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President's message

Greetings Members….

The monsoons have been a real delight for all of us!!! As I view the daunting task of the Presidency of SPIK, I am extremely pleased looking back on the progress we continue to make.

We are all a part of an important legacy of oral health education and service. As torchbearers of this great legacy, its up to all of us to maintain the proud tradition and step up to improve quality and access to oral health care. This year, we hope that as a society we can improve our knowledge and skills, our friendships with each other and our service to our communities.

Like always, we are working hard to promote both membership and meeting attendance through sponsored symposia, conferences and other keynote dental meetings thereby expanding the horizons of SPIK to include discussions on more cutting edge topics and research on implant dentistry, and of course providing the best in constant continuing updation.

With rapid growth comes more responsibility, and new scenarios arise that we should adapt too rapidly if we are to sustain the growth. The issues we face are the same that confront our colleagues globally. Some are:

- Methods of standardization of Postgraduate training on National and International basis.
- Initiation of research arenas, commissioning funds/grants and collaborative ventures.
- New horizons and opportunities to ensure employability of our graduates.
- Interaction with policy making bodies including DCI, Govt. of Kerala, etc. to assert the relevance of Periodontics in the dental curriculum and its scope.

We need to address these issues specifically at the earliest as to be relevant to the current state of evolving dental education and practice.

Last but not the least, we have to engage in active dialogue and collaboration with other specialities, national and international associations to increase our sphere of relevance and influence as a profession.

Although the challenges are many, we have a very dynamic team with oodles of enthusiasm and potential new productive arenas to look forward to, and I can confidently say that this teamwork will set standards for our association.

Till then, lets enjoy the beauty of soulful silence in this monsoon season.

Dr Mini Jose
President - SPIK

Editorial

A New beginning ….

An economy that continues to stress the limits of even well-balanced household budgets. A falling rupee that is causing prices to soar for even common dental materials. An Internet age that provides sometimes credible, sometimes dubious information about dentistry. And an array of treatment options to repair, alter, and maintain oral health that can leave even the well-informed confused rather than empowered

Standards of practice is changing, and dentists need to stick to newer, stringent regulations, better hygiene practices, smart, vibrant dental setups and be ready to impart latest dental treatments like implants, lasers, ozones, componeers etc. And above all today's patients are savvy, educated consumers who are armed with intelligent questions and less likely now than decades ago to blindly accept a dentist's recommendation for treatment.

Practicing Dentistry has become more complex now than years ago. It has become much more stressful with myriad responsibilities and expectations from individual dental practitioners. Dental Study groups like COPS and forums like SPIK can be a major stress buster and practice builder when individuals can discuss clinical problems, new treatment protocols, patient issues and personal issues with a confiding colleague or senior.

Enjoy the new year of SPIK.

Indulge, Engage and Contribute as an individual to the field of Dentistry and Periodontics..

And don't you forget to be a part of 38th ISP conference at Kochi.

Dr Mahesh Narayanan
editorspik@gmail.com

Secretary's Message

Warm greetings to all spik members

I take this opportunity to thank each one of you for choosing me for the post of Secretary of SPIK. I am sure that under the charismatic leadership of Dr. Mini Jose, the society will scale greater heights.

Specialisation being a norm in all fields of education, interactive scientific programmes come across as a wonderful opportunity for the professionals and emerging periodontist to refresh and gain knowledge in new avenues of modern science.

As always this year also we will be having scientific programmes and interactive sessions which will benefit the participants in both academic and clinical level.

To make sure the periodontal awareness to the larger group of the population, special programmes have been charted out through out the year and we are sure that this will benefit the community as a whole.

Let me request all the spik members for the whole hearted co-operation, advice and encouragement for the spik year a head.

Lets all work together to make 38th Indian Society of Periodontology Conference to be held at Kochi a memorable one.

Dr. Anil Melath
Secretary, SPIK

Management of fractured anterior teeth with an interdisciplinary approach: A case report

Binoy Mathews N [1]
Sajith Abraham [2]
Santhosh P Elias [3]

ABSTRACT

The trend towards a heightened awareness of esthetics has challenged dentistry to look at dental esthetics in a more organized and systematic manner, so that the health of the patient and his or her teeth still is the most important objective. But some existing dentitions cannot be restored to a more esthetic appearance without the assistance of several different dental disciplines.

Today, every dental practitioner must have a thorough understanding of the roles of these various disciplines in producing an esthetic makeover, with the most conservative and biologically sound interdisciplinary treatment plan possible. Violation of biological width with a restoration can result in localized crestal bone loss, gingival recession, localized gingival enlargement or a combination of these three. When teeth that have caries or fractures below the gingival attachment, a clinical crown lengthening is needed to establish biological width for a functional and esthetic restoration

Key words: crown lengthening, Biological width, prefabricated post

Introduction:

The relationship between periodontal health and restoration of teeth is intimate and inseparable. For restorations to survive long term, the periodontium must remain healthy so that the teeth are maintained. To maintain or enhance patient's esthetic appearance, teeth/tissue interface must present a healthy natural appearance with gingival tissue framing the restored teeth in a harmonious manner.

The dimension of space that the healthy gingival tissues occupy above the alveolar bone is termed as the biological width. Gargiulo et al, 1961 found that average human connective tissue attachment occupies 1.07 mm of space above the crest of alveolar bone and that the junctional epithelial attachment below the base of gingival sulcus occupies another 0.97 mm of space above the connective tissue attachment[1]. When restorative margins are placed too far below the gingival tissue crest it will impinge on the gingival attachment apparatus and create a violation of biological width[2]

By understanding and applying simple functional and esthetic rules, tools and strategies dentist have a basis for evaluating natural dentitions and the results of functional and esthetic restorative procedures and interdisciplinary approach that integrates the knowledge, skill and experience of all the disciplines of dentistry truly results into a comprehensive treatment plan.

Various procedures including porcelain restoration, direct composite, post and core system, surgical crown lengthening, orthodontic tooth eruption etc. when

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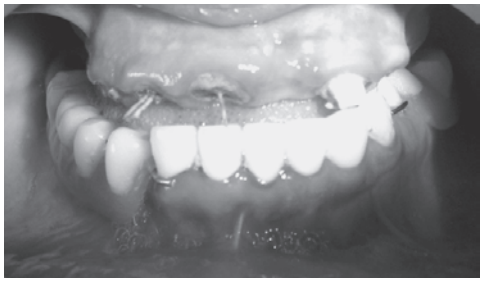

Fig. 1

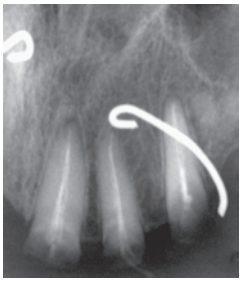

Fig. 2

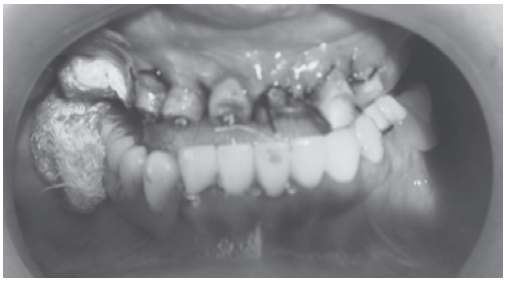

Fig. 3

incorporated to improve function and esthetics

A clinical case is presented to illustrate the interdisciplinary treatment approach to enhance and improve a patient's dental function and esthetics, which requires planning, organization, and discipline, with the establishment of a coordinated and efficient team comprising the periodontist, rehabilitating dentist, prosthetic laboratory technician, and the patient

Case history:

A 50 year old female was reported to department of Prosthodontics complains of broken anterior teeth followed by a trauma. Her concern was more of appearance rather than function. A detailed medical, dental and social history did not reveal any contraindications to dental therapy.

Clinical examination revealed, fractured anterior teeth from 13-11, 22 and 23 at the gingival level (Fig.1). All the five anterior teeth were root canal treated. She was wearing a bilateral removable partial denture in relation to maxillary and mandibular posterior region and a fixed partial denture in relation to 33 to 43. The patient was referred for an evaluation of her periodontal status and for clinical crown lengthening (due to inadequate clinical crown length.)

Radiograph revealed an adequate inter-proximal bone level and root length which is favorable for surgical crown lengthening procedure (Fig. 2).

An apically repositioned flap with osseous recontouring was planned from 13, 12, 11, 22 and 23. Under local anesthesia an internal bevel incision and crevicular incision were made on both labial and palatal aspects of involved teeth, full thickness flap retraction revealed that the fracture line was located 1mm above alveolar crest.

To achieve the biological width, a 3-4mm of osseous reduction was made. The flap was positioned apically and secured by suture and a periodontal pack was placed (Fig.3). Frenectomy was done along with APF to relieve the muscle pull. Patient was administered with systemic antibiotics for 1 week

Four weeks after clinical crown lengthening procedure, post and core was built on all the involved teeth. Prefabricated metallic threaded posts were placed and core build up done with composite resin (Fig.4). All the core buildup of anterior teeth were shaped and prepared to receive metal ceramic restorations (Fig.5). Impressions were made. Provisional restorations were fabricated and cemented with non-eugenol cement. Two weeks later, the final impression was taken. The finished restoration was cemented with glass ionomer reinforced luting cement (Fig. 6).

Discussion:

When restoring teeth with sub-gingival cases or fracture at or below the gingival margin, a dentist has to determine if the tooth was salvageable, whether the crown needs to be lengthened and which crown lengthening procedures are appropriate

For teeth requiring post and core wagenberg et al recommended 5mm of exposed tooth structure above the alveolar crest to establish the biologic width and achieve the ferrule effect[3].

Before planning dentist should determine the prognosis of the tooth, evaluating the bone loss, probing depth, furcation-involvement, mobility, crown -root ratio, root form, pulpal involvement and strategic value[4].

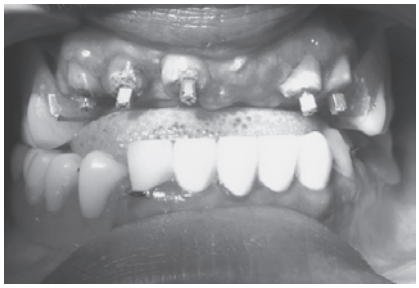

Fig. 4

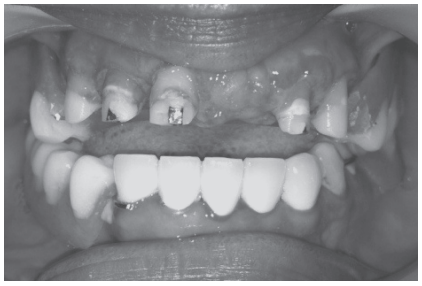

Fig. 5

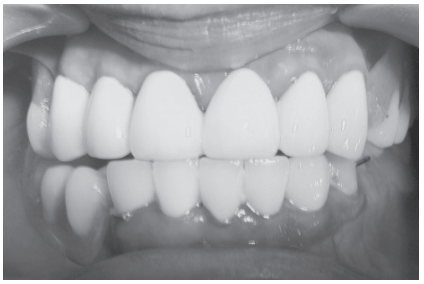

Fig. 6

Conclusion:

There is a significant relationship between restorative dentistry and periodontal health. As restoration margins get deeper sub-gingivally, inflammation becomes more severe[5]. Restoration margins placed near alveolar bone results in the formation of periodontal pockets and bone loss[6,7]. Periodontal surgery is recommended to support restorative dentistry and improve long term prognosis.

Depending on the specific clinical situation, a dentist can perform one of several clinical crown lengthening procedure. Surgical crown lengthening would be the most immediate and common approach since it will expose the sound tooth structure immediately after surgery[8,9].

After the surgical clinical crown lengthening procedure, the provisional restoration must be readapted. A waiting period of 12 weeks has been supported prior to starting the final restoration. Although Bragger et al reported no change in attachment level or probing depths after six weeks of healing[3,10]. However due to the possibility of recession Bragger et al recommended a waiting period of six months for the areas that held esthetic concern.

References:

1. Gargiulo A W, Wentz F M, Orban V: Dimension and relations of the dento-gingival junction, J Periodontol, 32:262,1961
2. Parma-Benfenati S, Fugazzoto P A, Ruben M P: The effect of restorative margins on the post-surgical development and nature of the periodontium. Part 1, Int J Periodont Restore Dent 6: 31,1985
3. Wagenberg BD, Eskow RN, Langer B. Exposing adequate tooth structure for restorative dentistry. Int J Periodontics Restorative Dent 1989;9(5): 322-331.
4. McGuire MK. Prognosis vs outcome: Predicting tooth survival. Compend Contin Educ Dent 2000;21(3):217-224.
5. Reitemeier B, Hansel K, Walter MH, Kastner C, Toutenburg H. Effect of posterior crown margin placement on gingival health. J Prosthet Dent 2002;87(2):167-172.
6. Gunay H, Seeger A, Tschernitschek H, Geurtsen W. Placement of the preparation line and periodontal health—A prospective 2-year clinical study. Int J Periodontics Restorative Dent 2000; 20(2):171-181.
7. Schatzle M, Land NP, Anerud A, Boysen H, Burgin W, Loe H. The influence of margins of restorations of the periodontal tissues over 26 years. J Clin Periodontol 2001;28(1):57-64.
8. Pontoriero R, Carnevale G. Surgical crown lengthening: A 12-month clinical wound healing study. J Periodontol 2001;72(7):841-848.
9. Deas DE, Moritz AJ, McDonnell HT, Powell CA, Mealey BL. Osseous surgery for crown lengthening: A 6-month clinical study. J Periodontol 2004;75(9):1288-1294.
10. Bragger U, Lauchenauer D, Lang NP. Surgical lengthening of the clinical crown. J Clin Periodontol 1992;19(1):58-63.

Risk factors of periodontal disease

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Biju Thomas [3]

ABSTRACT :

Periodontitis is a prevalent human disease with defined risk parameters that contributes to population morbidity in terms of edentulism and decreased oral function. Risk factors for destructive periodontitis have been extensively reviewed and include exposures such as specific bacterial pathogens, smoking and diabetes mellitus. In addition, genetic factors based polymorphisms and inflammatory responses have been recently identified. These patients may require modification of their prognosis and treatment plan. In addition to an evaluation of factors contributing to their risk, these patients should be educated concerning their risk, and when appropriate, suitable intervention should be implemented.

Key words : Periodontitis, risk factors, Diabetes mellitus.

Introduction

A Risk Factor is defined as an aspect of personal behaviour, or on inborn or inherited characteristic which on the basis of epidemiological evidence is known to be associated with a health related condition.

