

INTERDISCIPLINARY PERIODONTICS - A REVIEW

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Abstract: Understanding the interaction between different streams of dentistry is essential for the clinicians as it becomes challenging to achieve a diagnosis, plan a treatment and predict the prognosis of combined treatments in periodontal diseases. Periodontics is not practiced in isolation, as frequently many patients will require multiple dental needs or will have medical health issues which might require proper management. In a few cases although the periodontal treatments do not have a direct effect on the treatment outcome but, the harmony between the treatment outcome and the periodontium will be very essential in aesthetics considerations or in longevity of the restoration. A healthy periodontium is very essential for the success of any dental treatment. This review article discusses about the interaction and the interrelationship between the periodontal tissues and endodontics, fixed prosthodontics, implant dentistry, esthetics, gerodontology, radiology, orthodontics, pediatric dentistry, oral and maxillofacial surgery, oral pathology, special needs dentistry and general medicine. Without a strong interdisciplinary approach, the treatment outcome may be compromised and will necessitate extensive and expensive retreatment. The intention of this review was to highlight the interrelationship between periodontics and other specialities and also about the benefits of interdisciplinary approach.

Keywords: Endodontics, Interdisciplinary, Interrelationship, Orthodontics, Periodontics, Prosthodontics

INTRODUCTION

Periodontics is not practiced in isolation, as frequently many patients will require multiple dental needs or will have medical health issues which might require proper management. Understanding the interaction between different streams of dentistry is essential for the clinicians as it becomes challenging to achieve a diagnosis, plan a treatment and predict the prognosis of combined treatments in periodontal diseases. In a few cases although the periodontal treatments do not have a direct effect on the treatment outcome but, the harmony between the treatment outcome and the periodontium will be very essential in aesthetics considerations or in longevity of the restoration.

Interaction between endodontics and periodontics is of crucial importance to the clinicians. There are often challenges in the diagnosis, treatment and prognosis of combined periodontal diseases(1). Orthodontic- periodontal interactions are mutually beneficial. The combined approach of orthodontics and periodontics can greatly enhance the periodontal health and the dentofacial aesthetics. Higher susceptibility of plaque accumulation in patients undergoing orthodontic treatment makes the periodontal therapy unavoidable. Sometimes even orthodontic treatment can help in the betterment of the periodontal health.

Periodontal factors do not usually have a direct effect on the survival of a fixed prosthesis but harmony between the prosthesis and periodontium is always critical. If the harmony is not maintained, it might affect the esthetics, and the longevity of the prosthesis(2). Dental implants are regularly placed in patients with a history of periodontitis, even though peri implant tissues are susceptible to the same host modulated plaque induced factors which will initiate and sustain periodontitis(3). Esthetic considerations are a significant contributing factor in the management of prosthodontic cases and interdisciplinary approach is often necessary to achieve a better result(4).

The population of older people is increasing but the data on periodontal therapies is limited(5). Oral health of children and adolescents mirrors their general health. Oral signs and symptoms do not alert the general practitioners. There is always an association of higher risk of dental caries and periodontal diseases with prediabetic conditions in children and adolescents who are

obese and overweight. Dentists and the periodontists should always consider the health conditions of their patients to aid in diagnosis(6).

Intra-oral and panoramic radiographic are the modalities which are commonly used to identify the location, quantify the amount and determine the pattern of alveolar bone loss and will also determine the response to therapy. Cone beam computed tomography imaging offers special advantages for periodontal diagnosis by providing three-dimensional images of dental and marginal alveolar bone structures(7).

The periodontists and the oral pathologists can work together so that some of the less common lesions which affect the components of the periodontal tissues are diagnosed and managed in a timely manner(8). Surgical procedures of the oral cavity can be done by dental specialists and clinicians(9). Due to the limited number of surgical procedures, the general dentists may get confused in terms of patients referrals. But it is always important to include both surgical dental specialists of periodontics and oral and maxillofacial surgery in the multidisciplinary management.

The special needs patients have a greater prevalence and increased risk of developing a periodontal disease(10). Some systemic diseases have direct or indirect effects on periodontal health and vice versa. Hence referrals to general physicians and periodontal referrals from the general physicians are seen to play a significant role in the patient management of periodontal diseases with underlying systemic ailments(11).

