Dr Ron Ehrlich

Dr Ron Ehrlich graduated in Dentistry from Sydney University in 1978 and is in private practice in the Sydney CBD where he founded the Sydney Holistic Dental Centre 23 years ago. His particular interests include the treatment of headaches, biocompatible dentistry, oral infections, nutrition, posture and their effect on health and wellbeing. The Sydney Holistic Dental Centre has worked closely with medical and complimentary health practitioners in assisting their patients to realise their full dental and health potential.

Ron has presented his 2 day course *"Holistic Dentistry- a practice philosophy"* to dentists and health practitioners in the UK and Australia, pioneering his concept of understanding the diagnostic phase and the hierarchy of treatment in the dental practice. While there are many controversies surrounding the role of biocompatibility, toxicity, oral infections, and the biomechanics of the jaw on general health, Ron's practice philosophy incorporates the concepts of minimal intervention and optimal health in an accessible, ordered and conservative way.

Ron has been a member of ACNEM, AIMA, ADA, International Association for the Study of Pain (IASP), Australian Pain Society (APS), International Association of Dental Research (IADR) and is a founding member of the Australian Society of Oral Medicine and Toxicology (ASOMAT).

Ron has published on the role of jaw clenching and trunk muscle activity and is a contributing author (Nutrition Chapter) in*"Complementary Therapies in Dental Practice* (Butterworth-Heinemann 1998)

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Holistic Dentistry

An overview of the issues

The orofacial region is highly vascular and richly innervated, with 300 -500 species of microorganisms in the oral cavity. This cavity is also the site of the two most common chronic infections in humans, tooth decay and periodontal disease. These infections in teeth, periodontal tissues and jawbones have implications on the individual's health. The role of dental infection and their systemic effects will be discussed, with periodontal disease, tooth decay and root canal therapy, as well as the lesser-known neuralgia inducing cavitational osteonecrosis (NICO lesions) and neural therapy.

Dentists implant material into patients' mouths in the form of fillings, crowns, dentures and implants. The most common dental material used in the last 160 years, and still used today, is mercury amalgam fillings. The issue of biocompatibility has only been seriously considered in the last 10 years. An outline of the issues surrounding dental material in general, and mercury amalgam in particular, will be discussed.

Biomechanically when the jaw clenches there is increased activity in muscles throughout the body with implications to chronic headaches, neckaches and jawaches. A hypothesis for the aetiology of chronic tension headache and neckaches will be presented, together with a rationale for the role of holistic dentistry.

Holistic dentistry is about the health of the teeth, gums, bones and muscle of the head and neck and their relationship to the whole body. Recognising the inter-connectivity of the body and incorporating principles of nutrition, body chemistry, posture, biomechanics and the patients' potential to be involved in the healing process are central to holistic dental practice.

It is worth considering the difficulty of the scientific model in clinical practice. The essential preconditions of scientific investigations are the analysis of the given situation, and control of the conditions, so that every relevant factor can be varied one at a time[1]. However, human variation and the inability to achieve total 'control' of the variables make the criteria too stringent for most medical- particularly clinical-research.[2]

Oral infections

The effect of oral infections on systemic health has been a contentious issue within the dental profession and largely overlooked by the medical profession for many years. Weston Price in the 1920's conducted extensive research on the role of dental infections, and developed the theory of Focal Infection. Focal infections have been

defined as sepsis arising from a focus of infection that initiates a secondary infection in a nearby or distant tissue or organs. The source of these infections may be

- Periodontal
- Tooth Decay & Root Canal Treatment
- Neuralgia Inducing Cavitational Osteonecrosis (NICO)

A *focus of infection* is a circumscribed area infected with micro-organisms which may or may not give rise to clinical manifestations and releases substances that can affect the health of the individual. Bacterial, viral and fungal organisms are spread from such foci. Additionally, endotoxins produced by anaerobic organisms in the foci[3, 4] are also released into the body. Current research indicates that other toxins are also released into the body - these include hydrogen sulphide products and methyl mercaptans, both of which are highly poisonous products[5 6].

Distribution of organisms and their toxins throughout the body is by various routes:

- Blood circulation throughout the body
- Lymphatic distribution locally and then to the blood stream
- Retrograde axonal transport- transport along nerve fibres and back to the brain

For many years dentists have accepted that even simple scaling and cleaning has the potential to cause bacteraemia with resulting bacterial endocarditis in susceptible patients. Only since 1996 has periodontal disease been accepted as having significance for systemic disease. The issue of root canal treatment and jaw bone infections, as a potential threat to general health, has not received wide acceptance within the medical profession.