Periodontitis is the major cause of tooth loss all over the world. It not only causes loss of teeth but also increases morbidity. We as Periodontists have the most important role to play in the diagnosis and treatment of this disease. A complete and thorough case history recording is the key factor in pinpointing the patients risk factors. Understanding of the patient in this respect also plays an important role. Once the risk factors are outlined the treatment plan can be ensued keeping these factors in mind. The final result is always measured by the treatment and its success for the patient. Without the thorough knowledge of these aspects, it is impossible for us, dentists to render treatment to our patients that will be in his/ her best interest.

Terminologies [1]

1) **Risk** - It is the probability that an individual will get a specific disease in a given period of time.
2) **Risk Factor** - An aspect of personal behaviour, or on inborn or inherited characteristic which on the basis of epidemiological evidence is known to be associated with a health related condition.
3) **Risk Determinant**/ background factor[2] - A risk factor that cannot be modified is referred to as a risk determinant.
4) **Risk Indicator** - It is a term used to describe a potential risk factor identified to be associated with disease from case control studies or cross sectional studies.
5) **Risk Marker** - A risk factor that can be used to

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predict the future course of disease, such as an increased probability of disease, is known as a risk marker.

Categories

I. Risk factors

1. Microorganisms.
2. Smoking.
3. Diabetes Mellitus.
4. Neutrophil defects.

II. Risk Indicators

1. Age.
2. Osteoporosis.
3. Drugs.
4. Tooth related factors.

III. Risk Markers

1. Nutrition.
2. Systemic factors.
3. Alcohol
4. Psychological factors.
5. Obesity

IV. Risk Determinants

1. Genetic factors.
2. Gender
3. Race

Risk factors

Microorganisms as risk factors

The plaque biofilm consists largely of microbes and host proteins that adhere to the teeth within minutes of dental prophylaxis. In gingival health, gram-positive organisms like Actinomyces and streptococci dominate the plaque biofilm. In the later stages of plaque biofilm formation (i.e. days to weeks of poor oral hygiene) the plaque "matures", resulting in a in a shift towards gram-negative anaerobes and motile organisms. Some of the most common organisms associated with periodontal diseases are Poiphyromonas gingivalis, Prevotella intermedia, Bacteroides forsythus, Campylobacter rectus, and Actinobacillus actinomycetemcomitans, as well as the treponemes. [3,4]

Smoking

Smoking is related to the development of periodontal disease in a dose related fashion. The more the number of years and more the number of cigarettes, the more the chances of a subject developing periodontal disease. Also, the effect seems to be more deleterious in the area directly in contact with the smoke, like the maxillary anteriors.[5]

Diabetes

In adults with type 1 diabetes, the overall degree of gingival inflammation was similar between diabetic subjects as a whole and non-diabetic control subjects with similar plaque accumulation. However, when diabetic patients in this study were stratified according to their level of glycemic control, significantly greater gingival bleeding was seen in poorly controlled diabetic patients than in either well-controlled diabetic subjects or non diabetic controls. The number of bleeding sites decreased as glycemic control improved Greater gingival inflammation was also seen in adults with type 2 diabetes than in non-diabetic controls, with the highest level of inflammation in subjects with poor glycemic control.[6]

Neutropenia

Diagnosis of neutropenia is based on clinical signs and symptoms as well as absolute neutrophil counts. A relative deficiency in neutrophil number can dramatically increase susceptibility to infectious diseases. Neutropenia is considered clinically significant when the absolute neutrophil count falls below 1,000 cells/ml (normal adult range: 1,800-8,000 cells/ml). Qualitative disorders of neutrophil function also increase the host's susceptibility to infection. Classification of neutrophil disorders corresponds with the major neutrophil processes: margination (rolling and adhesion), chemotaxis and migration, phagocytosis, degranulation and killing.[7]

Risk indicators

Age

Age, for a long time was considered an important risk factor for attachment loss, however, recent studies have shown otherwise. This relationship is considered more due to the cumulative periodontal breakdown over

time than to an age related intrinsic deficiency than contributes to susceptibility to periodontal disease.[8]

Osteoporosis

The risk factors for osteoporosis can be grouped into modifiable and non modifiable factors. Non modifiable risk factors include age, sex, early menopause, thin or small body frame, the modifiable risk factors are ones like lack of calcium intake, lack of exercise; smoking and alcohol are modifiable factors. Osteoporosis is a risk factor for alveolar bone density loss in post menopausal women with a history of periodontitis.[9]

Drugs

Calcium channel blockers have been associated gingival overgrowth, although the risk for gingival overgrowth varies according to the specific drug. Certain systemic conditions require the use of drugs that may pose a risk for periodontitis from plaque accumulation as a result of gingival overgrowth.[10]

Tooth related factors

Anatomic factors such as furcations, root concavities, developmental grooves, cervical enamel projections, enamel pearls and bifurcation ridges and over hanging restorations may predispose periodontium to disease as a result their potential to harbor bacterial plaque and present challenge to clinician during instrumentation.[11]

Risk Markers

Nutrition

The potential mediating role of nutrition in the oral health- systemic disease relationship has increased interest in the effect of nutrition in oral health and periodontal disease. However, efforts to correlate the nutritional deficiency to periodontal disease have yielded conflicting results. Vitamins are coenzymes required for metabolism and health.[12]

Obesity

Obesity may be considered to be a unique form of malnutrition, in the sense that there is disorder in the individual's nutrition. Obesity is considered to be important risk factor for Type II diabetes, hyperlipidemia, and hypertension.[13]

Alcohol

Alcohol has been known to have detrimental effects when consumed above a certain quantity on a long term basis. Alcohol has been found to have adverse effects on the oral cavity, including a higher incidence and severity of periodontal disease.[56] Alcohol may affect the periodontal tissues and constitute a risk, through different mechanisms. These may include adverse effects on the host response, toxic effects on the liver, interference with protein metabolism and tissue healing, stimulation of bone resorption and finally, direct toxic effects on the tissues.[14]

Psychosocial Factors

A relationship between a sound mind in a sound body has been proposed for centuries. However this relationship has been studied by Selye in detail when he explained the General Adaptation syndrome. He proposed that the initial HPA axis response to stress was beneficial but that prolonged mental or physical stress can be detrimental to the human body by exhausting or diminishing the ability to respond to a perceived threat or challenge.[15]

Acquired immune suppression

HIV has a strong affinity for cells of the immune system, most specifically those that carry the CD4 receptor molecule. Thus the T helper cells are most commonly affected, but monocytes, macrophages, Langerhans cells are also affected. The periodontal condition is worsened and some atypical conditions such as linear gingival erythema, NUG, Cancrum oris and Necrotizing ulcerative periodontitis.[16]

Risk Determinants

Genetic factors

Genetic polymorphisms among individuals play as a major risk factor for periodontal disease. Accurately predicting all the genes and pathways involved in periodontal destruction (or regeneration) as well as their interactions with these modifiers represents a daunting task.[17]

Gender

Periodontal disease is seen more in males in population studies than females at comparable ages. There are

gingival inflammatory conditions found in female which are related to hormonal conditions.[17]

Race

The role of Race as a risk factor for periodontal disease is a more complicated issue. Studies done by Beck and co workers showed that approximately three times more blacks had advanced periodontitis as compared to whites of the same age cohort (65 yrs and above).[17]

Conclusion

"Well begun is half done" old adage goes so an accurate diagnosis is the most important thing before formulating the treatment plan. To reach a correct diagnosis, it is important for the clinician to pay attention to all the factors that could put the patient at a risk for developing a particular disease

References

1. Rees T. Periodontal Risk Factors and Indicators. Periodontology2000.2003;32:11
2. Genco RJ. Current view of risk factors for periodontal disease J. Periodontology 1996:67:104-1049
3. Last JM. A disctionary of Epidemiology; Ed 4, Oxford, 2001, Oxford University Press
4. Newman M, Haake SK. Periodontal Microbiology. Clinical Periodontlogy, 9th edition, Saunders Co. 2003;33:109
5. Heasman L. The effect of smoking on periodontal treatment response: A review of clinical evidence. J Clin Periodontology 2006:33:241-253.
6. Mealey B. Diabetes mellitus and periodontal disease. J Periodontology 2006:77: 1289-1303.
7. Waldrop TC. Periodontal manifestations of the heritable Mac-1, LFA- deficiency. J Periodontology 1987:58:400-416.
8. Van der Velden U. Effect of age on periodontium. J Clin Periodontology 1984;11:281-294.
9. Jeffcoat MK. Osteoporosis: a modifying factor in oral bone loss. Annals Peridontal 1998: 3:312-321.
10. Seymour RA. Prevalence of gingival overgrowth induced by calcium channel blockers. A community based study. J Periodontology 1999;70:63-67.
11. Blieden TM. Tooth related issues. Annals Periodontal 1999;4:91-96.
12. De Menezes AC. Clinical manifestations of hypervitamanosis A in human gingiva. J periodontology 1984;55:474-476.
13. Cutler CW. Association between hyperlipidemia and periodontitis: cause or effect? J Periodontology 1999;70:1429-1434.
13. Tzeal M. The effect of alcohol consumption on periodontal disease. J Periodontology 2001;72:183-189.
14. Monteiro da Silv AM. Psycho social factors in peridontal disease. J Clin Periodontology 1995; 22:516-5256.
15. Friedman RB. Periodontal status of HIV seropositive and AIDS patietns. J Periodontology 1991; 62:623-677.
16. Socransky SS. Microbiological parameters associated with IL-1 gene polymorphisms. J Clin Periodontology 2000;27:810-818.
17. Genco J. Current view of risk factors for periodontal diseases. J Clin Periodontology 1996;67:1041-1049.

Nylon Strip (Perfect Splint) reinforced Periodontal Splint- A Case Report

Biju Balakrishnan [1]
Shermin Karim [2]
Jose Paul [3]
Johnson D' Lima [4]
Biju Philip [5]
Sandhya [6]

ABSTRACT :

Dental Splinting can be defined as "The joining of two or more teeth into a rigid unit by means of fixed or removable restorations or devices." Different materials have been used for splinting. Most frequently used technique is to use orthodontic stainless steel wire, co-axial wire or ligature wire bonded on the teeth surface with composite. A major disadvantage of this technique is that there is no true bonding of the metal wire to the composite as well as the tooth and this type of splint tends to debond and fail in time. New generation fiber reinforced splinting materials have several advantages over conventional splints. A case of a patient who had her mobile mandibular anterior teeth splinted with PERFECT - SPLINT (New Generation Nylon strip – reinforced periodontal splint) is being presented in this case report.

Introduction

Tooth mobility has been described as an important clinical parameter in predicting prognosis. It is now accepted that clinical prognosis of periodontally compromised teeth many times hinges on the presence of tooth mobility.[1,2] It has been proven that while a splint is in place, there is a reduction in tooth mobility.[3,4] For this reason and for patient comfort, splinting has been the recommended therapy to stabilize teeth.

Dental splinting involves the joining of two or more teeth into a rigid unit by means of fixed or removable restorations or devices so that their relative movement is restricted and forces applied to each of the teeth are transmitted to root systems of all linked teeth.[5]

Biomechanics

Splinting allows better force distribution, directing the force to be distributed over the entire splinting area thus better periodontal support, as a result of conditioned reflex activity, masticatory function is directed toward the area that is most convenient and efficient for function.

In the past few decades, there has been tremendous advancement in the techniques used to splint teeth. In many cases, the clinician wants to approach the decision to splint teeth with the most conservative technique possible, especially during active periodontal treatment. Using composite resin alone to link the teeth is likely to lead to early failure at contact points as the material is brittle.[8]

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Splinting procedure

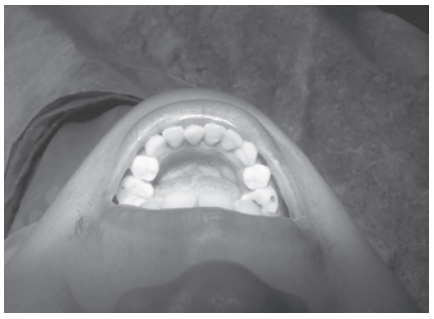

Fig. 1 Preoperative

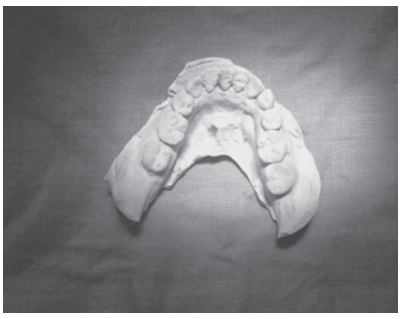

Fig. 2 cast prepared

Fig. 3 Nylon Strip (Perfect Splint)

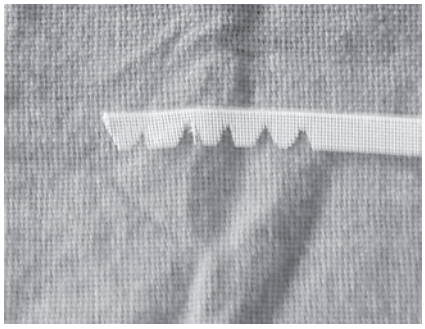

Fig. 4 The Nylon strip was shaped to conform to the gingival contour. This will aid in better oral hygiene maintenance in the interproximal areas

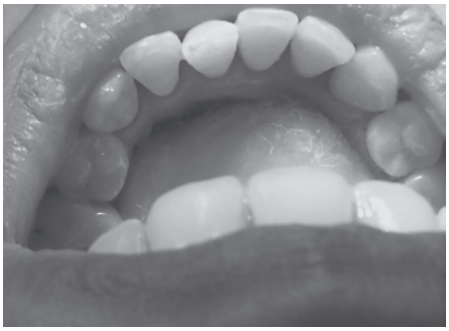

Fig. 5 The lingual surface was prepared and etched with phosphoric acid gel for 30 seconds. The area was isolated with cotton to prevent contamination from saliva

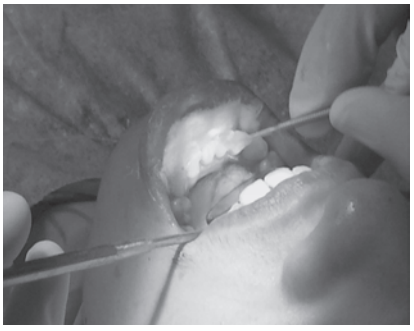

Fig. 6 Bonding agent was applied to the etched surface and light cured

Fig. 7 The Nylon strip (PERFECT SPLINT) was wetted with bonding agent, adapted to the lingual surface and light cured. Then Composite resin was applied to the adapted strip and light cured. This helps in reinforcing the adhesion of the splint to the tooth surface.

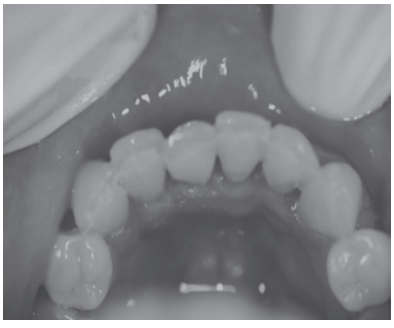

Fig. 8 POST SPLINTING -Nylon strip (PERFECT SPLINT) periodontal splint.

