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Periodontal Disease – A Physician's Viewpoint

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1. Introduction

From the physician's viewpoint teeth and the periodontal framework are relatively ignored. How many physicians actually inspect the teeth of their patients let alone their patients' gums? Increasingly though, awareness of integration and holistic appreciation of organ function has penetrated the formal divides that separate clinical practice according to body parts and organ function.

2. A deeper look in a clinical context

Metabolic function that is general and common to all body parts, and the inflammatory basis of disease highlight the commonality that underlies these processes. It is therefore not surprising to find that, in theory, changes in nail capillaries reflect capillary integrity in other body parts and signs of inflammatory disease that is present elsewhere may be seen in peripheral nail capillaries.

It has been proposed that periodontal disease is a factor resulting in inflammatory changes, raised C-reactive protein levels and loss of capillaries through inflammatory thrombotic events that results in increased cardiovascular risk and cognitive loss [1], as all body parts including brain become affected [2]. Thus if an association exists between capillary loss and rarefaction with cognitive decline and silent or ischaemic cardiomyopathy and ischaemic heart disease periodontal disease is a risk factor that needs to be considered. Similarly stroke occurs more commonly after an infection such as upper respiratory infection or urinary tract infection [3]. Thus inflammation resulting in stroke may also arise as a result of periodontal disease [1].

Microcirculatory changes involving capillary may be attributable to periodontal disease on the basis of inflammatory products being generated on a persistent basis [1,2]. There is also the

theoretical proposition that large vessels too are or become affected. Atheroma formation may be an inflammatory process [4]. It could result from the interaction of inflammatory proteins or monocytes acting on a dysfunctional endothelial surface such as may affect the lining of major blood vessels in the presence of underlying atheromatous change. These inflammatory cytokines [interleukin [IL]-1, IL-6] may be generated by periodontal disease and be linked to atheroma formation [5].

The effect on both micro-circulation i.e. capillaries and on the large vessels could result in increasing blood pressure and aggravate hypertension or even cause it if damage sufficient to impair capillary reserve capacity occurs, on challenge with a higher sodium intake, leads to the development of hypertension [6,7]. Similarly, renal effects would lead to renal impairment and even failure, as occurs in autoimmune [8] or hypertensive disease [9,10] or result in stroke and cerebral infarction or white matter degenerative change that manifest as vascular dementia [11] and even states of confusion depending on the severity and acuteness of the microcirculatory rarefaction and /or dysfunction.

Thus periodontal disease affects microcirculation integrity as well as larger vessels predisposing to cardiovascular risk through microvascular rarefaction and atheroma formation. Microvascular changes are themselves the cause of large vessel changes. Dysfunction or loss of perivascular capillaries affect large vessel compliance [12] in much the same way that periodontal vessels have an effect on dental health and function.

3. Treatment — Preventive, prophylactic and after the fact

Treatment of risk factors and complications such as stroke or cognitive loss must address the question is periodontal disease present. Diabetic disease is also related to this.

4. Periodontal health and general health and wellbeing

Periodontal disease causes halitosis and dentition. The presentation of a person relies on the ability to smile and is enhanced by having a set of healthy teeth and healthy breath. In Jewish law, bad breath is a sufficient reason for divorce. A smile is everything. It secures a job, makes friends, is high profile as well as high society and it ensures the willingness of others to help when behaviour is amicable and is accompanied by a smile, that, I contend, is as important a factor as incontinence or continence in either resulting in institutionalised care or willing helpers to assist in home based care if that is their preferred choice rather than institutionalisation.

Mouth breathing: upper respiratory complaints are the source. Chronic upper respiratory blockage leads to snoring and poor sleep. It causes those who cannot breathe through their nose to gulp, not chew their food and to put on weight. The answer is to clear the nose with steam inhalation and to practice “how to breathe when you eat”, Breathe in then out then insert

a small amount of food into your mouth and chew, then swallow before you breathe in again, through your nose. Eat with your mouth closed and practice breathing in through your nose using the abdominal transverse muscles and diaphragm to aerate the lungs through your nose. It is not uncommon for these people to present with what appears to be an asthma attack on a cold night. The dentist, too, as well as the physician, has to be aware of this [13].