Periodontal Diseases

The oral cavity contains almost half the commensal bacteria in the human body, approximately 6 billion microbes representing 300 -500 microbes. These bacteria reside on the surfaces of teeth, mucosal epithelia that line the oral cavity and prosthetic appliances within complex ecosystems called "biofilms". The oral microbial ecology is sensitive to the potential assaults that confront their human hosts. From fetal life through to senescence, both opportunistic infections and oral complications of systemic diseases, and medical, environmental, nutritional and hormonal factors continuously challenge the oral cavity. Transmissible and opportunistic microorganisms are responsible for periodontal diseases, involving both the gingival and periodontal structures.

There is growing evidence that oral bacteria contribute to systemic disease. One of the best examples is the involvement of streptococcus sanguis and streptococcus oralis in infective endocarditis[7].

Periodontal disease, once established, provides a biological burden of endotoxin (lipopolysaccharide) and inflammatory cytokines (especially TxA2, IL-1b, PGE2 and TNF-a) which serve to initiate and exacerbate atherogenic and thromboembolic events [8].

Periodontal disease is insidious, in that it is usually painless, and, apart form occasional bleeding on brushing or flossing, has few symptoms. These usually develop late in the disease process when sufficient bone loss has occurred to cause tooth mobility and migration. Furthermore the diagnosis of the disease requires intra-oral radiographs and periodontal probing, which are common diagnostic procedures in dentistry but rare in the practice of medicine. Physicians who are aware of the potential dangers of infection in a patient predisposed to atherosclerosis and infarction may not detect the presence of periodontal infection.

Holistic approach: A thorough scale, clean and curettage together with oral hygiene instruction is essential. Critical to identify potential underlying causes is an assessment of the patient's nutrition and body chemistry, with particular reference to biochemical indicators such as pH imbalance, anaerobic metabolism, excess free calcium, chronic inflammation, connective tissue breakdown and oxidative stress [9].

Dental Caries (Tooth Decay)

Dental Caries is a dietary carbohydrate and saliva modified bacterial infectious disease. Transmissible and opportunistic microorganisms are responsible for dental caries. Dietary carbohydrates and acidic food stuffs enrich dental plaque with acid-tolerant and acid-producing streptococci, particularly streptococcus sobrinus and streptococcus mutans, which is responsible for both the initiation and progression of dental caries.

The rate of decay is influenced by many factors, including;

- diet high in refined carbohydrate
- increased frequency of meals,
- decreased rate and quality of saliva including acidic pH imbalance and tendency toward aerobic metabolism,

Tooth decay may or may not be painful. However, it increases the risk of a tooth requiring either restorative treatment or possibly root canal treatment.

Holistic approach: the use of biocompatible materials, rubber dam to minimise patient's exposure to materials either by inhalation or ingestion, and identification of potential causes including an assessment of the patients nutrition and affected body chemistry, are important in the holistic treatment of tooth decay. Particular reference to biochemical indicators such as saliva's buffering capacity, pH imbalance and anaerobic metabolism can assist diagnosis.

Root Canal Therapy (RCT).

Inside every tooth is the dental pulp, consisting of nerves and blood supply. Its main role is in the growth of the tooth, and to detect changes in temperature or lay down reparative dentine in response to load, decay or trauma. From the pulp cavity of each tooth millions of minute parallel dentinal tubules radiate to the periphery of the dentino-enamel junction. The width of each tube is sufficient to house bacteria. [10].

The pulp may become inflamed and die. This usually occurs as a result of decay or trauma. This can be painful (acute pulpitis or acute periapical abscess) or painless and go on for years undetected (chronic periapical abscess) until it becomes painful or is detected from routine X-ray examination. When the pulp dies, necrotic, or gangrenous tissue, remains in the tooth and with no blood supply to fight the microbes and toxins, this reservoir of infection remains. A root canal treatment attempts to clean out the inside of the tooth and render it sterile.

This raises two basic questions, which are at the heart of the controversy surrounding root canal therapy.

Firstly, can the tooth be rendered completely sterile? Given the complex structure of the dental pulp and dentinal tubules, it is generally accepted that the answer to this question is no. Modern medicaments containing calcium oxide/calcium hydroxide attempt to overcome this challenge.