The patient was given proper oral hygiene instructions and advised to use interproximal toothbrush.

Fig. 9 Armamentarium

A linking wire provides flexibility and is therefore advantageous. The operative technique for making this type of splint has been widely described [6-9] Rochette originally described a perforated resin-bonded metal splint in 1973.[10]

The basic laboratory and chairside procedures are now commonly used and well known.[11-13] A major disadvantage of this technique is that there is no true bonding of the metal wire to the composite as well as the tooth and this type of splint tends to debond and

fail in time.

The problem was solved with the introduction of a high strength, bondable, biocompatible, esthetic, easily manipulated, colorless ribbon that could be embedded into a resin structure.[14]

Currently there are a number of fiber reinforcement materials available on the market. Fiber reinforcement materials affect the physical properties and behaviors of composite materials.[15]

One problem with the fiber reinforcement materials that have been available is their inherent thickness when embedded within composite resin in a splint causing discomfort to the patient.

To overcome this problem, Nylon strips were introduced. They possess the same physical properties of fibre splint but the thickness was greatly reduced thereby enhancing patient comfort and function. Another advantage is that they can be easily cut into shapes to accommodate the interproximal areas using a normal scissors thus making oral hygiene maintenance easier.

Case report

A 36 year old female came to the Department of Periodontics, Annoor Dental College, Muvattapuzha with the complaint of mobile lower front teeth with difficulty in biting food. On examination Grade II mobility was noticed in relation to 31, and 41, there was loss of attachment and alveolar bone along with recession.

The patient gave a history of dislodged wire splint placed 2 months back. This was the second time the wire splint got dislodged. Also patient was uncomfortable with the earlier splint as it was bulky and interfered with speech and mastication. Hence it was decide to splint the mandibular anteriors with PERFECT –SPLINT (New generation Nylon strip-reinforced periodontal splint).

Discussion

Indications of splints –

-To stabilize moderate to advanced tooth mobility that cannot be reduced by other means and which has not responded to occlusal adjustment and periodontal therapy

-When tooth mobility interferes with normal masticatory function

-Prevent extrusion of unopposed teeth

-Stabilization of mobile teeth during healing after periodontal surgery.

-Stabilization of mobile teeth during surgical (regenerative) therapy.

-Permanent post- orthodontic retention

Requirements of an Ideal splint-

- Splint should hold the teeth rigidly
- Should not subject the teeth to torsional stress
- Should not impose excessive stress on any supporting tooth
- Must be sufficiently strong to withstand stresses of mastication
- Must not interfere with function
- Should be designed such that it can be kept clean
- Should be esthetically acceptable

Nylon strip reinforced periodontal Splint (PERFECT SPLINT) possess the above mentioned requirements of an ideal splint and has lent toughness and reinforced the composite splint which was traditionally associated with detachments due to failure to withstand the heavy occlusal forces during mastication and the inherent insufficient strength of composite material. It can bond to any composite system, possesses physical properties equivalent to other fibre splint. They offer excellent esthetics and are translucent allowing the use of light cure composites.

Moreover, they can be cut into shapes using normal scissors which helps in better adaptability even in narrow arches.

Conclusion

The new generation Nylon strip reinforced splinting material (PERFECT-SPLINT) have several properties superior to conventional splints such as –

- High flexural strength and increased fracture resistance
- Superior ease of use and manageability
- forms a strong bond to the tooth surface with a greater surface area in contact with tooth

- being flat does not interfere with speech and masticatory functions

- Safe and biocompatible

- It is translucent, practically colorless and disappears within the composite

This unique combination of strength, esthetics, bondability and predictable results as well as an easy single visit chairside technique for placement has enhanced its popularity among clinicians.

References

1. Wheeler TT, McArthur WP, Magnusson I, et al: Modeling the relationship between clinical, microbiologic, and immunologic parameters and alveolar bone levels in an elderly population. *J Periodontol* 65(1):68-78, 1994.
2. McGuire MK, Nunn ME: Prognosis versus actual outcome. III. The effectiveness of clinical parameters in accurately predicting tooth survival. *J Periodontol* 67:666-674, 1996.
3. Laudenbach KW, Stoller N, Laster L: The effects of periodontal surgery on horizontal tooth mobility [abstract]. *J Dent Res* 56(Special Issue): abstract no. 596, 1977.
4. Scharer P: die stegkonstruktion als vesteigungemittel im vestgebiss. [Thesis], Zurich, Switzerland: University of Zurich, 1961
5. Smith B J, Setchell D In: Rowe, AHR, ed. Companion to Dental Studies Vol 3: Clinical Dentistry. Oxford: Blackwell Scientific Publications, 1986; pp. 519-529
6. Clark J W, Weatherford T W, Mand W V. Wire ligature – Acrylic splint. J Periodontol 1969; 40: 371-375
7. Klassman B, Zucker H W.Combination wire-composite resin intracoronal splinting: Rationale and technique. J Periodontol 1976; 47(8): 481-486
8. Polson A M, Billen J. Temporary splinting using ultraviolet- light- polymerized bonding materials. J. Am. Dent. Assoc. 1974; 89: 1137-1141
9. Saravanamuttu R. Post- orthodontic splinting of periodontally involved teeth. Br. J. Orthodont 1990; 17: 29-32
10. Rochette A L. Attachment of a splint to enamel of lower anterior teeth. J. Prosthet Dent 1973; 30: 418-423
11. Simonsen R, Thompson V, Barrack G. Etched Cast Restorations. Clinical and Laboratory Techniques. Chicago: Quintessence, 1983
12. Tay W M. Classification and assessment of composite retained bridges. Restor Dent 1986; 2: 15-18
13. Tay W M. Resin bonded bridges. I. Materials and methods. Dent Update 1988 15: 10-14
14. Strassler HE, Haeri A, Gultz JP: New generation bonded reinforcing materials for anterior periodontal tooth stabilization and splinting. *Dent Clin North Am* 43(1):105-126,1999
15. Rudo DN, Karbhari VM: Physical behaviors of fiber reinforcement as applied to tooth stabilization. Dent Clin North Am 43(1):7-35, 1999.

Role of tetracyclines in Periodontal therapy

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ABSTRACT :

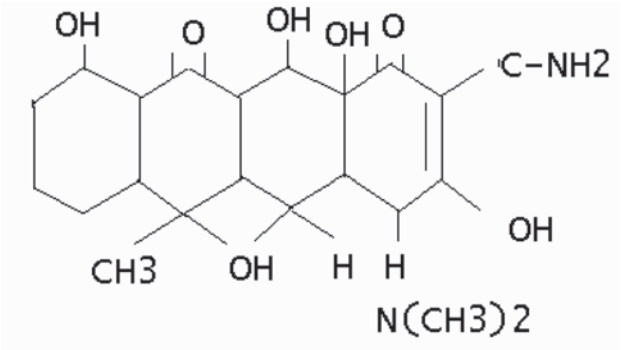
The primary etiological factor for periodontal disease is plaque associated biofilm. Removal of the cause is the primary factor in controlling the disease. Antimicrobial agents like tetracyclines have an effect in inhibiting the periodontopathic Bacteria like A.A. but tetracyclines have some other properties like collagenase inhibition, Anti inflammatory actions, inhibition of Bone resorption, ability to promote attachment of fibroblasts. However antibiotics can be used an adjunct to mechanical therapy.

Tetracyclines :

History : Tetracyclines comprise a group of Broad – spectrum anti Microbial Agents that were introduced into clinical practise in the late 1940's (Duggar 1948). These are a class of antibiotics having a nucleus of four cyclic rings It was isolated from fermentation of streptomycin aureofaciens all are obtained from soil actinomycetes. Chloro tetracycline was first to be introduced in 1948. Under the name Auremoycin (because of the golden yellow colour of streptomyces aureofaciens colonies producing it). It contrasted markedly from pencillin and streptomycin in being active orally and in affecting a wide range of microorganisms. Hence called BROAD SPECTRUM ANTIBIOTIC.

Oxytetracycline soon followed, others were produced later, either from muntant stravin or semisynthetically. Tetracyclines are active against gram +ve and gram –ve Bacteria as well as mycoplasm, chlamydial &Rick etbsial infections and viruses.

Chemical Structure :



Chemically the Tetracycline are Napthacene derivatives. The Napthacene nucleus is made by fusion of four partially unsaturated cyclohexane radicals and hence the name Tetracyclines.

Pharmacological properties[1] :

On the basis of chronology of development, as well as for convenience of description, they may divide into 3 groups.

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Group I	*Group II*	*Group III*
Chlorotetracycline Oxytetracycline Tetracycline	Demedocycline Methacycline Lymecycline	Doxycycline Minocycline

Tetracycline hydrochloride, doxycycline, minocycline are all semi synthetic tetracyclines, with Tetracycline Hcl being derived from chlorotetracycline, while Doxycycline is derived from Oxytetracycline.

Pharmacological properties of Tetracycline Hcl, Doxycycline and Minocycline[2] :

Property	**Tetracycline Hcl**	**Doxycycline**	**Mino cycline**
Stability	Less	More	More
Oral Absor-ption	Irregular & Incomplete	93%	Complete (100%)
Protein Binding	36-50%	82-93%	76%
Peak serum conc	2 µg ml-1	3.1-3.5 µg ml-1	4.8-6 µg ml-1
Plasma half life	8.5h	18-22h	12-16h
Systemic Dosage	250 µg x 4/day	Loading of 200 mg followed by 100 mg/day	100 mg x 2/day

Both doxycycline and minocycline exhibit greater oral absorption, are more extensively protein bound, and have more prolonged half lives than tetracycline hydrochloride (Barza and scheife 1977). As a consequence systemic dose regimens are different for these two tetracyclines.

The tetracycline Hcl is also a chelating agent and will chelate Ca^{2+}, Mg^{2+} and Al^{3+} in the GIT (ericsson et al 1982). These ions, especially calcium are contained in a variety of food substance. Since the chelate is poorly absorbed, it is advisable to take tetracycline either half an hour before or after food. Food does not interfere with absorption of Doxycycline or Minocycline[4,5,6].

a) Anti Bacterial Action :

Tetracycline exert their Anti Bacterial Activity by inhibiting microbial protein synthesis (chopra and thome 1978). Tetracyclines are considered to be bacteriostatic agents but may have a bactericidal effect in high concentration. This requires access to the inside of the Bacterial cells. Doxycycline and Minocycline are more lipid soluble than tetracycline hydrochloride and thus pass directly through the lipid bilayer of the bacterial cell wall[7,8,9,10]. Once through this layer, an energy dependant mechanism pumps the drugs through the inner cyptoplasmic membrane within the cell, tetracyclines bind specifically to 30s ribosomes this binding appears to prevent access of amino acyl RNA to acceptor sites of the mRNA ribosomes, which in turn prevents the addition of aminoacids to growing peptide chain. There is also evidence that tetracyclines may cause alterations in the bacterial cytoplasmic membrane, facilitating the leakage of nucleotides and other compounds from the cell. This action would explain the rapid inhibition of DNA replication that occurs when cells are exposed to concentration of tetracyclines in excess of that needed for protein inhibition.

b) Other properties[11-16] :

These include

- Ø Collagenase inhibition.
- Ø Inhibition of Bone Resorption
- Ø Anti inflammatory action
- Ø Ability of tetracycline to promote the attachment of fibroblasts
- Ø and connective tissue to root surface.

i) Tetracyclines and collagenase inhibition :

The Anti collagenase activity of these drugs appears to be related to the source of the enzyme and tetracycline used. Doxycycline is the most potent tetracycline for collagenase inhibition. (Burns et al 1989).

1.

- Ø Collagenase derived from neutrophils (MMP-8) are more susceptible to a tetracycline

induced inhibition.

- Ø It has been suggested that tetracycline inhibition of collagenase relates to the drug's ability to Bind with calcium and zinc ions (Golub et al 1984, 1987).
- Ø Zinc ions located at active site of the enzymes while ca^{+} ions act as exogenous co-factor.
- Ø Collagenase are proteinase type enzymes which degrade connective tissues. These enzymes are derived from variety of source including fibroblasts, epithelial cells, macrophages.

2. Another mechanism may be associated with the ability of tetracycline to scavenage reactive oxygen radicals (hypochlorous acid) produced by PMN's (Galber & Creamer 1991)

- Ø These oxygen radicals activate latent collagenase (Saari et al 1990)
- Ø The inhibition effect of tetracycline on oxygen radicals may also prevent a wider spectrum of tissue destruction.

Anti Inflammatory Actions of Tetracyclines:

- Ø Are used widely in certain skin disorders and this is related not to drug's anti microbial action.
- Ø These include ability of tetracyclines to suppress PMN activity, in particular the scavenging action on reactive oxygen metabolites (Martin et 1974, Galber & Creamer 1991).
- Ø Alternatively the drugs may block eicosanoid synthesis (PGE2) by inhibiting phospholipase A2 activity (El Altar et al 1988).

ii) **Tetracyclines and Bone Resorption** :

The Anti proteolytic properties of the tetracyclines, together with their specific anti collagenase Activity has remitted in the application of these drugs to inhibit Bone resorption is facilitated by collagenases secreated by osteoblasts. Tetracycline expecially chemically modified forms inhibit osteoblast collagenases in vivo (Golub et al 1991) Tetracycline may also have a modifying effect on osteoclasts (Rifkin et al 1992). This action may be mediated by an altered regulation of cystoplasmic calcium.

iii) Tetracyclines and fibroblast attachment :

There has been considerable interest in the application of therapeutic measures to facilitate periodontal ligament regeneration. Fundamental to such regeneration is the ability of the periodontal ligament fibroblast to attach to the root surface. In nitro studies have shown that pretreatment to dentine with tetracyclines enhances fibroblasts attachment and colonization. The drugs also enhance fibronectin binding.

Contraindication :

Pregnancy	:	Staining of deciduous teeth, depression of bone growth.
Breast Feeding	:	Staining of developing teeth, Disturbances in children.
Children < 8 Years	:	Staining of developing teeth.
Renal impairment produce	:	Anti-Anabolic properties Azotaemia and aggravate uremia.
Hepatic Disease	:	Fatty changes especially during pregnancy.
Systemic lupous Erythematosis	:	Exacerbation of lesion.

