Replacement of missing teeth with dental implants is one of the most rapidly increasing treatment modalities for edentulism. The advancement in our understanding of tissue healing, as well as continuous improvement in technology has extended the indication for dental implants to a wide portion of the population, ensuring long-term successful and highly predictable treatment outcomes. Despite the achievements of the last decades, treatments with dental implants are not free of complications, which can occur shortly, or even many years after successful installation/ restoration. As our experience with complications increases, the focus on careful patient selection becomes a major tool for prevention of future problems. However, the list of absolute and relative contraindications for treatment with dental implants is constantly being updated, as new conditions are being studied and new data emerges.

The current paper, which is the summary of a lecture given for the HKDA in March 2013, aims to highlight the current evidence with regards to certain factors that have recently attracted controversy in relation to implant treatment. In particular, this paper will discuss the risks for implant therapy in patients with a history of Periodontal Disease and patients under treatment with systemic Bisphosphonates.

A. Is history of Periodontitis an increased risk for implant placement?

Patients with a history of Periodontitis who have received implants have been shown to suffer a higher prevalence of peri-implantitis, when compared with patients who never had Periodontitis. Several cross sectional and retrospective studies have shown the prevalence of peri-implantitis to be between 5-20% higher already after 5 years (1) among patients with history of periodontitis, with this difference being even higher at 10 years (2). Most of these studies are however cross-sectional or retrospective in terms of design, which does not allow for documenting any cause-effect relation.

Two main concepts have been utilised to explain this increased prevalence of Peri-implantitis among patients with history of periodontitis: The concept of “re-infection” and the concept of “susceptibility”.

a. The concept of “Re-infection”

The main concept in “re-infection” evolves around the presence of specific perio-pathogenic species such as Porphyromonas Gingivalis (P.g.) or Aggregibacter Actinomyctemcommittans (A.a) elevated proportions of which are a common finding in both Periodontitis and Peri-implantitis. Patients who have harboured such pathogenic species around teeth, were considered likely to suffer a “re-infection” in the future, including an infection of the newly established implant sites, leading to Peri-implantitis. This concept was supported by publications of the 80s and 90s, where researchers failed to detect the main periodontal pathogens in fully edentulous patients with implants (3,4). This lead many to introduce aggressive disinfection strategies such as Full mouth disinfection (5), aiming to eliminate periodontal pathogens, while some even suggested that elimination of all teeth would eliminate periodontal pathogens and thus improve the prognosis of the implants (6). However, more recent research has demonstrated that the suspected periodontal pathogens are equally present in both fully and partially edentulous patients with implants (3,4). This lead many to introduce aggressive disinfection strategies such as Full mouth disinfection (5), aiming to eliminate periodontal pathogens, while some even suggested that elimination of all teeth would eliminate periodontal pathogens and thus improve the prognosis of the implants (6). However, more recent research has demonstrated that the suspected periodontal pathogens are equally present in both fully and partially edentulous patients with implants, while the prevalence of Peri-implantitis is not different in both groups (7). Periodontal pathogens such as Pg and Aa are also detected in patients with healthy peri-implant tissues, while the bacterial species of plaque in health and disease are similar. The difference appears to be not in the presence or absence of specific species, but rather in the environment of the biofilm. Mature biofilm in disease harbours elevated proportions of gram-negative anaerobes, which are however also present in health. A “re-infection”
is not necessary, as it has been shown that bacteria (including the periopathogenic species) bacteria will populate the implant surfaces only hours after installation. This presence of the bacteria or “infection”, is however compatible with periodontal and peri-implant health.

Consequently, it is not the infection (or “re-infection”) with specific pathogenic bacteria that causes Peri-Implantitis, but rather it is allowing the biofilm to accumulate over longer periods and mature into an anaerobic environment, which supports the elevated proportions of the pathogenic species. The disease is the inflammation, not the infection.

b. The concept of susceptibility.

