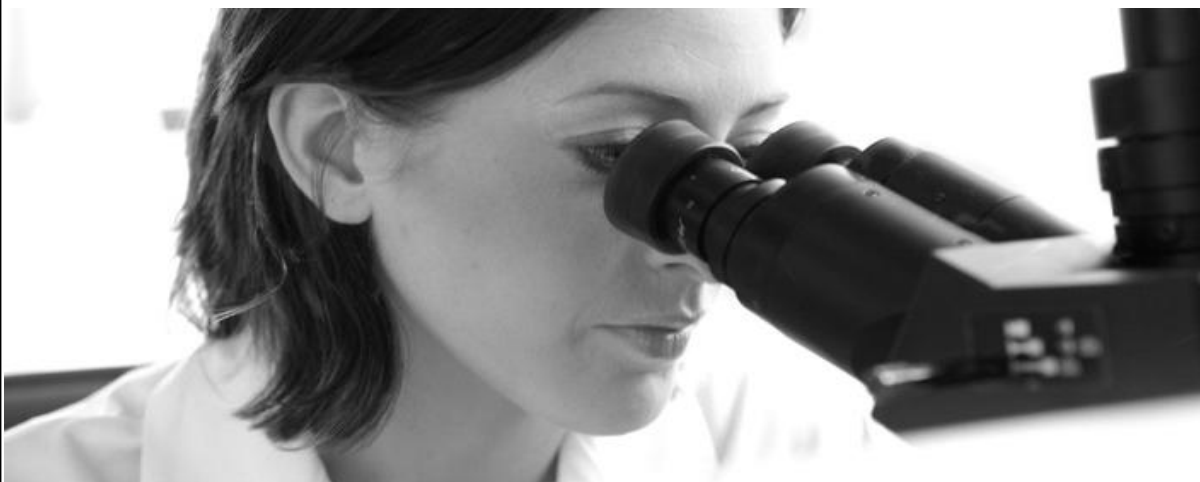


ISSN: 0976-3031

*International Journal of Recent Scientific
Research*

Impact factor: 5.114

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Volume: 6

Issue: 10

**THE PUBLICATION OF
INTERNATIONAL JOURNAL OF RECENT SCIENTIFIC RESEARCH**

**<http://www.recentscientific.com>
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ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

International Journal of Recent Scientific Research
Vol. 6, Issue, 10, pp. 7089-7092, October, 2015

**International Journal
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CASE REPORT

MANAGEMENT OF GROSSLY DECAYED TEETH WITH SHORT CLINICAL CROWN USING DISTAL WEDGE CROWN LENGTHENING METHOD: CASE REPORT

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ARTICLE INFO

Article History:

Received 15th July, 2015

Received in revised form

21st August, 2015

Accepted 06th September, 2015

Published online 28st

October, 2015

Key words:

Distal wedge, Crown lengthening, Grossly decayed teeth

ABSTRACT

A short clinical crown may lead to improper tooth preparation, thereby results in improper tooth preparation. The surgical crown lengthening procedure is done to increase the clinical crown length without violating the biologic width. Several techniques have been proposed for clinical crown lengthening which includes gingivectomy, apically displaced flap with or without resective osseous surgery, orthodontic extrusion and surgical extrusion using periosteal. The periodontal pocket on the distal surface of molars can be extremely deep due to the anatomy of this area. When the pocket becomes deeper, that depth is larger than in other areas and the inaccessibility of the area leads to difficulty in mechanical plaque control by the patient. The distal wedge technique of crown lengthening is a periodontal procedure for removal of excessive soft issue distal to the terminal tooth in an arch. This technique eliminates pocket along with crown lengthening. This case report describes the management of grossly decayed teeth by an interdisciplinary approach. (Endodontics and Periodontics)

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INTRODUCTION

Today's restorative dentist faces an apparent increase in patients exhibiting tooth wear that may result in shortened teeth, making crowning these teeth problematic. The need for crown lengthening is dictated by dental and patient factors. After crown lengthening it should be possible to put restoration margins coronal or at the gingival margin. In a study by Flores-de-Jacoby, *et al*, it was found that subgingival margins demonstrated higher plaque, gingival index scores and probing depths.¹

The indications for crown lengthening are.² a) to increase clinical crown height lost due to caries, fracture or wear. b) To access subgingival caries. c) To produce a ferrule for post crown restoration. d) To access perforation in the coronal third of the root. d) To relocate the margins of restorations that are impinging on biological width. e) Gummy smile. f) Uneven gingival contour.