This review article discusses about the interaction and the interrelationship between the periodontal tissues and endodontics, fixed prosthodontics, implant dentistry, esthetics, gerodontology, radiology, orthodontics, pediatric dentistry, oral and maxillofacial surgery, oral pathology, special needs dentistry and general medicine.

The intention of this review was to highlight the interrelationship between periodontics and other specialities and also about the benefits of interdisciplinary approach.

ENDO-PERIO INTERRELATIONSHIP

Etiologic factors such as microorganisms as well as contributing factors such as trauma, root resorption, perforations, fractures and dental malformations play an important role in the development and progression of this disease. Understanding the interrelationship between the endodontics and periodontics will enhance the clinician's ability to establish the correct diagnosis, assess the prognosis of the teeth involved and select a treatment plan based on clinical and biological evidence. The dental pulp and the periodontium are connected via three main avenues of communication: exposed dentinal tubules; small portals of exit; and the apical foramen.

Seltzer et al. (12) reported that pulpal inflammation may cause an inflammatory reaction in the interradicular periodontal tissues. The presence of these patent small portals of exit is a potential pathway for the spread of microorganisms and their toxic by-products from the pulp to the periodontal ligament and vice versa.

The apical foramen is the principal route of communication between the pulp and the periodontium. Microbial and inflammatory by-products may exit readily through the apical foramen to cause periradicular pathosis. The apex is also a potential portal of entry of inflammatory by-products from deep periodontal pockets to the pulp. Pulp inflammation or pulp necrosis extends into the periradicular tissues causing a local inflammatory response often associated with bone and root resorption (12). Endodontic treatment aims to eliminate the intraradicular etiologic factors, thereby leading to healing of the affected periradicular tissues.

Bacteria play a crucial role in the formation and progression of both endodontic and periodontal diseases (13). The periradicular tissues become involved when bacteria invade the pulp, causing either partial or total necrosis. Once the pulp got infected, periradicular lesions and inflammation occurred in the apical tissues(14). Korzen et al. reported similar results and suggested that pulpal infections are usually mixed infections by nature(15). Collectively, these studies provide early key evidence regarding the role of microorganisms in pulpal and periradicular diseases.

Spirochetes are another class of microorganism associated with both endodontic and periodontal diseases. Spirochetes are usually found more frequently in subgingival plaque than in root canals. It has been proposed that the presence or absence of oral spirochetes can be used to differentiate between endodontic and periodontal abscesses (16). It has been demonstrated that the spirochete species most frequently found in root canals are *T. denticola* and *Treponema maltophilum* (17).

The presence and prevalence of fungi associated with endodontic disease is well documented (18).

Human cytomegalovirus has been observed in about 65% of periodontal pocket samples and in about 85% of gingival tissue samples(19). On the other hand, other common species of herpes viruses may be involved in pulpal and periradicular diseases. It has been suggested that human cytomegalovirus and Epstein-Barr virus play a role in the pathogenesis of symptomatic periradicular lesions(20).

For differential diagnostic and treatment purposes the so-called 'endo-perio lesions' are best classified as endodontic, periodontal or combined diseases(21). These include: (i) primary endodontic diseases; (ii) primary periodontal diseases; and (iii) combined

diseases. The combined diseases include: (i) primary endodontic disease with secondary periodontal involvement; (ii) primary periodontal disease with secondary endodontic involvement; and (iii) true combined diseases.

Primary endodontic disease - An acute exacerbation of a chronic apical lesion in a tooth with a necrotic pulp may occasionally drain coronally through the periodontal ligament into the gingival sulcus. Pocket is narrow and lacks width. It usually heals following a root canal treatment.

Primary periodontal diseases- These lesions are caused primarily by periodontal pathogens. In this process, chronic marginal periodontitis progresses apically along the root surface. In most cases, pulp tests indicate a clinically normal pulpal reaction. The prognosis depends upon the stage of periodontal disease and the efficacy of periodontal treatment.

Primary endodontic disease with secondary periodontal involvement- After a period of time if the suppurating primary endodontic disease remains untreated, it may then become secondarily involved with marginal periodontal breakdown. If the endodontic treatment is adequate, the prognosis depends on the severity of the marginal periodontal damage and the efficacy of periodontal treatment.