The concept of susceptibility is built on the fact that due to genetic diversity, humans have a different immunological profile, which makes many to be susceptible to a certain disease, while others might not. In the case of periodontitis, it is well documented by the prospective studies of Löe et al (8) that a small percentage of patients even in the absence of plaque control will not progress from Gingivitis to Periodontitis, appearing to be not susceptible to this disease. As the pathogenesis of Peri-implantitis shares much with that of Periodontitis, it is reasonable to expect that someone not susceptible to periodontitis will be also resistant to Peri-implantitis and this might account for a big part of the lower prevalence of Peri-implantitis we see among people who never had a history of Periodontitis. Furthermore, two new studies have shown maintenance to be a risk parameter more important than history of Periodontal disease. Lee et al in 2012 (9) examined two cohorts of patients with implants after 8 years and showed that patients with history of Periodontitis demonstrated 13 % higher prevalence of Peri-implantitis, which was not surprising. But when the patients with history of Periodontitis were divided into those who at 8 years had a 6 mm pocket and those who didn’t, it was clear that the majority of attachment loss around implants was attributed to the group of patients with the residual pockets. Patients with history of Periodontitis but no residual pockets had lost the same amount of bone as the patients who never had Periodontitis. This finding indicates that the maintainance of periodontal health is the main risk parameter. When periodontal health is maintained, patients with implants demonstrated the same successful outcomes, regardless of history of periodontal disease or not. This conclusion was confirmed by a recent study by Pjetursson et al, who found that the presence of a 5mm periodontal pocket was the main predictor for Peri-implantitis, rather than the history of periodontal disease (10).

B. Systemic Bisphosphonates and dental implants

The use of systemically administered Bisphosphonates has attracted a lot of debate in the recent years, due to its implications for dental treatment. Bisphosphonates reduce or even suppress osteoclast function and can therefore be used in the treatment of various disorders most commonly in metastatic cancers and osteoporosis. Systemic administration of Bisphosphonates takes place through oral or Intravenous (IV) delivery. Intravenous Bisphosphonates were initially used for the treatment of malignancies affecting the bone tissue, such as multiple myeloma and bone metastases of breast and prostate cancer (11). However, the relatively recent introduction of IV Bisphosphonates for the treatment and prevention of osteoporosis (Aclasta, Novartis, Zoledronic Acid (12,13)) has expanded the application of such medication to a significant proportion of the adult population, frequently interfering with the design and execution of dental treatments.

Studies in cancer patients confirmed the association between treatment with Bisphosphonates through IV systemic delivery and the condition described as Bisphosphonate-Related Osteonecrosis of the Jaw (BRONJ) (14-17). This association however appears to be very weak in the case where Bisphosphonates are used for treatment or prevention of osteoporosis. The treatment of osteopenia/osteoporosis requires administration of much lower cumulative dosage than in the context of cancer therapy. Typically this was achieved with systemic oral administration, but lately IV administration is becoming increasingly a treatment of choice for osteoporosis as well.
The majority of papers in the dental literature which examined the risks of invasive dental procedures in patients treated with oral Bisphosphonates, concluded that dental implants are not contraindicated in patients treated with oral Bisphosphonates (18), with stronger evidence for treatments of less than 5 years duration (19). In the case of IV administration, the few papers that have discussed this subject, usually consider this to be an absolute contraindication for dental procedures and especially elective surgery (20,21) such as dental implants.

This, however, is based on the published research on cancer patients and does not differentiate on the basis of purpose of treatment, type of medication, cumulative dosage and duration of the treatment.