Often endodontic therapy and crown lengthening are linked. Isolation for endodontic therapy can be best achieved if adequate tooth structure is present. Finally the preservation or establishment of an adequate biologic width (between the margin of the restoration and the osseous crest) can be achieved by crown lengthening. This is essential for gingival health.

In distal wedge crown lengthening technique a triangular shaped incision is placed distal to terminal tooth and removal of wedge shaped tissue for exposing clinical crown along with pocket elimination. This case report explains interdisciplinary (Endodontics and Periodontics) approach to management of grossly decayed teeth using distal wedge crown lengthening technique along with endodontic treatment.

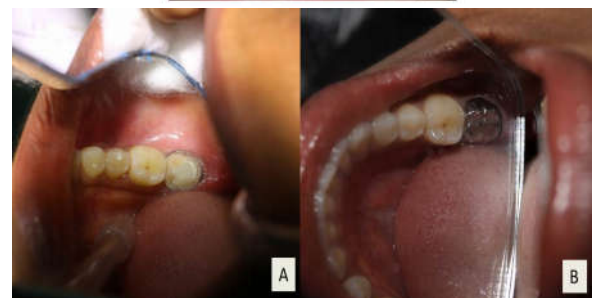
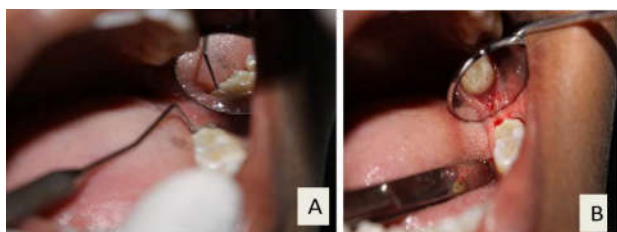
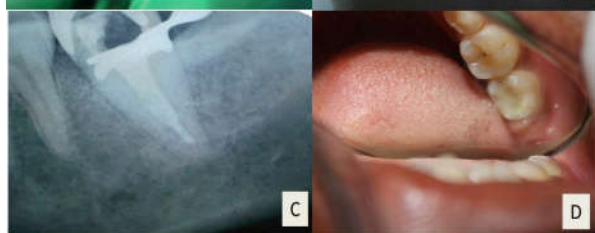
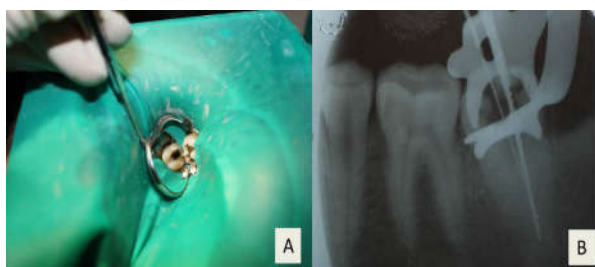
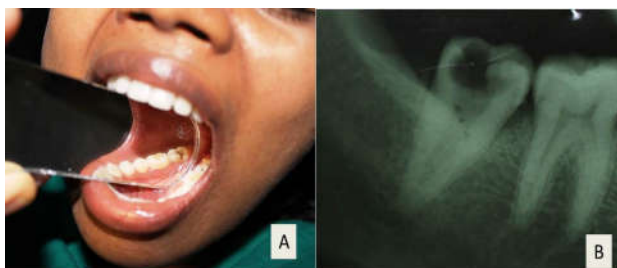
Case Report

A 20 year old female patient presented with a severely decayed mandibular left molar tooth. On intra oral examination deep carious lesion was seen in the mandibular left second molar teeth (Picture 1A). Patient gave a history of dull aching chronic

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pain from 3 months. Intra oral periapical radiograph revealed a carious lesion extending into pulp (Picture 1B). Heat, cold and electric pulp tests gave a negative response. Periodontal examination showed deep pocket distal to 37. Her medical history was non-contributory. Based on these findings the condition was diagnosed as chronic irreversible pulpitis. A detailed examination of the radiograph revealed the presence of a single root with a wide canal. Therefore C- shaped canal configuration was anticipated.



