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JOURNAL OF
CONTEMPORARY DENTISTRY

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Director's Message

I am extremely happy to know of the initiative taken by the MGM Dental College in coming out with a scientific journal, Journal of Contemporary Dentistry.

I congratulate the dean, Mrs. Sabita Ram, the editor-in-chief, Dr. Jyotsna Galinde and the entire editorial team for their efforts.

Scientific deliberation and exchange is the need of the hour and in an age of rapidly changing trends and knowledge that gets updated by the day; keeping abreast through the print format is a must.

It is my hope and earnest desire that this journal serves in meeting that very purpose it was evolved for; of satiating young dental professionals with the scientific bent of mind.

I wish the team the best in their efforts in sustaining and maintaining the quality of its issues in the times to come.

Dr. Sudhir N. Kadam
Medical Director & Trustee
Mahatma Gandhi Mission

Editor's Message

I am extremely delighted with the launch of the Journal of Contemporary Dentistry, MGM Dental College's first scientific literary endeavour.

The Journal would not have seen the light of the day without the forceful initiative and persuasion of our dean Dr. Sabita Ram; she has been keen to see the scientific journal compiled and launched right from the time of her joining the institution.

I wish to extend my gratitude to the senior Associate Editor, Dr. Karandikar and the young enthusiastic members of the Editorial Committee as they have been the backbone of this endeavour, their dedication and diligence towards completion of this journal is much appreciated. We could not envisage starting this journal without also the support and professionalism of all contributors. I would also like to acknowledge the creative genius of Dr. Sachin K. in conceptualizing the cover design.

A special thanks and appreciation to the dynamic Dr. Richard Pereira who has burnt the midnight oil to look into the details of the journal and in compiling and piecing the journal together.

Educating students is part of the college's fundamental mission. But education stretches beyond classrooms and preparing them for careers and professional life remains the constant commitment of a college. This journal will help their personal and professional growth, which helps them succeed in this demanding world.

I would like to express my hearty thanks and gratitude to our director Dr. Sudhir Kadam in believing in the policy of "Educate, Enrich, and Excel" in imparting professional education.

I would like to extend my thanks to reviewers for their expert comments and their time and the entire advisory board for their valuable inputs.

I look forward to a successful first year as Editor-in-Chief and welcome any comments or suggestions you may have that would improve the Journal.

Dr. Jyotsna Galinde
Assoc. Dean, Post Graduate Studies
Prof & Head, Dept. Oral & Maxillofacial Surgery, MGM

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JOURNAL OF
CONTEMPORARY DENTISTRY

General Information

The Journal of Contemporary Dentistry publishes original scientific papers, reviews, case reports, and method presentation articles in the field of dentistry. Original articles are published in all dentistry-related disciplines, all areas of biomedical science, applied materials science, bioengineering, epidemiology, and social science relevant to dental disease and its management. Manuscripts submitted for publication must be original articles and must not have appeared in any other publication. The publisher reserves the right to edit manuscripts for length and to ensure conciseness, clarity, and stylistic consistency, subject to the author's final approval.

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Experimentation involving human subjects will be published only if such research has been conducted in full accordance with ethical principles. Manuscripts must include a statement that the experiments were undertaken with the understanding and written consent of each subject and according to the abovementioned principles, the statement should also state that the protocol was approved by the author's institutional review committee for human subjects or that the study was conducted in accordance with the Helsinki Declaration of 1975, as revised in 2000. Do not use any designation in tables, figures, or photographs that would identify a patient, unless express written consent from the patient is submitted. When animals are involved, the methods section must clearly indicate that adequate measures were taken to minimize pain or discomfort. Experiments should be carried out in accordance with local laws and regulations.

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Should describe significant and original experimental observations and provide sufficient detail so that the observations can be critically evaluated and, if necessary, repeated. Articles considered as original research include, Randomized controlled trials, intervention studies, studies of screening and diagnostic test, outcome studies, cost effectiveness analyses, case-control series, and surveys with high response rate. Up to 2500 words excluding references and abstract.

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The second page should carry the full title of the manuscript and an abstract (of no more than 150 words for case reports, brief reports and 250 words for original articles).The structured abstract, should consist of no more than 250 words and the following four paragraphs:

* *Background:* Describes the problem being addressed.

* *Methods:* Describes how the study was performed.

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* *Conclusions:* Reports what authors have concluded from these results, and notes their clinical implications.

TEXT

Introduction

The Introduction contains a concise review of the subject area and the rationale for the study. More detailed comparisons to previous work and conclusions of the study should appear in the Discussion section.

Materials and Methods

This section lists the methods used in the study in sufficient detail so that other investigators would be able to reproduce the research. When established methods are used, the author need only refer to previously published reports; however, the authors should provide brief descriptions of methods that are not well known or that have been modified. Identify all drugs and chemicals used, including both generic and, if necessary, proprietary names and doses. The populations for research involving humans should be clearly defined and enrolment dates provided.

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ACKNOWLEDGMENTS AND CONFLICTS OF INTEREST

Acknowledgments

At the end of the Discussion, acknowledgments may be made to individuals who contributed to the research or the manuscript

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In the interest of transparency and to allow readers to form their own assessment of potential biases that may have influenced the results of research studies, the Journal requires that all authors declare potential competing interests relating to papers accepted for publication. Conflicts of interest are defined as those influences that may potentially undermine the objectivity or integrity of the research, or create a perceived conflict of interest.

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2) A conflict of interest and financial disclosure form for each author. Conflict of interest information will not be used as a basis for suitability of the manuscript for publication.

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FIGURE LEGENDS

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Statistical methods should be described such that a knowledgeable reader with access to the original data could verify the results. Wherever possible, results should be quantified and appropriate indicators of measurement error or uncertainty given. Sole reliance on statistical hypothesis testing or normalization of data should be avoided. Data in as close to the original form as reasonable should be presented. Details about eligibility criteria for subjects, randomization, and methods for blinding of observations, treatment complications, and numbers of observations should be included. Losses to observations, such as dropouts from a clinical trial, should be indicated. General-use computer programs should be listed. Statistical terms, abbreviations, and symbols should be defined. Detailed statistical, analytical procedures can be included as an appendix to the paper if appropriate.

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Neutrophil Exodus From The Gingival Crevice - A Novel Method of Quantification Using Durapore Filter Strips: A Cross Sectional Study

Sachin Kanagotagi[1], Sudhindra Kulkarni[2]

Abstract

Objectives: Neutrophils play a critical role as a part of the innate immune response.Although neutrophils are primarily protective, they release products partly responsible for the destruction seen in periodontal disease.The techniques presently available for counting neutrophils require special equipment and are only semi-quantitative. The aim of the present investigation was to check the efficacy of a single, rapid, non-invasive assay to enable the expedient quantification of oral neutrophils, and utilize the assay to quantify the number of neutrophils in periodontal disease.

Materials and Methods: Forty five subjects were recruited in the study. They were put into three groups based on the Gingival Index and Russell's Periodontal Index as clinically healthy (Group 1), gingivitis (Group 2) and periodontitis (Group 3). GCF samples were collected using a durapore filter and the number of neutrophils counted using an improved Neubaeur's Chamber.

Results: Neutrophils were present in GCF of all the samples. There was statistically significant difference between the neutrophil numbers in all the samples with respect to severity of periodontal disease. The strength of association was the strongest between probing pocket depth and neutrophil counts.

Conclusion: This study demonstrates that it is possible to collect and quantify oral neutrophils by a single, rapid, noninvasive assay using durapore strips.

Key Words: Neutrophils; dental plaque; saliva; gingival crevicular fluid; Millipore filter.

Introduction

Periodontal disease is defined as an inflammatory reaction to a microbial infection associated with dental plaque that, results in tissue loss. Neutrophils or polymorphonuclear leucocytes (PMNs) play a critical role as a part of the innate immune response acting as a first line of defense against these invading microbes.[1] The presence of leucocytes in the oral cavity has attracted interest for many years.The presence of leucocytes in the oral cavity has attracted interest for many years. Calonius in 1958 compared the salivary leucocyte count in patients with healthy and inflamed gingiva and edentulous patients and found that the levels were least in edentulous patients and highest in patients with gingivitis thus suggesting that leucocytes enter the saliva through the gingival sulcus.[2] This was also confirmed by studies done by Schiott and Loe in1970.[3]

In the healthy periodontium of both humans and experimental animals, PMNs have been demonstrated migrating towards or residing within the sulcular and junctional epithelium and within the underlying connective tissue.[4] With plaque accumulation and the development of clinical inflammation there is an increase in the number of leucocytes present in the lesion.[5,6,7] The location of PMNs at the plaque interface, their phagocytic activity and signs of lysosomal enzyme release give morphological evidence that these cells, may on one hand, protect the tissue from bacterial attack but on the other hand, may induce tissue damage and increased inflammation via release of lysosomal enzymes. Thus, high numbers ofsubgingival leucocytes could possibly indicate an active periodontal lesion.[8] Subgingival leucocyte counts may be useful in identifying sites with active periodontal disease. This is possible if a correlation is established between the clinical measures of disease activity and GCF neutrophil levels.

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Periodontal disease activity is the period of disease exacerbation which shows bone loss, connective tissue loss and inflammatory response. There are various methods that have evaluated periodontal disease activity like enzymatic activity and microbiological testing but they are cumbersome and have low clinical applicability. Efforts to find simpler and easier methods to evaluate disease activity are still elusive.[9]

The idea of using neutrophil quantification to assess periodontal disease activity and the effectiveness of therapy was first proposed by Raeste& Aura in 1978.[10] The detection of neutrophils in a plaque sample would seem to capture the host response to all of the periodontopathogens. This superiority of neutrophils as a diagnostic tool for periodontal disease can be transferred to the clinical setting. There are studies that have correlated the salivary neutrophils and gingival health and GCF neutrophils and periodontal health.[11,12,13,4,14,15] However difficulties can be encountered during quantification procedures such as aggregation of cells during collection, and when using washingtechniques, by partial loss of solution. Thus the aim of the present study was to check the efficacy of a single, rapid, non-invasive assay to enable the expedient quantification of oral neutrophils, and utilize the assay to quantify the number of neutrophils in periodontal disease.

Materials And Methods

This study was conducted in the Department of Periodontics and Oral Implantology, Sri DharmasthalaManjunatheswara College of Dental Sciences and Hospital, Dharwad, Karnataka, India. Forty five subjects (25 females and 20 males) in the age range 20 to 65 years were recruited for the study. Informed written consent was obtained from all subjects and ethical clearance was obtained from the ethical board of this institution. Three groups with 15 subjects each were designated as Group 1 (clinically healthy), as Group 2 (gingivitis) and Group 3 (chronic generalized periodontitis) respectively, according to the Gingival Index (Loe and Sillness, 1963) and Russell's Periodontal Index (1956).[16,17]

Subject inclusion criteria:

1. Subjects with varying degree of periodontal disease. (Healthy, gingivitis and chronic generalized periodontitis).
2. Subjects who were systemically healthy.
3. No invasive periodontal therapy in the past six months.

Subject exclusion criteria:

1. Systemic diseases like diabetes mellitus.
2. Pregnant subjects.
3. Smokers and alcoholics.
4. Presence of disease with possible effects on the immune system like chronic infection or cancer.
5. Treatment with any drugs that might alter PMN number or function.
6. Use of any antibiotics during the study period or in the recent past and subjects who have undergone non-invasive periodontal therapy.
7. Presence of carious lesion or any kind of mucosal ulceration.

A dental and medical history was compiled for all subjects with an oral examination, including caries assessment. Clinical parameters evaluated included Gingival index (Loe & Silness 1965) at four sites per tooth, Russell's Periodontal Index scores, and measurement of probing depth at four sites per tooth. The same investigator performed all data collection and examinations.

Collection of GCF: The gingiva was dried by air and cotton pellets 1minute before sampling and the area isolated by means of cotton rolls. Prior to GCF sampling, supragingival calculus was removed using sterile curette. A 7mm by 2 mm strip of Durapore® filters with a pore size of 0.22 µm (hydrophilic membrane filtersof polyviniiidene di-fiuoride); was placed at the entrance of the sulcus and left in place for 10 seconds (Fig 1). Pooled volume of GCF was collected for healthy subjects and with gingivitis, whereas for periodontitis site samples were collected from sites exhibiting severeinflammation and deepest probing depth. Test sites which did not express anyvolume of GCF and Millipore papers contaminated with blood and saliva were not included in the study.

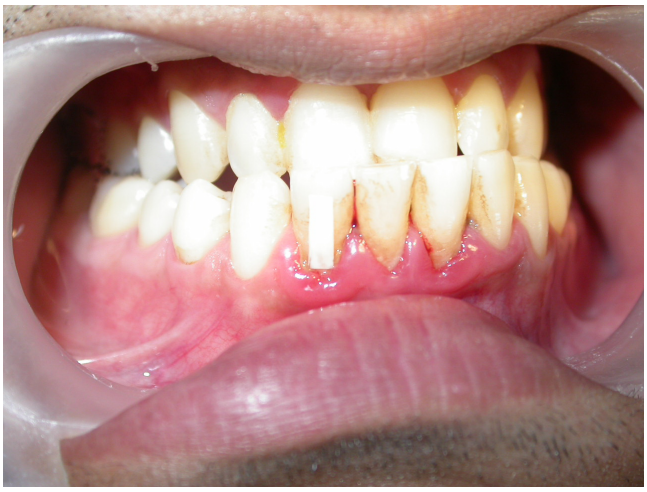

Fig 1: Collection of GCF using Durapore® Filter strip, of dimensions 2mm×7mm

Neutrophil determination:

The strips containing GCF were then inserted and suspended into plastic sealable siliconized tube of polypropylene (Sigma Aldrich, India) containing 40 micro litres (µl) of phosphate buffered saline without calcium (Ca), 3 milli Moles (mM) ethylene diaminetetraacetic acid (EDTA) and 1% bovine serum albumin (BSA), and vortexed for 30 seconds. Twenty

microlitres of this suspension was then withdrawn and stained with 10 ml of Turks solution for ten minutes (Fig 2). Neutrophils were then counted on an improved Neubeur's chamber (Cambridge Instruments Inc., USA) (Fig 3).

Statistical evaluation

The data collected was entered in Microsoft Office Excel Format and statistical analysis was done using Graph pad prism® (Graph pad prism, Graph pad software, Inc. Ver 5.03) One-way analysis of variance (ANOVA) was done to test thesignificant difference between the groups.To determine the correlation between the clinical indices and neutrophil, Carl Pearson correlation analysis along with tests of significance were used.Statistical significance was established at P< 0.05.

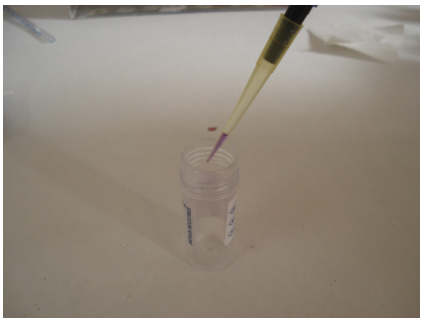

Fig 2: Twenty microlitres of neutrophil suspension withdrawn and stained with 10 ml of Turks solution for ten minutes.

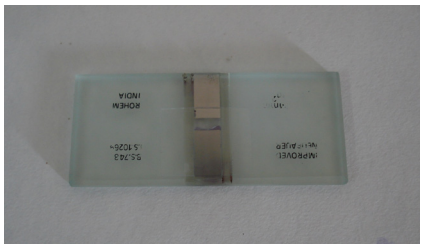

Fig 3: Improved Neubauers chamber

Results

All the samples in each group showed the presence of neutrophils. The highest numbers were in Group 3 and the lowest numbers in Group 1.The number of neutrophils for all the groups for plaque, saliva and GCF is shown in Table 1. One-way ANOVA showed statistically significant difference in the mean neutrophil number in all the groups as shown in Table 2. The results also suggest that the number of plaque, salivary and GCF neutrophils increased from health to gingivitis and to periodontitis in all the samples and it was statistically significant as shown in Figure 1.The clinical indices were correlated with the neutrophil counts and a positive correlation was found between the same as shown in Table 3.

Table 1

Variables	Summary	Groups		
		Healthy	Gingivitis	Periodontitis
Gingival index	Means	0.0650	1.8650	1.7400
	Std.Dev.	0.0272	0.4890	0.4782
Probing depth	Means	1.5100	2.3960	4.2320
	Std.Dev.	0.6535	0.3736	0.8579
Neutrophils	Means	5.6000	13.1000	25.7000
	Std.Dev.	1.4298	2.9609	6.4987

Table 2

SV	DF	SS	MSS	F-value	p-value	Signi.
Between groups	2	2063.4000	1031.7000	58.3492	0.0000	S
Within groups	27	477.4000	17.6815			
Total	29	2540.8000				

Table 3

Variable	neutrophil counts				
	r-value	r^2	t-value	p-value	Signi.
Gingival index	0.7096	0.5035	5.3286	0.0000	S
Probing depth	0.9049	0.8188	11.2470	0.0000	S

Table 4

	Sample	Mean	SD
Health	15	5.6	1.42
Gingivitis	15	13.1	2.96
Periodontitis	15	25.7	6.49

Discussion

The main source of neutrophils in the oral cavity is from those migrating from the gingival sulcus.[2] The results of the present study showed increase in the PMN leucocytes in saliva, GCF as well as in plaque with an increase in severity of periodontal disease. This was verified by a positive correlation seen between the Gingival Index and probing depth and neutrophil counts.This could be attributed to increase surface area of ulcerated epithelium and hence increase in the migration of PMN leucocytes though the ulcerated epithelium.[12] Using neutrophil counts in the GCF to evaluate the periodontal disease activity has been used in earlier studies and has shown a positive correlation with the probing pocket depth.[15] There are a number of ways of collecting GCF for neutrophil estimation. The use of Styroflex strips, might not give accurate results, due to the clumping of the cells.[4] The washing method suggested by Skapski and Lehner in1976, and by Salonen and Paunio in 1991 has a shortcoming that the dilution factor cannot bedetermined accurately and thus not an ideal method.[18,19] The method used in this study is

the one suggested by Andersen and Cimasoni in 1993 and is the most acceptable method for PMN estimation.[15] This requires special millipore filters for the collection of GCF for the analysis of PMN numbers. The previous studies have used only the extracrevicular method of GCF collection and have found good correlation between probing pocket depth and number of neutrophils in GCF inshallow pockets but it failed in deeper pockets. The co-relation analysis in the present study showed strong association between pocket probing depth and PMN numbers in plaque and the strength of correlation was comparable to the that found between PMN numbers in the GCF when sampled intracrevicularly from the site with the deepest probing.This is in tandem with the results of the study by Anderson&Cimasoni in 1993.[15] Despite the tremendous development in microbiologic and immunologic diagnostic markers, most of them failed to show any clinical applicability. Microbiologic markers are fraught with technical difficulties especially when it comes to anaerobic culturing for periodontopathogens and takes time to obtain the results. Collection of gingival biopsy samples for immunologic markers has its own limitations.[20] On the contrary chair side microscopic examination for the quantitative estimation of PMN leucocytes is not plagued by these limitations.

At present the most commonly used diagnostic tool is periodontal probing but it's a one dimensional measurement of a three dimensional space. Also, an error of 1mm will result in 50% error, with the biggest advantage being speed of execution and immediacy of interpretation as compared to other microbiologic or immunologic methods. Periodontal probing provides clinical information regarding pocket depth and configuration, but periodontal pockets go through periods of exacerbation and quiescence. Periods of quiescence are characterized by reduced inflammatory response and reduced amount of bone and little or no loss of bone and connective tissue attachment and the opposite, in periods of activity. Thus it is is important to know current disease activity, which will have an implication on treatment options. These considerations suggest that the advantage of probing though acceptable and irreplaceable in routine periodontal practice is deficient when disease activity is to be evaluated. Hence alternate measures to assess periodontal disease activity can be used based on indicators of inflammatory process[20]. GCF neutrophils could be used to assess the disease activity provided they could be correlated with the probing pocket depth.

Further studies could be directed to develop a chair side color changing agent similar to a disclosing agent that stains neutrophils in plaque which could help screen and monitor periodontitis subjects. Clinicians can use the plaque neutrophils to check the disease activity in subjects on supportive periodontal therapy. This could be further developed for screening of aggressive periodontitis subjects who have quantitative neutrophil abnormality.

Conclusion

This study demonstrates that it is possible to collect and quantify oral neutrophils by a single, rapid, noninvasive assay using duraporestrips. Neutrophils are found in higher numbers in GCF with increased severity of periodontal disease, a finding that reflects the inflammatory nature of the disease process. GCF neutrophils positively correlated with probing pocket depth.