Quantifying the risk of BRONJ related complications in such patients is a very difficult exercise on the basis of existing evidence. The estimate of cumulative incidence of BRONJ in cancer patients treated by IV-Bisphosphonates has been reported to range from 0.8% to 12% (22). Time of treatment appears to be an important parameter, as the incidence of BRONJ has been shown to increase from 1.5% among patients treated for 4 to 12 months to 7.7% for treatment of 37 to 48 months (17). Such figures have in the past scared away many clinicians, while some authors have recommended abstaining from any elective surgery in patients under IV Bisphosphonates altogether (20). The figures reported above however, originate from cancer patients, who are under a very different treatment course with multifold dosage of Bisphosphonates, without considering the array of other medications such as corticosteroids they might also receive. In cases of metastatic cancer for example, the median number of number of treatment cycles and time of exposure to Bisphosphonates for patients who developed BRONJ, were 35 infusions and 39.3 months (17). The treatment of Osteoporosis in comparison will only require 1 infusion per year. A study assessing once-yearly infusion of Zoledronate for osteoporosis management in 8000 individuals, reported only one potential episode of BRONJ in each of the placebo and Zoledronic acid groups, which was resolved with antibiotics and minor debridement (13). The 3-year follow up of the same study reported no incidence of BRONJ at all (21).

Apart from the invasive dental procedures, it has been shown that BRONJ can also be related to untreated dental pathology. Withholding necessary dental treatment due to the risk of BRONJ might be paradoxically associated with increased risk of BRONJ due to residual pathology. It is also interesting to observe that the single dental procedure which has been positively linked to BRONJ is the tooth extraction (12, 22-23).

On the basis of the existing evidence, IV delivery of Bisphosphonates for the treatment of Osteoporosis does not appear to be an absolute contraindication for dental implant placement. A multifactorial risk assessment is essential, which will analyse the individual characteristics of the patient and the medication used (time, dosage) prior to any clinical decision. Consultation with the patient’s physician is an essential step in the decision making, however the main responsibility lies within the operating dentist, who must be aware of the most current literature to support clinical decision making.

If implant treatment is selected, the general precautions for as an atraumatic procedure as possible must be observed. This implies exposure of as little of the bone tissues as possible, for as short a time period as possible. Primary closure of the wound (submerged healing of the implant) might be also of benefit. Large augmentations would better be avoided, but the aesthetic needs might necessitate some buccal augmentation procedures. Although proposed (24), it is very doubtful that interrupting the treatment with Bisphosphonates for 3 months will have any impact on the risk for BRONJ, due to the very long half life cycle the medication.

There is little evidence supporting the use of antibiotics in conjunction with implant placement in such cases, but a prophylactic role of antibiotics has been suggested on the basis of some limited retrospective findings (25). Nevertheless, in such marginal cases, it would not harm to take as many precautions as possible.

**Conclusions**

A. The natural susceptibility patterns might account for the higher prevalence of Peri-implantitis in patients with history of Periodontitis. However, history of Periodontitis must not be seen as a contraindication for implant treatment, but rather as an additional reason to ensure a strict maintenance protocol. The presence of periodontal pockets in the long term is shown to be a far more significant risk indicator for Peri-implantitis.
B. There is today a wider consensus that systemic oral administration of Bisphosphonates of less than five years does not pose a higher risk for implant treatment. As Intravenous infusion of Bisphosphonates is becoming an increasingly utilised treatment modality for the treatment of Osteoporosis, it is important to differentiate the risk of such procedures to that related to the treatment of cancer. The risk of BRONJ due to an annual IV infusion of Zoledronic acid for the treatment of Osteoporosis does not appear to be an absolute contraindication on the basis of existing evidence.

Reference


從中醫角度看口腔健康及牙醫養生之道

吳梓新醫師

很多人不一樣，我從小到大都喜歡看牙醫。他們總是十分友善，語氣溫和，為我作出牙齒保健的建議。不過我想最主要的原因，是我每次去找牙醫，都不是為了尋求治療，而只是作定期牙科保健。牙醫說：「牙齒刷得乾乾淨淨，整體算得上健康，剛才已為你的牙齒稍稍清潔一下，現在可以了！」於是我便高興地離開了。

