-threatening infection despite improvements in diagnosis and management. There is currently a greater role for nosocomial acquisition of organisms and immunosuppression in the pathogenesis of this disease and emergence of a broader spectrum of infective organisms including those not commonly isolated from the mouth such as staphylococci. We report a case of infective endocarditis caused by *Staphylococcus aureus* in which the patient developed disseminated intravascular coagulation and multiple septic infarcts resulting in a frontal lobe brain abscess. Multiple dental extractions were complicated by delayed postextraction hemorrhage and the immediate cause of death was abdominal hemorrhage. The dental management in infective endocarditis should be planned in consultation with the attending physician, and should take into account both the causative organism and the presence of complications. When the oral cavity cannot be proven as the bacterial source for infective endocarditis, the immediate dental management should be directed toward improving the patient's oral hygiene and providing pain relief. Definitive long-term treatment, including any extractions, is ideally delayed until the patient has fully recovered from the infective endocarditis and its attendant complications.

GREEN AW FLOWER EA NEW NE MORTALITY ASSOCIATED WITH ODONTOGENIC INFECTION!: BR DENT J (2001 MAY 26) 190(10):529-30

Odontogenic causes are the most common source for spreading maxillo-facial infections. These infections can develop into life threatening events. However a fatal outcome is fortunately rare and is generally associated with an immunocompromised status. This case report highlights a spreading maxillo-facial infection, which resulted in massive haemorrhage from the subclavian vein into the pleural cavity and subsequent death of a young fit male patient.

COUSIN GC POTENTIALLY FATAL ORO-FACIAL INFECTIONS: FIVE CAUTIONARY TALES. J R COLL SURG EDINB (2002 JUN) 47(3):585-6

Five cases of oro-facial infection leading to life-threatening complications are reported. Although all had been treated with antibiotics prior to maxillofacial referral, lack of surgical intervention had allowed progressive infection. The importance of resuscitation, supportive therapy, extraction of involved teeth to remove the source of infection and drainage of pus is emphasized

THEODOTOU N CILLO JE BRUGADA SYNDROME (SUDDEN UNEXPECTED DEATH SYNDROME): PERIOPERATIVE AND ANESTHETIC MANAGEMENT IN ORAL AND MAXILLOFACIAL SURGERY. J ORAL MAXILLOFAC SURG (2009 SEP) 67(9):2021-5

## CANCER

PLOHBERGER HM CANCER AND FOCAL INFECTION OSTERR Z STOMATOL (1974 APR) 71(4):138-41(PUBLISHED IN GERMAN)

RUBAN JM BRETON P COGNION M FREIDEL M A CONJUNCTIVAL TUMOR OF DENTAL ORIGIN. APROPOS OF A CASE REV STOMATOL CHIR MAXILLOFAC (1991) 92(4):262-4

JOSEF ISSELS MD CANCER A SECOND OPINION 1999 ISBN 0-89529-992-5 "ODONTOGENIC TOXINS WHEREVER THEY MAY HAVE BEEN PRODUCED, ARE ABLE TO DIFFUSE AND CIRCULATE WITHIN THE ORGANISM."

VENGAL M ARORA H GHOSH S PAI KM LARGE ERUPTING COMPLEX ODONTOMA: A CASE REPORT. J CAN DENT ASSOC (2007 MAR) 73(2):169-73

Odontomas are the most common odontogenic tumours. They are usually asymptomatic and are often discovered during routine radiography. We report a case of a large erupting complex odontoma that caused pain, infection and facial asymmetry. This case is significant as there are few reports of complex odontoma erupting in the oral cavity.

BRAJDIĆ D VIRAG M MANOJLOVIĆ S LUKSIĆ I FRANČESKI D BIOČIĆ J BOSAN-KILIBARDA I ZAJC I MACAN D MUCOEPIDERMOID CARCINOMA MISDIAGNOSED AS PALATAL ODONTOGENIC INFECTION: AN OVERVIEW ON THE DIFFERENTIAL DIAGNOSIS OF PALATAL LESIONS. COLL ANTROPOL (2010 DEC) 34(4):1473-9

Mucoepidermoid carcinoma (MEC) accounts for approximately 30% of malignant salivary gland tumors and approximately 30% occur in minor salivary glands. The palate is the most frequent localization for those arising in minor glands. A 33-year-old male patient with MEC of the hard palate was treated as an acute odontogenic infection, which was not cured after tooth endodontic treatments, repeated incisions and antibiotics. On the hard palate ovoid, a hard painless mass, which had not extended over the middle palatal line, was observed. Partial maxillectomy was performed. A review of the literature was performed in order to provide a coherent overview on the differential diagnosis of palatal lesions. To the best of authors' knowledge, this is the first report in English literature describing palatal MEC misdiagnosed and treated as odontogenic infection. Considering the extensive list of MEC's differential diagnoses on the hard palate, acute odontogenic infection can now be added to that list.

BIRGITTA SÖDER, MAHA YAKOB, JUKKA H MEURMAN, LEIF C ANDERSSON, PER-ÖSTEN SÖDER THE ASSOCIATION OF DENTAL PLAQUE WITH CANCER MORTALITY IN SWEDEN. A LONGITUDINAL STUDY BMJ OPEN 2012;2:E001083 DOI:10.1136/BMJOPEN-2012-001083

### **Abstract**

**Objectives** To study whether the amount of dental plaque, which indicates poor oral hygiene and is potential source of oral infections, associates with premature death from cancer.

### **Design Prospective cohort study.**

Participants 1390 randomly selected healthy young Swedes followed up from 1985 to 2009. All subjects underwent oral clinical examination and answered a questionnaire assessing background variables such as socioeconomic status and smoking.

Outcome measures Causes of death were recorded from national statistics and classified according to the WHO International Classification of Diseases. Unpaired t test,  $\chi^2$  tests and multiple logistic regressions were used.

Dr Issel's page about focal infection, demonstrates the connection to cancer causing agents and dead teeth. I consider it essential reading if we are to understand the extent of this association.  
<http://www.issels.com/publications/FocusOnFoci.aspx>

BIRGITTA SÖDER, MAHA YAKOB, JUKKA H MEURMAN, LEIF C ANDERSSON, PER-ÖSTEN SÖDER THE ASSOCIATION OF DENTAL PLAQUE WITH CANCER MORTALITY IN SWEDEN. A LONGITUDINAL STUDY  
 BMJ OPEN 2012;2:E001083 DOI:10.1136/BMJOPEN-2012-001083

**Results** Of the 1390 participants, 4.2% had died during the follow-up. Women had died at a mean age of 61.0 ( $\pm 2.6$  SD) years and men at the age of 60.2 ( $\pm 2.9$  SD) years. The amount of dental plaque between those who had died versus survived was statistically significant ( $p < 0.001$ ). In multiple logistic regression analysis, dental plaque appeared to be a significant independent predictor associated with 1.79 times the OR of death ( $p < 0.05$ ). Age increased the risk with an OR of 1.98 ( $p < 0.05$ ) and gender (men) with an OR of 1.91 ( $p < 0.05$ ). The malignancies were more widely scattered in men, while breast cancer was the most frequent cause of death in women.

**Conclusions** This study hypothesis was confirmed by showing that poor oral hygiene, as reflected in the amount of dental plaque, was associated with increased cancer mortality.

## CARDIAC

ROOT TE SILVA EA EDWARDS LD TOPP JH HEMOPHILUS APHROPHILUS ENDOCARDITIS WITH A PROBABLE PRIMARY DENTAL FOCUS OF INFECTION. CHEST (1981 JUL) 80(1):109-10

NORD CE, HEIMDAHL A. CARDIOVASCULAR INFECTIONS: BACTERIAL ENDOCARDITIS OF ORAL ORIGIN. PATHOGENESIS AND PROPHYLAXIS JOURNAL OF CLINICAL PERIODONTOLOGY 1990 AUGUST; VOLUME 17, NUMBER 7 PART 2, PP. 494-496.

The diagnosis infective endocarditis describes infection of the endocardial surface of the heart and indicates the presence of microorganisms in the lesion. In most cases, the heart valves are affected, but the disease can also occur on septal defects or on the mural endocardium. The disease has been classified as acute or subacute based on the progression of the untreated disease. The acute form has a fulminant course with high fever and leukocytosis with death in less than 6 weeks. It is most often associated with infections caused by *Staphylococcus aureus*, *Streptococcus pneumoniae* or *Streptococcus pyogenes*. The subacute (death within 6 weeks to 3 months) and chronic (death more than 3 months) forms are mostly described together. These forms usually occur in patients with prior valvular disease and are characterized by a slow, indolent course with low-grade fever, night sweats, and weight loss. This form is usually caused by the viridans streptococci. The above-mentioned classification does not include the nonbacterial forms of endocarditis and enterococci often give rise to a disease intermediate between acute and subacute endocarditis. It is preferable to have a classification based on the microorganism responsible since this classification has implications for the course followed and the appropriate antimicrobial agent to use. The clinical manifestations of the disease are so varied that they may be encountered in most medical subspecialties. Successful management is also dependent on the close cooperation of medical and dental disciplines.

LIEBERMAN MB A LIFE-THREATENING, SPONTANEOUS, PERIODONTITIS-INDUCED INFECTIVE ENDOCARDITIS. J CALIF DENT ASSOC (1992 SEP) 20(9):37-9

PAUNIO K IMPIVAARA O TIEKSO J MAKI J MISSING TEETH AND ISCHAEMIC HEART DISEASE IN MEN AGED 45-64 YEARS. EUR HEART J (1993 DEC) 14 SUPPL K:54-6

MATTILA KJ DENTAL INFECTIONS AS A RISK FACTOR FOR ACUTE MYOCARDIAL INFARCTION. EUR HEART J (1993 DEC) 14 SUPPL K:51-3

MATTILA KJ VALLE MS NIEMINEN MS VALTONEN VV HIETANIEMI KL DENTAL INFECTIONS AND CORONARY ATHEROSCLEROSIS. ATHEROSCLEROSIS (1993 NOV) 103(2):205-11

ASIKAINEN S ALALUUSUA S BACTERIOLOGY OF DENTAL INFECTIONS. EUR HEART J (1993 DEC) 14 SUPPL K:43-50

Oral bacteria may spread into the blood stream through ulcerated epithelium in diseased periodontal pockets and cause transient bacteraemias, which are regarded as increased risk, especially for immunocompromised patients or persons with endoprotheses.

MATTILA KJ. DENTAL INFECTIONS AS A RISK FACTOR FOR ACUTE MYOCARDIAL INFARCTION. EUROPEAN HEART JOURNAL 1993 DECEMBER; VOLUME 14, SUPPLEMENT K, PP. 51-53.

The so-called classic risk factors of coronary heart disease (CHD) do not explain all its clinical and epidemiological features. Recent evidence suggests that certain infections, among them dental infections, are involved in the pathogenesis of CHD. Case-control studies have revealed an association between dental infections and acute myocardial infarction and chronic coronary heart disease. A large epidemiological survey revealed an association between missing teeth and CHD and a recent 14-year follow-up of 9760 individuals showed that periodontitis is associated with an increased risk of coronary heart disease. Preliminary results suggest that the severity of dental infections correlates with the extent of coronary atheromatosis. Individuals with severe dental infections also have higher levels of von Willebrand factor antigen, leukocytes and fibrinogen. *Streptococcus sanguis* has been shown to aggregate human platelets *in vitro*. The mechanism behind the association between dental infections and CHD could be the effect of bacteria on the cells taking part in the pathogenesis of atherosclerosis and arterial thrombosis.

WHYMAN RA ET AL ORAL SURG ORAL MED ORAL PATHOL 1994 JUL;78(1):47-50 DENS IN DENTE ASSOCIATED WITH INFECTIVE ENDOCARDITIS AFTER DENTAL ABSCESS OF THE UL LATERAL INCISOR

LOESCHE WJ. PERIODONTAL DISEASE AS A RISK FACTOR FOR HEART DISEASE. COMPENDIUM 1994 AUGUST; VOLUME 15, NUMBER 8, PP. 976, 978-982, 985-986.

Many individuals with cardiovascular disease appear from epidemiologic studies to have either periodontal disease or to be edentulous. A Finnish group has provided evidence that after conventional risk factors for stroke and heart attacks have been accounted for, there still remain's a significant relationship between dental disease and cardiovascular disease. A preliminary analysis of our own investigation of the interrelationship of medical and dental health shows that individuals with a high dental morbidity (i.e., edentulous or with many missing teeth) have a high prevalence of coronary heart disease and stroke. A model based on how smoking can predispose to periodontal disease is used to explain how periodontal disease could be a potential risk factor for heart disease.

WAHL MJ CLINICAL ISSUES IN THE PREVENTION OF DENTAL-INDUCED ENDOCARDITIS AND PROSTHETIC JOINT INFECTION. PRACT PERIODONTICS AESTHET DENT (1995 AUG) 7(6):29-36; QUIZ 37

HERZBERG MC, MEYER MW. EFFECTS OF ORAL FLORA ON PLATELETS: POSSIBLE CONSEQUENCES IN CARDIOVASCULAR DISEASE. JOURNAL OF PERIODONTOLOGY 1996 OCTOBER; VOLUME 67, NUMBER 10, SUPPLEMENT, PP. 1138-1142.

During episodes of dental bacteremia, viridans group streptococci encounter platelets. Among these microorganisms, certain *Streptococcus sanguis* induce human and rabbit platelets to aggregate *in vitro*. In experimental rabbits, circulating streptococci induced platelets to aggregate, triggering the accumulation of platelets and fibrin into the heart valve vegetations of endocarditis. At necropsy, affected rabbit hearts showed ischemic areas. We therefore hypothesized that circulating *S. sanguis* might cause coronary thrombosis and signs of myocardial infarction (MI). Signs of MI were monitored in rabbits after infusion with platelet-aggregating doses of 4 to 40 x 10<sup>9</sup> cells of *S. sanguis* 133-79. Infusion resulted in dose-dependent changes in electrocardiograms, blood pressure, heart rate, and cardiac contractility. These changes were consistent with the occurrence of MI. Platelets isolated from hyperlipidemic rabbits showed an accelerated *in vitro* aggregation response to strain 133-79. Cultured from immunosuppressed children with septic shock and signs of disseminated intravascular coagulation, more than 60% of isolates of viridans streptococci induced platelet aggregation when tested *in vitro*. The data are consistent with a thrombogenic role for *S. sanguis* in human disease, contributing to the development of the vegetative lesion in infective endocarditis and a thrombotic mechanism to explain the additional contributed risk of periodontitis to MI.

DROZ D KOCH L LENAIN A MICHALSKI H BACTERIAL ENDOCARDITIS: RESULTS OF A SURVEY IN A CHILDREN'S HOSPITAL IN FRANCE. BR DENT J (1997 AUG 9) 183(3):101-5

OBJECTIVE: To identify and analyse the risk factors for infective endocarditis. DESIGN: Retrospective survey over a 12-year period. SETTING: Department of Paediatric Cardiology, Nancy, France. SUBJECTS: 43 children attending during 1970-1992 who were diagnosed with infective endocarditis in accordance with Von Reyn's classification. RESULTS: 45 episodes of infective endocarditis were recorded (2 children had 2 episodes). Congenital cardiac disease was the most frequent predisposing factor for infective endocarditis. The causes of bacteraemia found were frequently, but not exclusively, of dental origin (30.5%). Among the dental causes were: poor oral health, inappropriate treatments and lack of antibiotic prophylaxis. CONCLUSIONS: Children diagnosed with a cardiac disorder should be examined by a dentist. Modern principles of antibiotic therapy and accepted dental procedures must be performed as soon as possible and parents informed of the current preventive recommendations.

HERZBERG MC WEYER MW DENTAL PLAQUE, PLATELETS, AND CARDIOVASCULAR DISEASES. ANN PERIODONTOL (1998 JUL) 3(1):151-60

Cardiovascular diseases, including atherosclerosis and myocardial ischemia, occur as a result of a complex set of genetic and environmental factors. During periodontitis, dental plaque microorganisms may disseminate through the blood to infect the vascular endothelium and contribute to the occurrence of atherosclerosis and risk of myocardial ischemia and infarction. Myocardial ischemia and infarction are often preceded by acute thromboembolic events. In an *in vitro* model of thrombosis, certain dental plaque bacteria induce platelets to aggregate. Aggregation of platelets is induced by the platelet aggregation-associated protein [PAAP] expressed on plaque bacteria, including *Streptococcus sanguis* and *Porphyromonas gingivalis*. Intravenous infusion of *S. sanguis* into rabbits has been shown previously to cause changes in the electrocardiogram (ECG), heart rate, blood pressure, and cardiac contractility. These changes are consistent with the

occurrence of myocardial infarction. The ECG changes are now shown to begin within 30 seconds after infusion of PAAP+ *S. sanguis*, followed by alterations in blood pressure and respiratory rate. These changes occurred intermittently over a 30-minute period and changed within one heartbeat to a normal pattern and suddenly back to abnormal. Intermittent ECG abnormalities were seen in 13 of 15 rabbits, including left axis deviation, ST-segment depression, pre-ventricular contractions, alternans, and bigemina. Dose-dependent thrombocytopenia, accumulation of <sup>111</sup>Indium-labeled platelets in the lungs, and tachypnea also occurred. No changes occurred with the PAAP- strain. The data indicated that PAAP+ *S. sanguis* interacts with circulating platelets, inducing thromboemboli to cause the pulmonary and cardiac abnormalities. During periodontitis, therefore, PAAP+ *S. sanguis* and *P. gingivalis* bacteremia may contribute to the chance of acute thromboembolic events.

BECK JD OFFENBACHER S WILLIAMS R GIBBS P GARCIA R PERIODONTITIS: A RISK FACTOR FOR CORONARY HEART DISEASE? ANN PERIODONTOL (1998 JUL) 3(1):127-41

This paper evaluates the current information on the relationship between oral disease (specifically periodontitis) and atherosclerosis/coronary heart disease (CHD) to determine whether the information is sufficient to conclude that periodontitis is a risk factor for atherosclerosis/CHD. As background for this evaluation, the term "risk factor" is defined, and the 3 criteria used to establish exposures as risk factors are reviewed. In addition, epidemiologic criteria for defining an exposure as causal are presented. The available evidence then is evaluated according to the criteria for causality, which are extensions of the criteria for establishing a risk factor. This review is done in the context of the relationship between atherosclerosis/CHD and inflammation. A number of findings are briefly reviewed that link inflammation and atherosclerosis/CHD, such as: 1) prior flu-like symptoms were more common in cases of myocardial infarction than in concurrently sampled controls; 2) high levels of cytomegalovirus antibody titers were associated with elevated carotid intimal-medial wall thickness 18 years later; 3) prior infection with cytomegalovirus was a strong independent risk factor for restenosis after coronary atherectomy; 4) dental infections were more common in cases of cerebral infarction compared to community controls matched on age and sex; and 5) the gingival index was significantly correlated with fibrinogen and white cell counts in periodontal patients and controls, adjusted for age, smoking, and socioeconomic status. Three case-control studies and 5 longitudinal studies investigating the relationship between dental conditions and atherosclerosis/CHD are reviewed in terms of strength of associations, consistency of associations, specificity of associations, time sequence between exposure and outcome, and degree of exposure and outcome. Related to the last criterion, new findings are presented which indicate that the extent of the periodontal infection, a measure reflecting microbial burden, also is related to onset of new CHD events. Our previously published model describing the potential biological mechanisms underlying the associations found is reviewed. This model places the associations into a context of an intrinsic or acquired hyperinflammatory monocyte trait that results in a more intense inflammatory response to lipopolysaccharide (LPS) challenges, such as periodontal infections. This hyperinflammatory response may promote atheroma formation and thromboembolic events. Finally, new findings from ongoing animal studies are presented, indicating that high fat diets in atherosclerotic-susceptible mice induce greater inflammatory responses to *Porphyromonas gingivalis* challenges. We conclude that the available evidence does allow an interpretation of periodontitis being a risk factor for atherosclerosis/CHD. This conclusion, however, is made with some qualifications. While the associations found across a wide variety of subjects are remarkably consistent, for the most part they are represented by incidence odds ratios around 2.0. While this level of association would result in oral



conditions contributing to a large number of CHD cases, it is possible that associations of this magnitude are due to bias in the study designs. In addition, some studies report that periodontitis is associated with all-cause mortality and low birth weight infants. These multiple associations detract from the credibility of periodontitis as a risk factor, as specificity of association is more often related to causality. However, all-cause mortality may largely be driven by mortality from cardiovascular events: and some exposures, such as smoking, are indeed risk factors for multiple conditions. On the other hand, current findings regarding the associations between oral conditions and atherosclerosis/CHD imply that the criteria for causality may be met in the not-too-distant future.

**KINANE DF PERIODONTAL DISEASES' CONTRIBUTIONS TO CARDIOVASCULAR DISEASE: AN OVERVIEW OF POTENTIAL MECHANISMS. ANN PERIODONTOL (1998 JUL) 3(1):142-50**

Periodontitis and atherosclerosis have complex etiologies, genetic and gender predispositions, and potentially share many risk factors- the most significant of which may be smoking status. These diseases also have many pathogenic mechanisms in common. It is becoming increasingly clear that infections and chronic inflammatory conditions such as periodontitis may influence the atherosclerotic process. The severity and chronicity of periodontal disease provides a rich source of subgingival microbial and host response products and effects over a long time period. The objective of this review is to consider the mechanisms whereby diseases such as periodontitis, which is chronic and inflammatory in nature and initiated by microbial plaque, can predispose to atherosclerosis. In common with periodontal disease, the pathogenesis of atherosclerosis is not completely understood and both diseases are currently under intensive investigation. Two main processes in particular are worthy of consideration and may provide the link between these 2 diseases, namely the lipopolysaccharide-related responses and the hyperresponsive monocyte phenomenon. Insufficient experimental evidence exists, however, to further support these hypotheses at present and clearly more research is needed on both of these processes and the interrelationships between both diseases.

**SEYMOUR RA STEELE JG IS THERE A LINK BETWEEN PERIODONTAL DISEASE AND CORONARY HEART DISEASE? BR DENT J (1998 JAN 10) 184(1):33-8**

**OBJECTIVE:** To provide a critical review of the studies completed to date that have investigated a link between coronary heart disease and dental health. **DESIGN:** Retrospective analysis. **SETTING:** Mainly hospital-based patients or subjects involved in longitudinal health care studies. **MAIN OUTCOME MEASURES:** The incidence of coronary heart disease and its relationship to dental health and other recognised risk factors. **RESULTS:** Evidence suggests that dental health, in particular periodontal disease, may be a significant risk factor for coronary heart disease and further coronary events. Possible biological mechanisms that link the two diseases are appraised. **CONCLUSIONS:** There does appear to be increasing evidence that a relationship exists between dental health and coronary heart disease, especially in males aged 40-50 years. The presence of a hyperinflammatory monocyte phenotype may provide a common biological mechanism that links the two diseases.

**BECK JD, PANKOW J, TYROLER HA, OFFENBACHER S. DENTAL INFECTIONS AND ATHEROSCLEROSIS. AMERICAN HEART JOURNAL 1999 NOVEMBER; VOLUME 138, NUMBER 5 PT 2, PP. S528-S533**

In most countries, coronary heart disease is one of the leading causes of morbidity and death. This report reviews the current evidence indicating that oral conditions (specifically periodontitis) may be a risk factor for atherosclerosis and its clinical manifestations and provides new preliminary data. This review is done in the context of

the research indicating that inflammation plays a central role in atherogenesis and that there is a substantial systemic microbial and inflammatory burden associated with periodontal disease. Our review concentrates on 5 longitudinal studies that show oral conditions being associated with the onset of coronary heart disease while controlling for a variety of established coronary heart disease risk factors. In addition to published evidence, preliminary findings from our Dental Atherosclerosis Risk in Communities study also indicate that periodontal disease is associated with carotid intimal-medial wall thickness, a measure of subclinical atherosclerosis, adjusting for factors known to be associated with both conditions.

SCHWARTZ HC NGUYEN DC POSTANGINAL SEPTICAEMIA WITH EXTERNAL JUGULAR VENOUS THROMBOSIS: CASE REPORT. *BR J ORAL MAXILLOFAC SURG* (1999 APR) 37(2):144-6

Postanginal septicaemia is a syndrome of anaerobic septicaemia, septic thrombophlebitis of the internal jugular vein, and metastatic infections, that follows a localized infection in the area drained by the large cervical veins. The syndrome was well-known and often fatal in the preantibiotic era. It is now rather rare, presumably as a result of the almost routine use of prophylactic antibiotics. The symptoms are classic, and it should be suspected in any case where septicaemia and metastatic lesions are preceded by a head and neck infection. We report a case that is typical, except that branches of the external jugular vein were thrombosed. To our knowledge this has not been reported previously.

MEYER U WEINGART D DENG MC SCHELD HH JOOS U HEART TRANSPLANTS--ASSESSMENT OF DENTAL PROCEDURES. *CLIN ORAL INVESTIG* (1999 JUN) 99(2):79-83

The object of this study was to evaluate the effects of dental foci on survival rates and rejection episodes in heart transplant recipients. Therefore, in a retrospective longitudinal study we studied 74 heart transplant recipients at the Department of Maxillofacial Surgery and Department of Thoracic and Cardiovascular Surgery, University of Munster. Study patients were divided into groups: those in which dental foci had been verified (n = 31) and those without dental foci (n = 43). Statistical analysis was performed using the chi-square test, Kaplan-Meier life table analysis, and the log-rank test. Before heart transplantation, patients were screened clinically and radiographically to determine the extent of dental foci. Postoperatively, patients were evaluated dentally and medically to identify the impact of dental foci on the incidence of systemic and oral infections, frequency and severity of rejection episodes, mortality, and complications arising during dental treatment. By comparing the mortality, infection and rejection rates in the various groups no statistically significant differences ( $P > 0.05$ ) were found between patients. Despite immunosuppression, extended inflammatory processes such as abscess formation or viral stomatitis were not found in the oral cavity. We therefore suggest that patients suffering from the symptoms of severe heart failure need not be subjected to rigorous preoperative dental treatment.

Stein H Periodontal disease as a risk factor for cardiovascular disease and myocardial infarction. *Ont Dent* (1999 Jan-Feb) 76(1):16-20

HARASZTHY VI, ZAMBON JJ, TREVISAN M, ZEID M, GENCO IDENTIFICATION OF PERIODONTAL PATHOGENS IN ATHEROMATOUS PLAQUES. *JOURNAL OF PERIODONTOLOGY* 2000 OCTOBER; VOLUME 71, NUMBER 10, PP. 1554-1560.

Recent studies suggest that chronic infections including those associated with periodontitis increase the risk for coronary vascular disease (CVD) and stroke. We hypothesize that oral microorganisms including periodontal bacterial pathogens enter the blood stream during transient bacteremias where they may play a role in the

development and progression of atherosclerosis leading to CVD. **METHODS:** To test this hypothesis, 50 human specimens obtained during carotid endarterectomy were examined for the presence of *Chlamydia pneumoniae*, human cytomegalovirus, and bacterial 16S ribosomal RNA using specific oligonucleotide primers in polymerase chain reaction (PCR) assays. Approximately 100 ng of chromosomal DNA was extracted from each specimen and then amplified using standard conditions (30 cycles of 30 seconds at 95 degrees C, 30 seconds at 55 degrees C, and 30 seconds at 72 degrees C). Bacterial 16S rDNA was amplified using 2 synthetic oligonucleotide primers specific for eubacteria. The PCR product generated with the eubacterial primers was transferred to a charged nylon membrane and probed with digoxigenin-labeled synthetic oligonucleotides specific for *Actinobacillus actinomycetemcomitans*, *Bacteroides forsythus*, *Porphyromonas gingivalis*, and *Prevotella intermedia*. **RESULTS:** Eighty percent of the 50 endarterectomy specimens were positive in 1 or more of the PCR assays. Thirty-eight percent were positive for HCMV and 18% percent were positive for *C. pneumoniae*. PCR assays for bacterial 16S rDNA also indicated the presence of bacteria in 72% of the surgical specimens. Subsequent hybridization of the bacterial 16S rDNA positive specimens with species-specific oligonucleotide probes revealed that 44% of the 50 atheromas were positive for at least one of the target periodontal pathogens. Thirty percent of the surgical specimens were positive for *B. forsythus*, 26% were positive for *P. gingivalis*, 18% were positive for *A. actinomycetemcomitans*, and 14% were positive for *P. intermedia*. In the surgical specimens positive for periodontal pathogens, more than 1 species was most often detected. Thirteen (59%) of the 22 periodontal pathogen-positive surgical specimens were positive for 2 or more of the target species. **CONCLUSIONS:** Periodontal pathogens are present in atherosclerotic plaques where, like other infectious microorganisms such as *C. pneumoniae*, they may play a role in the development and progression of atherosclerosis leading to coronary vascular disease and other clinical sequelae.

BATE AL MA JK PITT FORD TR DETECTION OF BACTERIAL VIRULENCE GENES ASSOCIATED WITH INFECTIVE ENDOCARDITIS IN INFECTED ROOT CANALS. INT ENDOD J (2000 MAY) 33(3):194-203

**AIM:** The aim of this study was to examine whether bacteria associated with root canals possess genes that might predispose to bacterial colonization of the endocardium. **METHODOLOGY:** Oligonucleotides were designed from DNA sequences encoding the functional binding regions of streptococcal fibronectin-binding protein (FnBP) and staphylococcal fibrinogen-binding protein (FgBP). The specificity and cross-reactivity of the oligonucleotide primers were investigated; streptococcal primers were tested for recognition of FnBP genes in other strains of streptococci, and the staphylococcal primers for detection of FgBP from other staphylococci. Interspecies specificity of these primers was also investigated. In a pilot clinical study, the pulp chambers of 16 nonvital teeth without sinus tracts, were opened aseptically. Root canal samples were collected, along with samples from the gingival sulcus and anterior nares. From these samples DNA was extracted, subjected to polymerase chain reaction (PCR) and analysed by agarose gel electrophoresis. **RESULTS:** Using the streptococcal FnBP primers, PCR bands were amplified from eight root canal samples, eight gingival samples and three nasal samples. With the staphylococcal primers, PCR bands were amplified from seven root canals, 11 gingival and nine nasal samples. This study showed that PCR could be used to detect bacteria in root canals that possess genes with homology to functional regions of those encoding FnBP or FgBP. **CONCLUSIONS:** If bacteria in root canals possess FnBP or FgBP, they may have the potential to cause infective endocarditis.

KIECHL S, EGGER G, MAYR M, WIEDERMANN CJ, BONORA E, OBERHOLLENZER F, MUGGED M, XU Q, WICK G, POEWE W, WILLEIT CHRONIC INFECTIONS AND THE RISK OF CAROTID ATHEROSCLEROSIS: PROSPECTIVE RESULTS FROM A LARGE POPULATION STUDY. CIRCULATION 2001 FEBRUARY; VOLUME 103, NUMBER 8, PP. 1064-1070.

Chronic infections have been implicated in the pathogenesis of atherosclerosis, yet from an epidemiological perspective, this concept remains controversial. **METHODS AND RESULTS:** The Bruneck Study is a prospective population-based survey on the pathogenesis of atherosclerosis. In 826 men and women 40 to 79 years old (1990-baseline), 5-year changes in carotid atherosclerosis were thoroughly assessed by high-resolution duplex scanning. The presence of chronic respiratory, urinary tract, dental, and other infections was ascertained by standard diagnostic criteria. Chronic infections amplified the risk of atherosclerosis development in the carotid arteries. The association was most pronounced in subjects free of carotid atherosclerosis at baseline (age-/sex-adjusted odds ratio [95% CI] for any chronic infection versus none, 4.08 [2.42 to 6.85];  $P < 0.0001$ ) and applied to all types of chronic (bacterial) infections. It remained independently significant after adjustment for classic vascular risk attributes and extended to low-risk individuals free of conventional risk factors. Among subjects with chronic infections, atherosclerosis risk was highest in those with a prominent inflammatory response. Markers of systemic inflammation, such as soluble adhesion molecules and circulating bacterial endotoxin, and levels of soluble human heat-shock protein 60 and antibodies to mycobacterial heat-shock protein 65 were elevated in subjects with chronic infections and predictive of an increased risk of atherosclerosis. **CONCLUSIONS:** The present study provides solid evidence for a role of common chronic infections in human atherogenesis. Induction of systemic inflammation and autoimmunity may be potential pathophysiological links.

KOLLTVEIT KM ERIKSEN HM IS THE OBSERVED ASSOCIATION BETWEEN PERIODONTITIS AND ATHEROSCLEROSIS CAUSAL? EUR J ORAL SCI (2001 FEB) 109(1):2-7

Most of the documentation of possible causal links between periodontitis and atherosclerosis-related diseases appears indirect or circumstantial. There is, however, an increasing number of both experimental and longitudinal epidemiological studies which seem to support a causal relationship. A critical evaluation of the epidemiological data available might therefore be appropriate. The present study is based on a literature search using Ovid medical data base covering the period from 1989 to October 2000 and applying specific inclusion criteria. Based on a critical evaluation of the 14 investigations selected from a total of 21 retrieved from the search, a causal relationship between periodontitis and atherosclerosis-related diseases appeared possible. However, the nature both of periodontitis and atherosclerosis is multifactorial, and caution should be exercised when implicating periodontal disease in the causation of atherosclerotic disorders.

ROLA PRZEWLEKLYCH BAKTERYJNYCH ZAKAZEN ZKBOPOCHODNYCH W ETIOPATOGENEZIE CHOROBY NIEDOKRWIENNEJ SERCA. WIAD LEK (2002) 55 SUPPL 1(Pt 2):922-6

Chronic dental infections, even of low intensity, may cause the development of atherosclerotic changes in arteries, that lead to coronary heart disease. There are many risk factors for atherosclerosis, but the most important are endothelium function disturbances, platelets activation and oxidative changes of plasmatic lipoproteins. Among factors that can induce the epithelium lesions bacterial factor may play an important role. In consequence of the bacterial cell breakdown place the release of endotoxins takes, that lead directly to the damage of endothelial cells. Apart from this direct effect endotoxins activate the fagocytes releasing superoxide reactive radicals, that cause lesions of endothelium. Probably the most widespread chronic bacterial infections in human are the diseases of periodontium and teeth and their inflammatory complications. Oral cavity is colonized by 300-400 bacterial species. In the case of dental bacterial infections

bacteriemia occurs after such procedures as tooth extraction, endodontic treatment, therapeutic and hygienic interventions on periodontal tissues. The results of many investigations show the relationship between the oral status (dental and periodontal diseases as chronic oral infections) and disorders of cardiovascular system.

REEBYE N REEBYE U STROKE FOLLOWING DENTALLY-INDUCED SUBACUTE BACTERIAL ENDOCARDITIS. J MASS DENT SOC (2002 WINTER) 50(4):56-7

LAVELLE C IS PERIODONTAL DISEASE A RISK FACTOR FOR CORONARY ARTERY DISEASE (CAD)? J CAN DENT ASSOC (2002 MAR) 68(3):176-80

*Coronary artery disease (CAD) remains the principal cause of death in most developed countries, despite significant preventive and therapeutic advances. Current epidemiological data imply that recent reductions in the prevalence of this disease are unlikely to be sustained until those at high risk are more precisely targeted. Although dental (especially periodontal) infections have been recently identified as independent risk factors for CAD, current evidence is insufficient to justify treatment of such infections to arrest or reverse CAD or other systemic conditions (e.g., diabetes mellitus, stroke or adverse outcomes of pregnancies).*

LUND JP DREWS T HETZER R REICHART PA ORAL SURGICAL MANAGEMENT OF PATIENTS WITH MECHANICAL CIRCULATORY SUPPORT. INT J ORAL MAXILLOFAC SURG (2002 DEC) 31(6):629-33

After the introduction of mechanical circulatory support (MCS) for treatment of patients with severe cardiogenic shock, the survival rate of these patients increased significantly. Temporary MCS may be applied over a period of several days up to months prior to heart transplantation (HTx). Oral surgical management of patients with MCS is seriously complicated by a combination of anticoagulant and antiaggregant medication. Moreover, contact of blood with artificial surfaces, i.e. polyurethane and silicone, may increase the risk of thromboembolic events and infections. A total of 32 patients with MCS (29 men and three women with a median age 48 years [range 27-60 years]) were examined for odontogenic foci, treatment needs and local and cardiovascular complications after oral surgical intervention. In 27 patients (84%) at least one potential focus was diagnosed. Following tooth extraction 4 out of 6 patients presented with local haemorrhage (n=3) and thromboembolic events (n=2). Generally MCS has to be considered a relative contraindication for elective oral surgical interventions.

TOMAS CARMONA I LIMERES POSSE J DIZ DIOS P MELLA PEREZ C BACTERIAL ENDOCARDITIS OF ORAL ETIOLOGY IN AN ELDERLY POPULATION. ARCH GERONTOL GERIATR (2003 JAN-FEB) 36(1):49-55

The aim of this study was to analyze the prevalence and characteristics of bacterial endocarditis (BE) of oral origin in a group of elderly people. A retrospective study of 115 BE clinical records was performed, focusing on the demographic and predisposing features, as well as on the analytical and clinical variables. Twenty-two of the 115 cases were excluded as they were detected in intravenous drug users. Of the remaining 93 cases, 54.8% were diagnosed in patients older than 60 years of age (group A) and 45.2% in patients younger than 60 years (group B). There were 16 cases (17.2%) of oral origin; 4 BE cases mainly associated with tooth extractions were found in group A and 12 BE (most of them related with odontogenic abscesses) in group B. Within group A, 1 patient (25%) had not an underlying cardiac condition versus 5 cases (41.6%) in group B. Even though the prevalence of BE of oral origin in patients older than 60 is low, the high frequency of cardiopathies, poor oral health and high number of dental procedures shown by the old population makes them a risk group for BE of oral origin.

DAVE S BATISTA EL VAN DYKE TE CARDIOVASCULAR DISEASE AND PERIODONTAL DISEASES:

COMMONALITY AND CAUSATION. COMPEND CONTIN EDUC DENT (2004 JUL) 25(7 SUPPL 1):26-37

Periodontal diseases have long been recognized as a public health problem. Awareness of the destructive nature of periodontal diseases and the importance of a tight control of bacterial plaque are basic concepts of periodontal treatment. In the past decade, there has been a conceptual shift from periodontal diseases as an oral problem to periodontitis having an impact on systemic health. Recent evidence suggests a strong relationship between periodontal inflammatory disease and systemic diseases, such as cardiovascular disease. It is now generally accepted that inflammation plays an important role in atherosclerosis, and factors that systemically amplify inflammation are under close investigation. This article reviews some of the emerging concepts for the inflammatory mechanisms of periodontal diseases and atherosclerosis and examines the potential role of local inflammation in systemic inflammatory disease.

MEURMAN JH SANZ M JANKET SJ ORAL HEALTH, ATHEROSCLEROSIS, AND CARDIOVASCULAR DISEASE.

CRIT REV ORAL BIOL MED (2004) 15(6):403-13

During the last two decades, there has been an increasing interest in the impact of oral health on atherosclerosis and subsequent cardiovascular disease (CVD). The advent of the inflammation paradigm in coronary pathogenesis stimulated research in chronic infections caused by a variety of micro-organisms-such as *Chlamydia pneumoniae*, *Helicobacter pylori*, and cytomegalovirus-as well as dental pathogens, since these chronic infections are thought to be involved in the etiopathogenesis of CVD by releasing cytokines and other pro-inflammatory mediators (e.g., C-reactive protein [CRP], tumor necrosis factor [TNF-alpha]) that may initiate a cascade of biochemical reactions and cause endothelial damage and facilitate cholesterol plaque attachment. Yet, due to the multi-factorial nature of dental infection and CVD, confirming a causal association is difficult, and the published results are conflicting. The main deficit in the majority of these studies has been the inadequate control of numerous confounding factors, leading to an overestimation and the imprecise measurement of the predictor or overadjustment of the confounding variables, resulting in underestimation of the risks. A meta-analysis of prospective and retrospective follow-up studies has shown that periodontal disease may increase the risk of CVD by approximately 20% (95% confidence interval [CI], 1.08-1.32). Similarly, the reported risk ratio between periodontal disease and stroke is even stronger, varying from 2.85 (CI 1.78-4.56) to 1.74 (CI 1.08-2.81). The association between peripheral vascular disease and oral health parameters has been explored in only two studies, and the resultant relative risks among individuals with periodontitis were 1.41 (CI 1.12-1.77) and 2.27 (CI 1.32-3.90), respectively. Overall, it appears that periodontal disease may indeed contribute to the pathogenesis of cardiovascular disease, although the statistical effect size is small.

GORDON SC BARASCH A FOONG WC ELGENEIDY AK SAFFORD MM DOES DENTAL DISEASE HURT YOUR HEART? J CAN DENT ASSOC (2005 FEB) 71(2):93-5

*Recent research has yielded conflicting data regarding the relationship between dental disease, particularly periodontitis, and cardiovascular disease. A causative relationship would have major ramifications for health care. There is a plausible theoretical basis for such a link, as increased levels of inflammatory mediators may increase the risk of atherosclerotic plaque formation. Nevertheless, a clinical confirmation of a causative relationship has been difficult, in part because cardiovascular disease and periodontal disease share common risk factors such as increasing age and tobacco use, and because cardiovascular medications may increase the risk of periodontitis. Patients should be*

*encouraged to control documented risk factors for cardiovascular disease and to maintain oral health for its well-known health benefits.*

DEMMER RT DESVARIEUX M PERIODONTAL INFECTIONS AND CARDIOVASCULAR DISEASE: THE HEART OF THE MATTER. J AM DENT ASSOC (2006 OCT) 137 SUPPL:14S-20S; QUIZ 38S

BACKGROUND: Oral infection models have emerged as useful tools to study the hypothesis that infection is a cardiovascular disease (CVD) risk factor. Periodontal infections are a leading culprit, with studies reporting associations between periodontal disease and CVD. The results, however, have varied, and it often is unclear what conclusions can be drawn from these data. SUMMARY: An association exists between periodontal disease and CVD. It is unknown, however, whether this relationship is causal or coincidental. Early studies predominantly used nonspecific clinical and radiographic definitions of periodontal disease as surrogates for infectious exposure. While most studies demonstrated positive associations between periodontal disease and CVD, not all studies were positive, and substantial variations in results were evident. More recent studies have enhanced the specificity of infectious exposure definitions by measuring systemic antibodies to selected periodontal pathogens or by directly measuring and quantifying oral microbiota from subgingival dental plaque. Results from these studies have shown positive associations between periodontal disease and CVD. CONCLUSIONS: Evidence continues to support an association among periodontal infections, atherosclerosis and vascular disease. Ongoing observational and focused pilot intervention studies may inform the design of large-scale clinical intervention studies. Recommending periodontal treatment for the prevention of atherosclerotic CVD is not warranted based on scientific evidence. Periodontal treatment must be recommended on the basis of the value of its benefits for the oral health of patients, recognizing that patients are not healthy without good oral health. However, the emergence of periodontal infections as a potential risk factor for CVD is leading to a convergence in oral and medical care that can only benefit the patients and public health.

GOOLAMALI SI CARULLI MT DAVIES UM SPINAL ABSCESS AND MITRAL VALVE ENDOCARDITIS SECONDARY TO ASYMPTOMATIC FUSOBACTERIUM-INDUCED DENTAL ABSCESS. J R SOC MED (2006 JUL) 99(7):368-9

RUSTEMEYER J BREMERICH A NECESSITY OF SURGICAL DENTAL FOCI TREATMENT PRIOR TO ORGAN TRANSPLANTATION AND HEART VALVE REPLACEMENT. CLIN ORAL INVESTIG (2007 JUN) 11(2):171-4

Diagnosis and surgical treatment of septic foci (e.g., apical or marginal and profound periodontitis, cysts, unrestorable teeth, or abscesses) in patients awaiting organ transplants and heart valve replacement (HVR) have become a recommended, yet controversial standard procedure. This study aims to evaluate the numerical extent of the required oral surgical procedures removing septic foci in these patients. Data of 204 patients (115 males/89 females) of the Department of Oral- and Maxillofacial Surgery with an average age of 58 years were evaluated in terms of necessary oral surgical procedures before HVR or kidney (K), heart (H), or liver (L) transplant (T) and were compared with data from patients not undergoing transplantation or HVR, who were referred for other reasons such as oral surgery. The number of tooth extractions or apicoectomies per patient averaged two to five for each of the four patient groups (KT, 0-7 affected teeth; HT, 0-5; LT, 1-5; and HVR, 1-10). Treatment of periodontitis was necessary in 64% of patients. A total of 70% of patients required oral surgical procedures before HT, LT, and HVR, while 84% needed before KT. Removal of oral septic foci is necessary to avoid jeopardizing the success of transplantations. With regard to the surprisingly high need for surgical treatment in this patient population, assessment of these patients by the appropriate specialist and continuation with a follow-up program is still highly recommended.

DEPPE H AUER-BAHRS J KOLK A HALL D WAGENPFEIL S NEED FOR DENTAL TREATMENT FOLLOWING CARDIAC VALVE SURGERY: A CLINICAL STUDY. J CRANIOMAXILLOFAC SURG (2007 SEP-OCT) 35(6-7):293-301

**AIM:** The aim of the present study was to evaluate the long-term need for dental treatment following non-radical treatment modes prior to cardiac valve surgery. **PATIENTS:** From 1995 to 2001, a total of 305 patients were screened prior to cardiac surgery. After an average period of 36 months, 80 of these patients could be re-evaluated clinically (26%). Another 117 patients (38%) and their family doctors were contacted by telephone. **METHODS:** Dental evaluation prior to cardiac valve replacement was performed clinically and radiographically. Tooth extraction was recommended in cases of carious or periodontal destruction, root remnants, partial retention or apical osteolysis despite endodontic treatment with poor prognosis for apicectomy. Periodontal therapy was recommended if attachment loss was less than 1/2 of the root length. No measures were undertaken for endodontically treated teeth without apical osteolysis and impacted teeth. In October 2002, oral health was re-evaluated in 80 patients. Dental treatment carried out in the follow-up period was documented and compared with the current findings. **RESULTS:** At the time of re-evaluation, 60 of the total of 80 patients required dental treatment in 155 teeth; oral surgery was indicated in 51 of these 60 patients, mostly due to periodontal pathology. During the follow-up period, only 99 of the 142 dental interventions having taken place had been carried out with prophylactic antibiotic treatment. **CONCLUSION:** From the results of this study it may be concluded that non-radical dental treatment modes prior to cardiac valve replacement can only be successful over the long-term if adequate postoperative dental care is provided. To achieve this aim, common follow-up monitoring forms, similar to those used for care of cancer patients, could facilitate communication.

KRENNMAIR G AUER J KRAINHOFFNER M PIEHSLINGER E ODONTOGENIC INFECTION SOURCES IN PATIENTS SCHEDULED FOR CARDIAC VALVE REPLACEMENT. ORAL HEALTH PREV DENT (2007) 5(2):153-9

**PURPOSE:** Odontogenic infection sources represent a predisposing risk factor for patients with cardiac valvular disease (CVD) awaiting cardiac valve replacement procedures. **STUDY DESIGN:** The incidence and quality of odontogenic infection sources (foci) were evaluated on 152 consecutive patients (study group, SG) undergoing cardiac valve replacement and were compared to 150 age-, gender- and residence- matched non-cardiac patients (control group, CG). Clinical and radiographic examinations were used to evaluate the incidence of odontogenic infection sources, grouped into potential (high risk) and facultative foci (possible risk), and the presence/severity of periodontal disease (PD). Foci and PD were compared among the overall SG and the CG and also among a sophisticated subdivision of the study group, especially with respect to aortic valve (AVR) and mitral valve replacement (MVR). **RESULTS:** Overall, 218 potential and 116 facultative odontogenic foci were found in 87 (58.3%) and in 79 (51.9%) patients of the SG respectively. The overall incidence of odontogenic infection sources and the incidence and severity of PD did not differ between the SG and the CG. However, in comparison with the CG (48%), the incidence of potential odontogenic infection foci was significantly higher in patients scheduled for AVR than in those scheduled to undergo MVR (70.4% vs. 25.0%,  $p < 0.01$ ). Additionally, in patients scheduled for AVR, a significantly higher number ( $p < 0.01$ ) of individual potential odontogenic infection foci (1.7 vs. 0.8 foci/valve) and a higher prevalence of PD (60.2%) was seen than for patients scheduled for MVR (31.8%) or for patients without CVD (1.0 foci/valve; 39.3%;  $p < 0.05$ ). **DISCUSSION:** Although the overall incidence of odontogenic infection sources did not differ between the patients with and without CVD, a sophisticated subdivision of CVD may be crucial, demonstrating that patients with AVR differ significantly



from those with MVR and with the healthy CG. Cardiologists and cardiac surgeons play an important role in organising oral rehabilitation of patients scheduled for valve replacement

FORD PJ YAMAZAKI K SEYMOUR GJ CARDIOVASCULAR AND ORAL DISEASE INTERACTIONS: WHAT IS THE EVIDENCE? PRIM DENT CARE (2007 APR) 14(2):59-66

This paper reviews the evidence for the interaction of oral disease (more specifically, periodontal infections) with cardiovascular disease. Cardiovascular disease is a major cause of death worldwide, with atherosclerosis as the underlying aetiology in the vast majority of cases. The importance of the role of infection and inflammation in atherosclerosis is now widely accepted, and there has been increasing awareness that immune responses are central to atherogenesis. Chronic inflammatory periodontal diseases are among the most common chronic infections, and a number of studies have shown an association between periodontal disease and an increased risk of stroke and coronary heart disease. Although it is recognised that large-scale intervention studies are required, pathogenic mechanism studies are nevertheless required so as to establish the biological rationale. In this context, a number of hypotheses have been put forward; these include common susceptibility, inflammation via increased circulating cytokines and inflammatory mediators, direct infection of the blood vessels, and the possibility of cross-reactivity or molecular mimicry between bacterial and self-antigens. In this latter hypothesis, the progression of atherosclerosis can be explained in terms of the immune response to bacterial heat shock proteins (HSPs). Because the immune system may not be able to differentiate between self-HSP and bacterial HSP, an immune response generated by the host directed at pathogenic HSP may result in an autoimmune response to similar sequences in the host. Furthermore, endothelial cells express HSPs in atherosclerosis, and cross-reactive T cells exist in the arteries and peripheral blood of patients with atherosclerosis. Each of these hypotheses is reviewed in light of current research. It is concluded that although atherosclerotic cardiovascular disease is almost certainly a multifactorial disease, there is now strong evidence that infection and inflammation are important risk factors. As the oral cavity is one potential source of infection, it is wise to try to ensure that any oral disease is minimised. This may be of significant benefit to cardiovascular health and enables members of the oral health team to contribute to their patients' general health.