References

1. Van Dyke TE, Vaikuntum J. Neutrophil function and dysfunction in periodontal disease. CurrOpinPeriodontol 1994; 28:19-27.
2. Calonius PEB. The leucocyte count in saliva. Oral Surg1958; 11: 43-6.
3. Schiott CR, Loe H. The origin and variation of number of leucocytes in human saliva. J Periodont Res 1970; 5: 36-41.
4. Attstrom R. Presence of leucocyte in crevices of healthy and chronically inflamed gingivae. J Periodont Res 1970; 5:42-7.
5. Shroeder HE, Graf-de Beer M, Attstrom R. Initial gingivitis in dogs. J Periodont Res 1975;10:128-42.
6. Lindhe J, Rylander H. Experimental gingivitis in young dogs. Scan J Dent Res 1975; 83: 314-26.
7. Payne WA, Page RC, Ogilvie AC, Hall WB. Histological features of initial and early stages of experimental gingivitis in man. J Periodont Res 1975; 10: 51-64.
8. Miller DR., Lamster IB, Chasens AI. Role of polymorphonuclear leucocytes in periodontal health and disease. J ClinPeriodontol 1984; 11: 1-15.
9. Newman MG, Takei HH, Klokkevold PR, Carranza FA Jr., editors. Carranza's Clinical Periodontology.10th edition, St. Louis. Missouri Saunders. Elsevier Inc; 2006:444-5.
10. Raeste AM, Aura A. Rate of migration of oral leucocytes in subjects with periodontitis. Scand J Dent Res 1978; 86: 43-51.
11. Klinkhammer JM, Zimmerman S. Function and reliability of Orogranulocyte Migratory Rate as a measure of oral health. J Dent Res 1969; 48:709-15.
12. Skougaard MR, Klinkhammer JM. Correlation between gingivitis and Orogranulocyte migratory rate. J Dent Res 1969; 48:716-18.
13. Bender JS, Thang H, Glogauer M. Novel rinse assay for the quantification of oral neutrophils and the monitoring of chronic periodontal disease. J Periodont Res 2006; 4: 214-20.
14. Claffey N, Magnusson I, Crigger M, Garret S, Kiger RD, Egelberg J. Subgingival spirochete and leucocyte counts as indicators for response to therapy. J ClinPeriodontol 1985; 12: 639-47.
15. Andersen PE, Cimasoni G. A rapid and simple method for counting crevicularpolymorphonuclear leucocytes. J ClinPeriodontol 1993; 20: 651-55.
16. Loe H, Silness J. Periodontal disease in pregnancy. ActaOdontol Scand. 1963; 21:533-51.
17. Newman MG, Takei HH, Klokkevold PR, Carranza FA Jr., editors. Carranza's Clinical Periodontology.10th edition, St. Louis. Missouri Saunders. Elsevier Inc; 2006:120.
18. Skapski H, Lehner T. A crevicular washing method for investigating immune components of crevicular fluid in man. J Periodont Res 1976; 11: 19-24.
19. Salonen JI, Paunio KU. An intracrevicular washing method for collection of crevicular contents. Scan J Dent Res 1991; 99: 406-12.
20. Aspey DJ, Kaciroti N, LoescheWJ. The diagnosis of periodontal disease in private practice. J Periodontol 2006; 77: 1572-81.

Use of Antibiotics in the Management of Pediatric Dental Conditions – A Retrospective Study

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Abstract

Objectives: In order to evaluate the need of antibiotic use in children for a variety of dental procedures, a retrospective study was undertaken.

Material and Methods: Children as dental patients, a study The records of 100 children between age 2-10 years visiting a pediatric dental clinic for various pulpal and periapical conditions were evaluated. A total of 364 procedures (pulp therapies such as pulpotomy and pulpectomy, and extractions) were carried out in the children for different pulpal and periapical pathologies (irreversible pulpitis, pulp necrosis and periradicular abscess). Timing of the antibiotic cover (preop, intraop and post op), duration of the antibiotic, and type of the antibiotic or a combination was recorded.

Results: Only 19.5% procedures required antibiotic prescriptions. On most occasions, an antibiotic cover given prior to commencement of the treatment was sufficient to prevent the possible advancement of the infection and promote the post-operative healing.

Conclusion: Antibiotics are often not a necessity for the treatment of dental conditions in children. However, a larger sample size and multicentric study would be necessary to establish this finding.

Key Words: Antibiotics, Amoxicillin, Clavulanic acid, Metronidazole, Children, Pulp therapy, Extractions

Introduction

Since the introduction of antimicrobial agents, there has been an association between the antibiotic use and the development of antimicrobial resistance. Antibiotic therapy eradicates not only pathogenic organisms but also the protective normal flora. This so-called "selective pressure" results in colonization of bacteria that are resistant to the original therapy.[1]

To diminish the rate at which the resistance is increasing, health care providers must be prudent in the use of antibiotics.[2]

Bacteria can gain access to the pulpal tissue through caries, exposed pulp or dentinal tubules, cracks into the dentin, and defective restorations. If a child presents with acute symptoms of pulpitis, treatment (i.e., pulpotomy, pulpectomy, or extraction) should be rendered. Antibiotic therapy usually is not indicated if the dental infection is contained within the pulpal tissue or the immediately surrounding tissue unless the child has systemic signs of an infection (i.e., no fever and no facial swelling).[3]

Why the practitioners prescribe antibiotics inappropriately is not known. However, some explanations can be put forward. Firstly, the practitioners may have a poor understanding of the pathological processes involved in pulp and periapical diseases.Furthermore, there could be a lack of knowledge of the indications for effective antibiotic use.[4]

A child presenting with a facial swelling secondary to a dental infection should receive immediate dental attention. Depending on clinical findings, treatment may consist of treating or extracting the tooth/teeth in question with antibiotic coverage or prescribing antibiotics for several days to contain the spread of infection and then treating the involved tooth/teeth.[3]

In order to evaluate the need of antibiotic use in children as dental patients, a study was undertaken with following

Aims and Objectives

1. To assess the preoperative, intraoperative and postoperative need of antibiotics in Pediatric Dental Procedures such as pulp therapies and extractions

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2. To ascertain the preoperative, intraoperative and postoperative need of antibiotics in Pediatric Dental Conditions based upon the diagnosis
3. To evaluate the type or combination of antibiotic/s for the management of Pediatric Dental Conditions based upon the diagnosis

Material and Methods

The records of 100 children between age 2-10 years visiting a pediatric dental clinic for various pulpal and periapical conditions were evaluated. A total of 364 procedures (pulp therapies such as pulpotomy and pulpectomy, and extractions) were carried out in the children for different pulpal and periapical pathologies (irreversible pulpitis, pulp necrosis and periradicular abscess). Timing of the antibiotic cover (preop, intraop and post op), duration of the antibiotic, type of the antibiotic or a combination prescribed, whether the same was complemented with any analgesic was documented. Antibiotics were prescribed only after ascertaining known allergies for a minimum duration of 5 days with a loading dose. Syrups were preferred to tablets or capsules. Vitamin B complex-lactobacilli-zinc supplementation was added to a longer course (more than 5 days). The Table I below shows the prescribed dosages.

Often, a diagnosis was not established and a differential diagnosis was considered at the initial examination before carrying out the actual treatment. Thus, the antibiotic/combination was used to cover or prevent the possible advancement of the infection until a definitive treatment was carried out.

Table I: Drug dosages prescribed

Drug	Dosage	Frequency
Amoxicillin	50mg/kg/day in divided doses	TID
Amoxicillin + Clavulanic acid	50mg/kg/day in divided doses	BID
Metronidazole	30mg/kg/day in divided doses	TID
Cephadroxil 125mg/5ml	30mg/kg/day in divided doses	BID

Often the patients were already receiving an antibiotic either satisfactorily or unsatisfactorily. Hence, the timing, frequency, duration and dosage of the previously prescribed drug and its effectiveness were evaluated before prescribing a new antibiotic or a combination. All chronic intraoral lesions (sinuses, abscesses) were treated with topical Metronidazole. All children were prescribed an analgesic for symptomatic relief (Ibuprofen and/ or Paracetamol).

The results of the study are presented below.

Results

Table II summarizes the diagnoses of the conditions

Table II: Timing of Antibiotic-use based upon the Pulpal Diagnosis

Diagnosis	No.of Teeth Involved	Preop	Intraop	Postop	Total
Irreversible Pulpitis	147	9	-	4	13
Pulp Necrosis	3	1	1	-	2
Periradicular Abscess	31	26	-	3	29
Total	181	36	1	7	44

Table III: Antibiotic/Combination Used based on the Pulpal Diagnosis

Antibiotics	Irreversible Pulpitis	Pulp Necrosis	Periradicular Abscess	Others	Total
Amoxicillin	2	7	7	-	16
Amoxicillin+Clavulanic Acid	4	4	11	-	19
Amoxicillin+Metronidazole	1		5*	-	6*
Amoxicillin+Clavulanic Acid+Metronidazole	2	2	6	-	10
Topical Metrondazole	5	4	10	-	20
Total	14	17	39*	-	71

for which an antibiotic or a combination was prescribed and timing of the prescription. Out of 181 conditions, only 44 conditions were treated with antibiotic/s; out of which 29 were diagnosed as periradicular abscesses, 13 as irreversible pulpitis and 2 as pulpal necrosis. On 36 occasions, the antibiotics were prescribed preoperatively for a condition, once intraoperatively (for a two visit pulpectomy) and on 7 occasions for a post-treatment condition such as swelling.

Table III depicts the type of antibiotic used for the infection based on the diagnosis of pulpal and periapical pathology. It can be seen that the patients with periraducular abscess required the antibiotic/ combination more often than the condition diagnosed as pulp necrosis and irreversible pulpitis. Amoxicillin + Clavulanic acid was the most preferred combination, followed by plain Amoxicillin. The patients who had been receiving Amoxicillin unsatisfactorily were given additional Metronidazole or a combination of Amoxicillin + Clavulanic acid and Metronidazole. All chronic intraoral lesions (sinuses, abscesses) were treated with topical Metronidazole. Only in one case, a patient had been receiving Cephadroxil with Metronidazole satisfactorily, and the same was continued.

Table IV, V and VI report the use of antibiotics in pulpectomy, extractions and in all procedures, respectively. Most often, the antibiotic cover has been provided preoperatively to prevent the possible advancement of the infection until a definitive treatment was carried out. Only once, antibiotic was prescribed intraoperatively for a two visit pulpectomy due to a developed acute apical periodontitis. In the children undergoingpulpectomy in a single visit (out of 181 total cases), only 7 required a post-operative antibiotic for a similar condition. Out of total 183 extractions, only two required post-operative antibiotics for infected wounds and twenty five patients were prescribed provided preoperatively to prevent the possible complication of the infection.

Discussion

The justification of indecisive use of antibiotics on the part of clinicians is a mystery worthy of attention.

It is reported that oral administration of antimicrobial drugs alone produce little or no pain relief within 24 hours and anti-inflammatory analgesics offer poor pain control in pain due to the ravages of dental caries of periodontal disease.5 In the present study, pain was not considered as a sole criterion while prescribing an antibiotic. Rather all the children were prescribed an analgesic for symptomatic relief (Ibuprofen and/ or Paracetamol) and an antibiotic was prescribed only in some conditions topossible advancement of the infection and in a few cases to treat development of infections,

Table IV: Antibiotic-use in Pulpectomy

Pulpectomy	No. of Teeth Involved	Preoperative	Intraoperative	Postoperative	Total
Irreversible Pulpitis	147	9*	-	4	13
Pulp Necrosis	3	1	1	-	2
Periradicular Abscess	31	26	-	3	29
Total	181	36*	1	7	44

*Cephadroxil with Metronidazole combination in one case

Table V: Antibiotic-use In Extractions

Diagnosis	No. of Teeth Involved	Pre-op	Intra-op	Post-op	Total
Pulpal/ Periapical Pathology	179	25	-	2	27
Other Causes	4	-	-	-	-
Total	183	25	-	2	27

Table VI: Antibiotic-use in all procedures

No. of Extractions	No. of Pulpectomies	Total No. Teeth (Prescribed)
183	181	71 (out of 364) 19.5%

postoperatively. It is evident from the present study that the actual dental treatments accounted for the cure of a condition on most occasions.

D W Thomas, J Satterthwaite, E G Absi, M A Lewis & J P Shepherd reported that antibiotics were frequently prescribed without generally accepted criteria and there was wide variation in prescribing. Many patients with dental pain may seek treatment from medical practitioners, prior to, or in place of, definitive dental treatment. Rationalization of antibiotic prescription and the provision of emergency dental treatment is needed.[6] In the present study, only three antibiotics: Amoxicillin, Amoxicillin + Clavulanic acid and Metronidazole were used either solely, or in combination. All chronic intraoral lesions (sinuses, abscesses) were treated with topical Metronidazole. Only in one case, a patient had been receiving Cephadroxil with Metronidazole satisfactorily, and the same was continued. However, the present study does not try to establish any standards for antibiotic use in children.

R W Matthews, J D Peak & C Scully reported that the majority of patients attending the emergency dental clinics had pain, with a large proportion having localized infections either as pulpitis or localized dental abscess. Three quarters of these patients had no surgical intervention and were inappropriately prescribed antibiotics.[5] This is in agreement with the authors of this study that the surgical treatment is the most needed measure to resolve an infectious condition and not the antibiotics alone.

Sweeney LC, Dave J, Chambers PA, Heritage J concluded that better use of diagnostic services, surveillance and improvements in dental education are required now to lessen the impact of antibiotic resistance in the future.[7] The authors of this study endorse this view, too, in order to minimize the antibiotic use in dental conditions in children.

Conclusion

Following are the conclusions of the study:

1. The need of antibiotics in pediatric dental procedures such as pulp therapies and extractions is rare in children (only 19.5% dental procedures required antibiotic cover).
2. Often only a preoperative cover is sufficient to treat a condition. A perioperative cover is not warranted all the time and the need of postoperative antibiotics should base upon development ofpost-treatment symptoms (swelling).
3. Teeth with advanced periapical pathology such as periradicular abscess require to be treated with antibiotics. Rarely, other conditions such as pulp necrosis and irreversible pulpitis (which was not established definitively at the beginning) were treated with antibiotics.
4. The combination of Amoxicillin + Clavulanic acid was preferred in most conditions followed by Amoxicillin alone. Addition of Metronidazole was considered effective due to widened spectrum in case of periradicular abscesses.

From this study, we can conclude that antibiotics are often not a necessity for the treatment of dental conditions in children. An antibiotic cover given prior to commencement of the treatment was sufficient to prevent the possible advancement of the infection and promote the post-operative healing. However, a larger sample size and multicentric study would be able to establish this finding.

References

1. Appropriate Antimicrobial Prescribing: Approaches that Limit Antibiotic Resistance RICHARD COLGAN., JOHN H. POWERS, Am Fam Physician. 2001 Sep 15; 64(6):999-1005.
2. Wilson W, Taubert KA, Gevitz P, et al. Prevention of infective endocarditis: Guidelines from the American Heart Association. J American Dent Assoc 2008; 139(1):3S-24S.
3. Guideline on Use of Antibiotic Therapy for Pediatric Dental Patients AAPD Reference Manual 32 (6) 2010/11.
4. Therapeutics: Are antibiotics being used appropriately for emergency dental treatment?Y M Dailey & M V MartinBritish Dental Journal 191, 391 - 393 (2001).
5. The efficacy of management of acute dental pain R W Matthews, J D Peak & C Scully British Dental Journal 176, 413 - 416 (1994)
6. Antibiotic prescription for acute dental conditions in the primary care setting D W Thomas, J Satterthwaite, E G Absi, M A Lewis & J P Shepherd British Dental Journal 181, 401 - 404 (1996)
7. Antibiotic resistance in general dental practice--a cause for concern? Sweeney LC, Dave J, Chambers PA, Heritage J.J Antimicrob Chemother. 2004 Apr;53(4):567-76

Awareness and Practices of Dental Care Waste Management Among Dental Practitioners In Chennai City

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Abstract

Objectives:

1. To assess the dentist's awareness about dental care waste management.
2. To know the various methods of bio-medical waste disposal practiced by private dental practitioners in Chennai City.
3. To assess the awareness of dentists regarding colour coding of biomedical wastes.

Materials and Methods: A cross sectional questionnaire study was conducted among 250 private dental practitioners selected by simple random sampling.A pretested questionnaire consisting of 28 close ended questions divided into two sections was used.

Results: Out of 250 participants 167(66.8%) were males and 83(33.2%) were females.About 14.8% of the dentists were not aware of the different categories of bio-medical waste generated in their clinic.About 28% of the dentists were not aware of the bio-medical waste management law in India and the same number (28%) were not aware of the colour coding for different types of biomedical wastes.

Conclusion: The present study indicates that the majorities of the dental practitioners were not aware of the different categories of biomedical waste and are not practicing the appropriate method of waste disposal. There is an urgent need for continuing dental education on dental care waste management for the dental practitioners.

Key Words: Awareness, Dental practitioners, Bio-medical waste, Management

Introduction

Bio medical wastes have become a very important source of spreading infections in the society. Hospitals are supposed to be seat of healing, but have become a seat of infection. This is true when it comes to hospital acquired infections which are a frequent picture in those hospitals where health care waste is not managed appropriately.1 Hospital waste is not only infectious but also hazardous and contributes significantly to environmental pollution[2]. It is ironical that we as dental professionals, providing dental care in hospitals and clinics that bring relief to the sick can create health hazards due to improper management of waste generated in those places.[3]

Dental setup is a multidisciplinary system which consumes lot of items for delivery of dental care[2]. With the advances in technology many improved materials have emerged in the recent past. Many chemicals like acrylics, impression materials and mercury used for restorative purposes may have a possible environmental and human health impact if not handled properly. With the increase in demand for dental care, there has been a rapid growth of dental clinics in the recent years and this led to increase in the amount of bio medical waste generated by them.[3]

This has increased the incidence of nosocomial infections and environmental pollution leading to possibility of many diseases. To protect the environment and community from these hazards, the Ministry of Environment and Forest, Government of India issued a notification on Biomedical waste [management and handling] rules 1998 under Environmental [protection] Act.4 So it is the duty of

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every occupier of a hospital or clinic generating biomedical waste to take necessary steps to ensure that such waste is handled without any adverse effect to the human health and environment. Dental health care setups are found to generate both infectious and hazardous waste, so it is the time for us to get oriented, sensitized and trained to manage health care wastes scientifically.[3]

The present study is a humble effort to know the awareness and practices of dental care waste management among dental practitioners in Chennai, so that training modules can be designed for safer and more effective delivery of dental care.

Aim And Objectives

Aim

To study the awareness and practices of Dental care waste management among dentists in Chennai city.

Objectives

1. To assess the dentists awareness about dental care waste management.
2. To know the various methods of bio-medical waste disposal practiced by private dental practitioners in Chennai city.
3. To assess the awareness of dentist regarding color coding of biomedical wastes.

Materials And Methods

An epidemiologic survey was conducted to assess the awareness and practices of bio-medical waste disposal among dental practitioners in Chennai city.

1. Source of data
   The source of data was primary. It was a survey which included a questionnaire among private dental practitioners at various dental clinics in Chennai.
2. Study population
   The survey was conducted among private dental practitioners in Chennai.
3. Ethical clearance
   Ethical clearance was obtained from the Institutional Review Board of MAHER (Meenakshi Academy of Higher Education and Research).
4. Sample size
   A convenience sample of 250 dentists was decided for the study.
5. Sampling methodology
   A simple random sampling is carried out to select the dental practitioners for the study.

Inclusion criteria

1) They should have a private practice.
2) The clinic should be located in Chennai city.
3) They should be registered with IDA Madras branch

Out of 512 dentists registered with IDA Chennai branch, 250 dentists were selected.

6. Collection of data

The study was conducted from August 2009 to December 2009. A specially designed questionnaire consisting of 28 close ended questions divided into two sections is used to assess the awareness and practices of dental care waste management among dental practitioners in Chennai.

The first section of the questionnaire consisted of the questions related to respondent's age, sex, qualification and clinic location. Respondents name was not recorded in order to ensure anonymity. The second section consisted of questions related to the awareness and practices of dental care waste management.

The questionnaire was pilot tested on a small group of dentists who were requested to complete it and to indicate any questions that they found unclear. The qualification of post graduate students who are practicing was considered as BDS.

The dentists were approached personally, the purpose of the study was explained to them and informed consent was obtained. The questionnaire was distributed to them by the investigator and all the questions were explained to avoid any ambiguity. They were assured of the confidentiality of their responses and were requested to give appropriate answers. The filled Questionnaire was collected on the same day or the next day.

7. Statistical analysis

The resulting data was coded and statistical analysis was done using SPSS (Statistical Package for Social Sciences) software version 17.0. Mean is calculated for demographic variables and percentages were calculated for the responses gave by the dentists.

Results

Demographic details

The age of the participants ranged from 23 years to 64 years with the mean age of 33.7 and other demographic details are given in Table 1. Out of 250 participants 167(66.8%) were males and 83(33.2%) were females. 138(55.2%) participants completed post-graduation and 112(44.8%) were under-graduates. Of the participants, 121 (48.4%) had been practicing for less than 5 years, 75 (30 %) from 6-10 years and 54 (21.6%) for more than 10 years.

Table I Demographic details of the participants

Variables	No (%)
Gender	
Male	167 (66.8%)
Female	83 (33.2%)
Qualification	
B.D.S	112(44.8%)
M.D.S	138(55.2%)
No. of years in clinical practice	
1 - 5 years	121(48.4%)
6 - 10 years	75(30%)
> 10 years	54(21.6%)

Dentist's responses regarding awareness of dental care wastes

Table 2 describes the awareness of dental practitioners regarding dental care waste.

About 14.8% of the dentists were not aware of the different categories of bio-medical waste generated in their clinic.

When asked about the category of an extracted tooth 64.8% correctly said that it comes under the category of infected waste.

About 39.6% said they don't know the category of used needles and syringes and only 27.2% correctly said that it comes under category 4(waste sharps).

Only one third (30%) of the dentist correctly said that outdated and contaminated drugs come under cytotoxic waste.

With regard to the question about the category of used cotton and impression materials, 39.2% rightly said that it falls under soiled waste.