回到診室，有一位病人對我說：「醫師，我幾天來沒有睡覺，昨天吃了麻辣火鍋後，今天牙肉就腫起來了。」仔細看患者有牙齒，果然是又紅又腫。為他診脈、看舌苔、問病情後，我認為他牙齦部的腫痛，是因為「陰虛火旺」引起的，並非是單純的口腔問題，便給他開了幾味中藥，囑咐他如何服藥。他還不太放心，問：「醫師，這些藥是否有消炎作用呢？」這是臨床醫師經常遇到的問題。"中醫與西醫的治療原理不同，我處方這些藥物時，並不存在它有消炎作用，而只是希望利用藥物的偏性調整你身體的失衡狀態。」我說。病人繼續問：「我身體如何調理呢？是不是牙周病？」我微笑著回答：「牙周病也是現代醫學的講法，如在中醫角度看，你是因為這幾天沒有睡，陰開火旺，陽氣偏旺，加上吃了辛辣的東西後，體內的陽氣就不正常地旺盛起來，火熱之氣循著經絡到了牙肉的部位，便腫腫起來啦！你剛才說還有口渴、口乾、心煩等，其實屬實原因也是相同的。病人怔怔地看著我，似懂非懂，接著說：「那麼藥物不是止牙肉痛的，那牙肉痛能解決嗎？我真的很不舒服呢！」看來他是擔心不能迅速解決痛楚。我回答說：「藥物不是直接治療牙肉，但只要把引致疼痛的根本原因解決了，牙肉痛就可以很快解決了。」

一天工作完畢後，回頭想想，原來牙醫與中醫對「口腔健康」的認識，存在著很大的不同。中醫認為自然萬事萬物是一個整體，相互有著密不可分的關係，人的身體也不例外，身體並非由各種各樣的部件整合而成，而是一個本質上不能分割的整體，整體內的各部件是相互密切聯繫著的。所以，根據中醫的理論，口腔、牙齒等在外的部分，能反映身體內部的情況，相反，人體的病變，也能從口腔、牙齒中反映出來。例如清代名醫吳又如在《治療論》中，就論述可以「護歯」要護歯，要護歯，要護歯，要護歯。……

從對口腔健康認識的不同，稍作延伸就可以知道，牙醫對人體健康的重要性，是十分獨特的。這書的哲學思想認為「人法地，地法天，天法道，道法自然」，人是自然的一部分，當然要向天法效法，而天地之所以生生不息，背後有其亘古不變的運作，人們為了解釋事物，便創造出了「陰陽理論」。人要活得好，便要跟從天地的大道理調養生命。有云：「日出而作，日入而息」，就是依從天地陰陽之道而生活的一個例子。可惜的是，由於種種原因，人離開自然越來越遠，在起居作息、飲食、心緒、勞逸等方面也沒有順從自然。一年四季也生活在空調之中，飲食不分季節，作息不分日夜，不是過勞，就是過逸，慢慢就影響了身體的平衡，健康一旦被打破，各種疾病隨之而至，例如疲勞、失眠、食欲不振，腸胃病等。有些人為了解除不適，只管服用失眠藥、止痛藥等藥物解決症狀，又或誤信某中藥能保健養生，以為健康是「吃」回來的，始終沒有解決問題的根本，反而讓病情日趨嚴重。假以時日，形成不可挽回的病勢，到時就後悔莫及了。正如中醫典籍《黃帝內經》中記載：「聖人不治已病治未病，不治已亂治未亂，此之謂也。夫病已成而後藥之，亂已成而後治之，譬猶渴而穿井，斗而鑄鐡，不亦晚乎！」

要身體健康其實很簡單，只要順應自然便可，只是由現代人離自然太遠，竟然不知道如何順應它了。"趁天氣不錯，這個周日有興趣去行山嗎？"一位牙醫朋友致電問我。「你好！但為什麼想到要去行山呢？」我好奇地問。「每天都在診所工作，有空去多親近一下自然嘛！」看來我這位牙醫朋友也懂得養生之道呢！

梁生

梁生同國家紀念品予吳梓新醫師

吳梓新醫師講座

梁生

梁生同國家紀念品予吳梓新醫師