MARTOS R MARTON I CORRELATIONS BETWEEN DENTAL-ORAL INFECTIONS AND CARDIOVASCULAR DISEASE. J ORAL MAXIL SURG (2008 JUN) 66(6):101-5

The potential role of periodontal disease, gingivitis and other dental infections as a possible chronic source of infection and inflammation represents a continuous challenge to the host organism. The high number of oral pathogens, lipopolysaccharides and soluble mediators are related to the pathogenesis of local inflammation and the initiation of systemic inflammation process, which may impair systemic health. In the last decades, studies suggested that there could be a connection between the local oral infections and several systemic conditions such as diabetes, cardiovascular disease, low birth weight and chronic obstructive pulmonary disease. Cardiovascular disease is the number one cause of death in the last century. The primary contributing factor in the majority of cardiovascular diseases is atherosclerosis. The role of infection is believed to provide a critical inflammatory stimulus that contributes to atherogenesis. The present review is a short summary of studies of the last years about the possible pathogenic role of local oral infections as a contributing factor in the initiation and progression of cardiovascular disease.

Mathew B Francis G Deepa Suppurative odontogenic infection causing pyopericardium. Natl Med J India (2010 Nov-Dec) 23(6):374-5

MURRAY W. STINSON, SUSAN ALDER, SARMISHTHA KUMAR INVASION AND KILLING OF HUMAN ENDOTHELIAL CELLS BY VIRIDANS GROUP STREPTOCOCCI INFECT IMMUN. 2003 MAY; 71(5): 2365–2372.

Colonization of the cardiovascular endothelium by viridans group streptococci can result in infective endocarditis and possibly atherosclerosis; however, the mechanisms of pathogenesis are poorly understood. We investigated the ability of selected oral streptococci to infect monolayers of human umbilical vein endothelial cells (HUVEC) in 50% human plasma and to produce cytotoxicity. Planktonic *Streptococcus gordonii* CH1 killed HUVEC over a 5-h period by peroxidogenesis (alpha-hemolysin) and by acidogenesis but not by production of protein exotoxins. HUVEC were protected fully by addition of supplemental buffers and bovine liver catalase to the culture medium. Streptococci were also found to invade HUVEC by an endocytic mechanism that was dependent on polymerization of actin microfilaments and on a functional cytoskeleton, as indicated by inhibition with cytochalasin D and nocodazole. Electron microscopy revealed streptococci attached to HUVEC surfaces via numerous fibrillar structures and bacteria in membrane-encased cytoplasmic vacuoles. Following invasion by *S. gordonii* CH1, HUVEC monolayers showed 63% cell lysis over 4 h, releasing 64% of the total intracellular bacteria into the culture medium; however, the bacteria did not multiply during this time. The ability to invade HUVEC was exhibited by selected strains of *S. gordonii*, *S. sanguis*, *S. mutans*, *S. mitis*, and *S. oralis* but only weakly by *S. salivarius*. Comparison of isogenic pairs of *S. gordonii* revealed a requirement for several surface proteins for maximum host cell invasion: glucosyltransferase, the sialic acid-binding protein Hsa, and the hydrophobicity/coaggregation proteins CshA and CshB. Deletion of genes for the antigen I/II adhesins, SspA and SspB, did not affect invasion. We hypothesize that peroxidogenesis and invasion of the cardiovascular endothelium by viridans group streptococci are integral events in the pathogenesis of infective endocarditis and atherosclerosis.

Viridans group streptococci comprise a large proportion of the commensal bacteria that colonize oral surfaces. These bacteria frequently enter the bloodstream following trauma to oral tissues and can then adhere to surfaces of abnormal or previously damaged heart valves or become implanted in arterial atherosclerotic plaques. Streptococci growing on heart valve surfaces (causing infective endocarditis) become encased in a matrix of fibrin and platelets, which form macroscopic verrucous lesions and can lead to valve perforation, abnormalities in cardiac conduction, valve ring abscesses, pericarditis, aneurysm of the sinus of Valsalva, and release of peripheral emboli. Viridans group streptococci are the most common cause of native valve endocarditis in humans, accounting for 45 to 80% of cases. A variety of virulence factors have been implicated in the initial colonization of bacteria to cardiac valve surfaces, but those responsible for the ultimate destruction of underlying tissues are not well understood.

Experimental infective endocarditis in laboratory animals usually involves placement of an indwelling intracardiac catheter to cause endocardial damage that permits subsequent streptococcal colonization and infection; intravenous injection of bacteria in noncatheterized animals seldom results in cardiac infection. The requirement for the presence of a foreign body and the relatively large bacterial inoculum required for infection have raised concern about the relevance of these animal models to the natural disease in humans. In addition, animal models do not facilitate studies of the action of putative virulence factors during the early events in infection. Therefore, the present study was undertaken to define a simple, in vitro infection model using human endothelial cells and human plasma. In addition to the species relevance, the human model described here offers a much broader range of experimental conditions than do laboratory animals and allows for optimum quantification of experimental data during bacterial colonization, host cell invasion, and subsequent cell killing.

NAGATA E, DE TOLEDO A, OHO T. INVASION OF HUMAN AORTIC ENDOTHELIAL CELLS BY ORAL VIRIDANS GROUP STREPTOCOCCI AND INDUCTION OF INFLAMMATORY CYTOKINE PRODUCTION. *MOL ORAL MICROBIOL.* 2011 FEB;26(1):78-88.

Oral viridans group streptococci are the major commensal bacteria of the supragingival oral biofilm and have been detected in human atheromatous plaque. Atherosclerosis involves an ongoing inflammatory response, reportedly involving chronic infection caused by multiple pathogens. The aim of this study was to examine the invasion of human aortic endothelial cells (HAECs) by oral viridans group streptococci and the subsequent cytokine production by viable invaded HAECs. The invasion of HAECs by bacteria was examined using antibiotic protection assays and was visualized by confocal scanning laser microscopy. The inhibitory effects of catalase and cytochalasin D on the invasion of HAECs were also examined. The production of cytokines by invaded or infected HAECs was determined using enzyme-linked immunosorbent assays, and a real-time polymerase chain reaction method was used to evaluate the expression of cytokine messenger RNA. The oral streptococci tested were capable of invading HAECs. The number of invasive bacteria increased with the length of the co-culture period. After a certain co-culture period, some organisms were cytotoxic to the HAECs. Catalase and cytochalasin D inhibited the invasion of HAECs by the organism. HAECs invaded by *Streptococcus mutans* Xc, *Streptococcus gordonii* DL1 (Challis), *Streptococcus gordonii* ATCC 10558 and *Streptococcus salivarius* ATCC 13419 produced more cytokine(s) (interleukin-6, interleukin-8, monocyte chemoattractant protein-1) than non-invaded HAECs. The HAECs invaded by *S. mutans* Xc produced the largest amounts of cytokines, and the messenger RNA expression of cytokines by invaded HAECs increased markedly compared with that by non-invaded HAECs. These results suggest that oral streptococci may participate in the pathogenesis of atherosclerosis.

## LUDWIG'S ANGINA

SAADI C "LUDWIG'S ANGINA" (DIFFUSE AND GANGRENOUS IN INFLAMMATION OF THE FLOOR OF THE MOUTH HOSPITAL (RIO J) (1968 JUL) 74(1):213-9

MOUNIER-KUHN P GAILLARD J BERNARD P BOULUD B SEVERE LUDWIG'S ANGINA JFORL J FR OTORHINOLARYNGOL AUDIOPHONOL CHIR MAXILLOFAC (1972 APR) 21(4):349-50

STRAUSS HR TILGHMAN DM HANKINS J LUDWIG ANGINA, EMPYEMA, PULMONARY INFILTRATION, AND PERICARDITIS SECONDARY TO EXTRACTION OF A TOOTH. J ORAL SURG (1980 MAR) 38(3):223-9

IWU CO LUDWIG'S ANGINA: REPORT OF SEVEN CASES AND REVIEW OF CURRENT CONCEPTS IN MANAGEMENT. BR J ORAL MAXILLOFAC SURG (1990 JUN) 28(3):189-93

ESQUIVEL BONILLA D HUERTA AYALA S MOLINA MOGUEL JL REPORT OF 16 CASES OF LUDWIG'S ANGINA: 5-YEAR REVIEW PRACT ODONTOL (1991 APR) 12(4):23-4, 28

MERINO GALVEZ E GIL MELGAREJO JA HELLIN MESEGUER D PELEGRIN PELEGRIN F A CLASSIC CASE OF LUDWIG'S ANGINA UN CASO CLASICO DE ANGINA DE LUDWIG. AN OTORRINOLARINGOL IBERO AM (1991) 18(5):433-8

DUGAN MJ LAZOW SK BERGER JR THORACIC EMPYEMA RESULTING FROM DIRECT EXTENSION OF LUDWIG'S ANGINA: A CASE REPORT. J ORAL MAXILLOFAC SURG (1998 AUG) 56(8):968-71

DE BAST Y APPOLONI O FIRKET C CAPELLO M ROCMANS P VINCENT JL LUDWIG'S ANGINA REV MED BRUX (2000 JUN) 21(3):137-41

Ludwig's angina is a rare infectious condition originating in the oropharyngeal region, most commonly from the teeth. The principal symptoms consist of cervical pain, dyspnea, dysphagia, symmetrical neck swelling and fever. Serious complications include respiratory collapses, mediastinitis, pleural empyema, pericarditis and pericardial tamponade, and may result in the death of the patient. The most useful investigations in patients with suspected Ludwig's angina are clinical assessment, a cervico-thoracic CT-scan to determine the extent of the lesions, microbiological examination and panoramic radiography to detect possible dental focuses of infection. Treatment consists of ensuring adequate ventilation by securing the upper airways, broad spectrum antibiotic therapy, eradication of the source of infection, and often early surgical decompression may be necessary. Rapid diagnosis and appropriate treatment can reduce the mortality rate to 10%.

FURST IM ERSIL P CAMINITI M A RARE COMPLICATION OF TOOTH ABSCESS--LUDWIG'S ANGINA AND MEDIASTITIS. J CAN DENT ASSOC (2001 JUN) 67(6):324-7

Deep neck infections are a rare but potentially fatal complication of pulpal abscess of the teeth. If an infection can progress rapidly from a toothache to a life-threatening infection, then it is critical that dentists be able to recognize the danger signs and identify the patients who are at risk. This article reviews a case of a seemingly innocuous toothache which rapidly progressed to Ludwig's angina and mediastinitis, and discusses how to recognize and manage these life-threatening infections.

OCASIO-TASCON ME MARTINEZ M CEDENO A TORRES-PALACIOS A ALICEA E RODRIGUEZ-CINTRON W LUDWIG'S ANGINA: AN UNCOMMON CAUSE OF CHEST PAIN. SOUTH MED J (2005 MAY) 98(5):561-3

A 71-year-old male with coronary artery disease, hypertension, diabetes mellitus, tobacco and opioid dependence came to the emergency room complaining of one episode of retrosternal chest pain oppressive in nature of one day of evolution. He had acute respiratory distress and required mechanical ventilation. The initial impression was myocardial ischemia, but electrocardiography and cardiac enzymes ruled it out. During the following hours, neck and tongue edema developed. He was started on broad-spectrum antibiotics empirically. Neck computed tomography scan revealed a left parapharyngeal and submandibular abscess. The abscess was drained. The source of infection was found on the second molar of the left lower jaw. The patient improved and was successfully weaned from mechanical ventilation. Despite advances in therapy, Ludwig's angina remains a potentially lethal infection in which early recognition plays a crucial role.

PATEL M CHETTIAR TP WADEE AA ISOLATION OF STAPHYLOCOCCUS AUREUS AND BLACK-PIGMENTED BACTEROIDES INDICATE A HIGH RISK FOR THE DEVELOPMENT OF LUDWIG'S ANGINA. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOL ENDOD (2009 NOV) 108(5):667-72

OBJECTIVE: The aim of this study was to compare clinical, microbiological, enzymatic, and host immune response variables between subjects hospitalized with facial cellulitis, with Ludwig's angina (LA) and without Ludwig's angina (WOLA). STUDY DESIGN: Microbiological and enzymatic tests on pus, and hematological and immunological assessments on blood samples of 15 patients with LA and 42 patients with WOLA were performed. Laboratory findings of both groups were compared using the Student t test. Multiple logistic regression analysis was performed and significant differences identified by univariate analysis. RESULTS: Patients with LA demonstrated increased levels of white blood cell counts, urea, and CRP levels, and decreased levels of CIC compared with patients WOLA. However, only CRP and urea were found to be significantly raised in the LA group. A greater population of Staphylococcus aureus and black-pigmented bacteroides were isolated from

patients with LA. CONCLUSION: Elevated levels of CRP and urea could indicate the severity of infection in patients with LA. This could be because of the highly virulent and fast-spreading organisms, *S. aureus* and black-pigmented bacteroides, which may be a factor indicative of LA.

## BLOOD

FLEISCHHACKER H STACHER A ON THE EFFECT OF DENTAL FOCAL INFECTION ON THE COURSE OF HEMATOLOGIC DISEASES OSTERR Z STOMATOL (1969 JUN) 66(6):210-4

MADEIRA AA LOPES GV STUDY OF THE HEMATOLOGICAL CHANGES IN THIRTY PATIENTS WITH CHRONIC DENTAL INFECTION, BEFORE AND AFTER SURGICAL TREATMENT (AUTHOR'S transl) ARQ CENT ESTUD FAC ODONTOL UFMG (BELO HORIZ) (1976 JAN-DEC) 13(1-2):177-88

MARCULESCU A URSULEAC S PRALEA E ANGHEL I VASCULAR DISEASES OF THE POSTERIOR POLE CAUSED BY FOCAL INFECTIONS REV CHIR [OFTALMOL] (1978 OCT-DEC) 22(4):301-2

SHURIN SB SOCRANSKY SS SWEENEY E STOSSEL TP A NEUTROPHIL DISORDER INDUCED BY CAPNOCYTOPHAGA, A DENTAL MICRO-ORGANISM. N ENGL J MED (1979 OCT 18) 301(16):849-54

We recovered capnocytophaga, a gram-negative anaerobe implicated in the pathogenesis of periodontal disease, from two patients with a history of dental infections. Neutrophils from both patients failed to acquire the asymmetric shape characteristic of normal neutrophils. Fluorescein staining of the patients' living neutrophils remained diffuse and patchy instead of showing the normal pattern in which the fluorescence is swept into the rear of the cell. The locomotion of one patient's neutrophils in vitro was less than 50 per cent of that of normal neutrophils, and migration of this patient's neutrophils into dermal abrasions was reduced, although phagocytosis and nitroblue tetrazolium reduction were normal. All abnormalities of neutrophil morphology and function disappeared after eradication of the capnocytophaga infections. Sonicates and culture medium of capnocytophaga contained a dialyzable substance that caused normal neutrophils to behave like neutrophils obtained from the infected patients.

CARTER TB BLANKSTEIN KC WHITE RP JR SEVERE ODONTOGENIC INFECTION ASSOCIATED WITH DISSEMINATED INTRAVASCULAR COAGULATION. GEN DENT (1992 SEP-OCT) 40(5):428-31

SALGARELLI A MORANA G BELTRAMELLO A NOCINI PF PSEUDOANEURYSM OF THE LINGUAL ARTERY: A CASE REPORT. J ORAL MAXILLOFAC SURG (1997 AUG) 55(8):860-4

LACHARD J CREMIEU A JARS G GED S KAPLANSKI P 4 CASES OF OSLER'S DISEASE REV STOMATOL CHIR MAXILLOFAC (1970 JUL-AUG) 71(5):405-10

RUSKIN WJ FARNAD FA WOLF SM BILATERAL PROPTOSIS AND JUGULAR VEIN THROMBOSIS AFTER SUBMANDIBULAR ABSCESS. J ORAL MAXILLOFAC SURG (2009 MAR) 67(3):665-8

ALBILIA JB HUMBER CC CLOKIE CM SĂÎNDOR GK LEMIERRE SYNDROME FROM AN ODONTOGENIC SOURCE: A REVIEW FOR DENTISTS. J CAN DENT ASSOC (2010) 76:A47

Lemierre syndrome, which can result from a recent oropharyngeal or odontogenic infection, is characterized by clinical or radiographic signs of thrombosis of the internal jugular vein, distant infected emboli and the presence of anaerobic pathogens, usually

*Fusobacterium necrophorum*. The septic emboli resulting from the infected thrombophlebitis of the internal jugular vein give the syndrome its constellation of central nervous system, pulmonary and many other manifestations including septic shock. This condition was so rare that, historically, it became known as the "forgotten disease," but an increasing frequency of reports indicates that Lemierre syndrome may not be so uncommon.

## CHEST

SMITH RW TAYLOR RG O'CONNOR JF DENTAL INFECTION: A SOURCE OF PULMONARY EMBOLI. ORAL SURG ORAL MED ORAL PATHOL (1967 AUG) 24(2):158-63

MONCADA R WARPEHA R PICKLEMAN J SPAN M CARDOSO M BERKOW A WHITE H MEDIASTINITIS FROM ODONTOGENIC AND DEEP CERVICAL INFECTION. ANATOMIC PATHWAYS OF PROPAGATION. CHEST (1978 APR) 73(4):497-500

Potentially lethal consequences can quickly occur once the mediastinum is subjected to the ravages of an anaerobic infection. Mediastinitis from odontogenic or deep cervical infections is extremely rare in the era of antibiotic drugs. We have recently encountered five such cases, with a rapid spread of the inflammatory process into the mediastinum resulting in a number of local and systemic complications. All were caused by anaerobic bacteria. Awareness of such complications and early roentgenographic diagnosis lead to prompt surgical drainage, proper antibiotic therapy, and survival after a stormy clinical course. The anatomic pathways between the various fascial planes of the neck and mediastinum will be described.

MOLCHANOVA KA STEPANOVA TV CLINICAL PICTURE AND THERAPY OF ODONTOGENIC MEDIASTINITIS. KHIRURGIYA (MOSK) (1971 JAN) 47(1):79-83

GUITTARD P DUCASSE JL JORDA MF ESCHAPASSE H LARENG L MEDIASTINITIS CAUSED BY ODONTOGENIC ANAEROBIC BACTERIA. ANN FR ANESTH REANIM (1984) 3(3):216-8

ECONOMOPOULOS GC SCHERZER HH GRYBOSKI WA SUCCESSFUL MANAGEMENT OF MEDIASTINITIS, PLEURAL EMPYEMA, AND AORTOPULMONARY FISTULA FROM ODONTOGENIC INFECTION. ANN THORAC SURG (1983 FEB) 35(2):184-7

MUSGROVE BT MALDEN NJ MEDIASTINITIS AND PERICARDITIS CAUSED BY DENTAL INFECTION. BR J ORAL MAXILLOFAC SURG (1989 OCT) 27(5):423-8

ZACHARIADES N MEZITIS M STAVRINIDIS P KONSOLAKI-AGOURIDAKI E MEDIASTINITIS, THORACIC EMPYEMA, AND PERICARDITIS AS COMPLICATIONS OF A DENTAL ABSCESS: REPORT OF A CASE. J ORAL MAXILLOFAC SURG (1988 JUN) 46(6):493-5

COGAN IC NECROTIZING MEDIASTINITIS SECONDARY TO DESCENDING CERVICAL CELLULITIS. ORAL SURG ORAL MED ORAL PATHOL (1973 SEP) 36(3):307-20

SAZONOV AM MUROMSKII IUA PLOTNIKOV NA ZUBKOVA LF TROIANSKII IV ODONTOGENIC MEDIASTINITIS. GRUDN KHIR (1977 JUL-AUG)(4):82-6

RUBIN MM COZZI GM FATAL NECROTIZING MEDIASTITIS AS A COMPLICATION OF AN ODONTOGENIC INFECTION. J ORAL MAXILLOFAC SURG (1987 JUN) 45(6):529-33

LEVINE TM WURSTER CF KRESPI YP MEDIASTITIS OCCURRING AS A COMPLICATION OF ODONTOGENIC INFECTIONS. LARYNGOSCOPE (1986 JUL) 96(7):747-50

PIPERNO D GAUSSORGUES P LEGER P GERARD M BOYER F TIGAUD S PIGNAT JC ROBERT D MEDIASTITIS CAUSED BY ANAEROBIC BACTERIA. 4 CASES PRESSE MED (1987 NOV 14) 16(38):1889-90

TIMOSCA G GOGALNICEANU D BARNA M STREBA P VICOL C POPESCU E SUPPURATIVE CERVICO-MEDIASTITIS OF ODONTOGENIC ORIGIN REV CHIR ONCOL RADIOL O R L OFTALMOL STOMATOL SER STOMATOL (1989 OCT-DEC) 36(4):291-301

ESGAIB AS SILVA AC MEIRA EB KASSAB GE SALVESTRO E DE S DE SOUZA MM STEINBERG O LYRA R DE M GHEFTER M MEDIASTITIS FOLLOWING DENTAL INFECTION: REPORT OF 2 CASES REV PAUL MED (1986 SEP-OCT) 104(5):283-5

KRUCHINSKII GV KORSKAK AK MYSHKOVSKII VA RYNEISKII SP EXPERIENCE WITH THE DIAGNOSIS AND TREATMENT OF SECONDARY ODONTOGENIC MEDIASTITIS STOMATOLOGIJA (MOSK) (1989 NOV-DEC) 68(6):15-7

SCHEFFER P OUAZZANI A ESTEBAN J LERONDEAU JC SERIOUS CERVICOFACIAL INFECTIONS OF DENTAL ORIGIN INFECTIONS GRAVES CERVICO-FACIALES D'ORIGINE DENTAIRE. REV STOMATOL CHIR MAXILLOFAC (1989) 90(2):115-8

MOREY-MAS M CAUBET-BIAYNA J IRIARTE-ORTABE JI MEDIASTITIS AS A RARE COMPLICATION OF AN ODONTOGENIC INFECTION. REPORT OF A CASE. ACTA STOMATOL BELG (1996 SEP) 93(3):125-8

GARATEA-CRELGO J GAY-ESCODA C MEDIASTITIS FROM ODONTOGENIC INFECTION. REPORT OF THREE CASES AND REVIEW OF THE LITERATURE. INT J ORAL MAXILLOFAC SURG (1991 APR) 20(2):65-8

BONAPART IE STEVENS HP KERVER AJ RIETVELD AP RARE COMPLICATIONS OF AN ODONTOGENIC ABSCESS: MEDIASTITIS, THORACIC EMPYEMA AND CARDIAC TAMPONADE. J ORAL MAXILLOFAC SURG (1995 MAY) 53(5):610-3

ESGAIB AS GHEFTER MC LYRA R DE M GUIDUGLI RB TRAJANO AL FERREIRA SM MEDIASTITIS AFTER CERVICAL SUPPURATION. REV PAUL MED (1992 SEP-OCT) 110(5):227-36

ROBUSTOVA TG GUBIN MA KHARITONOV IUM GIRKO EI THE DIAGNOSIS AND TREATMENT OF CONTACT ODONTOGENIC MEDIASTITIS STOMATOLOGIJA (MOSK) (1996) 75(6):28-32

OGISO A TAMURA M MINEMURA T KURASHINA K KOTANI A MEDIASTITIS CAUSED BY ODONTOGENIC INFECTION ASSOCIATED WITH ADULT RESPIRATORY DISTRESS SYNDROME. ORAL SURG ORAL MED ORAL PATHOL (1992 JUL) 74(1):15-8

BAUMGARTNER FJ OMARI BO KLEIN SR APPROPRIATE EXPOSURE AND DRAINAGE FOR DESCENDING NECROTIZING MEDIASTITIS. ANN THORAC SURG (1997 SEP) 64(3):887-8

GARCIA-CONSUEGRA L JUNQUERA-GUTIERREZ L ALBERTOS-CASTRO JM LLORENTE-PENDAS S  
DESCENDING NECROTIZING MEDIASTITIS CAUSED BY ODONTOGENIC INFECTIONS. REV STOMATOL CHIR  
MAXILLOFAC (1998 Nov) 99(4):199-202

Intrathoracic dissemination of an odontogenic infection is very infrequent. The resulting clinical manifestation, known as descending necrotizing mediastinitis, causes high mortality. Due to the absence of early clinical or radiological signs, diagnosis is usually made only when the process is completely established. Treatment is a combination of intravenous antibiotics and mediastinal drainage, via either a cervical or a transthoracic approach. We report the clinical and microbiological characteristics of 4 patients with descending necrotizing mediastinitis, and their clinical course over a period of 10 years.

IYODA A YUSA T FUJISAWA T MABASHI T HIROSHIMA K OHWADA H DESCENDING NECROTIZING MEDIASTITIS: REPORT OF A CASE. SURG TODAY (1999) 29(11):1209-12

A 47-year-old man was admitted to our hospital for treatment of an odontogenic infection. He presented with a fever, signs of sepsis, and neck swelling, and was initially diagnosed as having a neck abscess. After cervical drainage, he showed no improvement, and mediastinitis was detected by chest X-ray and computed tomography. A thoracotomy and mediastinal drainage was subsequently performed for descending necrotizing mediastinitis, which resulted in marked improvement. To date, only 83 cases of descending necrotizing mediastinitis have been reported in Japan. We present herein an additional case, followed by a review of the Japanese literature.

TSUNODA R SUDA S FUKAYA T SAITO K DESCENDING NECROTIZING MEDIASTITIS CAUSED BY AN ODONTOGENIC INFECTION: A CASE REPORT. J ORAL MAXILLOFAC SURG (2000 FEB) 58(2):240-2

IZADI K LAZOW SK BERGER JR MEDIASTITIS SECONDARY TO AN ODONTOGENIC INFECTION. A CASE REPORT. N Y STATE DENT J (2003 DEC) 69(10):28-30

Infectious mediastinitis of odontogenic etiology is a rare occurrence in the United States. The mortality associated with descending necrotizing mediastinitis is estimated at 40% to 50%, even with advances made in management of such serious infections. The early diagnosis and aggressive treatment of odontogenic infections has made this entity relatively obsolete, but we have not been able to eliminate the disease process altogether. We report on a case that was managed successfully, albeit with a long, protracted course.

PINTO A SCAGLIONE M GIOVINE S LASSANDRO F GAGLIARDI N ROMANO L GRASSI R REGARDING THREE CASES OF DESCENDING NECROTIZING MEDIASTITIS: SPIRAL CT ASSESSMENT. RADIOL MED (2003 APR) 105(4):291-5

Descending necrotizing mediastinitis (DNM) is a rare and life-threatening complication of deep neck space infection which occurs when infection spreads from the deep spaces of the neck, propagating within the soft tissue into the mediastinal spaces. The disease has a high mortality rate due to frequent delay in diagnosis and treatment. Computed Tomography (CT) is important in determining the level of infection, showing the presence and extension of fluid collections (with or without gas bubbles) and diffuse soft-tissue infiltration of the mediastinal fat, and indicating the best surgical approach and progress of treatment. Three cases of DNM evaluated with spiral CT from June 1999 to June 2001 are presented.



BULUT M BALCI V AKKOSE S ARMAGAN E FATAL DESCENDING NECROTISING MEDIASTITIS. EMERG MED J (2004 JAN) 21(1):122-3

Descending necrotising mediastinitis rarely develops and this variety of mediastinitis is a highly lethal disease. A case is reported of descending necrotising mediastinitis caused by an odontogenic infection. The importance is emphasised of prompt diagnosis and aggressive surgical mediastinal drainage for the survival of these patients. Most acute mediastinal infections result from oesophageal perforation, either secondary to oesophagoscopy or tumour erosion. Mediastinitis occasionally develops as descending necrotising mediastinitis originating from the complications of cervical or odontogenic infections. Descending necrotising mediastinitis usually has a fulminant course, leading commonly to sepsis and death.

BIASOTTO M PELLIS T CADENARO M BEVILACQUA L BERLOT G DI LENARDA R ODONTOGENIC INFECTIONS AND DESCENDING NECROTISING MEDIASTITIS: CASE REPORT AND REVIEW OF THE LITERATURE. INT DENT J (2004 APR) 54(2):97-102

Descending necrotising mediastinitis is a rare complication secondary to oral surgery or odontogenic infections which ultimately spreads to the mediastinum through the anatomical cervical spaces. Delay in diagnosis, despite broad-spectrum antimicrobial therapy and extensive surgical intervention, results in an unacceptably high mortality rate (almost to 40%). A case study is presented as a rationale for a review of the current literature and to analyse the evolution in therapies, both medical and surgical from Pearse in 1938 to today.

BASA S ARSLAN A METIN M SAYAR A SAYAN MA MEDIASTITIS CAUSED BY AN INFECTED MANDIBULAR CYST. INT J ORAL MAXILLOFAC SURG (2004 SEP) 33(6):618-20

Descending necrotizing mediastinitis is a potentially fatal condition which may occur seldom as a consequence of oral infections. This report describes the management of a patient with mediastinitis due to an infected dentigerous cyst.

PAPPA H JONES DC MEDIASTITIS FROM ODONTOGENIC INFECTION. A CASE REPORT. BR DENT J (2005 MAY 14) 198(9):547-8

We report a case of mediastinitis complicating a dental infection in a 40-year-old male. Despite drainage of the localised neck abscess and the administration of systemic antibiotics, his submandibular abscess extended to involve the pericardial and pleural cavities. Drainage procedures and thoracotomies were required to treat the empyema and purulent pericarditis. Computed tomography was used to follow the progression of disease and assess the efficacy of treatment.

HO MW DHARIWAL DK CHANDRASEKHAR J PATTON DW SILVESTER KC SADIQ S EVANS RM USE OF INTERVENTIONAL RADIOLOGY IN THE MANAGEMENT OF MEDIASTITIS OF ODONTOGENIC ORIGIN. BR J ORAL MAXILLOFAC SURG (2006 DEC) 44(6):538-42

Descending necrotising mediastinitis is a rare complication of odontogenic infection. The key to diagnosis is to maintain a high index of suspicion when antibiotics and adequate surgical drainage do not lead to resolution of symptoms. Open thoracic operation to drain mediastinal collections is potentially lethal and interventional radiological techniques are thought to reduce mortality. We report the use of interventional radiology in the diagnosis, monitoring and treatment of this condition and illustrate our experience with three case reports.

ROCCIA F PECORARI GC OLIARO A PASSET E ROSSI P NADALIN J GARZINO-DEMO P BERRONE S  
TEN YEARS OF DESCENDING NECROTIZING MEDIASTITIS: MANAGEMENT OF 23 CASES. J ORAL  
MAXILLOFAC SURG (2007 SEP) 65(9):1716-24

PURPOSE: Through a 10-year retrospective study, we report our experience in the management of descending necrotizing mediastinitis (DNM), a rare and often lethal complication of odontogenic and oropharyngeal infections. PATIENTS AND METHODS: We reassessed 23 patients between the ages of 16 and 69 years (mean, 49 years) seen between 1996 and 2005, with DNM secondary to odontogenic abscess or phlegmon in 9 cases or secondary to peritonsillar abscess in 14 cases. In this study, 48% of the patients had immune system disorders, mainly diabetes mellitus (6 patients). The diagnosis of DNM was confirmed by cervicothoracic computed tomography. RESULTS: Eight patients underwent a bilateral collar cervicotomy, and 15 underwent a combined cervicothoracic approach. Five, 2, 1, and 1 patients underwent surgery 2, 3, 4, and 5 times, respectively. Seven patients died as a result of septic shock and multiorgan failure, for a mortality rate of 30.4%. Four of those who died had a compromised immune system. CONCLUSION: The relatively high mortality rate seen in this study shows that, in addition to early diagnosis and aggressive treatment, it is important to give greater attention to and be more medically and surgically aggressive in the management of patients whose immune system is compromised in any way.

MISTHOS P KATSARAGAKIS S KAKARIS S THEODOROU D SKOTTIS I DESCENDING NECROTIZING  
ANTERIOR MEDIASTITIS: ANALYSIS OF SURVIVAL AND SURGICAL TREATMENT MODALITIES. J ORAL  
MAXILLOFAC SURG (2007 APR) 65(4):635-9

PURPOSE: Descending necrotizing anterior mediastinitis (DNAM) is a severe infectious disease with a very high mortality rate. The aim of this study was to define the impact of several clinical factors on survival. PATIENTS AND METHODS: Between 1985 and 2002, 27 patients were managed for DNAM, 11 with combined transthoracic mediastinal and cervical drainage (group A) and 16 with a less aggressive surgical approach, such as cervical drainage and transcervical mediastinal drainage (group B). The records of all patients were statistically analyzed for the impact of several clinical factors on survival. RESULTS: Although patients in group A were admitted to the hospital faster, treated with antibiotics as outpatients earlier, and operated on much sooner after hospital admission compared with the patients in group B, multivariate analysis revealed that early combined transthoracic mediastinal and cervical debridement and drainage was the only favorable factor for survival in patients DNAM patients (odds ratio = 9.99; 95% confidence interval = 1.02 to 97.49). CONCLUSIONS: Less extensive surgical approaches (ie, thoracic drainage without cervical drainage or combined cervical and subxiphoid thoracic drainage) led to unsatisfactory results and high reoperation rates. In contrast, early, aggressive combined cervical and thoracic drainage proved to be an effective method for managing DNAM.

BIASOTTO M CHIANDUSSI S COSTANTINIDES F DI LENARDA R DESCENDING NECROTIZING MEDIASTITIS  
OF ODONTOGENIC ORIGIN. RECENT PAT ANTIINFECT DRUG DISCOV (2009 JUN) 4(2):143-50

Descending Necrotizing Mediastinitis is a rare complication that can be secondary to dental infections or surgical procedures involving the oral region. Despite a prompt pharmacological therapy and surgical intervention, a delayed diagnosis is still responsible for a too high mortality rate (about 40%). We present a review of the current literature on Descending Necrotizing Mediastinitis, focusing on the evolution of its management from Pearse to today. In particular, recent patents focused on novel compositions and methods

NOVAKOV IP SAFEV GP PEICHEVA SE DESCENDING NECROTIZING MEDIASTITIS OF ODONTOGENIC ORIGIN--PERSONAL EXPERIENCE AND LITERATURE REVIEW. FOLIA MED (PLOVDIV) (2010 JUL-SEP) 52(3):13-20

Descending necrotizing mediastinitis is the most severe form of mediastinal infection. The aim of the study was to present the optimal diagnostic and treatment approach to this severe, life-threatening condition. PATIENTS AND METHODS: Three patients (men, aged 75, 73, and 63) with descending necrotizing mediastinitis hospitalised between April 2007 and February 2009 have been included in the study. The diagnosis of the condition was made based on cervico-thoracic computed tomography and surgical findings. The surgical treatment in each of the cases included bilateral longitudinal cervicotomy, transversal suprasternal cervicotomy and posterior-lateral thoracotomy. RESULTS: The period between the initiation of ambulatory treatment of the dental infection and diagnosing the mediastinitis was 9, 8 and 11 days, respectively. Engagement of all cervical spaces and mediastinal sections with polybacterial (three or more agents) dental infection, originating from third and fourth lower molars was present in each of the patients. Chronic alcoholism and diabetes are factors influencing the course of mediastinitis. The outcome in all the three patients was lethal (within 72 hours). CONCLUSION: Success in the treatment of descending necrotic mediastinitis of odontogenic origin may be expected only in case of early diagnose and aggressive cervical and mediastinal drainage, performed by bilateral longitudinal cervicotomy and posterior-lateral thoracotomy.

YUVARAJ V KRISHNAN B ANTERIOR CHEST WALL ABSCESS--AN UNUSUAL COMPLICATION OF AN ODONTOGENIC INFECTION. ORAL MAXILLOFAC SURG (2010 DEC) 14(4):239-41

INTRODUCTION: A majority of odontogenic infections can be successfully managed with routine incision and drainage and empirical antibiotics. Sometimes an odontogenic infection may spread to contiguous spaces and descend along the neck causing significant morbidity and rarely even mortality. CASE REPORT: We report a case of an odontogenic infection which had an unusual spread to the anterior chest wall.

JUNCAR M POPA AR LUNG T ONIÅYOR F SEPTIC METASTASES OF SUPPURATION OF ODONTOGENIC ORIGIN CHIRURGIA (BUCUR) (2011 MAY-JUN) 106(3):359-64

The infections of odontogenic origin, set in the soft tissues region of the viscerocranium are among the most frequent conditions specific to this anatomical level. A distinct category among these, represented by the conditions with diffuse character, may have serious forms, developing systemic septic metastases. The current paper displays a study approaching seven cases of odontogenic diffuse infections with metastases at distance. The ways in which the septic metastases appeared, as well as the topic and general prescribed treatment have been analyzed. The expanding at distance of the suppuration occurred at those patients who were suffering from cervical necrotizing fasciitis associated to some immunodepressing conditions. Out of the 7 patients involved in the study, 4 were suffering from uncompensated diabetes and obesity. All those 7 patients had septic conditions localized in mediastinal region, and in 3 cases hepatic septic affections were observed. The best treatment possible for these conditions proved to be the surgical one associated with that concerned with the sustenance of the general state of health, the rebalancing of the homeostatic constants and the antibacterial one. The post-surgical evolution in case of 5 patients was a good one, in case of 2 patients being unfavourable because of the appearance of the multiorganic insufficiency and of death.

GONZÁLEZ-GARCÍA R RISCO-ROJAS R ROMÁN-ROMERO L MORENO-GARCÍA C LÁPEZ GARCÍA C DESCENDING NECROTIZING MEDIASTITIS FOLLOWING DENTAL EXTRACTION. RADIOLOGICAL FEATURES AND SURGICAL TREATMENT CONSIDERATIONS. J CRANIOMAXILLOFAC SURG (2011 JUL) 39(5):335-9

Descending necrotizing mediastinitis (DNM) following dental extraction is an extremely serious infection with a high mortality rate. Oral infection may rapidly descend into the mediastinum across the retropharyngeal and retrovisceral spaces. Once established, mediastinitis is rapidly followed by sepsis and death. If DNM is suspected cervical and thoracic CT must be carried out urgently. After this, prompt control of the upper airway with tracheostomy, aggressive surgical debridement of the deep cervical spaces and mediastinum, and intravenous broad spectrum antibiotic therapy are mandatory. The present paper reports two new cases of DNM following dental extraction, and focuses on radiological features of abscess progression through the cervical spaces down into the mediastinum.

## LUNGS

UNTEANU G SOLACOLU VI PROBLEMS CONCERNING THE ETIOPATHOGENESIS OF BRONCHOPULMONARY SUPPURATIONS PNEUMOTIZIOL (1976 JAN-MAR) 25(1-2):23-6

The data supplied by analysis of more than 1 000 patients pointed to the wide range of the causal factors, the role of focal infections of the upper respiratory and digestive tracts and the mechanisms that interfere in the determinism of the bronchopulmonary suppurative syndrome, the septic particles migrating as a rule along the bronchogenic route.

WEBSTER AC PARNELL AG THE MANAGEMENT OF RESPIRATORY OBSTRUCTION SECONDARY TO ODONTOGENIC INFECTION--CASE REPORT. CAN ANAESTH SOC J (1972 MAY) 19(3):299-304

LATRONICA RJ SHUKES R SEPTIC EMBOLI AND PULMONARY ABSCESS SECONDARY TO ODONTOGENIC INFECTION. J ORAL SURG (1973 NOV) 31(11):844-7

GONNON F PERRIN-FAYOLLE M INCIDENCE OF THE BUCCO-DENTAL INFECTIONS ON ACUTE AND CHRONIC BRONCHOPULMONARY INFECTIONS LIGAMENT (1978) 16(129):25-32

SIEGEL EB FRIEDLANDER AH MONGIARDO JJ KLEBSIELLA PNEUMONIA FACIAL FISTULA SECONDARY TO NON-VITAL TOOTH. A CASE REPORT. N Y STATE DENT J (1976 MAY) 42(5):291-2

LARIK ML VAN ZANTEN TE VAN DER WAAL I VAN DER KWAST WA LUNG DISEASE RESULTING FROM OSTEOMYELITIS OF THE MANDIBLE NED TIJDSCHR TANDHEELKD (1978 NOV) 85(11):428-30

TEREZHALMY GT BOTTOMLEY WK PULMONARY NOCARDIOSIS ASSOCIATED WITH PRIMARY NOCARDIAL INFECTION OF THE ORAL CAVITY. ORAL SURG ORAL MED ORAL PATHOL (1978 FEB) 45(2):200-6

A case of pulmonary nocardiosis associated with primary nocardial infection of the oral cavity in a compromised host is presented. *Nocardia asteroides*, an aerobic, gram-positive, branching, filamentous fungus, was demonstrated in the sputum and in pathologic specimens from gingival sulci stained by Gram's method and the acid-fast method Kinyoun. The organism was identified in cultures made on Sabouraud's glucose agar. Marked clinical improvement was noted when the patient received high dosage of sulfisoxazole diolamine (8 to 12 Gm. per day) for a prolonged period of time (9 to 12 months). Because of an apparent relative increase in the incidence of nocardiosis and a paucity of information on the subject in the dental literature, this article is timely.

SMITH RW TAYLOR RG O'CONNOR JF DENTAL INFECTION: A SOURCE OF PULMONARY EMBOLI. ORAL SURG ORAL MED ORAL PATHOL (1967 AUG) 24(2):158-63 1980-89

STEINER M GRAU MJ WILSON DL SNOW NJ ODONTOGENIC INFECTION LEADING TO CERVICAL EMPHYSEMA AND FATAL MEDIASTINITIS. J ORAL MAXILLOFAC SURG (1982 SEP) 40(9):600-4

MARCHAN CARRANZA E GIJON RODRIGUEZ J MANTES GERMAN I SEPTIC PULMONARY EMBOLISM SECONDARY TO DENTAL FOCUS. LEMIERRE'S SYNDROME? (LETTER; COMMENT) ARCH BRONCONEUMOL (1994 Nov) 30(9):473-4

SOBOLEWSKA E SKOKOWSKI J JADCZUK E PLEURAL EMPYEMA AS A COMPLICATION OF DESCENDING NECROTIZING MEDIASTINITIS PNEUMONOL ALERGOL POL (1997) 65(5-6):364-9

Fulminant infections of oropharyngeal origin may cause the most lethal form of mediastinitis due to extension of the infection along the neck fascial planes or by lymphatic way: descending necrotizing mediastinitis. Two cases of this rare life-threatening entity of odontogenic and tonsillar origin are reported. A pleural empyema and pericarditis as complications were observed. Bacteriologic etiology, possibilities of the early diagnosis and the aggressive treatment by means of a thoracotomy are discussed.

SAKAMOTO H AOKI T KISE Y WATANABE D SASAKI J DESCENDING NECROTIZING MEDIASTINITIS DUE TO ODONTOGENIC INFECTIONS. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOL ENDOD (2000 APR) 89(4):412-9

OBJECTIVE: Acute purulent mediastinitis caused by oropharyngeal infection is termed descending necrotizing mediastinitis. Such infections usually have a fulminate course, leading to sepsis and frequently to death. The purpose of this study is to show the importance of early diagnosis, aggressive surgical intervention, and optimal antibiotics chemotherapy in controlling this fatal infectious disease. STUDY DESIGN: Two patients with descending necrotizing mediastinitis due to odontogenic infection who were treated at our institution are described. RESULTS: Both patients survived. CONCLUSIONS: From the patients, 23 different aerobic and anaerobic bacteria were isolated. All of the isolates were susceptible to carbapenem. Early evaluation by means of cervicothoracic computed tomography scanning was extremely useful for diagnosis and surgical planning. Knowledge of anatomic pathways from the mouth to the mediastinum is essential. We believe that tracheostomy is not always necessary. In both of the cases presented, mediastinal drainage was completed through use of a transcervical approach. However, a more aggressive drainage including tracheostomy might be necessary when the infection extends below the carina.

MOJON P ORAL HEALTH AND RESPIRATORY INFECTION. J CAN DENT ASSOC (2002 JUN) 68(6):340-5

The oral cavity has long been considered a potential reservoir for respiratory pathogens. The mechanisms of infection could be aspiration into the lung of oral pathogens capable of causing pneumonia, colonization of dental plaque by respiratory pathogens followed by aspiration, or facilitation by periodontal pathogens of colonization of the upper airway by pulmonary pathogens. Several anaerobic bacteria from the periodontal pocket have been isolated from infected lungs. In elderly patients living in chronic care facilities, the colonization of dental plaque by pulmonary pathogens is frequent. Notably, the overreaction of the inflammatory process that leads to destruction of connective tissue is present in both periodontal disease and emphysema. This overreaction may explain the association between periodontal disease and chronic obstructive pulmonary disease, the fourth leading cause of death in the United States. These findings underline the necessity for improving oral hygiene among patients who are at risk and those living in long-term care institutions.

SHIOTA Y ARIKITA H HORITA N HIYAMA J ONO T OHKAWA S YAMAKIDO M SEPTIC PULMONARY EMBOLISM ASSOCIATED WITH PERIODONTAL DISEASE: REPORTS OF TWO CASES AND REVIEW OF THE LITERATURE. CHEST (2002 FEB) 121(2):652-4

We report two cases of septic pulmonary embolism associated with periodontitis. Chest CT revealed multiple nodular shadows with features characteristic of septic pulmonary embolism in both patients. Both patients had toothache, fever, and chest pain, and showed findings of periodontitis at initial presentation. Antimicrobial agents combined with dental surgery were successful in treatment. While septic pulmonary embolism from the lesions of periodontitis appears to be rare, periodontitis remains important in the differential diagnosis of septic pulmonary embolism.

RALLIS G PAPADAKIS D KOUMOURA F GAKIDIS I MIHOS P RARE COMPLICATIONS OF A DENTAL ABSCESS. GEN DENT (2006 JAN-FEB) 54(1):44-5

This article describes a case involving a poorly treated odontogenic infection, which was complicated by mediastinitis, thoracic empyema, pericarditis, and ascites. A posterolateral thoracotomy was necessary as incisional surgical drainage proved to be inadequate. A multidisciplinary approach of descending necrotizing mediastinitis and its complications is essential.

TERZIC A LUBBERS HT FRANZE T GRATZ KW WIDE-SPREAD SUBCUTANEOUS EMPHYSEMA AFTER THIRD MOLAR EXTRACTION. CASE REPORT SCHWEIZ MONATSSCHR ZAHNMED (2006) 116(8):823-9

Two days after wisdom teeth removal an eighteen-year-old man complained of a painful subcutaneous neck emphysema. CT scans showed that the air collections were expanding close to the mediastinum. A conservative intravenous medication with broadspectrum antibiotics was administered and within three days the symptoms resolved completely without any surgical intervention. Subcutaneous emphysema after dental treatment can develop into infectious, potentially lethal fasciitis and mediastinitis. Therefore it must be thoroughly examined and immediately operated on, if suspicious of an infection.

SEREFHANOGLU K BAYINDIR Y ERSOY Y ISIK K HACIEVLIYAGIL SS SEREFHANOGLU S SEPTIC PULMONARY EMBOLISM SECONDARY TO DENTAL FOCUS. QUINTESSENCE INT (2008 OCT) 39(9):753-6

A 24-year-old female was admitted to an infectious diseases unit with complaints of dyspnea and fever. She had suffered from multiple episodes of fever for 1 year. The diagnostic workup revealed multiple pulmonary nodules on the chest CT scan, suggesting septic pulmonary embolism, and a periapical abscess around the maxillary right central incisor. Because no other infectious source was found and resolution of the fever and the pulmonary lesions occurred only after extraction of the affected tooth and antibiotic therapy, the condition was diagnosed as a periapical abscess complicated by septic pulmonary embolism.

## TUBERCULOSIS

GAMBETTI G GELLI G ON A CASE OF TUBERCULOUS ADENOPATHY POSSIBLY OF PRIMARY ODONTOGENIC INFECTION MONDO ODONTOSTOMATOL (1966) 8(1):47-51

AVDONINA LI GEDYMIN LE EROKHIN VV INTRA-DENTAL ROUTE OF EXPERIMENTAL TUBERCULOSIS INFECTION PROBL TUBERK (1991)(10):79-83

## NECK

VIROLAINEN E HAAPANIEMI J AITASALO K SUONPAA J DEEP NECK INFECTIONS. INT J ORAL SURG (1979 DEC) 8(6):407-11

From January 1967 to August 1978, 65 patients with cervical abscesses were referred to the ENT Clinic of Turku University Hospital. The origin of these deep neck infections was odontogenic in 19, tonsillitis or tonsillectomy in 14, trauma in seven, salivary glands in five and branchiogenic cysts in five and other known causes in three cases. In 12 cases the origin was unknown. The cervical abscesses of odontogenic origin were located mostly in the submandibular space (11/19). The rest of the deep cervical infections were mostly found in the parapharyngeal space (25/46). Etiological factors and treatment of these severe infections are discussed.

VALDAZO A PERIPHARYNGEAL ABSCESES: VARIOUS OBSERVATIONS APROPOS OF 2 RECENT OBSERVATIONS REV LARYNGOL OTOL RHINOL (BORD) (1978 MAY-JUN) 99(5-6):361-8

BERTRAND JC COULY G PERET R ORO-PHARYNGEAL INFECTIONS DUE TO ANAEROBIC BACTERIA INFECTIONS ORO-PHARYNGEES A GERMES ANAEROBIES REV PRAT (1977 JAN 11) 27(3):155-61

ENGLISH WJ 2D KAISER AB LETHAL TOOTHACHE: PARAPHARYNGEAL CELLULITIS COMPLICATING DENTAL INFECTION. SOUTH MED J (1979 JUN) 72(6):687-9, 692

Three patients with parapharyngeal cellulitis arising from dental infection were seen by the Medical Service over a period of ten months. Respiratory distress and/or pharyngeal discomfort prompted all patients to seek medical aid. The extent of infection within the parapharyngeal space, the potential for life-threatening complications, and the significance of the dental lesions were not appreciated initially in all cases. Despite early antibiotic therapy, one patient died and one incurred severe neurologic sequelae. Early recognition, use of antibiotics effective against anaerobic bacteria, and prompt surgical drainage are mandatory to prevent considerable morbidity and mortality. Control of the airway is the most important therapeutic maneuver leading to a favorable outcome.