About 28% of the dentists were not aware of the bio-medical waste management law in India and the same number (28%) were not aware of the color coding for different types of biomedical wastes.

Only 31.6% correctly said that human anatomical waste should be disposed in yellow color container and 30.4% said they don't know.

When asked about the color coding for disposing sharp wastes, about 28.4% said they don't know and only 26.4% correctly said it should be disposed in blue/ white translucent container.

Figure 1 describes the responses of the dentists regarding the category of developer and fixer solution. Only one third (32%) of the dental practitioners know that it comes under liquid waste.

Table 2 Awareness of dentists regarding dental care waste

Questions	Dentist response (%)
1. Awareness of different categories of bio medical waste generated in the clinic	
a) Yes	213(85.2%)
b) No	37(14.8%)
2. Category of an extracted tooth	
a) Infected	162 (64.8%)
b) Cytotoxic	22 (8.8 %)
c) Infected/cytotoxic	38 (15.2%)
d) Don't know	28 (11.2%)
3. Category of used needles and syringes	
a) Category 1	40 (16%)
b) Category 2	43 (17.2%)
c) Category 4	68 (27.2%)
d) Don't know	99 (39.6%)
4. Category of outdated and contaminated medicines	
a) Chemical waste	97 (38.8%)
b) Cytotoxic waste	75 (30 %)
c) Biotechnological waste	33 (13.2%)
d) Don't know	45 (18%)
5. Category of used impression materials and cotton	
a) Solid waste	65 (26%)
b) Soiled waste	98 (39.2%)
c) Infected waste	58 (23.2%)
d) Don't know	29 (11.6%)
6. Awareness of bio medical waste management law in India	
a) Yes	180 (72%)
b) No	70 (28%)
7. Awareness of colour coding for different types of biomedical waste	
a) Yes	180 (72%)
b) No	70 (28%)
8. Human anatomical waste should be disposed in	
a) Yellow container	79 (31.6%)
b) Red container	73 (29.2%)
c) Blue/white translucent container	22 (8.8%)
d) Don't know	76 (30.4%)
9. Sharp wastes should be disposed in	
a) Yellow container	42 (16.8%)
b) Red container	71 (28.4%)
c) Blue/white translucent container	66 (26.4%)
d) Don't know	71 (28.4%)

The responses of dentists regarding the question about color coding for outdated and contaminated medicines is given in figure 2. About 36% said they don't know and only 34.8% correctly said that it should be disposed in a black container.

Figure 1

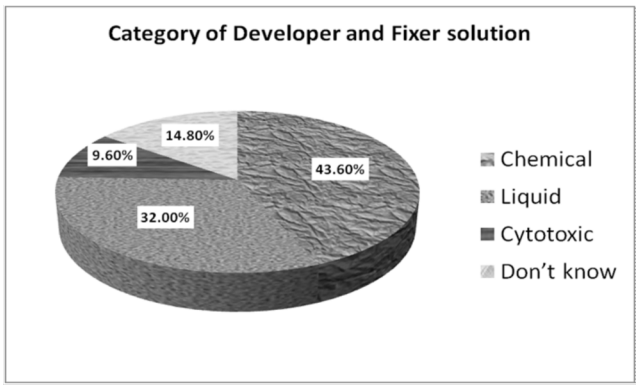
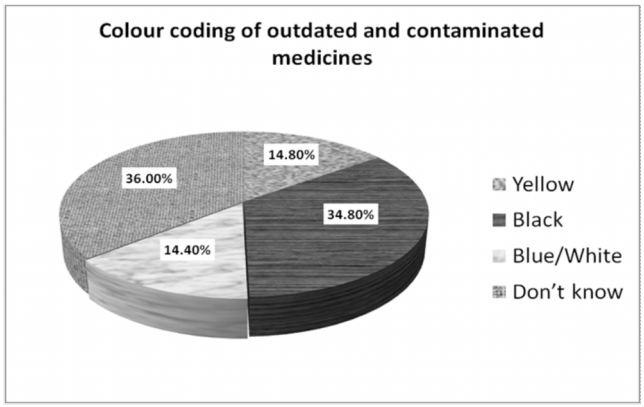


Figure 2



Dentist's responses regarding practices of dental care waste management

Table 3 describes the practices of the dental practitioners regarding dental care waste management. Only 17.6% of the dentists segregated the waste.

About 35.2% of the dentists dispose excess silver amalgam into common bin and 32.8% of them store it in air tight container with water. Surprisingly 17.6% of the dentists' don't use amalgam in their clinical practice and only 2% of them store it in a fixer solution.

To the question regarding the disposal of sharp wastes like needle, 40% said they will break the needle and dispose and only 24.4% use needle burner to destroy it which is the ideal method.

Three fourth (86.4%) of the dentists dispose the developer and fixer solution by letting into sewer, 50.8% of them dilute and led into sewer and only 7.6% return it to the supplier.

Nearly two thirds (69.2%) of the dental practitioners dispose the lead foil in the common bin and only 3.6% sell it to certified buyers.

Exposed x-ray films which can be considered as general wastes are disposed in common bin by 75.6% of the dentists.

Table 3 : Practices of dental care waste management by dentists

Questions	Dentist response (%)
1. Segregation of different types of wastes	
a) Yes	44 (17.6%)
b) No	206 (82.4%)
2. Storage of excess silver amalgam	
a) Dispose to common bin	88 (35.2%)
b) Store in a air tight container with water	82 (32.8%)
c) Store in an air tight container	31 (12.4%)
d) Others (not using/store in fixer)	49 (19.6%)
3. Disposal of infected sharp wastes like needle	
a) Dispose to common bin	83 (33.2%)
b) Break the needle and then dispose	100 (40%)
c) Destroy the needle with needle burner	61 (24.4%)
d) Dispose in a puncture proof plastic bag	6 (2.4%)
4. Disposal of developer and fixer solution	
a) Led into sewer	89 (35.6%)
b) Diluted and led into sewer	127(50.8%)
c) Return it to the supplier	19(7.6%)
d) Others (RVG/no unit)	15 (6%)
5. Disposal of x-ray film lead foils	
a) Common bin	173 (69.2%)
b) Stored and disposed in separate container	53 (21.2%)
c) Sell to certified buyers	9 (3.6%)
d) Others (RVG/no unit)	15 (6%)
6. Disposal of exposed X-ray films	
a) Common bin	189(75.6%)
b) Stored separately and disposed	42 (16.8%)
c) Buried in soil	9(3.6%)
d) Disposed in secured landfill	4 (1.6%)
7. Disposal of orthodontic wires and brackets	
a) Common bin	180 (72%)
b) Deform and disposed	62 (24.8%)
c) Sell to certified buyers	6 (2.4%)
d) Others	2 (0.8%)
8. Disposal of outdated and contaminated medicines	
a) Common bin	170 (68%)
b) Deform and disposed	54 (21.6%)
c) Buried in soil	15 (6%)
d) Disposed in secured landfill	11 (4.4%)
9. Use of colour coded bags for waste disposal	
a) Yes	41 (16.4%)
b) No	208 (83.2%)
10. Final disposal of dental care waste	
a) Corporation bin	224 (89.6%)
b) Certified collectors	26 (10.4%)

72% of the dentists dispose orthodontic wires and brackets in common bin and 24.8% deform and dispose it.

Figure 3

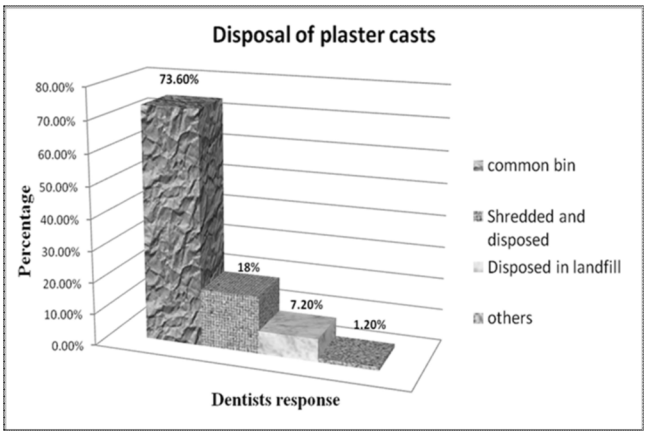
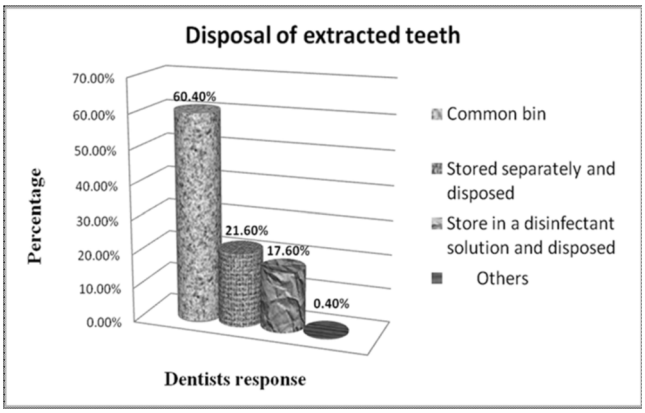


Figure 4



Outdated and contaminated medicines are disposed in common bin by 68% of the dentists and only 4.4% dispose it in secured landfill which is the ideal method.

Only 16.4% of the dentists use color coded bags and about 89.6% of them dispose the dental care wastes into corporation bin.

Figure 3 gives the responses of dentists regarding disposal of plaster casts. 73.6% dispose it to common bin and only 18% shred and dispose.

The response of dentists to the disposal of extracted teeth is given in figure 4. About 60.4% dispose it to common bin and only 17.6% store it in a disinfectant solution and dispose.

Discussion

This study was an effort to investigate dental practitioners' acquiescence with dental health care waste management procedures in Chennai city. The hazards of waste disposal from dental practices can be divided into two main areas. First, there is a wider environmental burden of a variety of hazardous products and second, the more immediate risks of potentially infectious materials that can be encountered by individuals handling the waste.[5] The results of this study provide a valuable insight into correct practices in the dental health care waste management and in the corresponding need for improvements to educate the dentists.

In the present study about 14.8% of the dentists were not aware of the different categories of biomedical waste generated in their clinic which is similar to a study conducted by Sudhir KM et al3 in which 11.1% were not aware.

64.8% said that an extracted tooth comes under the category of infected waste but in the study conducted by Sudhir KM et al[3] in Davangere, only 42.1% said it is an infected waste.

In the present study 72% of the dentists were aware of the biomedical waste management and handling law in India while in a study conducted by Sudhakar Vet al[6] in Bangalore and Kishore et al[7] in New Delhi, only 57.6% and 36% were aware respectively. This shows awareness of biomedical waste management law varies between cities.

When asked about the color coding for different categories of biomedical waste, 28% said they are not aware which is similar to the study conducted in Davangere[3] (27.2% not aware).

Majority of the dentists were actually not aware of the different categories of biomedical waste although 85.2% said they were aware. When subsequent questions were asked about the categories, most of them were not able to answer correctly. The same holds true for the color coding of biomedical waste.

In the present study, about 82.4% of the dentists do not segregate the wastes generated in their clinic which is similar to the study conducted by Sudhir KMet al3 and Issam Al-Khatib et al[8] but in contrast to the study conducted by Sudhakar V et al[6] in which only 35.7% do not practice segregation.

35.2% of the dentists dispose excess silver amalgam into common bin which is similar to the study conducted by Sudhakar V et al[6] and Al-Katib et al[9], but in the study conducted bySudhir KM et al3only 11.3% dispose it into common bin. Among 49 (19.6 %) dentists who marked others, 44(17.6%) were not using amalgam in their clinical practice and only 5(2%) store it in a fixer solution which is the recommended method by ADA. Management includes disposal if amalgam scrap as hazardous waste or more aptly sent to a recycler. Empty amalgam capsules are to be disposed in the garbage. Since amalgam decomposes on heating, it should not be incinerated.[10]

33.2% of the dentists dispose used injection needles into common bin and 40% break the needle and dispose, but in a Study conducted by Treasure et al[5] in New Zealand, only 24.4% dispose it to common

bin. In our study the same 24.4% of the dentists use a needle destroyerto dispose it which is the ideal method. It is of note that in both New Zealand and India there is legislation to ensure the proper disposal of clinical waste.

It was noticed that 50.8% dispose the developer and fixer solution by letting into sewer which is similar to a study conducted by Darwish et al[11] in Palestine. Developer solution does not contain silver so it can be diluted and led into sewer, on the other hand fixer solution contains silver, and if led into sewer it will increase the metal load in the sewer which is not allowed as per environmental protection rules. Spent fixer solution contains approximately 4000 mg of silver per litre.[10] In western countries; they have silver recovery units to reclaim silver. We have to store it separately and hand it over to certified buyers who will extract silver from it.

About 69.2% dispose the x-ray film lead foils into common bin which is not permitted because lead is a heavy metal that affects neurological development and functions. It should not be incinerated nor treated as general waste. It potentially leaches from landfills and can contaminate soil and ground water. Some of the factories may use lead as a raw material for manufacture of batteries but the quantity required is high.[10]

Only 16.8% stored exposed x-ray films separately which is in contrast to the study conducted by Sudhir KM et al[3] in which half (52.9%) of the dentists store it separately. Exposed x-ray films are harmless and can be considered as general wastes.

72% dispose orthodontic wires and brackets in to common bin. According to OSHA (Occupational Safety and Health Administration) regulations, orthodontic wires are considered as sharp wastes because the ends of orthodontic wires can penetrate the skin and their contamination with blood can reasonably be anticipated. So they should be disposed as sharp wastes. Orthodontic brackets should be disposed as recyclable wastes.[12]

In the present study 68% of the dentists dispose outdated and contaminated medicines into common. They are considered as cytotoxic wastes and should be disposed in a secured landfill.[4]

60.4% dispose extracted teeth in common bin. OSHA considers extracted teeth to be potentially infectious material that should be disposed in medical waste containers. Extracted teeth sent to a dental laboratory for shade or size comparisons should be cleaned, surface-disinfected with a hospital disinfectant solution. Extracted teeth used for preclinical exercises should be autoclaved before using because liquid chemical germicides do not reliably disinfect both external surface and interior pulp tissue.[12]

16.4% of the dentists use colour coded bags for waste disposal in their clinic and only 10.4% dispose their dental wastes to certified collectors which is similar to a study conducted by Punchanuwat et al1[3] in Bangkok. Whereas in the study conducted by Sudhakar et al[6] about 33.4% hand it over to certified agencies.

The validity and reliability of questionnaire based surveys can be influenced by design, question content, analysis and response rates. A significant limitation of this study is that only practitioners who are members of IDA Madras branch were included in this representative sample through simple random sampling. The advantage of using a questionnaire as a data collecting method is the possibility of collecting a lot of data from a large number of respondents relatively quickly and inexpensively.[6] One disadvantage is 'recall bias', where the respondent's older experiences influence his/her memory.

Conclusion

The present study indicates that the majorities of the dental practitioners were not aware of the different categories of biomedical waste and are not practicing the appropriate method of waste disposal. Dental health care setups generate number of hazardous wastes that can be detrimental to the environment if not properly managed. We have to address this issue in a practical and meaningful manner. Specialized health care waste management services are available in Chennai but it seems that there is a need for dentists to receive specific information about the availability of these services. Although recommendations can be made to the dental profession to alter their behavior, real improvement is unlikely without changes in legislation and social policy. Safe and effective management of waste is not only a legal necessity but also a social responsibility.

Recommendations

1. There is an urgent need for continuing dental education on dental care waste management for the dental practitioners.
2. Cooperation between dental associations, government-related ministries and authorities needs to be established, to enhance dental waste management practices.
3. Dentists should try to reduce the biomedical waste generation in their clinic because lesser amount of biomedical waste means a lesser burden on disposal work.
4. In New Zealand, widespread publication of a few cases of inappropriate procedures has helped to raise public and professional awareness of the possible consequences of inadequate procedures. The same can be tried in our country also.
5. A nationwide survey of waste management procedures in dental practices is recommended.

References

1. Pushpanjali.K. Dental Health Care Waste and Its Implications. JIAPHD 2004; (4): 8-10.
2. Pushpanjali.K, KH Shaik Hyder Ali, BK Srivatsava. Safe Management of Health Care Waste- A Practical Approach. Journal of Indian Dental Association 2003; 74:29-33.
3. Sudhir KM et al. Awareness and Practices about Dental Health Care Waste Management among Dentists of Davangere City, Karnataka. JIAPHD 2006; (8): 44 to50.
4. Ministry of Forest and Environment. Govt. of India. Bio-medical waste [Management & Handling] rules 1998.India: July 27, 1998.
5. Treasure ET, Treasure P. An investigation of the disposal of hazardous wastes from New Zealand dental practices. Community Dent Oral Epidemiol 1997; 25: 328-31.
6. Sudhakar.V, Janakiram Chandrashekar. Dental health care waste disposal among private dental practices in Bangalore City, India. Int Dent J 2008; 58: 51-54
7. Kishore J, Goel P, Sagar B, Joshi TK. Awareness about biomedical waste management and infection control among dentists of a teaching hospital in New Delhi, India. Indian J Dent Res. 2000; 11(4):157-61.
8. Issam Al-Khatib et al. Dental solid and hazardous waste management and safety practices in developing countries: Nablus district, Palestine. Waste Management & Research 2009; 0: pp. 0734242X09337657v1.
9. Al-Khatib IA, Darwish R. Assessment of waste amalgam management in dental clinics in Ramallah and al-Bireh cities in Palestine. Int J Environ Health Res 2004; 14(3):179-183.
10. Veda Hegde, Kulkarni RD, Ajantha GS. Biomedical waste management. J Oral Maxillofac Path 2007; 11(1): 5-9
11. Darwish RO, Al-Khatib IA. Evaluation of dental waste management in two cities in Palestine. East Mediter Health J 2006;12(2):S217-22
12. United States Department of Labor-Occupational safety and health administration. Dentistry OSHA standards. (Online). Available from: http: //www.osha.gov/SLTC/dentistry/standards.html. (Accessed 3rd July 2009).
13. Punchanuwat K, Drummond BK, Treasure ET. An investigation of the disposal of dental clinical waste in Bangkok. Int Dent J 1998; 48(4):369-73.

Contemporary Management of Patients on Warfarin, Aspirin And Clopidogrel Requiring Dentoalveolar Surgery

Sunil Sidana[1], Jyotsna Galinde[2]

Abstract

Patients with a variety of medical conditions often receive aspirin, warfarin or clopidogrel to prevent complications from atrial fibrillation, thromboembolisms or stroke. Although these medications can be lifesaving; it also can put patients at greater risk of experiencing haemorrhage after dental surgery. Therefore, a decision must be made whether to interrupt or continue anticoagulant treatment in patients undergoing various dental procedures. We have presented a review of this topic, including a brief description of the more commonly encountered anticoagulant and antiplatelet medications and the current recommendations for the surgical management of these patients.

Key Words: Aspirin, warfarin, clopidogrel, dental surgery, extraction, INR

In dentoalveolar surgery, the management of patients who are on aspirin or clopidogrel or warfarin is varied, controversial and frequently anecdote based[1]. Dental clinicians are frequently faced with the question of whether to continue or stop these medications before extraction. Even a significant disparity exists on the same issue among the oral and maxillofacial surgeons who are not up-to-date with the current literature[2]. Some dentists believe that consulting with patients' physicians is the solution to the problem of what to do for patients receiving continuous anticoagulant therapy. It has become common for the practitioner to stop these medications without being aware of the evidence of benefit or risks associated with stopping these medications. **"Simply following a physician's order" is unlikely to be an effective legal defence if the dentist is charged with failure to exercise reasonable professional judgment[3]**. Current evidence based guidelines with regards to management of patients on these medications is as follows.

Warfarin

Patients can require warfarin for various diagnoses, such as atrial fibrillation (AF), pulmonary embolism, myocardial infarction, stroke, deep venous thrombosis(DVT), and antiphospholipid syndrome, or because they have prosthetic heart valves[4-7]. As a vitamin K antagonist, warfarin decreases the coagulation of blood. The anticoagulant effect of warfarin takes 48-72 hours to develop fully, with an estimated duration of action of 2 to 5 days and a reported half-life of 2.5 days[8]. **Thromboembolic events are known to occur when warfarin is discontinued in the perioperative period[9-11].** Management of patients receiving long term oral anticoagulation who require dental extraction is based on an assessment of risks: the risk of procedure related bleeding if anticoagulants are continued measured against the thromboembolic risks if anticoagulants are stopped.

Thromboembolic events are associated with considerable morbidity and mortality. Permanent disability or death occurs in:

- 70% to 75% of patients who experience an arterial thromboembolism (e.g. stroke, myocardial infarction, pulmonary embolism),
- 4% to 10% of patients who have a venous thromboembolism (e.g. deep vein thrombosis).

Patients with heart valve replacements or recurrent thromboembolism (INR target between 3.0 and 4.0) are at the highest risk for serious thromboembolic events if their anticoagulant therapy is temporarily stopped or decreased.

The risk of thromboembolic events if warfarin is discontinued appears to vary from 0.02 to 1%.

Continuing warfarin during dental surgical procedures will increase the risk of postoperative bleeding requiring intervention. **Stopping warfarin is no guarantee that the risk of postoperative bleeding requiring intervention will be eliminated**

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as serious bleeding can occur in non-anticoagulated patients. Most cases of postoperative bleeding can be managed by pressure or repacking and suturing the socket. The incidence of postoperative bleeding not controlled by local measures varies from 0% to 3.8%.