What does dental form tell you? By this I mean the effect of thumb sucking, which is a transient phase, but could persist or recur, indicates a psychological effect or emotional disturbance that could influence adult behaviour, which is notional on my part, not researched. Yet, when the individual takes steps to overcome this, to have the cosmetic treatments that correct this, they are at the same time overcoming the insecurity that led to the "buck-teeth" and building confidence to deal with situations from within. This is healthy and surely indicates the place of cosmetic dentistry in the recovery motivated by inner strength to change, i.e. the place of dental treatments in psychological and emotional wellbeing. For the same reason, treatments that overcome or help to contain periodontal disease that cause bad breath through simple oral hygiene, especially in those patients predisposed to this, whether through mouth breathing or on anti-epileptic agents that produce gum hypertrophy, such as phenytoin, is important.

Smoking habit and oral health. I believe that is not uncommon that people who mouth breathe smoke. In this situation smoking warms the air and damages the cilia on the bronchial cell lining. The reflex that responds to cold air with a cough is therefore overcome and mucus production in the bronchi remains there as the cilia of ciliated bronchial cells that are paralysed cannot move it up. Smoking also discolours the teeth, pipe smoking breaks them. When the sinuses are blocked the air cannot be warmed nor humidified. Treatment may be given for asthmatic attack or long term for asthma, that may be an incorrect assessment of events. Steroid inhalator therapy may result in fungal overgrowth in the oral mucosa without therapeutic benefit either long term or during an acute attack [13].

Too many sweets. But its not the fruit. Its the sticky stuff and sticky stuff combined with acids that corrode or vehicles such as flour that stick to one's teeth.

Geriatric dentistry: care of the elderly includes attention to oral health and diet. Access to clinic and to the dental chair have to be user friendly. Assistance may be needed. Lowering the dental chair to a convenient level to get onto and off, safely. Head up tilt and back support may be required. Rheumatoid arthritis does affect the neck, so neck extension is to be prevented.

Visits to nursing homes and now routine; medications and poly-pharmacy remain sources of notable concern. All medications cannot be listed here. The newer oral anticoagulants [NOAC's] used as prophylaxis against stroke in patients with non-valvular atrial fibrillation, e.g. Dabigatran, a direct thrombin inhibitor [DTI] and Apixaban, Rivaroxaban [Factor Xa inhibitors] are increasingly being used to replace Warfarin/Vitamin K depleting anticoagulants [14]. Since new information is becoming available at a rapid pace, an "EHRA" web site with the latest updated information accompanies the guide able to be accessed on its website [www.NOACforAF.eu]. It also contains links to the ESC AF Guidelines, a key message pocket

booklet, print-ready files for a proposed universal NOAC anticoagulation card, and feedback possibilities. Side-effect hazards include anti-fungal agents and calcium channel blockers, Verapamil and Diltiazem, which increases the level and effects of NOAC's manifold as do "ketokonazole" and like anti-fungal medications that render unacceptable NOAC's risk of haemorrhage. Quinine also increases the level of drug and risk. Partial thromboplastin time may be used to check Dabigatran effects. Renal function also affects the dose and needs to be regularly checked [up to six monthly]. Refer to www.NOACforAF.eu. Ceasing treatment for dental treatments for at least twelve hours is advised, see paragraph 10 of the guide.

It is important to hand to the elderly patient written instructions for the patient if they are able and/or to a carer or accompanying person who may also be able to supervise, assist if necessary and give to you information regarding what other medications the person is taking, to bring in the dosette box, which is pre-packed by the pharmacy or by the carer or by the patient who is able and willing – it's a good mental exercise, as well as non-medications or unprescribed treatments.

Nutritional intake and health; role of carer; dental replacements – inserts, implants for nutrition and comfort; the importance of nutrition and type of foods available as well as types of diet, vitamised, soft can maintain health and prevent ill-health.

Aging is the inexorable loss of functional reserve capacity. There is a functional metabolic reserve, that could apply to anaesthetic agents, number of teeth, ability to chew, ability to swallow and ability to transfer to a chair, which maintains independence as the person is able to get onto and off a toilet and to mobilise. Exercise and nutrition are central to maintaining independence.