Secondly, what clinical, or for that matter sub-clinical significance is this to the individual and would the person be better off just extracting the tooth?

The issue of bacteraemia arising from RCT has been researched at length[11]. The potential for the spread of micro-organisms from the root canal to other parts of the body have been well documented using DNA ribotyping, stressing again the importance of the complete elimination of pathogenic organisms that are already present in the root canal system[12]. Response to infection is the result of the number and virulence of organisms and the resistance of the host. Resistance varies from individual to individual, and from time to time in the same individual[13]. While we may be reassured by studies that say the organisms are usually eliminated by the host's reticulo-endothelial system within minutes[14], we are alerted to a rather

exhaustive list of patients whose resistance to bacteraemia may be compromised. Debilitation or dehydration, radiation, diabetes, blood dyscrasias, malnutrition, vitamin deficiencies, liver or kidney disease, prolonged therapy with antibiotics, corticosteroids, immunosupressives and antimetabolites, leukaemias, multiple myeloma, and cancer[15] may all be factors compromising bacteraemia resistance. Unfortunately the logical follow up studies of the epidemiology of these conditions and the incidence of RCT have not been done.

The work of Weston Price is often quoted regarding the potential for systemic problems arising from infected teeth. Most famous is the recent and often quoted publication by Meinig[16] reviewing Price's work. Two significant statements from the book are often overlooked. Firstly, "... Price found that 25% of patients with family histories free of degenerative diseases who had excellent immune systems could expect to have and retain root canal fillings and to live without complications arising therefrom through old age". Secondly he identifies that Price's studies were done before the time of calcium hydroxide which " were found to kill most strains of bacteria in one minute.

Root canal treatment should be considered carefully because the implications of removing a tooth and replacing the missing tooth may further compromise the patient's health. From my clinical experience I have noted that some patients' persistent health problems have improved dramatically on removal of certain root filled teeth, while others have not.

A recent review of focal infection states " it may be salutary to observe the extent of current evidence for and the farsightedness of our predecessors in recognising the relationship between oral foci of infection and a wide range of diseases. Some are clearly infections, some inflammatory without direct evidence of microbial infection and some one would never have thought attributable in any clear way to microorganisms."[17]

Holistic approach: Assess each patient and tooth individually based on the patient's health history and current health status, and reviewing that situation at recall appointments. Optimise the patient's immune system and blood chemistry through nutrition and life style. Consider the strategic importance of each tooth from a biomechanical perspective, assessing a risk of involving the patient in more complex and costly treatment and the importance of achieving the best possible result with the best possible materials.

The following two issues are recognised as important by Holistic Dentistry but are not generally accepted by the dental profession.

Neuralgia Inducing Cavitational Osteonecrosis (NICO Lesions)

NICO lesions sometimes referred to as G.V.Black's ischaemic osteonecrosis, which means, "dead bone from poor blood flow", chronic osteitis, or Ratner's bone cavity. Pain from osteonecrosis can be severe, but at least a third of patients do not experience pain, whether the disease is in the long bones or the facial bones. It is extremely important to understand that osteonecrosis can produce major destruction or damage to bone marrow with minimal or no pain.

The pain in NICO is similar to the pain in osteonecrosis of the hips, knees or spine, but some patients have extreme or unusual pain, sometimes mimicking trigeminal neuralgia. Trigeminal neuralgia presents with lightning burst of pain radiating from the mouth or face to the ear, scalp, throat or neck. This may be related to the fact that the jaws are the only bones in humans which contain large sensory nerves, all of which are branches of one of the body's most complicated and extensive nerves, the trigeminal nerve. It may be significant that facial or trigeminal neuralgias (pain from the nerves themselves) represent the largest proportion (85%) of all neuralgias in humans.

The pain of NICO is usually diagnosed as atypical facial neuralgia/pain (67%) or trigeminal neuralgia (10%) until a jawbone lesion is discovered. An additional 23% are diagnosed with various headaches, sinusitis or phantom toothache/pain. The typical NICO patient will have had pain for approximately 6 years before a jawbone biopsy confirms the presence of ischaemic osteonecrosis or low-grade osteomyelitis; some were in pain for up to 32 years before a proper diagnosis was made. The pain, and presumably the ischaemic process, appears to progress slowly over time, with increasing pain, frequency of pain and areas of involvement.