Bleeding complications while inconvenient do not carry the same risks as thromboembolic complications.

The activity of warfarin is expressed using the international normalised ratio (INR). For an individual not taking warfarin a normal coagulation profile is an INR of 1.0.

Published trial data suggests that minor dental surgical procedures can be safely carried out on patients with an INR <4[12]. The consensus from reviews on the management of dental patients taking warfarin is that minor dental surgical procedures should be carried out **without alteration to the patient's warfarin therapy if the INR is within the therapeutic range(INR 2.0 to 4.0)[1-15].**

The INR should be measured prior to dental procedures, ideally within 24 hours before the procedure. For patients who have a stable INR, an INR measured within 72 hours before the procedure is acceptable. Patients presenting with an INR much higher than their normal value, even if it is less than 4.0 should have their procedure postponed and should be referred back to clinician maintaining their anticoagulant therapy.

Antiplatelet Therapy

Antiplatelet therapy has been shown to be effective in decreasing the risk of myocardial infarction and nonfatal stroke among patients with peripheral vascular disease. In contrast, discontinuation of this therapy in high-risk patients has been shown to increase the risk of cardiac complications and death[16-18]. Various medications have been used as antiplatelet therapy. The more common platelet-inhibiting medications include aspirin, clopidogrel, ticlopidine, and dipyridamole.

Aspirin

Aspirin, acetylsalicylic acid, is a nonsteroidal anti-inflammatory drug that exhibits analgesic, antipyretic, anti-inflammatory, and antiplatelet properties. Aspirin has been shown to be powerful secondary prevention agent, reducing the risk of myocardial infarction and ischemic stroke by up to 20% in patients diagnosed with cardiovascular disease[19]. Its mechanism of action involves an irreversible inhibition of the activity of cyclooxygenase-1 and a modification of the enzymatic activity of cyclooxygenase-2. Cyclooxygenase is an enzyme responsible for the conversion of arachidonic acid to prostaglandins, prostacyclin and thromboxane. The irreversible nature of the inhibition of cyclooxygenase is unique to aspirin among its counterparts.

Clopidogrel

Clopidogrel is an antiplatelet drug with a mechanism of action causing irreversible inhibition of an adenosine diphosphate receptor important in promoting platelet aggregation and cross-linking of platelets by fibrin. Clopidogrel is used alone or in combination with aspirin as both have synergistic effect

Aspirin begins irreversibly inhibiting platelet aggregation within one hour of ingestion and clopidogrel within two hours; this lasts for the life of the platelets (7-10 days). The effect is only overcome by the manufacture of new platelets. Complete recovery of platelet aggregation may occur in 50% of cases by day three and in 80% of cases by day four.

Platelet function is commonly assessed using the cutaneous bleeding time test. One study has found that the cutaneous bleeding time test has no role in the prediction of bleeding in the dental setting[20]. The cutaneous bleeding time test should not be used to estimate the haemorrhagic risk in a patient on antiplatelet medication. There is currently no suitable bioassay test sophisticated enough to be used routinely for the monitoring of side effects associated with antiplatelet medications.

Aspirin can double the baseline bleeding time but this may still be within or just outside the normal range. It has been reported that only 20% to 25% of patients using aspirin have an abnormal bleeding time. Clopidogrel is considered a more potent antiplatelet agent and can prolong the bleeding time by 1.5 to 3 times normal[21,22]. Sensitivity to antiplatelet agents varies from one person to another.

Stroke and myocardial infarction have been associated with cessation of antiplatelet medication approximately 10 days before the event. Stopping aspirin prior to surgical procedures may increase the risk of thromboembolic events by 0.005%[11].

Patients taking antiplatelet medications will have a prolonged bleeding time but this may not be clinically relevant. Postoperative bleeding after dental procedures can be controlled using local haemostatic measures in patients taking antiplatelet monotherapy (one antiplatelet agent).

There is insufficient evidence to comment on the bleeding risk if patients take both aspirin and clopidogrel.

Patients are more at risk of permanent disability or death if they stop antiplatelet medication prior to a surgical procedure than if they continue it.

Published reviews of the available literature advise that antiplatelet monotherapy should not be stopped prior to dental surgical procedures.

There is insufficient evidence to comment if patients take both aspirin and clopidogrel.

When patients are taking dual antiplatelet therapy either their interventional cardiologist should be contacted for advice or the patient should be referred to a dental hospital or hospital-based oral/ maxillofacial surgeon.

Planned surgery should ideally be

1. At the beginning of the day- this allows more time to deal with immediate re-bleeding problems.
2. Early in the week- this allows for delayed re-bleeding episodes occurring after 24-48 hours to be dealt with during the working week.
3. A local anaesthetic containing vasoconstrictor should be administered by infiltration or by intraligamentary injection wherever practical.
4. Sockets should be gently packed with an absorbable hemostatic dressing e.g. oxidised cellulose (surgical), or absorbable gelatin sponge (gelfoam), and then carefully sutured. Hemostatic dressings promote and stabilise clot formation by providing a mechanical matrix. Following closure pressure should be applied to the socket(s) by using a gauze pad that patient bites down on for 20 minutes.
5. Efforts should be made to make the procedure as a traumatic as possible and any bleeding should be managed using local measures.
6. For postoperative pain control, generally paracetamol is considered the safest simple analgesic for patients taking warfarin and it may be taken in normal doses if pain control is needed and no contraindication exists.
7. Metronidazole interacts with warfarin and should be avoided wherever possible.
8. Avoid prescribing aspirin and NSAIDs.
9. Tranexamic acid is an antifibrinolytic agent that inhibits the breakdown of fibrin clots. Its primary action is to block the binding of plasminogen and plasmin to fibrin therefore preventing fibrinolysis. It has been used in anticoagulated dental patients as a local hemostatic agent in the form of mouthwash. When used alone with no local hemostatic dressing, tranexamic acid mouthwash reduces postoperative bleeding compared to placebo mouthwash. When used with local hemostatic dressing and suturing, tranexamic acid mouthwash provides little additional reduction in postoperative bleeding[23-26]. 4.8% concentration solution of tranexamic acid mouthwash is commonly used.

Summary

1. The consensus from reviews on the management of dental patients taking warfarin is that patients requiring dental surgical procedures in primary care and who have an International Normalised Ratio (INR) below 4.0 should continue warfarin therapy without dose adjustment.
2. Most cases of postoperative bleeding are easily treated with local measures such as packing with a haemostatic dressing, suturing and pressure.
3. Published reviews of the available literature advise that antiplatelet monotherapy should not be stopped prior to dental surgical procedures.

References:

1. Dodson T: No need to routinely discontinue anticoagulants before dental extractions. Evidence-Based Dentistry (2002) 3, 100 ± 101
2. Ward B, Smith M: Dentoalveolar procedures for the anticoagulated patient: Literature recommendations versus current practice. J Oral Maxillofac Surg 65:1454, 2007
3. American Dental Association, American Academy of Orthopaedic Surgeons. Antibiotic prophylaxis for dental patients with total joint replacements. JADA 1997; 128:1004-8.
4. Sear JW, Higham H: Issues in the perioperative management of the elderly patient with cardiovascular disease. Drugs Aging 19:429, 2002
5. Cunningham LL Jr, Brandt MT, Aldridge E: Perioperative treatment of the patient taking anticoagulation medication. Oral Maxillofac Surg Clin North Am 18:151, 2006
6. Ananthasubramaniam K, Beattie JN, Rosman HS, et al: How safely and for how long can warfarin therapy be withheld in prosthetic heart valve patients hospitalized with a major hemorrhage? Chest 119:478, 2001
7. Solomon JM, Schow SR: The potential risks, complications, and prevention of deep vein thrombosis in oral and maxillofacial surgery patients. J Oral Maxillofac Surg 53:1441, 1995
8. Aldridge E, Cunningham L: Current Thoughts on Treatment of Patients Receiving Anticoagulation Therapy. J Oral Maxillofac Surg 68:2879-2887, 2010
9. Wahl MJ. Dental surgery in anticoagulated patients. Arch Intern Med 1998; 158: 1610-6.
10. Todd DW. Anticoagulated patients and oral surgery. Arch Intern Med 2003; 163: 1242.
11. Kovich O and Otley CC. Thrombotic complications related to discontinuation of warfarin and aspirin therapy preoperatively for cutaneous operation. J Am Acad Dermatol 2003; 48: 233-7.
12. Evans IL, Sayers MS, Gibbons AJ, Price G, Snooks H, Sugar AW. Can warfarin be continued during dental extraction? Results of a randomised controlled trial. Br J Oral Maxillofacial Surg 2002; 40:248±242
13. Wahl MJ. Myths of dental surgery in patients receiving anticoagulant therapy. J Am Dent Assoc 2000; 131: 77-81.
14. Campbell JH, Alvarado F and Murray RA. Anticoagulation and minor oral surgery: should the anticoagulation regimen be altered? J Oral Maxillofac Surg 2000; 131: 131-5.

15. Devani P, Lavery KM and Howell CJT. Dental extractions in patients on warfarin: is alteration of anticoagulant regime necessary? Br J Oral Maxillofac Surg 1998; 36: 107-11
16. Robless P, Mikhailidis DP, Stansby G: Systematic review of antiplatelet therapy for the prevention of myocardial infarction, stroke or vascular death in patients with peripheral vascular disease. Br J Surg 88:787, 2001
17. Sharma AK, Ajani AE, Hamwi SM, et al: Major noncardiac surgery following coronary stenting: When is it safe to operate? Catheter Cardiovasc Interv 63:141, 2004
18. Kapetanakis EL, Medlam DA, Boyce SW, et al: Clopidogrel administration prior to coronary artery bypass grafting surgery: The cardiologist's panacea or the surgeon's headache? EurHeart J 26:576, 2005
19. Lewis HD, Davis JW, Archibald DG, et al: Protective effects of aspirin against acute myocardial infarction and death in men with unstable angina: Results of a veteran's administration cooperative study. N Engl J Med 309:396, 1983
20. Shalom A and Wong L. Outcome of aspirin use during excision of cutaneous lesions. Ann Plast Surg 2003; 50: 296-8.
21. Harder S, Klinkhardt U and Alvarez JM. Avoidance of bleeding during surgery in patients receiving anticoagulant and/or antiplatelet therapy. Pharmacokinetic and pharmacodynamic considerations. Clin Pharmacokinet 2004; 43: 963-81.
22. Madan GA et al. Minor oral surgery without stopping daily low-dose aspirin therapy: A study of 51 patients. J Oral Maxillofac Surg 2005; 63: 1262-5.
23. Sindet-PedersonS,Ramström G, Bernvil S and Blombäck M. Hemostatic effect of tranexamic acid mouthwash in anticoagulant-treated patients undergoing oral surgery. N Engl J Med 1989; 320: 840-3.
24. Zanon E, Martinelli F, Bacci C, Cordioli GP and Girolami A. Safety of dental extraction among consecutive patients on oral anticoagulant treatment managed using a specific dental management protocol. Blood Coagul Fibrinolysis 2003; 14: 27-30.
25. Blinder D, Manor Y, Martinowitz U and Taicher S. Dental extractions in patients maintained on continued oral anticoagulant, comparison of local hemostatic modalities. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1999; 88: 137-40.
26. Blinder D, Manor Y, Martinowitz U and Taicher S. Dental extractions in patients maintained on oral anticoagulant therapy: Comparison of INR value with occurrence of postoperative bleeding. Int J Oral Maxillofac Surg 2001; 30: 518-21.

Review Article

Oral Submucous Fibrosis – Review of Literature

Varun Bhatia[1], Rohit Gadda[2], Rohini Salvi[3], Atul Patil[4] and Varsha Patel[5]

Abstract

Oral submucous fibrosis (OSMF) is a crippling disorder which is confined almost exclusively to the Indian subcontinent. The available epediomological data showed clear cut geographical and ethnic predisposition, which suggested that certain customs/ habits prevalent among the population groups in the south-east asia might be etiological factors. Despite its association with a significantly increased risk of cancer, the etiology is still not clear. More research is needed to elucidate the problem.

Key Words: Oral submucous fibrosis, Review

Introduction

Submucous fibrosis is an insidious chronic disease affecting any part of oral cavity and sometimes the pharynx.[1] Occasionally it is preceded by and/or associated with vesicle formation[2] and is always associated with juxtaepithelial inflammatory reaction followed by progressive hyalinization of lamina propria[3]. The latter sub epithelial and submucosal fibrosis leads to stiffness of oral mucosa and deeper tissues with progressive limitation in opening of the mouth and protrusion of the tongue, thus causing difficulty in eating, swallowing and phonation.[4] Epithelial atrophy is marked in advanced stage of disease.

In 1956, Paymaster[5] described the development of a slow-growing squamous cell carcinoma in one-third of his patients with submucous fibrosis at the Tata Memorial Hospital in Bombay. In contrast to this, Sirsat & Khanolkar[6] remarked that this observation was not borne out by their experience.

Geographical Distribution And Prevelance

A community-based epidemiological survey in three areas of India (north and south) recorded the following prevalence's of OSMF: 0.36% in Emakulam, Kerala, and 0.04% in Srikakulam district of Andhra Pradesh (both in the south), and 0.16% in Bhavnagar, Gujarat (in the north).[7] An epidemiological assessment of the prevalence of OSMF among Indian villagers based on baseline data recorded a prevalence of 0.2% (n = 10 071) in Gujarat, 0.4% (n = 10 287) in Kerala, 0.04% (n = 10 169) in Andhra Pradesh, and <0.07% (n = 20 388) in Bihar. The prevalence among 101 761 villagers in the state of Maharashtra (central India) was 0.03%.8

Diagnosis

Various investigators have correlated the salient clinical and histological features of this condition. The onset is insidious over a 2 to 5-year period.[9] The prodromal symptoms include a burning sensation in the mouth when consuming spicy food, appearance of blisters especially in the palate, ulcerations or recurrent generalized inflammation of the oral mucosa, excessive salivation, defective gustatory sensation, and dryness of the mouth. There are periods of exacerbation manifested by the appearance of small vesicles in the cheek and palate. The intervals between such exacerbations vary from three months to one year. Focal vascular dilatations manifest clinically as petechiae in the early stages of the disease.[10] This may be part of a vascular response due to hypersensitivity of the mucosa towards some external irritant like chilli or areca nut.11 Petechiae were observed in about 22% of OSMF cases, mostly on the tongue followed by the labial and buccal mucosa with no sign of blood dyscrasias or systemic disorders; histologically they revealed a slightly atrophic epithelium with numerous dilated and blood-filled capillaries juxta-epithelially.[12]

As the disease progresses, the oral mucosa become blanched and slightly opaque, and white fibrous bands appear. The buccal mucosa and lips may be

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affected at an early stage although it was thought that the palate and the faucial pillars are the areas involved first. The oral mucosa is involved symmetrically and the fibrous bands in the buccal mucosa run in a vertical direction. The density of the fibrous deposit varies from a slight whitish area on the soft palate causing no symptoms to a dense fibrosis causing fixation and shortening or even deviation of the uvula and soft palate. The fibrous tissue in the faucial pillars varies from a slight submucosal accumulation in both pillars to a dense fibrosis extending deep into the pillars with strangulation of the tonsils. It is this dense fibrosis involving the tissues around the pterygomandibular raphe that causes varying degrees of trismus.[13]

The exact site and extent of the fibrosis and its role in the causation of trismus are determined by several factors. For example, the anatomical and physiological integrity of the underlying musculature is vital for the degree of mouth opening. Based on electron microscopical observations El Labben et al.[14] reported muscle degeneration in OSMF, the extent of which may significantly affect the already existing trismus in these patients. Equally important is the involvement of the pterygomandibular raphe, a site commonly reported to accentuate the extent of trismus. Another factor is the duration of the disease in the affected individuals, which depends on the subjective evaluation of signs and symptoms. Current views of a protracted and insidious onset of the disease and its very slow progression make any sort of objective diagnostic criterion difficult, at least in the earlier stages.

A factor which seems to be overlooked by many investigators while recording the extent of mouth opening is the acuteness of oral symptoms (persistent/ recurrent stomatitis and glossitis) at the time of recording. Most investigators agree that in OSMF the patient experiences a protracted period of stomatitis and/or glossitis with remissions and exacerbations, which must be taken into consideration, together with the age of the patient and the extent and site of fibrosis, when recording the extent of trismus. Sometimes the fibrosis spreads to the pharynx and down to the pyriform fossae. Upon palpation, a circular band can be felt around the entire rima oris, and these changes are quite marked in the lower lip.[15] All observers have noted impairment of tongue movement in patients with advanced OSMF, but only some have registered an atrophy of the tongue papillae. With progressing fibrosis, patients complain of stiffening of certain areas of the mucosa leading to difficulty in opening the mouth, inability to whistle or blow out a candle, and difficulty in swallowing. When the fibrosis involves the pharynx, the patient may experience referred pain in the ear. Millard[16] mentioned a nasal voice as one of the later signs in some patients.

Clinical and functional staging[17]

Clinical stage

1. Faucial bands only
2. Faucial and buccal bands
3. Faucial, buccal, and labial bands

Functional stage

A. Mouth opening ? 20 mm
B. Mouth opening 11-19 mm
C. Mouth opening? 10 mm

Precancerous Nature Of The Condition:

The precancerous nature of OSMF was first postulated by Paymaster[5], who described the development of a slow-growing squamous cell carcinoma in one third of OSMF cases seen in the Tata memorial Hospital, Bombay. The frequency of malignant change in patients with OSMF ranges from 3% to 6%.

Treatment

Usually drug treatment was used when patients were at an early stage, and surgical treatment was preferred in patients at an advanced stage or when a lesion was circumscribed. However, the high recurrence rate of restricted mouth-opening, complications after surgical procedures, and the limited indications meant that surgical treatment cannot be considered popular among patients. After several decades of clinical trials, some drugs proved to be partially effective for relieving patients of the symptoms and signs of OSF.

Steroids

Steroids, and especially glucocorticoids, were first used in the treatment of OSF, and were extensively used in the past several decades because of their anti-inflammatory property. Several glucocorticoids were used, such as short-acting drugs (hydrocortisone), intermediate- acting drugs (triamcinolone), and long-acting drugs (betamethasone and dexamethasone). Glucocorticoids exert their anti-inflammatory activity by inhibiting the generation of inflammatory factors and increasing the apoptosis of inflammatory cells. They partially relieved patients of their symptoms at an early stage of OSF, as confirmed in many studies. They were less useful in reversing the abnormal deposition of fibrotic tissues and recovering the suppleness of the mucosa, and thus this treatment was always associated with a high incidence of relapse.[18-19]

Enzymes

According to several studies, a prominent characteristic of OSF is its abundant and abnormal accumulation of collagen fibres in the lamina propria and submucosa of the oral mucosa, including muscle fibres and salivary glands. Collagenase is a lysosomal enzyme, capable of degrading phosphate esters, proteins, polysaccharides, glycosides, and sulphate esters. In a controlled clinical trial, Lin and Lin20 found that intralesional injections of collagenase resulted not only in significant improvement in mouth-opening, but also in a striking reduction of hypersensitivity to spices, sour, cold, and heat. Further study found that hyaluronidase could ameliorate the symptoms and signs of OSF by depolymerising hyaluronic acid, which is the ground substance in connective tissue, lowering the viscosity of the intercellular cement substance, and decreasing collagen formation.[21]

Antioxidants

Gupta et al[22] found that after 6 weeks of treatment with tablets containing mostly _-carotene and vitamin E, patients showed an effective increase in mouth opening and tongue protrusion. Moreover, the decrease in mean malondialdehyde level (a marker of free radical damage) and the increase in levels of carotene after treatment were found to be statistically significant (P _ .01 and P _ .001, respectively), and these factors may play an important role in treatment. Kumar et al[23] studied the effects of lycopene soft gels in the treatment of OSF by RCT. Their results indicated that lycopene was more efficacious in improving mouth opening in patients and reducing associated symptoms than was placebo treatment (P _ .001). They attributed this curative effect to an inhibition of abnormal fibroblasts, up-regulation of lymphocyte resistance to stress, and a suppression of the inflammatory response.

Vitamins And Minerals

Vitamins and microelements are essential in the normal metabolism of organisms. Some studies regarded deficiencies in vitamins and minerals as promoting the initiation and development of OSF.[24] Numerous studies used vitamins as a standard or adjunct therapy, and vitamins partially accelerated ulcer healing and relieved symptoms such as burning sensations and intolerance of spicy food.[25] Generally, in the long run, no satisfactory results were achieved through treatment with vitamins alone.

Conclusion

Several therapeutic and surgical methods have been tried in the treatment of submucous fibrosis. Following therapy the oral mucosa should regain and retain its normalcy, and there should be a reduction in the risk for oral cancer. However, no such definitive and widely accepted treatment is currently available for this condition. Some temporary relief from the symptoms and improvement in the oral opening with medicinal treatment such as local injections of cortisone, enzymes and placentrex, has been observed. In view of the lack of availability of curative treatment, and the precancerous nature of this disease, it is essential to follow-up the patients regularly. Furthermore, they must be educated to discontinue the use of areca nut and tobacco in any form, with the aim of preventing further progress of the disease and perhaps reducing the risk of oral cancer.