Unwanted Effects of Tetracyclines :

Gastro intestinal disturbances :

- Ø Diarrhoea
- Ø Nausea & vomiting
- Ø Oesophagus ulceration (Doxycycline only)
- Ø Photosensitivity
- Ø Skin Rashes
- Ø Hypersensitivity reactions
- Ø Vestibular disturbances (minocycline only)

Overgrowth of resistant organisms :

- Ø Stomatitis
- Ø Vaginitis

Used in Medicine :

a) Veneral Diseases
b) Chlamydial infection

c) Atypical pneumonia
d) Brucellosis
e) Plague
f) Acne
g) Amoebiasis

PREPARATIONS :

SYSTEMIC

1. Chlorotetracycline : Aueromycin 250,500 mg cap; 3% skin ointment, 1% eye ointment.
2. Oxytetracycline : Terramycin 250, 500 mg cap.
3. Tetracycline : Hostacycline, Idilin 250, 500 mg cap.
4. Doxycycline : Tetradox, Doxycaps 100 mg cap.
5. Minocycline : Cyanomycin 50, 100 mg caps.

LOCAL

1. Tetracycline containing fibres (ACTISITE) : The first local delivery product available in the U.S.A and has been studied in an ethylene/ vinyl acetate copolymer fiber, diameter 0.5 mm, containing tetracycline.
2. Subgingival Delivery of Doxycycline (ATRIDOX) : Is a gel system that incorporates the Antibiotic Doxycycline (10%) in a syringeable gel system.
3. For Minocycline (Dentamycin, Periocline) : Subgingival delivery system of 2% ($^{w}/_{w}$) Minocycline hydrochloride (by lederle division, Osaka Japan)

3. Newer concepts in tetracyclines:

CHEMICALLY MODIFIED TETRACYCLINES :

Rifkin et al have stated that the non anti microbial properties of tetracyclines appear to modulate host response by inhibiting the activity of matrix metalloproteinase, collegenase. The Non Anti Microbial chemically modified analogues, known as chemically modified tetracycline, inhibit the extracellular activity of mammalian neutrophil and osteoblast collagenases.

Ø This concept had it beginning in 1980's with studies by Golub et al at the state university of Newyork at stony brook.

Ø Anti inflammatory and anti collagenase properties of tetracyclines reduces the tissue destruction. Its ability to promote fibroblast attachment to root surface and bone formation enhances the regenerative potential.

Ø Studies by Golub et al demonstrated that tetracyclines could inhibit bone resorption in organ culture, induced by factor's like PGE_2 and endo toxin.

The Beneficial effects of doxycycline and minocycline in suppressing the collagenolytic activity was well recognized. Attempts were made to remove the anti bacterial activity of the drug which caused the undesirable side effects. Recognisation that the anti microbial and anti collagenase properties of the drug are situated in different parts of the molecules Golub et al modified the drug by eliminating the anti bacterial activity.

According to modifications in the chemical structure CMT1, CMT-2, CMT-3 and CMT-4 have been developed. Only CMT-1, CMT-3 were able to block bone resorption in culture studies. CMT-1 was found to inhibit collagenase released from PMN's while collagenase of fibroblast origin was resistant. This observation indicated that while CMT-1 may be quite effective in treatment of adult periodontitis.

Ø The Discovery of Anti collegenase property of tetracycline has generated new therapeutic possibilities, not only for periodontal diseases but also for wide range of medical condition like, bullous lesions of skin, Rheumatoid, Arthritis, Osteoarthritis, etc.

References :

1) "Clinical Periodontology" by Carranza IXth edition.
2) Jan lindhe "Clinical Periodontology & Implant Dentistry".
3) Perio 2000, Volume 10, 1996. "Systemic & Topical Antibiotics".
4) "Drugs, Diseases & Periodontium" by Robin A Seymonr.
5) Journal of Clinical Periodontology 1995, "Role of Tetracyclines in Management of periodontal Disease".
6) 'Text Book of Pharmacology' by Tripathi

7) Addy M, Langeroudi . Comparison of the immediate effects in the subgingival microflora of acrylic strips containing 40% chlorhexidine, metronidazole or tetracycline J. Clin Periodontol 1984; 11:379-386.

8) Aimetti M, Romano F,Torta I Debridement and local application of tetracycline loaded fibers in the management of persistent periodontitis results after 12 months J. Clin Periodontol, 2004; 31: 166-172

9) Aitken S, Birek P, Kulkarni GV, Lee WL, McCulloch CA. Serial doxycycline and metronidazole in prevention of recurrent periodontitis in high-risk patients.J Periodontol 1992 63:87-92.

10) Al-Ali W, Bissada NF, Greenwell H. The effect of local doxycycline with and without tricalcium phosphate on the regenerative healing potential of periodontal osseous defects in dogs. J Periodontol. 1989 Oct;60(10):582-90.

11) Antezak-Bouckoms A A, Tulloch JFC and Berkey C S: Split-mouth and cross-over design in dental research. J Clin Periodontol 1990; 17:446-453.

12) Apatzidou DA, Kinane DF. Quadrant root planing versus same-day full mouth root planing. I. Clinical findings. J.Clin Periodontol 2004; 31(2): 132-140.

13) Armitage G.C, Dickinson W.R, Jenderseck R.S, Levine S.M. Relationship between the percentage of subgingival spirochetes and severity of periodontal disease; J.Periodontol 1982; 53: 550-555.

14) Baker P.J, Evans R.T, Coburn R.A. and Genco R.J. Tetracyclines and its derivatives strongly bind to and are released from the tooth surface in active form. J.Periodontol 1983; 54(10):580-585.

15) Betty N A, Quiryhen M and Van Steenberghe D. The use of tetracycline – containing controlled – release fibers in the treatment of refractory periodontitis. J Periodontol 1997; 68 : 353 – 361.

16) Payne JB, Golub LM, Stoner JA, Lee HM, Reinhardt RA, Sorsa T, et al. The effect of subantimicrobial dose doxycycline periodontal therapy on serum biomarkers of systemic inflammation: a randomized, double-masked, placebo-controlled clinical trial. JADA 2011; 142: 262–73.

17) Ying Gu, Clay Walker, Maria E. Ryan,Jeffrey B et al Non-antibacterial tetracycline formulations: clinical applications in dentistry and medicine journal of Oral Microbiol. 2012; 4: 10.3402

Efficacy of dentifrices containing pyrophosphate on calculus formation-a clinical and scanning electron microscopic evaluation

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Jagadeesh Pai [4]

ABSTRACT :

Aim: To assess and compare the clinical efficacy of two commercially available dentifrices containing pyrophosphate (1.35% and 0.68%) on plaque maturation and reduction in the calculus amount using SEM evaluation.

Materials and methods: 60 selected volunteers were randomly divided into group A and group B. Group A was instructed to use toothpaste containing 1.35% soluble pyrophosphate (Colgate sensitive toothpaste) and Group B to use 0.68% soluble pyrophosphate (Colgate strong teeth toothpaste). Subjects were recalled after 30, 60 and 90 days. Calculus scores were measured using VMI and SEMCI scores were assessed after 90 days.

Results: At the end of 90 days, the clinical VMI scores for the dentifrice containing 0.68% pyrophosphate were 9.3833±1.6165 and SEMCI was 1.45±0.5944. The clinical VMI score for dentifrice containing 1.35% pyrophosphate was 6.9833±1.880 and SEMCI score was 1.0833±0.3334. The clinical VMI and SEMCI scores for dentifrices containing 1.35% pyrophosphate over dentifrice containing 0.68% pyrophosphate were both statistically significant

Keywords: Calculus, oral hygiene, dentifrice, pyrophosphate.

Introduction

Dental calculus is an adherent calcified or calcifying mass that forms on the surface of natural teeth and dental prosthesis which is generally covered by a layer of unmineralized plaque.[1] The pathogenesis of calculus was attributed to its rough outer surface which mechanically irritates the adjacent tissues. [2]

Calculus plays an important role in accentuating periodontal disease due to its rough surface which mechanically irritate adjacent tissues and act as niche for further plaque accumulation and growth, thus creating areas where plaque removal is difficult.[1] Arabian Physician- surgeon Albucasis (963-1012 AD) found the relationship between calculus and disease, and the need for thorough scraping of teeth, to remove the "rough and ugly. " [3] Paracelus, a Swiss German Physician (1535) introduced the term 'tartar' as a designation of a variety of stone like concentrations. [2,4] The current view was given by Schroeder in 1969, that the initial damage to the gingival margin in periodontal disease is due to the immunological and enzymatic effects of

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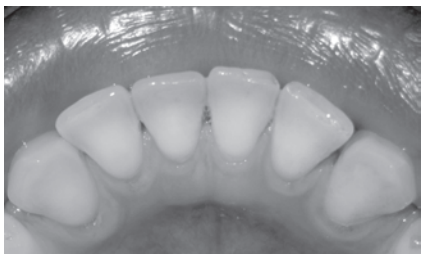

Fig. 1 Pre operative

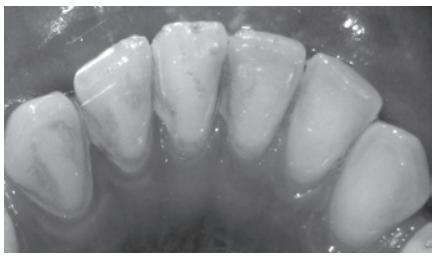

Fig. 2 After using dentifrice containing 0.68% pyrophosphate

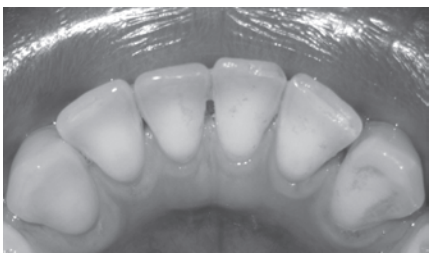

Fig. 3 After using dentifrice containing 1.35% pyrophosphate

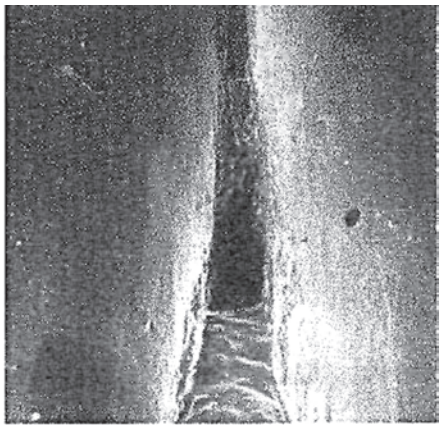

Fig. 4 Pre operative

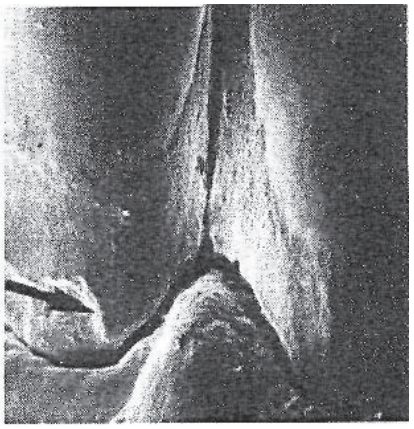

Fig. 5 After using dentifrice containing 0.68% pyrophosphate SEM score 3

Fig. 6 After usingdentifrice containing 1.35% pyrophosphate SEM score 1

microorganisms in plaque.[5] Studies carried out to determine the pathogenicity of calculus in periodontal disease stated that plaque build up on the surface of calculus has the potential for increasing the rate of displacement of the adjacent junctional epithelium and extending the radius of destruction of bone beyond that of plaque alone.[6]

The most usual and acceptable method of calculus removal is by mechanical means in the dental offices. An efficient tooth brushing technique with conventional toothpaste slows the rate of calculus deposition by retarding the growth of plaque.[7] A number of anti-calculus agents have been proposed. They are usually compounds that inhibit the formation of calcium phosphate salts as hydroxyapatite on the tooth surface.[5] Among the most effective inhibitors are pyrophosphates, phosphonates and polycarboxylate.[5] Chemotherapeutic agents containing pyrophosphate act by inhibiting plaque mineralization.[6] It inhibits the calcification by preventing the initial crystal nucleus in plaque from growing, possibly by poisoning the growth centres of crystal.[6] Pyrophosphates binds to two sites on the hydroxyapatite surface, thus phosphate ion cannot adsorb onto crystals, and thus crystal growth is inhibited. It also reduces acquired pellicle formation, by its ability to displace anions and positively charged macromolecules from the tooth surfaces.[2,6,8] Pyrophosphate adsorbs on to the hydroxyapatite and inhibits the crystal growth.[9]

Thus study was planned to evaluate the clinical efficacy of two commercially available dentifrices containing pyrophosphate (0.68% and 1.35%) on plaque maturation, calculus formation and reduction in the calculus amount with the use of Scanning electron microscopic assessment.

Materials and methods:

A total of 109 students from Coorg Institute of Dental Sciences, Virajpet were evaluated and sixty volunteers were selected for participation considering the following inclusion criteria: a)subjects having all the mandibular anterior teeth. b) subjects who agreed to refrain from using oral products other than those

Demographic Baseline Characteristics of the Subjects				
Number of Subjects			Age (Yrs.)	
Males	Females	Total	Mean	Range
23	37	60	22.2 (± 2.25)	19-24

Table. I

assigned as part of research. Following criteria were used to exclude subjects from entering the study: a)history of hypersensitivity to toothpaste or chemicals used in the study. b)subjects requiring antibiotic regimen or had antibiotic for last 3 months. c)subjects with lower anterior spacing, malalignment or undergoing orthodontic treatment. d)subjects presenting with fractured crowns of lower anterior and with lingual recession.

Examination was performed and all the participants were given full mouth oral prophylaxis. Soft bristled brushes (Colgate sensitive toothbrush) were given and asked to brush twice daily for two minutes.[10] The brushing techniques of volunteers were evaluated and they were instructed to follow Modified Bass brushing technique during the experimental period so as to standardize a common brushing technique by the participants.

Impressions of lower anterior teeth were made in silicon rubber base impression material (Speedex, Coltene, Whaledent) on sectional impression trays. Replicas of these impressions were prepared using epoxy resin(EP85-215, Eager Plastics, Inc.). The replicas were removed and two neighbouring teeth were randomly selected for SEM evaluation. Sputter coating (Joel JFC 1600)with gold palladium were done to make the specimen electroconductive. Microphotographs were taken from the replicas using Scanning electron microscope at magnification of 15X (Joel JSM 6380LA).

The sixty selected volunteers were divided into two groups: Group 'A'-30 subjects were instructed to use toothpaste containing 1.35% soluble pyrophosphate (Colgate sensitive toothpaste). Group 'B'-30 subjects were instructed to use toothpaste containing 0.68% soluble pyrophosphate (Colgate Strong teeth toothpaste)

The subjects were recalled after 30, 60 and 90 days. The teeth were isolated by placing cotton roll to facilitate calculus visualization. After drying the area with air from a dental three way syringe, calculus scores were measured and recorded using the Volpe Manhold Index (VMI)[11,12] using Williams graduated periodontal probe. Measurements were made in three planes.

1. Bisecting the lingual surface.
2. Diagonally through the area of greatest calculus height as mesio-incisal angle of the tooth.
3. Diagonally through the distoincisal angle of the lingual surface of mandibular incisors and canine.