Primary periodontal disease with secondary endodontic involvement- The apical progression of a periodontal pocket may continue until the apical tissues are involved. In this case, the pulp may become necrotic as a result of infection entering via lateral canals or the apical foramen. It is possible for a blood vessel within a lateral canal to be severed by a curette and for microorganisms to be pushed into the area during treatment, thus resulting in pulp inflammation and necrosis(21).

True combined diseases- True combined endodontic-periodontal disease occurs with less frequency. It arises when an endodontic disease progressing coronally joins with an infected periodontal pocket progressing apically(12,22). Sometimes, supplementary surgical procedures are necessary. In most cases, periradicular healing may be anticipated following successful endodontic treatment. The periodontal tissues, however, may not respond well to treatment and will depend on the severity of the combined disease.

Treatment prognosis depends primarily on the diagnosis of the specific endodontic and/or periodontal disease. The main factors to consider for treatment decision-making are pulp vitality and type and extent of the periodontal defect.

ORTHO-PERIO INTERRELATIONSHIP

An increasing number of adult patients are seeking orthodontic treatment. Many of them are likely to have some degree of periodontal diseases(23). A reduction of periodontal support can be associated with labial flaring, extrusion, rotation, spacing and drifting of the teeth(24). Such changes occur when the periodontal ligament is no longer able to stabilize the teeth against the external forces(25). Maxillary incisors are more susceptible to pathological migration and supra-eruption(26).

One of the most challenging clinical problems in orthodontics is the closure of large edentulous spaces with severely resorbed alveolar ridges. These situations may arise following the loss of a deciduous tooth with no permanent successor or after extraction of an unrestorable tooth. Over time, these uncontrolled tooth movements can result in scissor bites, non working side interferences, poor gingival contours, deepening of the bite and over-eruption of the opposing teeth(27).

The orthodontic management of lone standing molars often requires a combination of uprighting and space closure. The uprighting of tipped teeth usually results in apical migration of the gingival margin and a decrease in the depth of the periodontal pocket, which in turn helps to improve plaque control and access to restorative margins (28). Once a tooth has been uprighted, space closure can be carried out to help establish occlusal contacts and/or prepare the space for a prosthetic restoration.

Siew Han Chay has shown that gingival margin can be moved incisally by as much as 9 mm using orthodontic extrusion(29). Erkan observed that gingival margin and mucogingival junction moved in the same direction along with teeth by 79% and 62%, respectively, when mandibular incisor was intruded orthodontically(30). Extrusion of the mandibular incisor produces gingival margin and the mucogingival junction movement in the same direction as the extruded teeth by 80 and 52.5%, respectively(29).

Orthodontic attachments have the potential to cause plaque accumulation and increase the pathogenicity of the microbes(31). This can be prevented by repeating oral prophylaxis and oral hygiene instructions on each dental visit.

Orthodontics can serve as an adjunct to periodontal treatment procedures to improve oral health in a number of situations. Pathological tooth migration is one of the few evident signs of periodontitis that affects dentofacial esthetics. This phenomenon is more commonly seen in the anterior dentition due to lack of stable occlusal and sagittal contacts with the opposing teeth(32). Fixed appliance allows easy splinting of teeth to achieve stable anchorage. Along with periodontal procedures, occlusal improvement assisted orthodontically may be required in treatment of patients with severely attrited lower anterior teeth(33).

Orthodontic intrusion has also been shown to improve periodontal condition(34). However, elimination of pockets was undertaken prior to intrusion in order to prevent apical displacement of plaque(35).

On many occasions, a stable and esthetically acceptable outcome cannot be achieved with orthodontics without adjunctive periodontal procedures. For instance, a high labial frenum attachment is considered to be a causative factor of midline diastema. Frenectomy is recommended in such cases as the fibres are thought to prevent the mesial migration of the central incisors. Forced eruption of a labially or palatally impacted tooth is now a common orthodontic treatment procedure.

Retention of orthodontically achieved tooth rotation is a problem that has always caused trouble to the orthodontist. Circumferential supracrestal fiberotomy (CSF) is a procedure that is frequently used to enhance post-treatment stability. Few studies have concluded that CSF is more successful in preventing relapse in the maxillary arch. According to him, CSF does not adversely affect the periodontium adversely(36,37).