Ischaemic osteonecrosis in other sites in the body is usually painless. However the jaw is the only bone to have a sensory nerve passing through it. Atypical facial neuralgia or tri-gemminal neuralgia is often associated with NICO lesions.[18], [19],[20],[21].

Patients with NICO lesions often have the following characteristics:

- approximately 72% have some sort of clotting or vascular abnormality,
- 71% are 35-64 years old (range 18-94 years),
- 75% are in women,
- Patients experience pain prior to diagnosis for average of 6 years (range 1hour- 32 years).
- Location in mandibular molars (45% 3rd molar region), maxillary molars, and maxillary cuspids / lateral incisors.

Treatment involves surgery, with decortication and curettage of diseased marrow however up to one third of these lesions does not respond to surgery.

Neural Therapy

Neural therapy is a regulating system of medicine originating in Germany in the 1930's and practiced throughout Europe and USA. It is based on the autonomic nervous system (ANS) which provides the human organism with a network of the finest of electrical circuits, connecting every one of our 40 trillion cells with every other to form a living whole. These extremely fine endings of the ANS and the blood vessels terminate in the fluid that surround every cell. This system controls the vital processes throughout our bodies.

The underlying principle is that the healing action of many modalities has a single common principle. They all make use of the reflex pathway of the ANS by setting up a therapeutic stimulus in the nervous system, whose response to these stimulus releases the healing action. Using electro-acupuncture charts linking individual teeth to the whole body neural therapy postulates that various interference fields are set up in the mouth, either through toxins or infection.[22] These interference fields affect the normal function of the body's ANS and natural tendency to homeostasis.

Biocompatibility and Toxicity of Dental Materials

Biocompatible materials do not interfere with normal bodily functions.

The most commonly used dental material in the last 160 years is amalgam, which contains one of the most toxic substances, mercury. Dental amalgam contains 50% mercury, 20-35% silver, 6-15% copper, 8-15% tin and occasionally small amounts of zinc. In 1991 the World Health Organisation (WHO) included dental amalgam for the first time in its assessment of the human populations exposure to environmental mercury[23] (Table 1). WHO also noted that for mercury vapour "a specific no-observed-effects level (NOEL) cannot be established" and that no level of mercury vapour has been found that could be considered harmless!

Table 1

Dental Amalgam	3.0 -17 mcg/day (Hg vapour)
Fish and Seafood	2.3 mcg/day (Hg Methyl)
OTHER FOOD	0.3 mcg/day (Hg Inorganic)
AIR and water	negligible amounts.

Temperature, galvanic reaction and friction from chewing or clenching increase the rate of mercury release from amalgams. After chewing or increase in temperature,

the levels of mercury vapour in the mouth remain elevated for up to 90 minutes. Mercury is released from dental amalgam as vapour, elemental mercury and particles. Mercury vapour is invisible, odourless and tasteless and 80% is absorbed through the lungs into the bloodstream where it undergoes rapid biotransformation to Hg^{+2}. Methylation of mercury occurs in the body by the action of intestinal bacteria, and is readily absorbed through the intestinal lining.

Until the WHO 1991 report, Universities and Dental Associations around the world had contended that the mercury in dental amalgam was locked in to the material. If any were released it was in such small quantities as to be insignificant to health.

However significant studies have shown that;

- Major target organs for mercury released from dental amalgam is the kidney, liver and brain.[24], [25.]
- kidney function is impaired[26]
- heavy metal exposure from dental amalgam may contribute to immuno logical aberrations, which could lead to overt or increase auto-immunity[27];
- mercurials, as well as other metals such as gold or palladium, induce strong lymphocyte proliferative responses in patients with oral or s ystemic symptoms[28],
- Micro-mercurialism induced by a continuous supply of minute doses of mercury being released from dental amalgam fillings, is predominantly characterised by mental symptoms[29],[30],[31], [32],
- Mercury released from dental "silver" fillings provokes an increase in mercury-resistant and antibiotic-resistant bacteria in oral and intestinal floras of primates[33]
- Mercury from amalgam is stored in the foetus and breast-feeding infant.[34] where it concentrates [35]

Thousands of research articles have raised serious doubts about the use of mercury amalgam. Mercury is toxic and is slowly and continuously released from mercury amalgam. The number of amalgam fillings a patient has is proportionate to the amount of mercury stored in the tissues[36]. Mercury interferes with cellular metabolism by inactivating sulphydryl groups present in biologically active agents such as proteins, enzymes and enzyme inhibitors.