After the test period of 90 days, the microphotographs were assessed using the following SEM calculus index scores.[13]

0: no deposits detectable

1: interdental space partly filled with calculus

2: interdental space completely filled with calculus.

3: interdental space and parts of the gingival margin also covered with calculus.

After the first test period of 90 days, cross over between the groups was done. Oral prophylaxis was completed during this period.

Group 'A'-were instructed to use toothpaste containing 0.68% soluble pyrophosphate (Colgate strong toothpaste)

Group 'B'-were instructed to use toothpaste containing 1.35% soluble pyrophosphate (Colgate sensitive toothpaste).

The subjects were recalled after 30, 60 and 90 days. The calculus scores were measured and recorded using the Volpe Manhold Index.[11,12]

After the second test period of 90 days, impressions of lower anterior teeth were made in silicon rubber base impression material on sectional impression trays. Replicas of the impressions were prepared using the epoxy resin for Scanning electron microscopic evaluation at 15X magnification.

Table. II

Comparison of the Mean Vmi Scores for Group A after each Test Period

Time of Examination	*Dentifrice Used*	*Mean Vmi Score ± Std. Dev*	*Percentage of Reduction*	*Statistical Significance 'T'*
After 30 Days	Dentifrice Containing 0.68% Pyrophosphate	1.166± 0.592	34.28%	(P< 0.001)
	Dentifrice Containing 1.35% Pyrophosphate	0.766 ± 0.858		
After 60 Days	Dentifrice Containing 0.68% Pyrophosphate	5.60 ± 1.734	31.78%	(P< 0.001)
	Dentifrice Containing 1.35% Pyrophosphate	3.820 ± 1.224		
After 90 Days	Dentifrice Containing 0.68% Pyrophosphate	9.366 ± 1.650	26.64%	(P< 0.001)
	Dentifrice Containing 1.35% Pyrophosphate	6.870± 1.46		

Statistical methods

The descriptive procedure displays univariate summary statistics for several variables in a single table and calculate standardize values (z scores). Independent sample T- test procedure compares means for two groups of cases. Paired – sample T-test procedure compares the means of two variables for a single group.

GLM Repeated Measure analyzes groups of related dependent variables that represent different measurements of the same attribute. SPSS for Windows Version – 16(2007) was employed for statistical analysis

Results:

A total of 60 healthy student volunteer participated for the study (23 males and 37 females). The subjects selected for the study were between 19-24 years of age, the mean age being 22.2 (±2.25) years.

a) COMPARISON OF MEANS VMI SCORES FOR GROUP A

At the end of 30 days, Group A who used dentifrices containing 1.35% pyrophosphate, the mean VMI score was 0.7667±0.8583 and after the cross over the mean VMI score for 0.68% pyrophosphate was 1.1667±0.5992. The percentage of reduction of calculus by the dentifrice containing 1.35% pyrophosphate over the dentifrice containing 0.68% pyrophosphate was 34.28% which was statistically significant (p<0.001)

At the end of 60 days, the mean VMI score for dentifrice containing 1.35% pyrophosphate was 3.82±1.22, after the cross over the mean VMI score for dentifrice containing 0.68% pyrophosphate was 5.6±1.734. The percentage of reduction of calculus by the dentifrice containing 1.35% pyrophosphate over the dentifrice containing 0.68% pyrophosphate is 30.48% which was statistically significant.(p<0.001)

At the end of 90 days, the mean VMI score for dentifrice containing 1.35% pyrophosphate was 6.87±1.46 and after the cross over the mean VMI score for dentifrice containing 0.68% pyrophosphate was 9.366±1.650 and the percentage of reduction of calculus by the dentifrice containing 1.35%

Table. III

Comparison of the Mean VMI Scores for Group B after each Test Period

Time of Examination	*Dentifrice Used*	*Mean Vmi Score ± Std. Dev*	*Percentage of Reduction*	*Statistical Significance 'T'*
After 30 Days	Dentifrice Containing 0.68% Pyrophosphate	1.10± 0.305	36.42%	(P< 0.001)
	Dentifrice Containing 1.35% Pyrophosphate	0.701 ± 0.711		
After 60 Days	Dentifrice Containing 0.68% Pyrophosphate	5.90 ± 1.626	30.48%	(P< 0.001)
	Dentifrice Containing 1.35% Pyrophosphate	4.150 ± 1.524		
After 90 Days	Dentifrice Containing 0.68% Pyrophosphate	9.40 ± 1.610	24..52%	(P< 0.001)
	Dentifrice Containing 1.35% Pyrophosphate	7.095 ± 1.998		

pyrophosphate over the dentifrice containing 0.68% pyrophosphate was 26.64% which was statistically significant.(p<0.001)

b) COMPARISON OF MEAN VMI SCORE FOR GROUP B

At the end of 30 days, the mean VMI score for dentifrice containing 0.68% pyrophosphate was 1.1±0.30513 and after the cross over the mean VMI score for dentifrice containing 0.68% pyrophosphate was 1.1±0.30513 and after the cross over the mean VMI score for dentifrice containing 1.35% pyrophosphate was .701±.71197. The percentage of reduction of calculus by the dentifrice containing 1.35% pyrophosphate over the dentifrice containing 0.68% pyrophosphate was 36.42% which was statistically significant(p<0.001)

At the end of 60 days, the mean VMI score for dentifrice containing 0.68% pyrophosphate was 5.9±1.6262 and after the cross over the mean VMI score for the dentifrice containing 1.35% pyrophosphate was 4.150±1.524. The percentage of reduction of calculus by the dentifrice containing 1.35% pyrophosphate over the dentifrice containing 0.68% pyrophosphate was 30.48% which was statistically significant (p<0.001)

At the end of 90 days, the mean VMI score for dentifrice containing 0.68% pyrophosphate was 9.4±1.610 and after the cross over the mean VMI score for dentifrice containing 1.35% pyrophosphate was 7.095±1.99. The percentage of reduction of calculus by the dentifrice containing 1.35% pyrophosphate over the dentifrice containing 0.68% pyrophosphate was 24.52% which was statistically significant.(p<0.001)

c) TOTAL COMPARISON OF THE MEAN VMI SCORE FOR 0.68% PYROPHOSPHATE AND 1.35% PYROPHOSPHATE DENTIFRICE

At the end of 30 days, the mean VMI score for dentifrice containing 0.68% pyrophosphate was 1.133±0.4682 and the mean VMI score for dentifrice containing 1.35% pyrophosphate was 0.7333±0.7997. The percentage of reduction of calculus by the dentifrice containing 1.35% pyrophosphate over the dentifrice containing 0.68% pyrophosphate was 35.3%

Table. IV

Comparison of the Mean total VMI Scores of 0.68% And 1.35% Pyrophosphate Containing Dentifrices.

Time of Examination	*Dentifrice Used*	*Mean Vmi Score ± Std. Dev*	*Percentage of Reduction*	*Statistical Significance 'T'*
After 30 Days	Dentifrice Containing 0.68% Pyrophosphate	1.133± 0.468	35.3%	(P< 0.001)
	Dentifrice Containing 1.35% Pyrophosphate	0.733 ± 0.799		
After 60 Days	Dentifrice Containing 0.68% Pyrophosphate	5.750 ± 1.673	31.13%	(P< 0.001)
	Dentifrice Containing 1.35% Pyrophosphate	3.966 ± 1.472		
After 90 Days	Dentifrice Containing 0.68% Pyrophosphate	9.383 ± 1.616	25.58%	(P< 0.001)
	Dentifrice Containing 1.35% Pyrophosphate	6.983 ± 1.882		

which was statistically significant (p<0.001)

At the end of 60 days, the mean VMI score for dentifrice containing 0.68% pyrophosphate was 5.75±1.6735 and the mean VMI score for dentifrice containing 1.35% pyrophosphate was 3.966±1.472. The percentage of reduction of calculus by the dentifrice containing 1.35% pyrophosphate over the dentifrice containing 0.68% pyrophosphate was 31.13% which was statistically significant.(p<0.001)

At the end of 90 days, the mean VMI score for dentifrice containing 0.68% pyrophosphate was 9.3833±1.6165 and the mean VMI score for dentifrice containing 1.35% pyrophosphate was 6.9833±1.880. The percentage of reduction of calculus by the dentifrice containing 1.35% pyrophosphate over the dentifrice containing 0.68% pyrophosphate was 25.58% which was statistically significant.(p<0.001)

d) COMPARISON OF SEMCI SCORES

FOR GROUP A: At the end of 90 days, the mean SEMCI score for dentifrice containing 1.35% pyrophosphate was 1.033±0.31984 and after the cross over the mean SEMCI score for the dentifrice containing 0.68% pyrophosphate was 1.400±0.56324. The percentage of reduction of calculus by the dentifrice containing 1.35% pyrophosphate over the dentifrice containing 0.68% pyrophosphate was 26.19% which was statistically significant.(p<0.001)

FOR GROUP B: At the end of 90 days, the mean SEMCI score for dentifrice containing 0.68% pyrophosphate was 1.5±0.6297 and after the cross over the mean SEMCI score for the dentifrice containing 1.35% pyrophosphate group was 1.133±0.345. The percentage of reduction of calculus by the dentifrice containing 1.35% pyrophosphate over the dentifrice containing 0.68% pyrophosphate was 24.44% which was statistically significant.(p<0.001)

e) TOTAL COMPARISON OF MEAN SEMCI SCORE FOR 0.68% PYROPHOSPHATE AND 1.35% PYROPHOSPHATE DENTIFRICES

At the end of 90 days, the mean SEMCI score for

Table. V

Comparison of the Mean SEMCI Scores For Group A

Time of Examination	*Dentifrice Used*	*Mean Sem Score ±Std. Dev*	*Percentage of Reduction*	*Statistical Significance 'T'*
After 90 Days	Dentifrice Containing 0.68% Pyrophosphate	1.40±0.56	26.19%	(P< 0.001)
	Dentifrice Containing 1.35% Pyrophosphate	1.03±0.31		

Table. VI

Comparison of the Mean SEMCI Scores for Group B

Time of Examination	*Dentifrice Used*	*Mean Sem Score ±Std. Dev*	*Percentage of Reduction*	*Statistical Significance 'T'*
After 90 Days	Dentifrice Containing 0.68% Pyrophosphate	1. 5±0.62	24.44%	(P< 0.001)
	Dentifrice Containing 1.35% Pyrophosphate	1.13±0.34		

Table. VII

Comparison of the Total Mean SEMCI Scores of 0.68% and 1.35% Pyrophosphate Containing Dentifrices.

Time of Examination	*Dentifrice Used*	*Mean Sem Score ±Std. Dev*	*Percentage of Reduction*	*Statistical Significance 'T'*
After 90 Days	Dentifrice Containing 0.68% Pyrophosphate	1.45±0.59	25.3%	(P< 0.001)
	Dentifrice Containing 1.35% Pyrophosphate	1.08±0.33		

dentifrice containing 0.68% pyrophosphate was 1.45±0.5944, the mean SEMCI score for dentifrice containing 1.35% pyrophosphate was 1.0833±0.3334. The percentage of reduction of calculus by the dentifrice containing 1.35% pyrophosphate over the dentifrice containing 0.68% pyrophosphate was 25.28% which was statistically significant.(p<0.001)

f) CORRELATION BETWEEN CLINICAL RESULTS AND SEMCI VALUES

At the end of 90 days, the clinical VMI score for the dentifrice containing 0.68% pyrophosphate was 9.3833±1.6165 and the SEMCI was 1.45±0.5944. The

Table. VIII

Correlations between the Results

		T30	T60	T90	SEM
T30	Pearson Correlation	1	.251(**)	-.131	.075
	Sig. (2-tailed)	.	.006	.155	.416
	N	120	120	120	120
T60	Pearson Correlation	.251(**)	1	.375(**)	.086
	Sig. (2-tailed)		.006	.	.000 .349
N	120	120	120	120	
T90	Pearson Correlation	-.131	.375(**)	1	.186(*)
	Sig. (2-tailed)	.155	.000	.	.042
	N	120	120	120	120
C	Pearson Correlation	.075	.086	.186(*)	1
	Sig. (2-tailed)	.416	.349	.042	.
	N	120	120	120	120

clinical VMI score for dentifrice containing 1.35% pyrophosphate was 6.9833±1.880 and SEMCI score was 1.0833±0.3334. The clinical VMI and SEMCI scores for the dentifrice containing 1.35% pyrophosphate over the dentifrice containing 0.68% pyrophosphate was both statistically significant

Discussion

Pyrophosphate is a normal product of human metabolism present in serum and urine that has calcium chelating properties.[14] It inhibits the conversion of amorphous calcium phosphate ions into hydroxyapatite.[1,3] Dentifrices containing pyrophosphate in combination with sodium fluoride have been used commercially as 'tartar control' toothpaste.[7]

The study sample consisted of 60 dental student volunteers from Coorg Institute of Dental Sciences. The subjects selected were between 19-24 years of age. The dental students were taken as subjects because of easy access, sample matching in terms of age, education and demographics. It is easy to educate and motivate the students and the chances of sample attrition are less. A cross over design was opted for the study. Here the subjects acts as their own controls and is economical as the number of subjects required is less. Cross over study also helps to compare the two groups with high precision by eliminating the inter subject variation.[15] The results of the present study at all given time intervals (30, 60, 90 days) and the dentifrice containing 1.35% pyrophosphate showed better results in the reduction of calculus deposition than the dentifrice containing 0.68% pyrophosphate. These results were consistent with the results of the other clinical studies done on soluble pyrophosphate containing dentifrice (Lobene[16], Petrone Yejin[17], Hak-kong Yip[18]). This attributes to that pyrophosphate inhibits the transformation of amorphous or non-crystalline calcium phosphate into crystalline apatite.[19]

The largest reduction in calculus was obtained through the use of pyrophosphate 1.3% with copolymer polyvinyl methyl ether and maleic acid (Netuveli GS, Sheiham A[20]). Copolymer inhibits the hydrolysis of pyrophosphate by alkaline phosphatase. The addition of the copolymer stabilizes pyrophosphate in saliva and thereby extends the time over which the pyrophosphate is active.[8] The SEMCI scores revealed a significant reduction of calculus deposition by the dentifrice containing 1.35% pyrophosphate over the dentifrice containing 0.68%

pyrophosphate.

The Scanning electron microscopic evaluation and clinical scoring were correlating. These results were consistent with previously reported data indicating that soluble pyrophosphate has an anticalculus effect (Gaengler et al 1993[13], Zacherl et al[21]). Pyrophosphate interacts with calcium by virtue of ion pairing in solution, and on the surface with cationic positively charged calcium being attracted to the negatively charged oxygen on the phosphate ion.[2,8] The overall results of the present study thus indicates similar findings as the previous reports that there is significant reduction in calculus deposition by pyrophosphate containing dentifrice.