Treatment strategy

By co-relating clinical and investigation findings and discussing with other specialties an interdisciplinary treatment protocol was planned as follows: (Periodontics) and (Endodontics).

1. Oral prophylaxis
2. Endodontic treatment
3. Crown lengthening procedure
4. Post endodontic restoration

The treatment procedures were explained to the patient and patient consent was obtained. The tooth was anesthetized with 2% lignocaine containing 1:200000 epinephrine (Neon laboratories India). An endodontic access cavity was established under rubber dam isolation. Conventional endodontic access opening was established with an Endo Access bur (Dentsply Tulsa, Tulsa, OK). On access opening, a single large canal was located in the center of the pulp chamber (Picture 2A). Usually a single rooted mandibular molar could be associated with C-shaped canal, but in this case a “C” shaped orifice/canal was not identified, instead a single large canal was present at the centre of the pulp chamber which was confirmed using a dental operating microscope (Seiler Revelation, St. Louis, MO, USA).

Working length was determined using radiographs (Ingle’s method, Picture 2B) and confirmed with an apex locator (Root ZX II, Morita, Tokyo, Japan). Cleaning and shaping was done using a circumferential filing technique with ISO 2% taper files up to size 80 (MANI Inc., Tochigi-Ken, Japan). Irrigation was performed using normal saline (Nirma Pvt. Limited, Gujarat, India), 2.5% sodium hypochlorite solution (Novodent Equipments and Materials Ltd., Mumbai, India). Final rinsing of the canal was performed using 2% chlorhexidine digluconate solution (Vishal dental products, India).

The canal was dried using paper points and coated with calcium hydroxide paste as an intra canal medicament. In second appointment the canal is flushed with normal saline to remove intra canal medicament. Finally canal is irrigated with 17% EDTA (Vista dental products) and dried using paper points. Obturation of the canal was done by a combination of warm vertical condensation and thermo plasticized injectable gutta percha technique (Obtura II, Obtura Corporation, Picture 2C). After completion of root canal treatment, the tooth was restored using nano hybrid resin composite (Picture 2 D, Filtek Z250XT; 3M ESPE Dental Products, St. Paul, MN). The patient was recalled for crown lengthening procedure.

Crown Lengthening Procedure

1. After adequate anesthesia was given (2% lignocaine containing 1:200000 epinephrine (Neon laboratories India), bone sounding was done to determine the soft-tissue thickness of the ridge distal to last molar (37) (Figure 3A).
2. A no. 12 Bard-Parker blade was used to give two converging incisions distal to the left mandibular

terminal molar upto the bone. The triangular wedge incisions began from the distobuccal and distolingual line angles of the mandibular molar extending distally through the retro molar region for approximately 10.0 mm and meeting at a common point. The retromolar pad area usually does not present with much fibrous attached area. So the two incisions distal to the molars were directed slightly distofacially as the area had greater amount of attached gingiva. The distal wedge width was equal to the buccolingual dimension of the distal surface of the terminal tooth (around 4mm).

3. An intrasulcular incision was performed using no. 15 blade distal to the last molar joining the first two incisions, completing a triangular form with the base being the distal aspect of the terminal molar.
4. Using a periosteal elevator, full-thickness flap was reflected slightly buccally and lingually. The distal wedge of tissue was grasped with a tissue forceps and its connection from the bony crest was severed. The buccal and lingual flaps were thinned down using universal curette 4R-4L reducing the pocket depth. Scaling and root planing (Picture 3B) of the entire distal area was accomplished with a no. 13/14 Gracey curette. Granulation tissue was removed and osseous recontouring was done to eliminate the crater distally and to re-establish the proper bony architecture.
5. The flaps were approximated and sutured using a 3-0 bioabsorbable polyglycolic suture material (Vicryl, Ethicon, www.ethicon.com) with a P-3 needle, and the mesial interdental area of the terminal tooth was stabilized by simple interrupted suture and primary wound closure was achieved (Picture 3C).
6. A noneugenol periodontal dressing (Coe-Pak®, GC America Inc.) was placed over the surgical site. The antibiotic (Amoxicillin 500 mg for thrice daily for 5 days, Spine health care Pvt Ltd) and Chlorhexidine mouthwash (For 2 weeks, Icpa health product Ltd) prescribed. Both the dressing and sutures were removed 1 week after surgery, which showed satisfactory wound healing. The patient was recalled after week for crown preparation.