ANDRIUTSA VI KETRAR' GI KURIA VI ODONTOGENIC PERITONSILLAR ABSCESS COMPLICATED BY PARAPHARYNGEAL ABSCESS, THROMBOSIS OF THE INTERNAL JUGULAR VEIN AND CAVERNOUS SINUS, AND SEPSIS VESTN OTORINOLARINGOL (1977 MAY-JUN)(3):101-2

JANICKE S KETTNER R KUFFNER HD A POSSIBLE INFLAMMATORY REACTION IN A LATERAL NECK CYST (BRANCHIAL CYST) BECAUSE OF ODONTOGENIC INFECTION. INT J ORAL MAXILLOFAC SURG (1994 DEC) 23(6 Pt 1):369-71

COLMENERO RUIZ C LABAJO AD YANEZ VILAS I PANIAGUA J THORACIC COMPLICATIONS OF DEEPLY SITUATED SEROUS NECK INFECTIONS. J CRANIOMAXILLOFAC SURG (1993 MAR) 21(2):76-81

TASAR F TUMER C YULUG N BAYIK S CERVICOFACIAL ACTINOMYCOSIS (A CASE REPORT). J MARMARA UNIV DENT FAC (1994 SEP) 2(1):389-91

SAKAGUCHI M SATO S ISHIYAMA T KATSUNO S TAGUCHI K CHARACTERIZATION AND MANAGEMENT OF DEEP NECK INFECTIONS. INT J ORAL MAXILLOFAC SURG (1997 APR) 26(2):131-4

A retrospective review was conducted of 91 patients with deep neck infections to determine the pattern of clinical disease and formulate a management plan. The spaces

involved, as determined by clinical, radiologic, and operative findings, were the peritonsillar space (72 patients), parapharyngeal space (eight patients) submandibular space (seven patients), retropharyngeal space (one patient) superficial space (one patient), anterior visceral space (one patient), and visceral vascular space (one patient). Of the 19 patients who did not have a peritonsillar space infection the origin of the infection was found in eight; four of these were odontogenic. Thirty-eight patients required surgical drainage of the abscess. Five patients underwent tracheotomy due to increasing dyspnea. One patient with diabetes mellitus and a past history of myocardial infarction died of unknown cause. All other patients had an uneventful recovery without major complications. The combination of early radiologic diagnosis, effective antimicrobial therapy, and intensive surgical management contributed to the good prognosis.

SAKAMOTO H DEEP NECK INFECTION AND CERVICAL NECROTIZING FASCIITIS DUE TO ODONTOGENIC INFECTIONS RYOIKIBETSU SHOKOGUN SHIRIZU (1999)(25 Pt 3):360-2 (PUBLISHED IN JAPANESE)

HARDEE PG COGHLAN KM MISRA D STAPHYLOCOCCAL SUBMANDIBULAR LYMPHADENTITIS OF CHILDHOOD. J IR DENT ASSOC (2001) 47(3):83-5

The presentation of two patients with the condition is described. The difficulty of finding an underlying cause of the infection is discussed, and the importance of a history of recent head and neck infection emphasised. Recommendations are made for appropriate antibiotic therapy to cover Staphylococci as well as the more common Streptococci.

ABU EL-NAAJ I KRAUSZ A ARDEKIAN L PELED M PARAPHARYNGEAL AND PERITONSILLAR INFECTION FOLLOWING MANDIBULAR THIRD MOLAR EXTRACTION REFUAT HAPEH VEHASHINAYIM (2001 OCT) 18(3-4):35-9, 109-10

Numerous complications following impacted third molar extractions have been described previously. Among these are swelling, infection, subdermal hematomas, nerve injuries, injuries to adjacent teeth and mandibular fractures. The parapharyngeal space is a funnel-shaped space with its base located at the base of the skull and its apex near the hyoid bone. It is bounded medially by the superior constrictor muscle and the tonsillar fossa and laterally by the medial pterygoid muscle, the mandibular ramus, the deep lobe of the parotid gland and the posterior belly of the digastric muscle. The junction of the buccinator and superior constrictor muscles at the pterygomandibular raphe forms the anterior border. The posterior border is formed by the vertebral column and the prevertebral muscles. Infratemporal and peritonsillar space infections following third molar extractions are relatively rare because of anatomical barriers that exist in that area, but complications of such infections are considered to be highly severe and sometimes even life threatening. These complications include septic thrombophlebitis of the internal jugular vein, septic aneurysms of the internal carotid artery and mediastinitis. This article presents a parapharyngeal and peritonsillar space abscess resulting from a third molar extraction. Several articles reviewed in this paper revealed similar signs and symptoms in parapharyngeal abscesses. The main radiological finding was soft tissue swelling in the prevertebral area. Cultures have demonstrated *Klebsiella pneumoniae* as the dominant microorganism in these infections. Early identification and correct diagnosis of parapharyngeal and peritonsillar abscesses are necessary to avoid life-threatening complications that may accompany such infections. Airway control should receive top priority in treatment, followed by extensive surgical drainage and administration of high dose organism-specific antibiotics as well as removal of the source of infection.



ARIJI Y GOTOH M KIMURA Y NAITOH M KURITA K NATSUME N ARIJI E ODONTOGENIC INFECTION PATHWAY TO THE SUBMANDIBULAR SPACE: IMAGING ASSESSMENT. INT J ORAL MAXILLOFAC SURG (2002 APR) 31(2):165-9

The aims of this study were to determine the pathways of odontogenic infection spread into the submandibular space and their relationship to the clinical symptoms. Computerized tomography (CT) and magnetic resonance (MR) images of 33 patients with submandibular involvement were analyzed. The spread of infection was evaluated by lateral asymmetry of the shape and density of the fascial spaces and tissues, and by obliteration of the interfascial fat spaces. Imaging findings were classified into three types: in 19 patients (57.6%), infection spread through the mylohyoid muscle or sublingual space (type I). In five patients (15.2%), infection spread through the bony structures of the mandible with periosteal reaction or perforation of the cortical plate (type II) and was associated with relatively mild symptoms. In four patients (12.1%), infection spread from the masticatory space (type III). Seven of 11 patients with dysphagia or fever showed submandibular involvement spreading into the parapharyngeal space. CT and MR imaging clearly demonstrated different pathways of the spread of odontogenic infection into the submandibular space, which influenced the manifestation of clinical symptoms.

WHITE JM MACBEAN AD BENTLEY RP FULLER LC CASE 1. CERVICOFACIAL ACTINOMYCOSIS. CLIN EXP DERMATOL (2003 NOV) 28(6):681-2

THANOS L MYLONA S KALIORAS V POMONI M BATAKIS N POTENTIALLY LIFE-THREATENING NECK ABSCESES: THERAPEUTIC MANAGEMENT UNDER CT-GUIDED DRAINAGE. CARDIOVASC INTERVENT RADIOL (2005 MAR-APR) 28(2):196-9

PURPOSE: To evaluate the effectiveness of CT-guided drainage of potentially life-threatening neck abscesses. METHODS: Between September 2001 and December 2003, 15 patients presented to the emergency room with potentially life-threatening neck abscesses. Their clinical condition was critical due to the abscess size (larger than 3 cm in diameter; mean diameter 5.2 cm, SD 0.91 cm) and/or abscess location. A CT scan was carried out immediately to assess the lesion. At the same time, under CT guidance, an 8 Fr trocar-type pigtail catheter was inserted, in order to drain the abscess. The decision to drain percutaneously was based on a consensus between the surgical, infectious disease and radiology teams. The catheter was kept in place until drainage stopped, and a follow-up scan was performed. RESULTS: In 14 (93%) patients, the abscess was completely drained, and in 1 (7%) case the collection was still present because of multiple internal septation. That patient was treated by surgical management. The catheter was in place for a mean of 3 days (SD 0.96 day). CONCLUSION: Despite the fact that the number of our patients is small, CT-guided percutaneous drainage seems to be a fast, safe and highly effective low-cost method for the treatment of potentially life-threatening neck abscesses.

LAUTERMANN J LEHNERDT G BEIDERLINDEN M SUDHOFF H INFECTIONS OF THE DEEP NECK SPACES WITH ACCOMPANYING LARYNGORHINOOTOLOGIE (2005 MAR) 84(3):171-5

BACKGROUND: Infections of the deep neck spaces with accompanying mediastinitis are still a therapeutic problem with a high mortality. PATIENTS: We report on three patients with deep neck space infections and accompanying mediastinitis who have been treated in the Departments of Otorhinolaryngology at the Universities of Bochum and Essen in the past 2 years. In two patients the infection originated from a peritonsillar abscess and in one patient from an odontogenic infection. THERAPY: One patient was successfully treated by a tonsillectomy and drainage of the parapharyngeal abscess in conjunction with a thoracotomy because of a mediastinal abscess and bilateral pneumothorax. The second patient was cured by a tonsillectomy, wide cervical drainage und cervical mediastinotomy.

The third patient with pre-existent alcohol abuse died because of multiorgan failure despite wide cervical and mediastinal drainage. **CONCLUSION:** In every deep neck infection a mediastinal involvement has to be taken into account. Fast diagnosis and treatment are essential for the prognosis of this life-threatening disease.

BIRON A HALPERIN D SICHEL JY ELIASHAR R DEEP NECK ABSCESS OF DENTAL ORIGIN DRAINING THROUGH THE EXTERNAL EAR CANAL. *OTOLARYNGOL HEAD NECK SURG* (2005 JUL) 133(1):166-7

LOPPIN M ADAMSKI H LARREGUE M CADRE B GODEY B CHEVRANT-BRETON J CERVICOFACIAL ULCERATIONS CAUSED BY DENTAL INFECTION IN CHILDREN *ARCH PEDIATR* (2006 FEB) 13(2):149-51

In children, chronic cervicofacial ulceration related to dental infection is rare. Thus the diagnosis is often late and the treatment is consequently delayed. We report 2 new cases. **CASES REPORT:** A 13-year-old boy presented with a 1-year history of chronic and suppurative ulceration on the right cheek. Culture was positive for actinomycetes. In spite of a prolonged and miscellaneous antibiotherapy, the lesion recurred. The ulceration healed after the eradication of infection on a right superior molar. A 12-year-old girl presented with a right sub-mandibular ulceration, which appeared 3 months before. This lesion did not respond to penicillinotherapy given during 3 months. An infection on a right inferior molar was diagnosed on a tomodensitometry. 3 months after the tooth extraction, the ulceration healed without recurrence. **CONCLUSION:** These cases emphasize the interest to look for a dental infection at the origin of chronic cervicofacial lesion.

HUANG TT TSENG FY YEH TH HSU CJ CHEN YS FACTORS AFFECTING THE BACTERIOLOGY OF DEEP NECK INFECTION: A RETROSPECTIVE STUDY OF 128 PATIENTS. *ACTA OTOLARYNGOL* (2006 APR) 126(4):396-401

**CONCLUSIONS:** Broad-spectrum antibiotics are advocated for treating deep neck infection. Anaerobic coverage is necessary, especially in odontogenic cases. The presence of diabetes, infection of the parotid space and an obvious odontogenic source of infection can aid in determining the causative organisms. **OBJECTIVES:** This study aimed to analyze the bacteriology in deep neck infections and identify the factors that influenced the causative pathogens. **MATERIALS AND METHODS:** The records of 212 patients who were diagnosed as having deep neck infections at the National Taiwan University Hospital between 1997 and 2003 were reviewed; 128 patients with bacterial isolation from their pus cultures were enrolled. **RESULTS:** The cultures of 46 patients (35.9%) were polymicrobial. Viridans Streptococcus was the most commonly isolated organism (38.3%), followed by Klebsiella pneumoniae (32.0%) and Peptostreptococcus (17.2%). The most common organism in 44 diabetic patients was K. pneumoniae (54.5%), versus viridans streptococcus (48.8%) in 84 nondiabetic patients. In patients with dental sources of infections, the culture rate of anaerobes was 59.3%; in upper airway infections and other sources of infections they were 22.7% and 21.5%, respectively (Chi(2) test,  $p = 0.0008$ ). The differences in age, sex, and climate did not show any significant changes in the common causative pathogens. Common pathogens in the infection of parapharyngeal, submandibular, and extended spaces were the same as viridans streptococcus, but in the parotid space K. pneumoniae was the most common pathogen.

REGA AJ AZIZ SR ZICCARDI VB MICROBIOLOGY AND ANTIBIOTIC SENSITIVITIES OF HEAD AND NECK SPACE INFECTIONS OF ODONTOGENIC ORIGIN. *J ORAL MAXILLOFAC SURG* (2006 SEP) 64(9):1377-80

**PURPOSE:** The purpose of this study is to assess the anatomical spaces and causative microorganisms responsible for deep fascial space head and neck infections and evaluate the resistance of antibiotics used in the treatment of these infections. **PATIENTS AND METHODS:** A 6-year retrospective study evaluated hospital records of 103 patients. All

patients in this study underwent surgical incision and drainage, received IV antibiotics, and had culture and sensitivity performed. Patient demographics reviewed were gender, age, involved fascial space(s), micro-organisms identified and antibiotic resistance from culture and sensitivity testing. RESULTS: There were 56 male (54%) and 47 (46%) female patients. The submandibular space was the most frequent location for a single space abscess (30%), followed by the buccal space (27.5%) and the lateral pharyngeal space (12.5%). Sixty-three patients presented with multiple space involvement, totaling 142 spaces involved. A total of 269 bacterial strains were isolated from 103 patients. The bacteria were found to be 63.5% gram-positive. Gram-positive cocci were isolated 57.7% of specimens and gram-negative rods were isolated in 33% of cultures. There were 178 aerobes (65.7%) and 91 anaerobes (34.3%) isolated. The most common bacteria isolated were Viridans streptococci, Provetella, Staphylococci, and Peptostreptococcus. Culture and sensitivities were reviewed on 101 patients. CONCLUSION: Patients who underwent surgical incision and drainage in the operating room had a tendency for involvement of multiple space abscesses with the submandibular space, submental, and lateral pharyngeal spaces effected most frequently. Cultures and sensitivities commonly showed greater growth in aerobes (65.7%) than in anaerobes. Gram positive cocci and gram negative rods had the greatest growth percentage in cultures.

PINTO A SCAGLIONE M SCUDERI MG TORTORA G DANIELE S ROMANO L INFECTIONS OF THE NECK LEADING TO DESCENDING NECROTIZING MEDIASTITIS: ROLE OF MULTI-DETECTOR ROW COMPUTED TOMOGRAPHY. EUR J RADIOL (2008 MAR) 65(3):389-94

Descending necrotizing mediastinitis is an acute, polymicrobial infection of the mediastinum, originating from odontogenic, oropharyngeal and cervical infections. Anatomical continuity of the fascial spaces between the neck and the mediastinum leads to an occasional mediastinal extension of deep neck infection as a serious sequela. An understanding of the anatomy of the deep spaces of the neck and familiarity with the imaging findings in descending necrotizing mediastinitis may allow rapid diagnosis and treatment of this rare and life-threatening complication of deep neck space infection. In this article, we discuss the current role of radiology in diagnosing descending necrotizing mediastinitis, in determining the level of infection and the pathways of spread of infections from the neck to the mediastinum and in planning a successful treatment.

KINZER S PFEIFFER J BECKER S RIDDER GJ SEVERE DEEP NECK SPACE INFECTIONS AND MEDIASTITIS OF ODONTOGENIC ORIGIN: CLINICAL RELEVANCE AND IMPLICATIONS FOR DIAGNOSIS AND TREATMENT. ACTA OTOLARYNGOL (2009 JAN) 129(1):62-70

CONCLUSIONS: Early diagnosis and aggressive antimicrobial and surgical treatment are essential to successfully treat extensive cervico-mediastinal abscesses of odontogenic origin. Patient management should be performed by experienced clinicians well trained in managing possible complications. We recommend close clinical and radiological postoperative follow-up investigations with early surgical re-intervention if necessary. OBJECTIVES: While neck infections affecting the perimandibular space have a high prevalence and their clinical aspects have repeatedly been discussed, further spread of the inflammation and life-threatening situations have rarely been described. The objective was to determine clinical, diagnostic, and therapeutic aspects of severe neck infections of odontogenic origin. Emphasis was placed on grave descending deep neck space infections, sometimes resulting in mediastinitis as a life-threatening complication. PATIENTS AND METHODS: We reviewed 10 patients with severe odontogenic abscesses treated during an 8-year interval in a single center. RESULTS: The submandibular space was the most frequently encountered location of deep neck space infections. Mediastinitis was found in five patients. The most frequent causative bacteria were Streptococcus and Bacteroides

species. All patients underwent intravenous antibiotic treatment and surgical therapy. Mediastinotomy was inevitable in five cases and thoracotomy in one case. All patients survived.

CARTER LM LAYTON S CERVICOFACIAL INFECTION OF DENTAL ORIGIN PRESENTING TO MAXILLOFACIAL SURGERY UNITS IN THE UNITED KINGDOM: A NATIONAL AUDIT. BR DENT J (2009 JAN 24) 206(2):73-8

INTRODUCTION: Local studies have shown an increase in cervicofacial infections of dental origin presenting to oral and maxillofacial surgery units in the UK. A lack of access to National Health Service (NHS) primary care dental services has been implicated as a root cause. STUDY DESIGN: Cross-sectional national audit. Method Oral and maxillofacial surgery units in the UK were asked to report details of severe cervicofacial infection of dental origin presenting in October and November 2006. Data were collected regarding: patient demographics, referral source, management in primary care, management by maxillofacial surgery, and outcome. RESULTS: Two hundred and sixty-six episodes of cervicofacial infection of dental origin were reported during the audit period. At the time of presentation, 56.4% of patients were registered with a general dental practitioner (GDP). One hundred and forty (52.6%) patients sought treatment from primary care dental services for their episode of cervicofacial infection and only 20 patients were unsuccessful in obtaining treatment. Forty-seven percent of patients did not seek treatment from primary care dental services. Fifty percent of patients were referred by accident and emergency. Sixty-six percent of patients were prescribed oral antibiotics without operative intervention by primary dental care services. Eighty-one percent of patients required hospital admission and 46% of patients required a surgical procedure under general anaesthesia. Eighty-nine percent of patients made a full recovery and 3% recovered with complications. There were no deaths reported during the audit period. DISCUSSION: This audit provides a benchmark from which future comparisons can be made and by design cannot prove an increase in the presentation of cervicofacial infection of dental origin. Lack of access to NHS primary care dental services may be less significant than originally thought. A significant proportion of patients preferentially present to primary care medical services rather than dental services. Two thirds of patients treated by primary care dental services received oral antibiotics only which represents an inadequate level of treatment for odontogenic infection.

AL-HADAD I BURKE GA DOVER MS AN UNUSUAL PRESENTATION OF A TOOTH RELATED CERVICO-FACIAL ABSCESS. BR J ORAL MAXILLOFAC SURG (2009 APR) 47(3):253

METTLER S BRUNNER F LAMBRECHT JT CERVICOFACIAL ACTINOMYCOSIS: TWO CASE REPORTS SCHWEIZ MONATSSCHR ZAHNMED (2009) 119(3):239-51

Infectious diseases transmitted by actinomycosis species cause severe destructive lesions. This rare and specific infection is mainly found in the orofacial regions. Causes of any hard tissue swelling in the jaw have, thus, to be assessed carefully. When actinomycosis is identified, a surgical intervention with curettement, draining and long-term antibiotics is required. The aim of the current article is to describe two clinical cases and to show the necessity of both, microbiological and histological laboratory diagnostics, to hedge the clinic diagnosis.

ORFANOS JG QUERESHY FA CAUSES OF THE DIFFICULT AIRWAY. ATLAS ORAL MAXILLOFAC SURG CLIN NORTH AM (2010 MAR) 18(1):1-9

Recognizing a potentially difficult airway is important in avoiding a life-threatening emergency. There are 2 separate scenarios for considering the difficult airway: difficult mask ventilation (DMV) and difficult tracheal intubation (DTI). DMV can be described as

lacking the ability to maintain oxygen saturation or lacking the ability to reverse signs of inadequate ventilation with positive-pressure mask ventilation under general anesthesia. DTI remains constant among anesthesia-related patient injuries, and is the third most common respiratory-related episode leading to death and possible brain damage. It is important to preoperatively assess every patient by completing a full history and physical. A thorough history can provide clues in detecting a possible difficult airway. Airway impairment has been further subdivided into the anatomic regions that affect the airway, namely above the larynx, supraglottic, glottic, subglottic, and tracheobronchial. This article discusses the factors that can result in a difficult airway.

AL-QAMACHI LH AGA H McMAHON J LEANORD A HAMMERSLEY N MICROBIOLOGY OF ODONTOGENIC INFECTIONS IN DEEP NECK SPACES: A RETROSPECTIVE STUDY. BR J ORAL MAXILLOFAC SURG (2010 JAN) 48(1):37-9

The primary treatment of deep neck spaces odontogenic infection (DNSOI) with suppuration is surgery. Systemic antimicrobial therapy is an important adjunct. The initial prescription of antimicrobial therapy is empirical. Over the last decade we have observed a change in practice with the use of second-generation cephalosporins, in conjunction with metronidazole, replacing benzylpenicillin and metronidazole. More recently evidence has emerged suggesting that antimicrobial resistance in nosocomial infections could be related to the widespread use of second and third-generation cephalosporins. This study was therefore initiated to determine whether this change in prescribing was justified. A total of 75 cases were retrospectively identified by scrutiny of the operating theatre data. These patients presented with significant DNSOI that required surgical drainage. *Streptococcus milleri* and mixed anaerobes were predominant. Only in three cases (4%) there were penicillin-resistant microorganisms. The substitution of benzylpenicillin for cefuroxime as an initial empiric therapy for DNSOI seems likely to have been equally efficacious in the large majority of cases. On the other hand, studies in preference of cephalosporins are based on in vitro trials. A multi-centre randomized controlled clinical trial directly comparing initial empiric second-generation cephalosporin therapy with benzylpenicillin in non-allergic patients is justified.

POESCHL PW CREPAZ V RUSSMUELLER G SEEMANN R HIRSCHL AM EWERS R ENDODONTIC PATHOGENS CAUSING DEEP NECK SPACE INFECTIONS: CLINICAL IMPACT OF DIFFERENT SAMPLING TECHNIQUES AND ANTIBIOTIC SUSCEPTIBILITY. J ENDOD (2011 SEP) 37(9):1201-5

**INTRODUCTION:** The aims of the present study were to compare microbial populations in patients suffering from deep neck space abscesses caused by primary endodontic infections by sampling the infections with aspiration or swabbing techniques and to determine the susceptibility rates of the isolated bacteria to commonly used antibiotics. **METHODS:** A total of 89 patients with deep neck space abscesses caused by primary endodontic infections requiring extraoral incision and drainage under general anesthesia were included. Either aspiration or swabbing was used to sample microbial pus specimens. The culture of the microbial specimens and susceptibility testing were performed following standard procedures. **RESULTS:** A total of 142 strains were recovered from 76 patients. In 13 patients, no bacteria were found. The predominant bacteria observed were streptococci (36%), staphylococci (13%), *Prevotella* (8%), and *Peptostreptococcus* (6%). A statistically significant greater number of obligate anaerobes were found in the aspiration group. The majority of patients presented a mixed aerobic-anaerobic population of bacterial flora (62%). The antibiotic resistance rates for the predominant bacteria were 10% for penicillin G, 9% for amoxicillin, 0% for amoxicillin clavulanate, 24% for clindamycin, and 24% for erythromycin. **CONCLUSIONS:** The results of our study indicated that a greater number of anaerobes were found when sampling using the aspiration technique. Penicillin G and

aminopenicillins alone are not always sufficient for the treatment of severe deep neck space abscesses; beta-lactamase inhibitor combinations are more effective. Bacteria showed significant resistant rates to clindamycin. Thus, its single use in penicillin-allergic patients has to be carefully considered.

## OPHTHALMIC

CORDIER J VEXLER C WATRIN E BARISAIN P OCULAR INFLAMMATION OF DENTAL ORIGIN BULL SOC OPHTALMOL FR (1965 MAR) 65(3):221-2

HARRIS M DENTAL INFECTION AND THE EYES. R SOC HEALTH J (1966 MAR-APR) 86(2):79-81

BOYER R FOUREL J MARTIN R BARKAT A EYE MANIFESTATIONS OF DENTAL ORIGIN ACTUAL ODONTOSTOMATOL (PARIS) (1966 DEC) 76:455-68

HARRIS M DENTAL INFECTION AND THE EYES. DENT HEALTH (LONDON) (1966 JUL-SEP) 5(3):47-50

TAKAHASHI T A CASE OF RETROBULBAR NEURITIS WITH LONG-TERM REMISSION NIPPON GANKA KIYO (1967 FEB) 18(2):169-73

SZAK O BELAN J ENDOGENOUS UVEITIS IN 4-YEAR-MATERIAL OF THE EYE CLINIC IN BRATISLAVA CESK OFTALMOL (1967 MAY) 23(3):163-7

HARRIS M DENTAL INFECTION AND THE EYES. PAK DENT REV (1968 JUL) 18(3):107-11

FRANCOIS J VAN OYE R EYE DISEASES AND ODONTOLOGIC AFFECTIONS REV BELGE MED DENT (1968) 23(2):129-37

SOOFI MA THE TOOTH AND THE EYE. PAK DENT REV (1968 APR) 18(2):73-5

BERMANOWA G PIETROWA N LALEK A BUJALSKA H DENTAL FOCAL INFECTION IN EYE DISEASES (PRELIMINARY REPORT) CZAS STOMATOL (1969 OCT) 22(10):923-6

PAPAKONSTANTINO A PAPAKONSTANTINO P DENTAL FOCAL INFECTIONS AND OPTIC NEURITIS STOMATOL CHRON (ATHENAI) (1969 SEP-OCT) 13(5):185-91

KRUDYSZ J BARANOWA A RARE CASE OF OCULAR COMPLICATIONS OF DENTAL ORIGIN KLIN OCZNA (1970) 40(3):411-4

NIHO M 2 CASES OF RHINOGENIC RETROBULBAR OPTIC NEURITIS AND A CASE OF ODONTOGENIC RETROBULBAR OPTIC NEURITIS WITH ABDUCENT PALSY NIPPON JIBIINKOKA GAKKAI KAIHO (1972 JUL) 75(7):783-99

NEMETZ U OPHTHALMOLOGY AND FOCAL INFECTIONS OSTERR Z STOMATOL (1974 NOV) 71(11):414-5

SELA M SHARAV Y THE DENTAL FOCAL INFECTION AS AN ORIGIN FOR UVEITIS. ISR J DENT MED (1975 JAN) 24:31-5

RUBIN ET AL ORAL SURG 1976 VOL 41 NO 1 ABSCESS INVOLVING THE LEFT EYE THAT ORIGINATED AS A DENTAL ABSCESS

ZOLTAN N GYULA M ODONTOGENIC ORBITAL PHLEGMON ORV HETIL (1976 DEC 5) 117(49):2995-6

ROUSSELIE F EYE INFECTIONS OF DENTAL ORIGIN LIGAMENT (1978) 16(129):15-7

YATES C MONKS A ORBITAL CELLULITIS COMPLICATING THE EXTRACTION OF INFECTED TEETH. J DENT (1978 SEP) 6(3):229-32

MAY DR PEYMAN GA RAICHAND M FRIEDMAN E METASTATIC PEPTOSTREPTOCOCCUS INTERMEDIUS ENDOPHTHALMITIS AFTER A DENTAL PROCEDURE. AM J OPHTHALMOL (1978 MAY) 85(5 PT 1):662-5

A 46-year-old man developed symptoms of a chronic progressive uveitis in his right eye approximately one week after a dental procedure. The patient's intraocular inflammation was not diminished by massive treatment with topical and systemic corticosteroid therapy or intravenously administered adrenocorticotrophic hormone. The inflammatory process progressed to an overt endophthalmitis during a period of three weeks and the eye eventually required evisceration. A pure culture of *Peptostreptococcus intermedius* was isolated from the eye. The most likely source of this organism was hematologic transport following a dental procedure.

MURPHY NC MAHAR PJ FAIR R UVEITIS AND ITS RELATION TO PERIAPICAL-PERIODONTAL INFECTION. OHIO DENT J (1979 SEP) 53(9):24-5

STONE A STRAITIGOS GT MANDIBULAR ODONTOGENIC INFECTION WITH SERIOUS COMPLICATIONS. ORAL SURG ORAL MED ORAL PATHOL (1979 MAY) 47(5):395-400

Orbital cellulitis usually begins as an infection of the paranasal sinuses. While a small percentage of cases are of dental origin, these usually involve the maxillary teeth. In the case reported here orbital cellulitis originated from an infection in the mandible and spread through the paranasal sinuses, deep facial circulation, and orbital tissues, resulting in unilateral blindness. Principles of management and possible pathways for the spread of the infection are discussed.

ARTIS JP ARTIS M BOWYER M DURIVAUX S ON UVEITIS OF DENTAL ORIGIN. ON 200 CASES INF DENT (1979 FEB 1) 61(5):325-30

STONE A STRAITIGOS GT MANDIBULAR ODONTOGENIC INFECTION WITH SERIOUS COMPLICATIONS. ORAL SURG ORAL MED ORAL PATHOL (1979 MAY) 47(5):395-400

Orbital cellulitis usually begins as an infection of the paranasal sinuses. While a small percentage of cases are of dental origin, these usually involve the maxillary teeth. In the case reported here orbital cellulitis originated from an infection in the mandible and spread through the paranasal sinuses, deep facial circulation, and orbital tissues, resulting in unilateral blindness. Principles of management and possible pathways for the spread of the infection are discussed.

STEFANIU A CZAUSESCU V POPESCU N ROMASCANU G CEAUSESCU A ORBITO-OCULAR AND MENINGOENCEPHALIC COMPLICATIONS IN ODONTOGENIC MAXILLARY SINUSITIS REV CHIR ONCOL RADIOL O R L OFTALMOL STOMATOL OTORINOLARINGOL (1982 JAN-MAR) 27(1):59-64

BOCCA M ZOMBOLO L COSCIA D MONIACI D THE CORRELATION BETWEEN DENTAL PATHOLOGY AND OPHTHALMIC PATHOLOGY MINERVA STOMATOL (1989 OCT) 38(10):1117-20

ROSCA T MINCU G SARAFOLEANU C SARAFOLEANU D CIPRUT T AN EXTENSIVE LEFT SUBPERIOSTEAL FRONTOTEMPORAL ORBITAL ABSCESS AND LEFT SUPPURATIVE PANSINUSITIS WITH AN ODONTOGENIC ORIGIN OFTALMOLOGIA (1999) 48(3):67-71

NGEOW WC ORBITAL CELLULITIS AS A SOLE SYMPTOM OF ODONTOGENIC INFECTION. SINGAPORE MED J (1999 FEB) 40(2):101-3

A case of periapical infection resulting in unilateral maxillary sinusitis and cellulitis of the ipsilateral lower eyelid is presented. The sole symptom was right orbital swelling. The possible pathway for the spread of this type of infection predisposing factors and possible complications are reviewed. The value of radiographic examination and antibiotic therapy are also discussed.

ROSEN D ARDEKIAN L ABU EL-NAAJ I FISCHER D PELED M LAUFER D ORBITAL INFECTION ARISING FROM A PRIMARY TOOTH: A CASE REPORT. INT J PAEDIATR DENT (2000 SEP) 10(3):237-9

Odontogenic infections may spread to the orbit by one or more of several paths. Such extension is potentially dangerous and may lead to loss of vision. A case of infection from a primary tooth, which extended to the retrobulbar area is presented in this report. Treatment included surgical drainage of the resulting subperiosteal orbital abscess through a Caldwell-Luc approach as well as aggressive antibiotic therapy. The importance of early suspicion of this entity and its potential sequelae are discussed.

POON TL LEE WY HO WS PANG KY WONG CK ODONTOGENIC SUBPERIOSTEAL ABSCESS OF ORBIT: A CASE REPORT. J CLIN NEUROSCI (2001 SEP) 8(5):469-71

Subperiosteal abscess of orbit is an uncommon but serious complication of orbital infection. We report a case of a 78 year old gentleman who presented with bilateral periorbital oedema and proptosis. Computerised tomography of orbit revealed bilateral dilated superior ophthalmic veins. Bilateral carotid-cavernous fistula was initially suspected. Serial imaging showed an increasing bilateral subperiosteal lesion of the orbit. Fine needle aspiration confirmed subperiosteal abscess. A high level of awareness is necessary in diagnosing subperiosteal abscess.

IGNAT F BARASCU D MOCANU C CALARASU C INFLAMMATORY OCULAR DISEASES ASSOCIATED WITH ORO-DENTAL PATHOLOGY OFTALMOLOGIA (2001) 52(2):67-71

PAPER AIM: It is presented the correlation between the uveitis and the focal dental disease with infection, irritation or allergic pathogenicity. MATERIAL AND METHOD: This study was performed on a set of 54 patients with uveitis and dental diseases patients hospitalized in the Clinic of Ophthalmology of Craiova, during 1998-1999. This correlation was observed in 38-40% of uveitis. There were also mentioned some dental damages associated with uveitis: radicular focal infections, periodontitis under prosthetic works, fights cavities, inclusions dental chronic maxillary osteitis. RESULTS: The correlation uveitis-dental diseases was noticed in 1.2-1.8% of the hospitalized patients, comparing with 3-5% in literature (including the ocular adnexa diseases). CONCLUSIONS: This study shows the reality of the correlations between uveitis and dental diseases. It was relieved the importance of correlation ophthalmologist- stomatologist.



ZIAKAS NG TZETZI D BOBORIDIS K GEORGIADIS NS ENDOGENOUS GROUP G STREPTOCOCCUS ENDOPTHALMITIS FOLLOWING A DENTAL PROCEDURE. EUR J OPHTHALMOL (2004 JAN-FEB) 14(1):59-60

**PURPOSE:** To report a case of bilateral endogenous endophthalmitis due to group G Streptococcus after a dental procedure. **METHODS:** Case report of a 69-year-old woman who presented with pain, decreased vision, bilateral uveitis, and a unilateral hypopyon 1 week after treatment for an abscessed tooth. **RESULTS:** Bilateral endophthalmitis was diagnosed, and group G Streptococcus was cultured from the vitreous samples. **CONCLUSIONS:** To our knowledge, this is the second reported case of endogenous endophthalmitis following a dental procedure. Furthermore, it was due to group G Streptococcus, which is a rare cause of this condition.

BLANC O STEINBOCK N RABINOVICH I RACHMIEL A PELED M PRE-SEPTAL ORBITAL CELLULITIS FROM ODONTOGENIC ORIGIN--COMBINED SURGICAL AND ENDODONTIC APPROACH: A CASE REPORT REFUAT HAPEH VEHASHINAYIM (2004 JUL) 21(3):60-4, 95

Orbital abscesses are common infectious diseases. The etiology of orbital abscesses may vary from common sinusitis in most of the cases, to cocaine sniffing. As a result of the proximity to the brain, orbital abscesses may complicate to life threatening situations. The infectious process spreads to the orbit in several ways: hematogenous, via anatomic spaces in the maxillofacial region, direct invasion. The treatment philosophy combines surgical and Antibiotic therapy to resolve the acute phase of the disease, followed by elimination of the source. The purpose of this paper is to report a case of pre septal orbital cellulitis, that was treated surgically combined with endodontic therapy. To describe the different subtypes of orbital abscesses, differential diagnosis, imaging and treatment options.

LAURE B TIGUEMOUNINE J PICARD A GOGA D ORBITAL ABSCESS OF DENTAL ORIGIN REV STOMATOL CHIR MAXILLOFAC (2004 APR) 105(2):125-9

We describe an orbital abscess secondary to maxillary sinusitis of dental origin focusing on the seriousness of orbital infections and the dramatic consequences of delayed treatment. Classification of acute orbital conditions and appropriate management practices are presented.

STUBINGER S LEIGGENER C SADER R KUNZ C INTRAORBITAL ABSCESS: A RARE COMPLICATION AFTER MAXILLARY MOLAR EXTRACTION. J AM DENT ASSOC (2005 JUL) 136(7):921-5

**BACKGROUND:** The orbit is prone to being affected by an odontogenous infection, owing to its anatomical proximity to the maxillary sinus. A possible reason for an ophthalmic manifestation of a dental abscess is extraction of an acutely inflamed tooth. **CASE DESCRIPTION:** The authors describe the treatment of a man who had painful swelling and redness in the area of his right eye after having a maxillary molar extracted a few days previous. A general dentist referred the patient to the clinic after he began to experience a progressive deterioration of vision of his right eye. Emergency surgical intervention prevented impending loss of vision, and subsequent healing was uneventful. **CLINICAL IMPLICATIONS:** To avoid serious complications, clinicians should not perform a tooth extraction when the patient is in the acute stage of a maxillary sinus infection. Appropriate diagnostic imaging and profound evaluation of the clinical state play major roles in managing the treatment of patients with inflammatory processes that involve the oral and paraoral regions.

ZACHARIADES N VAIRAKTARIS E MEZITIS M RALLIS G KOKKINIS C MOSCHOS M ORBITAL ABSCESS: VISUAL LOSS FOLLOWING EXTRACTION OF A TOOTH--CASE REPORT. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOL ENDOD (2005 OCT) 100(4):E70-3

OBJECTIVE: It is the purpose of this article to alert the general practitioner to the severe consequences that may result from a tooth extraction, including the loss of vision, despite the use of antibiotics. CONCLUSIONS: Early and aggressive treatment is critical in obstructing the spread of infection toward the orbits, the eyes, and eventually the brain.

BLAKE FA SIEGERT J WEDL J GBARA A SCHMELZLE R THE ACUTE ORBIT: ETIOLOGY, DIAGNOSIS, AND THERAPY. J ORAL MAXILLOFAC SURG (2006 JAN) 64(1):87-93

PURPOSE: Extension of dental abscesses to distant areas of the head and neck has been repeatedly reported in the medical literature. Subsequent involvement of the orbit still remains a rarity, resulting in protracted onset of therapy because of inaccurate diagnosis. Considering the possible lasting damage that can result from insufficient therapy, like blindness or even death, the need to extensively educate practicing physicians becomes evident. MATERIALS AND METHODS: With the help of a comprehensive review of the medical literature underlined with a clinical case, the etiology, diagnosis, and therapy of the acute orbit are highlighted with emphasis on the new imaging modalities as well as the broad spectrum antibiotics currently available on the market. RESULTS: Orbital infections of odontogenic origin are the rarest sequelae, with a prevalence of 1.3%. Correct diagnosis, adequate antibiotic therapy, and surgical drainage are the keys to success. CONCLUSION: The acute orbit continues to be a medical challenge. With the proposed diagnostic and therapy guidelines, this affliction can be identified and contained with a high degree of certainty.

MUNOZ-GUERRA MF GONZALEZ-GARCIA R CAPOTE AL ESCORIAL V GIAS LN SUBPERIOSTEAL ABSCESS OF THE ORBIT: AN UNUSUAL COMPLICATION OF THE THIRD MOLAR SURGERY. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOL ENDOD (2006 NOV) 102(5):E9-13

Few procedures in oral surgery show severe complications with the potential to result in life-threatening problems. Subperiosteal orbital abscess is an extremely rare but transcendent complication arising spontaneously or after dental surgery. This report describes a case of subperiosteal abscess of the orbit in a 57-year-old man that occurred following the uneventful extraction of the left maxillary third molar. In the emergency department, proptosis and extraocular muscle dysfunction were marked but no decrease in visual acuity was observed. Echography, computed tomography scan, and magnetic resonance imaging allowed distinction from other types of orbital inflammation. Surgical drainage confirmed the diagnosis. In this patient, orbital abscess was probably caused by extension of the infection to the pterygopalatine and infratemporal regions progressing next to the inferior orbital fissure. This report highlights the difficulty in the clinical diagnosis of this complication.

CARUSO PA WATKINS LM SUWANSAARD P YAMAMOTO M DURAND ML ROMO LV RINCON SP CURTIN HD ODONTOGENIC ORBITAL INFLAMMATION: CLINICAL AND CT FINDINGS--INITIAL OBSERVATIONS. RADIOLOGY (2006 APR) 239(1):187-94

PURPOSE: To retrospectively review computed tomographic (CT) and clinical findings in patients with odontogenic orbital infection. MATERIALS AND METHODS: Approval from the institutional review board was obtained for chart and scan review, and informed consent was waived for this HIPAA-compliant study. Five patients, two male and three female (median age, 37 years; age range, 13-55 years), who had odontogenic orbital cellulitis underwent clinical evaluation, CT scanning, and treatment. CT findings, including periapical

lucency suggesting abscess, sinus opacification, and the route of spread of infection, were analyzed in each patient. Imaging, clinical, and surgical findings, including the initial clinical diagnosis and the presence of a periapical abscess at surgery and at pathologic examination, were compared. RESULTS: Periapical lucency and sinus opacification were seen in all patients. The route of infection spread was through either the premolar soft tissues or the maxillary sinuses. The odontogenic origin of the orbital infection was not clinically suspected in any patients. Correct diagnosis was later made at CT in all patients. Four patients had periapical abscesses at pathologic analysis, and the fifth patient had apical periodontitis at clinical analysis and granuloma at pathologic analysis. Dental surgery was required in each of the five patients for resolution of infection; four patients underwent extraction of the infected tooth, and one patient underwent incision and drainage of a periapical abscess. CONCLUSION: Abnormal periapical lucency, widening of the periodontal ligament space, and the presence of a subperiosteal abscess suggested an odontogenic origin of orbital infection.

SAKKAS N SCHOEN R SCHMELZEISEN R ORBITAL ABSCESS AFTER EXTRACTION OF A MAXILLARY WISDOM TOOTH. BR J ORAL MAXILLOFAC SURG (2007 APR) 45(3):245-6

A 21-year-old patient with orbital abscess and vision loss left after wisdom-tooth extraction is presented.

MASIPA JN BOUCKAERT M MASUREIK C LEMMER J MEYEROV R FELLER L ORBITAL ABSCESS AS A COMPLICATION OF ODONTOGENIC INFECTION. A CASE REPORT AND REVIEW OF THE LITERATURE. SADJ (2007 AUG) 62(7):318-9

Orbital abscess is a rare complication of odontogenic infection. This report describes a case of an orbital abscess in a 42-year-old HIV- seropositive woman who developed this condition as a complication by direct spread via the maxillary sinus of a dento-alveolar abscess of the maxillary first premolar, resulting in the loss of her eye.

YOUSSEF OH STEFANYSZYN MA BILYK JR ODONTOGENIC ORBITAL CELLULITIS. OPHTHAL PLAST RECONSTR SURG (2008 JAN-FEB) 24(1):29-35

PURPOSE: To describe a small series of patients with odontogenic orbital cellulitis and review the visual outcomes of such patients reported in the scientific literature. METHODS: Review of medical records and the scientific literature. Measured parameters included gender, age, days to presentation and surgery, the need for surgical intervention(s), sinus and orbital involvement on CT imaging, and pathogens involved. RESULTS: Current cases and review of the scientific literature resulted in 24 patients with odontogenic orbital cellulitis and adequate examinations for statistical analysis. Twelve of 24 patients had preserved vision (final vision better than 20/70), whereas 11 of 24 patients had vision loss (final vision of light perception or no light perception). Analysis of data showed no statistical correlation between visual loss and age ( $p = 0.81$ ), days to clinical presentation ( $p = 0.45$ ), days to surgical exploration ( $p = 0.96$ ), sinus radiographic involvement ( $p = 0.50$ ), orbital radiographic findings ( $p = 0.19$ ), or type of bacterial infection (Gram-positive aerobic vs. anaerobic organisms), ( $p = 0.31$  and  $p = 0.50$  respectively). Male gender, the need for surgical drainage, and multiple surgical procedures performed correlated statistically with loss of vision ( $p = 0.05$ ,  $p = 0.03$ , and  $p = 0.02$ , respectively). CONCLUSIONS: Multiple case reports have demonstrated that orbital cellulitis from an odontogenic source can result in devastating visual loss. Male gender, the need for surgical drainage, and multiple surgical procedures correlated statistically with severity of visual loss.

WYSLUCH A MAURER P AST J KUNKEL M ORBITAL COMPLICATIONS DUE TO AN ACUTE ODONTOGENIC FOCUS IN A CHILD. A CASE REPORT. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOLOG ENDOD (2009 JAN) 107(1):E39-42

The full clinical manifestations of complications due to odontogenic foci are rarely seen in daily dental practice and can take a clinically foudroyant course of development in young people owing to anatomic conditions, as demonstrated in this clinical case in a 12-year-old girl. Endodontic treatment of the first right upper molar was started owing to increasing toothache and swelling of fossa canina and the periorbital region. During the course of treatment, the patient exhibited an acute increase in orbital inflammation, which required immediate surgical intervention with postsurgical intravenous antibiotic administration. This case should serve to emphasize the crucial requirement for intensive attention to orbital symptoms after dental procedures.

KASTNER J TAUDY M LISY J GRABEC P BETKA J ORBITAL AND INTRACRANIAL COMPLICATIONS AFTER ACUTE RHINOSINUSITIS. RHINOLOGY (2010 DEC) 48(4):457-61

BACKGROUND/OBJECTIVES: Nowadays, intracranial abscess is a rare complication of acute rhinosinusitis. The consequent orbital and intracranial complications of acute rhinosinusitis are rare but must be mutually excluded in complicated rhinosinusitis even when proper surgical and medical treatment tend to efficiently heal the orbital complication. METHODS: We report a case of a patient who primarily revealed symptoms of orbitocellulitis as a complication of odontogenous rhinosinusitis. Proper diagnostic and therapeutical measures were undertaken to manage the disease immediately after stationary admission. RESULTS: Two weeks after an inconspicuous healing period, hemiparesis due to formation of an intracranial abscess developed. An emergent situation reveals which was unusual to the clinical situation. CONCLUSION: The possible role of underlying mechanisms of intracranial abscess formation is discussed and review of literature concerning orbital and intracranial rhinosinusitis complications is performed. The correct indication of imaging methods and accurate evaluation of diminutive symptoms are essential. We assume that performance of a complementary CT of the brain or MRI even when previous CT scan of the orbit/paranasal sinuses reveals no cerebral pathology should be done to avoid or minimize future patients with consecutive orbital and intracranial complications of acute rhinosinusitis.

## PSYCHIATRIC

BECAREVICI V ACUTE DELUSION PSYCHOSIS (ACUTE DELUSION CRISIS) SECONDARY TO A DENTAL INFECTION REV MED SUISSE ROMANDE (1988 MAR) 108(3):257-62

## BRAIN

POMPIANS-MINIAC L APROPOS OF 2 CASES OF ENDOCRANIAL ABSCESES OF DENTAL ORIGIN. PROPAGATION BY VENOUS ROUTE OF APICAL INFECTION REV FR ODONTOSTOMATOL (1966 JUN-JUL) 13(6):1161-76

HOLLIN SA HAYASHI H GROSS SW INTRACRANIAL ABSCESES OF ODONTOGENIC ORIGIN. ORAL SURG ORAL MED ORAL PATHOL (1967 MAR) 23(3):277-93

STEVENSON GW GOSSMAN HH DENTAL AND INTRACRANIAL ACTINOMYCOSIS. BR J SURG (1968 Nov) 55(11):830-4

DECHAUME M LAUDENBACH P CEREBRO-MENINGEAL MANIFESTATIONS OF DENTAL ETIOLOGY REV STOMATOL CHIR MAXILLOFAC (1969 MAR) 70(2):109-14

MARTINEZ GARCIA W ALEMAN LOPEZ ST SEPTIC THROMBOSIS OF THE CAVERNOUS SINUS OF DENTAL ORIGIN. CASE REPORT DIVULG CULT ODONTOL (1971 SEP-OCT)(171):25-7

MOJSEOWICZ K CZERWINSKI F LINNIK-KABAT A INTRACRANIAL COMPLICATIONS AS A CONSEQUENCE OF PURULENT ACUTE INFLAMMATORY PROCESSES ON THE FACE AND IN THE ORAL CAVITY CZAS STOMATOL (1971 JUN) 24(6):623-7

BALOGH G AFRA D INOVAY J ENDOCRANIAL ABSCESS: COMPLICATION OF DENTAL EXTRACTION REV STOMATOL CHIR MAXILLOFAC (1972 APR-MAY) 73(3):205-9

BALOGH G AFRA D INOVAY J ENDOCRANIAL ABSCESS: COMPLICATION OF DENTAL EXTRACTION REV STOMATOL CHIR MAXILLOFAC (1972 APR-MAY) 73(3):205-9

URMOSI J WITTMANN K TAMUS I SUCCESSFUL TREATMENT OF THROMBOPHLEBITIS OF THE SINUS CAVERNOSUS ORIGINATING FROM A CUSPID ORV HETIL (1972 MAR 26) 113(13):766-8

STRAUSS SI STERN NS MENDELOW H SPATZ SS SEPTIC SUPERIOR SAGITTAL SINUS THROMBOSIS AFTER ORAL SURGERY. J ORAL SURG (1973 JUL) 31(7):560-5

URMOSI J THROMBOPHLEBITIS OF THE SINUS CAVERNOSUS STOMATOL DDR (1975 Nov) 25(11):776-8

A short survey of the relevant literature is followed by the description of the clinical course of a thrombophlebitis of the cavernous sinus. In this case, the initial focus was an infection of a canine which caused thrombophlebitis via the anterior facial vein.

SAZONOV AM MUROMSKII IUA PLOTNIKOV NA ZUBKOVA LF TROIANSKII IV ODONTOGENIC MEDIASTINITIS GRUDN KHIR (1977 JUL-AUG)(4):82-6

INGHAM HR KALBAG RM THARAGONNET D HIGH AS SENGUPTA RP SELKON JB ABSCESES OF THE FRONTAL LOBE OF THE BRAIN SECONDARY TO COVERT DENTAL SEPSIS. LANCET (1978 SEP 2) 2(8088):497-9

The bacterial species found in pus aspirated from brain abscesses in two patients were typical of those found in dental sepsis. Subsequently apical-root abscesses were demonstrated in the upper jaws of both patients. This evidence strongly suggests that these cerebral abscesses were secondary to dental sepsis which could have spread from the teeth to the frontal lobes by several possible antaomical pathways.