Mucogingival surgeries may be needed during the course of orthodontic treatment to maintain sufficient width of attached gingival(38). Also, crown lengthening procedures can facilitate easy placement of orthodontic attachments on teeth with short clinical crowns. This procedure can also be used for smile designing(39). Alveolar ridge augmentation and placements of dental implants are the other adjunctive periodontal treatment procedures undertaken to facilitate achievement of orthodontic treatment goals(40).

Gummy smile can be a result of vertical maxillary excess, in which case, orthognathic surgery should be the preferred treatment plan. However, gummy smile can be a result of delayed apical migration of gingiva. Gingivectomy can also be considered as a treatment option(39). Missing interdental papilla can be an esthetic concern in patients undergoing orthodontic treatment. Orthodontic treatment alone or enameloplasty may not solve the problem in many such cases. A competent periodontist can solve the problem using a papilla creation procedure(41).

Certain adjunctive periodontal procedures may help an orthodontist achieve more stable and esthetically acceptable results and vice versa. Close co-operation between the periodontist and orthodontist can ensure excellent results with long-term stability.

PROSTHO-PERIO INTERRELATIONSHIP

Prosthodontic treatment should enhance patient comfort, function, health and esthetics. Of equal importance is that treatment should not induce damage to the periodontal structures. It is imperative that periodontal tissues are healthy before prosthodontic treatment commences, and additional periodontal treatment is commonly indicated to facilitate improved prosthodontic treatment outcomes.

Gingival morphology is critical in prosthodontics because it determines the outlines and extensions of the dental prosthesis (42) and can contribute significantly to the final dental and facial esthetics(43,44). Several authors have referred to the gingival morphological variables that can influence all phases of prosthodontic treatment(45). Although the exact dimensions have been disputed, for the last few decades the biologic width has been used as a guide for clinicians. There are several periodontal procedures that can modify the gingival contour. They can be classified into two categories: subtractive and additive.

Subtractive methods are used more commonly than additive methods, and are generally simpler and more predictable (46). Subtractive methods involve increasing the clinical crown length by removing soft tissues, with or without osseous modifications(47). These procedures are indicated to re-establish a physiological biologic width in cases where a fracture line, perforation or the restorative margin are located subgingivally. Complying with these principles preserves the health of tissues and facilitates the subsequent prosthodontic procedures(48).

Furthermore, lengthening a short clinical crown enhances the retention and resistance forms that can be achieved in a crown preparation. This is necessary if the clinical crown height is less than 3 mm(49). An additional advantage of crown-lengthening surgery is the elimination of periodontal pockets. Esthetically, subtractive methods can increase tooth display and resolve uneven gingival contour.

Additive methods correct gingival level and contour by augmenting the gingival tissues and reducing the height of the clinical crown(50). In general, these methods are indicated to improve the dentogingival esthetics by increasing the width of attached gingiva. The available techniques are a free gingival graft, a connective tissue graft or a coronally positioned flap. All aim to achieve an even band of attached gingiva and maintain coverage of roots. They should be completed well before the prosthodontic treatment.

The crown-to-root ratio is the ratio of the portion of the tooth coronal to the alveolar bone to the portion of the tooth within the alveolar bone, as determined by radiography. This ratio has been described as a prognostic tool to evaluate the suitability of an abutment tooth to support a fixed dental prosthesis(51). A crown-to-root ratio of 1:2 has therefore been considered ideal but, because this ratio can be difficult to observe clinically, a ratio of 1:1.5 has been deemed suitable and a ratio of 1:1 is considered minimal(51).

The contour and profile of a prosthesis will determine whether the prosthesis will blend harmoniously with the adjacent teeth. Over contoured prosthesis will result in food accumulation and gingival inflammation(52). It is interesting that over contouring produces gingival inflammation while under-contouring does not.

Furcation involvement is challenging because of the potential for plaque accumulation. A number of treatment options may be considered with the periodontist to manage a tooth with furcation involvement, including resection, tissue regeneration, a

combination of both or extraction of the tooth. When preparing teeth with furcation involvement, consideration needs to be given to the root anatomy and the coronal tooth structure. In particular, the furcation undercut needs to be considered when preparing these teeth so that the preparation will facilitate gingival health by not collecting plaque or making hygiene access difficult(53).

The interproximal contacts must not be too tight, too loose or open. Prostheses with interproximal contacts that are too tight are difficult to seat, produce discomfort to the patient and are difficult to floss; contacts that are too loose or open allow food impaction. Contacts that are too narrow can also result in food wedging between the teeth, and contacts that are too wide do not properly deflect food from the gingiva.

