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CASE REPORT

CLASS III LABIOCERVICAL GROOVE: AN ANATOMICAL ANOMALY POSING AN ESTHETIC AND FUNCTIONAL CHALLENGE

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ABSTRACT

In grooves, developmental groove become reason for periodontal disease involvement and progression. Maxillary incisors shows common occurrence of labiocervical grooves, which can predispose to localized periodontal tissue involvement. Cervical grooves act as a locus for plaque accumulation and can cause localized periodontitis. The clinician should have an eye for early detection of such defects to prevent further tissue loss and early control of disease spread. This case report presents diagnosis and different treatment modalities for correction of cervical labial groove and elimination of periodontal pocket.

Key words:

Labiocervical groove,
Odontoplasty,
Pulpo-periodontal lesion.

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INTRODUCTION

Developmental variations and morphological abnormalities such as cervical enamel projections, enamel pearls and developmental gingival grooves in the maxillary incisors have been described as factors contributing to the localized periodontal disease process (Shiloh and Kopezyk, 1979). Everett and Kramer showed the small frequency of dento lingual grooves present on extracted maxillary lateral incisors but being a significant causal factor for periodontal disease (Everett and Kramer, 1972). The presence of labiocervical groove on the enamel surface of the maxillary central incisors was determined by Brin I, Ben Bassat Y 1989. Labiocervical groove, which starts on the cervical enamel surface and extends to the radicular surface, which has also been described as a notch (Lee et al., 1968; Gaspersic, 1986; Kozlovsky et al., 1988; Goon et al., 1991; Seow, 1997; Ben-Bassat and Brin, 2001; Shpack et al., 2007). It was suggested that this malformation is a developmental anomaly in which an infolding of the enamel organ and Hertwig's epithelial root sheath creates a groove on the labial surface of permanent maxillary incisors.⁶ The etiology of this defect was earlier thought to be due to trauma to the developing tooth bud (Shpack et al., 2007), but now it is considered as a developmental defect due to the vertical extension of the mamelon groove (Simon et al., 1971).

The depth of this notch can change from a short shallow depression to a deep groove extending apically. Shallow defects are usually not associated with any change in gingival contour and are identifiable only by probing, whereas deeper defects can result in irregular contour of the marginal gingival (Lee et al., 1968). Hence the presence of Labiocervical Groove can cause esthetic deficiency of the gingival marginal contour, accumulation of plaque and, consequently leading to gingival pocket with bone loss (Peikoff and Trott, 1977; Peikoff et al., 1985). Scarce data is available in literature about prevalence of groove and complications caused by cervical labial groove. This case report presents successful morphological correction of labiocervical groove and treatment of periodontitis to improve aesthetics and prevent further periodontal destruction.

CASE REPORT

A 19-year-old male patient reported to the Department of Periodontology, Sinhgad Dental College and Hospital, Pune, with the chief complaint of deep brown notch on upper front tooth [Fig. 1]. Patient was systemically healthy. On intraoral examination the probing depth was measured to be 5mm at the mid buccal surface of 21, [Fig. 2] and was 2mm associated with 11 [Fig. 3]. On exploration it was revealed that there was mid labial cervical groove present in relation with 21. On soft tissue examination marginal gingiva was knife edge and scalloped in relation with 21. On intra-oral periapical radiograph, it was ruled out that there was no interdental and periapical tissue involvement with 21 [Fig. 4]. On vitality test it

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was confirmed that pulp was vital. According to the classification given by Mass *et al.* 2005 the present case showed features of severe defect on the labial crown surface. Based on the above investigations staged treatment plan was formulated (Kerezoudis *et al.*, 2003).



Fig. 1. Deep brown notch in relation with 21



Fig. 2. Probing depth 5mm at the mid buccal surface of 21



Fig. 3. Probing depth 2mm associated with 11



Fig. 4. Radiographic examination

Objectives of Treatment

- Morphological Correction of labial notch and
- Elimination of periodontal pocket to create physiologically maintainable gingival sulcus.

Treatment Plan

Phase I therapy was completed and oral hygiene instructions were given. Patient was informed about the significance of labial groove and the possible consequences of attachment loss, bone loss in the region of mid-cervicolabial groove. Treatment plan was explained to the patient and informed written consent was taken. Blood investigations were done, which were within normal limit.

Surgical Procedure

Phase I therapy was reevaluated. After assuring surgical asepsis, a pre-procedural rinse with 0.2% chlorhexidine gluconate was performed. Kirkland flap was planned. Crevicular incision was given under local anesthesia (2% Xylocaine HCL with 1: 80 000 adrenaline). The full-thickness flap was reflected on facial surface to expose the facial invagination extending from enamel along the root to the level of the bony crest [Fig. 5]. Complete length of the groove was explored after flap reflection, which was extending along the root, to the level of the bony crest [Figure 6]. All local irritants which were present in vertical grooves were scaled [Fig. 7].



Fig. 5. Facial invagination extending from enamel along the root to the level of the bony crest



Fig. 6. The level of the bony crest after flap reflection



Fig. 7. local irritants which were present in vertical grooves were scaled

The area was inspected for calculus and granulation tissue. Thorough debridement was carried out to eliminate calculus and granulation tissue. [Fig. 8]. Groove saucerization was carried out [Fig. 9a, b], with 169L tapered fissure carbide bur. After complete removal of discolouration the composite restoration was done under isolation [Fig. 10]. The restoration

was polished and flap was sutured back to its original position with 3-0 black silk [Fig. 11]. Periodontal dressing (Coe Pak) was placed to cover the wound area. The patient received post-operative instructions and was prescribed post-operative antibiotic-Cap Amoxicillin 500 mg thrice for 7 days and analgesic-Emanzen- D twice a day for 3 days and chlorhexidine mouth wash was prescribed. On 7thday the dressing was removed and saline irrigation was done. The patient was recalled at 3 months and 6 months for follow up. On follow up visit probing depth and integrity of restoration was evaluated in groove area and intraoral periapical radiographs were taken.