Cosmetic dentistry in the elderly is now available but not the only reason to undertake having new implants. At ninety three years, my mother chose to have implants as her dentures bothered her so much. Painful dentures can ruin any person's life, spoil one's appreciation of food, cause ulcers as everyone knows but also determine what one can eat or not eat. Loss of weight through poor dentition or ill fitting dentures can have devastating results, leading to a fall by having a mat in the wrong place and not lifting up one's feet, just once. Fracture, having to recuperate and being placed is the greatest risk of being admitted to a hospital, at least in Australia, where the maxim, we have a duty of care – to maintain safety" overtakes the right of privilege and free choice. Here, the word of an expert, whom the patient only trusts, is shunned by those with agenda's of their own, including seeking power and feeling of self importance. With less knowledge and greater inferiority everyone has their say. The Office of the Public Advocate, the bureaucrats on Tribunals and Medical Boards, who know less and are lesser individuals because they wish to control those who have made it, live it and enjoy it. What has this got to do with oral health? The answer is nutrition, trust, and confidence and an ability to communicate positively to one's environment, which is more likely to happen when one has a smile and a good set of teeth and friends in support. It will determine who will be prepared to care for you and who will not. It will ensure that where you live is where you wish to live and with whom.

Inflammation and infection is not as obvious in the elderly as immune mechanisms are not as intense, or able to be marshalled, but tissue turgor is also not as dense and therefore pain is less. On the other hand recovery takes time. Even after extractions one needs to be cared for. One ought to take in higher protein drinks before and to continue to do so afterwards. The advent of bisphosphonates, which inhibit osteoclast recruitment and reduces bone loss in the treatment of osteoporosis and secondary prevention in cases with fracture of the femur or vertebrae has resulted in fear of osteonecrosis of the jaw [15], which is more likely to occur in patients who are receiving chemotherapy. Pretreatment dental surgery is suggested as well as use of antibiotics and an oral antiseptic solution when the condition occurs to treat and control pain [15].

5. Social dentistry

I have likened the loss of a tooth to the social situation of an elderly person. When one loses a friend one also loses support and one's own position becomes more vulnerable. This leads to lack of confidence, to isolation from society and to becoming depressed. Living in a residential home is akin to having a set of dentures. They are not yours, but they are there and do provide some comfort, but not always.

Tooth extraction is a metaphor for diminution of social interaction; support and social functioning in the elderly; isolation and depression, effect of loss and deprivation, while restoration is akin to the effect of nutrition on wellbeing, psychological, physical and spiritual.

Behaviour and institutionalisation: The effect of oral health, hygiene and behaviour can ensure that you will stay longer in your own home and even die there in familiar memory clad surroundings. Nothing insures this better than behaviour characterised by appreciation, thanks and a smile.

In old age, in adults and teens; the effect is the same. Confidence, radiating happiness and achievement are related to dental pride and appearance.

6. Oral function as a driver in social evolution

Stomal drive in evolution. Food and water intake determines survival.

Setting down roots led to stomatal development; to vegetative and sessile development.

Stomal development led to cortical development and permitted mobility.

Senses in animals included two eyes and two ears. Dentition permitted there to be one mouth for fluids and solids and determined strength development on the basis of what could be eaten when caught, the consistency of foods. Eyes and ears were used as warning signs to prevent being eaten and to survey what could be eaten or caught.

Amphibian and reptilian evolutionary dichotomy occurred as amphibians developed a buccal respiration pattern, using the floor of the mouth to create air movement into and out of the lungs, whereas reptiles developed ribs and birds developed air sacks in those ribs to lighten the weight and developed beaks as the driver rather than alligator teeth, though the Cretaceous creatures, Pterosaurs, that flew such as Pterodactylus had a small number of teeth, while Pteranodon was completely toothless. This fact, combined with Pteranodon's vaguely albatross-like build, has led paleontologists to conclude that this pterosaur flew along the seashores of late Cretaceous North America and fed mostly on fish [16].

