

Soft tissue development around pontic site: A case series

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Abstract

An ideal emergence profile is vital for maintaining gingival health and developing esthetics. The ovate pontic which mimics a natural tooth gives the most appropriate emergence profile. For a successful ovate pontic restoration, an alveolar ridge of sufficient height and width is necessary to enhance the deficient ridge and to achieve an esthetic emergence profile. Interpositional graft was carried out along with ovate pontic to achieve an ideal esthetic restoration. After three months of the postoperative period, there was an increased horizontal dimension in the deficient ridge and an esthetic emergence profile. Interpositional graft technique is a simpler and predictable technique for pontic site development in moderate cases of bucco-lingual ridge deficiency.

Key Words: Emergence profile, interpositional graft technique, ovate pontic

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INTRODUCTION

Stein and Kuwata were the first to use the term “emergence profile” in 1977 to describe the contours of tooth and crown as they traversed through soft tissue and rose interproximally toward the contact area and height of contour facially and lingually.^[1]

An ideal emergence profile is vital for maintaining gingival health and developing esthetics.

An improperly created emergence profile creates a protected area that encourages plaque accumulation and is more difficult to clean, leading to marginal inflammation whereas contralateral teeth that have not been restored remains healthy.^[2] Careful attention to developing the proper emergence profile in the

final restoration will help reduce plaque retentive areas and will thus reduce iatrogenic inflammation. This, in turn, prevents the unsightly dark spaces and triangles in the area near the gums and between the teeth.^[3]

A proper emergence profile becomes even more important if the restoration is planned in the anterior maxilla or if the patient has a high smile line.

The ovate pontic has been suggested as a more accurate duplication of emergence profile for natural teeth to provide esthetics, the goal of which is to create an illusion that the tooth is emerging from the gingiva with a cuff of tissue surrounding it on the facial aspect.^[4]

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For successful ovate pontic restoration, an alveolar ridge of sufficient height and width is a prerequisite, which is in terms of interproximal height, free gingival margin, and facial prominence. Augmentation of any of the deficiencies is needed to accommodate the pontic.^[5]

This case series describes two cases of the deficient alveolar ridge being augmented by interpositional connective tissue graft and finally restored by ovate pontic.

CASE REPORTS

Case 1

A 50-year-old female patient reported to the Department of Periodontics, Sri Rajiv Gandhi College of Dental Sciences, Bengaluru with the chief complaint of the mobile upper front tooth. Clinical examination revealed Grade II mobile I2, with root canal treated I2, I1, 2I, 22 [Figure 1]. Cone beam computed tomography scan revealed horizontal fracture at the cervical third of the root making the tooth mobile, absence of buccal plate up to the apical third of root and large periapical radiolucency, making the endodontic prognosis for retreatment poor.

Patient was then given two treatment options, first guided bone regeneration followed by implant placement, and the second being tooth retained fixed partial denture with cantilevered I2 considering that central incisors and the contralateral lateral incisor required crown placement postendodontic therapy. Meanwhile, the patient fractured her crown and visited a private practitioner where the extraction of I2 was carried out and was restored with a provisional restoration, when the patient reported back to the department 1 month after the extraction, she presented with collapsed ridge in the bucco-lingual direction [Figure 2]. So an interpositional graft procedure^[6] for increasing the bucco-palatal dimensions and pontic site development was planned after complete healing of the extraction socket.

Interpositional graft procedure with graft harvested through trap door technique

Horizontal incision not involving the adjacent papillae was placed slightly buccal to the crest of the ridge, and a supra-periosteal pouch was created using No. 15-c blade.

Connective tissue graft was harvested from palate using trap-door technique^[7] utilizing a horizontal incision 3–4 mm away from the gingival margin with two vertical incisions on the either end of the first incision, creating a door, the door is then undermined and opened using a sharp dissection, the underlying connective tissue is then harvested using a periosteal elevator, and the door was then sutured using 4-0 silk sutures [Figure 3] and was transferred to the buccal pouch and sutured using 6-0



Figure 1: Preoperative picture prior to extraction



Figure 2: Collapsed ridge in the bucco-palatal dimension



Figure 3: Trap door technique to harvest connective tissue graft

polypropylene suture [Figure 4]. Immediate provisionalization was carried out using lateral incisor shaped in the form of an ovate pontic and attached with a wire splint [Figure 5].

Periodontal dressing Coe-Pak was applied over the surgical sites. The patient was prescribed with antibiotic therapy, that is, amoxicillin 500 mg, thrice a day and analgesic, that is, ibuprofen 400 mg twice a day for 5 days. Tooth-brushing was

discontinued for the first 2 weeks at the surgical site, and 0.2% chlorhexidine mouth rinse was instructed until 2 weeks after surgery. Coe-Pak was replaced every week for 4 weeks after the surgical procedure. Sutures were removed after 2 weeks at the donor site and 4 weeks at recipient site.