TAICHER S GARFUNKEL A FEINSOD M REVERSIBLE CAVERNOUS SINUS INVOLVEMENT DUE TO MINOR DENTAL INFECTION. REPORT OF A CASE. ORAL SURG ORAL MED ORAL PATHOL (1978 JUL) 46(1):7-9

HENIG EF DERSCHOWITZ T SHALIT M TOLEDO E TIKVA P AVIV T BRAIN ABCESS FOLLOWING DENTAL INFECTION. ORAL SURG ORAL MED ORAL PATHOL (1978 JUN) 45(6):955-8

A 48-year-old woman underwent root canal treatment of the upper left lateral incisor and lower right second premolar. Close to the conclusion of the endodontic treatment she

complained about headaches. Later on, because of aggravation of her condition, with headaches, fever, malaise, Weakness, and numbness of the right limbs, she was admitted to the hospital. The disease progressed to an epileptic state, with appearance of a right hemiparesis. A brain scan and carotid arteriogram revealed the presence of a mass occupying the left parietal space. Craniotomy disclosed an abscess containing yellow pus from which *Streptococcus viridans* was cultured. After thorough surgical cleansing of the area, removal of the bone for decompression, and treatment with ampicillin the patient improved gradually and slowly regained the mobility of her right side.

HENIG EF, DERSCHOWITZ T, SHALIT M, TOLEDO E, TIKVA P, AVIV T. BRAIN ABCESS FOLLOWING DENTAL INFECTION. ORAL SURGERY, ORAL MEDICINE, AND ORAL PATHOLOGY 1978 JUNE; VOLUME 45, NUMBER 6, PP. 955-958.

A 48-year-old woman underwent root canal treatment of the upper left lateral incisor and lower right second premolar. Close to the conclusion of the endodontic treatment she complained about headaches. Later on, because of aggravation of her condition, with headaches, fever, malaise, weakness, and numbness of the right limbs, she was admitted to the hospital. The disease progressed to an epileptic state, with appearance of a right hemiparesis. A brain scan and carotid arteriogram revealed the presence of a mass occupying the left parietal space. Craniotomy disclosed an abscess containing yellow pus from which *Streptococcus viridans* was cultured. After thorough surgical cleansing of the area, removal of the bone for decompression, and treatment with ampicillin the patient improved gradually and slowly regained the mobility of her right side.

VALACHOVIC R HARGREAVES JA DENTAL IMPLICATIONS OF BRAIN ABSCESS IN CHILDREN WITH CONGENITAL HEART DISEASE. CASE REPORT AND REVIEW OF THE LITERATURE. ORAL SURG ORAL MED ORAL PATHOL (1979 DEC) 48(6):495-500

There is a high morbidity and mortality associated with brain abscesses in children with congenital cyanotic heart disease. A case is reported here which implicated an *endodontically treated primary molar in the etiology of a brain abscess* in a boy with congenital cyanotic heart disease.

SCHOTLAND C STULA D LEVY A SPIESSL B BRAIN ABSCESS AFTER ODONTOGENIC INFECTION SSO SCHWEIZ MONATSSCHR ZAHNHEILKD (1979 APR) 89(4):325-9

LUTSIK LA STREPTOCOCCAL CHRONIOSEPSIS COMPLICATED BY MENINGOENCEPHALITIS WITH A FATAL OUTCOME STOMATOLOGIJA (MOSK) (1979 NOV-DEC) 58(6):55-6

SCHOTLAND C STULA D LEVY A SPIESSL B BRAIN ABSCESS AFTER ODONTOGENIC INFECTION SSO SCHWEIZ MONATSSCHR ZAHNHEILKD (1979 APR) 89(4):325-9

VALACHOVIC R HARGREAVES JA DENTAL IMPLICATIONS OF BRAIN ABSCESS IN CHILDREN WITH CONGENITAL HEART DISEASE. CASE REPORT AND REVIEW OF THE LITERATURE. ORAL SURG ORAL MED ORAL PATHOL (1979 DEC) 48(6):495-500

CHURTON MC GREER ND INTRACRANIAL ABSCESS SECONDARY TO DENTAL INFECTION. N Z DENT J (1980 APR) 76(344):58-60

HEDSTROM SA NORD CE URSING B CHRONIC MENINGITIS IN PATIENTS WITH DENTAL INFECTIONS. SCAND J INFECT DIS (1980) 12(2):117-21

PERNA E LIGUORI R PETRONE G MANNARINO E ACTINOMYCOTIC GRANULOMA OF THE GASSERIAN GANGLION WITH PRIMARY SITE IN A DENTAL ROOT. CASE REPORT. J NEUROSURG (1981 APR) 54(4):553-5

ESSIOUX H BURLATON J LEGROS J DALY JP MOLINIE C LAVERDANT C RECURRENT SUPPURATIVE MENINGITIS OF DENTAL ORIGIN IN BEHCET'S DISEASE ACTUAL ODONTOSTOMATOL (PARIS) (1982) 36(139):355-60

VITZTHUM HE ERLE A LAMBRECHT R INTRACRANIAL COMPLICATIONS INDUCED BY ODONTOGENIC PYOGENIC INFECTIONS STOMATOL DDR (1985 NOV) 35(11):637-42

ZACHARIADES N VAIRAKTARIS E MEZITIS M TRIANTAFYLLOU D PAPAVALASSIOU D CEREBRAL ABSCESS AND MENINGITIS COMPLICATED BY RESIDUAL MANDIBULAR ANKYLOSIS. A STUDY OF THE ROUTES THAT SPREAD THE INFECTION. J ORAL MED (1986 JAN-MAR) 41(1):14-20

BENECH A BARRALE S DALMASSO DI GARZEGNA A LEFT TEMPORAL ABSCESS IN BEARERS OF MAXILLARY AND MANDIBULAR ENDOSSEOUS IMPLANTS. A CLINICAL CASE MINERVA STOMATOL (1986 OCT) 35(10):999-1003

ALDOUS JA POWELL GL STENSAAS SS BRAIN ABSCESS OF ODONTOGENIC ORIGIN: REPORT OF CASE. J AM DENT ASSOC (1987 DEC) 115(6):861-3

GUERIN JM LAURENT C MANET P SEGRESTAA JM FACIAL CELLULITIS AND SEPTIC THROMBOPHLEBITIS OF THE CAVERNOUS SINUS OF DENTAL ORIGIN REV MED INTERNE (1987 SEP-OCT) 8(4):416-8

MARKS PV PATEL KS MEE EW MULTIPLE BRAIN ABSCESES SECONDARY TO DENTAL CARIES AND SEVERE PERIODONTAL DISEASE. BR J ORAL MAXILLOFAC SURG (1988 JUN) 26(3):244-7

SAAL CJ MASON JC CHEUK SL HILL MK BRAIN ABSCESS FROM CHRONIC ODONTOGENIC CAUSE: REPORT OF CASE. J AM DENT ASSOC (1988 SEP) 117(3):453-5

OGUNDIYA DA KEITH DA MIROWSKI J CAVERNOUS SINUS THROMBOSIS AND BLINDNESS AS COMPLICATIONS OF AN ODONTOGENIC INFECTION: REPORT OF A CASE AND REVIEW OF LITERATURE. J ORAL MAXILLOFAC SURG (1989 DEC) 47(12):1317-21

SYRJANEN J, PELTOLA J, VALTONEN V, LIVANAINEN M, KASTE M, HUTTUNEN JK. DENTAL INFECTIONS IN ASSOCIATION WITH CEREBRAL INFARCTION IN YOUNG AND MIDDLE-AGED MEN. JOURNAL OF INTERNAL MEDICINE 1989 MARCH; VOLUME 225, NUMBER 3, PP. 179-184.

The association between dental infections and cerebral infarction was investigated in a case-control study involving 40 patients with ischaemic cerebral infarction under the age of 50, and 40 randomly selected community controls matched for sex and age. Poor oral health, as assessed by two indices measuring the severity of infections of teeth and periodontium, or by the presence of subgingival calculus or the presence of suppuration in the gingival pockets, was more common in male patients than in male controls, but no difference was observed in females. If severe dental infections were combined with other probable bacterial infections there were altogether 16 patients (40%) but only two controls (5%) who had suffered from a

probable bacterial infection within 1 month or at the time of the stroke or when examined as a control (P less than 0.01). Our results suggest an association between bacterial infection and ischaemic cerebrovascular disease in patients under 50 years of age. Severe chronic dental infection seems to be an important type of infection associated with cerebral infarction in males.

ANDREWS M FARNHAM S BRAIN ABSCESS SECONDARY TO DENTAL INFECTION. GEN DENT (1990 MAY-JUN) 38(3):224-5

FELDGES A HEESEN J NAU HE SCHETTLER D ODONTOGENIC BRAIN ABSCESS. 2 CASE REPORTS DER ODONTOGENE HIRNABSZESS. 2 FALLBERICHTE. DTSCH Z MUND KIEFER GESICHTSCHIR (1990 JUL-AUG) 14(4):297-300

Frequently the bacteria found by aspiration of the brain abscess are the only indication of a dental focus.

ANDERSEN WC HORTON HL PARIETAL LOBE ABSCESS AFTER ROUTINE PERIODONTAL RECALL THERAPY. REPORT OF A CASE. J PERIODONTOL (1990 APR) 61(4):243-7

YUN MW HWANG CF LUI CC CAVERNOUS SINUS THROMBOSIS FOLLOWING ODONTOGENIC AND CERVICOFACIAL INFECTION. EUR ARCH OTORHINOLARYNGOL (1991) 248(7):422-4

GOSCINSKI I STACHURA K UHL H [THROMBOSIS OF THE CAVERNOUS SINUS] ZAKRZEP ZATOKI JAMISTEJ. NEUROL NEUROCHIR POL (1991 MAY-JUN) 25(3):386-9

EL FAKIR Y JIDDANE M ABID A THROMBOPHLEBITIS OF THE CAVERNOUS SINUS OF DENTAL ORIGIN. APROPOS OF A CASE WITH A REVIEW OF THE LITERATURE REV STOMATOL CHIR MAXILLOFAC (1993) 94(1):55-9

MONTEJO M AGUIRREBENGOE K STREPTOCOCCUS ORALIS MENINGITIS AFTER DENTAL MANIPULATION [LETTER] ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOLOG ENDOD (1998 FEB) 85(2):126-7

RENTON TF DANKS J ROSENFELD JV CEREBRAL ABSCESS COMPLICATING DENTAL TREATMENT. CASE REPORT AND REVIEW OF THE LITERATURE. AUST DENT J (1996 FEB) 41(1):12-5

LORBER M DENTAL AND OTHER ASPECTS OF A POSSIBLE ASSOCIATION BETWEEN CEREBROVASCULAR ISCHEMIA AND CHRONIC INFECTION. STROKE (1998 JAN) 29(1):257-8

MONTEJO M AGUIRREBENGOE K STREPTOCOCCUS ORALIS MENINGITIS AFTER DENTAL MANIPULATION. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOLOG ENDOD (1998 FEB) 85(2):126-7

LI X TRONSTAD L OLSEN I BRAIN ABSCESES CAUSED BY ORAL INFECTION. ENDOD DENT TRAUMATOL (1999 JUN) 15(3):95-101

Brain abscesses are rare but can be life-threatening infections. Recent progress in microbiological classification and identification has indicated that they are sometimes caused by oral infection and dental treatment. It has been postulated that oral microorganisms may enter the cranium by several pathways: 1) by direct extension, 2) by hematogenous spread, 3) by local lymphatics, and 4) indirectly, by extraoral odontogenic infection. In the direct extension, oral infections spread along the fascial planes. Hematogenous spreading occurs along the facial, angular, ophthalmic, or other veins which lack valves, through the cavernous sinus and into the cranium. Another hematogenous



pathway is through the general circulation. Oral bacteria may cause systemic infections, e.g., endocarditis, and then indirectly initiate brain abscess. Microbiota, complications, and the prevention and management of odontogenic brain abscesses are also discussed in this review.

WU T, TREVISAN M, GENCO RJ, DORN JP, FALKNER KL, SEMPOS CT PERIODONTAL DISEASE AND RISK OF CEREBROVASCULAR DISEASE: THE FIRST NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY AND ITS FOLLOW-UP STUDY.. : ARCHIVES OF INTERNAL MEDICINE 2000 OCTOBER; VOLUME 160, NUMBER 18, PP. 2749-2755.

Periodontal disease has been found to be a potential risk factor for coronary heart disease. However, its association with cerebrovascular accidents (CVAs) is much less studied. METHODS: This study examines the association between periodontal disease and CVA. The study cohort comprises 9962 adults aged 25 to 74 years who participated in the First National Health and Nutrition Examination Survey and its follow-up study. Baseline periodontal status was categorized into (1) no periodontal disease, (2) gingivitis, (3) periodontitis, and (4) edentulousness. All CVAs (International Classification of Diseases, Ninth Revision [ICD-9], codes 430-438) were ascertained by hospital records for nonfatal events and death certificates for fatal events. The first CVA, nonfatal or fatal, was used to define incidence. Relative risks were estimated by hazard ratios from the Cox proportional hazard model with adjustment for several demographic variables and well-established cardiovascular risk factors. Weights were used to generate risk estimates. RESULTS: Periodontitis is a significant risk factor for total CVA and, in particular, nonhemorrhagic stroke (ICD-9, 433-434 and 436-438). Compared with no periodontal disease, the relative risks (95% confidence intervals) for incident nonhemorrhagic stroke were 1.24 (0.74-2.08) for gingivitis, 2.11 (1.30-3.42) for periodontitis, and 1.41 (0.96-2.06) for edentulousness. For total CVA., the results were 1.02 (0.70-1.48) for gingivitis, 1.66 (1.15-2.39) for periodontitis, and 1.23 (0.91-1.66) for edentulousness. Increased relative risks for total CVA and nonhemorrhagic stroke associated with periodontitis were also seen in white men, white women, and African Americans. Similar results were found for fatal CVA. CONCLUSION: Periodontal disease is an important risk factor for total CVA and, in particular, nonhemorrhagic stroke.

SHOTELERSUK V GOYAL M RAUCHENSTEIN JN KONEZ O SUBDURAL EMPYEMA SECONDARY TO ODONTOGENIC MASTICATOR SPACE ABSCESS: DETECTION BY INDIUM-111-LABELED WHITE CELL SCAN. CLIN IMAGING (2001 JAN-FEB) 25(1):18-22

Subdural empyema (SDE) is an extremely rare but serious complication of dental infection. A case is presented in which dental infection was complicated by a masticator space abscess and eventually led to a SDE. This report illustrates a rare sequence of events leading to SDE and its serendipitous detection by indium-111-labeled leucocyte scan.

CORSON MA POSTLETHWAITE KP SEYMOUR RA ARE DENTAL INFECTIONS A CAUSE OF BRAIN ABSCESS? CASE REPORT AND REVIEW OF THE LITERATURE. ORAL DIS (2001 JAN) 7(1):61-5

Dental pathology and/or treatment have been linked to a small number of brain abscesses as possible sources of infection. A further case is presented, in which a dental site is implicated. A review of the evidence was undertaken. A wide range of dental procedures had been implicated. In some cases the brain isolate was not of dental origin. In many, the diagnosis was one of exclusion. In order to confirm the role of odontogenic infection in the pathogenesis of brain abscess, modern sampling techniques should be used to precisely

identify the isolates. The causal organism should be identified in both oral and cranial sites.

ZWAVELING-SOONAWALA N SPANJAARD L VAN DE WETERING M WINTERBERG DH INTRACRANIAL

ACTINOMYCOSIS IN A CHILD WITH DENTAL NED TIJDSCHR GENEESKD (2003 NOV 29) 147(48):2386-9

A diagnosis of intracranial actinomycosis was made in a 9-year-old boy with headache, cranial nerve dysfunction and ataxia. Poor dental hygiene leading to caries and an inflammation in his right upper jaw probably was the cause of cervicofacial actinomycosis with intracranial extension. A full recovery was achieved by treatment with benzylpenicillin. Actinomyces is a gram-positive bacterium belonging to the endogenous flora of the mucous membranes of the oropharynx, gastrointestinal tract, and female genital tract. Disruption of the mucous membrane is the portal of entry for an extremely destructive infective process that is effectively treated with penicillin. Good orodental hygiene is important for the prevention of actinomycosis.

LIMERES-POSSE J TOMAS-CARMONA I FERNANDEZ-FEIJOO J MARTINEZ-VAZQUEZ C CASTRO-IGLESIAS

A DIZ-DIOS P CEREBRAL ABSCESES OF ORAL ORIGIN REV NEUROL (2003 AUG 1-15) 37(3):201-6

INTRODUCTION: It has been suggested that between 3% and 13% of the cerebral abscesses (CA) are presumably associated to oral infections or dental procedures. AIM: Determine the prevalence of CA of oral origin, discussing their clinical and microbiological characteristics. PATIENTS AND METHODS: Retrospectively, 54 cases of CA diagnosed in 3 hospitals of Galicia between 2001 and 2002 were reviewed. RESULTS: A presumed oral portal of entry was recorded in 6 patients (11.1%); 4 cases were associated to oral infections and the remaining 2 had received dental treatment in the months prior to the onset of symptoms. Half of the patients showed irrelevant medical record, 2 had had previous extracranial abscesses and 1 presented a type A immunoglobulin deficiency. In 4 cases, the microbiological analysis was positive and typical oral bacteria (*Streptococcus viridans* and *Peptostreptococcus* spp.) were identified. CONCLUSIONS: The results of this study suggest that a significant number of CA are probably of oral origin. In consequence, to maintain a good oral health status is important and specific prophylactic measures before any dental procedure should be applied, especially in patients with risk recognized factors.

IIDA Y HONDA K SUZUKI T MATSUKAWA S KAWAI T SHIMAHARA T CHIBA H BRAIN ABSCESS IN WHICH PORPHYROMONAS GINGIVALIS WAS DETECTED IN CEREBROSPINAL FLUID. BR J ORAL MAXILLOFAC SURG (2004 APR) 42(2):180

In this paper, we report one case of severe brain abscess in which *Porphyromonas gingivalis* was detected in the spinal fluid.

MARQUES DA SILVA R CAUGANT DA JOSEFSEN R TRONSTAD L OLSEN I CHARACTERIZATION OF

STREPTOCOCCUS CONSTELLATUS STRAINS RECOVERED FROM A BRAIN ABSCESS AND PERIODONTAL POCKETS IN AN IMMUNOCOMPROMISED PATIENT. J PERIODONTOL (2004 DEC) 75(12):1720-3

BACKGROUND: There have been a number of reports of brain abscesses suggesting an odontogenic etiology. However, no efforts have been made to compare brain abscess isolates with isolates from the oral cavity using highly discriminative methods. We report a brain abscess caused by *Streptococcus constellatus* in an immunocompromised patient where oral infection (periodontitis) was suspected to be implicated. METHODS: The brain abscess and oral isolates were compared by means of one phenotypic and three genetic (restriction fragment length polymorphism [RFLP], ribotyping, and random amplified polymorphic DNA [RAPD]) fingerprinting techniques. RESULTS: The phenotypic method and RFLP showed identical profiles between brain and periodontal isolates, while ribotyping and RAPD showed very close similarity, with only one band difference in one of the three

ribotypes and in one of the three polymorphic RAPD. CONCLUSIONS: Gene transfer by genetic recombinational events in the periodontal pocket might have been responsible for the emergence of a strain variant of *S. constellatus* that had the potential to cause an abscess at a distant site (brain). The importance of odontogenic sources as potential foci of infection for brain abscesses is discussed.

VEGA-BASULTO S DOMINGUEZ-NAPOLES M BETHANTES-SOTOMAYOR Y DE LA CONCEPCION-ALMEIDA F SARDUY-RAMOS CM GABRIEL MC GUTIERREZ-MUNOZ F RIVERO-GARCIA C RIVERO-TRUIT F VEGA-TRENADO SA ACTINOMYOTIC BRAIN ABSCESS REV NEUROL (2004 NOV 16-30) 39(10):991-3

BROOK I MICROBIOLOGY OF INTRACRANIAL ABSCESES ASSOCIATED WITH SINUSITIS OF ODONTOGENIC ORIGIN. ANN OTOL RHINOL LARYNGOL (2006 DEC) 115(12):917-20 (COPY IN SECTION ON SINUSES)

OBJECTIVES: The unique microbiology of sinusitis of dental origin that is associated with intracranial abscesses (IAs) and the correlation between the organisms at the two sites has not been reported before. This report describes the author's experience during a 30-year period in studying the microbiology of 8 IAs and their corresponding sinusitis of dental origin. METHODS: Aspirates of pus from 8 infected sinuses associated with odontogenic infections and their corresponding IAs were studied for aerobic and anaerobic bacteria. Polymicrobial flora was found in all 8 sinuses and 7 IAs, and the number of isolates varied from 1 to 5. RESULTS: Anaerobic bacteria were isolated from all sinuses and IAs. A total of 28 isolates (3.5 isolates per site; 25 strict anaerobic, 1 aerobic or facultative, and 2 microaerophilic) were recovered from the sinuses, and 20 isolates (2.5 isolates per site; 16 strict anaerobic, 1 aerobic or facultative, and 3 microaerophilic) were found in the IAs. The bacterial isolates were *Fusobacterium* spp (14), *Prevotella* spp (11), *Peptostreptococcus* spp (13), microaerophilic streptococci (5), *Veillonella parvula* (3), and beta-hemolytic streptococci group F(2). Concordance in the microbiological findings between the sinus and the IA was found in all instances; however, certain organisms were only present at one site. CONCLUSIONS: These data illustrate the concordance in the organisms recovered from sinusitis of dental origin and their associated IAs and confirm the importance of anaerobic bacteria in sinusitis and IAs of dental origin.

WAGNER KW SCHON R SCHUMACHER M SCHMELZEISEN R SCHULZE D CASE REPORT: BRAIN AND LIVER ABSCESES CAUSED BY ORAL INFECTION WITH *STREPTOCOCCUS INTERMEDIUS*. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOL ENDOD (2006 OCT) 102(4):E21-3 (COPY IN NLIVER SECTION)

Organ abscesses are a rare and life-threatening complication mostly of hematogenously disseminated infections. We report a case of brain and liver abscesses. Identification of the lesions was made by contrast-enhanced computed tomography (CT) and magnetic resonance imaging (MRI), respectively. An oral examination comprised an oral focus of infection. *Streptococcus intermedius* was isolated from oral smear, liver and ventricular drainage, and blood sample. After the commencement of antibiotic therapy, drainage of abscesses and oral rehabilitation, complete recovery was noted.

MYLONAS AI TZERBOS FH MIHALAKI M ROLOGIS D BOUTSIKAKIS I CEREBRAL ABSCESS OF ODONTOGENIC ORIGIN. J CRANIOMAXILLOFAC SURG (2007 JAN) 35(1):63-7

INTRODUCTION: Cerebral abscess is a rare but serious and life-threatening infection. Dental infections have occasionally been reported as the source of bacteria for such an abscess. PATIENT AND METHODS: A 54-year-old man was admitted with a right hemiparesis and epileptic fits. After clinical, laboratory and imaging examination, the diagnosis of a cerebral abscess of the left parietal lobe was made. The intraoral clinical examination as well as a panoramic radiograph confirmed the presence of generalized periodontal disease,

multiple dental caries, and periapical pathology. The treatment included: (i) Immediate administration of high-dose intravenous antibiotics and (ii) surgical procedures consisting of craniotomy and resection of the abscess cavity first, and secondly removal of the periodontal, decayed and periapically involved teeth of the patient, in an effort to eradicate all the possible septic foci, presuming the cerebral abscess to be of odontogenic infection. RESULTS: The patient made an uneventful recovery, and 29 months postoperatively he had completely recovered from the hemiparesis.

STEFANIKOVA L FREIBERGEROVA M HUSA P KERKOVSKY M MULTIPLE BRAIN ABSCESES OF ODONTOGENIC ORIGIN CAUSED BY FUSOBACTERIUM NUCLEATUM KLIN MIKROBIOL INFEKC LEK (2008 AUG) 14(4):149-53

Infection caused by the anaerobic gram-negative rod *Fusobacterium nucleatum* belongs to endogenous infections. A 41-year-old man developed multiple brain abscesses of odontogenic origin. The main causes were poor oral hygiene and no dental check-ups. Pus aspirated from a site in the brain contained DNA of the bacterium *Fusobacterium nucleatum*. Several teeth with periapical abscesses were extracted. Initially, the patient was treated empirically with a combination of cefotaxime and metronidazole (18 days). Subsequently, co-trimoxazole and rifampicin were administered (8 months). Four and eight months after the onset of the disease, MRI scans revealed only persistent residual changes in the brain parenchyma; the patient was asymptomatic, with no neurological signs and back at work.

SAKAMOTO H KARAKIDA K OTSURU M ARAI M SHIMODA M A CASE OF BRAIN ABSCESS EXTENDED FROM DEEP FASCIAL SPACE INFECTION. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOLOG ENDOD (2009 SEP) 108(3):E21-5

A case of brain abscess in the temporal lobe caused by direct intracranial extension of deep neck abscess is described. The abscess also spread to the orbital cavity through infraorbital fissure. The possible etiology of this case might be dental surgery. The diagnostic imaging clearly showed the routes of intracranial and - orbital extension of parapharyngeal and masticator space abscesses. From the abscess specimens, oral streptococci, anaerobic streptococci, and anaerobic gram-negative bacilli were isolated. Antimicrobial susceptibility testing of isolates showed that some *Prevotella* and *Fusobacterium* strains had decreased susceptibility to penicillin, and these bacteria produced beta-lactamase. The bacteria from the deep neck abscess were consistent with those detected from the brain abscess. Proper diagnosis, aggressive surgical intervention, and antibiotics chemotherapy saved the patient from this life-threatening condition.

MUELLER AA SALDAMLI B STUBINGER S WALTER C FLUCKIGER U MERLO A SCHWENZER-ZIMMERER K ZEILHOFER HF ZIMMERER S ORAL BACTERIAL CULTURES IN NONTRAUMATIC BRAIN ABSCESES: RESULTS OF A FIRST-LINE STUDY. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOLOG ENDOD (2009 APR) 107(4):469-76

OBJECTIVE: Bacterial cultures from nontraumatic brain abscesses (BAs) frequently contain oral bacteria. We assessed bacterial cultures from BAs and oral infective sources for a bacterial match. STUDY DESIGN: Bacterial samples from brain abscesses and oral abscesses, and at sites with probing depths  $\geq 3.5$  mm were taken from 11 nontraumatic BA patients and analyzed. RESULTS: Brain abscess bacterial cultures were obtained in 9 of the 11 cases, which revealed 5 cases of *Streptococcus milleri* group bacteria and 4 cases of subgingival flora. The bacteriologic results were interpreted taking all medical and bacteriologic findings into account, which made an oral origin of the BAs most likely in 6 of the 11 cases: from an oral abscess and from the subgingival flora in 3 cases each.

**CONCLUSIONS:** Early collaboration between neurosurgeons, infectious disease specialists, and oral-maxillofacial surgeons will aid the identification and treatment of suspected oral sources of nontraumatic BAs.

KIDDEE W PREECHAWAI P HIRUNPAT S BILATERAL SEPTIC CAVERNOUS SINUS THROMBOSIS FOLLOWING THE MASTICATOR AND PARAPHARYNGEAL SPACE INFECTION FROM THE ODONTOGENIC ORIGIN: A CASE REPORT. J MED ASSOC THAI (2010 SEP) 93(9):1107-11

Neglect of odontogenic infections can have serious consequences. If they spread through fascial planes and intracranially they can cause an abscess, orbital cellulitis, and eventually cavernous sinus thrombosis. The authors report a case of rapid progressive bilateral orbital cellulitis and cavernous sinus thrombosis that originated from dental caries. Septic cavernous sinus thrombosis is a medical emergency. Early recognition and prompt treatments direct to the underlying sources of infection are crucial. Broad-spectrum intravenous antibiotics are the mainstay of treatment to reduce morbidity and mortality from this lethal condition. Management should be based on early diagnosis and prompt management with intravenous broad-spectrum antibiotics and surgical intervention.

COLBERT S CAMERON M WILLIAMS J SEPTIC THROMBOSIS OF THE CAVERNOUS SINUS AND DENTAL INFECTION. BR J ORAL MAXILLOFAC SURG (2011 SEP) 49(6):E25-6

We report a case of septic thrombosis of the cavernous sinus and dental infection, and highlight the clinical features to enable prompt diagnosis and management.

RAHAMAT-LANGENDOEN JC VAN VONDEREN MG ENGSTRÖM LJ MANSON WL VAN WINKELHOFF AJ MOOI-KOKENBERG EA BRAIN ABSCESS ASSOCIATED WITH AGGREGATIBACTER ACTINOMYCETEMCOMITANS: CASE REPORT AND REVIEW OF LITERATURE. J CLIN PERIODONTOL (2011 AUG) 38(8):702-6

**INTRODUCTION:** Aggregatibacter actinomycetemcomitans is considered a major pathogen in localized and generalized aggressive periodontitis. A. actinomycetemcomitans has been found in various extra oral infections and most frequently in endocarditis. We report a patient with multiple brain abscesses due to infection with A. actinomycetemcomitans and review the English language literature related to this subject.**CASE REPORT:** A 42-year-old patient with no underlying medical conditions presented with multiple brain lesions initially thought to be metastatic lesions of a tumour of unknown origin. Findings during drainage and subsequent histopathological conclusions made infection more likely. Culture of drained material remained negative; however, 16S rDNA polymerase chain reaction and sequence analysis on direct material revealed A. actinomycetemcomitans as the causative agent of the infection. The most likely source of infection was the poor dentition of the patient. After repeated drainage of the lesions and antibiotic treatment the patient gradually improved, although cognitive impairment remained.**CONCLUSIONS:** Our report illustrates that a poor dental condition, notably destructive periodontal disease, can be a risk for life-threatening extra oral disease, and thus contributes to the total inflammatory burden of the body.

ANTUNES AA DE SANTANA SANTOS T DE CARVALHO RW AVELAR RL PEREIRA CU PEREIRA JC BRAIN ABSCESS OF ODONTOGENIC ORIGIN. J CRANIOFAC SURG (2011 Nov) 22(6):2363-5

Brain abscess is a rare and threatening infection, which is in a suppuration area, caused either by trauma, neurosurgical complication, or by a secondary infection of dental origin complication. The infectious process spread from the start focus can occur in 2 ways: hematogenous or by contiguity. The treatment should ideally be based on the etiological factor excision, combined with drainage and antibiotics as adjuvant; this philosophy is not observed in the reports described in the 1960s, 1970s, and 1980s. This study's goal was to

report a case of brain abscess consequent of an odontogenic outbreak, where an adequate treatment was set up, but it was already in advanced stages and had as a result the lethal outcome. Complications from the odontogenic infections have a low incidence, but should never be disregarded, because they can lead to death, as described in this manuscript.

KANU OO UKPONMWAN E BANKOLE O OLATOSI JO ARIGBABU SO INTRACRANIAL EPIDURAL ABSCESS OF ODONTOGENIC ORIGIN. J NEUROSURG PEDIATR (2011 MAR) 7(3):311-5

Dental infection as a cause of epidural abscess is rare compared with other forms of intracranial suppurations. A 10-year-old boy was seen because of headaches and fever. There was no history of otitis media or sinusitis, but he had sought care for dental complaints. The patient was from an upper-middle-class family, was not immunocompromised, and had no other risk factor for a major infection. A CT brain scan confirmed a frontal epidural abscess. The patient underwent emergency surgery for evacuation of the epidural abscess, followed by antimicrobial therapy. His condition improved remarkably following surgery, with complete resolution of symptoms. He subsequently underwent extraction of 2 teeth following dental review. Dental infection as a cause of intracranial epidural abscess is rare, but should be considered when evaluating patients for intracranial infections. A review of the literature sheds light on the causal relationship and possible pathogenesis of this condition.

HOBSON DT IMUDIA AN SOTO E AWONUGA AO PREGNANCY COMPLICATED BY RECURRENT BRAIN ABSCESS AFTER EXTRACTION OF AN INFECTED TOOTH. OBSTET GYNECOL (2011 AUG) 118(2 Pt 2):467-70 (COPY IN REPRODUCTION SECTION)

BACKGROUND: Odontogenic infections are quite common and, in unusual cases, can extend beyond the oral cavity with potentially life-threatening complications. CASE: A 35-year-old woman, G3P0020, underwent extraction of an infected left maxillary third molar tooth at 19 3/7 weeks of gestation and later presented with mental status changes. Computed tomography revealed left pterygoid muscle abscess, which progressed to brain abscess. She underwent multiple partial lobectomies to drain her recurrent brain abscess. The pregnancy continued until term, and she underwent a cesarean delivery. CONCLUSION: Brain abscess is a rare but life-threatening complication of pregnancy. This case illustrates the potential complications after extraction of an infected tooth in pregnancy.

HAGGERTY CJ TENDER GC ACTINOMYCOTIC BRAIN ABSCESS AND SUBDURAL EMPYEMA OF ODONTOGENIC ORIGIN: CASE REPORT AND REVIEW OF THE LITERATURE. J ORAL MAXILLOFAC SURG (2012 MAR) 70(3):E210-3

CLIFTON TC KALAMCHI S A CASE OF ODONTOGENIC BRAIN ABSCESS ARISING FROM COVERT DENTAL SEPSIS. ANN R COLL SURG ENGL (2012 JAN) 94(1):E41-3

Odontogenic infections can spread to any organ of the body and in some cases cause life threatening infections. We report a case of multiple odontogenic brain abscesses resulting from undetected tooth decay. Whereas most odontogenic brain abscesses occur following dental treatment, this report documents brain abscesses prior to dental treatment, signifying the dangers of covert dental infections. This case report updates the literature on the topic of odontogenic brain abscesses.

HIBBERD CE NGUYEN TD BRAIN ABSCESS SECONDARY TO A DENTAL INFECTION IN AN 11-YEAR-OLD CHILD: CASE REPORT. J CAN DENT ASSOC (2012) 78:c49

A primary molar dental abscess was implicated as the cause of a brain abscess in an 11-year-old boy. This case report describes the neurological signs and symptoms, and acute

management of a brain abscess in a child. A brain abscess is provisionally diagnosed from the patient's medical history, as well as the presence of signs and symptoms such as fever, headache, nausea, vomiting, focal neurological deficit, altered mentation, speech alterations, papillary edema, and neck stiffness or seizures. A definitive diagnosis of brain abscess is confirmed through imaging. The dental source of infection is identified by the exclusion of more probable foci such as the ears, heart, lungs, eyes or sinuses.

## NEUROLOGICAL

STRUZAK-WYSOKINSKA M PERIPHERAL PARALYSIS OF THE FACIAL NERVE CAUSED BY PERIDONTAL FOCI  
CZAS STOMATOL (1967 MAR) 20(3):283-8

GLONTI TI MALASHKIIA IUA CHKHIKVISHVILI TSsH ON THE ROLE OF CHRONIC ODONTOGENIC INFECTION  
IN THE GENESIS OF NEUROLOGIC DISORDERS KLIN MED (MOSK) (1968 JAN) 46(1):112-5

BERGOUIGNAN H BENOIT P BOUSSAGOL P BRUN G NEURALGIC SYNDROME OF DENTAL ORIGIN  
SIMULATING AN ESSENTIAL FACIAL NEURALGIA REV ODONTOSTOMATOL MIDI FR (1969) 27(2):124-5

DECHAUME M LAUDENBACH P CEREBRO-MENINGEAL MANIFESTATIONS OF DENTAL ETIOLOGY REV  
STOMATOL CHIR MAXILLOFAC (1969 MAR) 70(2):109-14

TASSAROTTI B [A CASE OF SPHENO-PALATINE GANGLIONIC SYNDROME OF DENTAL ORIGIN] RASS INT  
STOMATOL PRAT (1969 SEP-OCT) 20(5):307-13

LEWANDOWSKI L SERAFINOWSKA A PERIPHERAL FACIAL NERVE PALSY CAUSED BY FOCAL DENTAL  
INFECTION CZAS STOMATOL (1970 DEC) 23(12):1357-60

CADENAT H MARCOPOULOS A GELY P FABIE M COMBELLES R 2 NEW CASES OF MELKERSSON-  
ROSENTHAL'S SYNDROME REV STOMATOL CHIR MAXILLOFAC (1971 SEP) 72(6):635-42

KING R. INTERACTION OF NOXIOUS AND NONNOXIOUS STIMULI IN PRIMARY SENSORY NUCLEI ADV NEUROL  
1974; 4:659-63

HAMLYN JF ACUTE HEMIPLEGIA IN CHILDHOOD FOLLOWING A DENTAL ABSCESS. BR J ORAL SURG (1978  
Nov) 16(2):151-5

The syndrome of acute hemiplegia in childhood is described and a case following dental infection reported. The possible mechanisms responsible for the development of this condition are considered.

GRAY RL PERIPHERAL FACIAL NERVE PARALYSIS OF DENTAL ORIGIN. BR J ORAL SURG (1978 NOV)  
16(2):143-50

The aetiology, diagnosis and treatment of peripheral facial nerve palsy are discussed. Four cases of facial nerve palsy following dental procedures are reported. Following a revision of the world literature during the last 23 years, the 25 cases of facial nerve palsy documented are analysed and divided into four groups on the basis of aetiology, speed of onset and recovery and modes of treatment suggested.

MUKHARINSKAIA VS ANTADZE ZI DEVIDZE NV EMCHENKO VT NODIIA EI NEUROLOGICAL COMPLICATIONS IN CHRONIC SUPPURATIVE ODONTOGENIC INFECTION STOMATOLOGIJA (MOSK) (1981) 60(4):22-3

MUCKE L CLINICAL MANAGEMENT OF NEUROPATHIC PAIN NEUROL CLIN 1987;5:649-63

METZGER MC WAGNER KW HOHLWEG-MAJERT B VOSS PJ SCHOEN R SCHMELZEISEN R DIPLOPIA AND ACUTE RECTUS MUSCLE PALSY AS SYMPTOMS OF AN INFECTED FOLLICULAR CYST OF A MAXILLARY RIGHT THIRD MOLAR: A CASE REPORT. QUINTESSENCE INT (2007 JUL-AUG) 38(7):571-4

Severely impacted third molars have a high risk of developing a dentigerous cyst. Dental cysts in the maxilla can cause acute infection of the maxillary sinus that can involve the orbital cavity. Possible complications of infections of the orbital cavity are eyesight reduction, including blindness, and disseminated infections, including brain abscesses. This article reports on a 53-year-old male patient with diplopia caused by acute rectus inferior muscle palsy as symptoms of an empyema of the maxillary right sinus. An infected follicular cyst due to the impacted and displaced maxillary right third molar caused the empyema. An emergency trepanation with drainage of the right maxillary sinus was performed. Additionally, intravenous antibiotic therapy with penicillin G and metronidazole resulted in improvement. In a secondary surgical process 2 weeks later, the cyst and the third molar were removed. Complete recovery was noted. It is important to be familiar with clinical diagnostics in cases of undefined pain of the teeth and jaws. Radiographic imaging is indicated in such cases. Disseminated odontogenic infections must be considered as the primary origin of pain and diplopia.

AL-MUHARRAQI MA O'SULLIVAN EC UNILATERAL FACIAL NERVE PARALYSIS FOLLOWING AN INFECTED LOWER THIRD MOLAR. INT J ORAL MAXILLOFAC SURG (2010 FEB) 39(2):192-5

The authors report the case of a 35-year-old Arab man who presented with unilateral facial nerve palsy in the presence of an infected lower third molar. The paralysis occurred within hours of the development of a left-sided facial swelling. Surgical removal of the tooth and drainage of the abscess produced significant improvement in facial nerve function, and total resolution occurred prior to clinical follow-up 10 days later. The authors discuss the aetiology of this hemifacial paralysis and its significance as a clinical sign of third molar odontogenic infection.

TOLSTUNOV L BELAGA GA BELL'S PALSY AND DENTAL INFECTION: A CASE REPORT AND POSSIBLE ETIOLOGY. J ORAL MAXILLOFAC SURG (2010 MAY) 68(5):1173-8

LAZOW SK IZZO SR VAZQUEZ D DO DENTAL INFECTIONS REALLY CAUSE CENTRAL NERVOUS SYSTEM INFECTIONS? ORAL MAXILLOFAC SURG CLIN NORTH AM (2011 NOV) 23(4):569-78, VII

In the post-World War I antibiotic era, the prevalence of central nervous system (CNS) infections is estimated to be 1 per 100,000 population. The literature is replete with anecdotal case reports of CNS infections of apparent dental etiology. Conversely, it is widely cited that the incidence of CNS infection of dental etiology is only in the range of 1% to 2%. We seek to answer the question if dental infections really cause CNS infections. In this article, we focus on septic cavernous sinus thrombosis and brain abscess and if it is a diagnosis of exclusion or evidence-based.

YAMAMOTO T KONDO K HIRAI H NAKADE M AIDA J HIRATA Y ASSOCIATION BETWEEN SELF-REPORTED DENTAL HEALTH STATUS AND ONSET OF DEMENTIA: A 4-YEAR PROSPECTIVE COHORT STUDY OF OLDER JAPANESE ADULTS FROM THE AICHI GERONTOLOGICAL EVALUATION STUDY (AGES) PROJECT. PSYCHOSOM MED (2012 APR) 74(3):241-8



**OBJECTIVES:** Studies have shown that people with cognitive impairment have poor dental health. However, the direction of causality remains unknown. This prospective cohort study aimed to determine the association between four self-reported dental health variables and dementia onset in older Japanese people. **METHODS:** Analysis was conducted on 4425 residents 65 years or older. Four self-reported dental health variables included the number of teeth and/or use of dentures, ability to chew, presence/absence of a regular dentist, and taking care of dental health. Data were collected using self-administered questionnaires given in 2003. Records of dementia onset during 2003 to 2007 were obtained from municipalities in charge of the public long-term care insurance system. Age, income, body mass index, present illness, alcohol consumption, exercise, and forgetfulness were used as covariates. **RESULTS:** Dementia onset was recorded in 220 participants. Univariate Cox proportional hazards models showed significant associations between the dental health variables and dementia onset. In models fully adjusted for all covariates, hazard ratios (95% confidence intervals) of dementia onset of respondents were as follows: 1.85 (1.04-3.31) for those with few teeth and without dentures; 1.25 (0.81-1.93) for those who could not chew very well; 1.44 (1.04-2.01) for those who did not have a regular dentist; and 1.76 (0.96-3.20) for those who did not take care of their dental health. **CONCLUSIONS:** Few teeth without dentures and absence of a regular dentist, not poor mastication and poor attitudes toward dental health, were associated with higher risk of dementia onset in the older Japanese cohort even after adjustment for available covariates.

## TRIGEMINAL NEURALGIA

UPPGAARD RO TIC DOULOUREUX--MULTICAUSES INCLUDE DENTAL ORIGIN. NORTHWEST DENT (1968 SEP-Oct) 47(5):273-7

BLACK R., LABORATORY MODEL FOR TRIGEMINAL NEURALGIA. ADV. NEURO.1974; 4:651-8

WESTRUM LE., CANFIELD RC., BLACK R., TRANSGANGLIONIC DEGENERATION IN THE SPINAL TRIGEMINAL NUCLEUS FOLLOWING THE REMOVAL OF TOOTH PULPS IN ADULT CATS. BRAIN RES 1976; 6:100:137-40

WESTRUM LE., CANFIELD RC., ELECTRON MICROSCOPY OF DEGENERATING AXONS AND TERMINALS IN THE SPINAL TRIGEMINAL NUCLEUS AFTER TOOTH PULP EXTERPATION. AM J ANAT. 1977; 149:591-6

GOBEL S., BINK J., DEGENERATIVE CHANGES IN PRIMARY TRIGEMINAL AXONS AND IN NEURONS IN NUCLEUS CAUDALIS FOLLOWING TOOTH PULP EXTIRPATION IN THE CAT., : BRAIN RES. 1977;132:347-54

RATNER EJ, PERSON P, KLEINMAN DJ, SHKLAR G, SOCRANSKY SS. JAWBONE CAVITIES AND TRIGEMINAL AND ATYPICAL FACIAL NEURALGIAS ORAL SURGERY, ORAL MEDICINE, AND ORAL PATHOLOGY 1979 JULY; VOLUME 48, NUMBER 1, PP. 3-20.

The possible role of dental and oral disease in the etiology of idiopathic trigeminal and atypical facial neuralgias has been examined. Among thirty-eight patients with idiopathic trigeminal neuralgia and twenty-three patients with atypical facial neuralgia, there was in nearly all instances a close relationship between pain experienced and the existence of cavities in alveolar bone and jawbone of the patients. The cavities were at the sites of previous tooth extractions and, although at times more than 1 cm. in a given diameter, were usually not detectable by x-rays. A new method for their detection and localization was developed empirically, based on the observation that peripheral infiltration of local anesthetic into or very

close to the bone cavity rapidly abolished trigger and pain perception by patients during persistence of the anesthetic action. Histopathologic examination of bone removed from cavities by curettage revealed, in both idiopathic trigeminal and atypical facial neuralgias, a similar pattern characterized by a highly vascular abnormal healing response of bone. Some lesions presented a mild chronic inflammatory (lymphocytic) infiltration. Preliminary microbiologic studies of material from the walls of the cavities showed the existence within them of a complex, mixed polymicrobial aerobic and anaerobic flora. Treatment consisted of vigorous curettage of the bone cavities, repeated if necessary, plus administration of antibiotics to induce healing and filling-in of the cavities by new bone. Responses of patients to the above treatment consisted of marked to complete pain remissions, the longest of which has been for 9 years. Complete healing leads to complete and persistent pain remissions. It was concluded that in both idiopathic trigeminal and atypical facial neuralgias, dental and oral pathoses may be major etiologic factors.

BAYER D. ET AL TRIGEMINAL NEURALGIA AN OVERVIEW. ORAL SURG. ORAL MED. ORAL PATHOL. 1979;48:393-9

SHABER EP, KROL A.1. TRIGEMINAL NEURALGIA—A NEW TREATMENT CONCEPT. : ORAL SURGERY, ORAL MEDICINE, AND ORAL PATHOLOGY 1980

URBANI G FERRONATO G BERTELE GP TRIGEMINAL NEURALGIA WITH CHRONIC INFECTION DUE TO THE PRESENCE OF A LARGE ROOT FRAGMENT IN THE MANDIBULAR CANAL G STOMATOL ORTOGNATODONZIA (1982 JUL-SEP) 1(2):17-20

SELBY G., DISEASES OF THE FIFTH CRANIAL NERVE. IN DYKE PJ., THOMAS PK., PERIPHERAL NEUROPATHY. PHILADELPHIA. W.B. SAUNDERS 1984;1224-65

RIES P TURK R HISTOPATHOLOGIC CHANGES IN BONE MARROW AND IN DENTAL PULP IN PATIENTS WITH TRIGEMINAL NEURALGIA DTSCH Z MUND KIEFER GESICHTSCHIR (1984 JUL-AUG) 8(4):301-4

FROMM G., ET AL TRIGEMINAL NEURALGIA. CURRENT CONCEPTS REGARDING ETIOLOGY AND PATHOGENESIS ARCH NEUROL 1984;41: 1204-

RATNER EJ LANGER B EVINS ML ALVEOLAR CAVITATIONAL OSTEOPATHOSIS. MANIFESTATIONS OF AN INFECTIOUS PROCESS AND ITS IMPLICATION IN THE CAUSATION OF CHRONIC PAIN PUBLISHED ERRATUM APPEARS IN J PERIODONTOL 1987 FEB;58(2):77] J PERIODONTOL (1986 OCT) 57(10):593-603

## **MULTIPLE SCLEROSIS**

STEINER G J NEUROPATH. 1952;11:343-72 MULTIPLE SCLEROSIS "SINUS MUCOSA MAY BECOME REPEATEDLY INFECTED FROM DISEASED TEETH, GUMS AND TONSILS"

CALLAGHAN TS MULTIPLE SCLEROSIS AND SINUSITIS. LANCET (1986 JUL 19) 2(8499):160-1

GAY D DICK G IS MULTIPLE SCLEROSIS CAUSED BY AN ORAL SPIROCHAETE? LANCET (1986 JUL 12) 2(8498):75-7

Evidence of a direct link between chronic sinusitis and multiple sclerosis (MS) prompted examination of the old "spirochaetal hypothesis". This hypothesis has not been shown to

be erroneous and a spirochaetal infection of the central nervous system could explain the specific pathological, immunological, and epidemiological features of MS.

MULTIPLE SCLEROSIS AND SINUSITIS. LANCET (1986 MAY 17) 1(8490):1158-60

MULTIPLE SCLEROSIS ASSOCIATED WITH SINUSITIS. LANCET (1986 MAY 10) 1(8489):1096-8

GAY D DICK G UPTON G MULTIPLE SCLEROSIS ASSOCIATED WITH SINUSITIS: CASE-CONTROLLED STUDY IN GENERAL PRACTICE. LANCET (1986 APR 12) 1(8485):815-9

In an analysis of general practice records the rate of chronic sinusitis was significantly greater in 92 patients with multiple sclerosis (MS) than in matched controls (p less than 0.0001). MS and chronic sinus infection were also significantly associated in the timing of attacks, in the age at which patients suffered their attacks, and in the seasonal pattern of attacks.

JONES RL CROWE P CHAVDA SV PAHOR AL THE INCIDENCE OF SINUSITIS IN PATIENTS WITH MULTIPLE SCLEROSIS. RHINOLOGY (1997 SEP) 35(3):118-9 (DUPLICATED IN SINUS SECTION FOR ITS IMPORTANCE)

A retrospective study was performed to assess the incidence of sinus disease in patients with MS. The MRI scans of 108 patients referred to a regional Neurosciences Unit with a diagnosis of multiple sclerosis were examined. There were 71 females and 37 males with an age range of 22 to 67 years (mean: 39.7 years). The sagittal and axial images were reviewed and the degree of sinus disease noted. This was graded as absent, minimal, polypoid and pansinus. Fifty-seven patients (53%) had disease, the most common sinus involved was the maxillary followed by the ethmoid, frontal and sphenoid. Thirty-six patients had bilateral disease affecting the ethmoid sinuses most commonly. Three patients had fluid levels and four patients had retention cysts. The incidence of sinus disease is higher than in some other studies of normal populations.

