

Comparison of Two Soft Tissue Gingivectomy Techniques For Gingival Clefts: A Case Report

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Abstract

Gingival cleft is an alteration of the gingival tissues. Gingival clefts or invaginations subsidize to orthodontic relapse and deterioration of periodontal health in extraction cases. During orthodontic treatment, the clefts can induce plaque retention and initiation of periodontal problems. These clefts or invaginations can be eliminated by surgical gingivectomy techniques. This report presents a case of bilateral gingival clefts and its management by surgical gingivectomy technique and laser assisted therapy on either sites.

Keywords: Gingival cleft; Invagination; Gingivectomy; Orthodontic treatment; Tooth extraction.

Introduction

In this Case report, a complimentary frame to bring out its true beauty! It is common nowadays for esthetically-conscious individuals to place great importance on the improvement of their smile. Cosmetic dentistry or esthetic dentistry has become a separate specialty in its own right. With increase in concern for esthetics, along with changing social norms, the focus on orthodontic treatment has been enhanced among the adult population. In order to

move the teeth and jaws positioned improperly orthodontic force is applied, thus transforming the soft tissue and hard tissue relationship to achieve acceptable esthetics. The changing concepts of esthetics have combined functional benefits with esthetics with advancements of ceramic brackets, mini brackets and lingual braces.

As with any form of treatment, there are some risks associated with orthodontic treatment which includes tooth staining, decalcification of enamel, periodontal complications like open gingival embrasures, root resorption, allergic reactions to nickel & chromium and orthodontic relapse [1]. But the risks and complications of orthodontic treatment are outweighed by their benefits. Inter disciplinary co-operation with clinical excellency from orthodontists and periodontists is required. Teamwork is also important in monitoring the periodontal health of patients throughout the course of orthodontic therapy.

Thus, orthodontic treatment can be attributed as a two-edge sword, which at times may lead to improvement of the periodontal health status, or on the contrary may have

detrimental effects leading to various periodontal complications.[2]

The extraction of teeth may be required in orthodontic treatment to satisfy the demands of space indiscrepancy, preferably first or second premolars are extracted in both the maxilla and the mandible. An infolding or invagination of gingival tissue is often formed during the orthodontic approximation of teeth adjacent to the extraction site.[3,4] Gingival cleft refers to a fissure in the gingival tissues (AAP Glossary of Periodontal Terms) and is usually caused by traumatic oral hygiene habits.[5] Abnormal frenula, trauma from occlusion [6], orthodontic, or pierce related trauma[7] also contribute in gingival cleft formation. This finding appears as a "pseudopocket" which can be probed both horizontally and vertically[8].

The cleft may appear as either a crease in the attached gingiva which may be minor and casual or it can be present from the buccal to the lingual alveolar surface as deep clefts approaching the interdental papilla. Many reasons have been put forth for these but one reason may be the discontinuity of the gingival fiber system and remodeling of bone that may be a consequence of disintegration of cortical plates, healing of socket, and movement of root.[9] The invagination may also form due to displacement of the gingival fiber system during tooth movement, resulting in a passive folding or piling up of gingival tissue[10]. After completion of orthodontic treatment, these may persist for upto five years [11].

Based on the extent of the gingival thickness involvement, gingival clefts are classified into red and white. The "red" clefts may heal spontaneously on changing the oral hygiene habits and presents as a partial gingival fissure. On the other hand, the "white" clefts are irreversible involving the entire gingival thickness. The white clefts involving the entire keratinized mucosa are divided as

complete and those with an unaffected gingiva apical to the cleft as incomplete.[12].

Accumulation of bacterial plaques directly related to periodontal health.[13] The future periodontal health could be affected by the presence of gingival invaginations or clefts during and persistence after orthodontic tooth movement. Since there are possibilities of space recurrence and periodontal problems occurrence, periodontic intervention is necessary on the gingival cleft region. [14]The gingivectomy of the affected gingival tissue is the recommended treatment approach for the clefts .[15]

This article presents a case report of management of gingival clefts on maxillary bicuspid region bilaterally by conventional surgical and laser assisted gingivectomy technique on either side.

Case Report

A 23 year old female patient was referred to the department of periodontics, Kalinga Institute of Dental Sciences, Bhubaneswar from the department of orthodontics for management of gingival overgrowth in maxillary bicuspid region bilaterally resulting in improper space closure. On examination, it was observed that gingival cleft was present bilaterally with the vertical (length) and horizontal (depth) extent upto 3-4 mm on probing with a Williams periodontal probe. IOPA radiograph revealed no involvement of alveolar bone. The patient's medical history was non-contributory, so a conventional surgical and laser assisted gingivectomy technique was planned.