Conclusion

Dentifrice containing soluble pyrophosphate has significant inhibiting action on supragingival calculus deposition; hence dentifrices containing pyrophosphate can be advocated as anticalculus agent. Dentifrices containing 1.35% pyrophosphate significantly reduced calculus level more than dentifrices containing 0.68% pyrophosphate. Dentifrices having a combination of pyrophosphate and its stabilizers (polyvinyl methyl ether and maleic acid) could be definitely recommended to any individual for reducing calculus deposition. Studies with larger sample size and longer follow up and microbiological evidence will be required to provide new impetus for future research.

References

1. Newman, Takei, Klokkevold, Carranza. Clinical Periodontology 10 th edition. Saunders 2007.
2. Irwin D Mandel: Calculus Update: Prevalence, pathogenicity and prevention. JADA 1995;126:573-580.
3. Fairbrother K J, Heasman P A: Anticalculus agents. J Clin Periodotol 2000; 27:285-301.
4. Fermin A Carranza, jr., Clinical Periodontology, 9th edition Saunders 2003.
5. Irwin D. Mandel. Dental calculus; contemporary Periodontics; Mosby publication 1990.
6. Mandel I.D & Gaffar A. Calculus revisited; A review. J clin Periodontology 1986; 13: 249.
7. Jill Rethman et al. contemporary dental hygiene care; Periodontics, medicine, surgery, and implants; Mosby publication
8. Donald J. White, Robert W. Gerlach. Anticalculus effects of a novel, dual phase polypyrophosphate dentifrice: chemical basis, mechanism, and clinical response, The J of Cont Dent Pract 2000; 1(4) 1-12.
9. Edgard C Morenno et al. Pyrophosphate adsorption onto hydroxyapatite and its inhibition of crystal growth. Comp cont edu Dent 1987 256-266.
10. Jan Lindhe clinical Periodontology and implant dentistry.4thedition Blackwell Munksgaard; 2003.
11. Volpe AR, Manhold JH, Hazen SP: Invivo calculus assessment part I, A method and its examiner reproducibility. J Periodontol 1965; 36:292-298.
12. Volpe AR, Kupezak L J, King WJ: Invivo calculus assessment Part IV Parmeters of Human Clinical studies. J Periodontol jan:12-22.
13. Gaengler P et al: evaluation of anticalculus efficacy, A SEM method of evaluating the effectiveness of pyrophosphate dentifrice on calculus formation. J Clin Periodontol 1993; 20 (2):144-146.
14. Tenenbaum et al: Bisphosphonates and Periodontics: potential applications for regulation of bone mass in the periodontium and other therapeutic /diagnostic uses. J.periodontol 2002; 73:813-822.
15. Russel R G and Fleish H: Inorganic pyrophosphate and pyrophophatases in calcification and calcium homeostasis, Clin Orthop 1970;69:101.
16. Lobene RR : A clinical comparison of the anticalculus effect of two commercially available dentifrices: Clin Prev Dent 1987;9:NO 4
17. Petrone M, etal: Clinical comparison of the anticalculus efficacy of three commercially available dentifrices. Clin Prev Dent1991; 13(4)18-21.
18. Ye Jin, Hak-Kong Yip, supragingival calculus: formation and control. Crit Rev Oral Biol Med 2002; 13(5):426-441.
19. Fleish H, et al: Influence of pyrophosphate on the transformation of amorphous to crystalline calcium phosphate. Calcific Tissue Res 1968; 2:49.
20. Netuveli G S, Sheiham A: A systematic review of the effectiveness of anticalculus dentifrices.Oral Health and Preventive Dentistry 2004; 2(1) :49-58
21. Zacherl W A etal: The effect of soluble pyrophosphate on dental calculus in adults. JADA 1985; 110:737-738.

JSPIK

Platelet rich plasma and platelet rich fibrin – A short review

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ABSTRACT :

Regeneration is the natural renewal of a structure, produced by growth and differentiation of new cells and intercellular substances to form new tissues or parts contrast to *repair*, which is healing of a wound by tissue that does not fully restore the architecture or the function of the part. Regeneration is the ideal outcome desired and platelet concentrates is one of the technology for purpose of regeneration. Although the use of fibrin adhesives in many field related protocols is well documented from the past 30 years, it remained controversial owing to the complexity of the production protocols (for autologous adhesives) or risk of cross-infection (for commercial adhesives). The development of platelet concentrate technologies offers simplified and optimized production protocols for a new kind of fibrin adhesive, concentrated platelet-rich plasma (cPRP). Because of legal restrictions on blood handling, a new family of platelet concentrate, which is neither fibrin glue nor a classical platelet concentrate, appeared in France. This new biomaterial, called platelet-rich fibrin (PRF), looks like an autologous cicatricial matrix.

Key words: Regeneration, repair, platelet rich plasma, platelet rich fibrin

Introduction

Regeneration is the natural renewal of a structure, produced by growth and differentiation of new cells and intercellular substances to form new tissues or parts contrast to *repair*, which is healing of a wound by tissue that does not fully restore the architecture or the function of the part.[1] Regeneration is the ideal outcome desired and many techniques such as bone grafting, guided tissue regeneration, growth factors are used. Platelet rich plasma and platelet rich fibrin are newer technologies used for purpose of regeneration.

THE PLATELETS:

They arise from the cytoplasmic fragmentation of the megakaryocyte in bone marrow. Platelets enter the circulation as anuclear cells and therefore have a limited lifespan. The platelet lives for only about 7 to 10 days. The platelets, in particular, actively synthesize growth factors throughout the life span and actively secrete them in response to clotting. The vesicles are composed of three types of granules: Lysosomal, dense, alpha. The alpha granules are storage granules of the growth factors, such as TGF-β, PDGF, VEGF and IGF. [2,3]

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FIBRIN ADHESIVES:[4]

It is soluble fibrillary molecule present both in plasma and in the platelet α-granules and plays a major role in platelet aggregation during homeostasis. It is transformed into biologic glue capable of consolidating the initial platelet cluster, thus constituting a protective wall along vascular breaches during coagulation. The operating mode of fibrin adhesives reproduces the last stages of the enzymatic cascades of coagulation during which the fibrinogen is converted into fibrin in the presence of thrombin, factor XIII, fibronectin, and calcium ions. It consists of:

→ A lyophylized fibrinogen concentrate, associated with fibronectin and factor XIII

→ A bovine aprotinin solution (for protease inhibition), acting as an antifibrinolytic able to increase the lifespan of fibrin sealing

→A bovine thrombin concentrate

→ A calcium chloride solution

Fibrin glue was first used in application of wound healing and regeneration perspective. However, they have been criticized owing to the fact that they are blood-derived products and they constitute an infinitely small viral contamination risk. Most studies show the efficiency of fibrin adhesives in controlling slow and diffuse bleeding as well as lymphatic exudates, serous collections, and all diffuse bleeding of the parenchyma. However, these adhesives do not guarantee homeostasis of severe vascular hemorrhages and will never be used in replacement of generally accepted surgical techniques.

CONCENTRATED PLATELET-RICH PLASMA:[5]

Due to risk of transmission of hepatitis, many marketed fibrin adhesives have been prohibited in the USA since 1978. PRP is a normal autogenous blood clot that contains a highly concentrated number of platelets. Because it is patient's own blood, it is free of transmissible diseases and cannot cause hypersensitivity reactions. The minimum platelet count required for a blood clot to quantify as PRP may be arguable, but a concentration of about 1 million platelets/μL, or about 4 to 7 times the usual baseline platelet count (i.e.2,00,000 platelets/μL) has been shown to provide clinical benefits. A normal blood clot contains 94% red blood cells, 6% platelets and somewhat less than 1% white blood cells. In contrast, a PRP blood clot contains 94% platelets, only 5% red blood cells and 1% white blood cells, this alteration of cellular ratios in the wound blood clot, whereby cells that do not stimulate healing (red blood cells) are replaced by cells that stimulate all phases of healing (platelets). The alpha granules contained in the platelets, whether in a normal blood clot or in a PRP clot, begin degranulating within 10 minutes of clot development and secrete over 90% of their pre-packaged growth factors within 1 hour. The growth factors immediately bind to the transmembrane receptors of osteoprogenitor cells, endothelial cells, and mesenchymal stem cells. They act as mitogens for osteoblast, endothelial cell, and mesenchymal stem cell proliferation. Because of its increased concentration of platelets, the PRP thus initiates a greater, and faster initial cellular response in the bone graft than the normal blood clot. Identifiable osteoprogenitor cell mitosis and capillary buds can be seen as early as 3 days after graft placement.

Technique to obtain cPRP:[4,5]

(i) Venous blood is taken with anticoagulant to avoid platelet activation and degranulation.

(ii) The first centrifugation ("soft spin") allows the blood separation in 3 distinct layers. At the bottom of the tube, the red blood corpuscle constitutes 55% of total volume. At the top of the tube, the acellular plasma layer is mainly made up of circulating plasmatic molecules (in particular, fibrinogen) and low in platelets. It is designated platelet-poor plasma (PPP) and constitutes 40% of total volume. Between the two, an intermediate layer is where platelets concentrations are largely increased. It constitutes only 5% of total volume and presents a characteristic buffy aspect that led to it being called "buffy coat.

(iii) Using a sterile syringe, the practitioner aspirates PPP, PRP, and some red blood corpuscles (which are systematically attracted during the operation). Then the material is transferred to another tube, without anticoagulant.

(iv) Second tube will then undergo another centrifugation, purported to be longer and faster than

the first ("hard spin"). This makes it possible to concentrate platelets at the bottom of the tube and subsequently to obtain once again 3 distinct layers.

- Some residual red blood corpuscles trapped at the bottom of the tube
- Acellular plasma (PPP) for 80% of total volume
- Between the two layers, a buffy layer, or PRP.

(v). At this stage, it becomes easy to collect the PRP. cPRP is then mixed with bovine thrombin and calcium chloride at the time of application, with the help of a mixing syringe. The ACD-A which is used as an anticoagulant in developing PRP inhibits clotting by binding calcium. Therefore, activation of the PRP requires replacement of calcium and initiation of the cascade of blood coagulation. This can be accomplished by adding 5 mL of a 10% calcium chloride ($CaCl_2$) solution to 5,000 units of topical bovine thrombin. Replacing the normal clot that develops in this soft tissue wound with a PRP clot increases the growth factors available to it. Kotsovilis et al conducted a study to find, 'What is the efficacy, with respect to clinical, radiographical and patient-centred outcomes, of combinations of PRP with other therapeutic bioactive agents/procedures, compared with the efficacy of the same agents/procedures without the adjunctive use of PRP in the therapy of periodontal intraosseous defects in patients with chronic periodontitis and found that the specific selection of agents/procedures combined with PRP could be important. Additional research on the efficacy of each specific combination of PRP is necessary.

Pantou et al in their study concluded the beneficial role of PRP alone or combined with the bone graft on periodontal ligament cells in vitro, suggesting that it may be considered as a potential biological approach in periodontal regeneration.[6]

Fabbro et al concluded in systematic review of autogenous platelet concentrates on clinical outcomes of the surgical treatment of periodontal diseases. A significant positive effect of the adjunct of PRP was found for intrabony defects. Such an effect was magnified in studies in which GTR was not used, whereas in studies using GTR, the use of PRP had no adjunctive effect. No effect of the study type was found. No significant effect of platelet concentrates was found for gingival recession treatment in which only studies with a follow-up ≤6 months displayed positive results. No significant benefit of PRP could be demonstrated for furcation treatment. PRP may exert a positive adjunctive effect when used in combination with graft materials, but not with GTR, for the treatment of intrabony defects. No significant benefit of platelet concentrates was found for the treatment of gingival recession.[7]

Yilmaz et al concluded in study that the outcomes of the treatment after PRP/BDX and PPP/BDX applications in intrabony defects are similar. When the platelet counts are taken into consideration, PPP seems to demonstrate similar clinical efficacy as the PRP.[8]

Platelet rich fibrin:[4,9]

PRF was first developed in France by Choukroun et al. This technique requires neither anticoagulant nor bovine thrombin (nor any other gelling agent). It is nothing more than centrifuged blood without any addition. This technology requires a table centrifuge and a collection kit. The PRF protocol is very simple: A blood sample is taken without anticoagulant in 10-mL tubes which are immediately centrifuged at 3000 rpm (approximately 400g according to our calculations) for 10 minutes. The absence of anticoagulant implies the activation in a few minutes of most platelets of the blood sample in contact with the tube walls and the release of the coagulation cascades. Fibrinogen is initially concentrated in the high part of the tube, before the circulating thrombin transforms it into fibrin. A fibrin clot is then obtained in the middle of the tube, just between the red corpuscles at the bottom and acellular plasma at the top. Platelets are theoretically trapped massively in the fibrin meshes. The success of this technique entirely depends on the speed of blood collection and transfer to the centrifuge. Indeed, without anticoagulant, the blood samples start to coagulate almost immediately upon contact with the tube glass, and it takes a minimum of a few minutes of centrifugation to concentrate fibrinogen in the middle and upper part of the tube. Quick handling is the only way to obtain a clinically usable PRF clot.

Pradeep et al conducted a study to explore the

clinical and radiographical effectiveness of autologous platelet rich fibrin (PRF) and platelet rich plasma (PRP) in treatment of intrabony defects in chronic periodontitis subjects. Within the limit of the present study, there was similar PD reduction; CAL gain and bone fill at sites treated with PRF or PRP with conventional open flap debridement. Since PRF is less time consuming and less technique sensitive it may seem as the better among the two.