SANTA EULALIA-TROISFONTAINES E MARTÁNEZ-PÁEZ EM MIEGIMOLLE-HERRERO M PLANELL-DEL POZO P ORAL HEALTH STATUS OF A POPULATION WITH MULTIPLE SCLEROSIS. MED ORAL PATOL ORAL CIR BUCAL (2012 MAR) 17(2):E223-7

OBJECTIVE: To determine the oral treatment needs of a sample of patients diagnosed with multiple sclerosis in the Community of Madrid (Spain).PATIENTS AND METHODS: A cross-sectional epidemiological study was carried out with a sample of 64 patients who were aged 25 to 77 years. They were distributed into homogeneous age groups: < 46 years, 46-54 years and > 54 years. In order to evaluate the oral health status and treatment requirements, the parameters and guidelines of the WHO were used.RESULTS: The prevalence of caries was 100%, or very close in all three groups. As age increased, the morbidity rate decreased, but the mortality rate increased considerably. On analyzing gingival health, 65% of patients had calculus, 5% bleeding and 30% were healthy.CONCLUSIONS: The DMFT index found provided data that was, in general, very similar to that of the general population in Spain. However, the gingival health status found demonstrated that the population of multiple sclerosis patients requires specific assistance.

EBRINGER A RASHID T WILSON C THE ROLE OF ACINETOBACTER IN THE PATHOGENESIS OF MULTIPLE SCLEROSIS EXAMINED BY USING POPPER SEQUENCES. MED HYPOTHESES (2012 JUN) 78(6):763-9

Multiple sclerosis (MS) is an autoimmune neurological disorder. The role of 'Acinetobacter' has been examined using the method of Karl Popper and involves nine "Popper sequences". The frequency of MS increases with latitudes in the Northern Hemisphere, and the reverse is found in the Southern Hemisphere. Sinusitis is found frequently at

colder latitudes. Sinusitis occurs frequently in patients with MS. Specific sequences of bovine myelin when injected into experimental animals will produce a neurological disorder resembling MS which is called "experimental allergic encephalomyelitis". Computer analysis of myelin shows molecular mimicry with sequences found in *Acinetobacter*. Antibodies to *Acinetobacter* bacteria are found in MS patients. *Acinetobacter* bacteria are located on human skin and in the nasal sinuses. IgA antibodies are preferentially elevated in the sera of MS patients, thereby suggesting the trigger microbe is acting across a mucosal surface probably located in the nasal sinuses. Only *Acinetobacter* bacteria and no other microbes evoke statistically significant titres of antibodies in MS patients. These nine Popper sequences suggest that MS is most probably caused by infections with *Acinetobacter* bacteria in the nasal sinuses, and this could have therapeutic implications.

## SINUS

MATTILA K ROENTGENOLOGICAL INVESTIGATIONS INTO THE RELATION BETWEEN PERIAPICAL LESIONS AND CONDITIONS OF THE MUCOUS MEMBRANE OF MAXILLARY SINUSES. ACTA ODONTOL SCAND (1965) 23:SUPPL 42:1-91

IVANKIEVICZ D SCHUMACHER GH ETHMOIDAL COMPLICATIONS FOLLOWING MAXILLARY INFLAMMATIONS OF DENTAL ORIGIN. DENT MAG ORAL TOP (1968 JUN) 85(3):111-4

MALONEY PL DOKU HC MAXILLARY SINUSITIS OF ODONTOGENIC ORIGIN. J CAN DENT ASSOC (1968 Nov) 34(11):591-603

MALONEY PL DOKU HC MAXILLARY SINUSITIS OF ODONTOGENIC ORIGIN. J CAN DENT ASSOC (TOR) (1968 Nov) 34(11):591-603

LOPEZ A COMMISSIONAT Y LEPOIVRE M MAXILLARY SINUSITIS OF DENTAL ORIGIN LES SINUSITES MAXILLAIRES D'ORIGINE DENTAIRE. CAH COLL MED HOP PARIS (1969 APR 15) 10(4):259-67  
GUGLANI L MAXILLARY SINUSITIS DUE TO DENTAL INFECTION. NEWSL INT COLL DENT INDIA SECT (1970 SEP) 7(3):15

ESPOSITO S MAXILLARY SINUSITIS OF DENTAL ORIGIN RASS INT CLIN TER (1970 JAN 15) 50(1):39-45

GUGLANI L MAXILLARY SINUSITIS DUE TO DENTAL INFECTION. NEWSL INT COLL DENT INDIA SECT (1970 SEP) 7(3):15 PASSIM

YASUMA K RELATION BETWEEN CHRONIC MAXILLARY SINUITIS AND TOOTH DISEASES. THE CONSERVATIVE TREATMENT OF TEETH PENETRATING THE MAXILLARY SINUS. NIHON KOKU GEKA GAKKAI ZASSHI (1971) 17(1):2-12

IVANKIEVICZ D SCHUMACHER GH ETHMOID COMPLICATIONS OF DENTAL INFLAMMATIONS OF THE MAXILLA FOGORV SZ (1972 APR) 65(4):109-15

YAMAZAKI Y SHIMADA K SAKUMA M KAWASHIMA Y KOBAYASHI H ODONTOGENIC MAXILLARY SINUSITIS: WITH SPECIAL REFERENCE TO SURGICAL THERAPY NIPPON JIBIINKOKA GAKKAI KAIHO (1972 OCT) 75(10):1125-6

IVANOV I MAXILLARY SINUSITIS AND ORBIT PHLEGMON FROM DENTAL ORIGIN MAKSILAREN SINUIT I FLEGMON NA ORBITATA. STOMATOLOGIJA (SOFIA) (1973 OCT-NOV) 55(6):467-70

HALSTEAD CL MUCOSAL CYSTS OF THE MAXILLARY SINUS: REPORT OF 75 CASES. J AM DENT ASSOC (1973 DEC) 87(7):1435-41

ASIEDU WA CALAIS P DIAGNOSIS AND THERAPY OF ODONTOGENOUS DISEASES OF THE MAXILLARY SINUS FORTSCHR KIEFER GESICHTSCHIR (1976) 21:80-1

AZIMOV M ERMAKOVA FB ROLE OF FOCAL ODONTOGENIC INFECTION IN THE PATHOGENESIS OF MAXILLARY SINUSITIS (EXPERIMENTAL STUDY)] STOMATOLOGIJA (MOSK) (1978 JAN-FEB) 57(1):11-4

NORTJE CJ FARMAN AG DE V JOUBERT JJ PATHOLOGICAL CONDITIONS INVOLVING THE MAXILLARY SINUS: THEIR APPEARANCE ON PANORAMIC DENTAL RADIOGRAPHS. BR J ORAL SURG (1979 JUL) 17(1):27-32

NORTJE CJ FARMAN AG DE V JOUBERT JJ PATHOLOGICAL CONDITIONS INVOLVING THE MAXILLARY SINUS: THEIR APPEARANCE ON PANORAMIC DENTAL RADIOGRAPHS. BR J ORAL SURG (1979 JUL) 17(1):27-32

SMITH D GOYCOOLEA M MEYERHOFF WL FULMINANT ODONTOGENIC SINUSITIS. EAR NOSE THROAT J (1979 OCT) 58(10):411-2

LINDAHL L MELEN I EKEDAHN C HOLM SE CHRONIC MAXILLARY SINUSITIS. DIFFERENTIAL DIAGNOSIS AND GENESIS. ACTA OTOLARYNGOL (1982 JAN-FEB) 93(1-2):147-50

By a careful ENT and oral examination of 111 patients with suspected chronic maxillary sinusitis, the diagnosis was verified in only 56% (62/111). In 29 of these 62 patients (47%) a relation to dental infections was found, periodontitis being as frequent as apical granulomas. In 61% of the patients, in whom the diagnosis chronic maxillary sinusitis could not be verified, dental infections and/or myofascial pain dysfunction syndrome (MPD) were the most common and likely cause of the symptoms. A careful oral examination including dental radiographs is thus important in patients with chronic maxillary sinusitis.

SCHMELZLE R SCHWENZER N ODONTOGENIC DISEASES OF THE MAXILLARY SINUS DIE ODONTOGENEN ERKRANKUNGEN DER KIEFERHOHLE. ARCH OTORHINOLARYNGOL (1982) 235(2-3):379-86

HOVINGA J CHRISTIAANS BJ ODONTOGENIC INFECTION LEADING TO ORBITAL CELLULITIS AS A COMPLICATION OF FRACTURE OF THE ZYGOMATIC BONE. J CRANIOMAXILLOFAC SURG (1987 OCT) 15(5):254-7

We describe a 51-year-old man in whom chronic maxillary sinusitis developing from a deep periodontal pocket, at 26, gave rise to cellulitis of the left orbit. The immediate cause was a fracture of the left zygomatic bone with some displacement of the infraorbital margin and the orbital floor. Treatment consisted of drainage and antibiotic medication. The zygomatic bone fracture was not reduced. Eye movements returned to normal and visual acuity was not permanently affected.

SELDEN HS THE ENDO-ANTRAL SYNDROME: AN ENDODONTIC COMPLICATION. J AM DENT ASSOC (1989 SEP) 119(3):397-8, 401-2

Infection of pulpally involved teeth near the maxillary sinus sometimes spreads into the sinus and causes serious complications. This pathological complex, involving both antral and periapical tissues, is referred to as the endo-antral syndrome (EAS). It includes diagnostic difficulties, treatment considerations, and occasionally persistent pathological antral alterations after nonsurgical endodontic therapy. Surgical measures are occasionally required to stimulate healing and preserve the teeth.

Moreschi T Pathology of the maxillary sinus. I: Sinusitis of dental origin *Patologia dei seni mascellari*. Dent Cadmos (1984 May) 52(5):111-4

Melen I Lindahl L Andreasson L Short and long-term treatment results in chronic maxillary sinusitis. *Acta Otolaryngol* (Stockh) (1986 Sep-Oct) 102(3-4):282-90

The diagnostic criteria and the length of the observation period are essential factors influencing the results of treatment of maxillary sinusitis. In 198 patients (244 sinuses) with chronic maxillary sinusitis of either rhinogenous or dental etiology all patients were judged as cured or improved at the short-term control 1-3 months after completion of therapy. The long-term observation (mean 3.5 years) revealed different figures of healing. Satisfactory results after conservative therapy were seen in only 34% while the Caldwell-Luc operation gave good results in 80%. In sinusitis of dental origin, dental treatment combined with local sinus surgery was successful in 90%. In 78 sinuses investigated by sinuscopy, discrepancy between the symptoms and the endoscopic findings was seen in 14 cases (18%). Information obtained by questionnaire is therefore unreliable. In 30 sinuses operated upon with the Caldwell-Luc procedure, discrepancy between radiographic and endoscopic findings was seen in 3 cases (10%). Contributory factors, e.g. nasal polyps, dental infections and nasal allergy were found in 48 out of 84 sinuses not completely healed at the long-term control. Patients treated for chronic maxillary sinusitis must be followed up over a long period. A clinical control after 1-2 years, including sinuscopy or sinus radiographs, is recommended even in patients free from symptoms of sinusitis. Sinuscopy seems to be more reliable than sinus radiography and should be performed if the sinus radiographs show any pathology. The patients are also recommended to visit their dentists regularly, due to the close relationship between dental infections and chronic maxillary sinus diseases.

POLITI M ROSSETTI G CONSOLO U NOCINI PF FUGAZZOLA C ODONTOGENIC SINUSITIS. AN EVALUATION AND THE RADIOLOGIC CHECKUP PROTOCOL AFTER A CALDWELL-LUC INTERVENTION *MINERVA STOMATOL* (1990 FEB) 39(2):119-22

NEUPOKOEV NI NEUPOKOEVA NV PERIAPICAL CYST OF THE MAXILLARY TEETH AS A CAUSE OF ODONTOGENIC MAXILLARY SINUSITIS *STOMATOLOGIJA (MOSK)* (1991 MAY-JUN) 70(3):62-3

CHIKHANI L DUPONT B GUILBERT F IMPROVISI L CORRE A BERTRAND JC UNCOMMON FUNGAL MAXILLARY SINUSITIS OF DENTAL ORIGIN DUE TO *SCEDOSPORIUM PROLIFICANS* UNE SINUSITE MAXILLAIRE FONGIQUE EXCEPTIONNELLE D'ORIGINE DENTAIRE A *SCEDOSPORIUM PROLIFICANS*. *REV STOMATOL CHIR MAXILLOFAC* (1995) 96(2):66-9

This is the first case report of an exceptional maxillary infection due to *Scedosporium prolificans*. This recently discovered fungus was identified in the sinus. In the literature, it has been observed at different locations. Identification requires careful sample taking for mycology and pathology studies emphasizing the importance in maxillary surgery. This

pathogenic fungus is very invasive, particularly in immunodepressed or immunocompromised patients. Therapeutic modalities vary with the patient's immune status

Bertrand B Rombaux P Eloy P Reyckler H Sinusitis of dental origin. *Acta Otorhinolaryngol Belg* (1997) 51(4):315-22

Acute or chronic sinusitis may be odontogenic. Bacteria involved in odontogenic sinusitis are specific organisms associated with the teeth (*Streptococcus sanguis*, *Streptococcus salivarius*, *Streptococcus mutans*, anaerobic germs). They are often secondary to an intrasinus foreign body following periodontitis. The treatment is both naso-sinusal and dental. Cysts of the maxilla can also invade the sinus. In particular, radiculo-dental cysts (periapical) must be surgically excised, in some cases associated with a middle meatotomy. Finally, one should look for oro-antral fistulae. The surgical technique for its closure should take into account the reversibility of the sinus lesions.

ABRAHAMS JJ, GLASSBERG RM. DENTAL DISEASE: A FREQUENTLY UNRECOGNIZED CAUSE OF MAXILLARY SINUS ABNORMALITIES? *AIR. AMERICAN JOURNAL OF ROENTGENOLOGY* 1996 MAY; VOLUME 166, NUMBER 5, PP. 1219-1223.

Periodontal disease may be a frequently unrecognized cause of maxillary sinus disease. The purposes of this study were to determine if maxillary sinus disease is more prevalent in patients with periodontal disease than in an age-and-sex-matched control group and to show radiographically an association of focal maxillary sinus disease with periodontal disease. **MATERIALS AND METHODS:** Maxillary DentaScans (General Electric Medical Systems, Milwaukee, WI) of 84 patients (168 maxillary sinuses) with periodontal disease were retrospectively evaluated for the simple presence or absence of maxillary sinus disease. This group was compared with an age-and-sex-matched control population of 84 patients who were referred for head or neck CT scans in which the maxillary sinuses (including their inferior aspects) were visualized. For the likelihood of sinus disease in patients compared with controls, an odds ratio and a 95% confidence interval were calculated using the SYSTAT version 5.2 (SYSTAT, Evanston, IL). In the second portion of the study, the subject population alone was graded in the following fashion to establish a causal relationship: grade 0, no sinus disease; grade 1, focal sinus disease not adjacent to periodontal disease (unlikely to be caused by periodontal disease); grade 2, nonfocal sinus disease (complete opacification, air-fluid levels, or diffuse mucoperiosteal thickening; indeterminate cause), and grade 3, focal sinus disease adjacent to periodontal disease (likely to be caused by peri-odontal disease). **RESULTS:** In the subject population—patients with periodontal disease who were referred for DentaScans 100 of 168 (60%) sinuses had sinus disease; in the control population, only 49 of 168 (29%) sinuses had sinus disease. The odds ratio for maxillary sinus disease in the patient population compared with controls was 3.6 (95% confidence interval, 2.35.6;  $p < .0001$ ). The grading results of the subject population in the second portion of the study were grade 0, 68 sinuses (41%); grade 1, four sinuses (2%); grade 2, 32 sinuses (19%); and grade 3, 64 sinuses (38%). **CONCLUSION:** We have demonstrated a twofold increase in maxillary sinus disease in patients with periodontal disease and have shown a causal relationship. Recognition of this relationship may have an impact on the clinical management of patients, particularly those planning implant surgery

JONES RL CROWE P CHAVDA SV PAHOR AL THE INCIDENCE OF SINUSITIS IN PATIENTS WITH MULTIPLE SCLEROSIS. RHINOLOGY (1997 SEP) 35(3):118-9 (DUPLICATED IN MS SECTION FOR ITS IMPORTANCE)

A retrospective study was performed to assess the incidence of sinus disease in patients with MS. The MRI scans of 108 patients referred to a regional Neurosciences Unit with a diagnosis of multiple sclerosis were examined. There were 71 females and 37 males with an age range of 22 to 67 years (mean: 39.7 years). The sagittal and axial images were reviewed and the degree of sinus disease noted. This was graded as absent, minimal, polypoid and pansinus. Fifty-seven patients (53%) had disease, the most common sinus involved was the maxillary followed by the ethmoid, frontal and sphenoid. Thirty-six patients had bilateral disease affecting the ethmoid sinuses most commonly. Three patients had fluid levels and four patients had retention cysts. The incidence of sinus disease is higher than in some other studies of normal populations.

BERTRAND B ROMBAUX P ELOY P REYCHLER H SINUSITIS OF DENTAL ORIGIN. ACTA OTORHINOLARYNGOL BELG (1997) 51(4):315-22

Acute or chronic sinusitis may be odontogenic. Bacteria involved in odontogenic sinusitis are specific organisms associated with the teeth (*Streptococcus sanguis*, *Streptococcus salivarius*, *Streptococcus mutans*, anaerobic germs). They are often secondary to an intrasinus foreign body following periodontitis. The treatment is both naso-sinusal and dental. Cysts of the maxilla can also invade the sinus. In particular, radiculo-dental cysts (periapical) must be surgically excised, in some cases associated with a middle meatotomy. Finally, one should look for oro-antral fistulae. The surgical technique for its closure should take into account the reversibility of the sinus lesions.

SANDLER HJ CLINICAL UPDATE--THE TEETH AND THE MAXILLARY SINUS: THE MUTUAL IMPACT OF CLINICAL PROCEDURES, DISEASE CONDITIONS AND THEIR TREATMENT IMPLICATIONS. PART 2. ODONTOGENIC SINUS DISEASE AND ELECTIVE CLINICAL PROCEDURES INVOLVING THE MAXILLARY ANTRUM: DIAGNOSIS AND MANAGEMENT. AUST ENDOD J (1999 APR) 25(1):32-6

Although odontogenic sinusitis is a rare entity when compared to sinus disease of rhinogenic origin, it is extremely important to identify a dental aetiology when it occurs. The offending tooth or teeth would thus require endodontic treatment or extraction, and the sinus disease carefully assessed and appropriately managed. Aetiology and presentation of oro-antral fistulae are also discussed and guidelines for the management of this complication are recommended. Certain lesions such as cysts and tumours may involve the jaws and hence the maxillary antrum; some of these, such as a radicular cyst are quite common, but the rarer ones are included for completeness. Surgical techniques are continuously evolving to optimise form and function of the jaws, and when applied to the maxilla there may be some impact on nasal and sinus function. The advent, and now proven success, of osseointegrated jaw implants have brought with them innovations and refinements of bone grafting techniques, and more recently distraction osteogenesis for augmentation. Maxillary osteotomies for surgical orthodontics, and to facilitate prosthodontic treatment are briefly mentioned, as most of these inevitably involve the antrum and/or nose. This paper discusses, in summary form, important aspects of clinical dental practice which may involve the maxillary antrum. It is thus a broad overview of certain pathologic conditions and elective surgical procedures which have relevance to both medical and dental practitioners



Lindeboom JA van den Akker HP Sinusitis as the first indication of sarcoidosis an incidental finding in a patient with presumed 'odontogenic' sinusitis: case report. *Br J Oral Maxillofac Surg* (2000 Aug) 38(4):277-9

Involvement of the paranasal sinuses and nose by sarcoidosis is uncommon, and has been reported in only 1-4% of patients with sarcoidosis. Clinical symptoms are nasal obstruction, epistaxis, nasal pain, discharge, anosmia or hyposmia, epiphora, and dyspnoea. We present a case of sarcoidosis in which sinusitis was the first clinical sign of the disease.

Bogaerts P Hanssens JF Siquet JP Healing of maxillary sinusitis of odontogenic origin following conservative endodontic retreatment: case reports. *Acta Otorhinolaryngol Belg* (2003) 57(1):91-7

Because of the anatomical proximity, infection of posterior upper teeth can spread into the maxillary sinus. When confronted with a large persistent periapical lesion on a posterior maxillary root-treated tooth, the practitioner should question the quality of the previous endodontic treatment, evaluate the impact of the potential causes of failure and consider, in the majority of cases, the conservative non-surgical retreatment instead of extraction or periapical surgery of the dental element. This paper reports two cases of healing of extensive periapical bone destruction and of the co-existing sinus pathology of odontogenic origin after non-surgical endodontic retreatment of previously root-treated upper molars. Misconceptions concerning the role of epithelium in the periapical lesion are discussed. Also, emphasis is put on the need of precise radiological diagnosis, pre-operatively as well as post-operatively to ascertain healing and to avoid unnecessary delay in the appropriate management of these patients.

BROOK I MICROBIOLOGY OF ACUTE AND CHRONIC MAXILLARY SINUSITIS ASSOCIATED WITH AN ODONTOGENIC ORIGIN. *LARYNGOSCOPE* (2005 MAY) 115(5):823-5

OBJECTIVES:: To study the microbiology of sinusitis associated with odontogenic origin. METHODS:: Aspirates of 20 acutely and 28 chronically infected maxillary sinuses that were associated with odontogenic infection were processed for aerobic and anaerobic bacteria. RESULTS:: A total of 66 isolates were recovered from the 20 cases of acute sinusitis (3.3/specimen), 16 aerobic and facultatives, and 50 anaerobic. Aerobes alone were recovered in 2 (10%) specimens, anaerobes only in 10 (50%), and mixed aerobic and anaerobic bacteria in 8 (40%). The predominant aerobes were alpha-hemolytic streptococci (5), microaerophilic streptococci (4), and *Staphylococcus aureus* (2). The predominant anaerobes were anaerobic Gram-negative bacilli (22), *Peptostreptococcus* (12), and *Fusobacterium* spp. (9). A total of 98 isolates were recovered from the 28 cases of chronic sinusitis (3.5/patient): 21 aerobic and facultatives and 77 anaerobic. Aerobes were recovered in 3 (11%) instances, anaerobes only in 11 (39%), and mixed aerobic and anaerobic bacteria in 14 (50%). The predominant aerobes were alpha-hemolytic streptococci (7), microaerophilic streptococci (4), and *S. aureus* (5). The predominant anaerobes were Gram-negative bacilli (41), *Peptostreptococcus* (16), and *Fusobacterium* spp. (12). Thirteen beta-lactamase-producing bacteria (BLPB) were recovered from 10 (50%) patients with acute sinusitis and 25 BLPB from 21 (75%) patients with chronic sinusitis. No correlation was found between the predisposing odontogenic conditions and the microbiological findings. CONCLUSIONS:: These data illustrate the similar microbiology of acute and chronic maxillary sinusitis associated with odontogenic infection where anaerobic bacteria predominate in both types of infections.

BROOK I MICROBIOLOGY OF INTRACRANIAL ABSCESES ASSOCIATED WITH SINUSITIS OF ODONTOGENIC ORIGIN. *ANN OTOL RHINOL LARYNGOL* (2006 DEC) 115(12):917-20 (COPY IN BRAIN SECTION)

OBJECTIVES: The unique microbiology of sinusitis of dental origin that is associated with intracranial abscesses (IAs) and the correlation between the organisms at the two sites has

not been reported before. This report describes the author's experience during a 30-year period in studying the microbiology of 8 IAs and their corresponding sinusitis of dental origin. METHODS: Aspirates of pus from 8 infected sinuses associated with odontogenic infections and their corresponding IAs were studied for aerobic and anaerobic bacteria. Polymicrobial flora was found in all 8 sinuses and 7 IAs, and the number of isolates varied from 1 to 5. RESULTS: Anaerobic bacteria were isolated from all sinuses and IAs. A total of 28 isolates (3.5 isolates per site; 25 strict anaerobic, 1 aerobic or facultative, and 2 microaerophilic) were recovered from the sinuses, and 20 isolates (2.5 isolates per site; 16 strict anaerobic, 1 aerobic or facultative, and 3 microaerophilic) were found in the IAs. The bacterial isolates were *Fusobacterium* spp (14), *Prevotella* spp (11), *Peptostreptococcus* spp (13), microaerophilic streptococci (5), *Veillonella parvula* (3), and beta-hemolytic streptococci group F(2). Concordance in the microbiological findings between the sinus and the IA was found in all instances; however, certain organisms were only present at one site. CONCLUSIONS: These data illustrate the concordance in the organisms recovered from sinusitis of dental origin and their associated IAs and confirm the importance of anaerobic bacteria in sinusitis and IAs of dental origin.

ARIJI Y ODAYASHI N GOTO M IZUMI M NAITOH M KURITA K SHIMOZATO K ARIJI E ROOTS OF THE MAXILLARY FIRST AND SECOND MOLARS IN HORIZONTAL RELATION TO ALVEOLAR CORTICAL PLATES AND MAXILLARY SINUS: COMPUTED TOMOGRAPHY ASSESSMENT FOR INFECTION SPREAD. CLIN ORAL INVESTIG (2006 MAR) 10(1):35-41

The purposes of this study were to investigate the horizontal relationship of the roots of maxillary molars with the cortical plates and the maxillary sinus and to investigate the influence of these relationships on the spread of odontogenic infection. Computed tomography images of 120 control subjects and 49 patients with infection originating in the maxillary first or second molar were investigated. In the control group, more than 60% of the first molar roots contacted both palatal and buccal cortical plates (type A), while such contact was not seen in more than 60% of second molars. The floor of maxillary sinus was most frequently observed at the level between the bifurcation and apices of roots in both first and second molars. In patients with infection, cortical changes were more frequently seen on the buccal side than on the palatal side, and 80% of patients with buccal cortical change showed the position in which the buccal roots were close to the buccal cortical plate. Mucosal thickening of the maxillary sinus was found in 87.8%. The buccopalatal spread of odontogenic infection originating in the maxillary first and second molars was influenced by the horizontal root position in relation to the cortices

BROOK I SINUSITIS OF ODONTOGENIC ORIGIN. OTOLARYNGOL HEAD NECK SURG (2006 SEP) 135(3):349-55

Odontogenic sinusitis is a well-recognized condition and accounts for approximately 10% to 12% of cases of maxillary sinusitis. An odontogenic source should be considered in individuals with symptoms of maxillary sinusitis with a history of odontogenic infection, dentoalveolar surgery, periodontal surgery, or in those resistant to conventional sinusitis therapy. Diagnosis usually requires a thorough dental and clinical evaluation including appropriate radiographs. The most common causes of odontogenic sinusitis include dental abscesses and periodontal disease that had perforated the Schneiderian membrane, irritation and secondary infection caused by intra-antral foreign bodies, and sinus perforations during tooth extraction. An odontogenic infection is a polymicrobial aerobic-anaerobic infection, with anaerobes outnumbering the aerobes. The most common isolates include anaerobic streptococci and gram-negative bacilli, and Enterobacteriaceae. Surgical and dental treatment of the odontogenic pathological conditions combined with medical therapy is indicated. When present, an odontogenic foreign body should be surgical

removed. Surgical management of oroantral communication is indicated to reduce the likelihood of causing chronic sinus disease. The management of odontogenic sinusitis includes a 3- to 4-week course of antimicrobials effective against the oral flora pathogens.

UGINCIUS P KUBILIUS R GERVICKAS A VAITKUS S CHRONIC ODONTOGENIC MAXILLARY SINUSITIS. STOMATOLOGIJA (2006) 8(2):44-8

The aim of the present study was to estimate average age of the patients in both sexes treated for MS, distribution by sex, amount of dexter and sinister MS with and without the fistulas into the maxillary sinus, with and without the foreign-bodies, length of stay in the Department of Maxillofacial Surgery at Kaunas Hospital of University of Medicine during the period from 1999 till 2004. The retrospective data analysis of the patients' treated from chronic MS was made. 346 patients (213 females and 133 males) were treated for chronic MS. 55 cases of chronic dexter MS with a fistula into maxillary sinus, 98 cases of chronic dexter MS without a fistula, 45 cases of chronic sinister MS with a fistula, 112 cases chronic sinister MS without a fistula, 16 cases of foreign-bodies in dexter maxillary sinus, 20 cases of foreign-bodies in sinister maxillary sinus have been detected. The main age of the female was 46.6+/-15.0, the main age of the men was 42.1+/-14.4. Statistically significant difference in the age difference of the women and the men was found ( $p=0.0024$ ). It was determined, that females diagnosed and treated with chronic MS were 1.6 times more than males during the period from 1999 till 2004 in Kaunas Hospital of University of Medicine. Females treated for chronic MS were 4.5 years older than males.

SINUSITIS OF ODONTOGENIC ORIGIN. OTOLARYNGOL HEAD NECK SURG (2006 SEP) 135(3):349-55

Odontogenic sinusitis is a well-recognized condition and accounts for approximately 10% to 12% of cases of maxillary sinusitis. An odontogenic source should be considered in individuals with symptoms of maxillary sinusitis with a history of odontogenic infection, dentoalveolar surgery, periodontal surgery, or in those resistant to conventional sinusitis therapy. Diagnosis usually requires a thorough dental and clinical evaluation including appropriate radiographs. The most common causes of odontogenic sinusitis include dental abscesses and periodontal disease that had perforated the Schneiderian membrane, irritation and secondary infection caused by intra-antral foreign bodies, and sinus perforations during tooth extraction. An odontogenic infection is a polymicrobial aerobic-anaerobic infection, with anaerobes outnumbering the aerobes. The most common isolates include anaerobic streptococci and gram-negative bacilli, and Enterobacteriaceae. Surgical and dental treatment of the odontogenic pathological conditions combined with medical therapy is indicated. When present, an odontogenic foreign body should be surgical removed. Surgical management of oroantral communication is indicated to reduce the likelihood of causing chronic sinus disease. The management of odontogenic sinusitis includes a 3- to 4-week course of antimicrobials effective against the oral flora pathogens.

MEHRA P JEONG D MAXILLARY SINUSITIS OF ODONTOGENIC ORIGIN. CURR ALLERGY ASTHMA REP (2009 MAY) 9(3):238-43

Odontogenic etiology accounts for 10% to 12% of cases of maxillary sinusitis. Although uncommon, direct spread of dental infections into the maxillary sinus is possible due to the close relationship of the maxillary posterior teeth to the maxillary sinus. If a periapical dental infection or dental/oral surgery procedure violates the schneiderian membrane integrity, infection will likely spread into the sinus, leading to sinusitis. An odontogenic source should be considered in individuals with symptoms of maxillary sinusitis and a history of dental or jaw pain; dental infection; oral, periodontal, or endodontic surgery; and in those people resistant to conventional sinusitis therapy. An odontogenic infection is a polymicrobial aerobic-anaerobic infection, with anaerobes outnumbering the aerobes.

Diagnosis requires a thorough dental and clinical evaluation, including radiographs. Management of sinus disease of odontogenic origin often requires medical treatment with appropriate antibiotics, surgical drainage when indicated, and treatment to remove the offending dental etiology.

PATEL NA FERGUSON BJ ODONTOGENIC SINUSITIS: AN ANCIENT BUT UNDER-APPRECIATED CAUSE OF MAXILLARY SINUSITIS. CURR OPIN OTOLARYNGOL HEAD NECK SURG (2012 FEB) 20(1):24-8

**PURPOSE OF REVIEW:** For well over 100 years, it has been appreciated that maxillary dental infections can cause sinusitis. This insight has been largely overlooked with the advent of functional endoscopic sinus surgery (ESS) and its emphasis on the osteomeatal complex. We review several recent case series and reviews of odontogenic sinusitis that characterize and discuss emerging diagnostic modalities in odontogenic sinusitis. **RECENT FINDINGS:** In recent publications on odontogenic sinusitis, up to 40% of chronic bacterial maxillary sinus infections are attributed to a dental source, which is far higher than the previously reported incidence of 10%. Plain dental films and dental evaluations frequently fail to detect maxillary dental infection that can be causing odontogenic sinusitis. However, sinus computed tomography (CT) or Cone Beam Volumetric CT (CBVCT) are far more successful in identifying dental disease causing sinusitis. The microbial pathogens of odontogenic sinusitis remain unchanged from earlier reviews; however, the clinical findings in odontogenic sinusitis are better described in recent reviews. Successful treatment of odontogenic sinusitis requires management of the odontogenic source and may require concomitant or subsequent sinus surgery. **SUMMARY:** Odontogenic sinusitis is frequently recalcitrant to medical therapy and usually requires treatment of the dental disease. Sometimes dental treatment alone is adequate to resolve the odontogenic sinusitis and sometimes concomitant or subsequent ESS is required. Evaluation of all patients with persistent chronic rhinosinusitis (CRS) should include inspection of the maxillary teeth on CT scan for evidence of periapical lucencies. Unilateral recalcitrant disease associated with foul smelling drainage is especially characteristic of odontogenic sinusitis. High-resolution CT scans and CBVCT can assist in identifying dental disease.

PATEL NA FERGUSON BJ ODONTOGENIC SINUSITIS: AN ANCIENT BUT UNDER-APPRECIATED CAUSE OF MAXILLARY SINUSITIS. CURR OPIN OTOLARYNGOL HEAD NECK SURG (2012 FEB) 20(1):24-8

**PURPOSE OF REVIEW:** For well over 100 years, it has been appreciated that maxillary dental infections can cause sinusitis. This insight has been largely overlooked with the advent of functional endoscopic sinus surgery (ESS) and its emphasis on the osteomeatal complex. We review several recent case series and reviews of odontogenic sinusitis that characterize and discuss emerging diagnostic modalities in odontogenic sinusitis. **RECENT FINDINGS:** In recent publications on odontogenic sinusitis, up to 40% of chronic bacterial maxillary sinus infections are attributed to a dental source, which is far higher than the previously reported incidence of 10%. Plain dental films and dental evaluations frequently fail to detect maxillary dental infection that can be causing odontogenic sinusitis. However, sinus computed tomography (CT) or Cone Beam Volumetric CT (CBVCT) are far more successful in identifying dental disease causing sinusitis. The microbial pathogens of odontogenic sinusitis remain unchanged from earlier reviews; however, the clinical findings in odontogenic sinusitis are better described in recent reviews. Successful treatment of odontogenic sinusitis requires management of the odontogenic source and may require concomitant or subsequent sinus surgery. **SUMMARY:** Odontogenic sinusitis is frequently recalcitrant to medical therapy and usually requires treatment of the dental disease. Sometimes dental treatment alone is adequate to resolve the odontogenic sinusitis and sometimes concomitant or subsequent ESS is required. Evaluation of all patients with persistent chronic rhinosinusitis (CRS) should include inspection of the maxillary teeth on

CT scan for evidence of periapical lucencies. Unilateral recalcitrant disease associated with foul smelling drainage is especially characteristic of odontogenic sinusitis. High- resolution CT scans and CBVCT can assist in identifying dental disease.

## IMMUNE

KALIUSZNAIA RA THE ROLE OF TOXICOSIS IN THE DEVELOPMENT OF SENSITIZATION AND ALLERGIC CONDITIONS IN CHILDREN AND ADOLESCENTS PEDIATRIIA (1967 OCT) 46(10):9-14

CHUIKIN SV IMMUNOLOGICAL ASPECTS OF THE EFFECT OF INFLAMMATORY DISEASES OF THE MAXILLOFACIAL AREA ON THE BRAIN STOMATOLOGIIA (MOSK) (1989 MAY-JUN) 68(3):32-5

MARQUES AP WALKER PO INTRAORAL ETIOLOGY OF A LIFE-THREATENING INFECTION IN AN IMMUNOCOMPROMISED PATIENT: REPORT OF CASE. ASDC J DENT CHILD (1991 NOV-DEC) 58(6)

RAPOPORT H POPKO M FINDLER M FINDLER M DENTAL TREATMENT FOR PATIENTS WITH MYASTHENIS GRAVIS REFUAT HAPEH VEHASHINAYIM (2005 JUL) 22(3):35-40, 90

Myasthenia gravis is an autoimmune disease, characterized by weakness of the skeletal muscles, which increases during action. The nature of the disease influences the mode of dental treatment. Careful treatment planning prevents over-activity of the muscles. The bulbar appearance of the disease, affects the chewing muscles, thus, it is important to avoid aspiration of foods or other particles from the mouth. Infections may exacerbate the symptoms of Myasthenia gravis, therefore the dentist must eliminate oral focal infections and avoid using medicines that might worsen the disease.

## LUPUS

SINCLAIR RJ ORAL INFECTION IN CONNECTIVE TISSUE DISEASE. J BR ENDOD SOC (1967 SPRING) 1(1):13-4

ARELLANO OCAMPO F ROJAS RODRIGUEZ J ROSALES PEREZ S PEREZ MA RAMALES E SYSTEMIC LUPUS ERYTHEMATOSUS (PRESENTATION OF A CASE) LUPUS ERITEMATOSO SISTEMICO (PRESENTACION DE UN CASO). ALERGIA (1977 JUL) 24(3):149-58

## GENERAL

BERARD R SPECIAL CHARACTERISTICS OF INFECTION SPREAD IN TEMPORARY MOLARS ACTUAL ODONTOSTOMATOL (PARIS) (1973 DEC) 27(104):707-18

GAWRZEWSKA B WEDLER A FIJAL D RESULTS OF STUDIES ON THE REMOVAL OF ACTIVE INFECTIOUS FOCI IN THE TREATMENT OF DISEASES CAUSED BY ODONTOGENIC FOCAL INFECTIONS CZAS STOMATOL (1976 DEC) 29(12):1099-103

ELSNER R KOCH H ERRORS AND DANGERS IN TREATMENT OF ODONTOGENIC INFECTIONS WITH ANTIBIOTICS QUINTESENZ (1977 OCT) 28(10):137-40

EASTMAN HL NEURO-FOCAL DENTISTRY: THE BASIC REGULATORY SYSTEM. 3 REV FED ODONTOL COLOMB (1982 APR-JUN) 31(141):53-61

THODEN VAN VELZEN SK ABRAHAM-INPIJN L MOORER WR PLAQUE AND SYSTEMIC DISEASE: A REAPPRAISAL OF THE FOCAL INFECTION CONCEPT. J CLIN PERIODONTOL (1984 APR) 11(4):209-20  
 BUSCH DF ANAEROBES IN INFECTIONS OF THE HEAD AND NECK AND EAR, NOSE, AND THROAT. REV INFECT DIS (1984 MAR-APR) 6 SUPPL 1:S115-22

Anaerobic bacteria outnumber aerobes at most oropharyngeal sites, with counts up to 10(11)/ml of fluid, and have been implicated in infections of all structures of the head and neck. They are common in chronic otitis media, chronic sinusitis, and various soft-tissue infections. These infections are initiated primarily by mucosal breaks. Bacterial factors such as adhesiveness and antileukocytic activity also may play a role. Among the complications of these infections are brain abscess, aspiration pneumonia, and anaerobic sepsis. Treatment includes surgical drainage and use of antimicrobial agents active against the mixed flora commonly found. Penicillin is currently the drug of choice, but this may change with the emergence of beta-lactamase-producing strains of anaerobes such as *Bacteroides melaninogenicus*.

SCHROEDER DC SARHA ED HENDRICKSON DA HEALEY KM SEVERE INFECTIONS OF THE HEAD AND NECK RESULTING FROM GAS-FORMING ORGANISMS: REPORT OF CASE. J AM DENT ASSOC (1987 JAN) 114(1):65-8

DEBELIAN GJ, OLSEN I, TRONSTAD L. SYSTEMIC DISEASES CAUSED BY ORAL MICROORGANISMS ENDODONTICS & DENTAL TRAUMATOLOGY 1994 APRIL; VOLUME 10, NUMBER 2, PP. 57-65.

Human endodontic and periodontal infections are associated with complex microfloras in which approximately 150, (in apical periodontitis) and 350 (in marginal periodontitis) bacterial species have been encountered. These infections are predominantly anaerobic, with gram-negative rods being the most common isolates. The anatomic closeness of this microflora to the bloodstream can facilitate bacteremia and systemic spread of bacterial by-products and immunocomplexes. A variety of clinical procedures such as tooth extraction, periodontal and endodontic treatment, may cause translocation of microorganisms from the oral cavity to the bloodstream. The microorganisms that gain entrance to the blood circulate throughout the body, but are usually eliminated by the host (reticuloendothelial system) within minutes. However, in patients with ineffective heart valves or vascular diseases, bacteremia can be a potential danger, leading most commonly to infective endocarditis and myocardial or cerebral infarction. Other forms of systemic diseases such as brain abscesses, hematological infections and implant infections have also been related to oral microorganisms.

BRIDGEMAN A WIESENFELD D HELLYAR A SHELDON W MAJOR MAXILLOFACIAL INFECTIONS. AN EVALUATION OF 107 CASES. AUST DENT J (1995 OCT) 40(5):281-8

NAVAZESH M MULLIGAN R SYSTEMIC DISSEMINATION AS A RESULT OF ORAL INFECTION IN INDIVIDUALS 50 YEARS OF AGE AND OLDER. SPEC CARE DENTIST (1995 JAN-FEB) 15(1):11-9

NAVAZESH M, MULLIGAN R. SYSTEMIC DISSEMINATION AS A RESULT OF ORAL INFECTION IN INDIVIDUALS 50 YEARS OF AGE AND OLDER. SPECIAL CARE IN DENTISTRY 1995 JANUARY-FEBRUARY; VOLUME 15, NUMBER 1, PP. 11-19.

The oral pathosis caused by systemic disorders in middle-aged and elderly adults has been the focus of many publications in recent years. The immorsoft and hard tissue changes associated with systemic disorders, medications, chemotherapy, and radiation treatment have been well-investigated and-documented. Far less attention has been paid to the role of

oral infection as the etiology of systemic disorders. A literature review (1980-1994) is provided here focusing on well-documented cases in which systemic disorders \_were caused by oral foci of infections. This paper attempts to raise the level of awareness of practitioners in considering possible systemic complications caused by oral infection. It also emphasizes the need for further longitudinal studies in this field involving healthy and medically compromised elderly individuals.

WALSH LJ SERIOUS COMPLICATIONS OF ENDODONTIC INFECTIONS: SOME CAUTIONARY TALES.  
AUSTRALIAN DENTAL JOURNAL 1997 JUNE; VOLUME 42, NUMBER 3, PP. 156-159..

While endodontic (dentoalveolar) abscesses can cause significant morbidity, in susceptible individuals they can pose life-threatening problems. This paper provides an overview of the more serious sequelae of endodontic abscesses, and provides examples of 'high risk' situations in practice in which these serious complications are more likely to occur.

MEURMAN JH DENTAL INFECTIONS AND GENERAL HEALTH. QUINTESSENCE INT (1997 DEC)  
28(12):807-11

The detrimental effect of focal infection on general health has been known for decades. Chronic dental infections may worsen the condition of medically compromised patients. Prophylactic antibiotics are therefore routinely prescribed before dental treatment to immunosuppressed and other at-risk patients to combat the spread of oral bacteria into the bloodstream. More recent studies have shown that dental infections may also be a risk factor for atherosclerosis and various other chronic diseases, emphasizing the need for frequent dental checkups among the diseased, in particular. The aim of this review article is to discuss some recent findings on the effect of dental infections on health in general. In many industrialized countries, there is an urgent need to focus on preventive dental care for the diseased and the elderly, whose oral health has been more or less neglected.

LOESCHE WJ. ASSOCIATION OF THE ORAL FLORA WITH IMPORTANT MEDICAL DISEASES. CURRENT OPINION IN PERIODONTOLOGY 1997, VOLUME 4, PP. 21-28.

Recently, there have been case-control and epidemiologic investigations that strongly associate poor dental health with cardiovascular disease, preterm low birth weight infants, and early death from any cause. In a 7-year prospective study, dental disease was a significant predictor of coronary events leading to death after controlling for known coronary disease risk factors. Missing teeth displaces smoking as a risk factor for ischemic heart disease in another study. Periodontal disease was seven times more likely to be associated with a preterm delivery of a low birth weight infant than mother's age, race, number of live births, and use of tobacco or alcohol. This review examines the role of asymptomatic bacteremia as possibly explaining these associations, focusing on the bacterial load on the teeth as mediated via oral hygiene

LOESCHE WJ ASSOCIATION OF THE ORAL FLORA WITH IMPORTANT MEDICAL DISEASES. CURR OPIN PERIODONTOL (1997) 4:21-8

Recently, there have been case-control and epidemiologic investigations that strongly associate poor dental health with cardiovascular disease, preterm low birth weight infants, and early death from any cause. In a 7-year prospective study, dental disease was a significant predictor of coronary events leading to death after controlling for known coronary disease risk factors. Missing teeth displaces smoking as a risk factor for ischemic heart disease in another study. Periodontal disease was seven times more likely to be associated with a preterm delivery of a low birth weight infant than mother's age, race,

number of live births, and use of tobacco or alcohol. This review examines the role of asymptomatic bacteremia as possibly explaining these associations, focusing on the bacterial load on the teeth as mediated via oral hygiene.

MEURMAN JH DENTAL INFECTIONS AND GENERAL HEALTH. *QUINTESSENCE INT* (1997 DEC) 28(12):807-11

YONETSU K IZUMI M NAKAMURA T DEEP FACIAL INFECTIONS OF ODONTOGENIC ORIGIN: CT ASSESSMENT OF PATHWAYS OF SPACE INVOLVEMENT. *AJNR AM J NEURORADIOLOG* (1998 JAN) 19(1):123-8

**PURPOSE:** We investigated the pathways of spread of odontogenic infection in the facial and neck spaces. **METHODS:** CT scans of 45 patients with extensive spread of odontogenic infection into the facial and neck spaces were analyzed to document pathways of spread. **RESULTS:** Odontogenic infections arising in the mandible first spread upward, into the masseter and/or medial pterygoid muscles in the masticator space, and downward, into the sublingual and/or submandibular spaces, and then spread into the spaces or muscles adjacent to one or more of these locations. Infections from the masseter muscle spread into the parotid space to involve the temporalis and lateral pterygoid muscles. Infections from the medial pterygoid muscle spread into the parapharyngeal space to involve the lateral pterygoid muscle. Infections in the maxilla did not spread downward; instead, they tended to spread upward and superficially into the temporal and/or masseter spaces and deeply involve the lateral and/or medial pterygoid muscles in the medial masticator space. **CONCLUSION:** CT may be useful to depict the extent of infection and to plan treatment of extensive odontogenic infection, which can be life threatening when therapy is ineffective.

OKUDA K EBIHARA Y RELATIONSHIPS BETWEEN CHRONIC ORAL INFECTIOUS DISEASES AND SYSTEMIC DISEASES. *BULL TOKYO DENT COLL* (1998 AUG) 39(3):165-74

There are over 300 species of bacteria forming populations of several hundred billion in the human oral cavity. The number of bacteria reaches a thousand billion when the mouth is not sufficiently cleaned. Using saliva and gingival crevicular fluid as their main nutrients, these bacteria create their ecological niches on tooth surfaces, gingival crevices, saliva, dorsum linguae, and buccal and pharyngeal mucosa, threatening oral and systemic health. It is known that primary lesions of these chronic bacterial infections secondarily cause nephritis, rheumatoid arthritis, and dermatitis. Further, it has been demonstrated in recent years that bacteria inhabiting the oral cavity can cause bacterial pneumonia and endocarditis and that the periodontal-disease-associated bacteria become causative agents for pregnancy troubles and are involved in blood circulation problem and coronary heart disease. Dentistry reviewed the theme of World Health Day, Oral Health for a Healthy Life, in 1994. The 8020 campaign to promote tooth care is also becoming established in Japan; however, the authors emphasized that this achievement is not the goal of dental health care. In this article, we explain the bases supporting the concept that oral health care, primarily mouth cleaning, is important for not only oral disease but also a healthy life.

JANSMA J VISSINK A DENTAL FOCI. ROLE, TREATMENT AND PROPHYLAXIS IN PATIENTS AT RISK *NED TIJDSCHR TANDHEELKD* (1998 FEB) 105(2):52-6

A dental focus usually is a localized chronic infection that under certain circumstances may result in severe local or systemic disease. The most important dental foci are periodontitis, periapical lesions, advanced carious lesions, nonvital pulp, partially impacted teeth and root tips. Local effects of dental foci particularly are processes that may come to expression because of a compromised immunological defence, such as osteoradionecrosis. Systemic effects are mainly caused by transient bacteraemia which can occur spontaneously out of dental foci or after manipulations such as brushing, flossing and dental treatment. Well



known examples are infectious endocarditis, fever during chemotherapy and hematogenous infections of total joint prostheses. For all patients at risk (a.o. endocarditis, endoprosthesis, chemotherapy, radiotherapy) it is important that dental foci are treated. Because in most patients the risk factors are present lifelong, a healthy dentition and a healthy periodontium are the best way of prevention.

SCANNAPIECO FA POSITION PAPER OF THE AMERICAN ACADEMY OF PERIODONTOLOGY: PERIODONTAL DISEASE AS A POTENTIAL RISK FACTOR FOR SYSTEMIC DISEASES. J PERIODONTOL (1998 JUL) 69(7):841-50

This paper on periodontal disease as a potential risk factor for systemic diseases was prepared by the Research, Science and Therapy Committee of The American Academy of Periodontology. It is intended to provide information regarding the role of periodontal disease in systemic diseases, including bacteremia, infective endocarditis, cardiovascular disease and atherosclerosis, prosthetic device infection, diabetes mellitus, respiratory diseases, and adverse pregnancy outcomes.

MORIMOTO A MORIMOTO Y MAKI K NISHIDA I KAWAHARA H KIMURA M DENTAL TREATMENT OF A PROSPECTIVE RECIPIENT OF A LIVER TRANSPLANT: A CASE REPORT. J CLIN PEDIATR DENT (1998 FALL) 23(1):75-8

A protocol to treat a carious condition in a young girl scheduled to receive a liver transplantation is described. Teeth with serious caries were filled with amalgam. Those teeth with pulp exposure were extracted. To stop bleeding, sutures and a surgical splint with a periodontal pack were used. All procedures were performed as rapidly as possible to minimize stress. Antibiotics were used sparingly. By improving the oral health of transplant recipients, the chances that the transplanted liver will become infected are much reduced, increasing the likelihood of a successful surgical outcome.

PAGE RC THE PATHOBIOLOGY OF PERIODONTAL DISEASES MAY AFFECT SYSTEMIC DISEASES: INVERSION OF A PARADIGM. ANN PERIODONTOL (1998 JUL) 3(1):108-20

A new paradigm for the pathobiology of periodontitis is presented, and the manner in which periodontitis may relate to susceptibility for certain systemic diseases such as cardiovascular disease and preterm labor is described. Periodontitis is caused by a small group of Gram-negative bacteria present on the tooth root surfaces as biofilms. Lipopolysaccharide (LPS) and other substances gain access to the gingival tissues, initiate and perpetuate immunoinflammation, resulting in production of high levels of proinflammatory cytokines. These induce production of matrix metalloproteinases which destroy the connective tissues of the gingiva and periodontal ligament, and prostaglandins which mediate alveolar bone destruction. Periodontitis may enhance susceptibility to systemic diseases in several ways. LPS and viable Gram-negative bacteria from the biofilms and proinflammatory cytokines from the inflamed periodontal tissues may enter the circulation in pathogenic quantities. In addition, periodontitis and certain systemic diseases, such as cardiovascular disease, share risk factors including tobacco smoking, male gender, race/ethnicity, stress, and aging.

