Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Indian Citation Index (ICI) Index Copernicus value = 100

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Case Report

Clinical crown lengthening with periotome in esthetic region-balancing pink and white esthetics

Sudipta Sannigrahi[1], Savan SR[2], Pritish Chandra Pal[3], Debika Karmakar[4], Ishika Sarkar[5]

[1,4,5]Post Graduate Student, [2]Professor and Head, [3]Assistant Professor, Department of Periodontics, Haldia Institute of Dental Sciences and Research, Haldia, West Bengal, India

ABSTRACT:

Background: Crown lengthening(CL) is a common pre-prosthetic procedure which aims to increase the clinical crown height.The specific CL procedure is selected by considering biologic functional and esthetic requirements. **Aim:** Alternative approach of surgical crown lengthening using periotome **Materials and Methods:** Two patients havingfractured clinical crown in maxillary anterior were treated with surgical cl using periotome. After giving sulcular incisionsthe periodontal fibres were severed using minimally invasive periotome technique and the crown was repositioned in desired level.Biological width and requirement of crown height for placement of prosthesis were achieved. **Conclusion:** CL by periotome gives advantage of better patient compliance in terms of reduced treatment time, no chances of relapse, no need for resective osseous surgery, no uneven gingival contours. So, it is an efficient alternative option in anterior esthetic zone when compared to osseous resection and orthodontic tooth extrusion.

Keywords: Crown lengthening, Biological width, Periotome.

Received: 23 April, 2024 Accepted: 27 May, 2024

Corresponding author: Sudipta Sannigrahi, Post Graduate Student, Department of Periodontics, Haldia Institute of Dental Sciences and Research, Haldia, West Bengal, India

This article may be cited as: Sannigrahi S, SR Savan, Pal PC, Karmakar D, Sarkar I. Clinical crown lengthening with periotome in esthetic region-balancing pink and white esthetics. J Adv Med Dent Scie Res 2024;12(6):48-51.

INTRODUCTION

Grosslydecayed teeth often poses problems to the restorative dentistry due to insufficient clinical crown height. Hence, crown lengthening procedure before restorative treatment of such grossly mutilated teeth become important. Clinical crown lengthening refers to the procedures designed to increase the extent of supragingival tooth structure for restorative or esthetic purpose.[1]The need for crown lengthening is dictated by biological, functional and esthetic requirement of individual patient. The concept of crown lengthening was first introduced by D.W. Cohendate back 1962.[2]It employs a combination of marginal gingival tissue removal,osseous reduction or orthodontic extrusion of teeth.Crown lengthening is done to increase the length of the tooth structure without encroaching the biological width.The concept of biological width was conceptualized by Garguillo where the distance between the base of the gingival sulcus to the crest of alveolar bone was measured on several cadavers and it was reported that the biological width was 2.04mm out of which 0.97mm was epithelial attachment and 1.07mm was connective tissue attachmentis crucial.[3]Violation of biological width is a very common day to day practice in dentistry due to deep subgingival margin placement, due to caries, fracture,external root resorption etc. If the biological width is encroached gradually chronic inflammation may develop.The anatomical considerations needed to be assessed for crown lengthening are- lip line,anatomy of root,location of furcation, interdental bone architecture,soft tissue and hard tissue anatomy and width of the attached gingiva.[4]

Indications of crown lengthening can be due to inadequate crown structure for restoration,placement of margins of restoration that impinge the biological width,gummy smile,uneven gingival contour, short teeth,aesthetic needs,to increase clinical crown height lost due to caries,fracture and to produce ferrule for restoration.[5]Contraindications of crown lengthening are inadequate crown/root ratio,high furcation ,esthetic compromise non restorability of caries or root fracture.[6]

Although many techniques have been used for crown lengthening in past literature, each of them has certain advantages and disadvantages.Crown lengthening by gingivectomy which is most commonly performed technique can be done only in region with sufficient width of keratinized tissue.Similarly, apically positioned flap is currently contraindicated in esthetic zones. Crown lengthening by orthodontic therapy require repeated supracrestalfiberotomy and has a tendency to relapse.Surgical crown lengthening by periotome offers an alternative treatment option with predictable functional and esthetic outcomes. Crownlengthening by periotome avoids the consequences of extensive resectivesurgeryand orthodontic extrusion like relapse,loss of interdental papilla and uneven gingival margin.[7]The present case report consists of two cases where surgical extrusion by periotome was done in the esthetic zone and follow up was done for 6 months.