References

1. Lemmer J, Shear M, Oral submucous fibrosis: a possible case in a person of Caucasian descent, Br Dent J; 1967, 122: 342-346.
2. Pindborg JJ, Singh B. Formation of vesicles in oral submucous fribrosis. Acta Path. Microbiol. Scand, 1964; 62: 562-566.
3. Sirsat SM, pindborg JJ, Subepithelial changes in Oral submucous fibrosis. Acta Path. Microbiol. Scand, 1967; 70: 161-173.
4. Wahi PN et al, Submucous fibrosis of oral cavity: histopathological studies, Br. J. Cancer. 1966; 20: 676-687.
5. Paymaster JC. Cancer of the buccal mucosa: a clinical study of 650 cases in Indian patients. Cancer, 1956, 9: 431-435.
6. Sirsat, S. M. & Khanolkar, V. R. (1962) Indian J. med. Sci., 16, 189-197.
7. Gupta PC et al. Incidence rates of oral cancer and natural history of oral pre-cancerous lesions in a 10- year follow-up study of Indian villagers. Community dent. Oral epidemiol., 1980, 8: 287-333.
8. Mehta FS et al. An epidemiologic study of oral cancer and pre-cancerous conditions among 101 761 villagers in Maharashtra, India. Ind. j. cancer, 1972, 10: 134-141.
9. Pindborg JJ, Sirsat SM. Oral submucous fibrosis. Oral surg. oral med. oral pathol., 1966, 22: 764-779.
10. Pindborg JJ et al. Incidence and early forms of oral submucous fibrosis. Oral surg. oral med. Oral pathol., 1980, 50: 40-44.
11. Canniff JP, Harvey W. The aetiology of oral submucous fibrosis: the stimulation of collagen synthesis by extracts of areca nut. Int. j. oral surg., 1981, 10: 163-167.
12. Bhonsle RB et al. Focal vascular dilatations and petechiae in oral submucous fibrosis. Scand. j. dent. res., 1981, 89: 270-274.
13. Bhonsle RB et al. Regional variations in oral submucous fibrosis in India. Community dent. Oral Epidemiol., 1987, 15: 225-229.
14. El-Labban NG, Canniff JP. Ultrastructural findings of muscle degeneration in oral submucous fibrosis. J. oralpathol., 1985, 14: 709 717.
15. Mani NJ. Studies on oral submucous fibrosis. IV. Connective tissue changes. J. Oral Med., 1977, 32: 70-74.
16. Millard PR. Submucous fibrosis. Br J dermatol., 1966, 78: 305-307.
17. Haider SM, Merchant AT, Fikree FF, Rahbar MH. Clinical and functional staging of oral submucous fibrosis. Br J Oral Maxillofac Surg (2000) 38, 12-15

18. Lai DR, Chen HR, Lin LM, et al: Clinical evaluation of different treatment methods for oral submucous fibrosis. A 10-year experience with 150 cases. J Oral Pathol Med 24:402, 1995.
19. Xiaowen Jiang, Jing Hu Drug Treatment of Oral Submucous Fibrosis: A Review of the Literature J Oral Maxillofac Surg 67:2009 1510-1515.
20. Lin HJ, Lin JC: Treatment of oral submucous fibrosis by collagenase: Effects on oral opening and eating function. Oral Dis 13:407, 2007.
21. Gupta D, Sharma SC: Oral submucous fibrosis-A new treatment regimen. J Oral Maxillofac Surg 46:830, 1988.
22. Gupta S, Reddy MVR, Harinath BC: Role of oxidative stress and antioxidants in aetiopathogenesis and management of oral submucous fibrosis. Indian J Clin Biochem 19:138, 2004
23. Kumar A, Bagewadi A, Keluskar V, et al: Efficacy of lycopene in the management of oral submucous fibrosis. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 103:207, 2007.
24. Anuradha CD, Devi CS: Serum protein, ascorbic acid and iron and tissue collagen in oral submucous fibrosis-A preliminary study. Indian J Med Res 98:147, 1993.
25. Borle RM, Borle SR: Management of oral submucous fibrosis: A conservative approach. J Oral Maxillofac Surg 49:788, 1991.

Review Article

Resilon-Epiphany Obturation System

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Abstract

For over hundred years Gutta Percha (GP) has been the most common material used for the obturation of the root canal. GP was the standard with which newer materials were tested. GP fulfills all the characteristics of an ideal root canal filling material, but has a disadvantage of not being able to seal the root canal on its own and requires a sealer for providing an effective seal. In an attempt to overcome this draw back a new root canal filling material was introduced, called, Resilon which is a thermoplastic synthetic polymer-based root canal filling material and Epiphany being the sealer. This material has the ability of forming a Monoblock with the root canal. The properties of this material has been studied, it has shown promising results and has emerged as a alternative to GP.

Key Words: Root Canal, Obturation, Resilon, Epiphany, Monoblock.

Introduction

Obturation is an important step during root canal treatment, which aids in the periapical healing and prevents further spread of disease. The root canal filling material fulfills this by reducing microleakage and sealing off any inflammatory irritants. The effectiveness of a material to adequately seal the root canal space is established by its physical properties and handling characteristics.

Gutta-Percha has been the choice of root canal filling material for over hundred years, as it possesses many favorable properties, which includes biological compatibility, dimensional stability, pliability, easy placement and removal and radiopacity[1].GP has universally been accepted as the gold standard for root canal filling material, but it does have one of its disadvantages, of not being able to adhere to the walls of the root canal and requires a sealer for obtaining an effective seal. The poor sealing ability of GP could be one of the causes for the failure of root canal treatment. There has a been a quest for an alternative root canal obturating materials, which could bond to the walls of the root canal and provide an effective seal against microleakage. Thus in the early 2000s a resin based thermoplastic root canal filling material based on a biodegradable synthetic polyester, called Polycaprolactone, was marketed as Resilon, to be used in conjunction with its sealer called Epiphany, both by Pentron Clinical Technologies, Wallingford [CT] US), called the Resilon-Epiphany System (RES) was developed, which claimed to overcome the limitations of GP. This material was developed in an attempt to create an adhesive bond between the solid core material and the sealer thus reducing microleakage[2,3].

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Composition

Resilon (Resilon Research LLC, Madisson CT) consists of polyester, difunctional methacrylate resin, bioactive glass and radiopaque fillers of bismuth oxychloride and barium sulfate, these fillers constitute approximately 65% of the composition. This Resilon is the core material, which according to the manufacturer is very similar to GP. The Resilon performed, handled and looked like GP cones. Standardized non standardized accessory Resilon points and pellets, are available for use with Obtura II (Obtura/Spartan, Fenton [MO], US) injectable system. Resilon can be used with cold or warm obturation techniques and softened by solvent like chloroform and is radiopaque.

A Sealer system is supplied along with Resilon called Epiphany. It consists of a primer and a low viscosity resin composite. The Epiphany primer is an aqueous self-etching primer contains 2-hydroxyethylmethacrylate (HEMA), a sulfonic acid-terminated functional monomer, and a polymerization initiator. The Epiphany root canal sealer, is a dual-cured, low viscosity resin composite consisting of a mixture of bisphenol A-digilycidyldimethacrylate (Bis-GMA), ethoxylated Bis-GMA, urethane dimethacrylate (UDMA), hydrophilic difunctional methacrylates, and filler particles which is a mixture of calcium hydroxide, barium sulfate, barium glass and silica. Fillers constituted more than 50% of the material by weight[3]. The material can be cured coronally for 40 seconds, using a curing light and is capable of providing an immediate seal at the canal orifice, so as to achieve on-demand curing. If not light activated,

this resin sealer self-cured in approximately 30 to 60 minutes[2,3].

Commercial sealers available for Resilon are methacrylate based. Examples include Epiphany (Pentron Clinical Technologies, Wallingford [CT] US), RealSeal (Sybron-Endo, Orange [CA], US).SimpliFill (Lightspeed, San Antonio [TX], US). InnoEndo (Heraeus-Kulzer, Armonk [NY] US).

Technique of Obturation

a. Following cleaning and shaping procedure of the root canal an appropriate size master is selected, verified by the visual, tactile and radiographic method.
b. Choice of irrigant during the procedure would be Sodium Hypochlorite (NaOCl). It should not be the last rinse as NaOCl interferes with the bonding of the resin sealer to the dentin and results in decreased bond strength[9].
c. Use of 17% Ethylene di-amine Tetra Acetic acid (EDTA), followed by sterile water or 0.2% Chlorhexidine gluconate (CHX) should be used as the final irrigant.
d. After blot drying the root canal with sterile absorbent points, the self etch primer is used to condition the root canal walls and prepare them for bonding to the resin sealant.
e. Two or three drops of the primer are placed in the canal using a pipette, a syringe or a sterile absorbent point.
f. The excess primer is removed with the help of a dry sterile absorbent point.
g. The resin sealer is dispensed onto a mixing slab and the viscosity is adjusted using the thinning resin.
h. The sealer is applied using a sterile absorbent point, Resilon point or lentulo spiral.
i. The root canal is then obturated using lateral compaction, warm vertical compaction or thermoplastic injection method.
j. The coronal surface of the material is light cured for 40 seconds[2,3].

Properties

Monoblock Formation: Monoblock means a single unit. The clinical advantage of using adhesive endodontic sealer with bondable polymeric root canal filling material Resilon-Epiphany is that they bond through out the length of the root canal. By creating micromechanical retention via the formation of a thin hybrid layer to the self etching primer-treated root dentin and chemical coupling to the urethane dimethacrylate containing Resilon root filling material to the methacrylate based sealer, a continuum has been achieved, that results in the creation of a "Secondary Monoblock" between root canal filling and the intra radicular dentin, wherein there are two interfaces, one between the sealer and primed dentin and other between the sealer and Resilon[4,5].

Sealing Ability: Historically endodontic leakage research focused mainly on the quality of apical seal of the root canal system. Coronal leakage into the obturated root canal system had not received any attention until the late 1980s. Since then numerous dyes, bacterial penetration and fluid filtration leakage studies have been evaluated. With the RES, the coronal portion of the obturation is light cured for 40 seconds which creates an immediate coronal seal at the orifice and the rest of the sealer setting in 25 minutes[6]. RES produces a Monoblock and microleakage studies have shown that it has good apical sealing ability[7,8].

The penetration of root canal filling material into the fins, deltas, accessory and lateral canals and dentinal tubules is a function of viscoelastic property of the delivery system. RES has been shown to flow into all the complex anatomical irregularities. This is aided by the smear layer removal from the root canal during the obturation which allows greater sealer penetration into he exposed dentinal tubules, which also increases the adhesion and seal within the canal space[9,10].

Inter-radicular Dentin Bond Strength: RES having viewed as having intermediate bond strength. The creation of a Mono-block also significantly helps the Inter-radicular dentin bond strength to improve[11].

Effect of Irrigant on seal of Resilon-Epiphany system: During biomechanical preparation NaOCl is one of the irrigating solutions used. The manufacturer's instruction for the Resilon-Epiphany system suggests that NaOCl should not be used as the final irrigant, as it may result in reduced bond strength and as NaOCl is an oxidizing agent it leads to the oxidation of some components of the dentin matrix. Oxygen also has been shown to inhibit the polymerization of resins. Hence after use of NaOCl, the root canal has to be irrigated with 17% EDTA followed by 0.2%CHX and flushed with sterile water or saline[11].

Sealer and root canal wall condition: The hydrophilic characteristics of the Epiphany might improve the penetration of the sealer into moist dentin and dentinal tubules. This might contribute to substantially reduced microleakage. The manufacturer recommends that the root canal walls be kept moist, not dehydrated, to take maximum advantage of the hydrophilic properties of the sealers, thus allowing for resin tag penetration and the formation of a hybrid layer. Before the advent of the methacrylate resin based sealers, root canals had to be dried thoroughly before placement of sealers. Studies conducted to compare the effect of different levels of moisture of root canals, from none to wet, on the coronal seal after filling the root canals, demonstrated that the Resilon-Epiphany system leaked less when root canals were blot dried with paper points[12].

Effect of intracanal medicament on the RES: Calcium hydroxide is one of the most widely used intra canal medicament in endodontics, to reduce residual microbial flora. The remnants of calcium hydroxide on the walls of the root canal after its removal should not interfere with the obturation and it has been observed that with RES, calcium hydroxide did not adversely affect the apical seal[13].

Root End filling material: RES has the advantage of providing an immediate light cured seal. It has been suggested that RES has the potential as a root end filling material when used in an environment with good hemostasis[14].

Setting Time: Commonly used resin cements have been shown to require an anaerobic environment for setting. The root canal has an anaerobic environment and Resilon sealer can set in an anaerobic environment. Manufacturer's instructions for Resilon do not describe the need for an anaerobic environment[15].

Fracture resistance of root obturated with RES: Resin based dental material have been proposed as a means to reinforce an endodontically treated teeth, through the use of an adhesive sealer in the root canal system. Single canal teeth obturated with the RES have shown increased resistance to fracture[16].

Toxicity: Toxicity of dental materials can be assessed invitro. Resilon has been found to be biocompatible, but Epiphany was more cytotoxic than conventional materials[17] and another study indicating that the cytotoxicity of freshly mixed Epiphany sealer and thinning resin did not exceed that of freshly mixed AH-Plus, an epoxy resin based root canal sealer[18].

Retreatment: In case of retreatment, Resilon obturation can be removed from the root canal by use of heat, solvents and rotary instruments. Resilon can be removed with the use of resin solvent Endosolv-R (Septodont, Paris, France), which contains Formamide and 2-Phenylethanol in the range of 50-100% and 25-50% respectively[19].

Summary

Resilon-Epiphany obturation system is a viable alternative to GP, which has shown to produce a Monoblock, thereby enhancing the coronal and apical seal and strengthening the root. The weak link in the Resilon filled root canal lies at the sealer-dentin interface. Studies have raised doubts about the formation of a Monoblock within the root canal system. Prevention of leakage has not been demonstrated consistently. At best its performance appeared similar to the use of GP and sealer.

Future investigations may focus on the impact of heat on its constituents, performance of Resilon Epiphany sealer, their setting time and degree of polymerization, as well the periradicular response to extruded material.

Conclusion

RES was introduced as a challenging material for replacement of GP .As an obturating material it has shown superior characteristics. GP has been studied for all its properties, for over 100 years and it has also been compared with other materials which were introduced as obturating materials and recently with RES. Studies have shown conflicting findings in terms of Monoblock formation, sealing ability, bond strength of the RES. Further research is required to study the properties of RES in detail.

References

1. Miner, Berzins and Bahcall. A comparison of Thermal Properties between Gutta Percha and a Synthetic Polymer based Root canal filling material (Resilon). J Endodon 2006; 32:683-686.
2. Ko CH, Cheung GS, Chan AW. A review of a resin-based root canal filling material. Hong King Dent J 2008; 5:38-44.
3. Cohen S, Hargreaves KM, Keiser K. Pathways of the Pulp, 9th ed. St.Louis: Mosby, 2006, 264, 372-375, 970-971.
4. Shipper G, Ørstavik D, Teixeira FB, Trope M. J Endodon 2004; 30:342-347.
5. Tay FR and Pashley DH. Monoblock in Root Canals: A Hypothetical or a Tangible Goal. J Endodon 2007; 33:391-398.
6. Pitout E, Oberholzer TG, Blignant E, Molepo J. Coronal Leakage of Teeth Root-Filled with Gutta Percha or Resilon Root Canal Filling Material. J Endodon 2006; 32:879-881.
7. Tunga U and Bodrumlu E. Assessment of sealing of a New Root Canal Obturation Material. J Endodon 2006; 32:876-878.
8. Wedding JR, Brown CE, Legon JJ, MooreBK, Vail MM. An In Vitro Comparison of Microleakage between Resilon and Gutta Percha with a Fluid Filtration Model. J Endodon 2007:33:1447-1449.
9. Karabucak B, Kim A, Chenn V, Iqbal MK. The comparison of Gutta-Percha and Resilon Penetration into lateral canals with different Thermoplastic Delivery Systems. J Endodon 2008; 34:847-849.
10. Patel Dr, Sherriff M, Ford TRP, Watson TF and Mannocci F. The Penetration of Realseal Primer and Tubliseal into root canal dentinal tubules: a confocal microscopic study. Int Endod J 2007; 40:67-71.
11. Skidmore LJ, Berzins DW, Bahcall JK. An Invitro Comparison of the Intraradicular Dentin Bond Strength of Resilon and Gutta Percha J Endodon 2006; 32:963-966.
12. Zmener O, Pameijer CM, Serrano SA, Vidueira M, Macchi RL. Significance of Moist Root Canal Dentin with the use of methacrylate-based Endodontic Sealers. J Endodon 2008; 34:76-79.
13. Wang CS, Debelian GJ, Teixeira FB. Effect of Intracanal Medicament on the Sealing Ability of Root canals filled with Resilon. J Endodon 2006; 32:532-536.
14. Maltezos C, Glickman GN, Ezzo P, He J. Comparison of Sealing of Resilon, ProRoot, MTA and Super-EBA as Root-End Filling Materials: A Bacterial Leakage Study. J Endodon 2006; 32:324-327.
15. Nielsen BA, Beeler WJ, Vy C, Baumgartner JC. Setting Times of Resilon and Other Sealers in Aerobic and Anaerobic Environments. J Endodon 2006; 32:130-132.
16. Teixeira FB, Teixeira ECN, Thompson JY, Trope M. Fracture resistance of roots endodontically treated with a new resin filling material. J Am Dent Assoc 2004; 135:646-652.
17. Key JE, Rahemtulla FG, Eleazer PD. Cytotoxicity of a new Root Canal Filling Material on Human Gingival Fibroblasts. J Endodon 2006; 32:756-758.
18. Merdad K, Pascon AE, Kulkarni G, Santerre P, Friedman S. Short term Cytotoxicity Assessment of Components of Epiphany Resin-Percha Obturating System by indirect and Direct Contact Millipore Filter Assays. J Endodon 2007; 33:24-27.
19. Oliveria DP, Barbizam JVB, Trope M, Teixeira FB. Comparison between Gutta Percha and Resilon Removal Using Two Different Techniques in Endodontic Retreatment. J Endodon 2006; 32:362-364.

Granular Cell Ameloblastoma

Shwetha V. Kumar[1], Niharika Swain[2]

Abstract

Ameloblastoma is an epithelial odontogenictumour of the jaw and exhibits diverse histopathologic subtypes like follicular, plexiform, acanthomatous and desmoplastic variantswhich occurs either singly or in combination. Granular cell ameloblastoma is a rare histological subtype of ameloblastoma accounting for less than 5% of the total. The rare granular cell variant is seen in combination usually with follicular or plexiform subtypes. The aim of this paper is to describe clinical and microscopic features of Ameloblastoma of a pure granular cell histopathological subtype occurring in a seventeen year old adolescent female patient in the lower right region of the mandible.

Key Words: Odontogenic tumors, Ameloblastoma, granular cell ameloblastoma

Introduction

Ameloblastoma is a true neoplasm of odontogenic epithelial origin characterized by a local invasiveness and high frequency of recurrence. It includes several clinicoradiographic and histologic subtypes like follicular, plexiform, acanthomatous, basaloid and granular cell types. Follicular and plexiform are the commonly encountered variants accounting to 32.5% and 28.2% respectively, followed by the acanthomatous subtype with 12.1% while desmoplastic is extremely uncommon with incidence rates ranging from 4-13%. Less common histopathologic subtypes include the granular cell and basal cell ameloblastoma.[1] Although the treatment and prognosis are virtually the same (with the possible exception of more aggressive desmoplastic variant), knowledge of various histopathologic subtypes is a prerequisite for accurate diagnosis and management.[2] The granular cell Ameloblastoma is a relatively rare histologic subtype (less than 5%)[3], and in most instances, it is found as an admixture with other histologic patterns particularly the follicular subtype.[4] The granular cell subtype of ameloblastoma is characterized by the groups of round, cuboidal or columnar granular cells, which have abundant cytoplasm filled with eosinophilic granules. The granules have been identified as lysosomal aggregates, both ultrastructurally and histochemically The acquisition of granular cell phenotype has been attributed to an aging or degenerative change in long-standing lesions; however, it may also affect young patients.[1] When this granular cell change is extensive in an ameloblastoma, the designation of granular cell ameloblastoma is appropriate.[5] The purpose of this paper is to present an unusual case of granular cell ameloblastoma to highlight its unique microscopic features that allow its distinction from other jaw tumours with a granular cell constituency.