Pradeep et al concluded in their study that since PRF is less time consuming and less technique sensitive it may seem as the better among the two. However, long term, multicenter randomized, controlled clinical trials will be required to know their clinical and radiographical effects over bone regeneration.[10]

Study done by Eskan et al concluded that there was greater PD reduction, PAL gain, and bone fill at sites treated with PRF with conventional open-flap debridement compared to conventional open-flap debridement alone. However, a long-term, multicentered randomized controlled clinical trial is required to know the clinical and radiographic effects of PRF on bone regeneration.[11]

Reference:

1. Newman MG, Takei HH, Carranza HH. Clinical Periodontology. 10th ed, Philadelphia: Saunders (An imprint of elsevier); 2003.
2. Sembulingum K, Sembulingam P. Essentials of medical physiology. 6th ed, New Delhi: Jaypee Brothers publication; 2012.
3. Kumar V, Cotran RS, Robbins SL. Basic pathology. 5th ed. Boston: W.B. Saunders CO;1992.
4. J Choukroun, A Diss, A Simonpieri, MO Girard, C Schoeffler, SL Dohan, AJJ Dohan, J Mouhyi, DM Dohan. Platelet-rich fibrin (PRF): A second-generation platelet concentrate. Part I: Technological concepts and evolution; Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2006; 101(3): E37-44.
5. Robert E. Marx, Arun K. Garg. Dental and Craniofacial applications of Platelet-rich plasma. 1st ed. Chicago: Quintessence Publishing Co, Inc; 2005.
6. AL Pantou, CE Markopoulou, XE Dereka, H Vavouraki, A Mamalis, IA VrotsosCell and Tissue Banking. The effect of platelet-rich plasma (PRP) combined with a bone allograft on human periodontal ligament (PDL) cells. Cell and Tissue Banking 2012; 13 (1): 81-88.
7. M Del Fabbro, M Bortolin, S Taschieri, R Weinstein. Is Platelet Concentrate Advantageous for the Surgical Treatment of Periodontal Diseases? A Systematic Review and Meta-Analysis. J Periodontol 2011; 82 (8): 1100-11.
8. S Yilmaz, C Kabadayi, SD Ipci, G Cakar, B Kuru. Treatment of Intrabony Periodontal Defects With Platelet-Rich Plasma Versus Platelet-Poor Plasma Combined With a Bovine-Derived Xenograft: A Controlled Clinical Trial. J Periodontol 2011; 82 (6): 837-44.
9. Dohan DM, Choukroun J, Diss A, Dohan SL, Dohan AJ, Mouhyi J, Gogly B. Platelet-rich fibrin (PRF): A second-generation platelet concentrate. Part II: Platelet-related biologic features. E45-50.
10. AR Pradeep, NS Rao, E Agarwal, P Bajaj, M Kumari, SB Naik. Comparative Evaluation of Autologous Platelet-Rich Fibrin and Platelet-Rich Plasma in the Treatment of Three-Wall Intrabony Defects in Chronic Periodontitis: A Randomized Controlled Clinical Trial. J Periodontol 2012, Vol. 83, No. 12, Pages 1499-1507.
11. A Sharma, AR Pradeep. Treatment of 3-Wall Intrabony Defects in Patients with Chronic Periodontitis with autologous Platelet-Rich Fibrin: A Randomized Controlled Clinical Trial. J Periodontol 2011; 82 (12): 1705-12.

Microsurgery-Periodontics magnified!!..

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ABSTRACT :

Microsurgery was broadly defined as surgery performed under magnification provided by microscope. Daniel. R. K. Periodontal microsurgery is defined as refinement in existing basic surgical technique that is made possible by the use of surgical microscopes & subsequent improved visual acuity. In 1992 Shanelec, Tibbetts, Belcher, Nordland and Boudro were amongst those who postulated that the microscope could provide for more precision in periodontal surgery and patients had less pain postoperatively when utilizing microsurgical techniques. Using microsurgery instruments allows the periodontist to make precise, minimally invasive incisions while leaving a sharp wound edge. This improved technique helps limit tissue trauma and promotes faster healing.

Keywords: Periodontitis, Microsurgery, loupes

Introduction:

The word microscope comes from Greek words - MICROS means small; SKOPEIN means to view. Micro-surgery subsequently means surgery with the aid of microscope, in the field of plastic surgery, micro lymphatic surgery, and micro tubular surgery. Microsurgery is not an independent discipline, but is a technique that can be applied to different surgical disciplines. It is based on the fact that the human hands, by appropriate training, are capable of performing finer movements.

Microsurgery was broadly defined as surgery performed under magnification provided by microscope. Daniel. R. K.[1]

Microsurgery was described as a methodology that helps in modification & refinement of existing surgical techniques using magnification to improve visualization that had implications & applications to all specialties. Serafin.[2]

Periodontal microsurgery is defined as refinement in existing basic surgical technique that is made possible by the use of surgical microscopes & subsequent improved visual acuity.

Shanelec and Tibbets[3] 1992, presented a paper at the 78th American academy of periodontology annual meeting, Orlando & proposed that periodontal microsurgery is a natural transition and an extension of surgical principles and techniques by which exceedingly accurate and delicate preparation and atraumatic handling of soft and hard tissue enhances primary wound closure through optical or video magnification.

Evolution of microsurgery:

References to magnification date back 2,800 years, when simple glass meniscus lenses were described in

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Egypt. In 1694, Amsterdam merchant Anton van Leeuwenhook constructed the first compound-lens microscope. Despite early pioneers, it was not until 1952 that operating microscopes were commercially available to surgeon's. By the mid-1960s; surgical microscopy had become the standard of care in otological and ophthalmological surgery.

The history of microsurgery dates from 1922 when Nylen first performed eye surgery under a microscope. At the American College of Surgeons Forum, Jacobson J Suarez[4] in 1960 presented a series of successful small vessel anastomoses with use of the operating microscope. German opthalmologist, Saemisch et al in 1980 introduced simple binocular loupes to opthalmic surgery, later in nineteenth century dentists started using it. That was the origin of microsurgery in dentistry. An article published by Carr et al in 1992 outlines the advantages of using surgical microscope during endodontic procedures. In 1992 Shanelec, Tibbetts, Belcher, Nordland and Boudro were amongst those who postulated that the microscope could provide for more precision in periodontal surgery and patients had less pain postoperatively when utilizing microsurgical techniques.

Belcher[5] wrote an article in 2001 summarizing the benefits and potential usages of the surgical microscope in periodontal therapy. Although Belcher and several other periodontists view the addition of the microscope as an invaluable tool in periodontal therapy, it has been cautiously accepted by the periodontal profession as a whole.

Thus, the growth of the usage of surgical telescopes from a rarity to the norm in general practice increased dramatically from 1980 to 2001. Along these lines, it can be observed that the popularity in microsurgery and its techniques still keeps growing by the day.

Concepts in Microsurgery:

The continuous development of operating microscopes, refinement of surgical instruments, production of improved suture materials and suitable training laboratories have played a decisive role for the world wide establishment of microsurgical technique in many specialities. Kim et al[6] in 2001 reported the microsurgical triad ie. magnification, illumination and instruments; the improvement of which is a prerequisite for improved accuracy in surgical intervention. Without any one of these, microsurgery is not possible.

I) Magnification:

Magnification is the first component of this triad. Understanding it calls for defining the following terms:

The Power of Magnification: This is the ability of the lens to increase the visual size of the object. The power of magnification is usually measured in terms of x. Number of times x denotes the number of times the visual size has been increased. If a magnification is 4 x it means that the object appears 4 times larger.

Working distance of the focal length: It is the distance measured from the eye lens location to the object in vision. The less the amount of space between the object and the magnifier the shorter is the working distance and higher is the power of the microscope.

Field of View: This is the area of the object that can be seen through the microscope. It represents the width and height of the area the practitioner sees while using the magnification device. Higher the magnification, smaller the width of field.

Depth of Field: The distance that a magnifier can be moved from an object and still have the object in focus; the higher the power, the shorter the depth of field.

The most common magnification system used in dentistry is magnification loupes. Loupes are fundamentally two monocular microscopes, with side-by-side lenses, angled to focus on an object. Although loupes are widely used, their major disadvantage is that the eyes must converge to view an image, which can result in eye strain, fatigue, and even vision changes with the prolonged use of poorly fitted loupes. Three types of loupes[7] are commonly used:

- Simple
- Compound
- Prism

Simple Loupes: Simple loupes consist of a pair of single, positive, side-by-side menicus lenses. Such loupes tend to be primitive magnifiers, with limited capabilities. A disadvantage of such loupes is that they are highly subject to spherical and chromatic

aberration, which distorts the image of the object that is being viewed.

Compound Loupes: Compound loupes use converging multiple lenses with intervening air spaces to gain additional refracting power, magnification, working distance, and depth of field. Such loupes can be adjusted to clinical needs without excessive increase in size or weight. Compound lenses can be achromatic, in addition to offering substantially improved optical design. Compound loupes are commonly mounted in or on eyeglasses.

Prism Loupes: Prism loupes are the most optically advanced type of loupe magnification presently available. These loupes actually contain Schmidt or roof-top prisms that lengthen the light path through a series of minor reflections within the loupes, virtually folding the light so that the barrel of the loupe can be shortened. Better magnification, wider depths of field, longer working distances, and larger fields of view are produced by these loupes than other loupe types. The barrel of prism loupes are short enough to be mounted on eyeglasses or a headband, but the increased weight, at magnifications of 3.0 diameters or greater, causes headband mounted loupes to be more comfortable and stable than mountings on glasses. Only the surgical microscope can provide better magnification and optical characteristics than prism loupes.

Surgical Microscope:

The surgical operating microscope offers superior flexibility.

A basic surgical microscope for dentistry should have the following configuration: Kim et al[8] 2001:

- X 12.5 eyepieces with reticule.
- 200- or 250- mm objective lens
- 180 degree inclinable binocular
- Five step manual magnification changer or power zoom magnification changer
- Fibroptic illumination system
- Audiovisual accessories (e.g. video camera)

Advantages of the microscope:

- The most useful overall magnification range X3 to X30.
- Low magnifications (x3 to X8) produce a wider field of view and high focal depth.
- The midrange magnifications (X10 to X16) provide moderate focal depth.
- The high magnifications (X20 to X30) are used only for inspection of fine detail.
- The surgical field can be inspected at high magnification so that minute details of anatomical structures can be identified and managed.
- Surgical techniques can be evaluated.
- Video recordings of the procedure can be used for patient teaching.
- Communication with referring dentists and insurance companies can be improved.
- Video libraries can be made for teaching programs. Video recordings of different surgical procedures and techniques can be effective teaching tools.
- Use of a surgical microscope requires erect posture thus less chances of posture related ailments.

Magnification is determined by the power of the eyepiece, focal length of binoculars, the magnification change factor and focal length of objective lens.

- Eyepiece:

Eyepieces pay an important role in magnification together with the focal length and magnification change factors, they provide the desired magnification of an object. Eyepieces generally are available in powers of X6.3, X10, X12.5, X16 and X20. The viewing side of an eyepiece has a rubber cup, which is turned down if the surgeon wears eyeglasses. Eyepieces also have adjustable diopter settings from -5 to +5.

- Binoculars:

The function of the binoculars is to project an intermediate image into the focal plane of eyepieces. The interpupillary distance is set by adjusting the distance between two eyepieces. Binoculars often come in different focal lengths. When choosing binocular focal lengths, it is important to remember that the longer the focal length, the greater the magnification. Binoculars are available either as straight inclined or inclinable. Straight binoculars are oriented parallel to the optical axis of the microscope, where as inclined

binocular tubes are offset at a 45- degree angle. Inclinable binoculars are adjustable for positions up to and sometimes beyond 180 degrees.

- Magnification Changers:

Magnification changers, located in the head of the microscope, are available as 3 or 5 step manual changers or power zone changers. Power zone changers avoid the momentary visual disruption or jump common to 3 or 5 step manual changers. Magnification changer functions in power zone microscopes are controlled either by manual knobs at the side of the microscope near the objective lens or by foot control.

II) Illumination:

Important consideration in the selection of an accessory lighting source are total weight quality and the brightness of the light, ease of focusing and directing the field of view of the magnifiers, and ease of transport between surgeries.

Shanelec et.al.[3] in 1992 demonstrated that fiber optic illumination /trans illumination is beneficial in removing deposits in moderate to deep pockets. Fiber optic lighting is a standard feature of surgical operating microscopes. Several sources of fibre optic cables can be attached to the handpiece, instrument or loupes.

Most of the manufacturers offer collateral lighting systems or suitable fixing options. These systems may be helpful for higher magnification in the range of 4X and more. Loupes with larger field of view will have better illumination and brighter image than those of narrower field of view.

III) Instruments:

An important characteristic of microsurgical instruments is their ability to create clean incisions to prepare the wound for healing by primary intention. Such incisions are established at 90-degree angles to the surface using a Castroviejo microsurgical scalpel. Several types of ophthalmic knives, such as the crescent, lamellar, blade breaker, sclera, and spoon knife, can be used in the field of periodontics.

- Opthalmic knife:

Ophthalmic knives offer the dual advantages of extreme sharpness and minimal size. Because ophthalmic knives are chemically etched rather than ground, their sharper blades produce a more precise wound edge. Compared with the standard blades commonly used in periodontics, the smaller size of the ophthalmic knives facilitates precision in surgical work.

- Crescent Knife:

The crescent knife can be used for instrasulcular procedures. This knife is designed with a unilateral bevel and measures 2.4 mm x 3.7 mm. It can used in connective tissue graft procedures to tunnel, to prepare the recipient site, or to obtain the donor graft.

- Spoon Knife:

The spoon knife is often used to undermine into the lateral sulcular region in preparation for placement of connective tissue grafts using a sulcular, nonrelief technique. This knife is also beveled on one side, thereby allowing the knife to track through the tissue adjacent to bone.

In addition to ophthalmic knives, several other instruments have been designed for use under a surgical operating microscope. These include forceps, needle holders, retractors, and scissors. Using these smaller instruments under magnification allows surgeons to refine their movements with the end result of enhanced surgical skills. Using microsurgery instruments allows the periodontist to make precise, minimally invasive incisions while leaving a sharp wound edge. This improved technique helps limit tissue trauma and promotes faster healing.

Applications in the field of periodontics:[9,10]

Flap reflection in periodontics, as a basic rule, is to gain exposure of the underlying tissues for whatever surgical procedure the surgeon has in mind. Flaps must be adequate to the clinical situation being treated, and the use of the surgical microscope has introduced the reality of considerably less invasive surgical incisions and flap reflections in periodontics.

It is common to use dual or buccal and lingual flaps, which are often returned to postsurgical positions different from the preoperative positions. By using microsurgical techniques, flap margins and closure can best be controlled by dissection of a uniform thickness periodontal flap that has a scalloped butt-joint margin. This facilitates precise adaptation

of the tissue to the teeth or the opposing flap in an edentulous area (Acland, R.D., 1989)

Applications in mucogingival surgery:[11]

Periodontal mucogingival or plastic surgery, by current meaning, now includes procedures to augment the dimensions of gingival tissue, to gain root coverage, to augment the edentulous ridge, to eliminate the aberrant frenulum, to prevent ridge collapse associated with tooth extraction in which unassisted wound healing would result in poor ridge morphology, to achieve lengthening of the clinical crown of a tooth for restorative purposes and to restore aesthetically important interdental papillae that have been lost. All of these procedures are technique and operator sensitive and therefore tend to have varying therapeutic results Microsurgery provides a predictable means of improving the reliability of the three broad types of gingival transplantation procedures used in treating gingival recession.