CASE REPORT

Two patients visited the Department of Periodontics with a chief complain of fractured upper front teeth due to recent traumatic injury.The short clinical crown posed a problem in placement of direct restoration.The medical history was found non-contributory.After proper clinical and radiographic examination crown lengthening was planned for the patients. Considering the advantages of periotome guided technique over other methods of crown lengthening;(both esthetically,functionally,less extensive resective surgery,new biological width establishment). Hence,the surgical crown lengthening with periotome was planned.

SURGICAL PROCEDURE

Phase I therapy consisted of proper brushing supplemented with pre-procedural mouth rinse with 0.2% chlorhexidine twice daily. complete thorough scaling and root planning was done a week prior to the surgical procedure. Root canal treatment of those teeth were done prior to the surgical extrusion and the final restoration was done with GIC.

On the day of surgery 2% lignocaine was administered. Intrasulcular incision were given involving one tooth adjacent to the tooth to be treated on either side.A full thickness mucoperiosteal flaps were elevated carefully. All the granulation tissue was thoroughly curetted with area specific Gracey's curette and the area was irrigated with normal saline.The distance between the incisal edge and the crest of the alveolar bone was measured by UNC-15 probe to determine the amount of extrusion required.The blade of the periosteum was inserted through the PDL of the tooth to be treatedand moved in walking motion to severe the periodontal ligament attachment. The tooth was luxated, and extruded to the desired position using a hemostat such that at least 3-5 mm of the tooth structure was above the alveolar crest.The tooth was secured in the place by splinting on the palatal aspect of the tooth. Simple interrupted sutures were given to close the flap followed by the placement of periodontal pack for 1 week.Patients were instructed to rinse the mouth with 0.2% chlorhexidine twice daily for 2 weeks.Analgesics were prescribed for 5 days.Patients were recalled after 7 days for suture removal. The patient was recalled after every one week for the next one month for checkup .Clinical and radiographic assessments were done to check for changes in the gingival features,bleeding on probing, mobility, height of the bone, periapical bone formation.Patient was referred to the restorative department after 6 months for placement of fixed prosthesis.

CASE I

A systemically healthy 47year male patient with Elli's class III oblique fracture of maxillary right central incisor was referredto the Dept of Periodontics for clinical crown lengthening procedure. Thorough clinical evaluation revealed that distally the tooth was fractured 1 mm below the papillary gingival level, while mesially 2mm of tooth structure was present coronal to the papilla. Bone sounding showed approximately 1.5-2mmm of tooth structure coronal to the alveolar crest. Gingival crest of maxillary anterior teeth seems esthetic.So,after thorough discussion of the treatment plan with patient,Department of Endodontics and Periodontics surgical extrusion through Periotomeof the involved tooth was planned.5mm of tooth was extruded and secured with soft splint with the adjacent tooth. Distal fracture margin of the tooth was placed 2mm coronal to the interproximal gingiva.

CASE II

A 37yearold female patient with a horizontal fracture of the maxillary left central incisor was referred to the Department of Periodontics for clinical crown lengthening.Clinicaland radiographic evaluation revealed a fractured tooth margin below crestal bone. The decision
was made to perform surgical extrusion for clinical crownlengthening and subsequent crown replacement. The toothwas extruded and secured at a level such that the fracturemargin was situated at least 3 mm from the bone crest.Tooth mobility and gingival inflammation decreasedgradually during the second week of post-operative recall.