GIBBONS RV. GERMS, DR. BILLINGS, AND THE THEORY OF FOCAL INFECTION. CLINICAL INFECTIOUS DISEASES 1998 SEPTEMBER; VOLUME 27, NUMBER 3, PP. 627-633.

Our understanding of infectious diseases continues to expand rapidly, and has led to the realization that microorganisms are responsible for, or at least contribute to, numerous diseases that were never before associated with infectious etiologies. However, a review of medical history reminds us that this is not so novel an idea. Not long after the widespread

acceptance of bacteriology and the germ theory and with an increased awareness of public hygiene, there was a period during which it seemed that nearly all diseases would prove to be the result of infections. One popular proposal that championed such an idea was the theory of focal infection. This article reviews this theory by considering the key concepts and developments that likely inspired it, and examines the work of the theory's most visible proponent, Dr. Frank Billings.

OKUDA K, EBIHARA Y. RELATIONSHIPS BETWEEN CHRONIC ORAL INFECTIOUS DISEASES AND SYSTEMIC DISEASES. THE BULLETIN OF THIYO DENTAL COLLEGE 1998 AUGUST; VOLUME 39, NUMBER 3, PP. 165-174.

There are over 300 species of bacteria forming populations of several hundred billion in the human oral cavity. The number of bacteria reaches a thousand billion when the mouth is not sufficiently cleaned. Using saliva and gingival crevicular fluid as their main nutrients, these bacteria create their ecological niches on tooth surfaces, gingival crevices, saliva, dorsum linguae, and buccal and pharyngeal mucosa, threatening oral and systemic health. It is known that primary lesions of these chronic bacterial infections secondarily cause nephritis, rheumatoid arthritis, and dermatitis. Further, it has been demonstrated in recent years that bacteria inhabiting the oral cavity can cause bacterial pneumonia and endocarditis and that the periodontal disease-associated bacteria become causative agents for pregnancy troubles and are involved in blood circulation problems and coronary heart disease. Dentistry reviewed the theme of World Health Day, Oral Health for a Healthy Life, in 1994. The 8020 campaign to promote tooth care is also becoming established in Japan; however, the authors emphasized that this achievement is not the goal of dental health care. In this article, we explain the bases supporting the concept that oral health care, primarily mouth cleaning, is important for not only oral disease but also a healthy life.

TOLJANIC JA BEDARD JF LARSON RA FOX JP A PROSPECTIVE PILOT STUDY TO EVALUATE A NEW DENTAL ASSESSMENT AND TREATMENT PARADIGM FOR PATIENTS SCHEDULED TO UNDERGO INTENSIVE CHEMOTHERAPY FOR CANCER. CANCER (1999 APR 15) 85(8):1843-8

**BACKGROUND:** Patients scheduled to receive chemotherapy frequently undergo pretherapy dental treatment to eliminate potential sources of odontogenic infection. A prospective study was conducted to assess a new protocol emphasizing minimal pretherapy dental treatment. **METHODS:** Forty-eight consecutive patients diagnosed with solid or hematologic neoplasms underwent dental examination prior to intensive chemotherapy. All chronic dental pathology was scored as either mild- to-moderate or severe based on the likelihood of conversion to an acute state during chemotherapy. No pretherapy dental treatment was given to patients with chronic dental disease. Intertherapy dental complications and the overall impact on chemotherapy outcomes were assessed. **RESULTS:** Thirty-eight patients (79%) were diagnosed with pretherapy chronic dental pathology. Twenty-one of these patients (44% of the total population) were identified as having severe pathology and considered at risk for acute intertherapy dental complications. Two patients (4%) experienced acute intertherapy episodes, each presenting as oral abscesses. In both cases, resolution was achieved with antibiotics without interruption of chemotherapy. Oncologic treatment outcomes for all patients were judged to be unaffected by either the presence of chronic pretherapy dental disease or acute intertherapy exacerbations of these disease states. **CONCLUSIONS:** These results demonstrate that patients with chronic dental pathology can safely proceed with chemotherapy without dental intervention, as conversion of chronic dental disease to an acute state during chemotherapy occurs infrequently. If intertherapy dental infections do

arise, they can be managed effectively without interrupting therapy or adversely affecting oncologic treatment outcomes.

FLYNN TR SURGICAL MANAGEMENT OF OROFACIAL INFECTIONS. ATLAS ORAL MAXILLOFAC SURG CLIN NORTH AM (2000 MAR) 8(1):77-100

This overview of the surgical management of orofacial odontogenic infections is designed as a practical guide for the oral and maxillofacial surgeon. Fortunately, the incidence of serious odontogenic infections is decreasing. This decreased frequency, however, necessitates diligent study and mental preparation in advance of the emergent situations in which such cases present.

JOSHIPURA K RITCHIE C DOUGLASS C STRENGTH OF EVIDENCE LINKING ORAL CONDITIONS AND SYSTEMIC DISEASE. COMPEND CONTIN EDUC DENT SUPPL (2000)(30):12-23; QUIZ 65

Associations between dental diseases and systemic outcomes are potentially important because of the high occurrence of dental diseases. If this extremely common source of chronic infection (dental disease) leads to an increased morbidity and mortality rate, the public health impact of oral disease on millions of Americans would be substantial. Recent studies demonstrate an association between dental and systemic diseases, including systemic infections, cardiovascular disease, pregnancy outcomes, respiratory diseases, and increased all-cause mortality rate. Because there are several common risk factors for oral and systemic diseases, and limitations in published studies, a careful interpretation is needed. Confounding (shared risk factors for both systemic and dental disease) may explain part of the reported associations. It is also plausible that there may be a causal link. It is likely that if there is a causal link, several pathways and mediators coexist, linking oral and systemic disease. Bacteremia, bacterial endotoxins, cytokines, and other inflammatory mediators could conceivably be playing a direct or indirect role. Missing teeth are a surrogate marker for previous dental infection, and may also lead to altered dietary intake. Hence, diet may be an additional mediator for several of these outcomes. We caution clinicians not to recommend extracting infected teeth, based on the periodontal-systemic disease associations, if the teeth do not warrant extraction otherwise, because loss of teeth and edentulousness are associated with increased risk of systemic diseases. When assessed against causal-defined criteria, the evidence suggests possible causal associations between chronic periodontal disease and tooth loss with cardiovascular disease, bacterial endocarditis, pregnancy outcomes, and all-cause overall mortality. Further studies are needed to show consistency, to corroborate that the associations are independent of common risk factors for both systemic and dental disease, including healthy lifestyle factors, and to evaluate different biological pathways.

HAYRINEN-IMMONEN R IKONEN TS LEPANTALO M LINDGREN L LINDQVIST C ORAL HEALTH OF PATIENTS SCHEDULED FOR ELECTIVE ABDOMINAL AORTIC CORRECTION WITH PROSTHESIS. EUR J VASC ENDOVASC SURG (2000 MAR) 19(3):294-8

OBJECTIVE: to evaluate the frequency of potential oral foci of infection in patients scheduled for elective abdominal aortic surgery. Design: prospective clinical study. MATERIALS: oral health and dentures of 50 patients (33 males and 17 females, mean age 65 years) were examined before aortic surgery. Chief outcome measures: radiographic and clinical examination with special emphasis on identifying acute and chronic oral and odontogenic conditions which may contribute to aortic prosthesis infection. RESULTS: eighty-two per cent of the patients had some oral infection foci. The mean number of remaining teeth in the cohort was 9.3, and 21% of these were potential infectious foci (62% in the patients). Twenty-six per cent of the patients suffered from oral Candida infection. Seventy-four per cent of the patients had total or partial dentures, 45% of which were ill-fitting and

needed repair. **CONCLUSIONS:** oral infectious foci occur frequently in patients needing aortic surgery. Untreated foci may contribute to aortic prosthesis infection. Preoperative oral evaluation and elimination of intraoral infection is recommended for patients scheduled for abdominal aortic repair.

PALLASCH TJ WAHL MJ THE FOCAL INFECTION THEORY: APPRAISAL AND REAPPRAISAL. J CALIF DENT ASSOC (2000 MAR) 28(3):194-200

This paper discusses the past, present, and future of the focal infection theory of disease. A focal infection is a localized or general infection caused by the dissemination of microorganisms or toxic products from a focus of infection. The resurgence of the focal infection theory of disease has been greeted with great enthusiasm in some quarters; however, the present evidence for the relationship of oral microorganisms and systemic disease is very limited due not only to a dearth of prospective studies and a complete lack of interventional studies but also to very significant methodological difficulties associated with the clinical studies that have been performed.

Fowler EB Breault LG Galvan DA Nasal fistula associated with dental infection: a report of a case. J Endod (2000 Jun) 26(6):374-6

Most clinicians have come across a patient with difficult symptoms to diagnose. Often confusion occurs between odontogenic and nonodontogenic causes of sinus discomfort. On many occasions, sinus pain is due to purely dental causes, whereas in other situations dental pain is reported when the sinuses are infected. Due to the intimate association between the roots of the maxillary teeth and the floor of the nasal cavity and maxillary sinuses, diagnosis may be difficult. The following is a case report of a nasal fistula that developed from an abscessed maxillary central incisor.

Lucas V Roberts GJ Odontogenic bacteremia following tooth cleaning procedures in children. Pediatr Dent (2000 Mar-Apr) 22(2):96-100

**PURPOSE:** This study was designed to investigate the prevalence and intensity of odontogenic bacteremia from tooth cleaning procedures in children and adolescents. **METHODS:** One hundred and fifty five children receiving dental treatment under general anesthesia at The Great Ormond Street Hospital for Children and Guy's Hospital were recruited. Each child was randomly allocated to one of three tooth cleaning groups. These were (1) toothbrushing, (2) professional cleaning with a rubber cup and (3) scaling. **RESULTS:** There was no significant difference in the prevalence of positive blood cultures or intensity of bacteremia between the three groups. The bacterial species isolated were similar to those reported by other workers. These were *S. mitis*, *S. sanguis* and Coagulase--negative staphylococci, all of which are implicated in the pathogenesis of Bacterial Endocarditis. **CONCLUSIONS:** Patients at risk are as likely to develop odontogenic bacteremia from toothbrushing at home as from professional scaling and polishing of the teeth at dental surgery.

Slots J Kamma JJ General health risk of periodontal disease. Int Dent J (2001 Dec) 51(6):417-27

The possibility that periodontal disease might influence the morbidity and mortality of systemic diseases constitutes a research topic of great current interest. Human periodontal disease is associated with a complex microbiota containing approximately 500 microbial taxa and various human viruses, many of which possess significant virulence potential. *Actinobacillus actinomycetemcomitans*, *Porphyromonas gingivalis* and other periodontopathic bacteria that are unique to the oral cavity and may disseminate to other body sites comprise the best-documented form of dental focal infection. However, systemically healthy individuals seem to be at low risk of acquiring acute non-oral diseases

from direct infections by periodontal pathogens. Research data from various laboratories point to periodontal infections as a risk factor for chronic medical disorders, including cardiovascular disease, cerebrovascular accidents and low-birth-weight infants. However, recent epidemiological studies have failed to show a significant relationship between periodontal disease and cardiovascular disease. This review paper evaluates the current status of knowledge on dental focal infection and suggests avenues for further research into the topic of general health risks of periodontal disease.

COHEN DW PERIODONTAL MEDICINE IN THE NEXT MILLENNIUM. REFUAT HAPEH VEHASHINAYIM (2001 APR) 18(2):6-8, 60

*Dentistry and medicine have, to a great extent, been somewhat separated during the last 160 years, despite the fact that they have the same patients in common. We have now reached a period in our history when research is bringing medicine and dentistry closer together with data that are cogent to physicians and dentists and, most importantly, to the patient. A new paradigm is emerging with regard to susceptibility to periodontal disease, its etiology, and pathogenesis. Definite relationships between the oral disease and systemic conditions show that some risk factors are a concern for periodontal disease and certain systemic diseases such as cardiovascular disease. Periodontal diseases and systemic diseases-- this is a two-way street. It is becoming clear that the dentist needs to know more about systemic diseases, and the physician needs to increase his or her knowledge of oral diseases. We may see an increase in oral microbiology testing for patients with periodontal disease. We also will see more dentists doing glucose testing as well as other tests in their practices. Physicians and dentists working more closely together, more patients with systemic diseases will be managed more successfully, and patients will benefit from predictable treatment regimens to save their dentition.*

GILON Y BRANDT L LAHAYE T HEYMANS O SYSTEMIC INFECTIONS OF DENTAL ORIGIN REV STOMATOL CHIR MAXILLOFAC (2002 FEB) 103(1):26-9

Microorganisms harbored in the oral cavity have long been recognized to cause systemic disease with a well known mechanism of spread via the blood stream. Different factors, including the presence of periodontal disease, the number of dental extractions or the duration of dental surgery have an influence on the risk of bacteremia. Infectious endocarditis is classically cited, but there are other potential problems including brain abscess, meningitis, lung or liver abscess, and even for some authors, a risk of thrombotic heart disease. It is important to keep in mind that some of these focal infections may be possible complications of dental (or buccal) infection. Prevention is crucial.

PERIODONTAL DISEASE AND SYSTEMIC DISEASE. CLINICAL INFORMATION FOR THE PRACTICING DENTIST. J INDIANA DENT ASSOC (2002 SUMMER) 81(2):15-8

The relationship between periodontal and systemic disease, previously called the "focal infection theory" or "focus of infection," has become an exciting area of clinical and laboratory research. Periodontal disease has been reported to influence diabetes mellitus, cardiovascular disease, osteoporosis, and respiratory disease. It also can influence the course and duration of pregnancy. This article reviews some of these associations and proposed mechanisms by which periodontal disease and systemic conditions influence each other. We also discuss clinical implications for our daily practice in dentistry.

Teng YT Taylor GW Scannapieco F Kinane DF Curtis M Beck JD Kogon S Periodontal health and systemic disorders. J Can Dent Assoc (2002 Mar) 68(3):188-92

Recent studies in periodontal medicine suggest a mild to moderate association between human periodontal disease and certain systemic disorders such as diabetes mellitus,

pneumonia, heart disease and preterm birth. The latest evidence, presented at a symposium entitled Periodontal Health and Systemic Disorders, sponsored by the University of Western Ontario School of Dentistry, showed that indeed such an association is likely. New data suggest that this association is not indicated by traditional clinical signs of periodontal disease but rather by a cluster of host immune and inflammatory mediators. The coming era of periodontal medicine based upon molecular criteria will affect the future of periodontal diagnosis, treatment and professional practice.

MANDEL ID ORAL INFECTIONS: IMPACT ON HUMAN HEALTH, WELL-BEING, AND HEALTH-CARE COSTS.

COMPEND CONTIN EDUC DENT (2002 MAY) 23(5):403-6, 408, 410 PASSIM; QUIZ 414

Both caries and periodontal disease as well as many diseases of the mucous membranes, tongue, and salivary glands are infectious. If left untreated or inadequately treated, they have profound systemic as well as local effects. Maintenance of oral health goes beyond the physiological needs of proper nutritional intake and protection of the oral tissues. It also includes protection against oral sources of systemic infection and encompasses a range of social and psychological attributes. The rising expectations of patients in the pursuit of comfort and esthetics has provided evidence of the oral contribution to quality of life. Oral infections and their sequela account for the major portion of annual dental expenditures.

DEEMING GM PEMBERTON MN CUTANEOUS FACIAL SINUS TRACT OF DENTURE-RELATED AETIOLOGY? A

CASE REPORT. BR DENT J (2004 SEP 25) 197(6):315-6

A case is reported of a chronic facial sinus on the mandible. It is postulated that this was due to chronic mucosal trauma associated with a poorly adapted denture in a patient rendered immunosuppressed by poorly controlled type II diabetes. Previous treatment with antibiotics alone was unsuccessful. Healing was only achieved when antibiotics were combined with removal of the denture and improved diabetic control.

BELTRAN-AGUILAR ED BELTRAN-NEIRA RJ ORAL DISEASES AND CONDITIONS THROUGHOUT THE

LIFESPAN. II. SYSTEMIC DISEASES. GEN DENT (2004 MAR-APR) 52(2):107-14

Oral diseases may affect general health and many systemic disorders have oral manifestations and implications for dental treatment. This article reviews examples of the oral manifestations of systemic diseases, including oral cancer, diabetes mellitus, and infection from HIV. In addition, the plausible link between periconceptional use of folic acid by the mother and the risk of facial clefts is reviewed. The possible associations between oral infections, specifically periodontal diseases, and both cardiovascular disease and the delivery of preterm low birthweight infants also are reviewed. These and other associations present challenges to dentists, who must evaluate the scientific evidence supporting the associations or alleged causality and select effective treatment options. Both of these challenges require in-depth knowledge of the scientific method, criteria to establish causality, and evaluation of the merit of possible treatment options; in turn, these requirements identify dentists as medical professionals who utilize prevention as the first option in health care, use oral tissues and saliva to diagnose systemic diseases, rely on medical facilities to order laboratory tests, and diagnose and treat patients in close collaboration with their medical colleagues.

BAQAIN ZH NEWMAN L HYDE N HOW SERIOUS ARE ORAL INFECTIONS? J LARYNGOL OTOL (2004 JUL)

118(7):561-5

Life-threatening conditions following dental infections have been rare since antibiotics were introduced into the world of medicine. However, infections spreading through the soft tissues of the head and neck are encountered occasionally and mortality is still reported as a result of sepsis or airway embarrassment. A case of Ludwig's angina from

odontogenic infection that progressed into mediastinitis and pericarditis is presented. The steps adopted in the management of this case highlight the significance of early recognition and diagnosis of the source of deep cervical infections, the importance of securing the airway, effecting surgical drainage and aggressive intravenous antibiotic therapy.

JIMENEZ Y BAGAN JV MURILLO J POVEDA R ODONTOGENIC INFECTIONS. COMPLICATIONS. SYSTEMIC MANIFESTATIONS. MED ORAL PATOL ORAL CIR BUCAL (2004) 9 SUPPL:143-7; 139-43

The term, odontogenic infection refers to an infection that originates in the tooth proper or in the tissues that closely surround it; said infection then progresses along the periodontia down to the apex, involving periapical bone and from this area, it then spreads through the bone and periosteum towards near-by or more distant structures. The relevance of this type of infection lies in that it can cause infections that compromise more distant structures (via direct spread and distant spread), for example, intracranial, retropharyngeal and pulmonary pleural infections. Dissemination by means of the bloodstream can lead to rheumatic problems and deposits on the valves of the heart (endocarditis), etc. The conditions or factors that influence the spread of infection are dependent on the balance between patient-related conditions and microorganism-related conditions. The virulence of the affecting germs is dependent upon their quality and quantity and is one of the microbiological conditions that influences the infection. It is this virulence that promotes infectious invasion and the deleterious effects the microbe will have on the host. Patient-related conditions include certain systemic factors that determine host resistance, which may be impaired in situations such as immunodeficiency syndrome or in brittle diabetes, as well as local factors that will also exert their impact on the spread of the infection.

OHSHIMA A ARIJI Y GOTO M IZUMI M NAITOH M KURITA K SHIMOZATO K ARIJI E ANATOMICAL CONSIDERATIONS FOR THE SPREAD OF ODONTOGENIC INFECTION ORIGINATING FROM THE PERICORONITIS OF IMPACTED MANDIBULAR THIRD MOLAR: COMPUTED TOMOGRAPHIC ANALYSES. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOL ENDOD (2004 NOV) 98(5):589-97

OBJECTIVES: The aims of the present study were to clarify the anatomy of impacted mandibular third molars in relation to surrounding structures and to investigate the pathway of infection originating from pericoronitis of this tooth. STUDY DESIGN: Computed tomography (CT) images were evaluated in 87 patients with uninfected mandibular third molar impaction and in 12 patients with infection originating from an impacted mandibular third molar. In uninfected patients, bony features around the impacted crown were investigated together with the relationship between the crown and surrounding muscles. In infected patients, involvements of bony and soft tissue structures were evaluated according to the disappearance of cortices and lateral asymmetry of density and shape in the spaces and muscles. RESULTS: In uninfected patients, the disappearance of the lingual cortical plate was observed in 48 (35.3%) impacted molars, while only in 11 (8.1%) teeth for buccal cortices. The cortical thickness was thinner on the lingual side than the buccal side. Sixty-five percent of the masseter muscle horizontally overlapped the crown, while almost all of the medial pterygoid muscle was posteriorly situated apart from the crown. The mylohyoid muscle horizontally overlapped the crown at below or intermediate vertical positions. In infected patients, the involvement of lingual structures was more frequently observed than that of buccal structures. The mylohyoid muscle was involved in 10 (83.3%) of 12 patients. Among them, 8 showed submandibular space involvement. CONCLUSION: CT findings supported the clinical observations of infection spread in patients with pericoronitis of the impacted mandibular third molar. CT appeared to be an effective tool for investigating the pathway of infection originating from the pericoronitis of impacted mandibular third molars.

OBAYASHI N ARIJI Y GOTO M IZUMI M NAITOH M KURITA K SHIMOZATO K ARIJI E SPREAD OF ODONTOGENIC INFECTION ORIGINATING IN THE MAXILLARY TEETH: COMPUTERIZED TOMOGRAPHIC ASSESSMENT. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOL ENDOD (2004 AUG) 98(2):223-31

OBJECTIVE: The aim of this study was to investigate the pathways of infection originating in the maxillary teeth through the interpretation of computerized tomographic (CT) appearances. STUDY DESIGN: CT images of 78 patients were analyzed with reference to lateral asymmetry of shape and density of fascial spaces and tissues. RESULTS: Changes in the alveolar cortical plates were observed more frequently in the labial/buccal side than in the palatal side. The facial expression muscles were involved in 23 (19.4%) patients. Infection caused by anterior teeth often spread into the levator labii superioris and levator anguli oris muscles. Deep spread into the fascial space was found in 9 (11.5%) patients. Masticator space changes were predominantly seen in the patients with infection caused by molars. Maxillary sinus changes were found in 57 (71.3%) patients with infection originating in the canines, premolars and molars. CONCLUSION: Infection spread characteristics are related to the causal teeth, and the pathways were clearly demonstrated on CT images.

ANTONIADES K HADJIPETROU L ANTONIADES V ANTONIADES D ACUTE TONGUE ABSCESS. REPORT OF THREE CASES. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOL ENDOD (2004 MAY) 97(5):570-3

Abscess of the tongue seems to be a rare clinical entity and is a potentially life-threatening infection. It may result in airway compromise and disseminated infection to other regions. Thus, a tongue abscess should be considered in all cases of acute tongue swelling, especially when host defences are severely impaired. In acute cases the diagnosis of tongue abscess can be reached clinically. Needle aspiration of pus collection is a useful diagnostic and therapeutic tool, which provides considerable amelioration of symptoms. Three cases of tongue abscess are reported, along with discussion of the presentation, pathophysiology, differential diagnosis, and management of this disease.

DIRKS SJ TEREZHALMY GT THE PATIENT WITH AN ODONTOGENIC INFECTION. QUINTESSENCE INT (2004 JUN) 35(6):482-502

The routine use of antibacterial agents for the management of odontogenic infections has not been shown to be effective and is inappropriate. Most of these bacterial infections can be resolved satisfactorily through an approach that incorporates debridement (primary dental care) in conjunction with local anesthesia. Odontogenic infections are polymicrobial. Facultative anaerobes, particularly viridans streptococci, accompanied by strict anaerobes, appear to predominate in all types of odontogenic infections. When antibacterial chemotherapy is indicated, the drug of choice should be either the most effective drug against the infective pathogens or the least toxic alternative among several available agents. It should also be emphasized that drugs seldom exert their beneficial effects without also causing adverse side effects. Dealing with this certainty, the clinician familiar with the mechanisms of action, principles of disposition, and therapeutic and adverse effects of antibacterial agents, has the advantage.

CHKHIKVISHVILI MD LYMPHATIC SYSTEM OF THE TONGUE AND ITS ROLE IN GLOSITIS OF ODONTOGENIC ORIGIN GEORGIAN MED NEWS (2005 FEB)(119):57-60

In aged persons reduction of diameter of tongue lymphatic capillaries precedes thinning of the Kaarl net. In the process of tongue inflammation, lymphogenic way of inclusion in 6|6 and 8|8 teeth lower area should be stuck out with existence of alleged 51Integration Centers51. Lymphatic knots and lymphatic ducts are in prevailed placed in corresponding tissues of lower-chin and lower teeth. Lymphatic-muscular system and its anatomical links



and age-related changeability raise the special interest during odontogenic infections with tongue inflammation.

CHRISTEN AG CHRISTEN JA THEODORE ROOSEVELT'S PRESIDENTIAL SMILE AND QUESTIONABLE DENTAL HEALTH. J HIST DENT (2007 SUMMER-FALL) 55(2):85-90

Theodore Roosevelt (1858-1919), who served as the twenty-sixth President of the United States from 1901 to 1909, was an icon of the American Century.<sup>51</sup> Characterized by immense energy, numerous skills, zest for life, and enduring accomplishments, he made an impressive ascent to political importance. However, he also experienced serious, chronic, oral and systemic health problems. In spite of these significant health obstacles, he chose the strenuous life,<sup>51</sup> and cultivated a lifetime of joy, laughter and humor. TR was known as the first president that smiled,<sup>51</sup> and he was typically photographed and illustrated grinning from ear to ear. His flashing white teeth, wide smile, and engaging openness became welcome symbols of national and international acceptance. When Roosevelt died, suddenly and prematurely at the age of 60, dentists and physicians of that time began to investigate the probable medical causes of his untimely demise. The focal infection hysteria<sup>51</sup> of the early 1900s convinced some of these health professionals that a bad tooth<sup>51</sup>, that previously had been endodontically treated, was the probable cause of death. Much of the early 20th century evidence- supporting the notion that oral sepsis was a cause<sup>51</sup> of local or systemic disease-has now been proven, on closer inspection, to be anecdotal or of questionable scientific merit. Nevertheless, during those early days, it was common practice to extract all endodontically or periodontally involved teeth to eliminate any possible foci of infection that many clinicians believed could cause disease.

GORTZAK RA VAN DER WAAL I ALLARD RH DIAGNOSING AND TREATMENT OF DENTAL FOCI IN DUTCH MEDICAL NED TIJDSCHR TANDHEELKD (2007 JUL) 114(7):287-91

Although not scientifically proven, dental foci are believed to result in severe local or systemic disease. Eradicating dental foci in order to prevent possible interference with a medical treatment may be important in specific patient groups. To gain insight in the number of dental focus examinations, the medical evidence, the number of potential foci determined, as well as the treatment eradicating the focus, all dental focus examinations in 16 Dutch hospitals were registered during 3 months. A total number of 470 examinations were performed. Scheduled heart(valve)surgery and radiotherapy of the head and neck were the main reasons for a dental focus examination. Dental foci were found and treated in more than 50% of the patients examined. There was a significant difference between dentate and edentulous patients in the percentage of patients diagnosed and treated for a dental focus. More than 80% of dentate and less than 20% of edentulous patients were treated.

SCHUKNECHT B STERGIU G GRAETZ K MASTICATOR SPACE ABSCESS DERIVED FROM ODONTOGENIC INFECTION: IMAGING MANIFESTATION AND PATHWAYS OF EXTENSION DEPICTED BY CT AND MR IN 30 PATIENTS. EUR RADIOL (2008 SEP) 18(9):1972-9

Propagation of odontogenic masticator space abscesses is insufficiently understood. The purpose was to analyse pathways of spread in 30 patients with odontogenic masticator space abscess. The imaging findings in 30 patients (CT in 30, MR in 16 patients) were retrospectively analysed. CT and MR imaging depicted a masticator space abscess within: medial pterygoid muscle in 13 patients (43.3%), lateral masseter and/or pterygoid muscle in 14 (46.7%) and superficial temporal muscle in 3 patients (10%). In the lateral masticator space intra-spatial abscess extension occurred in 7 of 14 patients (50%). The sub-masseteric space provided a pathway in seven (70%). Extra-spatial extension involved the

submandibular space only in 3 of 14 patients (21.4%). Medial masticator space abscesses exhibited extra-spatial spread only. Extension affected the parapharyngeal space and/or soft palate in 7 of 13 lesions (53.8%). MR imaging in comparison to CT increased the number of abscess locations from 18 to 23 (27.8%) and regions affected by a cellular infiltrate from 12 to 16 (33.3%). The sub-masseteric space served as a previously underestimated pathway for intra-spatial propagation of lateral masticator abscesses. Medial masticator space abscesses tend to display early extra-spatial parapharyngeal space and/or soft palate extension.

AL-NAWAS B MAEURER M SEVERE VERSUS LOCAL ODONTOGENIC BACTERIAL INFECTIONS: COMPARISON OF MICROBIAL ISOLATES EUR SURG RES (2008) 40(2):220-4

AIM: It was the aim of this study to evaluate the clinical and microbiological differences between severe and local odontogenic abscesses. METHODS: Thirty patients were prospectively enrolled. Sixteen of 30 patients suffered from a severe life-threatening abscess of the head and neck, whereas 14/30 patients presented with a localized submucous abscess. Anaerobic bacteria were identified and susceptibility testing was performed using E test strips for penicillin, amoxicillin + clavulanic acid, imipenem + cilastatin, clindamycin and metronidazole. RESULTS: The mean duration until removal of all drains was 14.1 and 3.5 days, respectively. Anaerobic bacteria were found in all episodes of local abscesses, whereas 19% of the severe episodes were culture negative, and in 13%, only aerobes were identified. A total of 60 anaerobes were isolated from 27 patients (2.2 isolates/positive sample). The dominating species were *Prevotella* sp. (n = 17), *Peptostreptococcus* sp. (n = 15) and *Propionibacterium* sp. (n = 5). Eighty-seven percent of the isolates were susceptible to penicillin. Ninety-seven percent of the anaerobes were susceptible to amoxicillin + clavulanic acid, imipenem + cilastatin, and clindamycin. Eighty-three percent were susceptible to metronidazole. There was a tendency for a higher rate of episodes with penicillin-resistant bacteria in the patients with severe abscesses (14 vs. 31%). No difference in susceptibility regarding amoxicillin + clavulanic acid and clindamycin (7%) was observed.

SEPPANEN L LAUHIO A LINDQVIST C SUURONEN R RAUTEMAA R ANALYSIS OF SYSTEMIC AND LOCAL ODONTOGENIC INFECTION COMPLICATIONS REQUIRING HOSPITAL CARE. J INFECT (2008 AUG) 57(2):116-22

OBJECTIVE: Analysis of systemic and local odontogenic infection complications requiring hospital care. METHODS: All cases of odontogenic infections requiring hospital care, which were adjudicated in the Finnish Patient Insurance Centre during 2000-2003, were analysed. Patient characteristics, and the course and outcome of infection were reviewed. RESULTS: The study material consisted of 35 patient cases; 15 male, 20 female; mean age 38.4 (16-67) years. The mean length of hospital stay was 14.8 (2-81) days. Nine patients required intensive care for mean 6.2 (2-19) days. Twenty-five (71%) patients developed local infection complications with cellulitis and abscess formation, and 10 (29%) patients a generalised or metastatic infection complication. The length of hospital stay among patients with systemic complications was longer than with local complications, 30.2 (2-81) days vs. 8.0 (2-34) days (p=0.0144). All patients with local complications survived but three of the 10 patients with systemic complications died. Medically compromised patients with underlying disease developed more often systemic infection complications than previously healthy patients (p=0.0028). CONCLUSIONS: Medically compromised patients appear more susceptible to systemic rather than local infection complications with a need for significantly longer hospital stay and with an increased risk for fatal complications.

JANKET SJ JONES JA MEURMAN JH BAIRD AE VAN DYKE TE ORAL INFECTION, HYPERGLYCEMIA, AND ENDOTHELIAL DYSFUNCTION ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOL ENDOD (2008 FEB) 105(2):173-9

Metabolic syndrome and type 2 diabetes (T2DM) resulting from sustained hyperglycemia are considered as risk factors for cardiovascular disease (CVD) but the mechanism for their contribution to cardiopathogenesis is not well understood. Hyperglycemia induces nonenzymatic glycation of protein-yielding advanced glycation end products (AGE), which are postulated to stimulate interleukin-6 (IL-6) expression, triggering the liver to secrete tissue necrosis factor alpha (TNF-alpha) and C-reactive protein (CRP) that contribute to CVD pathogenesis. Although the high prevalence of periodontitis among individuals with diabetes is well known by dental researchers, it is relatively unrecognized in the medical community. The expression of the same proinflammatory mediators implicated in hyperglycemia (i.e., IL-6, TNF-alpha, and CRP) have been reported to be associated with periodontal disease and increased risk for CVD. We will review published evidence related to these 2 pathways and offer a consensus.

VIEIRA CL CARAMELLI B THE HISTORY OF DENTISTRY AND MEDICINE RELATIONSHIP: COULD THE MOUTH FINALLY RETURN TO THE BODY? ORAL DIS (2009 Nov) 15(8):538-46

The relationship between dentistry and medicine has been acknowledged throughout the history of humanity. This relationship was documented in ancient medicine accounts, and has survived until the present day, accompanied by the evolution of molecular technologies. Although we have had very important researchers' contributions in this interdisciplinary area, mainly after the 18th century, the knowledge on oral infections is still ignored by or unknown to the majority of clinical dentists and physicians. These circumstances could be changed through a broader divulgation of this complex relationship, both in the dentistry and in the medicine areas, which in turn would have a significant impact in systemic health worldwide. This movement has already started, as was observed in a World Health Assembly resolution which called for oral health to be integrated into chronic disease prevention programs in 2007. This was a significant indicator of changing perceptions of oral health over the past several decades. This brief review reports the evolution through time of the knowledge on the association between dental infections and systemic diseases, as well as the paths which we could take to consolidate this historical trend.

SEPPÄNEN L RAUTEMAA R LINDQVIST C LAUHIO A CHANGING CLINICAL FEATURES OF ODONTOGENIC MAXILLOFACIAL INFECTIONS. CLIN ORAL INVESTIG (2010 AUG) 14(4):459-65

Odontogenic maxillofacial infections occasionally require hospital care. Our aim was to study whether the number and the clinical features of patients hospitalized due to odontogenic abscesses in a large hospital district in Finland had changed in one decade. A retrospective analysis of two 12-month study cohorts one decade apart from the same population base was conducted. The first cohort comprised 71 patients and the second cohort comprised 101 patients. The incidence of odontogenic infections requiring hospital care increased from 5.3 to 7.2 per 100,000 inhabitants. The need for intensive care increased significantly from 15% to 32%, and the maximal C-reactive protein levels were significantly higher in the latter cohort, 127 mg/L, compared to the first cohort, 104 mg/L. The proportion of previously healthy patients decreased significantly from 83% to 65%. Odontogenic maxillofacial infections have become more prevalent and more severe during the decade in our hospital district. An increasing proportion of patients had underlying diseases.

EVIDENCE SHOWS KEEPING WISDOM TEETH MAY BE MORE HARMFUL THAN PREVIOUSLY THOUGHT. DENT ASSIST (2010 NOV-DEC) 79(6):37

RICHARDSON R SEPPANEN L DEEP MAXILLO-FACIAL INFECTIONS DUODECIM (2010) 126(6):695-701

Deep maxillo-facial infections typically originate from chronically infected teeth. The chronic infection flares up and spreads locally causing cellulitis and abscesses. Chronic dental infections may also disseminate and cause metastatic infections as well as complicate medical conditions such as diabetes and cardiovascular diseases. Medically compromised patients seem to be more susceptible to systemic rather than local infection complications. Surgical intervention in combination with effective antibiotic treatment is the corner stone of the treatment of deep maxillo-facial infections. Urgent hospital referral is required if the swelling results in a risk of airway compromise or if the patient has fever and sepsis.

OHMAN D BJORK Y BRATEL J KRISTIANSSON C JOHANSSON P JOHANSSON JE BRUNE M HASSEUS B PARTIALLY ERUPTED THIRD MOLARS AS A POTENTIAL SOURCE OF INFECTION IN PATIENTS RECEIVING PERIPHERAL STEM CELL TRANSPLANTATION FOR MALIGNANT DISEASES: A RETROSPECTIVE STUDY. EUR J ORAL SCI (2010 FEB) 118(1):53-8

Forty-four patients with malignant diseases for which they received peripheral stem cell transplant therapy (PSCT) were retrospectively studied regarding local and systemic infection originating from around partially erupted third molars (PEMs). Twenty-two patients had one or more PEMs, while 22 patients had none. Data were retrieved from medical and dental records. Systemic and local signs of infection and treatment were assessed. We recorded the number of transplanted CD34(+) blood stem cells, days with white blood cell counts  $< 0.5 \times 10^9/l$ , days until engraftment, maximum level of C-reactive protein (CRP), days with fever, positive blood cultures, days taking antibiotics, days drinking  $< 0.5 l$ , days of total parenteral nutrition, days receiving intravenously administered analgesics, and number of admission days. No statistically significant difference was detected between patients with PEMs and those without PEMs regarding any of the studied parameters. Of patients with PEMs, 36% (8 of 22) developed local infections around PEMs during the PSCT period. The study indicates that PEMs pose no significant risk of causing systemic infection in patients receiving PSCT for malignant diseases but increase the risk of developing a local infection, justifying close supervision and early treatment in cases of local infection during PSCT treatment.

AKINBAMI BO AKADIRI O GBUJIE DC SPREAD OF ODONTOGENIC INFECTIONS IN PORT HARCOURT, NIGERIA. J ORAL MAXILLOFAC SURG (2010 OCT) 68(10):2472-7

PURPOSE: Odontogenic infections constitute a substantial portion of diseases encountered by oral and maxillofacial surgeons. Infections start from dental tissues and sometimes rapidly spread to contiguous spaces. The consequence is a fulminant disease with significant morbidity and mortality. The study was aimed at studying the pattern of spread, approach to management, and outcome of these infections at a Nigerian teaching hospital. PATIENTS AND METHODS: A retrospective study of all patients with orofacial infections who presented to our center over an 18-month period was carried out. The medical records were reviewed to retrieve the following: age, gender, source of infection, anatomic fascial spaces involved, associated medical conditions, various treatment modalities, types of antibiotics administered, causative micro-organisms, length of stay in the hospital, and any complications encountered. Infections were classified into 2 categories: those that are confined to the dentoalveolar tissues belong to category I, and those that have spread into the local/regional soft tissue spaces and beyond belong to category II. RESULTS: Odontogenic infections constituted 11.3% of the total oral and

maxillofacial surgery cases. A total of 261 patients were treated for odontogenic infections. There were 146 female patients (59.8%) and 98 male patients (40.2%) in the first category, whereas the second category comprised 10 male patients (58.8%) and 7 female patients (41.2%). The fascial spaces involved, in descending order, were submasseteric in 10 (22.7%), submandibular in 9 (20.5%), and sublingual in 6 (13.6%). The causative microorganisms commonly found were *Klebsiella* and *Streptococcus* spp. Incision and drainage were performed in the 17 cases with spreading infection. Amoxicillin, amoxicillin/clavulanate, and metronidazole were the most routinely administered antibiotics. CONCLUSIONS: Our experience shows that delay in presentation, self-medication, aging, male gender, and unusual causative agents are some of the factors associated with spread. Therefore efforts must be made to further improve public dental awareness.

BURNHAM R BHANDARI R BRIDLE C CHANGES IN ADMISSION RATES FOR SPREADING ODONTOGENIC INFECTION RESULTING FROM CHANGES IN GOVERNMENT POLICY ABOUT THE DENTAL SCHEDULE AND REMUNERATIONS. *BR J ORAL MAXILLOFAC SURG* (2011 JAN) 49(1):26-8

The government changed the system of payment to general dental practitioners on 1 April 2005 from a fee/item to a banding system. The figures collected have shown that there has been a 62% increase in the number of patients who require admission for surgical treatment of spreading odontogenic infections compared with the 3- year period before this date.

HWANG T ANTOUN JS LEE KH FEATURES OF ODONTOGENIC INFECTIONS IN HOSPITALISED AND NON-HOSPITALISED SETTINGS. *EMERG MED J* (2011 SEP) 28(9):766-9

OBJECTIVE: To compare the sociodemographic and clinical features of odontogenic infections between hospitalised and non-hospitalised adult patients. METHODS: The two study groups consisted of inpatients (IP) and outpatients (OP) with odontogenic infections who were treated at Christchurch Hospital, New Zealand. Clinical and sociodemographic data were collected retrospectively from patients' hospital records. RESULTS: The study sample consisted of 28 IP (13.9%) and 174 OP (86.1%). There were no significant differences in age, gender or ethnicity between the two groups. A higher proportion of IP had trismus (75.0% IP; 6.9% OP), floor of the mouth oedema (10.7% IP; 0.6% OP) and decreased tongue mobility (10.7% IP; 1.7% OP). The IP group also had a greater proportion of multiple-space infections (39.3%) than the OP group (18.9%). The most commonly involved anatomical space in the OP group was the buccal space (49.4%), while that in the IP group was the submandibular space (57.1%). The submandibular, submental and submasseteric spaces were more likely to be involved in the IP group ( $p < 0.05$ ). The most common source of odontogenic infections in the IP group was the mandibular third molars (20.8%) and first/second molars (20.8%), while that in the OP group was the mandibular first/second molars (30.9%). CONCLUSIONS: There are important differences in the features of odontogenic infections between hospitalised and non-hospitalised patients. Some of these clinical signs may assist in recognising severe courses of odontogenic infections that may potentially require hospitalisation.

IGAWA K SATOH T YOKOZEKI H POSSIBLE ASSOCIATION OF HENOCH-SCHÖNLEIN PURPURA IN ADULTS WITH ODONTOGENIC FOCAL INFECTION. *INT J DERMATOL* (2011 MAR) 50(3):277-9

BACKGROUND: Odontogenic focal infection (OFI) is considered to be an important precipitating factor in some cases of palmoplantar pustulosis and psoriasis. In Henoch-Schönlein purpura (HSP), it is clear that acute bacterial infection is one of the causes. However, it remains unclear how OFI participates in the pathogenesis of HSP. METHODS: To clarify how OFI is related to the disease activity of HSP in terms of skin lesions and organ

involvement, we conducted a retrospective study of 28 cases of adult-type HSP. RESULTS: Panoramic x-ray screening detected OFI in 14 of the 28 patients. Patients with OFI had higher incidences of renal and gastrointestinal complications than those without OFI. Seven patients had severe OFI and underwent tooth extraction, resulting in a marked improvement of their skin lesions. Five of those seven patients exhibited transient flare-up after the tooth extraction. CONCLUSIONS: Latent OFI is an important infectious focus that is involved in the pathogenesis of HSP and influences its disease activity.

SEPPÄNEN L LEMBERG KK LAUHIO A LINDQVIST C RAUTEMAA R IS DENTAL TREATMENT OF AN INFECTED TOOTH A RISK FACTOR FOR LOCALLY INVASIVE SPREAD OF INFECTION? J ORAL MAXILLOFAC SURG (2011 APR) 69(4):986-93

PURPOSE: To determine the impact of antecedent dental procedures and dental health on the course of odontogenic maxillofacial infections requiring hospital care. PATIENTS AND METHODS: In this retrospective cohort study in a referral center, we evaluated medical records and panoramic radiographs of all patients admitted because of odontogenic maxillofacial infection (n = 84). The predictor variables were preceding dental treatment, antimicrobial therapy, and dental health. The outcome variables comprised infection parameters, length of stay, need for intensive care, and management during hospitalization. RESULTS: The mean age of the patients was 43.2 ± 16.5 years and 60% were men. Dental procedure preceded the spread of the infection in 49 cases (58%): endodontic treatment (n = 22), tooth extraction (n = 19), and minor first aid (n = 8). Twenty-seven patients had not received any dental or antimicrobial treatment in the recent past. Antimicrobial treatment alone had been given to 8 patients. Patients without preceding treatment had the highest C-reactive protein levels on admission and at maximum (P = .020 and P = .011) and the highest white blood cell counts on admission (P = .011). Their length of stay was also longer, and they needed intensive care more often than the other patients. Maximum C-reactive protein levels and white blood cell counts between treatment groups did not significantly differ from each other. CONCLUSIONS: The systemic response to the infection was strongest and the course of the infection most severe in the absence of preceding dental treatment and in patients with poor dental health. All types of dental treatment contributed to a less severe course of infection.

PALMASON S MARTY FM TREISTER NS HOW DO WE MANAGE ORAL INFECTIONS IN ALLOGENEIC STEM CELL TRANSPLANTATION AND OTHER SEVERELY IMMUNOCOMPROMISED PATIENTS? ORAL MAXILLOFAC SURG CLIN NORTH AM (2011 Nov) 23(4):579-99, vii

The oral cavity is among the sites in the body most susceptible to infections. In the immunocompetent population these are most frequently localized odontogenic infections caused by bacteria. In severely immunocompromised patients, such as those undergoing allogeneic stem cell transplantation, fungal and viral infections become especially prominent. Infections in this population can present in an unusual fashion, can spread rapidly to other organs in the body, and are more frequently resistant to therapies. This article discusses the current knowledge of the most frequent presentations of infections in this patient population and reviews contemporary approaches to prevention, diagnosis, and management.

ROCAS, ISABELA N.; SIQUEIRA, JOSE F; DEBELIAN, GILBERTO J. ANALYSIS OF SYMPTOMATIC AND ASYMPTOMATIC PRIMARY ROOT CANAL INFECTIONS IN ADULT NORWEGIAN PATIENTS J ENDODONTICS. 37(9):1206-1212, SEPTEMBER 2011.

This molecular study analyzed the microbiota of primary root canal infections from adult Norwegian patients.

**Methods:** Samples were taken from the necrotic root canals of teeth with symptomatic (n = 13) or asymptomatic (n = 21) apical periodontitis and chronic apical abscesses (n = 9). DNA was extracted from samples, and bacterial identifications were performed by a closed-ended reverse-capture checkerboard approach targeting 50 candidate endodontic pathogens.

**Results:** Bacterial DNA was detected in all cases. In teeth with asymptomatic apical periodontitis, the most frequent taxa were *Dialister invisus* (71%), *Fusobacterium nucleatum* (62%), and *Porphyromonas endodontalis* (62%). In chronic apical abscesses, the most prevalent taxa were *P. endodontalis* (100%), *D. invisus* (89%), *Parvimonas micra* (78%), and *Solobacterium moorei* (78%). In teeth with symptomatic apical periodontitis, the most prevalent taxa were *D. invisus*, *P. endodontalis*, *S. moorei*, *Propionibacterium acnes*, and *Streptococcus* species (all in 69%). None of the targeted taxa were significantly associated with either sinus tract or pain ( $P > .05$ ), except for *Selenomonas sputigena*, which was more frequently found in painful cases ( $P = .04$ ). No taxa were found in significantly higher levels in any conditions ( $P > .05$ ). Cluster analyses revealed bacterial groupings that differed between cases with and without pain.

**Conclusions:** Although basically the same species were highly prevalent in the different conditions examined and none of the most prevalent taxa were positively associated with symptoms, results revealed that species formed different partnerships and associations in samples from teeth with or without pain. Therefore, it is possible that more virulent multispecies communities can form as a result of overall bacterial combinations and give rise to acute inflammation.

TEN CATE JM, ZAURA E. THE NUMEROUS MICROBIAL SPECIES IN ORAL BIOFILMS: HOW COULD ANTIBACTERIAL THERAPY BE EFFECTIVE? ADV DENT RES. 2012 SEP;24(2):108-11. DOI: 10.1177/0022034512450028.

#### **Abstract**

Hundreds of bacterial species inhabit the oral cavity. Many of these have never been cultivated and can be assessed only with DNA-based techniques. This new understanding has changed the paradigm of the etiology of oral disease from that associated with 'traditional pathogens' as being primarily responsible for all diseases. Increasingly, associations between oral bacteria and systemic diseases are being reported. The emergence of antibiotic resistance is alarming and calls for in-depth studies of biofilms, bacterial physiology, and a body-wide approach to infectious diseases. We propose that the borderline between commensal bacteria and pathogens is no longer discrete. In a field of science where so many of the established paradigms are being undermined, a thorough analysis of threats and opportunities is required. This article addresses some of the questions that can be raised and serves to identify research opportunities and needs to leverage the prevention of oral diseases through novel antimicrobial strategies.

ADRIANA L. SANTOS, JOSÉ F. SIQUEIRA JR., ISABELA N. RÔÇAS, EDERSON C. JESUS, ALEXANDRE S. ROSADO, JAMES M. TIEDJE COMPARING THE BACTERIAL DIVERSITY OF ACUTE AND CHRONIC DENTAL ROOT CANAL INFECTIONS NOVEMBER 21, 2011

This study performed barcoded multiplex pyrosequencing with a 454 FLX instrument to compare the microbiota of dental root canal infections associated with acute (symptomatic) or chronic (asymptomatic) apical periodontitis. Analysis of samples from 9 acute abscesses and 8 chronic infections yielded partial 16S rRNA gene sequences that were taxonomically classified into 916 bacterial species-level operational taxonomic units (OTUs) (at 3% divergence) belonging to 67 genera and 13 phyla. The most abundant phyla in acute infections were Firmicutes (52%), Fusobacteria (17%) and Bacteroidetes (13%), while in

chronic infections the dominant were Firmicutes (59%), Bacteroidetes (14%) and Actinobacteria (10%). Members of Fusobacteria were much more prevalent in acute (89%) than in chronic cases (50%). The most abundant/prevalent genera in acute infections were Fusobacterium and Parvimonas. Twenty genera were exclusively detected in acute infections and 18 in chronic infections. Only 18% (n = 165) of the OTUs at 3% divergence were shared by acute and chronic infections. Diversity and richness estimators revealed that acute infections were significantly more diverse than chronic infections. Although a high interindividual variation in bacterial communities was observed, many samples tended to group together according to the type of infection (acute or chronic). This study is one of the most comprehensive in-deep comparisons of the microbiota associated with acute and chronic dental root canal infections and highlights the role of diverse polymicrobial communities as the unit of pathogenicity in acute infections. The overall diversity of endodontic infections as revealed by the pyrosequencing technique was much higher than previously reported for endodontic infections.