Conventional surgical technique [Fig 1-3]

Hyperplastic gingival tissue with respect to 13 15 region was resected with periodontal knives, a scalpel, and scissors. The pockets were recorded and marked to create bleeding points and incision was started with face of the blade directed coronally (external bevel incision). The

incision was beveled at approximately 45° to the tooth surface aimed to recreate, as far as possible, the normal festooned pattern of the gingiva. The gingival margin was detached at the incision line with currettes, and a periodontal pack was placed.

Laser assisted gingivectomy technique [Fig 4-6]

Gingival cleft with respect to 23 25 region was performed using diode laser. The operator, patient and assistant wore laser eyewear protection as proposed by FDA laser safety rules.[16] The PICASSO AMD soft tissue diode lasers of 810 nm wavelength and tip diameter of 200µm was used. The diode laser unit was activated at energy settings 1.8 watts in Continuous Wave (CW) mode along the initial laser incision to remove the tissue and tip was kept in contact mode. Sterile gauze soaked in saline was used to remove the gingival tissue tags.

Patient was prescribed analgesics for use when required and postoperative instructions were given. Patients did not complain of any pain or discomfort, during surgery or follow up.

Discussion

The area subjected to orthodontic space closure following extraction is commonly associated with the development of gingival cleft. In a study Robertson et al., examined forty patients for the presence and distribution of gingival clefts. It was observed that fourteen of the forty patients presented with cleft on the premolar extraction sites, while patients treated without extractions had no cleft on the premolar sites.[11]

In this case, on 7th postoperative day of conventional surgical technique, the patient revealed of experiencing mild postsurgical pain and discomfort. However, the healing was uneventful with complete removal of the gingival cleft. However, on the laser operated site, no clinical healing difference was observed

between the site operated with conventional surgery. Although the healing was delayed with lasers.

Gingivectomy can be done by various techniques such as scalpel, electrosurgery and laser. However, the use of lasers provide many advantages as compared to other techniques. The diode laser is a solid-state semiconductor laser with wavelength ranging from 810 to 980 nm that determines its absorption in biologic tissues. Laser radiant energy interacts with the tissue in several ways: reflection, transmission, scattering and absorption. When the tissue is initially heated by laser beam, it is subjected to warming (37C to 60C), protein denaturization, coagulation (> 60C), welding (70C to 900C), vaporization (100C to 150C), vaporization and carbonization (>200C).[17] Laser light at 800 to 980 nm has good absorption in hemoglobin and other pigments like melanin.[8] Soft tissue surgeries in close proximity with hard tissues can be managed efficiently with diode lasers as they do not have any effect on other hard tissues.

Rapid cell vaporization with loss of intracellular fluid, chemical mediators and denaturation of intracellular substance and protein results in a less intense local inflammatory response and consequently less pain and edema; therefore, less amount of local anesthesia is required to perform laser surgery in comparison to scalpel surgery.[19]

There are indeed a not many studies comparing the postoperative effects of diode laser and scalpel technique for removal of gingival clefts. Edwards[20] reported a controlled study on a series of 10 patients, who were followed with bilateral gingival clefts after initial closure of extraction spaces. He claimed that if the excess gingiva between approximated teeth is removed by gingivectomy, relapse can be alleviated and gingival health can be maintained. Rivera Circuns and Tulloch[9] reported no correlation between the presence of gingival invaginations

and the extraction space reopening. The advantage of comparing the techniques within a subject, minimizes the influence of numerous other factors. However, the 1 month results also showed significant improvement in improvement of the gingival cleft depth.

Conclusion

Until 1970s, periodontists could not substantiate the positive and negative impact of orthodontic treatment on the periodontal health and longevity of the teeth. Periodontic-orthodontic interrelationships are still controversial issues.

Removal of gingival clefts can be considered a treatment modality to maintain the periodontal health and may help to avoid orthodontic relapses in extraction cases. Further studies need to be conducted in this regard. It will be interesting to follow such patients for a long period and to investigate the effect of gingival cleft removal on extraction space reopening and on future periodontal health. Taking into consideration the admirable clinical outcome, the diode laser can be used as a dependable alternative as it is an efficient, secure, and satisfactory option for soft tissue surgeries like management of gingival clefts.

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Legends Figure



Fig 1: Preoperative view of Gingival cleft of 13 15



Fig 2: Preoperative view of Gingival cleft of 13 15



Fig 3: Postoperative view of Gingivectomy with scalpel technique.



Fig 4: Preoperative view of Gingival cleft of 23 25



Fig 5: Preoperative view of Gingival cleft of 23 25



Fig 6: Postoperative view of Gingivectomy with diode lasers