Table 1: Advantages and disadvantages of various crown lengthening procedures

	Periotome	Orthodontic extrusion	Gingivectomy/osseous resection
Advantages	a)Used in wide ranging resective	a)Minimally invasive therapy	Biologic width is re-established by resective surgical procedures like

	osseous surgical cases b)Reduction of duration of surgery C)Esthetics and functional results is achieved d)less chances of root resorption or ankylosis	b)esthetics is not compromised C)No interference with periodontium of adjacent tooth	gingivectomy along with osseous surgery.
Disadvantages	Crown-root ratio has to be maintained to a minimum of 1:1	a)Repeated fiberotomy b)Retention phase after extrusion is required. c)Tendency to relapse	Esthetics is the major concern

DISCUSSION

Clinical crown lengthening in esthetic zone needs an elaborative,delicateand detailed diagnosis and treatment methods. Surgical crown lengthening procedure with or without osteotomy may create asymmetric gingival zenith which can adversely affect the esthetics particularly with individual having high smile line. Hence, it is very important to maintain the symmetrical gingival contour and proper biological width while selecting a particular crown lengthening procedure.[8]

So, crown lengthening with periotome gives the advantage of preserving the gingival margin and interdental papilla.Same outcome can be achieved by orthodontic extrusion but that requires increased treatment time, repeated supracrestalfibrotomy and also has high tendency to relapse. Past studies showed surgical extrusion by osteotomy and pulling the root in desired new position can be achieved successfully and stability can be maintained for long period.

Khanberg first performed Crown lengthening by careful laxation and reposition of the tooth in new position without the use of any bone graft. But this periotome guided crown lengthening technique used specialized periotome which can easily luxate the single rooted tooth by severing the PDL.This technique doesnot cause any loss of alveolar crest.This minimally traumatic extrusion technique reduce the risk of PDL dehydration hence during healing PDL vitality is maintained. As the tooth root never extrude completely out of the socket so in long run root resorption /ankylosis is minimal.[9]

The advantage of crown lengthening by periotome over other technique is compared through table no 1.[10]

CONCLUSION

Crown lengthening by periotome gives advantage of better patient compliance in terms of reduced treatment time,no chances of relapse,no need for fiberotomy, no need for resective osseous surgery,no uneven gingival contours. So, it is an efficient alternative option in anterior estheticzone when compared to osseous resection and orthodontic tooth extrusion.

REFERENCE

1. American academy of periodontology. Glossary of periodontal terms,4th ed. Chicago: III the American Academy of Periodontology; 2001. p. 11.
2. Cohen DW. Lecture, Walter Reed Medical Center 1962
3. Gargiulo A, Wentz F, Orban B. Dimensions and relations of dentogingival junction in humans. J Periodontal 1961;32:261-7.
4. Gunay H, Seeger A, et al, Placement of the preparation line and periodontal health- a prospective two-year clinical study. Int J Periodontics Restorative Dent 2000; 20:171-81
5. Camargo PM, Melnick PR, Camargo LM. Clinical Crown Lengthening in Esthetic Zone. C D A Journal 2007;3 5,Number7:487- 498
6. Cohen ES. Crown lengthening. Atlas of Cosmetic & reconstructive periodontal surgery.Third edition.
7. Lanning SK, Waldrop TC, Gunsolley JC, Maynard JG. Surgicalcrown lengthening: Evaluation of the biological width. J Periodontol. 2003;74:468-74.
8. Wise MD. Stability of gingival crest after surgery and before anterior crown placement. J Prosthet Dent 1985;53:20-3.
9. Pontoriero R, Carnevale G. Surgical crown lengthening. A 12 month clinical wound healing study. J Periodontol 2001; 72: 841- 848
10. Ernesto A. Lee, Cir Dent. Aesthetic Crown Lengthening: Classification, Biologic Rationale, And Treatment Planning Consideration.PractProcedAesthet Dent 2004; 16(10): 769- 778.