Snakes developed the tooth to the utmost by having a venom ejaculation mechanism in them used in forward fanged snakes such as Viperidae [vipers] to blind or poison their prey before they ate them. Ear ossicles later incorporated into the middle ear in higher vertebrates, that are part of the mandibular system in snakes enabled the snake to dislocate his mandible to swallow large prey whole, and their fangs to catch prey, as least in the forward fanged snakes, whose body lengths are shorter than constrictors, rather than masticate. The extra ossicles also permitted vibration detection in preparedness to catch their prey as well as to swallow it, indicating the economy of form in relation to function that appears to be a formula for successful evolution; the combining of survival mechanisms: energy acquisition, through ingestion and metabolism, which also requires excretion, to live, grow and mate and energy expenditure to escape or, alternatively to develop further and adapt.

In the invertebrate world helminths developed suckers and they became tapeworm parasites, while special insertion of sperm techniques used by spiders ended by self sacrifice, with the male being eaten to provide ready nourishment for the newly fertilised eggs, taking the survival pitch of stomal drive to its ultimate.

Years ago, the rabbis recognised that food which is visually tempting increases appetite [17]. Plants use colour to attract insects to feast on the nectar as the lure to pollinate inadvertently and by the design of the plant while the insects eat. The latter example has a message – when you help others eat by providing nectar and food, they share in the benefits that you reproduce, which ensures that their progeny have energy in the form of nectar to eat.

Primal instinct and stomal drive – in the 21st century. A primal instinct demands our focus. In today's world while success can be founded on dental presentation, it can also be one's undoing, when stomal drive is for one's own sake, rather than for survival.

Obsession with desire that may attend one who has achieved success, in detracting from the focus of what one eats and gratitude for every morsel that appreciation of survival demands, results in a change in priorities, such that desire overtakes survival. Dependency results, as does pleasure drive and desire, to hedonism, loss of survival focus and breakdown.

It is true that eating can be fashioned to ensure body health and looks. It can also induce anorexia or bulimia. We need to be in tune with our primal instincts. They are a survival mechanism. Stomal health, includes oral hygiene and cortical awareness.

The stomal society. Society has cultural values that are tied to eating patterns. Nations are distinguished by their cultural or national cuisine. Japanese food is unique to Japan. Middle

Eastern food is particular to the middle east. African food to Africa. It ties us to the land. Chinese food is unique to Chinese. Is it fair to ask whether Italian culture would be what it is today if Marco Polo (1254-1324) had not brought back noodles from the Far East?

Cultures with traditions that incorporate food as symbols of significance and ethical values, as is the case with traditional Jewish customs, ensures that there is focus on survival as they are enjoyed and partaken to ensure history and moral values and ethics of daily life are transmitted to future generations. Therefore they do survive and can impart ethical values and morality to the world, for generations.

Stomal drive remains the focus during development as well as into old age. The application of implant techniques to old age in order to be able to masticate and enjoy a wholesome meal will ensure longer life and a more pleasing one. On the other hand cosmetic dentistry which forsakes nutritional and masticatory functions may shorten lifespan by changing focus and permitting distraction from survival to creep in.

7. Lips and buccal function

Although the lips have not been addressed in this chapter, lip function and the cheeks, ensures swallowing without spillage, as occurs in lower motor neurone facial palsy or paralysis. Lips have a prehensile function working with the tongue in almost mitten like clasp that enables giraffe to selectively eat the leaves they desire from the top of trees. Lips also reveal features of human emotion and desire. They also permit breath-holding and labial sounds.

8. General systems theory and stomal drive

The concept of the "constancy of the milieu extérieur"[7] i.e. maintaining one's environment in terms of Eco-social[®] harmony [18] even in response to change, this means ensuring diversity of activity, and diversity of flora and fauna. External milieu is also the lymph and plasma bathing cells [7]. What ensures this? Oral hygiene, oral health and what passes through it, liquids, solids, sounds and words.

9. Conclusion

Oral health and development determine both quality of life and quantity, as a survival mechanism essential for life the importance of stomal function for physical and emotional wellbeing as well as social functioning has been understated in the past. In addition stomal drive as a evolutionary mechanism has not been appreciated or previously understood in terms of both plant (stomata) and of invertebrate and vertebrate, animal, evolution and development, on land, in fresh water and the sea.

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