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Case report

A 17 year old female was referred to Department of Oral Pathology with the chief complaint of pain and swelling in relation to lower right jaw region mandibular since 1 year. Past medical, dental & family history of the patient was noncontributory. There was no history of trauma, sinus opening or pus discharge. Extraoral examination revealed facial asymmetry due to swelling on lower right side of the face extending from parasymphyseal region to 2cm away from the corner of mouth anteroposteriorly. Superioinferiorly, the swelling extended from middle third of the cheek till inferior border of mandible (Fig. 1). Intra-oral examination revealed obliteration of buccal sulcus in the region of 43,44,45,47 with both buccal and lingual cortical expansion (Fig. 2). On palpation the swelling was bony hard in consistency with no associated lymphadenopathy. On Radiological examination, the OPG revealed well defined multilocular radiolucent lesion extending 33 to 37 periapical region with root resorption of 36

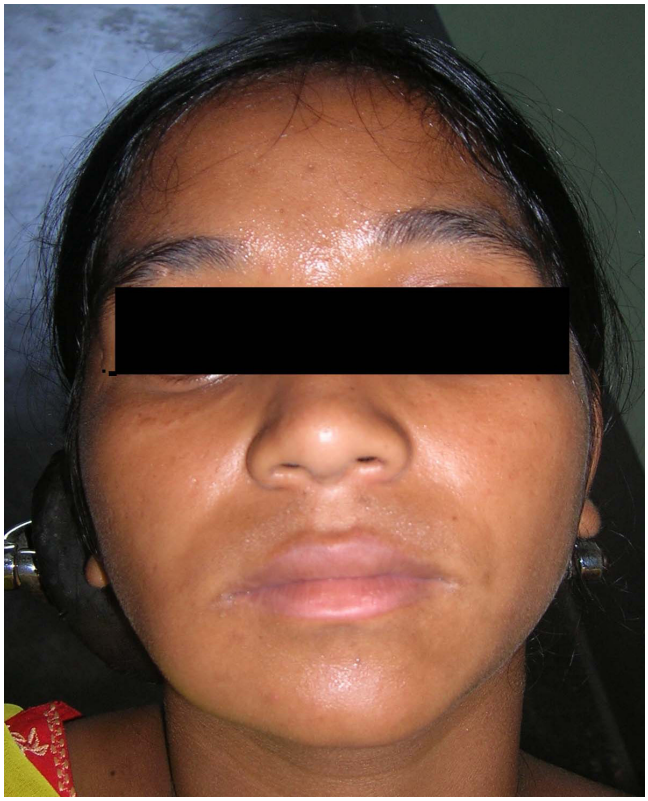

Fig. 1: Photograph showing extraoral swelling on the right side of the lower jaw.

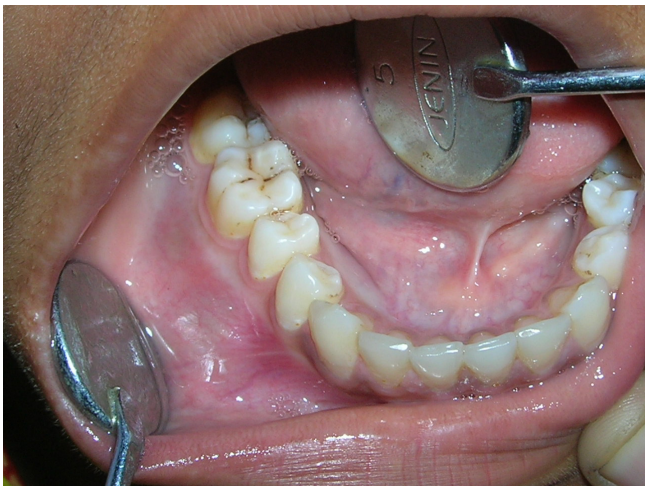

Fig. 2: Photograph showing intraoral swelling on the right mandible with expansion of buccal and lingual cortical plates.

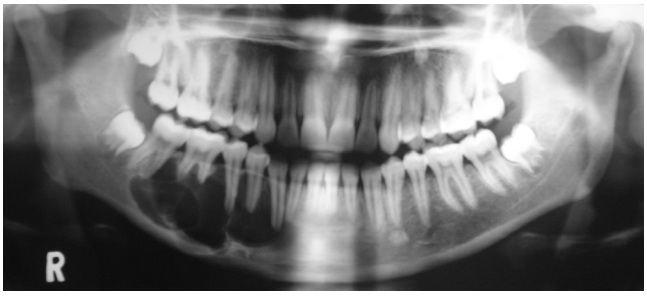

Fig. 3: Photograph showing OPG radiograph multilocular radiolucency fro 43 to 47

(Fig.3). A provisional diagnosis of Ameloblastoma and Odontogenic Keratocyst was considered and an incisional biopsy was taken. Macroscopically, the specimen received was 3.0 x 2 cm in size, grayish brown in color with firm consistency. The cut section H & E stained sections showed the presence of areas of follicles with peripheral palisading preameloblast with central granular cells replacing the stellate reticulum like cells. The connective tissue stroma is loose fibrous. The center of the follicles showed cystic degeneration. (Fig. 4, 5)

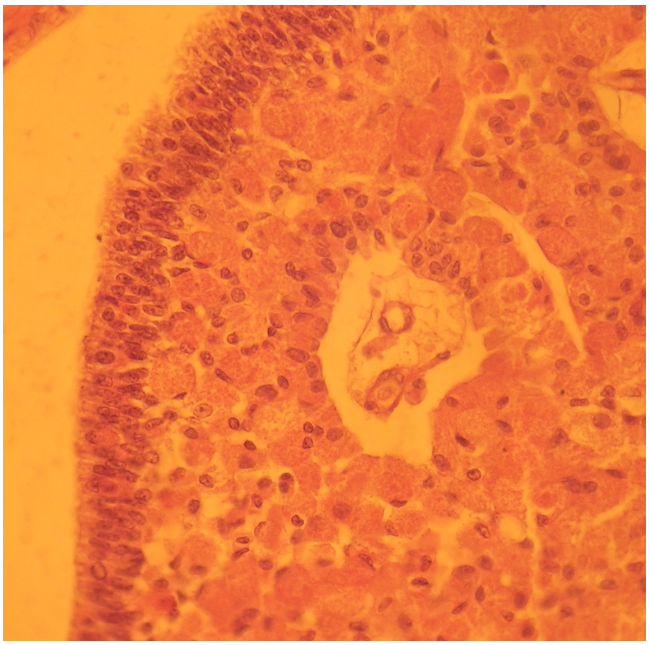

Fig. 4: Photomicrograph showing ameloblastic follicles with peripheral layer of ameloblasts with central granular cells(10X)

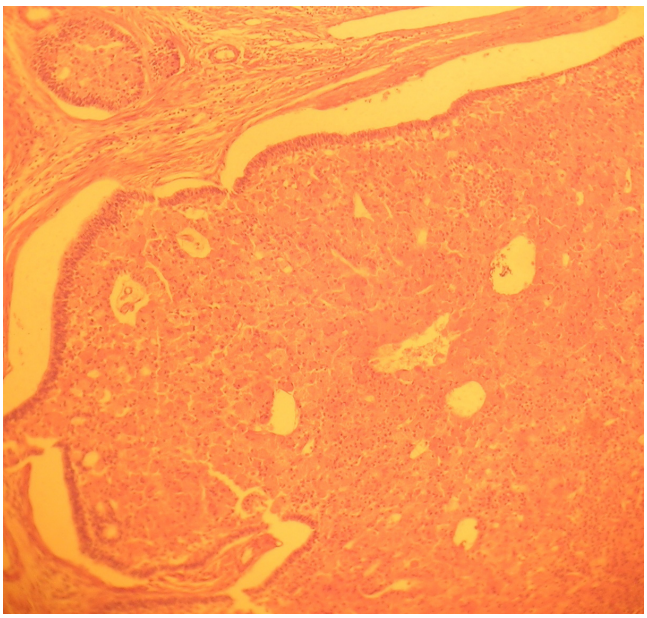

Fig. 5: Photomicrograph showing large cuboidal to oval cells packed with dense eosinophillicgranules(40X)

Discussion

Ameloblastoma chiefly occurs predominantly in 4th - 5th decade of life and the age range is very broad. The average age of patients with intraosseous ameloblastoma has been reported to be 39 years. The rare lesions occurring in adolescents are usually cystic and appear clinically as odontogenic cysts. In this study, we document the occurrence of granular cell ameloblastoma in a significantly younger patient.[6,2]

Granular cell ameloblastoma is a rare variant of ameloblastoma. According to Reichart et al.[1] out of a total of 1593 cases with available data on histologic subtypes, there were only 56 (3.5%) cases of the granular cell variant. Hartman reviewed 20 cases of the granular cell ameloblastoma and reported an average age of 40.7 years (age range: 21 - 65 years) with no distinct gender predilection. The majority of the lesions were reported in mandible with propensity towards the posterior regions of the mandible[5]. Jaw swelling and pain were the most frequent presenting symptoms. There have been no distinguishing radiographic findings forgranular cell Ameloblastoma reported. Our case showed similar clinico radiographic parameters except that it was reported in a 17 year old female patient.

The defining characteristic of granular cell ameloblastoma is the presence of granular cells in the central portion of the epithelial islands, strands and cords. The granular cells tend to be large and have an oval to polyhedral outline. The follicles may have a thin rim of stellate reticulum like calls that separates the granular cells from the peripheral columnar layer. The nucleus is displaced to the periphery of the cells. Prominent coarse granules tend to stain eosinophilic and pack and distend the cytoplasm, imparting a distinctive appearance. The granular cells rarely show a distinctive cell borders and the cytoplasm merges imperceptibly.4originally they were considered to represent an aging or degenerative process but recent immuno-histochemical studies suggest that this phenomenon is related with increased apoptotic cell death of the lesional cells and the phagocytosis by neighbouring neoplastic cells.[7,8]. On Immunohistochemical analysis it is seen that the granular cells show positivity for cytokeratin, CD68, lysozyme and alpha-1-antichymotrypsin, but are negative for vimentin, desmin, S-100 protein, neuron-specific enolase and CD15, indicating epithelial origin and lysosomal aggregation[8,9] Dina et al. also showed that the granular cells exhibited membranous positivity for cytokeratin and cytoplasmic positivity for CD68.[10]

The differential diagnosis of granular cell ameloblastomas includes other oral lesions with a similar morphology of granular cell accumulation, including granular cell odontogenic tumour, granular cell tumour and congenital epulis. These lesions have different biologic behaviour and should be discriminated from granular cell ameloblastomas.[11]

Conclusion

The granular cell ameloblastoma is a rare condition with unique histopathologic and immuno-histochemical findings; its treatment and prognosis do not significantly differ from those of the other subtypes of the solid/multicystic ameloblastoma.

References

1. Reichart PA, Philipsen HP, Sonner S.Ameloblastoma: biological profile of 3677 cases. EurJ Cancer B Oral Oncol 1995; 31: 86-99
2. Neville BW, Damm DD, Allen CM, Bouquot JE. Odontogenic cysts and tumours. In: Neville BW, Damm DD, Allen CM, Bouquot JE, editors. Oral and Maxillofacial Pathology. 3rd ed. St. Louis: Saunders; 2009. p. 702-11, 729
3. Reichart PA, Philipsen HP. Odontogenic tumors and allied lesions. Quintessence Publishing Co. London p69-p77, 2004, 1st edition
4. Dean K White, Odontogenic tumors, Oral and Maxillofacial Surgery Clinical of North America. August 2004, volume 16, number 3
5. Hartman KS. Granular cell Ameloblastoma. Oral surg Oral Med Oral Pathol Oral Radiol Endod 1996;82(6):660-9
6. Regezi, Sciubba, Jordan. editors. OralPathology Clinical Pathologic Correlations.4th ed. Saunders; 2003; 267-2
7. Nasu M, Takagi M, Yamamoto H. Ultrastructural and histochemical studies of granular-cell ameloblastoma. J Oral Pathol. 1984 Aug; 13(4):448-56. [Medline] [CrossRef]
8. Tandler B, Rossi EP. Granular cell ameloblastoma: electron microscopic observations. J Oral Pathol. 1977 Nov; 6(6):401-12. [Medline] [CrossRef]
9. Kumamoto H, Ooya K. Immunohistochemical and ultrastructural investigation of apoptotic cell death in granular cell ameloblastoma. J Oral Pathol Med. 2001 Apr; 30(4):245-50. [Medline] [CrossRef]
10. Dina R, Marchetti C, Vallania G, Corinaldesi G, Eusebi V. Granular cell ameloblastoma. An immunocytochemical study. Pathol Res Pract. 1996 Jun; 192(6):541-6. [Medline]
11. Slater L. Granular cell ameloblastoma versus central odontogenic granular cell tumor. Oral Oncol. 1997 Mar; 33(2):145. [Medline] [CrossRef

Management of Unstable Mandibular Denture With Neutral Zone Impression Technique

Janani Mahadevan[1], Sabita M. Ram[2]

Abstract

Oral functions involve unique interplay of oral structures and muscles. Any interference with their movements by a denture would result in denture instability. If the denture is placed in a zone where the displacing forces of tongue, lips, cheeks and modiolus are balanced, then the denture will be retained more effectively during function. This zone is known as neutral zone. If the denture strays outside/inside the neutral zone it will be unstable during the activities such as talking, swallowing and mastication. The neutral zone technique is used to minimize the displacing forces of the surrounding structures. This is a case report in which neutral zone impression technique was used to solve the problem of denture instability.

Key Words: Instability, atrophic ridge, muscle function

Introduction

The copy technique is most commonly used for construction of complete dentures. This traditionally used technique serves an excellent role in most of the cases except in cases where the residual ridge resorption has led to highly atrophic ridge. It also gives unsatisfactory results in cases where the patient has been edentulous for an extremely long period thus leading to poor neuromuscular control exerted on the denture. An alternative technique may be used in treating such complex cases.[1]

Locating the neutral zone for the mandibular denture is one of the most important factors in achieving stability of the denture. Although the concept and the importance of the concept have been mentioned in the literature, very little has been written as to the techniques involved.[2] The mandibular denture presents with most common difficulties with looseness being the most common complaint.[3] This is because the mandible atrophies at a greater rate than the maxilla and has less residual ridge for retention and support.[4] The neutral zone impression technique is most effective in patients who have had numerous unstable, unretentive mandibular complete denture. These patients usually have highly atrophic mandible and there has been difficulty in positioning the teeth to produce a stable denture. This article aims to provide clinicians with the knowledge to use the technique.

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Neutral zone

The neutral zone has been defined, "As the area in the mouth where during function, the forces of the tongue pressing outwards are neutralized by the forces of the cheeks and lips pressing inwards".

Sir Wilfred Fish first described the influence of the polished surfaces on retention and stability in1931.6He described it as dead space which later came to be known as "NEUTRAL ZONE".[7] Since that time there have been a number of techniques described in the literature, which have attempted to provide moulding of the neutral zone. Soft waxes, modeling compound & tissue conditioners can be used for this procedure.

Buchman and Gelb, Lott and Levin, and Russel have described the use of waxes in locating the neural zone. Tench has suggested the use of modelling compound.[2] Tissue conditioners can also be used. These soft, mouldable materials are placed in the mouth with patients performing actions with their lips and tongues, the idea being to capture in greater detail the actions of the lips, cheeks and tongue. These actions determine the tooth position and shape of polished surface. The aim is to produce a denture moulded by muscle function that is in harmony with its surrounding structures so enhancing stability and retention.[1]

Case report

A 52 years old female patient reported to the OPD with the chief complaint of loose mandibular complete

denture. History revealed that the patient had been edentulous for the past 20 years. Patient had two sets of complete denture made earlier and with both the dentures patient had the problem of instability of mandibular denture.

Intra-oral examination revealed extremely strong mentalis and buccinator muscle which on activation led to narrowing of labial and buccal sulcus. Tongue showed uncoordinated movements. The patient had very uncertain pattern of mandibular closure. (Fig. 1 & 2)

Critical examination of previous denture showed the posterior teeth were positioned lateral to the crest of the ridge. The mandibular occlusal plane was also higher further adding to instability of mandibular denture.

It was therefore decided to use neutral zone impression technique to determine the optimum position of teeth and the contour of the polished surfaces of denture in harmony with the surrounding musculature. (Fig. 1 & 2)

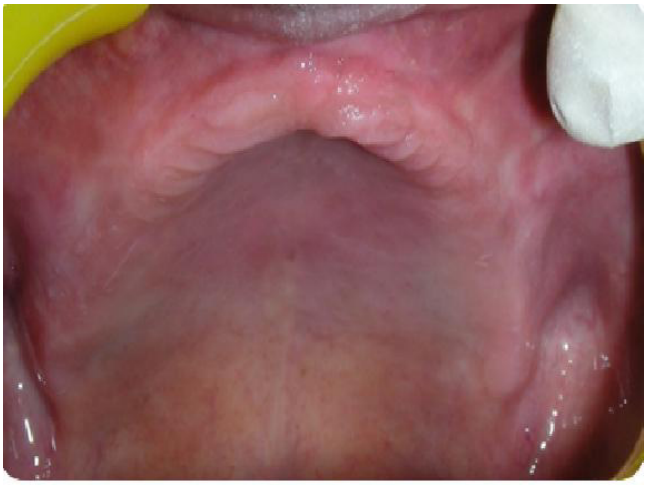

Fig 1. Edentulous maxillary arch

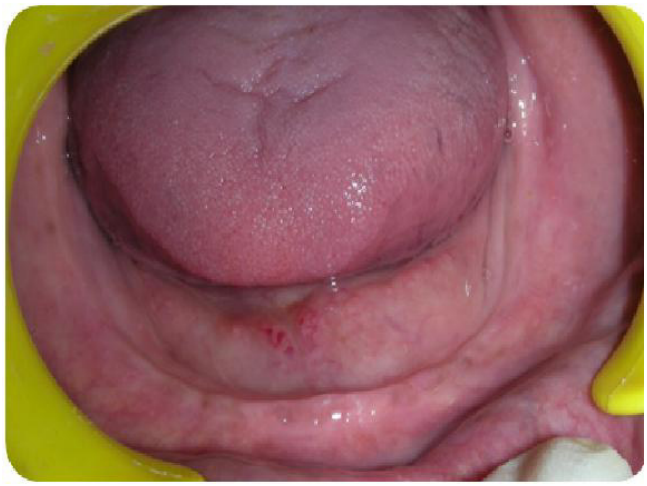

Fig 2. Resorbed mandibular ridge

Clinical technique

Preliminary and secondary impressions

The preliminary impressions were made in stock tray with a mucocompressive material, impression compound. (Fig. 3). The secondary impression was made in special tray with low viscosity mucostatic material, zinc oxide eugenol. (Fig. 4 & 5)

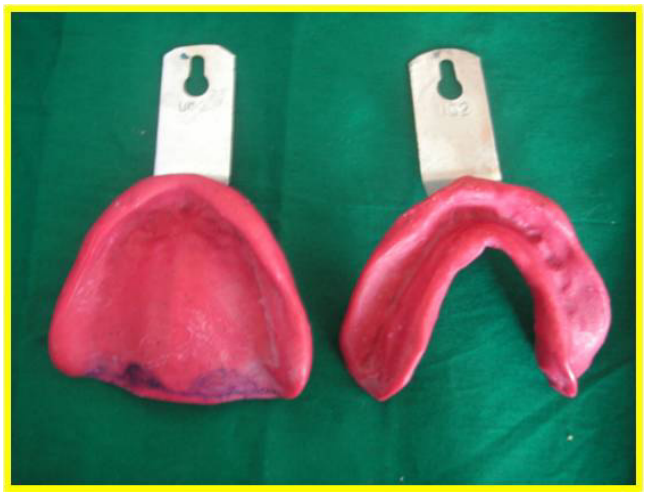

Fig 3. Maxillary and Mandibular Primary Impression

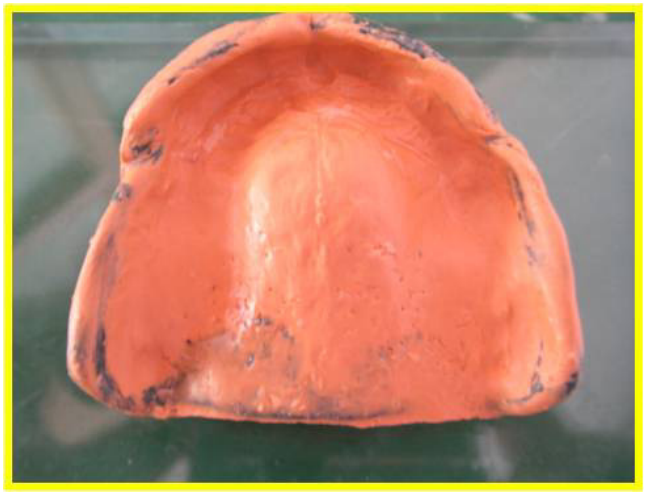

Fig 4& 5. Final Impressions

Jaw relation

The occlusal rims were made on heat cured acrylic record denture bases for increased stability. The record base was assessed for extension, comfort and stability. The maxillary occlusal rim was shaped properly to provide good support for the musculature labially and buccally. It is vitally important that the occlusal rim was correctly shaped in its height and width; otherwise the correct width of the mandibular arch cannot be developed. After establishing the correct maxillary occlusal plane- the mandibular occlusal rim was adjusted to the correct occlusal vertical dimension. (Fig. 6). The established jaw relation record was then mounted on a mean value articulator.

Fig 6. Jaw Relation

Modification of mandibular record base

The occlusal rim was removed from the mandibular record base and a superstructure was constructed on it. Numerous designs of superstructure have been suggested in the literature but the one used here was made of low fusing impression compound. The low fusing impression compound superstructure had two vertical pillars in the posterior region that maintained the contact with the maxillary rim. In rest of the region it was slightly short of the vertical to allow space for the neural zone impression material. (Fig. 7). The superstructure served two functions:

Fig 7.Establishing the Correct Occlusal Height with Low Fusing Compound

- Provided occlusal stops at correct vertical dimension of occlusion.
- It provided support to the neutral zone impression material.