## FEVER

ROUCHON DISTANT MANIFESTATIONS OF BUCCO-DENTAL ORIGIN IN CHILDREN MED INFANT (PARIS) (1965 MAY) 72(5):341-9

STORTEBECKER TP SPREADING HAZARDS FROM INFECTION FOCI SVEN TANDLAK TIDSKR (1966 FEB 15) 59(2):99-107

CROS P FREIDEL A PARRET J 3 STUDIES ON GENERAL INFECTIONS WITH DENTAL ETIOLOGY AND BACTERIOLOGICAL PROOFS ANN ODONTOSTOMATOL (LYON) (1969 SEP-OCT) 26(5):189-93

BERRY E SILVER J PYORRHOEA AS CAUSE OF PYREXIA. BR MED J (1976 NOV 27) 2(6047):1289-90

Three patients with fever and malaise, one of whom also had joint pains, were extensively investigated before their condition was attributed to dental sepsis. Each patient recovered fully after appropriate dental treatment. Dental sepsis should be added to the list of possible causes of pyrexia of undetermined origin, and a routine dental examination should be carried out in each case.

HUNTER N FOCAL INFECTION IN PERSPECTIVE. ORAL SURG ORAL MED ORAL PATHOL (1977 OCT) 44(4):626-7

In this article some of the theoretical possibilities arising as a result of focal infection are discussed. Rheumatic fever is discussed as an example of a disease in which a number of possible mechanisms may act to produce tissue damage at a target area. The mechanisms examined are direct dissemination of organisms from the focus to the target area, the induction of L-phase bacteria, and toxic damage to target tissue. Host-mediated tissue damage by hypersensitivity or auto-immune mechanisms is considered as well.

LEVINSON SL BARONDESS JA OCCULT DENTAL INFECTION AS A CAUSE OF FEVER OF OBSCURE ORIGIN. AM J MED (1979 MAR) 66(3):463-7

Three patients with prolonged unexplained fevers were ultimately found to have deep-seated dental infection. After initial examination failed to elicit symptoms or signs of dental infection, and extensive in-hospital evaluation was nonproductive, dental consultation with roentgenograms provided the diagnosis. All three patients underwent dental extractions with periapical or peridontal debridement; following a brief postoperative febrile period, all three responded with defervescence, without subsequent recurrence of fever. These cases emphasize the importance of periapical and peridontal infection as causes of fever of



obscure origin. The pathogenesis, characteristics and bacteriology of periapical abscess are discussed.

SAMRA Y BARAK S SHAKED Y DENTAL INFECTION AS THE CAUSE OF PYREXIA OF UNKNOWN ORIGIN--TWO CASE REPORTS. POSTGRAD MED J (1986 OCT) 62(732):949-50

DIERKS EJ MEYERHOFF WL SCHULTZ B FINN R FULMINANT INFECTIONS OF ODONTOGENIC ORIGIN. LARYNGOSCOPE (1987 MAR) 97(3 Pt 1):271-4

SHINODA T MIZUTANI H KANEDA T SUZUKI M FEVER OF UNKNOWN ORIGIN CAUSED BY DENTAL INFECTION. REPORT OF A CASE. ORAL SURG ORAL MED ORAL PATHOL (1987 AUG) 64(2):175-8

PERNICE L RIBAUT JY FOURESTIER J GACON J QUILICHINI R AUBERT L CHAFFANJON P ROUBAUDI G PERSISTENT FEVER OF DENTAL ORIGIN : REV STOMATOL CHIR MAXILLOFAC (1990) 91 SUPPL 1:137-8

LAINE PO LINDQVIST JC PYRHONEN SO STRAND-PETTINEN IM TEERENHOVI LM MEURMAN JH ORAL INFECTION AS A REASON FOR FEBRILE EPISODES IN LYMPHOMA PATIENTS RECEIVING CYTOSTATIC DRUGS. EUR J CANCER B ORAL ONCOL (1992 OCT) 28B(2):103-7

SHAKER MA LEVEL OF PLASMA PROTEINS IN PATIENTS WITH SEVERE ODONTOGENIC INFECTION AND FEVER. EGYPT DENT J (1995 APR) 41(2):1189-94

PALACIOS E VALVASSORI G DEEP FACIAL INFECTION OF ODONTOGENIC ORIGIN. EAR NOSE THROAT J (2001 JAN) 80(1):15

PRYSZMONT J GRYGORCZUK S KONDRUSIK M PANCEWICZ S ZAJKOWSKA J SEVERE FORM OF ODONTOGENIC SEPSIS--A CASE REPORT POL MERKUR LEKARSKI (2005 MAR) 18(105):314-6

One of possible and diagnostically difficult sources of bacterial sepsis may be purulent foci of odontogenic character. We present the case of a pregnant woman, in whom untreated purulent focus within oral cavity led to severe systemic infection. The disease was characterized by persistent hectic fever with accompanying features of intravascular coagulation, anemia and erythema nodosum and no response to antibiotic treatment. It was the second episode of sepsis in this patient in a period of one year, the source of the infectious process not being recognized previously. Dental examination revealed presence of the apical abscess of the tooth 6-, extraction of which led to spectacular clinical improvement, accompanied by the healing of erythema nodosum. The clinical course and outcome of the disease strongly supports odontogenic etiology, in spite of the lack of full microbiological confirmation. Purulent foci within oral cavity, including apical abscesses, constitute significant clinical problem and must be taken into consideration as a potential source of severe and recurrent systemic infections.

## NECROTISING FASCIITIS

ROSER SM CHOW AW BRADY FA NECROTIZING FASCIITIS. J ORAL SURG (1977 SEP) 35(9):730-2

Necrotizing fasciitis is a relatively uncommon severe soft tissue infection that is characterized by rapid widespread superficial fascial necrosis with undermining of surrounding soft tissue. Recent advances in anaerobic culture techniques have allowed identification of anaerobic organisms, which are now considered to have a vital role in the pathogenesis of this soft tissue infection. Therapy requires both rapid institution of a high level of antibiotics and a radical surgical incision and drainage procedure. All of the aerobic

and anaerobic organisms isolated in the reported case of necrotizing fasciitis arising from a periapically infected mandibular third molar demonstrated in vitro sensitivity to penicillin.

MRUTHYUNJAYA B NECROTIZING FASCIITIS: REPORT OF CASE. J ORAL SURG (1981 JAN) 39(1):60-2

McANDREW PG DAVIES SJ GRIFFITHS RW NECROTISING FASCIITIS CAUSED BY DENTAL INFECTION. BR J ORAL MAXILLOFAC SURG (1987 AUG) 25(4):314-22

Y HIMELFARB MZ ZIKK D BLOOM J CERVICAL NECROTIZING FASCIITIS OF ODONTOGENIC ORIGIN. ORAL SURG ORAL MED ORAL PATHOL (1991 JUL) 72(1):15-8

STOYKEWYCH AA BEECROFT WA COGAN AG FATAL NECROTIZING FASCIITIS OF DENTAL ORIGIN. J CAN DENT ASSOC (1992 JAN) 58(1):59-62

DE BACKER T BOSSUYT M SCHOENAERS J MANAGEMENT OF NECROTIZING FASCIITIS IN THE NECK. J CRANIOMAXILLOFAC SURG (1996 DEC) 24(6):366-71

CHIDZONGA MM NECROTIZING FASCIITIS OF THE CERVICAL REGION IN AN AIDS PATIENT: REPORT OF A CASE. J ORAL MAXILLOFAC SURG (1996 MAY) 54(5):638-40

ROBERSON JB HARPER JL JAUCH EC MORTALITY ASSOCIATED WITH CERVICOFACIAL NECROTIZING FASCIITIS. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOL ENDOD (1996 SEP) 82(3):264-7

FICHEVA M MARINA M IVANOVA K TOMOVA M ODONTOGENIC CRANIOFACIOCERVICAL NECROTIZING FASCIITIS KHIRURGIJA (SOFIJA) (1997) 50(3):21-2

DALE RA HOFFMAN DS CRICHTON RO JOHNSON SB NECROTIZING FASCIITIS OF THE HEAD AND NECK: REVIEW OF THE LITERATURE AND REPORT OF A CASE. SPEC CARE DENTIST (1999 NOV-DEC) 19(6):267-74

Necrotizing fasciitis is a rapidly spreading, life-threatening, bacterial disease. Mortality rates have been estimated to vary between 8.7% and 74%. Mortality depends on many factors, one of which is early recognition. Necrotizing fasciitis of dental origin has a low prevalence and as such presents diagnostic challenges for the dentist. The literature is reviewed, and a case history is presented.

TUNG-YIU W JEHN-SHYUN H CHING-HUNG C HUNG-AN C CERVICAL NECROTIZING FASCIITIS OF ODONTOGENIC ORIGIN: A REPORT OF 11 CASES. J ORAL MAXILLOFAC SURG (2000 DEC) 58(12):1347-52; DISCUSSION 1353

PURPOSE: Although most cases of cervical necrotizing fasciitis (CNF) are odontogenic in origin, reports of this disease in the dental literature are sparse. The purpose of this study was to review the cases treated on our service, and to analyze the features of this disease and the responses to management, to supplement the understanding of this relatively rare and life-threatening disease. PATIENTS AND METHODS: All cases of infection admitted to the OMS service in a period of 10.5 years were studied retrospectively. The diagnosis of CNF was established by the findings on surgical exploration and histologic examination. The patients' age, sex, medical status, causes of the infection, bacteriology, computed tomography scan findings, surgical interventions, complications, survival, and other clinical parameters were reviewed. RESULTS: A total of 422 cases of infection were admitted, and 11 cases of cervical necrotizing fasciitis were found. The incidence of CNF was 2.6% among the infections hospitalized on the OMS service. There were 7 male and 4 female patients. Eight patients were older than 60 years of age. Seven patients had immunocompromising

conditions, including diabetes mellitus in 4, concurrent administration of steroid in 2, uremia in 1, and a thymus carcinoma in 1. All patients showed parapharyngeal space involvement; four also showed retropharyngeal space involvement. Gas was found in the computed tomography scan in 6 patients, extending to cranial base in 3 of them. Anaerobes were isolated in 73% of the infections, whereas *Streptococcus* species were uniformly present. All patients received 1 or more debridements. Major complications occurred in 4 patients, including mediastinitis in 4, septic shock in 2, lung empyema in 1, pleural effusion in 2, and pericardial effusion in 1. All major complications developed in the immunocompromised patients, leading to 2 deaths. CONCLUSION: The mortality rate in this study was 18%. Early surgical debridement, intensive medical care, and a multidisciplinary approach are advocated in the management of CNF

WHITESIDES L COTTO-CUMBA C MYERS RA CERVICAL NECROTIZING FASCIITIS OF ODONTOGENIC ORIGIN: A CASE REPORT AND REVIEW OF 12 CASES. J ORAL MAXILLOFAC SURG (2000 FEB) 58(2):144-51; DISCUSSION 152

PURPOSE: This article reviews the demographics, presentation, cause, clinical findings, and treatment of 12 cases of cervical necrotizing fasciitis of odontogenic origin. PATIENTS AND METHODS: A retrospective chart review of 12 cases treated between 1987 and 1997 was done. RESULTS: Most cases resulted from an abscessed mandibular molar. The most common significant medical conditions in the patient's history were diabetes, hypertension, obesity, and substance abuse. All patients were treated surgically within 24 hours of admission. Hyperbaric oxygen (HBO) was used as adjunctive treatment in all cases. The average length of hospital stay was 31 days. All patients recovered. CONCLUSION: Early surgical intervention and the use of HBO decreases morbidity and improves the clinical outcome.

OBIECHINA AE AROTIBA JT FASOLA AO NECROTIZING FASCIITIS OF ODONTOGENIC ORIGIN IN IBADAN, NIGERIA. BR J ORAL MAXILLOFAC SURG (2001 APR) 39(2):122-6

We reviewed eight patients with necrotizing fasciitis of odontogenic origin. There were three women and five men, mean age 58 (range 46-72), and none had any associated medical condition such as diabetes. All cases had symptoms of toothache for a mean duration of 34 days (range 26-42) before they sought treatment. Infection originated in the molar teeth region, and initially presented as an odontogenic or periodontal abscess. The clinical features of necrotizing fasciitis became apparent only after the superficial fascia had been invaded. The transient unusually reddish hue for a dark skin might be explained by the fact the deep fascia and muscles were affected before the superficial fascia and skin. Necrosis of the skin began in the submandibular region and progressed downwards. The necrotic area was less than the extent of infection. Antimicrobial treatment, debridement, and fasciotomy improved healing. Delay before appropriate treatment had an adverse affect on outcome, and one patient died. Copyright 2001 The British Association of Oral and Maxillofacial Surgeons.

AKALLAL N ACHIR A REGRAGUI W FARIK M ZIDOUH S BENCHEKROUN BA DESCENDING NECROTIZING MEDIASTINITIS: A DIAGNOSIS NOT TO MISS REV PNEUMOL CLIN (2002 DEC) 58(6 Pt 1):355-8

Descending necrotizing mediastinitis is a severe disease which occurs after a mild otorhinolaryngologic or dental infection. The diagnosis must be established rapidly with the help of clinical and computed tomography of the neck and chest data. Treatment is based on antibiotics, surgery and hyperbaric oxygen. The outcome is poor with high mortality. We report a case of septicemia complicating descending necrotizing mediastinitis after dental infection.

NDUKWE KC FATUSI OA UGBOKO VI CRANIOCERVICAL NECROTIZING FASCIITIS IN ILE-IFE, NIGERIA. BR J ORAL MAXILLOFAC SURG (2002 FEB) 40(1):64-7

Sixteen cases of necrotizing fasciitis were seen at the Obafemi Awolowo University Teaching Hospital, Ile-Ife, Nigeria from 1990 to 2000. Primary craniocervical involvement was recorded in seven patients (five men and two women). The clinical records of five patients were sufficiently detailed to allow us to report their age, aetiology, predisposing illness, clinical features, complications, management regimen and outcome. The patients were aged 30-75 years and in four of them odontogenic infections were the cause of the condition. Hypertension, diabetes mellitus and obesity were the underlying systemic diseases in three cases and the body/angle region of the mandible was the predominant site of the infection on the face. All five cases had involvement of the neck. Mediastinal extension was recorded in three cases. Two patients had complications: one had septicaemia and renal failure and the other developed bone necrosis. Pre-existing ill health, old age, late surgical intervention, and mediastinal and thoracic extension of infection were responsible for the only death. Treatment involved frequent and multiple surgical debridement, aggressive antimicrobial treatment and control of systemic disease. Early recognition, prompt surgical intervention, and aggressive antimicrobial treatment are essential to minimize morbidity and mortality. Rapid progression of infection, financial constraints, delayed referrals from rural clinics and distance to the tertiary hospital caused problems.

UMEDA M MINAMIKAWA T KOMATSUBARA H SHIBUYA Y YOKOO S KOMORI T NECROTIZING FASCIITIS CAUSED BY DENTAL INFECTION: A RETROSPECTIVE ANALYSIS OF 9 CASES AND A REVIEW OF THE LITERATURE. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOL ENDOD (2003 MAR) 95(3):283-90

OBJECTIVES: Necrotizing fasciitis of the head and neck is an uncommon, potentially fatal soft tissue infection characterized by extensive necrosis and gas formation in the subcutaneous tissue and fascia. The aims of this study were to describe the condition of this rare disease and to find factors affecting the mortality. STUDY DESIGN: Nine of our new cases and 125 reported cases in the English-language literature with necrotizing fasciitis of dental origin were reviewed. RESULTS: Two of our 9 patients had some form of systemic disease such as diabetes, cardiac insufficiency, renal failure, or cerebral infarction, whereas the other 7 had no particular general complications. A computed tomography examination was useful for detecting gas formation in the deep neck. All 9 patients underwent extensive debridement within 24 hours, and good results were obtained. In contrast, 24 of the 125 reviewed patients died despite therapy. Factors affecting the mortality were associated diseases such as diabetes or alcohol abuse, delay of surgery, and the complication mediastinitis. CONCLUSION: Necrotizing fasciitis is still a potentially fatal disease. Early and aggressive debridement may reduce mortality.

RICALDE P ENGROFF SL JANSISYANONT P ORD RA PAEDIATRIC NECROTIZING FASCIITIS COMPLICATING THIRD MOLAR EXTRACTION: REPORT OF A CASE. INT J ORAL MAXILLOFAC SURG (2004 JUN) 33(4):411-4

Necrotizing fasciitis is an uncommon but well-described entity. In the paediatric population compromising risk factors are frequently absent. We describe the successful treatment of a case of cervicofacial necrotizing fasciitis in a healthy 14-year-old male following routine extraction of an uninfected wisdom tooth for orthodontic purposes.

FENTON CC KERTESZ T BAKER G SANDOR GK NECROTIZING FASCIITIS OF THE FACE: A RARE BUT DANGEROUS COMPLICATION OF DENTAL INFECTION. J CAN DENT ASSOC (2004 OCT) 70(9):611-5

Necrotizing fasciitis of the face is extremely rare. However, dentists should be familiar with the presentation of this condition because of the suddenness of its onset, the rapidity of its

spread, the resulting drastically disfiguring morbidity and the high rate of mortality associated with it. In this paper, we describe the presentation and treatment of a 57-year-old woman with necrotizing fasciitis of the face and neck due to dental causes and discuss factors in the management of this life-threatening condition.

TORAN KC NATH S SHRESTHA S RANA BB ODONTOGENIC ORIGIN OF NECROTIZING FASCIITIS OF HEAD AND NECK - A CASE REPORT. KATHMANDU UNIV MED J (KUMJ) (2004 OCT-DEC) 2(4):361-3

Necrotizing fasciitis (NF) of head and neck is a fulminant infection associated with necrosis of connective tissue which spreads along the fascial planes with high mortality rate. It is usually polymicrobial, odontogenic and occurs more frequently in immunocompromised patients. Because of the rarity of the disease, early diagnosis and early management is often delayed. We present a diabetic patient who developed NF of head and neck following tooth extraction. Because of vigorous teamwork he could be saved from the fatal disease but required extensive plastic repair. Every clinician should be aware of such a disease, particularly in immunocompromised patients and necessitates earliest diagnosis and intervention to save their life. Keywords: Necrotizing fasciitis, necrotizing soft tissue infections.

FARRIER JN KITTUR MA SUGAR AW NECROTISING FASCIITIS OF THE SUBMANDIBULAR REGION; A COMPLICATION OF ODONTOGENIC ORIGIN. BR DENT J (2007 MAY 26) 202(10):607-9

Inadequate treatment or neglect of odontogenic infections can have serious consequences. The potential for spreading through fascial planes and intracranially can cause compromise of the airway and cavernous sinus thrombosis respectively. On rare occasions this can lead to a rapidly progressing necrotising fasciitis, with destruction of soft tissue, making reconstruction difficult. Antibiotic administration without removal of the cause is inadequate and can complicate subsequent management. We report the presentation and successful management of a 13-year-old boy, who developed necrotising fasciitis in the submandibular region as a result of inadequate initial treatment of a carious, lower molar resulting in significant skin and soft tissue loss.

MOHAMMED-ALI RI MCGURK M ATYPICAL FULMINATING DENTAL INFECTIONS. DENT UPDATE (2008 JUL-AUG) 35(6):420-4

Dental surgeons are faced with treating dental infections on a daily basis and the cases discussed in this paper highlight the potential outcome of such infections, especially in immunocompromised patients. Fulminating infection in the head and neck may present as a rapidly progressive, potentially fatal condition characterized by extensive necrosis of the subcutaneous tissues. One form of such infection is necrotizing fasciitis. Although first described in 1793 by Pouteau, the term necrotizing fasciitis was first coined in 1952 by Wilson who noted that facial necrosis was the most consistent feature of this disease. When necrotizing fasciitis occurs in the head and neck region it is usually odontogenic in origin. This paper reviews the cases of four patients presenting with atypical fulminating dental infection who presented to the oral and maxillofacial department at Guy's and St Thomas's Hospital, London, resulting in cellulitis and necrotizing fasciitis. Aggressive management is critical for patient survival and time wasted is tissue lost. CLINICAL RELEVANCE: Early diagnosis and aggressive treatment of dental infections, especially in patients with altered immune status, is critical. There should be a high index of suspicion in patients with dental infections not responding to treatment and maxillary dental infections with sinus symptoms.

Heath N Macleod I Chippindale A Greenwood M Ripley C Severe necrotizing fasciitis complicating odontogenic infection: a case report. *Dent Update* (2008 Jun) 35(5):353-5

We report a case of cervical necrotizing fasciitis complicating dental infection in a 36-year-old man, who presented with infection involving mucosa of the right maxilla, mandible, parapharyngeal and masticator spaces, requiring extensive surgery and antibiotic therapy. The initial presentation, radiological appearance and clinical course are discussed. **CLINICAL RELEVANCE:** This case highlights the course of an aggressive dento-alveolar infection in the immuno-compromised host. The need for early detection and urgent referral by the practitioner to minimize the risk of mortality and morbidity is essential in such cases.

FIHMAN V RASKINE L PETITPAS F MATEO J KANIA R GRAVISSE J RESCHE-RIGON M FARHAT I BERCOT B PAYEN D SANSON-LE PORS MJ HERMAN P MEBAZAA A CERVICAL NECROTIZING FASCIITIS: 8-YEARS' EXPERIENCE OF MICROBIOLOGY. *EUR J CLIN MICROBIOL INFECT DIS* (2008 AUG) 27(8):691-5

Cervical necrotizing fasciitis (CNF) is a life-threatening complication of pharyngeal or dental infections. The aim of this paper was to investigate whether dental or pharyngeal source result from different pathogen(s) in CNF and whether antibiotics, given before admission, influence the antimicrobial resistance of pathogens. In 152 CNF patients, *Streptococcus milleri* group and *Prevotella* species were the predominant isolates, frequently copathogens, mostly in dental CNF samples. Penicillin and clindamycin resistance were observed in 39% and 37% of cases, respectively, independently of any previous antibiotic therapy. Thus, a combined aerobe-anaerobe infection may have a synergistic effect, which allows the infection to spread in cervical tissues.

QUERESHY FA BASKIN J BARBU AM ZECHEL MA REPORT OF A CASE OF ERVICOOTHORACIC NECROTIZING FASCIITIS ALONG WITH A CURRENT REVIEW OF REPORTED CASES. *J ORAL MAXILLOFAC SURG* (2009 FEB) 67(2):419-23

FLANAGAN CE DARAMOLA OO MAISEL RH ADKINSON C ODLAND RM SURGICAL DEBRIDEMENT AND ADJUNCTIVE HYPERBARIC OXYGEN IN CERVICAL NECROTIZING FASCIITIS. *OTOLARYNGOL HEAD NECK SURG* (2009 MAY) 140(5):730-4

**OBJECTIVE:** To review our management of cervical necrotizing fasciitis (CNF) with the use of adjunctive hyperbaric oxygen therapy (HBO). **STUDY DESIGN:** Case series with chart review. **SUBJECTS AND METHODS:** Evaluation of ten patients with CNF between 2001 to 2006. **RESULTS:** There were five male and six female patients. Mean age was 43 +/- 11 years. Eight cases resulted from an odontogenic source. Comorbidities included diabetes mellitus, hypertension, and substance abuse. All patients had computed tomography scans performed, received intravenous antibiotics, and underwent surgical debridement. Eight patients underwent surgery within 24 hours. The average number of debridements was 2.2 +/- 0.8. Hospitalization was twice as long for diabetic patients (15.5 +/- 8.16 days) compared with nondiabetic patients (7.5 +/- 1.6 days,  $P = 0.029$ ). Nine patients had HBO therapy. Combined data revealed a possible decrease in length of hospitalization with HBO therapy ( $P < 0.001$ ). No mortality was documented. **CONCLUSION:** In addition to early and aggressive medical management and surgical debridement, this study suggests that HBO therapy is a beneficial adjunct by potentially decreasing length of hospitalization. Randomized trials are still needed to demonstrate its efficacy.

ZHANG WJ CAI XY YANG C ZHOU LN CAI M LU XF ZHENG LY JIANG B CERVICAL NECROTIZING FASCIITIS DUE TO METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS: A CASE REPORT. *INT J ORAL MAXILLOFAC SURG* (2010 AUG) 39(8):830-4

Cervical necrotizing fasciitis is an uncommon but potentially fatal infection characterized by rapidly progressive, widespread necrosis of the superficial fascia. The authors report a case of cervical necrotizing fasciitis of odontogenic origin in a male with uncontrolled diabetes mellitus. An early diagnosis was based on clinical examination, confirmed by computed tomography (CT) scan, which showed multiple collections of air in the left submandibular, submental and cervical region. Broad spectrum antibiotic therapy was started quickly followed by surgical drainage and debridement. Pus culture was positive for methicillin-resistant *Staphylococcus aureus*. Four days after admission, mediastinitis was revealed by CT and drainage was conducted through a transcervical incision. The patient was treated successfully with antimicrobial therapy, repeated surgical debridement and supportive care.

MEDEIROS JÃNIOR R MELO ADA R OLIVEIRA HF CARDOSO SM LAGO CA CERVICAL-THORACIC FACIAL NECROTIZING FASCIITIS OF ODONTOGENIC ORIGIN. BRAZ J OTORHINOLARYNGOL (2011 NOV-DEC) 77(6):805

LORENZINI G PICCIOTTI M DI VECE L PEPPONI E BRINDISI L VESSIO V MAFFEI M VIVIANO M CERVICAL NECROTIZING FASCIITIS OF ODONTOGENIC ORIGIN INVOLVING THE TEMPORAL REGION--A CASE REPORT. J CRANIOMAXILLOFAC SURG (2011 DEC) 39(8):570-3

Necrotizing fasciitis (NF) is a soft-tissue infection, usually polymicrobial, that causes necrosis of fascia and subcutaneous tissue while sparing skin and muscle. We report a case of cervical NF complicating dental infection in a 50-year-old woman, who presented with infection involving mucosa of the right mandible and temporal muscle, and masticator spaces, requiring extensive surgery and antibiotic therapy. Prompt diagnosis and immediate aggressive surgical debridement of all compromised tissues are critical to reducing morbidity and mortality in these rapidly progressive infections.

Brunworth J Shibuya TY Craniocervical necrotizing fasciitis resulting from dentoalveolar infection. Oral Maxillofac Surg Clin North Am (2011 Aug) 23(3):425-32

Craniocervical necrotizing fasciitis is a rare infectious process that can be life-threatening. It most commonly occurs as a result of a severe dentoalveolar infection. This article reviews the diagnosis, microbiology, anatomy, and pathophysiology behind this infectious process; the incidence; and the recommended treatments and therapies. It is hoped that this article provides the treating health care provider with an up-to-date review of this serious infectious process.

SARNA T SENGUPTA T MILORO M KOLOKYTHAS A CERVICAL NECROTIZING FASCIITIS WITH DESCENDING MEDIASTITIS: LITERATURE REVIEW AND CASE REPORT. J ORAL MAXILLOFAC SURG (2012 JUN) 70(6):1342-50

Cervical necrotizing fasciitis (CNF) can develop from odontogenic infections that spread to the deep fascial planes of the neck. This polymicrobial infection is rapidly progressive, destructive, and often fatal. Prompt diagnosis, recognition of acuity, aggressive, repeated surgical treatment, and medical management contribute to improved survival. Nevertheless, the progression of the disease to descending mediastinitis and septic shock leads to a poor prognosis and decreased survival. A comprehensive review of the current data regarding CNF was conducted using MEDLINE, PubMed, Scopus, and Google Scholar. The diagnostic elements, comorbid conditions, treatment modalities, complications, and survival rates were analyzed. CNF has a reported mortality rate of 7% to 20%, depending on the extent of neck involvement. When the disease progresses into the thorax, such as in the subset of patients with CNF complicated by descending necrotizing mediastinitis (DNM) of odontogenic origin, the mortality rate increases to 41%. This is greater than the reported

mortality rate of 22% for DNM in cardiothoracic studies. When DNM is present, the risk of developing septic shock appears to be much greater, 22% versus 7%. In the presence of CNF, DNM, and sepsis, the mortality rate increases to 64%. Those who survive CNF complicated by DNM and sepsis have truly beaten the odds. CNF is an uncommon, but potentially fatal, condition that oral and maxillofacial surgeons might be called on to manage emergently. Treatment includes surgery and medical intensive care. Surgeons offer the best odds of patient survival by following these basic principles: airway security, early aggressive incision and drainage plus debridement with thoracotomy, as needed, close surveillance with computed tomography, and a low threshold for retreatment. In immunocompromised patients, even greater vigilance is required. Antibiotic therapy should be adjusted as cultures and sensitivities become available. Advances in interventional radiology might lead to improved survival by allowing guided minimally invasive drainage in critically ill patients who cannot tolerate additional surgical insult. Despite the technologic advances in diagnosis and treatment, CNF complicated by DNM mediastinitis and sepsis still results in astoundingly high mortality.

## CELLULITIS

HEILELMAN JF DIRLAM JH SEVERE CELLULITIS OF DENTAL ORIGIN WITH GAS-PRODUCING BACTERIA. J INDIANA DENT ASSOC (1982 MAY-JUN) 61(3):11-3

REYFORD H BOUFFLERS E BARALLE MM TELION C GUERMOUCHE T MENU H KRIVOSIC-HORBER R CERVICOFACIAL CELLULITIS OF DENTAL ORIGIN AND TRACHEAL INTUBATION CELLULITES CERVICO-FACIALES D'ORIGINE DENTAIRE ET INTUBATION TRACHEALE. ANN FR ANESTH REANIM (1995) 14(3):256-60

IM DHANARAJANI PJ CERVICAL CELLULITIS AND MEDIASTINITIS CAUSED BY ODONTOGENIC INFECTIONS: REPORT OF TWO CASES AND REVIEW OF LITERATURE. J ORAL MAXILLOFAC SURG (1995 FEB) 53(2):203-8

UNKEL JH MCKIBBEN DH FENTON SJ NAZIF MM MOURSİ A SCHUIT K COMPARISON OF ODONTOGENIC AND NONODONTOGENIC FACIAL CELLULITIS IN A PEDIATRIC HOSPITAL POPULATION. PEDIATR DENT (1997 NOV-DEC) 19(8):476-9

SUGATA T FUJITA Y MYOKEN Y FUJIOKA Y CERVICAL CELLULITIS WITH MEDIASTINITIS FROM AN ODONTOGENIC INFECTION COMPLICATED BY DIABETES MELLITUS: REPORT OF A CASE. J ORAL MAXILLOFAC SURG (1997 AUG) 55(8):864-9

PERSAC S PERON JM TEMPORAL CELLULITIS OF ODONTOGENIC ORIGIN COMPLICATED BY TEMPOROMANDIBULAR OSTEOARTHRITIS REV STOMATOL CHIR MAXILLOFAC (2008 APR) 109(2):110-3

INTRODUCTION: Temporal cellulitis complicated by temporomandibular osteoarthritis and mandibular osteomyelitis is rare with the availability of antibiotics and the prevention of dental infections. CASE REPORT: A 56 year-old woman developed a jaw abscess during hospitalization in an intensive care unit following medical drug overdose. Repeatedly surgical drainage was performed guided by CT scans and multiple antibiotherapies. CT scan follow-up revealed temporomandibular arthritis with decrease of the joint space, synovitis, and subchondral cysts. Slow improvement was noted but limited mouth opening was persistent. DISCUSSION: This case illustrates the insidious evolution of an uncommon infection. It requires both expert clinical evaluation and an early MRI or CT scan investigation to determine the extension of the infection. Treatment is urgent because of the prognosis and is achieved by surgical drainage and adequate long-term antibiotherapy.



ARSENAULT M ANDERSON RD DYMENT H MACLELLAN J DOYLE T FACIAL CELLULITIS SECONDARY TO DENS INVAGINATUS: A CASE REPORT. J CAN DENT ASSOC (2010) 76:A114

We describe a case of dens invaginatus in an unerupted permanent maxillary lateral incisor, which led to facial cellulitis in a 10- year-old girl. We review the importance of recognizing dens invaginatus and present strategies for preventing loss of vitality in the affected tooth.

MILOUNDJA J ASSINI EYOGHO SF MANDJI LAWSON JM ONDOUNDA M KOUMBA JS LEKASSA P INIBEND M N'ZOUBA L DIFFUSE CERVICO-FACIAL CELLULITIS: 32 CASES IN LIBREVILLE. SANTE (2011 JUL-SEP) 21(3):153-7

OBJECTIVE: The aim of this study was to analyze the predisposing factors and the diagnostic and therapeutic aspects of diffuse cervico- facial cellulitis. MATERIAL AND METHODS: This retrospective study examined the records of all 32 patients admitted to the ENT and cervico-facial department of the Omar Bongo Ondimba Army Teaching Hospital in Libreville with diffuse cervico-facial cellulitis, from January 2006 through December 2010. RESULTS: The study included 18 women (56%) and 14 men (44%) with a mean age of 28 years. At admission, 28 patients (87.5%) had already received anti-inflammatory drugs and 25 (78%) one or more antibiotics. Two patients were HIV+. The main route was dental for 21 patients (66%), tonsillar for 4 (13%), submandibular for 2 (6%), parotid for 2 cases (6%), cutaneous for 1 (3%) and unspecified in 2 more (6%). The cellulitis was pseudo- phlegmonous in 24 patients (75%) and gangrenous in 8 cases (25%). It extended to the mediastinum in six patients (19%). The bacteriological study, carried out in 24 cases (75%), found 14 cases of aerobic germs. Medical or medical and surgical treatment led to cure for 30 patients (94%). Two patients (6%) died. CONCLUSION: Treatment of cervico-facial cellulitis must be early and multidisciplinary. Self-medication with anti-inflammatory drugs for bucco-pharyngeal infections without appropriate antibiotic treatment is the principal predisposing factor.

## SHOCK

DONOFF RB GURALNICK W SHOCK DUE TO ODONTOGENIC INFECTION: REPORT OF CASE. J ORAL SURG (1977 JUL) 35(7):569-72

QUINN P GUERNSEY LH THE PRESENTATION AND COMPLICATIONS OF ODONTOGENIC SEPTIC SHOCK. REPORT OF A CASE. ORAL SURG ORAL MED ORAL PATHOL (1985 APR) 59(4):336-9

EGBERT GW SIMMONS AK GRAHAM LL TOXIC SHOCK SYNDROME: ODONTOGENIC ORIGIN. ORAL SURG ORAL MED ORAL PATHOL (1987 FEB) 63(2):167-71

KHARITONOV IUM KOROLINSKIÄ SA STEGANTSOV VA ERMOLENKO VS SEPTIC SHOCK IN SUPPURATIVE DISEASES OF THE FACE AND NECK STOMATOLOGIJA (Mosk) (1997) 76(4):27-30

A total of 283 patients with odontogenic sepsis, in 66 of these complicated with septic shock, were observed in 1983-1995. A program for rapid assessment of the main clinical laboratory parameters is proposed for differentiating the phases of shock development. Combined use of hemoperfusion and extracorporeal perfusion oxygenation of the blood with preliminary or simultaneous intraarterial infusion of plasma substitutes possessing hemodynamic effects is pathogenetically justified in septic shock.

FARDY CH, FINDLAY G, OWEN G, SHORTLAND G. TOXIC SHOCK SYNDROME SECONDARY TO A DENTAL ABSCESS. INTERNATIONAL JOURNAL OF ORAL AND MAXILLOFACIAL SURGERY 1999 FEBRUARY; VOLUME 28, NUMBER 1, PP. 60-61.

A 9-year-old girl presented with arthralgia and myalgia, which progressed to developing renal failure and overwhelming septic shock. The underlying cause was assumed to be a periodontal abscess from an upper right deciduous canine tooth. The pus from the abscess grew a toxic shock syndrome toxin 1-producing *Staphylococcus aureus*. This case illustrates the importance of an oral surgical review of patients presenting with features of toxic shock syndrome if the source of the infection is not immediately obvious.

## SEPTICEMIA

GHANASSIA R SEPTICEMIA OF DENTAL ORIGIN INF DENT (1975 MAR 27) 57(13):29-32

ORLENKO MA TSYMBALIUK VP KATSNEL'SON BM ODONTOGENIC STAPHYLOCOCCUS SEPSIS STOMATOLOGIJA (MOSK) (1975 NOV-DEC) 54(6):81-2

PLAMIENIAK Z MEDRAS M MAN W 2 CASES OF ODONTOGENIC SEPTICEMIA WITH ATYPICAL CLINICAL COURSE CZAS STOMATOL (1977 NOV) 30(11):947-50

ANDRA A [MASSIVE INFECTION OF ODONTOGENIC ORIGIN (AUTHOR'S TRANSL)]: ZENTRALBL CHIR (1978) 103(8):527-32

GOSNEY MA PRESTON AJ CORKHILL J MILLNS B MARTIN MV PSEUDOMONAS AERUGINOSA SEPTICAEMIA FROM AN ORAL SOURCE. BR DENT J (1999 DEC 25) 187(12):639-40

Oral colonisation with aerobic Gram-negative bacilli (AGNB) is abnormal and usually indicates a medically compromised state in the host. It has been postulated that oral colonisation with AGNB may predispose a patient to serious systemic infection, but proof of this assertion is lacking. This report describes an elderly patient who had oral colonisation of *Pseudomonas aeruginosa* and developed septicaemia from an identical strain of this bacterium.

NGAPETH-ETOUMDI M ELA GA ITOUA ES OBOUNOU A SEPTICEMIA OF DENTAL ORIGIN AND POST-EXTRACTION COMA. APROPOS OF 3 CASES ODONTOSTOMATOL TROP (2001 JUN) 24(94):19-22

The authors report 3 cases of septicaemia and coma post dental extraction. These 3 patients had dental extraction in the same confessional dental clinic. After these acts the situation were so severe and they came to central hospital in Yaounde. Infections from dental origin proven by blood culture necessitate an early antibiotherapy and treatment, which propriate and sustain, but adapted to the antibiogram. The streptococcus of group F and *Klebsiella pneumonia* were challenged. One of the cases was negative. The presence of common signs (fever, tachycardia, chill) need the search for a secondary localisation which can be determine by X-ray.

MATIJEVIC S MARJANOVIC M UNERUPTED LOWER THIRD MOLAR AS A CAUSE OF ACUTE INFECTION IN SOLDIERS VOJNOSANIT PREGI (2005 NOV) 62(11):827-31

BACKGROUND/AIM: To record the frequency of infections as complications accompanying the unerupted lower third molars and to determine if there was a significant level of the relationship between the frequency and the severity of infections and the age of patients. METHODS: This study included 100 soldiers of the Army of Serbia & Montenegro, with the unerupted third molars, of male sex, 18 to 25 years old, who were receiving clinical treatment. RESULTS: In 73% of the patients the infection was caused with the unerupted lower third molars. The highest frequency of infection was observed in the group of 20-23 years of age (75.3%). Mild infection occurred in 49 (67.1%) of the patients. CONCLUSION:

The frequency of infection was significantly higher in the older patients. Because of the high frequency of the infection recorded, the unerupted lower third molars should be surgically removed before the age of 20.

## BONE

SOLLMANN AH MANDIBULAR ANGLE AND VERTEBRAL DISEASES MED KLIN (1966 JAN 14) 61(2):51-4

BIBERMAN IAM CLINICAL ASPECTS OF ODONTOGENIC OSTEOMYELITIS OF THE MAXILLA IN ADULTS

STOMATOLOGIJA (MOSK) (1974 NOV-DEC) 53(6):31-4

RUZIN GP ZAKHAROV IUS BOLGOV DF A CASE OF ODONTOGENIC OSTEOMYELITIS OF THE MAXILLA

COMPLICATED BY MENINGITIS STOMATOLOGIJA (MOSK) (1974 SEP-OCT) 53(5):87-8

NEUMANN VH, STEINBRECHER G, THIMANN I. OSTEOMYELITIS OF THE JAW STOMATOLOGIE DER DDR

1975 JANUARY; VOLUME 25, NUMBER 1, PP. 31-34.

A brief description of nomenclature differences and classification principles is followed by a report of the results from an analysis of cases of osteomyelitis of the jaw, which have been treated during the years 1967-1972. During this period, altogether 745 patients with soft-tissue infection and 72 patients with osteomyelitis have been treated at the clinic. The chronic form of osteomyelitis is considerably more frequent than the acute one. The odontogenic mode of infection prevails by far. The flora of causative organisms and the resistance conditions are dealt with separately. The mixed flora dominates; monoinfections are rare. Antibiotherapy occupies the first place in the treatment of the acute forms whereas surgical intervention is the method of choice in the treatment of the chronic forms of osteomyelitis.

MCGINNIS JP KEENE RD FOCAL OSTEOPOROTIC BONE MARROW DEFECT OF THE JAWS--REPORT OF A CASE. ARK DENT J (1976 MAR) 47(1):10-11

MAUKS G TOTTH A TEETH, CAUSING ODONTOGENIC PERIOSTITIS CLASSIFICATION BY AGE FOGORV SZ (1976 AUG) 69(8):330-4

RANGNE A, RUUD A. OSTEOMYELITIS OF THE JAWS. INTERNATIONAL JOURNAL OF ORAL SURGERY 1978 DECEMBER; VOLUME 7, NUMBER 6, PP. 523-527.

Material consisting of 16 patients examined and/ or treated under the diagnosis osteomyelitis is reported. A description is given of the history, etiology, clinical and radiographic findings, results of histologic and microbiologic examinations, blood chemistry, diagnostic subgroups, findings at operation and the surgical and antibiotic therapy used. The results of treatment at short-term follow-up are given. Of nine patients observed 5 months or longer, six showed signs of healing, while the result was judged as uncertain in two cases and unsuccessful in one.

WANNFORS K, HAMMARSTROM L. INFECTIOUS FOCI IN CHRONIC OSTEOMYELITIS OF THE JAWS: INTERNATIONAL JOURNAL OF ORAL SURGERY 1985 DECEMBER; VOLUME 14, NUMBER 6, PP. 493-503.

Chronic osteomyelitis of the jaws has a varied clinical appearance and an unclear etiology. In a retrospective study based-on case histories and histological material from 24 patients with chronic osteomyelitis, no specific correlation could be found between clinical symptoms and morphological changes in bone. In 10 patients, bacteria were found in certain foci such as osteocytic lacunae of necrotic bone and dentinal tubules of embedded tooth fragments. In these foci,

the bacteria probably escaped the immunological response as well as the antibiotic treatment. From these foci, the bacteria might maintain an inflammatory reaction in the surrounding bone. In some patients, the mandibular canal seemed to be a pathway for the spreading of the inflammatory process.

HARRIS LF CHRONIC MANDIBULAR OSTEOMYELITIS.. SOUTHERN MEDICAL JOURNAL 1986 JUNE; VOLUME 79, NUMBER 6, PP. 696-697.

Chronic osteomyelitis of the mandible is an infrequently reported condition, but recent experience with six cases over a 14-month period suggests it is more common than appreciated. Chronic mandibular osteomyelitis results from odontogenic infection, postextraction complication, trauma, or irradiation to the mandible. Clinical findings include local pain and swelling and trismus, but constitutional symptoms are unusual. Radiologic examination discloses radiolucent areas, bony destruction, and sequestrum formation. Pathogenic organisms are normal oral flora, *Staphylococcus aureus*, and aerobic gram-negative bacilli. Chronic mandibular osteomyelitis must be differentiated from malignant disease involving the mandible. Diagnosis is accomplished by bone biopsy and culture. Treatment involves thorough surgical debridement and prolonged antimicrobial therapy. Osteoradionecrosis of the mandible is extremely recalcitrant to conventional therapy, but aggressive surgery and treatment have proven effective.

BIANCHI MA ROSENBERG SL MURPHY JB CERVICAL NECROSIS AND SINUS TRACT FORMATION SECONDARY TO A DENTOALVEOLAR INFECTION: REPORT OF A CASE. J ORAL MAXILLOFAC SURG (1986 Nov) 44(11):894-6

SCHELHORN P, ZENK W. CLINICS AND THERAPY OF THE OSTEOMYELITIS OF THE LOWER JAW STOMATOLOGIE DER DDR 1989 OCTOBER; VOLUME 39, NUMBER 10, PP. 672-676.

During the last three decades the clinical picture of osteomyelitis has considerably changed. Acute cases have become rarer than in the past. The outbreak of the disease to be observed in recent times is primarily of a subacute chronic stage. These non-characteristic symptoms make diagnosis more difficult. Acute cases of osteomyelitis are treated with antibiotics; chronic cases should surgically be approached as early as possible. Surgical methods used are above all decortication as well as transplantation of autogenous spongiosa.

WALLACE DE CHRONIC PERIODONTITIS AND A CHRONIC SWELLING OF THE RIGHT INDEX FINGER. J N Z SOC PERIODONTOL (1991 MAY)(71):15

WANNFORS K, GAZELIUS B. BLOOD FLOW IN JAW BONES AFFECTED BY CHRONIC OSTEOMYELITIS. THE BRITISH JOURNAL OF ORAL & MAXILLOFACIAL SURGEON 1991 JUNE; VOLUME 29, NUMBER 3, PP. 147-153.

In order to study circulatory changes throughout the course of chronic osteomyelitis of the jaws, blood flow in bone affected by osteomyelitis was assessed in 14 patients, by means of laser Doppler flowmetry (LDF). The difference in perfusion between the osteomyelitic bone and corresponding sites on the opposite healthy jaw was evaluated. The patients were classified into two groups according to the clinical activity of their disease. A significantly reduced bone blood flow was recorded in the jaw during non-active stages, while an increased flow was associated with the initial stage of disease and the inflammatory exacerbations. No pre-existing vascular disorders were discovered prior to the development of this disease. However, a long-standing local inflammation of the jaw bone was associated with a persistent reduction in blood flow. In 12 healthy

subjects, blood flow in the left jaw was found not to be statistically different to that in the right jaw.

HUDSON JW. OSTEOMYELITIS OF THE JAWS: A 50-YEAR PERSPECTIVE JOURNAL OF ORAL AND MAXILLOFACIAL SURGEON 1993 DECEMBER; VOLUME 51, NUMBER 12, PP. 1294-1301..

The incidence of osteomyelitis of the jaws has decreased dramatically, except for a few subsets of individuals. This has been due, in no small part, to the availability of bacteriocidal antimicrobial therapy. The pathogenesis of osteomyelitis of the jaws is predominately due to odontogenic microorganisms rather than the classic skin contaminant, *Staphylococcus*. This causative relationship relegates the classification of osteomyelitis of the bimaxillary skeleton to predominately that of contiguous foci. These may be regionally progressive, secondary to microvascular compromise brought about by inherent flaws in regional anatomic calcified tissue vascular perfusion as well as by inflammatory metaplastic processes. Diagnosis is based on the presence of painful sequestra and suppurative areas of tooth-bearing jaw bone unresponsive to debridement and conservative therapy. This is usually accompanied by regional or systemic compromise of the immune response, microvascular decompensation, or both. Treatment of both acute and chronic forms of the disease is successful if surgically supported. Sustained bacteriocidal antibiotic therapy is pertinent, especially in the face of potentially refractory virulent microorganisms and compromised regional vascular penetration. The use of adjunctive hyperbaric oxygen therapy also may be included in the more refractory forms of osteomyelitis of the jaws to enhance the local and regional immune response of the jaws as well as to produce microvascular neoangiogenesis for reperfusion support. With resolution of infection, hard and soft tissue reconstruction may be necessary to augment the reparative process.

LARKIN EB SCOTT SD METASTATIC PARASPINAL ABSCESS AND PARAPLEGIA SECONDARY TO DENTAL EXTRACTION. BR DENT J (1994 NOV 5) 177(9):340-2

SASAKI J, NAMETA K. CHRONIC OSTEOMYELITIS OF MANDIBULA NIPPON KINSHO. JAPANESE JOURNAL OF CLINICAL MEDICINE 1994 FEBRUARY; VOLUME 52, NUMBER 2, PP. 507-511.

As the human lower jaw (mandibula) itself is a hard bone, and when bacterial inflammation occurs in it by pericoronal infection of the 3rd molar or apical infection of caries tooth, the inflammation remains in the bone marrow and often progresses to acute osteomyelitis. The prominent sign of acute osteomyelitis in the lower jaw is mental nerve palsy, which is the so-called Vincent's Syndrome. The causative organisms are not different from those of the common odontogenic infections. Recently, we have identified some strains of Oral Streptococci tolerant against PCs and Cefems and also ones capable of biofilm formation. When antimicrobial agents or drainage proves unsuccessful, acute osteomyelitis may become chronic, which is more difficult to treat. Surgical procedures, such as, debridement or decortication of cortex bone, are necessary in most cases. If these surgical procedures do not give satisfactory results, the amputation of the jaw is not rare.

WANG TD CHEN YC HUANG PJ RECURRENT VERTEBRAL OSTEOMYELITIS AND PSOAS ABSCESS CAUSED BY STREPTOCOCCUS CONSTELLATUS AND FUSOBACTERIUM NUCLEATUM IN A PATIENT WITH ATRIAL SEPTAL DEFECT AND AN OCCULT DENTAL INFECTION. SCAND J INFECT Dis (1996) 28(3):309-10

CORREA-NAZCO VJ ROMERO-PEREZ JC DOMINGUEZ J AMERIGO MJ GONZALEZ-FEBLES M ERDOZAIN-RUIZ I EPIDURAL ABSCESS OF THE CERVICAL SPINE SECONDARY TO DENTAL ABSCESS REV NEUROL (1999 AUG 1-15) 29(3):286-7

JACOBSON HL BAUMGARTNER JC MARSHALL JG BEELER WJ PROLIFERATIVE PERIOSTITIS OF GARRE: REPORT OF A CASE. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOL ENDOD (2002 JUL) 94(1):111-4

Proliferative periostitis of Garre is described as a productive and proliferative inflammatory response of periosteum to infection or other irritation. This can be odontogenic or non-odontogenic in nature. This is a case report of an odontogenic periostitis resulting from periapical inflammation of endodontic origin. It was successfully treated by nonsurgical endodontics. Antibiotic therapy was not used during the treatment of this patient.