References:

1. Daniel R, Terzis J: Reconstructive Microsurgery. Boston, Little, Brown, 1977.
2. Serafin D: Microsurgery: Past, present and future. Plast Reconstr Surg 66:781, 1980.
3. Shanelec D A and Tibbetts LS. A perspective on the future of periodontal microsurgery Periodontology 2000; 1996 : 11 : 56 -64.
4. Jacobson J Suarez E. microsurgery in anastomoses in small vessels. Surg Forum 1960; 9:243.
5. Belcher J. M a perspective of periodontal microsurgery; Int J Periodontics Restorative Dent 2001; 21 :191 -196.
6. Kim.S, Pecora.G, & Rubinstein.R.A. 2001. Comparison of traditional and microsurgery in endodontics. In Color Atlas of Microsurgery in Endodontics. Phildelphia: W.B. Saunders Company, pp.1-12.
7. Shanelec D A: Optical principals of loupes. Calif Dent Assoc J 20:25. 1992.
8. Kim, J.M. (2001) Enhanced visualization during dental practice using magnifying systems. Compending of continuing education in dentistry 19, 595-611.
9. Francetti, L., Del Fabbro, M., Testori, T. & Weinstein, R.L.(2004). Periodontal microsurgery: report of 16 cases consecutively treated by the free rotated papilla autograft technique combined with the coronally advanced flap. International Journal of Periodontics and Restorative Dentistry 24, 272–279.
10. Cortellini, P. & Tonetti, M. (2007). A minimally invasive surgical technique with an enamel matrix derivate in regenerative treatment of intrabony defects: a novel approach to limit morbidity. Journal of Clinical Periodontology 34, 87–93.
11. Cortellini, P. & Tonetti, M.S. (2001). Microsurgical approach to periodontal regeneration. Initial evaluation in a case cohort. Journal of Periodontology 72, 559-569.

Management of palatogingival groove; a case report

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Jayan Jacob Mathew [3]
Anu kuriakose [3]

ABSTRACT :

Palatogingival groove is a developmental anomaly found predominantly in maxillary lateral incisors; which is an important predisposing factor for periodontal destruction of affected teeth. A 29 year old patient presented with a deep pocket, mobility and migration in relation to a palatogingival groove on the maxillary right lateral incisor. After flap reflection, the groove was restored with glass ionomer cement, which is a biocompatible material within the subgingival environment.

Keywords: Palatogingival groove, lateral incisor, glass ionomer cement

Introduction

Palatogingival groove (PGG) or radicular lingual groove is a developmental anomaly that occurs as developmental infoldings of the inner enamel epithelium and Hertwig's epithelial root sheath (HERS), involving primarily maxillary lateral incisors. It presumably represents an aborted attempt to represent an additional root[1].

The groove was first mentioned in a dental anatomy text in 1917, later described by Zeisz Nuckolin (1949). In 1965, Prichard described this as a defect predisposing to the formation of periodontal pockets[2]. Lee et al (1968) named this as the palatogingival groove. Its funnel shaped morphology forms a niche for bacterial plaque and calculus accumulation making it difficult for the patient as well as professional to maintain it plaque-free. Inflammation may thus develop in the periodontal tissues adjacent to the groove leading to the detachment of junctional epithelium, periodontal destruction, pocket formation and alveolar bone loss (Kerezoudis et al, 2003)[3]. Various treatment modalities have been advocated for the treatment of periodontal lesions associated with palato-gingival grooves. They include scaling and root planing, flap curettage, bone grafts, guided tissue regeneration, and use of enamel matrix proteins. The grooves can be eliminated by odontoplasty in the case of shallow ones or by restoring with amalgam, composite, or glass ionomer cements (GIC). Here we report a case of localized periodontitis associated with palatogingival groove in relation to a maxillary lateral incisor and its management.

Case report

A 29 year old female patient presented to the out patient department of Periodontics, with a chief complaint of forwardly placed and loose upper front tooth since 2 years. The tooth was asymptomatic without any history of pain and swelling. Family and medical history were non contributory. No gross asymmetry was found on extra oral examination. On intraoral examination the oral hygiene status was fair. Marginal gingival in relation to the palatal aspect of

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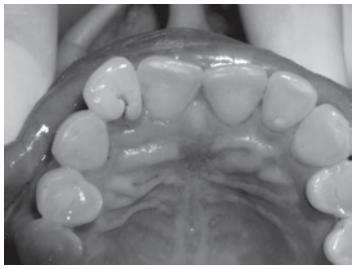

Fig 1: Pre-operative photograph showing palatogingival groove in relation to 12

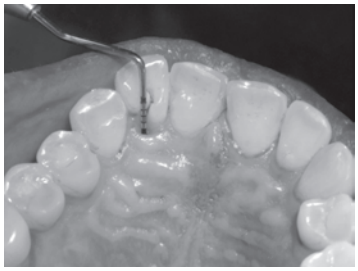

Fig 2: Pre-operative photograph showing 10mm pocket along the groove

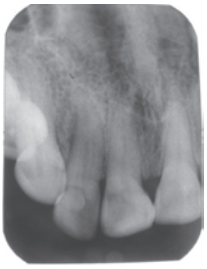

Fig 3: Pre-operative x ray showing pear shaped radiolucency along the distal aspect of the root of 12

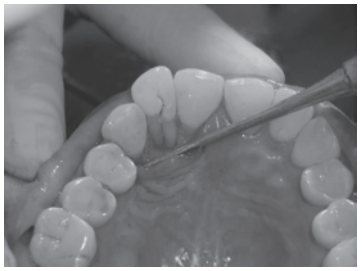

Fig 4: Flap reflection showing the extend of groove

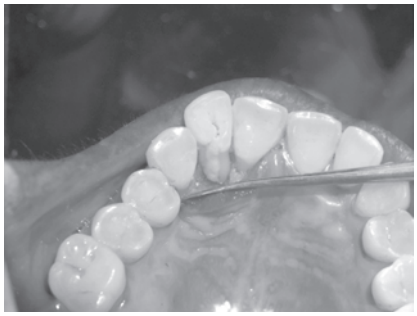

Fig 5: Groove restorated with GIC

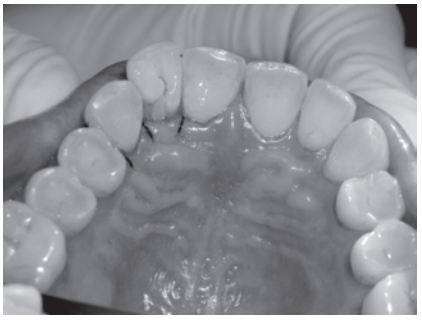

Fig 6: Flap sutured

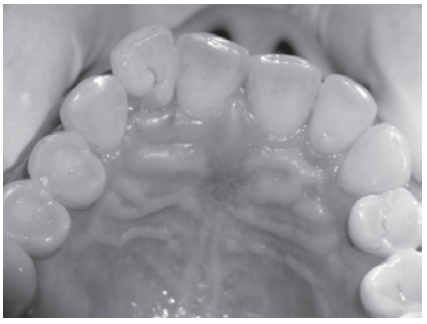

Fig 8: Three months post-operative view

maxillary right lateral incisor (tooth number 12) appeared inflamed. A groove was noticed crossing the cingulum and extending on to the root surface.

Probing revealed a 10 mm pocket extending along the course of the groove. Grade I mobility was present in 12 and the tooth showed mild extrusion and labial proclination. On radiographic examination, a pear-shaped radiolucency was present along the lateral aspect of the root of 12.

In the initial phase of the therapy, thorough scaling and root planing were carried out. In the second visit it was decided to raise a flap to gain access. Following local anesthesia, a full thickness mucoperiosteal flap was reflected on the palatal aspect of the affected teeth. Flap reflection and debridement allowed the complete visualization of the grooves.

The groove extended up to 10 mm on the root surface terminating short of the marginal bone. As the bone loss was horizontal and the groove was too deep to be corrected with odontoplasty, it was restored with GIC. The flap was replaced and sutured and a periodontal dressing was placed.

Postoperatively, the patient was prescribed amoxycyline (500 mg TID for 5 days) and ibuprofen (400 mg thrice daily for 3 days). Chlorhexidine rinses were also advised. The dressing and sutures were removed one week postoperatively. The post surgical healing period was uneventful. The patient was reviewed after first and third month, postoperatively. The third month review showed healthy gingival tissues in relation to the tooth and reduced mobility. Periodontal probing, however, was not attempted.

Discussion

Dysplastic radicular dentin with numerous clefts are often considered to be an important contributing factor for the development of localized periodontitis as it favours the accumulation and proliferation of bacterial plaque deep into the periodontium[4]. The pulp is also affected by bacteria which are situated in the radicular groove. Bacteria and their products may enter the pulp through the accessory foramina and lateral canals situated along the floor or side walls of the

groove. Another route of bacterial invasion into the pulp is via the exposed dentinal tubules on the side of the groove where surface resorption as a result of inflammatory process may occur. Different studies have revealed a prevalence rate for palatal groove of about 2.8 to 8.5%, the most prevalent being the maxillary lateral incisor[5]. Goon *et al.* suggested a classification, which represents two types of PGG, simple and complex. The simple PGG do not communicate with the pulp and represents a partial unfolding of HERS, while complex PGG communicate directly with the pulp and groove that extend the length of the root[6].

The reported long term prognosis of the therapy appears to be related to the apical extension of the groove. Shallow grooves may often be treated successfully while a deep groove presents complex endodontic periodontal problems with a poor prognosis. In the present case periodontal treatment was performed to eliminate the irritants causing inflammatory process. Radiculoplasty was performed to eliminate the groove which often harbors bacteria and debris leading to local inflammatory reaction. Here GIC has been used to seal the defect as it has chemical adhesion to the tooth structure providing good sealing ability[7]. Dragoo et al evaluated the clinical and histologic wound healing responses to GIC in 9 teeth which underwent extraction after periodontal and subgingival restoration procedures. Clinically, the treated teeth exhibited minimal signs of clinical inflammation and gingival recession. Significant decrease in probing depth and gain in clinical attachment were also noted. Histologic evaluation suggested epithelium and connective tissue adherence to GIC[8].

Conclusion

Although the incidence of palatogingival grooves is minimal, we should have an eye to recognize them early and diagnose their extent and pulpal involvement in order to save the patient from further periodontal destruction

References:

1) Simon JH, Glick DH, Frank AL. Predictable endodontic and periodontic failures as a result of radicular anomalies. *Oral Surg Oral Med Oral Pathol.* 1971;31:823–6.

2) Prichard JF. *Advanced Periodontal Therapy*. p14, Philadelphia, W B Saunders Co., 1965

3) Bhatsange A, Japatti S, Attur K. Palatogingival groove: management of an innocuous culprit of a perio-endo lesion. *People's Journal of Scientific Research* 2012; 5: 43-46

4) Kerezoudis N P, Siskos G J, Tsatsas V. Bilateral buccal radicular groove in maxillary incisors: case report. *Int Endod J* 2003; 36: 898-906.

5) Rachana D, Nadig P, Nadig G. The palatal groove: Application of computed tomography in its detection - a case report. *J Conserv Dent* 2007;10:83-8

6) Goon WW, Carpenter WM, Brace NM, Ahlfeld RJ. Complex facial radicular groove in a maxillary lateral incisor. *J Endod.* 1991;17: 244–248.

7) Ballal NV, Jyothi V, Bhat KS, Bhat K M. Salvaging a tooth with a deep palatogingival groove : an endo-perio treatment. A case report. *Int Endod J* 2007;40:808-817.

8) Dragoo M R, Resin ionomer and hybrid ionomer cements; part II Human clinical and histologic wound healing responses in specific periodontal lesions. *Int J Periodontics Restorative Dent* 1997;17: 75-87.

Installation of new office bearers of SPIK 2013

Installation of new office bearers of SPIK for the year 2013 was held at Trivandrum on 21st April 2013. Dr Mini Jose took office as the new president, with Dr Anil Melath as the Honorary Secretary. entire team of office bearers was also present during the occasion.

INAUGURAL PERIODONTAL HEALTH CARE PROGRAM

The inauguration of the periodontal health care activities for this year was held under the joint efforts of SPIK and Government Dental College, Kottayam at 27Anganwadi workers and general public in Ward IX of Ettumanoor Grama Panchayat on 17 May 2013 at 10 AM. Kumari Mohini K.K, Member, Ettumanoor Grama Panchayat presided over the function. The first periodontal health care program was inaugurated by Sri. C K Chandrakumar, Chairman, health standing committee, Ettumanoor grama panchayat.

Dr. Vivek Narayan, periodontal health care coordinator, SPIK welcomed the gathering. Dr. Mini Jose, President SPIK addressed the audience about the activities of SPIK and outlined the programs being planned for health care workers. A health education pamphlet in Malayalam, prepared by the Department of Public Health Dentistry, Government Dental College, Kottayam was released by Dr. Mini Jose. The first copy was handed over to Kum. Mohini KK.

The program was conducted to benefit ASHA workers. Dr. Baiju R M, Associate Professor, Department of Periodontics, Government Dental college, Kottayam delivered the periodontal health awareness class in Malayalam. Dr. Anupa Lucas,

Administrative medical officer, Primary health Center, Ettumanoor graced the occasion and offered felicitations. Smt. Suni, ASHA worker, proposed the vote of thanks.Following the inaugural function, the Department of Public health Dentistry, Government Dental College, Kottayam conducted a free dental screening and treatment camp for the benefit of ASHA & Anganwadi workers and general public. More than 120 patients attended the camp. Primary dental care including dental extraction, temporary restorations, topical fluoride application, etc. was provided to 43 patients using the services of the Mobile Dental clinic, Government Dental College, Kottayam. The camp concluded by 2:30 PM.

INFORMATION FOR AUTHORS

Membership: One of the authors should be either a life member/associate member/affiliate member of SPIK

Manuscripts: Articles should be type written on one side of A4 size (21x28cm) White paper in double spacing with a sufficient margin. One Original and two high quality photostat copies should be submitted. The author's name is to be written only on the original copy and not on the two photostat copies. In addition to the printed version, a CD containing the article file also should be submitted compulsorily. Use a clear and concise reporting style. SPIK reserves the right to edit, manuscript, to accommodate space and style requirements. Authors are advised to retain a copy for the reference.

Title Page: Title page should include the title of the article and the name, degrees, positions, professional affiliations of each author. The corresponding authors, telephone, e-mail address, fax and complete mailing address must be given.

Abstract: An abstract of the article not exceeding 200 words should be included with abbreviated title for the page head use. Abstract should state the purpose of the study, investigations, basic procedures and the main findings.

Tables: Tables should be self explanatory, numbered in roman numbers, according to the order in the text and type on separate sheets of paper like legends for illustrations.

Illustrations: Illustrations should be clearly numbered and legends should be typed on a separate sheet of paper, while each figure should be referred to the text. Good black and white glossy photographs or drawings drawn in black Indian ink on drawing paper should be provided. Photographs of X-rays should be sent and not the original X-rays. Prints should be clear and glossy. On the back of each print in the upper right corner, write lightly the figure number and author's name; indicate top of the photograph with an arrow of word Top' Slides and X-ray photographs should be identified similarly.

Photographs: Author's photograph - Stamp size, Black and White, glossy photographs should be sent along with the article.

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