Neutral zone impression

Patient was made to sit upright with the head unsupported to allow actions of swallowing and speaking to be more natural. Maxillary wax rim was inserted in the mouth and reassessed for support & occlusal plane. With the mandibular record base out of the mouth, tissue conditioner (GC Company) was mixed according to manufacturers instructions and the correct volume of it was placed on the superstructure. Tissue conditioner was manipulated to form an approximate rim and the mandibular record base was inserted in the mouth. The volume of tissue conditioner was controlled so that the sulci are not distorted. The patient was instructed to perform repeated actions:

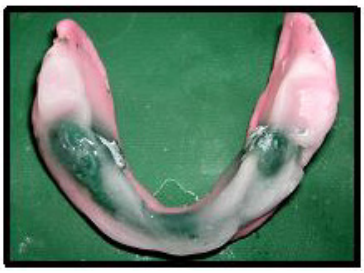

Fig 8.Completed Neutral Zone Impression

- Swallow and take sips of water
- Talk aloud, pronouncing vowels and count from 60 to 70
- Smile, grin, lick their lips
- Protrude the tongue
- Pout/purse the lips

These actions moulded the material by muscle activity. After 10mins, the set impression was removed from the mouth. (Fig. 8).

Laboratory stage

The neutral zone impression was replaced on the master cast and orientation grooves were made on the base of the cast, on buccal as well as lingual side. On the buccal side the plaster index was made in two parts separated at the midline for ease of removal and replacement. On the lingual side the index was made as a single piece. (Fig. 9). The tissue conditioner impression & the low fusing compound was removed and the plaster index was replaced. (Fig. 10) Wax was then poured in the space which represented the neutral zone forming the new occlusal rim on the mandibular record base. Teeth arrangement was done exactly following the index. Posterior teeth had to be trimmed slightly lingually to conform in to the neutral zone. Due to uncertain pattern of mandibular closure it was decided to use

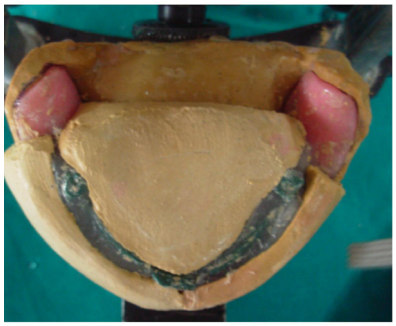

Fig 9. Plaster Index made around Neutral Zone Impression

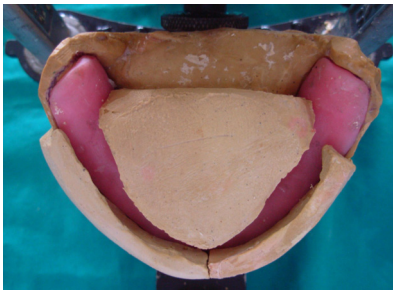

Fig 10. Neutral Zone Impression removed to build wax occlusal Rim

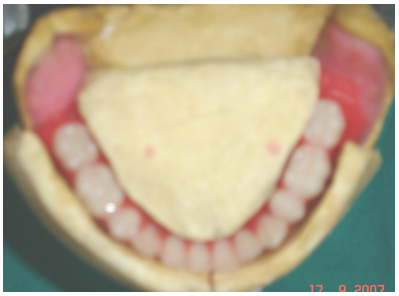

Fig 11. Teeth arrangement done following Plaster Index

monoplane occlusion concept. Teeth arrangement was checked again by putting the plaster index around the wax try-in. (Fig. 11).

Completion of denture

The waxed up dentures were placed in the mouth and patient was asked to repeat all the movements previously mentioned. The denture was stable after all the movements. The dentures were then processed as a conventional denture. Finishing and polishing of denture was done carefully so that the contour of the polished surfaces remained unaltered. (Fig. 12). On insertion of denture, minor occlusal discrepancies were corrected. (Fig. 13)

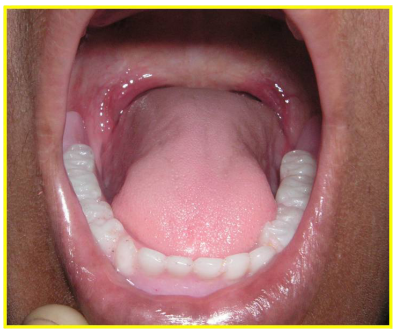

Fig 12. Teeth Positioned in the Neutral Zone in Final Denture

Fig 13. Post denture insertion

Advantages

A denture made using the neutral zone impression technique provided the following advantages-

- Improved stability and retention.
- Posterior teeth were correctly positioned allowing sufficient tongue space.
- Good esthetics due to proper support of underlying musculature.

Summary and conclusion

Neutral zone impression technique is very effective in highly atrophic ridge providing stability and retention. This technique uses muscle function to produce the impression. It defines the polished surface and teeth position. This technique requires a extra clinical stage & good communication with the technician.[1] The neutral zone approach has also been used in patients who have had a partial glossectomy, mandibular resections or motor nerve damage to tongue- which have led to either atypical movements or unfavourable denture bearing area.[6]

References

1. M.J.Gahan and A.D. Walmsley. The neutral zone impression revisited. Br Dent J 1985; March 2005, 198(5):269-72.
2. Victor E. Beresin and Frank J. Schiesser. The neutral zone in complete dentures-principles and technique, Reprint 1973, C.V.Mosby company.
3. Basker RM,Harrison A. A survey of patients referred to restorative dentistry clinics. Br Dent J 1981; 64:105-8.
4. Atwood D A, Post extraction changes in the adult mandible as illustrated by micrographs of midsagittal sections and serial cephalometric roentogenograms. J Prosthet Dent 1963;13: 810-24.
5. Okhuoo C, Hanatani S, Hosoi T. Mizuno Y. Neutral zone approach for fabrication for a partial glossectomy patient- A clinical report. J Prosthet Dent 2000; 84:390-93.
6. Fish E.W an analysis of the stabilizing factors in denture construction. Br Dent J 1932; 52:599.
7. Fish E.W. Using the muscles to stabilize the full denture. JAm Dent Assoc 1933; 20:2165-65.

Orthodontic Microimplants and Its Applications

Rajesh Patil[1], Girish Karandikar[2], Manish Sonawane[3]

Abstract

Microimplants usage has revolutionized the clinical orthodontic practice over last few years. Their diverse clinical applications and ease of usage has simplified orthodontic cases requiring maximum anchorage. Their application in minor tooth movements for facilitation of prosthodontic restoration in overerupted or drifted teeth without usage of orthodontic brackets will soon find favour with other dental specialties.

Key Words: Microimplants, Anchorage, Intrusion, Retraction, Supraeruption

Introduction

Microimplants also known sometimes as Mini screws, Mini implants and wrongly as TAD`S (Temporary anchorage devices) are currently being branded as Holy Grail of orthodontics.

Since specialty of orthodontics emerged, orthodontists have been quite obsessed with anchorage planning. Anchorage control is one of the most important aspects of orthodontic treatment. There are times when absolute or maximum anchorage is needed. Various appliances for anchorage purpose have been designed which were either too cumbersome or depended on unreliable patient compliance.

A Microimplant is a titanium-alloy miniscrew, ranging from 6 to 12 mm in length and 1.2 to 2 mm in diameter, that is inserted into bone temporarily to enhance orthodontic anchorage. Procedure is minimally invasive and often completed using only topical anesthetic. They can be inserted directly through the gingival tissue into bone with a hand driver.

Microimplants act as stationary anchorage from which forces can be delivered without having undesirable side effects.

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History of Skeletal Anchorage

Gainsforth and Higley in 1945[1] used vitallium screws in the dog ramus for purpose of anchorage. This experiment led to failure.

Linkow (1969)[2] had some clinical success using mandibular blade-vent implants for retraction of maxillary incisors.

Roberts (1984)[3] investigated and found that endosseous implants had future potential to be used as source of firm anchorage.

Kanomi (1997)[4] reported that 1.2 mm diameter titanium mini implants provide sufficient anchorage for intruding the teeth.

Numerous other attempts were taken to gain use of microimplants for purpose of absolute anchorage over years.

Availability of titanium alloys, latest designs and interaction with fellow dental implantologists have allowed orthodontists currently to reliably place and use implants for cases which were considered very difficult or impossible to treat.

Clinical Applications of Microimplants

Currently Microimplants are mostly used in cases of high anchorage requirement, loss of anchor teeth, open bite cases, intrusion of teeth, uprighting of drifted molars and in periodontally compromised cases. (Fig. 1, 2)

Implant Design and Size

The contemporary microimplant is made up of titanium alloy. It is self drilling or self tapping. (Fig. 3) Self drilling design is preferred due to ease of use and less chances of failure.

The contemporary microimplant diameter ranges from 1.2 to 1.8 mm and is 5-11mm in length.

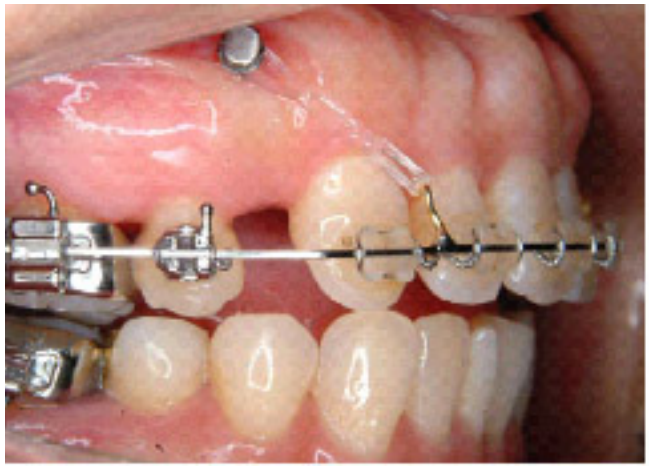

Fig. 1 - Microimplant used for retraction of anterior teeth

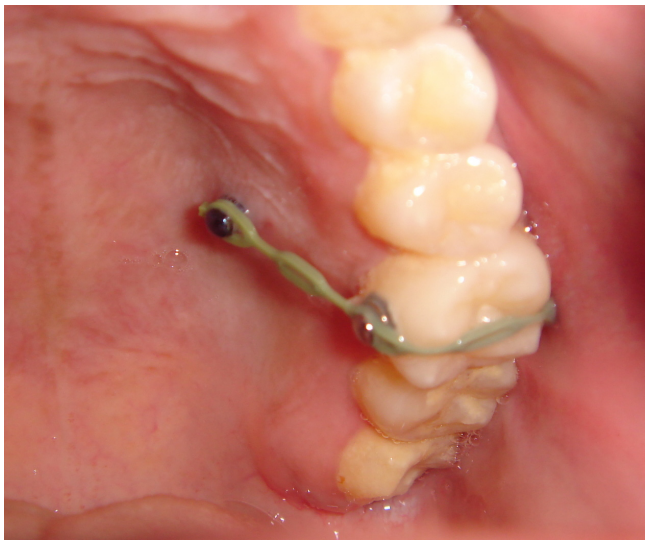

Fig. 2 - Microimplant used for intrusion of an over erupted molar

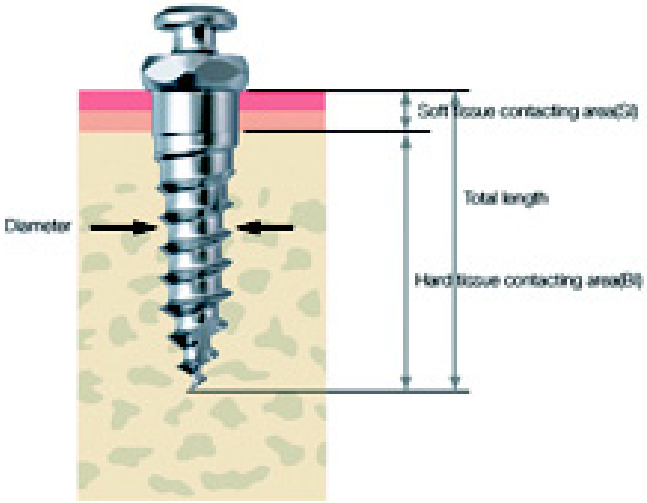

Fig. 3 - Contemporary self-drilling implant design

Placement Technique

Most orthodontists place their microimplants themselves as its relatively simple to place and requires only local anesthesia. Self tapping implant needs a predrilling using a pilot drill.

In self drilling method, implant itself acts as the drill as it is inserted in the bone.

After selection of site of insertion, topical anesthesia is used to anesthetize the area.

Topical anesthesia (15% Novocain) is preferred over injectable local anesthesia as it anesthetizes only the overlying soft tissues without anesthetizing the roots of the teeth. This helps us during implant insertion as proximity to root can be gauged by pain reaction in patient.

Microimplants can be either hand driven or engine driven depending on operator preference. (Fig. 4, 5)

After placement of implants they can be immediately loaded with orthodontic force as osseointegration is not desired.

Removal of implants can be performed easily without anesthesia.

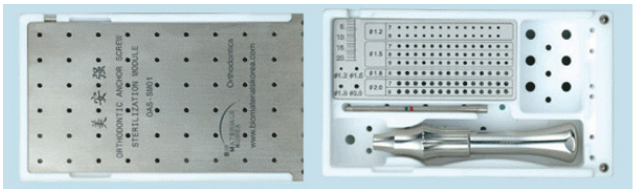

Fig. 4a - Microimplant insertion kit

Fig. 4b - Microimplant insertion hand driver and insertion blade

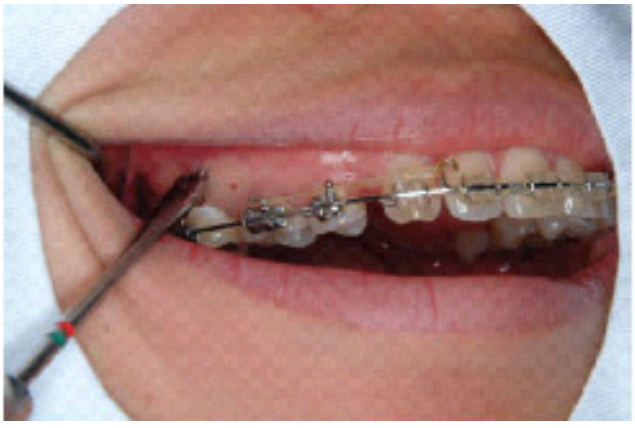

Fig. 5 - Microimplant insertion using hand driver

Sites for Implant Placement

The most common locations for placing of micro implants are buccal alveolar bone in maxilla and mandible, palate and retro molar pad area.

Their success percentage today ranges from 70-90%.

Complications and Failures

Because of ease of use and widespread applications usage of microimplants is increasing exponentially and it is going to be more and more popular in time to come.

But with widespread usage there is always risk of potential misuse or complications.

Potential complications of microimplants include[5]

- Mobility of Microimplants (Fig. 6)
- Oro-Antral communication
- Peri-implantitis
- Proximity to tooth-root (Fig. 7)
- Undesirable tooth movement
- Microimplant fracture

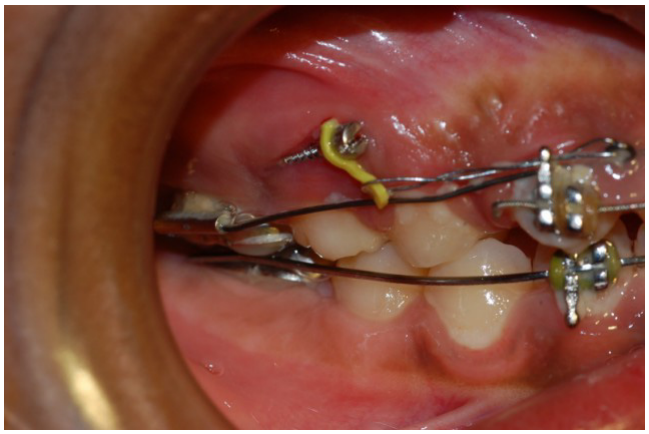

Fig. 6 - Microimplant failure due to loosening

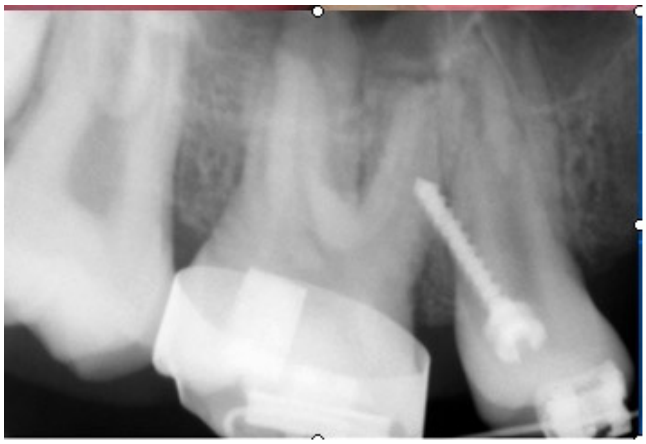

Fig. 7- Root contact of Microimplant

Case report

A 48yr old female patient reported with missing lower right second premolar, lower right first molar and lower left first molar (35,36,46). She had supraerupted upper left and right upper first molars(16, 26). (Fig. 8, 9)

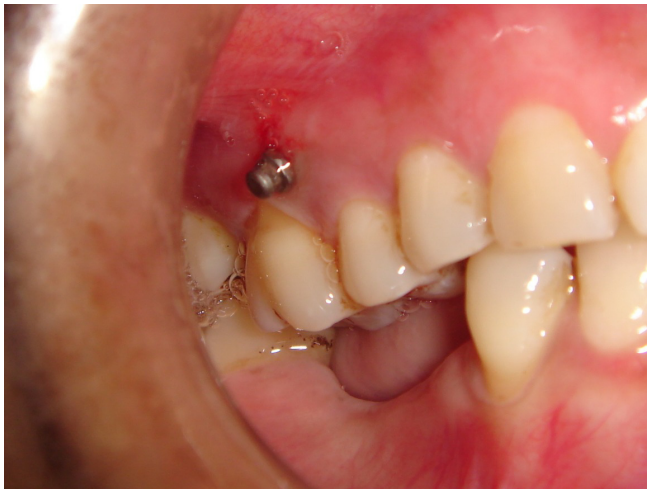

Fig. 8 - Right Buccal View (Pretreatment)

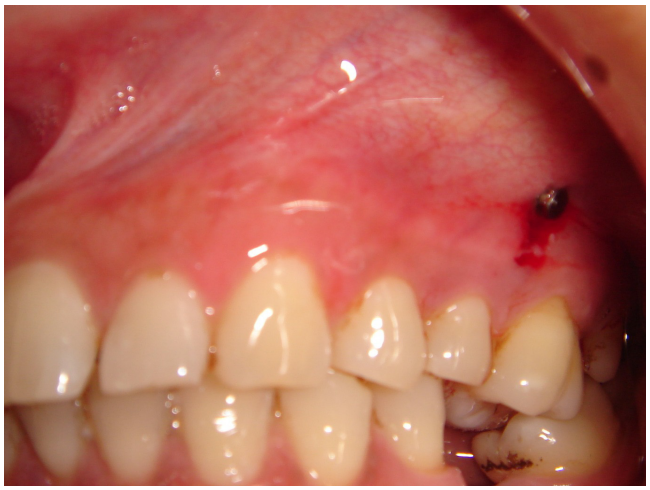

Fig. 9 - Left Buccal View (Pretreatment)

She desired replacement of missing teeth using fixed bridges. On examination it was observed that the supraerupted teeth had reduced the space available for prosthodontic replacement of missing teeth in vertical dimension. Treatment was planned to intrude the supraerupted upper right and left first molars using orthodontic microimplants.

One microimplant was inserted buccally and one palatally to each supraerupted tooth.

The microimplants were placed on buccal aspect between roots of 15, 16 and 25, 26 (Fig. 8, 9). Palatally the microimplants were placed between 16, 17 and 26, 27 (Fig. 10). This was done to allow the force to pass diagonally as close to centre of resistance preventing tipping of the teeth.

Bondable attachments (brackets or buttons) were placed on buccal and palatal surfaces of 16 and 26 to allow attachment of elastic chain to the teeth. The elastic chain was attached from head of microimplant to the bondable attachments on the teeth.

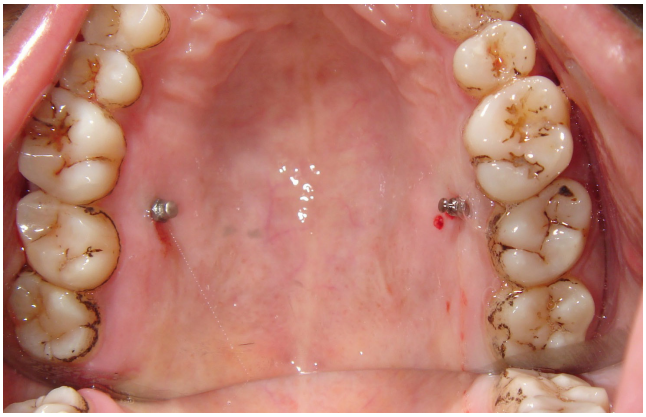

Fig. 10 - Occlusal View of Inserted Palatal Microimplants

The supraerupted teeth were intruded approximately 3mm each in three months which leveled the occlusal plane. Crown preparations were performed on lower posterior teeth to receive porcelain fused to metal bridges replacing missing teeth.

Microimplants were removed once the final crowns were cemented. (Fig. 11)

The intrusion achieved is stable as the intruded teeth are in occlusion with lower crowns which will prevent their supraeruption. The entire procedure lasted around 4 months and patient received a healthy, functional and beautiful smile without compromising sound tooth structure.

Discussion

Microimplants are being used by orthodontists in cases of malocclusion which require high anchorage. They offer stationery anchorage which can be used for intrusion, retraction or uprighting of the teeth. They provide innumerable possibilities for bringing about desired tooth movement without taxing anchor teeth. Intrusion of teeth orthodontically without usage of microimplants is a very difficult tooth movement to bring about due to its reactive effect of extrusion on anchor teeth.