Healing was uneventful with minimal postoperative discomfort to the patient. The patient was recalled at 1 and 3 months for follow-up.

At 3 months follow-up, examination revealed an increased bucco-palatal width of the ridge and a saucer like depression in the area of the ovate pontic covering the ridge was achieved. After 3 months, this provisional restoration was replaced by a three-unit fixed partial denture with a cantilevered I2 [Figure 6].

Case 2

A 14-year-old female patient undergoing orthodontic treatment was referred to the Department of Periodontics, Sri Rajiv Gandhi College of Dental Sciences, Bengaluru, for the evaluation of ridge deficiency in the region of 22 which was congenitally missing.

Because of the patient's age, the option of replacement with an implant was not feasible. Hence a Maryland tooth supported fixed partial denture was planned. On clinical examination, bucco-palatal ridge deficiency was seen at the edentulous site [Figure 7]. An interpositional graft procedure^[6] for increasing the bucco-palatal dimensions and pontic site development was planned.

Interpositional graft procedure with graft harvested through single incision technique

The crestal incision was made, and the supra-periosteal pouch was created using No. 15-c blade without involving subjacent interdental papillae.

Connective tissue graft was harvested from the palate using single incision technique^[8] which involves starting from a single incision 3 to 4 mm away from the gingival margin to a layer thickness of 1 to 1.5 mm and undermining to sharply separate the connective tissue layers from each other. After preparation, the deep-lying connective tissue is separated from its surroundings by incisions reaching to the bone and is detached from the bone with a periosteal elevator. After the removal of



Figure 4: Connective tissue graft pouched into the created buccal pouch



Figure 5: Immediate provisionalization using lateral incisor shaped as ovate pontic



Figure 6: Three months postoperative depicting maintained interdental papilla and emergence profile

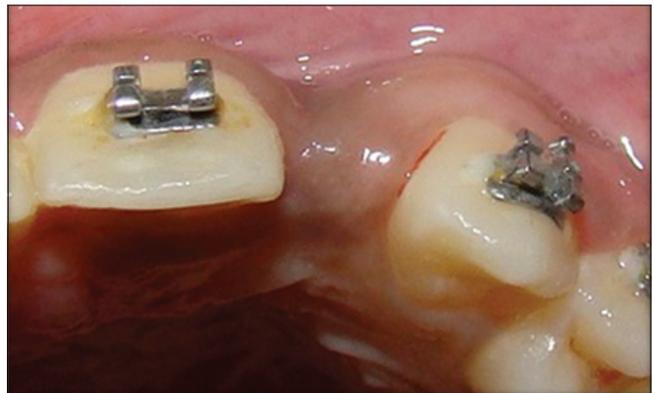


Figure 7: Preoperative picture showing loss of ridge in bucco-palatal dimension

connective tissue, the donor site is closed with 4-0 silk sutures. Connective tissue graft is then transferred to the recipient site [Figure 8] and sutured with 6-0 polypropylene making sure that enough space was left in between the tissue to accommodate for ovate pontic [Figure 9]. Immediate provisionalization was carried out using temporary Maryland bridge with ovate pontic.

Periodontal dressing Coe-Pak was applied over the surgical sites. The patient was prescribed with antibiotic therapy, that is, amoxicillin 500 mg, thrice a day and analgesic, that is, ibuprofen 400 mg twice a day for 5 days. Tooth-brushing was discontinued for the first 2 weeks at the surgical site, and 0.2% chlorhexidine mouth rinse was instructed until 2 weeks after surgery. Coe-Pak was replaced every week for 4 weeks after the surgical procedure. Sutures were removed after 2 weeks at the donor site and 4 weeks at the recipient site.

Healing was uneventful with minimal postoperative discomfort to the patient. The patient was recalled at 1 and 3 months.

At 1 month follow-up, there was an increased bucco-palatal width of the ridge and an esthetic emergence profile was

achieved [Figures 10 and 11], which was maintained at 3 months follow-up [Figure 12].

DISCUSSION

Preserving interproximal soft tissues and prevention of alveolar bone collapse following tooth extraction still remains a challenge. It is prudent to preserve the socket dimensions, shape, and the gingival tissue height, with techniques utilizing connective tissue grafts,^[9] free gingival graft,^[10] acellular dermal matrix,^[11] resorbable hemostatic plug,^[12] and membranes with or without the bone grafts,^[13] or provisionalization with a pontic that supports the gingival contours and eliminates the “black triangle.”^[14]

If socket preservation procedure is not employed at the time of extraction in esthetically demanding areas, then soft tissue augmentation procedures have to be performed after the healing of extraction site to optimize the esthetics.