Mercury increases cell membrane permeability, poor cellular nutrition and interferes with enzyme function in the cell by combining with carboxyl, phosphoryl, amine and amide group. In the lungs mercury vapour tends to oxidise into free radicals

i.e. Mercury ions reacting with haemoglobin (chronic fatigue), insulin (pancreas), thyroxin and coenzyme A (hypoglycaemia, haemoglobin formation)

The NHMRC recently published a patient information brochure[37], which states that pregnant and breast feeding women, children and people with kidney disease should avoid amalgam filling. It also warns that the greatest exposure to mercury is when a filling is placed or removed and advises that these procedures be done using dental dam, additional suction and a particular cutting technique. Unfortunately the use of rubber dam is still not routine in all dental practices[38], [39].

The most comprehensive and informative study to be done in recent years was undertaken by the Canadian Government, conducted and refereed by toxicologists[40],[41]. The reports showed that even on the most conservative assessment of mercury levels and health risks that for toddlers and children one amalgam filling would exceed a safe dose while teens could tolerate three filling and adults four before exceeding safe dose.

Holistic approach: Extreme care in the removal of amalgam, by routine use of rubber dam and filtered air and the use of a biocompatible restorative material. Nutritional support during removal and detoxification.

The most commonly used alternative, composite fillings is inorganic filler 70-80% in a resin base. An assessment of the health risks of various components showed that the health risks are well below US EPA reference doses for mean and maximum exposure.

Headaches – a dental perspective

Headaches affect a large proportion of the population. It has been estimated that more than nine out of ten patients who seek attention in a doctor's office for the relief of head pain could be helped if the proper diagnosis of muscle contraction (now referred to as tension-type) headache were made. [42]

Tension type headaches and migraine constitute 98% of headaches. Yet the cause of these headaches is still largely unknown. Over the last 30 years dentistry's involvement in the treatment of headaches through temporomandibular disorders (TMD) has gone through many changes, attempting to link clenching and grinding (bruxism), clicking temporomandibular joints (anteriorly displaced meniscus with reduction) or even malocclusion as a causative factor.

A study comparing TMD and these common headache groups found that a common feature is the presence of muscle tenderness[43]. The muscle tenderness was no different for the TMD or the headache subgroups and it was noted that a reduction in muscle tenderness could result in a reduction in craniofacial pain from TMD, migraine and

tension-type headache. The pathophysiology of MPD and tension-type headache is still poorly understood. Though muscle tenderness and pain are closely associated in many pain syndromes a cause and effect relationship has not been established.

Holistic approach: Combines nutritional, postural and dental disciplines. A hypothesis for the pathophysiology of tension headaches is that tension headaches may be the result of soft tissue lesions, primarily in the posterior cervical region. Soft tissue lesions are defined as tear or damage to a muscle, tendon, ligament or periosteal attachment of the muscle to the bone[44], [45], [46],[47]. Soft tissue lesions may act as a stimulus activating nociceptive pathways and soft tissue lesions may excite reflex muscle activity of both neck and jaw muscles.

The aim of headache treatment is to heal these soft tissue lesions. The jaw and neck muscles are synergistic[48]. Parafunctional activity of the jaw muscles activates the posterior cervical muscles and frustrates healing. The role of holistic dentistry is to reduce oral muscle activity and thereby reduce posterior neck muscle activity assisting the healing of the soft tissue lesion. Treatment ranges from simple jaw muscle exercises and the use of orthotic appliances to the more extensive orthopaedic/ orthodontic treatment, full mouth reconstruction and surgery. It is imperative to promote the concept of minimal intervention and understand the hierarchy of diagnosis and treatment.

Conclusion

There are many issues for the holistic dentist to consider. The knowledge of the extent of oral infections and an understanding of how they may impact on our patient's health. Choosing biocompatible materials and taking care with the removal of toxic materials of the past. An understanding our role in their management of headaches and orofacial pain.

Combining a critical assessment of the scientific literature, together with a sound knowledge of the basic sciences and maintaining a tolerance of the ambiguity that our patients often present us with is central to holistic practice.

Working together with other health professionals and understanding each other's contribution is truly holistic and central to our patients achieving optimal health.

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