Teeth that have been saved by periodontal treatment frequently have reduced supporting bone height, and if teeth have been lost because of periodontal disease, there may be moderate-to-severe loss of residual ridge. One solution to manage recession and long teeth, whether for a pontic or a natural tooth, is to simulate the normal crown or root and emphasize the cemento–enamel junction, with staining to simulate the exposed root.

A way of simulating the gingival tissues is to use ceramic of a gingival color. Gingival Colored ceramic can also be added to the gingival embrasure area where there are black triangles to simulate interdental papilla, although the shade of the gingival-colored ceramic rarely matches the hue of the patient's gingiva(54). Therefore, use of this ceramic can be satisfactory when replacing molars and mandibular incisors where the gingiva is not in a high esthetic area, but is more difficult in high esthetic areas, such as the maxillary incisors.

A healthy periodontium is a prerequisite for success with fixed prosthodontic treatment. Without a strong interdisciplinary relationship between periodontics and prosthodontics, the esthetic, functional and/or biological outcome may be compromised and necessitate extensive and expensive retreatment.

IMPLANT-PERIO INTERRELATIONSHIP

Bacterial species around teeth and around implants, 6 months after connecting the abutment, appear to be similar, and these similarities are consistent after 3 years(55). However, the mere presence of putative pathogenic bacteria does not explain the development and progression of peri-implantitis(56).

More recent studies provide evidence that patients with a history of periodontitis are at greater risk of having implant loss and peri-implantitis (57,58). All of these studies report data from restored implants with a minimum of 5 years of function and some with well over 10 years of function. Peri-implant disease is likely to be chronic, slow and cyclical, analogous to chronic periodontitis, depending on modifying factors(59). Interestingly, some studies found zero cases of peri-implantitis in patients without a history of periodontitis even after 10 years(58). Conversely, other studies found rates of peri-implantitis to range from 10% (60) to as high as 33% (61) in patients with no history of periodontitis.

Supportive peri-implant therapy can reduce the occurrence of peri-implantitis in patients with a history of periodontitis. Long-term studies showed that a lack of supportive peri-implant therapy correlated with a greater incidence of peri-implant bone loss, in all patients over 10 years(57,58). Furthermore, patients with a history of periodontitis showed a statistically greater prevalence of peri-implant sites with plaque, bleeding on probing and a deeper mean pocket depth. This suggests that patients with a history of periodontitis, even if they are 'treated' and considered periodontally healthy at the outset of implant treatment, may benefit from a greater emphasis on self-performed plaque control and more frequent supportive peri-implant therapy recall visits.

Cigarette smoking is associated with a greater risk of developing peri-implant diseases and implant loss(62,63). A meta-analysis by Strietzel and colleagues showed that smokers were 2.6-times more likely to have implant loss compared with nonsmokers(63). A systematic review from the same paper showed there is a significantly greater risk of developing peri-implantitis among smokers than nonsmokers; 11 of 12 studies reporting on peri-implant marginal bone changes showed greater mean bone loss in smokers compared with nonsmokers.

The risk factors for destructive periodontal disease and peri-implant disease are bacterial plaque, factors that hinder plaque removal and impaired healing, such as in smokers. Management of periodontally involved teeth or implants in periodontally susceptible patients relies on the simple concept of plaque control. Implants are regularly used to replace periodontally involved teeth, but are at demonstrably higher risk of peri-implant disease. A supportive, preventative program for all patients, based on a risk assessment, is mandatory.

AESTHETIC CONSIDERATIONS

The gingival apparatus plays an important role in the overall beauty of an individual's smile. Esthetic periodontal plastic surgery is becoming an inseparable part of dental treatment as patients become increasingly more conscious of dental esthetics. Therefore, it is important for clinicians to be aware of the different options, the reliability of these treatment modalities, the consistency of results and the long-term prognosis.

Short crowns and/or excessive gingival display are considered as unpleasant by many patients (64). Tjan et al. described the position of the upper lip line in relation to the teeth and gingiva as an important factor in the esthetics of a smile(65). They reported an

anterior crown height display of less than 75% in a low smile and of 75–100% in an average smile. A high or ‘gummy’ smile, on the other hand, shows the full length of the anterior crown heights, in addition to a band of gingival tissue.