Fig. 8. Debridement was carried out to eliminate calculus and granulation tissue

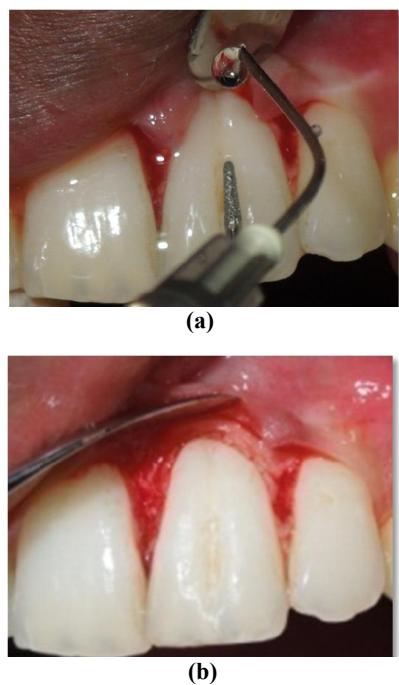


Fig. 9. a & b Groove saucerization was carried out



Fig. 10. After complete removal of discolouration, the composite restoration was done



Fig. 11. Flap sutured back to its original position with 3-0 black silk



Fig. 11. Postoperative After 15 Days

DISCUSSION

According to the American Academy of Periodontology (AAP) classification1999, the developmental conditions could lead to periodontal destruction. (Armitage 1999), developmental groove (Radicular groove) is one of the reason for bone loss and localized periodontitis (Newman *et al.*, 2002). There is literature suggesting that changes in tooth size, number, and morphology have been widely noticed and discussed (Constant and Grine, 2001; Mishal and Sheela, 2014). Recent microbiological data have acknowledged that before disease progression can occur, a susceptible host and site are required, in addition to the presence of pathogenic bacteria (PrashantBhusar *et al.*, 2014). There are numerous morphologic anomalies that can predispose to periodontal diseases, like cervical enamel projection, labial groove, palatoradicular grooves, root grooves and enamel pearls. The Labiocervical groove is an anatomical variation occurs at cervical third area on crown of maxillary incisor region. This region is an area of embryological hazard which forms stagnant sites or ecological niches favoring micro-organisms retention and growth, when it extends on the root it also creates an anaerobic conditions that get established inside the grooves (Constant and Grine, 2001). These fissure like grooves which favors plaque and calculus accumulation and become critical areas for the patient or dentist to clean properly. These areas later act as a secondary etiological factor for development of periodontitis in localized tooth defect (Peikoff and Perry, 1985). Shapack *et al.* studied the prevalence of labiocervical groove in upper incisors in 1250 patients. He found that the groove was present in 5.3% of upper incisors and there was significantly more distribution in the central incisors (94%) (Simon *et al.*, 1971). According to Mass *et al.*, 2005 the prevalence of labial notch on the maxillary central incisors was 4.5% while according to Brin and Ben-Bassat the prevalence was 6.5% (Brin and Ben-Bassat, 1989). Mass *et al.* 2005 has proposed a classification based on the severity of labiocervical groove. (1) a mild subgingival shallow groove below the marginal gingiva that can be felt only by probing; (2) a

moderate groove that can be detected with the eyes, extending subgingivally as in (1), and additionally supragingivally on the labial crown surface, not more than 2 mm from the marginal gingiva in the incisal direction and (3) a severe defect extending supragingivally more than 2 mm from the marginal gingiva on the labial crown surface and further subgingivally (Mass *et al.*, 2005).

The appropriate treatment modality would be

No	Type of defect	Treatment modality
1	Mild	Morphological alteration of groove by smoothening or odontoplasty
2	Moderate	Saucerization and restoration of groove with composite or GIC restoration
3	Severe	Periodontal flap surgery with or without regenerative procedure depending upon soft and hard tissue loss and restoration of groove with composite or GIC restoration

The depth & extent of the groove is an important factor for the prognosis of the tooth. The labiocervical groove present on maxillary central incisor (11), in the present case can be classified as a severe defect according to Mass *et al.*, 2005. In this case, labiocervical groove was present in the midbuccal region of 21 which was associated with 5 mm probing depth. The periodontal flap surgery was planned to gain an accessibility and visibility for treatment of groove and to achieve physiologically maintainable gingival sulcus. After raising a flap, the groove was sealed with light cure composite material. In several case reports various restorative materials like composite resins and light cure GIC, MTA have been used to seal such grooves. A case report by Srinivas and Pradeep²³ reported restoration of groove using Glass ionomer cement.²³ Light cure composite was preferred as an aesthetic restorative material over GIC, because the sealing ability in terms of micro-leakage is better with composite resins than light cure GIC (Everett and Kramer, 1972).

Conclusion

Labiocervical groove causes faster breakdown of fragile sulcular attachment in relation to defect leading to esthetic defect of gingival marginal contour and Periodontal tissue destruction. It is essential not only to identify and record its presence in routine dental examination but also its preventive correction to avoid further periodontic-endodontic involvement of tooth, to avoid such consequences which affect prognosis of treatment.

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