Microimplants are indicated[6] in orthodontics for,

1) Intrusion of tooth or group of teeth
2) High anchorage cases requiring maximum retraction of anterior teeth
3) Protraction of molars
4) Uprighting of tilted molars
5) Forced eruption of impacted third molars
6) Periodontally compromised cases

They can be placed successfully in maxillary and mandibular buccal alveolar area, retromolar area, palate and anterior maxillary and mandibular region.

The procedure used for placement of microimplants is very simple, non invasive and can be performed under local or topical anesthesia. Care should be taken to place them in between roots to prevent root damage. Also placing microimplants in close proximity to important anatomical landmarks should be avoided.

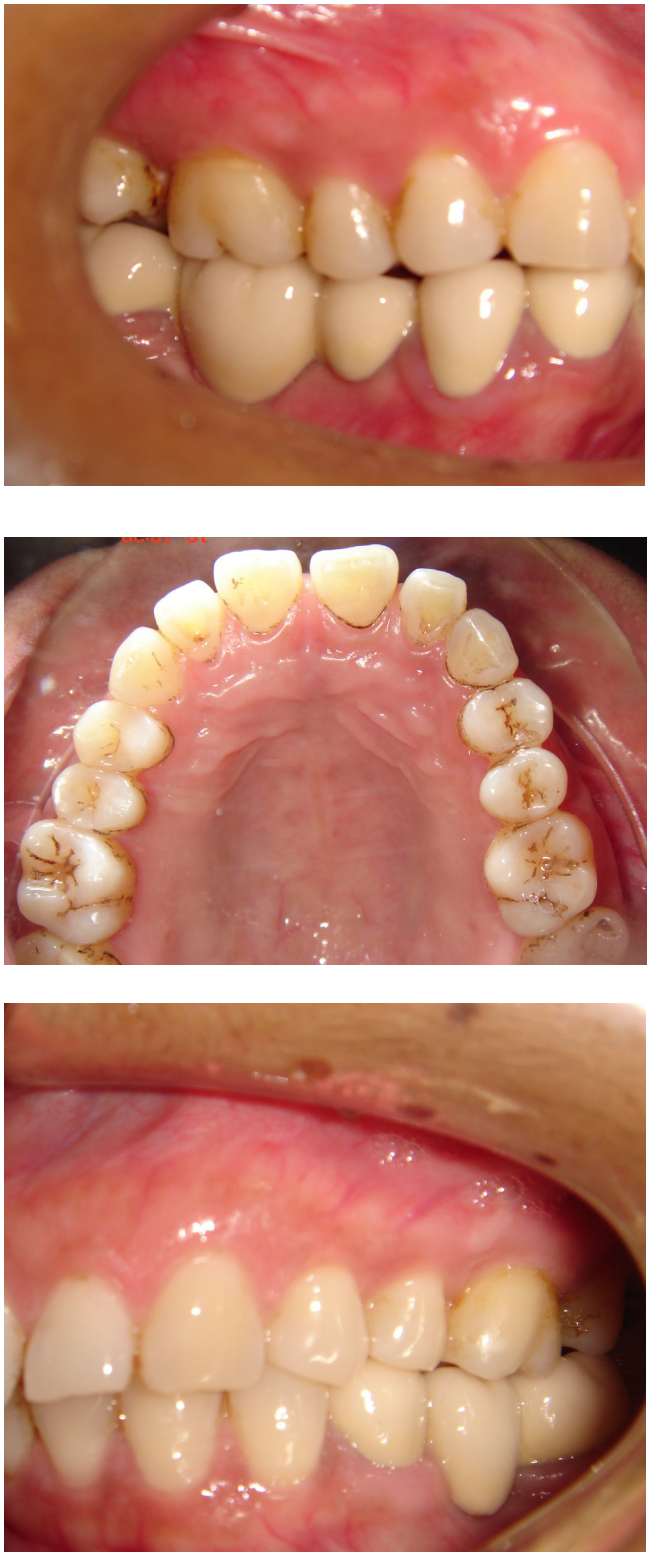

Fig. 11a, b, c - Post Treatment Right and left Buccal and Occlusal Views with Crowns Cemented

Post treatment, they can be removed easily using manual hand drill with or without local anesthesia.

Conclusion

Absolute anchorage has been an orthodontist's dream and microimplants have become one of the most effective tools for achieving it.

This new approach has brought about a paradigm shift in orthodontic treatment planning.

Microimplants can also be used in various clinical situations like mesially tipped teeth adjacent to missing teeth, fractured teeth, periodontally compromised teeth etc to facilitate their restoration.[7]

Restorative dentists, periodontists and surgeons should ensure that they have a clear understanding of the many applications of orthodontic microimplants when presenting patients with options for correcting occlusal problems.

The results achieved in cases of intrusion using microimplants are stable and entire procedure is simple and conservative[8].

References

1) Gainsforth BL, Higley LB. A study of orthodontic anchorage possibility in basal bone Am J Orthod Oral Surg 1945;1:406-17
2) Linkow LI, Weiss JL. The endosseous blade. A progress report. Int J Orthod. 1969 Dec;7(4):155-65
3) Roberts WE, Smith RK, Zilberman Y, Mozsary PG, Smith RS. Osseous adaptation to continuous loading of rigid endosseous implants Am J Ortho 1984;86:95-111
4) Kanomi R. Mini-implant for orthodontic anchorage J Clin Orthod. 1997 Nov; 31(11):763-7.
5) Hoste S, Vercruyssen M, Quirynen M, Willems G. Risk factors and indications of orthodontic temporary anchorage devices: a literature review.Aust Orthod J. 2008 Nov; 24(2):140-8. Review.
6) Sohn DS, Lee JK, An KM. Minor tooth movements using microimplant anchorage: case reports. Implant Dent. 2008 Mar; 17(1):32-9.
7) Mizrahi E, Mizrahi B. Mini-screw implants (temporary anchorage devices): orthodontic and pre-prosthetic applications. J Orthod. 2007 Jun; 34(2):80-94.
8) Kravitz ND, Kusnoto B, Tsay TP, Hohlt WF. The use of temporary anchorage devices for molar intrusion. J Am Dent Assoc. 2007 Jan; 138(1):56-64. Review.

Microsurgical Approach To Subepithelial Connective Tissue Graft For Treatment of Gingival Recession

Ashvini Padhye[1], Rashmi Hegde[2], Sumanth S.[3], Sanjeev Patil[4]

Abstract

Gingival recession is one of the most common mucogingival deformity and treatment should be rendered in a manner such that the best esthetic results are achieved. Periodontal plastic surgery is a rapidly emerging field, which helps us to meet this criterion. Various techniques have been employed in the past years using conventional surgical procedures to achieve coverage of denuded roots. Increased patient awareness has generated the demand for an ideal therapy encompassing the elimination of disease and the restoration of esthetics and function that is administered with minimal trauma and discomfort. . This case report throws light on the use of a surgical operating microscope to cover Miller's class I gingival recession in a maxillary left canine using the subepithelial connective tissue graft technique and its advantages over the conventional technique under normal or macro vision. Satisfactory root coverage was obtained with excellent esthetics and patient comfort.

Key Words : Microsurgery, Periodontal plastic surgery, Root coverage, Gingival recession, Denuded roots

Introduction

Contemporary periodontal therapy extends well beyond merely treating the bacterial component of periodontal disease. Gingival recession is one of the most common mucogingival deformity and should be treated in a way such that the best esthetic results are achieved. Various techniques have been employed in the past years using conventional surgical procedures to achieve coverage of denuded roots. Increased patient awareness has generated the demand for an ideal therapy encompassing the elimination of disease and the restoration of esthetics and function that is administered with minimal trauma and discomfort. These expectations can be met by the periodontist who extends expertise beyond conventional technology and employs the use of minimally invasive procedures using various magnification systems[1]. This case report throws light on the subepithelial connective tissue graft technique for covering gingival recession performed under a surgical operating microscope and its advantages over the conventional technique under normal vision.

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Microsurgery

Microsurgery can be defined as the refinement in surgical technique by which normal vision is enhanced through magnification.[2,3] Surgical operating microscopes are widely used in the field of microvascular surgery and other medical fields, but in dentistry they have been largely limited to use in endodontics[1]. However, the popularity of periodontal plastic surgery has enhanced the use of microsurgery in periodontics because of an increased visibility of the surgical site and the creation of smaller surgical wounds, resulting in an expedited healing process with minimal post-surgical discomfort

Microsurgical Instruments[2,3,4,5,6,7]

Microsurgical instruments are specifically designed to minimize trauma. They are circular in cross-section to permit rotational movement by the clinician and are used to make a clean, nonragged incision to prepare the wound for healing by primary intention. Incisions can be established at a 90° angle to the surface using ophthalmic microsurgical scalpels. Since microsurgical instruments are made of titanium, they are strong, lightweight, and

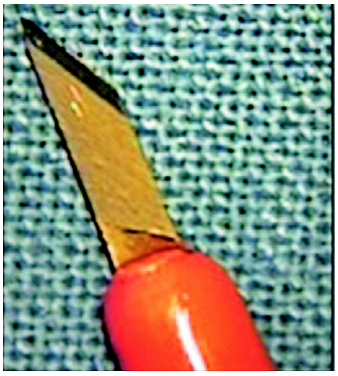

Fig. 1. Ophthalmic blade 16x magnification.

nonmagnetic. A variety of shapes and sizes of microsurgical scalpels and ophthalmic scalpels can be used for periodontal procedures (Fig. 1).

Titanium micro-instruments such as tissue forceps, micro-scissors, breakable carbon steel blade, scalpel handle, needle holder, micromirrors (furcation and interdental), microelevators, microretractors, and root resection instruments are also available.

Sutures for Microsurgery[4,7]

Sizes 6-0 to 10-0 absorbable sutures are used to approximate wound edges accurately. For periodontal microsurgery, usually the 3/8" reverse-cutting needles ensure optimum results. The length of needle can vary from 5 mm to 13 mm depending on its area of application. Along with material properties, the color of the suture material is important in micro-surgery since noncolored material is invisible even under magnification. Very dark-tinted suture thread is the most visible (Fig. 2).

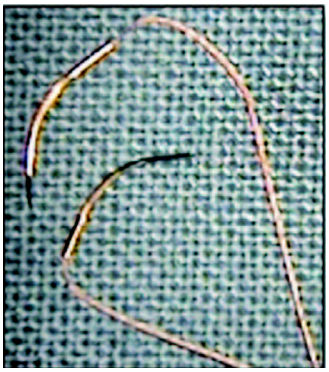

Fig. 2. 6-0 and 8-0 sutures at 16x magnification

Case Report

A 30 year old male patient reported to the department of Periodontics & Oral Implantology with a complaint of sensitivity in relation to the maxillary left canine (23) . On examination an isolated Miller's Class I recession defect was present on the buccal aspect of 23 (Fig. 3). There was adequate attached gingival apical to the defect. After through scaling and root planning, a subepithelial connective tissue graft surgery was planned under the surgical microscope for root coverage.

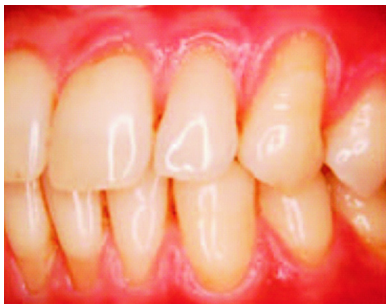

Fig. 3. Miller's Class I recession maxillary left canine (23)

Surgical Technique (Fig. 5 - 13)

A Moller Wedell microscope (Fig. 4) was used for the entire procedure with a magnification range of 10x-16x. The entire surgical procedure was performed under the the microscopic vision. A vertical incision was made using an ophthalmic blade (Fig. 5) on the mesiobuccal aspect of the maxillary left first premolar (24). The tip of the interdental papilla between 23 & 24 was left intact and the incision was extended horizontally in a mesial direction 2mm apical to the tip taking care not to damage the tip of the papilla . The incision was then extended along the buccal aspect of 23 upto the mesial papilla. A partial thickness flap was dissected to create a pouch to receive the subepithelial connective tissue graft at the recipient site. A subepithelial connective tissue graft was harvested from the hard palate using an ophthalmic blade and the trap-door technique. The harvested tissue was handled with utmost care and tucked into the pouch prepared at the recipient site. The graft was secured in place using 6-0 mono-filament polypropylene absorbable sutures to prevent any mobility during

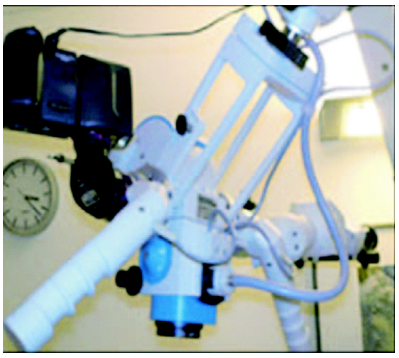

Fig. 4. Moller Wedel microscope.

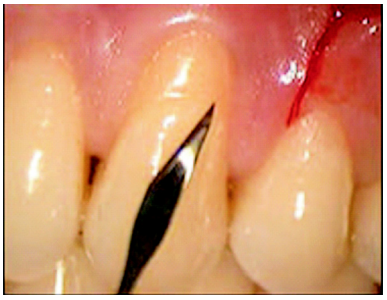

Fig. 5. Single vertical incision with Ophthalmic blade at 10x magnification.

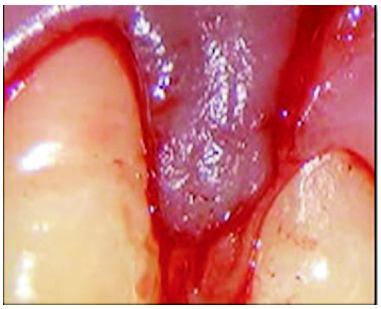

Fig. 6. Horizontal incision to preserve the papilla (10x magnification).

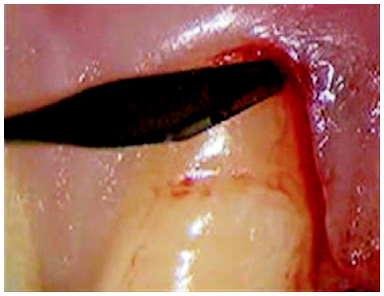

Fig. 7. Pouch preparation with ophthalmic blade (10x magnification)

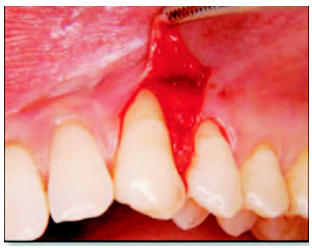

Fig. 8. Partial thickness flap reflected.

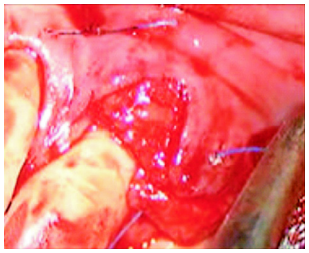

Fig. 11. Graft in place (10x magnification).

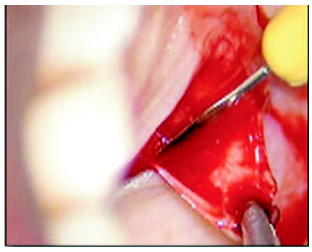

Fig. 9. Trap door prepared on palate to harvest connective tissue, with ophthalmic blade (10x magnification).

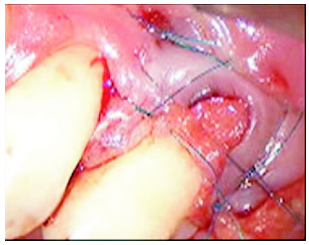

Fig. 12. Graft sutured with 6-0 monofilament polypropylene absorbable sutures showing complete intra-operative coverage.

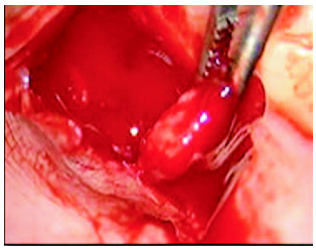

Fig. 10. Connective tissue graft being harvested from palate (10x magnification).

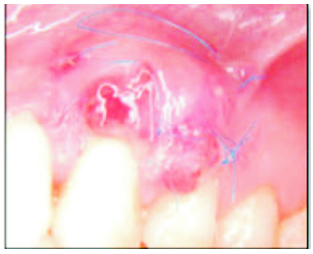

Fig. 13. One-week post-operative view of the graft, showing accelerated healing of the graft.

healing. The elevated flap was then sutured back over the entire graft except the part of the graft covering the exposed root surface. Pressure sutures were placed over entire recipient site. The epithelial flap was sutured back at the donor site. Complete intraoperative closure was achieved with minimal trauma at both the recipient and donor sites and an exceptionally pleasing esthetic outcome[8] . A tin foil was adapted over the recipient site and a non eugenol periodontal dressing was placed over it to protect the graft. Healing of the graft and the donor sites was observed at intervals of one week, two weeks, one month, three months, and six months.(Figs. 14 and 15).

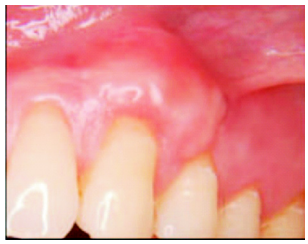

Fig. 14. One-month post-operative view of the graft showing faster healing but some shrinkage.

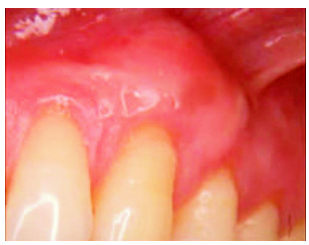

Fig. 15. Six-months post-operative view of the graft, showing 80% root coverage.

Discussion

Development in human research and technology has enabled the dental profession to offer better therapy to patients. Periodontics is a rapidly evolving field of dentistry with major changes occurring during the last five decades. The transition from use of a radical gingivectomy for the elimination of periodontal pockets to the use of flap surgeries and different regenerative measures is indicative of such change. The introduction of microsurgery is a part of this process and has helped the periodontist in treating the patient in a conservative manner using enhanced visibility of the surgical field and minimizing surgical wounds to achieve a favorable treatment outcome. Thus, the superior endpoint of esthetic appearance following microsurgery compared to conventional surgery is because of the remarkable advantages magnification offers to microsurgery. Burkhardt R and Lang NP, in their study, showed that root surface coverage with a subepithelial connective tissue graft using a microsurgical approach substantially improved the vascularization of the grafts, seen with fluorescent angiograms, and resulted in increased percentage of root coverage compared with applying a conventional macroscopic approach[9].

There are some limitations in the use of microsurgery in periodontics. The clinician operating the microscope needs to be trained. Presently, there are very few institutions offering such training for surgeons in the use of a microscope, which could lead to its indiscriminate use. It is prudent to remember that nonsurgical as well as conservative surgical therapy still forms the basis of a quality periodontal practice. The very nature of periodontal surgery demands a surgical microscope capable of offering a broader area of focus compared to needs in endodontics. A periodontal surgeon needs to change the focus of the microscope continuously while performing microsurgery, which can be a cumbersome process with the current generation of microscopes. However, advancing technology will likely overcome the disadvantages seen with the present generation of microscopes. This will no doubt benefit the clinicians in their endeavor to provide excellent treatment options for their patients.

Conclusion

In the present case report, a subepithelial connective tissue graft was used under microscopic vision for coverage of denuded root. Even though the procedure shown in this report can be performed using normal vision, performing this procedure using a surgical microscope and microsurgical instruments offers definite advantages in terms of improved visual acuity, superior approximation of wounds, rapid

wound healing, decreased post-operative morbidity, and increased acceptance by the patients. Despite the advantages stated previously, as well as those cited by various other authors[5,6,7,9], there is still a lack of "high level of evidence" in the form of controlled clinical trials to estimate the magnitude of the real benefits of the microsurgical approach over the conventional approach.

References

1. Apotheker H, Jako GJ. A microscope for use in dentistry. J Microsurg. 1981; 3(1):7-10.
2. Shanelec DA, Tibbetts LS. Periodontal microsurgery. Periodontal Insights. 1994;1(5):4-7.
3. Shanelec D, Tibbetts L. Current status of periodontal microsurgery. Periodontics 2000.1996; 2:88-92.
4. Newman MG, Takei HH, Klokkevold PR, Carranza FA. Recent advances in surgical technology. In: Carranza's clinical periodontology. 10th ed. Philadelphia: W.B. Saunders; 2006. p. 1030-8.
5. Shanelec DA. Periodontal microsurgery. J. Esthet & Restor Dent. 2003; 15(7):402-7.
6. Shanelec DA, Tibbetts LS. Periodontal microsurgery. Continuing education course, 78th American Academy of Periodontology annual meeting, Orlando, FL, Nov 19, 1992.
7. Burkhardt R, Hürzeler MB. Utilization of the surgical microscope for advanced plastic periodontal surgery. Pract Periodontcis Aesthet Dent. 2000; 12(2):171-80.
8. Cortellini P, Tonetti MS. Microsurgical approach to periodontal regeneration. Initial evaluation in a case cohort. J Periodontol. 2001; 72(4):559-69.
9. Burkhardt R, Lang NP. Coverage of localized gingival recessions: comparison of micro- and macrosurgical techniques. J Clin Periodontol. 2005; 32(3):287-93.

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