Before the decision is made regarding the type of surgical procedure, pre-prosthetic planning of the desired esthetic outcome should be performed. An assessment of the smile line and periodontal parameters is paramount in determining the most suitable treatment plan and surgical approach to correct the excessive gingival display.

The surgical management of short crowns by crown lengthening may include gingivectomy or apically repositioned flap, with or without ostectomy. Gingivectomy is indicated in type I altered passive eruption.

Gingival recession results from the apical migration of gingival tissues. Periodontal surgery to provide root coverage has been reported since the beginning of the 20th century(66). A variety of surgical techniques are available. These are pedicle grafts, free grafts, grafts combining the two modalities and guided tissue regeneration, which uses artificial membrane beneath the flap. The loss of interdental papilla can lead to many problems, such as esthetic problems (so-called ‘black triangles’), phonetic problems (space allowing passage for the air or saliva) and food impaction. Restoration of lost interdental papilla is one of the more challenging problems in esthetic dentistry. Therefore, preserving the interdental papilla in different procedures should be of paramount importance.

A predictable successful outcome cannot be achieved without a comprehensive examination and accurate diagnoses that are subsequently used to generate an appropriate treatment plan. Predictability and success in esthetic dentistry are largely dependent on the health and stability of the periodontal tissues.

PERIODONTAL HEALTH IN ELDERLY PEOPLE

The population of older people is increasing but the data on periodontal therapies and their efficacy in this population is limited. Furthermore, although life expectancy has increased, this does not suggest that older people are medically healthy as the prevalence of most chronic diseases increases with age(5).

Treatment of individuals in the older age group seemed to have limited effects(67). Thus, older individuals may not respond to periodontal therapy comparably to younger adults. In addition, one study over 10 years in well-maintained patients with a history of periodontitis showed that tooth loss from periodontitis was higher among the older individuals than among younger individuals(68). Thus, these results suggest that in well-maintained patients, the progression of periodontitis is not only more severe among the older individuals but also that supportive therapy is less successful (69,70).

A recent systematic review has shown that nonsurgical debridement in the treatment of periodontitis provides moderate improvement in perceived quality of life among older individuals(71).

Data suggest that the role of dental auxiliaries and specifically of dental hygienists appears to be an important factor in the provision of effective periodontal care (48). Older individuals with periodontitis may therefore benefit from more conservative treatment approaches.

PERIODONTAL HEALTH IN CHILDREN

Dentists and periodontists need to consider the health conditions of their patients to aid in diagnosis, and alert the practitioner to oral conditions that may not resolve without general health-care intervention also. The potential associated health problems are also presented, together with the role of pediatric dentists and periodontists in the management of children entering adulthood(72,73).

In adolescence, alongside prevention of dental caries to avoid a lifetime of restoration replacement, there should be an aim of achieving healthy supporting tissues. Following the diagnosis of periodontal disease, initial therapy should focus on removing the cause of the condition, followed by corrective therapy to restore function and esthetics, and then by supportive therapy to prevent recurrence of the condition(74). In early childhood, parents should be involved in tooth brushing and flossing, and this should continue until children develop the skills to remove dental plaque effectively on their own.

This reduces interproximal caries risk and develops a lifetime habit of flossing. In older children and adolescents, good tooth brushing behaviors are important. Dental plaque disclosing at home is very helpful to allow children to visualize what they need to remove. If further oral-hygiene measures are needed, short periods of chlorhexidine gel or rinse may be used, including gels combined with fluoride that aid in dental-caries prevention.

Professional removal of calculus and referral to periodontists for management of complex problems should be a routine part of care. This will improve the periodontal health of the children.

RELATIONSHIP BETWEEN ORAL RADIOLOGY AND PERIODONTICS

Periodontal therapies increasingly include the identification and treatment of periradicular pathologies involving the alveolar bone and overlying gingival mucosa.

In situations where conventional imaging involving a combination of panoramic and intraoral radiography is unable to answer a specific diagnostic question related to periodontal disease, cone-beam computed tomography imaging provides a simple, relatively low-dose imaging procedure that is capable of visualizing the quantity and pattern of alveolar bone loss associated with periodontitis on all surfaces of the dentition in one procedure(7).

However, there is currently no evidence to support the routine use of cone beam computed tomography imaging for three-dimensional bone mapping. Supplemental cone beam computed tomography imaging of localized defects, such as furcation involvement and intrabony vertical and buccal/lingual defects, is clinically efficacious, particularly in assessment of the effects of regenerative therapy.