Tooth preparation was done with chamfer finish lines in relation to tooth no 37(Picture 4 A).Retraction cord (Ultrapak, Ultradent) was used for gingival tissue retraction. Polyvinyl silicone putty wash Impressions made. Temporization was done using self cure acrylic resin and cemented using non eugenol cement. The definitive full metal crown was cemented using Type I Glass ionomer cement (Picture 4B). The appearance of the patient was markedly improved.

DICUSSION

Badly mutilated teeth or the grossly decayed teeth often pose problems to the restorative dentists during their treatment due to unavailability of sufficient clinical crowns. Hence a crown lengthening procedure prior to restorative treatment is mandatory during management of such teeth.³ This case describes crown lengthening along with deep pocket elimination in the mandibular terminal tooth. Deep periodontal pockets associated with the distal surfaces of terminal molars in

the maxilla and mandible is common. Robinson initially described their characteristics in 1963.

According to that report, the gingival crest on the distal aspect of terminal molars is frequently 4mm or more occlusal to the cemento-enamel junction.⁴ The inaccessibility of the area makes proper cleaning difficult of the patient difficult or impossible and can lead to the development of pathologically deepened periodontal pocket. Prichard stated that the management of the distal area depends on the size, shape, and thickness of the fibrous tissue and the access available for surgical manipulation.⁵ The distal wedge procedure allows for elimination of deep periodontal pockets, correction of the underlying osseous defects and suturing the periodontal flap at a more apical level. This leads to exposure of more tooth structure for placement of crown margins, which makes the site more cleanable. In this case triangular wedge method of crown lengthening was employed because the lower second molar was grossly decayed with deep pockets, requires crown lengthening.

To perform this technique, various criteria are first required to set and then one should choose for an optimal technique which would best suit the situation. All the hard and soft tissue parameters (bone level, biological width and width of attached gingiva) should be recorded first to evaluate the requirement of the case. In this case there is sufficient amount of attached gingiva for proper crown lengthening.² The distal wedge technique eliminates pockets along with crown lengthening. The significance of biologic width in restorative dentistry has been well documented. Maynard and Wilson demonstrated a progressive inflammation with down-growth of the epithelial attachment and loss of connective tissue attachment as a result of the violation to biologic width.⁶ When biological width is violated, as a defense mechanism, inflammatory response triggers alveolar bone resorption to provide space for a new connective tissue attachment, which results in increased pocket depth.⁷ The next important factor is attached gingiva. Several studies have shown that 2 mm to 3 mm band of attached gingiva is preferable to maintain the restored tooth successfully.^{8,9} It is of utmost importance when planning surgical crown lengthening to evaluate and measure the width of attached gingiva. Because of the resecting nature of this procedure, there is the risk of reducing the width of attached gingiva.

The study by [Medha Singh et al](#) demonstrated that distal wedge technique is effective in the reduction of periodontal pockets present on the distal aspect terminal molars, and statistically significant difference was detected in terms of probing depth reduction, clinical attachment level gain, postoperative pain and healing rate.¹⁰ There are various means of performing crown lengthening procedure for example, scalpels, electrocautery and lasers. Laser and electrocautery have the upper hand over the scalpel in relation to hemostasis, but also have demerits like collateral heat damage, delayed wound healing, skill of the operator and higher cost.¹¹ In this case, lower terminal grossly decayed teeth with short clinical crown was successfully rehabilitated by distal wedge crown lengthening technique using a scalpel along with routine endodontic treatment.

CONCLUSION

This clinical case report describes an interdisciplinary approach for the rehabilitation of grossly decayed teeth by endodontic treatment and surgical crown lengthening using distal wedge technique. Coordinated endodontic and periodontal treatments with careful consideration of patient expectations were critical for a successful outcome and patient satisfaction.

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How to cite this article:

Pradeep. K *et al.* 2015, Management of Grossly Decayed Teeth With Short Clinical Crown Using Distal Wedge Crown Lengthening Method: Case Report *Int J Recent Sci Res*. 6(10), pp. 7089-7092.

*International Journal of Recent Scientific
Research*

ISSN 0976-3031



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