DHARIWAL DK PATTON DW GREGORY MC EPIDURAL SPINAL ABSCESS FOLLOWING DENTAL EXTRACTION--A RARE AND POTENTIALLY FATAL COMPLICATION. BR J ORAL MAXILLOFAC SURG (2003 FEB) 41(1):56-8

TONG AC NG IO YEUNG KM OSTEOMYELITIS WITH PROLIFERATIVE PERIOSTITIS: AN UNUSUAL CASE. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOL ENDOD (2006 NOV) 102(5):E14-9

Chronic osteomyelitis with subperiosteal new bone formation results from periosteal reaction to chronic inflammatory/infectious stimulation. In the maxillofacial region, it has traditionally been termed Garre's osteomyelitis with proliferative periostitis and more recently periostitis ossificans. The term Garre's osteomyelitis has been regarded as a misnomer by many authors in the recent literature. The term chronic osteomyelitis with proliferative periostitis, although cumbersome, is considered to be the most accurate description of the pathology. It usually affects the mandible of young patients secondary to dental infection. Management involves removal of the source of infection and antibiotic treatment. We present an unusual case of chronic osteomyelitis with proliferative periostitis affecting the mandible of a 12-year-old patient. The source of infection was related to the developing lower left third molar, which had apparently no communication with the oral cavity.

PRASAD KC PRASAD SC MOULI N AGARWAL S OSTEOMYELITIS IN THE HEAD AND NECK. ACTA OTOLARYNGOL (2007 FEB) 127(2):194-205

CONCLUSION: All bones of the facial skeleton and spine are susceptible to osteomyelitis due to various predisposing conditions. Current radiological tools are sufficient to provide adequate diagnosis. Treatment can be conservative resection of the diseased bone with adequate clearance in all cases except in cases of osteomyelitis due to osteoradionecrosis (ORN) where resection has to be more radical. OBJECTIVE: In today's antibiotic era, osteomyelitis in the head and neck is a rare occurrence. Dealing with osteomyelitis in head and neck bones is not the same as in other bones of the body due to the nature of the bones, complex anatomy of the region, and esthetics. Our purpose was to analyze the behavior of osteomyelitis in the head and neck bones and its management. MATERIALS AND METHODS: A total of 84 cases of osteomyelitis in head and neck were reviewed in a 10-year period. Pus for culture, antibiotic sensitivity, and radiology were the main investigations. A medical line of treatment was effective in acute cases. Surgery was opted for in chronic cases. RESULTS: Mandible, frontal bone, cervical spine, maxilla, temporal bones, and nasal bones were involved, in descending order of frequency, i.e. the mandible was the most common bone affected. Nine patients were diagnosed as having acute osteomyelitis (11%); 75 were diagnosed as having chronic osteomyelitis (89%). Radiation-induced ORN leading to osteomyelitis was the most common cause of osteomyelitis of the mandible (13 of the 32 cases; 41%). Odontogenic infections and chronic sinusitis each gave rise to osteomyelitis in 3 of 10 cases (30%) of the patients with osteomyelitis of the maxilla.

Chronic sinusitis was the main cause of frontal bone osteomyelitis in all 20 cases (100%). Tuberculosis (10 of 15 cases; 67%) and malignancy (5 of 15 cases; 33%) were the main predisposing factors in cervical spine osteomyelitis. Malignant external otitis (MEO) with diabetes mellitus was an underlying factor in all four cases of osteomyelitis of the temporal bone. Of the 18 patients with a diagnosis of ORN, the mandible was found to be the most susceptible bone (13 cases; 72%), followed by the maxilla (four cases; 22%) and cervical spine (1 case). Acute osteomyelitis responded to antibiotics. Sequestrectomy was carried out in all chronic cases but in cases of ORN more radical surgery was performed.

ADAMS JR BRYANT DG CRANIAL OSTEOMYELITIS: A LATE COMPLICATION OF A DENTAL INFECTION. BR J ORAL MAXILLOFAC SURG (2008 DEC) 46(8):673-4

Dental infections are associated with a range of serious complications. The orofacial region provides potential spaces in the tissue that infections of dental origin can occupy. We describe the subtemporal extension of a dental infection, the late development of cranial osteomyelitis, and its surgical management

## OSTEITIS

SCHUH E RESIDUAL OSTEITIS IN THE EDENTULOUS JAW AS A FOCUS POSSIBILITY THERAPIEWOCHE (1965 DEC) 15(23):1246-9

KOPPANG HS, OLSEN I, STUGE U, SANDVEN P. AUREOBASIDIUM INFECTION OF THE JAW. JOURNAL OF ORAL PATHOLOGY & MEDICINE 1991 APRIL; VOLUME 20, NUMBER 4, PP. 191-195

A 32-yr-old white North American male resident of Norway presented with an asymptomatic radiolucency first identified 3 yr after the removal of an impacted mandibular right third molar in Southern California 16 yr previously. Surgical exploration revealed an intraosseous cavity filled with a black, homogeneous, gelatinous substance thought to be foreign material, but which was diagnosed histologically as containing black yeasts. Cultivation of a microbiologic sample for 6 wk grew black yeast-like colonies. The yeast isolate was identified as an *Aureobasidium* species different from the typical *A. pullulans*. A blood sample was negative with regard to antibodies both with double diffusion technique and ELISA. Also, examination with respect to dermatologic manifestations gave negative results. Flucytocin 10 g/d was administered systemically for 30 d. Six months postoperatively bone regeneration was satisfactory radiologically.

SEGALL RO, DEL RIO CE. CAVITATIONAL BONE DEFECT: A DIAGNOSTIC CHALLENGE. JOURNAL OF ENDODONTICS 1991 AUGUST; VOLUME 17, NUMBER 8, PP. 396-400.

A patient with a history of trauma to the maxillary left anterior region presented with chronic pain of unknown etiology. Root canal therapy and periradicular surgery failed to resolve the persistent pain. A second surgical procedure revealed a bone cavity superior and distopalatally to the apex of the maxillary left lateral incisor. The suspected etiology was necrotic bone removed from the bone cavity.

SCHUH E RESIDUAL OSTEITIS IN THE EDENTULOUS JAW AND GENERAL DISEASES OSTERR Z STOMATOL (1966 FEB) 63(2):52-9.

BOUQUOT JE, ROBERTS AM, PERSON P, CHRISTIAN J. NEURALGIA-INDUCING CAVITATIONAL OSTEONECROSIS (NICO). OSTEOMYELITIS IN 224 JAWBONE SAMPLES FROM PATIENTS WITH FACIAL NEURALGIA. ORAL SURGERY, ORAL MEDICINE, AND ORAL PATHOLOGY 1992 MARCH; VOLUME 73, NUMBER 3, PP. 307-319.

A somewhat obscure etiologic theory for facial neuralgias presumes a low-grade

osteomyelitis of the jaws that produces neural degeneration with subsequent production of inappropriate pain signals. Animal investigations and treatment successes with human patients based on this theory lend it credence. The present study examined 224 tissue samples removed from alveolar bone cavities in 135 patients with trigeminal neuralgia or atypical facial neuralgia. All tissue samples demonstrated clear evidence of chronic intraosseous inflammation. The most common microscopic features included dense marrow fibrosis or "scar" formation, a sprinkling of lymphocytes in a relative absence of other inflammatory cells (especially histiocytes), and smudged, nonresorbing necrotic bone flakes. Very little healing or new bone formation was visible. These lesions were able to burrow several centimeters to initiate distant cavities. The present preliminary investigation cannot prove etiology, but the presence of intraosseous inflammation in every single jawbone specimen in these patients and certain clinical and treatment aspects of these lesions (to be reported later) has led the authors to recommend the term neuralgia-inducing cavitation osteonecrosis or NICO for these lesions.

CATHELIN A MADJIDI A FLEURIDAS G COULY G PSEUDO-TUMORAL OSTEITIS OF THE MANDIBLE IN CHILDREN OSTEITE PSEUDO-TUMORALE DE LA MANDIBULE CHEZ L'ENFANT. REV STOMATOL CHIR MAXILLOFAC (1994) 95(2):109-11

GLUECK CJ, McMAHON RE, BOUQUOT JR, TRIPLETT D, GRUPPO R, WANG P HETEROZYGOSITY FOR THE LEIDEN MUTATION OF THE FACTOR V GENE, A COMMON PATHOETIOLOGY FOR OSTEONECROSIS OF THE JAW, WITH THROMBOPHILIA AUGMENTED BY EXOGENOUS ESTROGENS. THE JOURNAL OF LABORATORY AND CLINICAL MEDICINE 1997 NOVEMBER; VOLUME 130, NUMBER 5, PP. 540-543.

We assessed whether heterozygosity for the thrombophilic Leiden mutation of the factor V gene (MFV) was pathogenetic for alveolar osteonecrosis of the jaw and chronic facial pain (neuralgia-inducing cavitation osteonecrosis (NICO)) in 89 patients with NICO. A second specific aim was to assess for thrombophilic synergism between exogenous estrogens and MFV for development of osteonecrosis of the jaw. MFV was found in 24% of the patients, 16 (21%) of 76 women and 5 (39%) of 13 men. The mutation was much less common in healthy normal controls: 3 (3%) of 101 women ( $\chi^2 = 14.8$ ,  $p = 0.001$ ) and 4 (3.7%) of 108 men ( $\chi^2 = 20.4$ ,  $p = 0.001$ ). Patients with and without MFV did not differ in tissue plasminogen activator activity, plasminogen activator inhibitor activity, proteins C and S, lipoprotein (a), or anticardiolipin antibodies ( $p > 0.05$ ). Use of standard-dose oral contraceptives and/or postmenopausal estrogens before the development of NICO was more common in female patients with MFV (13 (81%) of 16) than in those without it (23 (38%) of 60;  $\chi^2 = 9.33$ ,  $p = 0.002$ ). When the thrombophilic effects of such exogenous estrogens were superimposed on the familial resistance to activated protein C associated with MFV, thrombophilia was augmented and the risk of osteonecrosis was increased. Since heterozygosity for this mutation occurs in at least 3% of unselected, healthy women, measurement of resistance to activated protein C and MFV would identify women at high risk for venous thrombosis and osteonecrosis, in whom use of oral contraceptives or postmenopausal estrogens might be contraindicated, while identifying a much larger group of women (approximately 97%) without the mutation whose risk from exogenous estrogens would be low.



**SHANKLAND WE MEDULLARY AND ODONTOGENIC DISEASE IN THE PAINFUL JAW: CLINICOPATHOLOGIC REVIEW OF 500 CONSECUTIVE LESIONS. CRANIO (2002 OCT) 20(4):295-303**

Ischemic jawbone lesions were first discussed in the dental literature more than a century ago, but then seemingly forgotten. In recent years, there has been considerable resurgence in interest in this unique pathological condition. Controversy surrounds the subject. Some proclaim these lesions to be mere fabrications of the imaginations of non-traditional or alternative dental surgeons. Others attribute all human maladies to these maxillofacial lesions. Aside from these philosophical and metaphysical arguments, are there common diagnoses of jawbone pathologies that produce pain? This present investigation reviews the clinicopathologic features of 500 consecutive jawbone surgeries with pathological confirmation in patients with idiopathic facial pain. Four hundred seventy-six (476) of the 500 lesions (95.2%) were directly attributed to impaired blood flow in the jawbone, tooth, or both, according to histopathological analysis and confirming Cavitat (bone ultrasound) examination. Statistical data concerning the location, frequency, and pathological diagnoses of these bony lesions are presented, as are brief methods of diagnosis, and treatment is also discussed.

**AL-SEBAEI MO KAHN MA PAPAGEORGE MB A CLINICO-PATHOLOGIC CORRELATION. CONDENSING OSTEITIS (FOCAL SCLEROSING OSTEOMYELITIS). J MASS DENT SOC (2003 SPRING) 52(1):52-4**

## **JOINT**

**JANECEK J FOCAL INFECTION OF DENTAL ORIGIN AS THE CAUSE OF A JOINT DISEASE PRAKT ZUBN LEK (1987 MAR) 35(2):47-9**

## **JOINT ARTIFICIAL**

**SCHURMAN DJ APTEKAR RG BURTON DS INFECTION IN TOTAL KNEE JOINT REPLACEMENT, SECONDARY TO TOOTH ABSCESS. WEST J MED (1976 SEP) 125(3):226-7**

**RUBIN R SALVATI EA LEWIS R INFECTED TOTAL HIP REPLACEMENT AFTER DENTAL PROCEDURES. ORAL SURG ORAL MED ORAL PATHOL (1976 JAN) 41(1):18-23**

Three cases are reported in which there was a worrisome association between dental work and an infected total hip replacement. The patients had long asymptomatic intervals subsequent to Implantation of prosthetic hip joints. After dental procedures, infections became apparent in these hips. Such infections carry an enormous and crippling morbidity. The potential complications of transient bacteremia in the patient with a cardiac valvular prosthesis are appreciated and the importance of prophylactic antibiotics for dental work in such patients is well known. Although we emphasize that there is no proof that the infections in our patients were metastatic from the mouth, the sequence of events is suggestive. We recommend prophylactic antibiotics for dental work in the Patient with a total hip replacement.

**MULLIGAN R LATE INFECTIONS IN PATIENTS WITH PROSTHESES FOR TOTAL REPLACEMENT OF JOINTS: IMPLICATIONS FOR THE DENTAL PRACTITIONER. J AM DENT ASSOC (1980 JUL) 101(1):44-6**

JACOBSEN PL MURRAY W PROPHYLACTIC COVERAGE OF DENTAL PATIENTS WITH ARTIFICIAL JOINTS: A RETROSPECTIVE ANALYSIS OF THIRTY-THREE INFECTIONS IN HIP PROSTHESES. ORAL SURG ORAL MED ORAL PATHOL (1980 AUG) 50(2):130-3

J. ENDO 18:2 1992 INFECTED TOTAL HIP REPLACEMENT AFTER DENTAL PROCEDURES

ADVISORY STATEMENT. ANTIBIOTIC PROPHYLAXIS FOR DENTAL PATIENTS WITH TOTAL JOINT REPLACEMENTS. AMERICAN DENTAL ASSOCIATION; AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS. J AM DENT ASSOC (1997 JUL) 128(7):1004-8

An expert panel of dentists, orthopaedic surgeons and infectious disease specialists convened by the American Dental Association and the American Academy of Orthopaedic Surgeons, or AAOS, performed a thorough review of all available data to determine the need for antibiotic prophylaxis to prevent hematogenous prosthetic joint infections in dental patients who have undergone total joint arthroplasties. The result is this report, which has been adopted by both organizations as an advisory statement. The panel's conclusion: Antibiotic prophylaxis is not indicated for dental patients with pins, plates and screws, nor is it routinely indicated for most dental patients with total joint replacements. However, it is advisable to consider premedication in a small number of patients who may be at potential increased risk of hematogenous total joint infection.

KLUEBER D POSSIBILITY OF A LATE INFECTION OF A JOINT IMPLANT BECAUSE OF DENTAL PROCEDURES. CLIN ORTHOP RELAT RES (1998 SEP)(354):253-4

NADLACAN LM HIRST P INFECTED TOTAL KNEE REPLACEMENT FOLLOWING A DENTAL PROCEDURE IN A SEVERE HAEMOPHILIC. KNEE (2001 JUN) 8(2):159-61

This article documents the late infection of a total knee replacement in a haemophilic following a dental procedure. It underlines the need for reconsideration of the current British guidelines regarding antibiotic prophylaxis for dental procedures in patients with total joint replacement.

SEYMOUR RA WHITWORTH JM MARTIN M ANTIBIOTIC PROPHYLAXIS FOR PATIENTS WITH JOINT PROSTHESES - STILL A DILEMMA FOR DENTAL PRACTITIONERS. BR DENT J (2003 JUN 28) 194(12):649-53

OBJECTIVES: To provide a critical review of the current evidence that implicates dental-induced bacteraemia as a risk for joint infections in patients fitted with joint prostheses and appraise the need for antibiotic prophylaxis. DESIGN: Retrospective analysis. SETTING: Mainly hospital-based patients or subjects. OUTCOME MEASURES: The relationship between joint infections and dental treatment is equivocal at the best and there is no evidence that antibiotic prophylaxis provides such patients with any protection. RESULTS: Microbiological evidence linking dental treatment-induced bacteraemia to joint infections is weak and if an oral commensal is implicated, it is more likely to have arisen either from a spontaneous bacteraemia or from a dental infection. As a consequence of the latter, we recommended the institution of good dental health prior to joint replacement. There may be a case for providing prophylaxis to the immuno-compromised patient, but only if the immuno-suppression is associated with a neutropenia. In such circumstances, only emergency treatment should be considered until the neutropenia is resolved. Antibiotic regimens that are recommended by orthopaedic surgeons have not been evaluated in a randomised placebo-controlled study and many of the drugs are not licensed for this purpose. The evidence on cost-risk benefit seems to demonstrate that antibiotic prophylaxis with either amoxicillin or penicillin is not cost effective when compared with

no prophylaxis. CONCLUSION: The case for providing antibiotic prophylaxis prior to dental treatment in patients fitted with a joint prosthesis is weak or virtually non-existent. Furthermore, the risk from providing prophylaxis is greater than the risk of a joint infection.

Comment in: Br Dent J. 2003 Sep 13;195(5):231

MEDINA-GENS L BORDES-BENITEZ A SAEZ-NIETO JA PENA-LOPEZ MJ INFECTION OF A TOTAL HIP ARTHROPLASTY DUE TO GEMELLA MORBILLORUM. ENFERM INFECC MICROBIOL CLIN (2007 OCT) 25(8):553

VAN DAMME PA MEIS JF VOSS A ANTIBIOTIC PROPHYLAXIS INDICATED IN DENTAL PROCEDURES IN PATIENTS WITH A JOINT PROsthESIS NED TIJDSCHR GENEESKD (2007 NOV 10) 151(45):2541

WIJNGAARDEN S KRUIZE AA ANTIBIOTIC PROPHYLAXIS INDICATED IN DENTAL PROCEDURES IN PATIENTS WITH A JOINT PROsthESIS NED TIJDSCHR GENEESKD (2007 JUL 14) 151(28):1574

Randomised controlled trials concerning antibiotic prophylaxis are lacking and reported incidence of late infections after dental procedures is probably underestimated by the high rate of antibiotic prescription in the past and the difficulty in establishing the origin of late infection. Bacteraemia after dental procedures has been proven, especially in infected areas and, given the serious morbidity of late prosthetic joint infections, antibiotic prophylaxis is advised, particularly for patients with risk factors such as rheumatoid arthritis and haemophilia.

BAUER T MAMAN L MATHA C MAMOUDY P DENTAL CARE AND JOINT PROSTHESES REV CHIR ORTHOP REPARATRICE APPAR MOT (2007 OCT) 93(6):607-18

PURPOSE OF THE STUDY: Infectious dental foci and oral dental care constitute one of the leading causes of arthroplasty infection after infections involving the skin and the urinary tract. There is however no formal evidence confirming the relationship between oral or dental care and arthroplasty infection. MATERIAL AND METHODS: We reviewed 44 cases of arthroplasty infection secondary to dental infections and searched for data in the literature. In our series, no risk factor could be identified for 24 cases. The median disease-free interval was five years and mean time from the oral-dental procedure to the first signs of prosthesis infection was one month. Tooth extraction was the most common oral-dental procedure involved (n=19). Most of the infections were caused by a single agent, predominantly Streptococci sp. (n=24) and Staphylococci sp. (n=12). DISCUSSION: It is well known that dental-related bacteriemia is a spontaneous daily event even without dental procedures. It is also probable that spontaneous bacteriemia induced by daily activities is much more frequent than dental-care induced bacteriemia. The presence of foreign material diminishes local antibacterial defense systems increasing the risk of hematogeneous contamination of the joint prosthesis after dental care. The oral flora is also modified in immunodepressed subjects, particularly carriage of Staphylococcus aureus in the oral cavity which is significantly more frequent in patients with rheumatoid arthritis. These changes increase the risk of contamination after dental care. For arthroplasty infection, the pathogenic power of Staphylococci sp. is certainly greater than that of Streptococci sp. even if the inoculum is less abundant. Antibiotic prophylaxis during dental care in patients with an arthroplasty remains a controversial subject and the most appropriate antibiotic remains to be defined. Successive episodes of spontaneous bacteriemia arising from an oral-dental foci are probably the main cause of arthroplasty infections, more so than bacteriemia triggered by dental care. CONCLUSION: Antibiotic therapy is not indicated for routine dental care in the majority of patients but is

recommended whenever there is a high risk of arthroplasty contamination. In the event of oral-dental infection, antibiotic therapy is necessary. The recommendations proposed by the ADA and the AAOS were revised in 2003. The most important point is to obtain and maintain a good state of oral hygiene. For prevention, awareness of the risk is essential, for the patient, the orthopedic surgeon and the primary care physician alike. Regular dental visits are necessary.

GOFFART J GILLET P ENDODONTIC BIOFILMS AND SECONDARY INFECTION OF TOTAL HIP ARTHROPLASTY  
REV MED LIEGE (2007 DEC) 62(12):736-42

Biofilms are well recognised in different settings. Endodontic biofilms containing bacteria responsible for bacteraemia and secondary infection of total hip arthroplasties (THA) represent a diagnostic challenge because they are often asymptomatic. Their treatment is difficult and inadequate management of such unrecognised sources of systemic infection can lead to the devastating situation of an infected arthroplasty necessitating implant removal, long term antibiotic treatment and secondary implantation of a new prosthesis. Since about ten percent of secondary infected THA can have a dental origin, this article is intended to give guidelines to all intervening care providers: general practitioner, orthopaedic surgeon and dentist.

ASSAEL LA ORAL BACTEREMIA AS A CAUSE OF PROSTHESIS FAILURE IN PATIENTS WITH JOINT REPLACEMENTS. J ORAL MAXILLOFAC SURG (2009 SEP) 67(9):1789-90

FRIEDLANDER AH PRESENCE OF STAPHYLOCOCCI IN MOUTH AND PRESENCE OF STREPTOCOCCI IN LATE INFECTIONS OF KNEE AND HIP JOINT PROSTHESES: ANTIBIOTIC PROPHYLAXIS, A CONUNDRUM. SPEC CARE DENTIST (2009 NOV-DEC) 29(6):226-8

WAHL MJ ANTIBIOTIC PROPHYLAXIS IN ARTIFICIAL JOINT PATIENTS. J ORAL MAXILLOFAC SURG (2010 APR) 68(4):949

## ARTHRITIS

ROSLAWSKI A ROLE OF INFECTIOUS FOCI IN ETHIOPATHOGENESIS OF CHRONIC RHEUMATOID ARTHRITIS AND ANKYLOSING SPONDYLITIS WIAD LEK (1972 FEB 1) 25(3):247-50

MORER G LETTER: ARTHRITIS OF THE KNEE HEALED AFTER DENTAL AVULSION ARTHRITES DU GENOU GUERIES APRES VULSION DENTAIRE NOUV PRESSE MED (1975 OCT 4) 4(32):2338

MORER G ARTHRITIS OF THE KNEE DUE TO DENTAL ORIGIN CHIRURGIE (1977) 103(9):815-8  
SHIMIZU K TOYOTA Y KOH T ISHIKAWA M HIROSE Y A CASE OF RHEUMATOID ARTHRITIS CAUSED BY FOCAL INFECTION FROM PERIODONTAL TISSUE (AUTHOR'S TRANSL) JOSAI SHIKA DAIGAKU KIYO (1977)(6):421-4

HESS JC VICTOR M RELATION BETWEEN RHEUMATOLOGY AND ENDODONTICS LIGAMENT (1978) 16(129):19-21

IIDA M YAMAGUCHI Y REMISSION OF RHEUMATOID ARTHRITIS FOLLOWING PERIODONTAL TREATMENT. A CASE REPORT NIPPON SHISHUBYO GAKKAI KAISHI (1985 MAR) 27(1):234-8

MOSES JJ LANGE CR ARREDONDO A SEPTIC ARTHRITIS OF THE TEMPOROMANDIBULAR JOINT AFTER THE REMOVAL OF THIRD MOLARS. J ORAL MAXILLOFAC SURG (1998 APR) 56(4):510-2

## LEGS

DUGOIS P AMBLARD P GAGNAIRE J IMBERT R LEG ABSCESES IN STAGES AFTER PHLEBOSCLEROSUS: COMPLICATION OF A SEPTICEMIA OF DENTAL ORIGIN BULL SOC FR DERMATOL SYPHILIGR (1968) 75(4):518-20

## BACK

KOLB H SPONTANEOUS REMISSION OF SEVERE BACKACHE FOLLOWING ORAL REHABILITATION QUINTESSENZ (1976 APR) 27(4):35-6

## KIDNEY

STYPULKOWSKI C LAGAN W STYPULKOWSKA J CHRONIC FOCAL ORAL INFECTION AS A FACTOR CAUSING THE APPEARANCE OF HEMORRHAGIC HYPERGLOBULINEMIC PURPURA OF WALDENSTROM POL TYG LEK (1965 MAY 17) 20(20):734-5

SUC JM RENAL GLOMERULUS, SITE OF FOCAL INFECTION LIGAMENT (1978) 16(129):23-4  
SOWELL SB DENTAL CARE FOR PATIENTS WITH RENAL FAILURE AND RENAL TRANSPLANTS. J AM DENT ASSOC (1982 FEB) 104(2):171-7

## SPLEEN

ABU-DALLO KI MANNY Y PENCHAS S EYAL Z CLINICAL MANIFESTATIONS OF SPLENIC ABSCESS. ARCH SURG (1975 MAR) 110(3):281-3

Two patients with splenic abscess were successfully treated. In one patient, *Streptococcus viridans*, possibly arising in a dental abscess, led to inflammatory left upper quadrant signs. An exploratory laparotomy was performed, and the spleen, being found enlarged, was removed. The other patient showed no peritoneal signs. Laparotomy was done for pyrexia of unknown origin, and the removal of a normal-sized spleen was elected on the suspicion of lymphosarcoma. The spleen was abscessed, apparently because of old infarcts. A high index of suspicion is important in diagnosis, and selective angiography, not used in these two patients, is recommended.

## LIVER

BOROWSKY SA HASSE A WIEDLIN R LOTT E DENTAL INFECTION IN A CIRRHOTIC PATIENT. SOURCE OF RECURRENT SEPSIS. GASTROENTEROLOGY (1979 APR) 76(4):836-9

A patient with alcoholic cirrhosis had multiple episodes of sepsis with *Klebsiella pneumoniae*. Repeated searches for the source of infection finally revealed the organism in the root of a tooth. Evidence indicated that this site was the primary source of infection. The importance of dental infections in alcoholics and the difficulty in diagnosing those infections are emphasized by this case.

WAGNER KW SCHON R SCHUMACHER M SCHMELZEISEN R SCHULZE D CASE REPORT: BRAIN AND LIVER ABSCESES CAUSED BY ORAL INFECTION WITH *STREPTOCOCCUS INTERMEDIUS*. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOLOG ENDOD (2006 OCT) 102(4):E21-3 (COPY IN BRAIN SECTION)

Organ abscesses are a rare and life-threatening complication mostly of hematogenously disseminated infections. We report a case of brain and liver abscesses. Identification of the lesions was made by contrast-enhanced computed tomography (CT) and magnetic resonance imaging (MRI), respectively. An oral examination comprised an oral focus of

infection. *Streptococcus intermedius* was isolated from oral smear, liver and ventricular drainage, and blood sample. After the commencement of antibiotic therapy, drainage of abscesses and oral rehabilitation, complete recovery was noted.

Kim YH, Yoon HJ, Park CW, Kim JH, Lee MK, Kim KB, Na DJ, Kim JM. A case of liver abscess caused by *Fusobacterium nucleatum* in a patient with recurrent periodontal diseases. *Korean J Gastroenterol*. 2011 Jan;57(1):42-6.

*Fusobacteria* are anaerobic gram-negative, non-spore forming bacilli found in normal flora of the oral cavity, urogenital tract, and gastrointestinal tract. *Fusobacterium nucleatum* has been seldom reported as a cause of liver abscess, particularly in immunocompetent hosts. A 55-year-old man with frequent periodontal disease visited our hospital with intermittent fever and headache for 2 months. Abdominal CT scan revealed an 8.2 × 6 cm mass in the right hepatic lobe with central low density. Abscess culture revealed *F. nucleatum* as the causative organism. Percutaneous abscess drainage and intravenous administration of antibiotics for 4 weeks improved symptoms and decreased the abscess size. We report a rare case of liver abscess due to *F. nucleatum* in an immunocompetent man with periodontal disease.

## PANCREAS

ROMERO-GOMEZ M LARRAONA JL PANCREATIC ABSCESS DUE TO *STREPTOCOCCUS SALIVARIUS* AFTER DENTAL MANIPULATION [LETTER] *AM J GASTROENTEROL* (1999 JUL) 94(7):1987-8

CHANDU A MACISAAC RJ SMITH AC BACH LA DIABETIC KETOACIDOSIS SECONDARY TO DENTO-ALVEOLAR INFECTION. *INT J ORAL MAXILLOFAC SURG* (2002 FEB) 31(1):57-9

Diabetic ketoacidosis (DKA) is a medical emergency with a potentially fatal outcome if not recognized and treated appropriately. Infective processes are a common precipitant of DKA. We report two cases of dentoalveolar infections in patients with type I diabetes mellitus who presented with DKA. The management of such cases requires both specialist surgical and medical intervention.

ZHENG L YANG C ZHANG W CAI X KIM E JIANG B WANG B PU Y WANG J ZHANG Z ZHOU L ZHOU J GUAN X IS THERE ASSOCIATION BETWEEN SEVERE MULTISPACE INFECTIONS OF THE ORAL MAXILLOFACIAL REGION AND DIABETES MELLITUS? *J ORAL MAXILLOFAC SURG* (2012 JUL) 70(7):1565-72

**PURPOSE:** This study aims to identify the impact of diabetes on the final outcome (length of hospital stay and development of complications) in patients with severe multispace infections in the head and neck. Furthermore, it intends to characterize significant clinical features of these patients compared with nondiabetics. **MATERIALS AND METHODS:** A retrospective study was conducted in 117 patients who received treatment for multispace infections of the head and neck region from 2007 through 2010 at the Department of Oral and Maxillofacial Surgery, Shanghai Ninth Hospital. The study identified diabetic patients and compared them with nondiabetic patients. Demographics, etiology of infection, clinical parameters (time from first onset of symptoms to hospital admission, number of spaces affected, and distribution of involved spaces), and laboratory values (bacteriology, admission blood glucose level, admission white blood cell count, and percentage of neutrophils on admission) were analyzed for clinical significance. Statistical analyses of the results between groups were performed using the Student t test,  $\chi^2$  test, variance analysis, logistic regression analysis, and linear regression analysis. **RESULTS:** Admission blood glucose level was the only factor influencing the complications in multispace

infections in the oral-maxillofacial region. Compared with nondiabetic patients, diabetics had infections that involved more spaces, longer hospital stays, and more frequent complications. Some diabetic patients died. The disease status (with or without diabetes) was associated with clinical outcomes (length of hospital stay and complications) in the therapy procedures. **CONCLUSIONS:** This study identifies uncontrolled diabetes mellitus as an important indicator of clinical features and outcomes in treating multispace infections of the oral-maxillofacial region.

## ABDOMEN

PETERSON CM THEANDER C TOOTH INFECTION SPREADING TO THE ABDOMINAL CAVITY  
LAKARTIDNINGEN (1986 FEB 5) 83(6):412-3

PELIZZO G MISSANA G BISI G RETROPERITONEAL ABSCESS FROM ODONTOGENIC INFECTION. CLINICAL CASE MINERVA CHIR (1997 JAN-FEB) 52(1-2):129-30

KEULERS BJ ROUMEN RH KEULERS MJ VANDERMEEREN L BEKKE JP BILATERAL GROIN PAIN FROM A ROTTEN MOLAR. LANCET (2005 JUL 2-8) 366(9479):94

## REPRODUCTION

ROSE JF JR THE PROSTATE AND DENTAL INFECTIONS. PA DENT J (HARRISB) (1968 APR) 35(4):84-7  
KICINSKI J TOOTH INFECTION AS A COURSE OF PUERPERAL SEPSIS POL TYG LEK (1971 JUL 5)  
26(27):1047-8

HAN YW FARDINI Y CHEN C IACAMPO KG PERAINO VA SHAMONKI JM REDLINE RW TERM STILLBIRTH CAUSED BY ORAL FUSOBACTERIUM NUCLEATUM. OBSTET GYNECOL (2010 FEB) 115(2 Pt 2):442-5

**BACKGROUND:** Intrauterine infection is a recognized cause of adverse pregnancy outcome, but the source of infection is often undetermined. We report a case of stillbirth caused by *Fusobacterium nucleatum* that originated in the mother's mouth. **CASE:** A woman with pregnancy-associated gingivitis experienced an upper respiratory tract infection at term, followed by stillbirth a few days later. *F. nucleatum* was isolated from the placenta and the fetus. Examination of different microbial floras from the mother identified the same clone in her subgingival plaque but not in the supragingival plaque, vagina, or rectum. **CONCLUSION:** *F. nucleatum* may have translocated from the mother's mouth to the uterus when the immune system was weakened during the respiratory infection. This case sheds light on patient management for those with pregnancy-associated gingivitis.

HOBSON DT IMUDIA AN SOTO E AWONUGA AO PREGNANCY COMPLICATED BY RECURRENT BRAIN ABSCESS AFTER EXTRACTION OF AN INFECTED TOOTH. OBSTET GYNECOL (2011 AUG) 118(2 Pt 2):467-70 (COPY IN BRAIN SECTION)

**BACKGROUND:** Odontogenic infections are quite common and, in unusual cases, can extend beyond the oral cavity with potentially life-threatening complications. **CASE:** A 35-year-old woman, G3P0020, underwent extraction of an infected left maxillary third molar tooth at 19 3/7 weeks of gestation and later presented with mental status changes. Computed tomography revealed left pterygoid muscle abscess, which progressed to brain abscess. She underwent multiple partial lobectomies to drain her recurrent brain abscess. The pregnancy continued until term, and she underwent a cesarean delivery. **CONCLUSION:** Brain abscess is a rare but life-threatening complication of

pregnancy. This case illustrates the potential complications after extraction of an infected tooth in pregnancy.

LINOSSIER A THUMANN A BUSTOS-OBREGON E SPERM IMMOBILIZATION BY DENTAL FOCUS MICROORGANISMS. ANDROLOGIA (1982 MAY-JUN) 14(3):250-5

BIENIEK KW RIEDEL HH DISEASES OF THE MASTICATORY SYSTEM AS POSSIBLE CAUSAL FACTORS IN INFERTILITY ZWR (1989 OCT) 98(10):850, 852, 854

DASANAYAKE AP. POOR PERIODONTAL HEALTH OF THE PREGNANT WOMAN AS A RISK FACTOR FOR LOW BIRTH WEIGHT ANNALS OF PERIODONTOLOGY 1998 JULY; VOLUME 3, NUMBER 1, PP. 206-212.

In both developed and developing countries, low birth weight (LBW) has a tremendous impact on both the health care system and the individual families affected. This warrants the continuous search for risk factors for LBW that are amenable to prevention. Can poor oral health of the pregnant woman be one such factor? In a 1:1 matched case-control study (N = 55 pairs), we evaluated the hypothesis that poor oral health of the pregnant woman is a risk factor for LBW. The effect of periodontal and dental caries status of the woman at the time of delivery on the birth weight of the infant was evaluated by using conditional logistic regression analyses, while controlling for known risk factors for LBW. Mothers of LBW infants were shorter, less educated, married to men of lower occupational class, had less healthy areas of gingiva and more areas with bleeding and calculus, and gained less weight during the pregnancy. Conditional logistic regression analyses indicated that mothers with more healthy areas of gingiva (OR = 0.3, 95% CI = 0.12--0.72) and those who were taller (OR = 0.86, 95% CI = 0.75---0.98) had a lower risk of giving birth to an LBW infant. Risk of LBW was higher in mothers who had no or late prenatal care (OR = 3.9, 95% CI = 1.2 12.2). We conclude that poor periodontal health of the mother is a potential independent risk factor for LBW.

OFFENBACHER S, JARED VIL, O'REILLY PG, WELLS SR, SALVI GE, LAWRENCE HP, SOCRANSKY SS, BECK JD. POTENTIAL PATHOGENIC MECHANISMS OF PERIODONTITIS ASSOCIATED PREGNANCY COMPLICATIONS. ANNALS OF PERIODONTOLOGY 1998 JULY; VOLUME 3, NUMBER 1, PP. 233-250.

During normal pregnancy, maternal hormones and locally acting cytokines play a key role in regulating the onset of labor, cervical ripening, uterine contraction, and delivery. Maternal infections during pregnancy have been demonstrated to perturb this normal cytokine and hormone-regulated gestation, sometimes resulting in preterm labor, preterm premature rupture of membranes, and preterm low birth weight (PLBW), i.e., < 2,500 g and < 37 weeks of gestation. Our research focus has been to determine whether periodontal infections can provide sufficient challenge to the mother to 'trigger PLBW. New experiments from 48 case-control subjects have measured gingival crevicular fluid (GCF) levels of PGE(2) and IL-1-beta to determine whether mediator levels were related to current pregnancy outcome. In addition, the levels of 4 periodontal pathogens were measured by using microbe-specific DNA probes. Results indicate that GCF-PGE(2) levels are significantly higher in PLBW mothers, as compared with normal birth weight (NBW) controls (131.4 +/-21.8 vs. 62.6 +/-10.3 [mean +/-SE ng/mL], respectively, at P = 0.02). Furthermore, within primiparous PLBW mothers, there was a significant inverse association between birth weight (as well as gestational age) and GCF-PGE(2) levels at P = 0.023. These data suggest a dose-response relationship for increasing GCF-PGE(2) as a marker of current periodontal disease activity and decreasing birth weight. Microbial data indicate that 4 organisms associated with mature plaque and progressing periodontitis *Bacteroides forsythus*, *Porphyromonas gingivalis*, *Actinobacillus actinomycetemcomitans*, and *Treponema denticola*—were detected at higher levels in PLBW mothers, as compared to NBW controls. These data suggest that



biochemical measures of maternal periodontal status and oral microbial burden are associated with current PLBW.

CHAMPAGNE CM MADIANOS PN LIEFF S MURTHA AP BECK JD OFFENBACHER S PERIODONTAL MEDICINE: EMERGING CONCEPTS IN PREGNANCY OUTCOMES. J INT ACAD PERIODONTOL (2000 JAN) 2(1):9-13

The term periodontal medicine encompasses the study of the contribution of periodontal infections on several systemic conditions such as atherosclerosis, myocardial infarction, stroke, diabetes, and premature delivery. The early reports of a linkage between periodontitis and systemic conditions are gaining further support from additional epidemiological studies. The evidence continues to suggest that maternal periodontitis may be an important risk factor or risk indicator for pregnancies culminating in preterm low birth-weight deliveries. Potential mechanisms by which infectious challenge of periodontal origin and systemic inflammation may serve as a potential modifier of parturition are discussed. Furthermore, preliminary data are presented, supporting a hypothetical model in which periodontal pathogens disseminate systemically within the mother and gain access to the foetal compartment. Several aspects of this hypothetical model remain to be elucidated. Only the clarification of the mechanisms of pathogenesis of both periodontitis and premature deliveries will ultimately allow for accurate diagnoses and successful therapies. The concept of diagnosing and treating a periodontal patient to minimise the deleterious effects of this chronic infectious and inflammatory condition on systemic conditions represents both an unprecedented challenge and opportunity to our profession.

## SKIN

CEPICKA W TIELSCH R FOCAL INFECTIONS AND PSORIASIS VULGARIS DERMATOL WOCHENSCHR (1967 FEB 25) 153(8):193-9

PEROVIC J PISCEVIC A CHRONIC SUBCUTANEOUS ABSCESES OF DENTAL ORIGIN STOMATOL GLAS SRB (1971 AUG-OCT) 18(4):233-5

URMOSI J CLINICAL AND LABORATORY DATA SUPPORTING THE POSSIBLE RELATIONSHIP BETWEEN DENTAL FOCI AND ERYTHEMA EXUDATIVUM MULTIFORME FOGORV Sz (1974 Nov) 67(11):342-7

SAMANT A MALIK CP CHHABRA SK TEWARI A BILATERAL FACIAL SINUS OF ODONTOGENIC ORIGIN. J INDIAN DENT ASSOC (1975 Oct) 47(10):417-21

BRUSZT P VEGH T INCIDENCE OF FACIAL FISTULAE OF DENTAL ORIGIN IN AMBULATORY PATIENTS OF A DENTAL CLINIC ORV HETIL (1978 FEB 12) 119(7):405-7

KIRCH W DUHRSEN U ERYTHEMA NODOSUM OF DENTAL ORIGIN. CLIN INVESTIG (1992 DEC) 70(12):1073-8

MITCHELL CS NELSON MD JR OROFACIAL ABSCESES OF ODONTOGENIC ORIGIN IN THE PEDIATRIC PATIENT. REPORT OF TWO CASES. PEDIATR RADIOL (1993) 23(6):432-4

LESCLOUS P MAMAN L AN UNUSUAL CASE OF A RELATIONSHIP BETWEEN ROSACEA AND DENTAL FOCI. ORAL SURG ORAL MED ORAL PATHOL ORAL RADIOL ENDOD (1999 DEC) 88(6):679-82

Rosacea is a chronic disorder affecting the facial convexities, characterized by frequent flushing, persistent erythema, and telangiectases. During episodes of inflammation, additional features are swelling, papules, and pustules. The exact etiology of this dermatitis is unknown, and theories abound. Infectious foci, especially dental foci, seem to be rarely associated with the onset and progression of this disease. Dermatologic treatments are determined by the severity of the disease. But eradication of infectious foci, and in this case eradication of dental foci, may generate a significant improvement and may lead to a recovery.

CRIBIER B NOACCO G CHRONIC URTICARIA AND INFECTIOUS DISEASES ANN DERMATOL VENEREOL (2003 MAY) 130 SPEC NO 1:1S43-52

Infectious diseases are often considered as a classic cause of chronic urticaria. Nevertheless, laboratory investigations greatly vary from one centre to the other and the link between the infection and skin signs does not rely on hard data. The purpose of this work was a systematic analysis of the published cases of urticaria associated with infection. METHODS: We did a Medline search, using the key-words "urticaria" and "infection/infectious disease"; a second analysis was carried out in groups of infectious agents (viruses, bacteria, parasites) and using each germ name as a key-word. We excluded cases of acute urticaria and articles without English abstract, as well as general reviews without clinical data. RESULTS: No viral cause has ever been clearly documented in chronic urticaria; the screening of viral markers does not yield significant results, compared to the general population (hepatitis B, hepatitis C, HIV). Among bacterial infections, sinusitis and dental infection are not significantly associated with urticaria, and their treatment produces variable and poorly documented results. Helicobacter pylori infection was studied in numerous series, which produced contrasted results: the prevalence was not higher than in controls in the majority of comparative studies; conversely, the outcome of antibiotic treatment was not significant in randomised trials. Only anecdotal series of cases documented a link between parasites and chronic urticaria. Two French studies have suggested a high prevalence of Toxocara canis markers in chronic urticaria, but anti-parasitic treatment had only inconstant effects. CONCLUSION: There is not enough clear-cut data to affirm a direct link between chronic urticaria and infectious diseases, except in occasional case reports. Therefore, systematic screening for infectious markers cannot be recommended in chronic urticaria. A role of Toxocara canis infections should be re-evaluated by controlled studies.

TANAKA T SATOH T YOKOZEKI H DENTAL INFECTION ASSOCIATED WITH NUMMULAR ECZEMA AS AN OVERLOOKED FOCAL INFECTION. J DERMATOL (2009 AUG) 36(8):462-5

Nummular eczema is a common skin disease, but the pathoetiology has yet to be elucidated. We report here a case of severe nummular eczema. Although the skin lesions were resistant to topical corticosteroids, the patient became responsive to treatment and no recurrence was noted after the eradication of dental infections. We have experienced 13 similar cases of nummular eczema with widely-distributed skin lesions. The cases had moderate to severe odontogenic infections, which were detected by panorama X-ray screening test. In 11 patients, skin lesions partially or completely improved after the dental treatment. Latent odontogenic infection may thus be an aggravating factor in treatment-resistant nummular eczema.

## ALOPECIA

NECEVA LJ LAZAREVA B FOCAL EFFECT OF DISEASED DECIDUOUS TEETH IN ALOPECIA AREATA ACTA STOMATOL CROAT (1970) 5(2):110-4

ZIVKOVIC S ENDODONTIC TREATMENT IN THE THERAPY OF ALOPECIA AREATA STOMATOL GLAS SRB (1990 JUN) 37(3):299-305]

## PERIODONTAL

SADOWSKY C THE TOOTH AND PERIODONTIUM AS A SITE OF FOCAL INFECTION. DIASTEMA (1968) 2(3):43-7

BALCHEVA E DZHERASI E THE INCIDENCE OF ACTIVE PERIODONTAL FOCI IN FOCAL INFECTIONS NAUCHNI TR NAUCHNOIZSLED STOMATOL INST (SOFIA) (1969) 13:21-3

SALLUM AW DO NASCIMENTO A DE SOUZA CA PERIODONTAL INFECTION AND DISEASE AS POTENTIAL FACTORS AFFECTING THE PATIENTS HEALTH BOL FAC ODONTOL PIRACICABA (1974) 75:1-12

SUKIN L PERIODONTAL DISEASE, FOCAL INFECTION AND SYSTEMIC HEALTH. J N J DENT ASSOC (1975 WINTER) 46(2):26-9, 47

SCANNAPIECO FA SYSTEMIC EFFECTS OF PERIODONTAL DISEASES. DENT CLIN NORTH AM (2005 JUL) 49(3):533-50, vi

A number of studies suggest an association between periodontal disease and cardiovascular disease, pulmonary disease, diabetes, and pregnancy complications. Presently, the data must be regarded as preliminary. Additional large-scale longitudinal epidemiologic and interventional studies are necessary to validate these associations and to determine whether the associations are causal. The goal of this article is to review the history of this concept, describe the biologically plausible circumstances that may underlie these potential associations, and provide a summary of the published literature that supports or refutes them.

CABALA A CHOMYSZYN-GAJEWSKA M DROZDZ W PERIODONTITIS AND SYSTEMIC DISEASE RELATIONSHIPS PRZEGL LEK (2006) 63(8):681-4

It is becoming increasingly clear that infections and chronic inflammatory conditions, such as periodontitis can be linked with atherosclerotic process. Periodontitis and atherosclerosis have many pathogenetic mechanisms in common. The objective of this based on current knowledge review is to present the putative mechanisms whereby periodontitis which is chronic and inflammatory in nature and initiated by microbial plaque can influence the atherosclerosis. Two main processes in particular are worthy of consideration and may provide the link between these two diseases. Induction of the chronic systemic inflammation has been proposed to be of pathogenetic relevance in the association of infection and atherosclerosis, and may rely in part on the endothelial toxicity of bacterial endotoxin and the action of proinflammatory cytokines (PGE-2, IL-1beta, TNF-alpha). Another well-founded proatherogenetic property of infectious illness may be the induction of autoimmunity and autoaggression. It has been suggested that humoral immune cross-reaction of the same antibodies to heat shock proteins (HSP), both bacterial mHSP65 and human endothelial HSP60 may play an important role in the process of vascular endothelial injury. Both of these mechanisms are believed to be a key event in the pathogenesis of arteriosclerosis.

JOHNSON RB PERIODONTITIS AS A COMPONENT OF HYPERINFLAMMATION: TREATING PERIODONTITIS IN OBESE DIABETIC PATIENTS. COMPEND CONTIN EDUC DENT (2007 SEP) 28(9):500-4; QUIZ 506, 528

Increasing evidence points to periodontal disease as a significant risk factor in the etiology of other diseases with inflammatory components, such as cardiovascular disease and type 2 diabetes mellitus. Thus, it may be possible to reduce the risk for other diseases with an inflammatory component by maintaining a healthy periodontium. In addition to plaque and calculus, other factors such as diet, body weight, lifestyle, and environmental stress complicate the maintenance of a healthy periodontium. It is becoming more important for the general dentist to address these additional risk factors in addition to providing conventional treatment for periodontal disease. This review addresses a multifactorial approach to the treatment of periodontal disease and suggests that the "focal theory" of infection may still be relevant for oral inflammation.

## IMPLANTS & FOCAL INFECTIONS

BENECH A BARRALE S DALMASSO DI GARZEGNA A LEFT TEMPORAL ABSCESS IN BEARERS OF MAXILLARY AND MANDIBULAR ENDOSSEOUS IMPLANTS. A CLINICAL CASE MINERVA STOMATOL (1986 OCT) 35(10):999-1003

CALLAN DP DENTAL IMPLANT DESIGN AND ORAL AND SYSTEMIC HEALTH. COMPEND CONTIN EDUC DENT (2007 SEP) 28(9):482-4, 486-90, 492

**Dental implants are now a common treatment for replacing missing teeth, and their success has long been measured by appearance, function, and longevity of placement. Most dental implants provide a natural-looking appearance. However, both patients and dentists should be aware that infectious complications of dental implants may not only affect function and longevity, but also the systemic health of patients. In addition to traditional measures of success, numerous published studies support, as a key outcome, prevention of implants from harboring periodontal pathogens. Known negative outcomes of infection include failure of the implant to integrate with the bone, causing implant loss and possible bone loss. Given the established associations between periodontitis and systemic health, it is possible that infection in and around the implant components may impart risks to systemic health. This article reviews causes for peri-implant infection and implant loss, and evaluates an implant design that decreases the possibility of infection and possible health complications, by preventing bacterial infiltration.**

JOSEPH R NARAYAN V KRISHNAN R MELEMAATHIL S NON-SURGICAL PERIODONTAL THERAPY IMPROVES SERUM LEVELS OF C-REACTIVE PROTEIN AND EDEMATOUS STATES IN FEMALE PATIENTS WITH IDIOPATHIC EDEMA.J PERIODONTOL (2011 FEB) 82(2):201-9

**BACKGROUND:** The relationship between periodontal disease and systemic disease is revealing new and exciting associations. Idiopathic edema presents a clinical syndrome with obscure pathophysiology. The present study investigates whether non-surgical periodontal therapy is beneficial in patients who are not responding to conventional treatment of idiopathic edema. **RESULTS:** Both groups were comparable at baseline. All parameters, except serum albumin, showed significant improvement after periodontal therapy. The control group showed further worsening of these parameters.**CONCLUSIONS:** This study shows that sources for systemic inflammation, such as periodontal disease, could affect the pathogenesis of idiopathic edema. Successful elimination of such covert sources of inflammation leads to a clinical benefit in patients who are distressed by this condition.