RELATIONSHIP BETWEEN PERIODONTICS AND ORAL PATHOLOGY

Hereditary gingival Fibromatosis is an uncommon condition in which there is generalized extensive enlargement of the gingiva and appears slightly paler in colour and are firm to touch. Ligneous gingivitis is another rare disorder and should be included in the differential diagnosis for patients presenting with gingival enlargement in absence of the use of medications. Gingival hamartoma is a rare, benign hamartomatous lesion that is believed to arise from the epithelial remnants of the dental lamina.

Gingival lesions of traumatic origin are peripheral giant cell lesions and are relatively common and appear as bluish or purple gingival mass. Gingival lesions of infectious origin are Herpes simplex virus infection and HIV infection. Gingival lesions considered to have an immunologic origin are Lichen Planus, Mucous membrane pemphigoid, pemphigus vulgaris and orofacial granulomatosis.

Drug induced gingival enlargement is seen in patients under the medication of Anti-convulsant, calcium channel blockers and immunosuppressants(75).

The periodontists and the oral pathologists should work together so that some of the less common lesions which affect the components of the periodontal tissues are diagnosed and managed in a timely manner.

PERIODONTAL HEALTH IN SPECIAL NEEDS PATIENTS

Individuals with special needs are at higher risk of dental disease, including periodontal diseases, and special needs patients have a greater prevalence and incidence of periodontal diseases compared with the rest of the population. Genetic or medical conditions, and/or the use of prescription medication or recreational substances, may further increase the risk for susceptibility to periodontal disease.

The prevention or management of periodontal disease often requires the patient to follow a home-care program to enhance oral health and/or treatment outcomes(76). Development of such a program must take into consideration the patient's and/or their carer's motivation, the ability to understand the need for and to achieve good oral hygiene, and the physical and medical limitations in providing reasonable home care.

Provision of a written preventive program is recommended as patient anxiety during a dental appointment may impact on the understanding and implementation of verbal instructions(77).

An individualized preventive program may be designed to minimize the detrimental effects of the oral biofilm on both hard and soft tissues of the oral cavity. Therefore, removal of plaque may require education and training for the patient and/or the carer to achieve an effective outcome.

RELATIONSHIP BETWEEN PERIODONTICS AND ORAL AND MAXILLOFACIAL SURGERY

There is considerable commonality between periodontists and oral and maxillofacial surgeons in the provision of minor oral surgical procedures in dentistry.

In the case of block bone-graft surgery, an interdisciplinary approach will maximize the patient care and expose trainees to different approaches and methodologies. The basic tenets for patient care should revolve around patient safety, the scope of practice and experience of the clinician (who is best placed to deal with any major complications and complex medical issues) and the physical resources that are required, especially if access to general anesthesia or hospital services is involved.

The inclusion of both periodontists and oral and maxillofacial surgeons should be routine in the multidisciplinary management of dental implant patients.

RELATIONSHIP BETWEEN PERIODONTICS AND GENERAL MEDICINE

The fields of dentistry and medicine are interconnected and complementary to each other. Recognizing diseases that influence either profession is beneficial.

Specifically, periodontal diseases are a treatable, and therefore a modifiable, risk factor for systemic diseases, especially atherosclerotic disease, which has a high prevalence and economic burden. There is a lack of awareness of the importance of dental

health to overall general medical health, and vice versa, not only within the medical and dental communities, but also with the community in general.

To provide patients with the optimal level of care, physicians need to continue to refer to dental professionals as they do with other medical specialties.

CONCLUSION

The objectives of such reviews is to identify important patient and treatment- related factors that may influence the response of periodontal tissues to specific treatment modalities and vice-versa. A healthy periodontium is a prerequisite for success with any dental treatment. Without a strong interdisciplinary relationship between periodontics and prosthodontic, esthetic, endodontic and orthodontic modalities, the treatment outcome may be compromised and will necessitate extensive and expensive retreatment. During treatment planning, consideration should be given to periodontal factors even if they do not have a direct effect on the final results. Periodontal treatment plays a very important role in esthetics and in longevity of a prosthesis.

AUTHOR CONTRIBUTIONS

All the authors have equal contributions in bringing out this research work.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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