Various soft tissue procedures for improving ridge deformities are described. Free gingival onlay graft was advocated by Seibert to enhance ridge height and replace traumatized

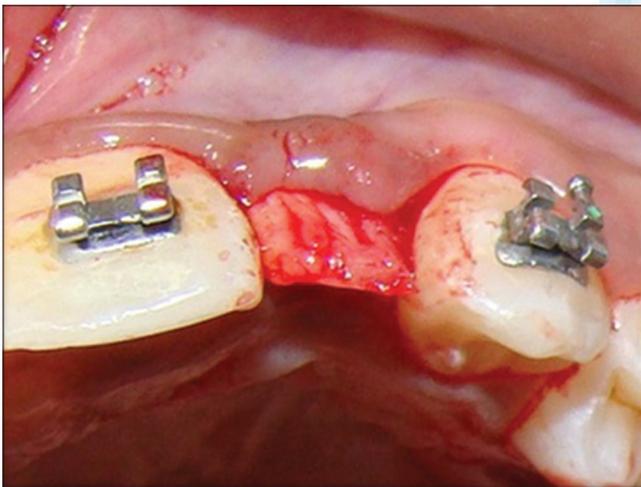


Figure 8: Connective tissue graft being pouched into the buccal pouch

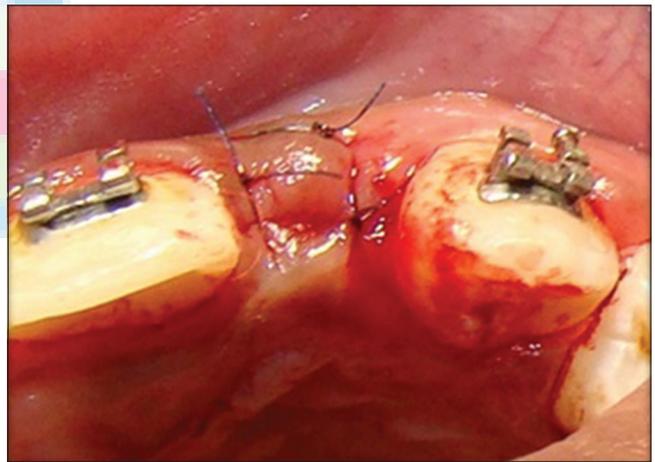


Figure 9: Recipient site for ovate pontic



Figure 10: One month follow-up showing esthetic emergence profile

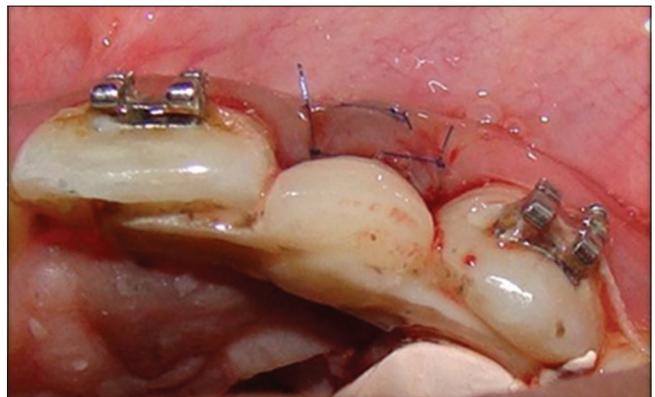


Figure 11: One month follow-up showing increased bucco-palatal ridge dimensions

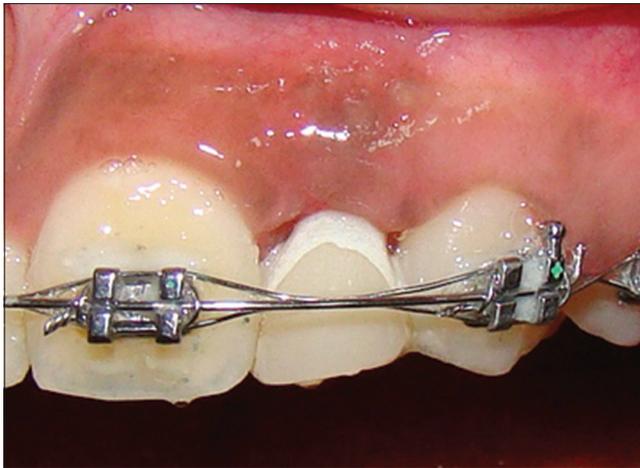


Figure 12: Three months follow-up showing maintained ridge dimensions and emergence profile

tissue.^[15] Though technically simpler, it has its own disadvantages, including postoperative necrosis in case of inadequate blood supply, unpredictable shrinkage of grafts, and color mismatch.^[16]

Later, Langer and Calagna described subepithelial connective tissue graft to preserve tissue color and the texture of the underlying mucosa, resulting in better esthetics.^[9] Thoma *et al.* in his review concluded that subepithelial connective tissue grafts provided greater soft tissue volume than free gingival grafts, due to increased vascularity, there are decreased chances of necrosis. However, the need for the second surgical site and unpredictable shrinkage are the disadvantages.^[9]

Interpositional graft procedure is technically simpler and procedure to augment the deficient ridge in bucco-palatal direction.^[9] However, it can only be used for mild to moderate augmentations.

In situations with large ridge deficiencies, a combination of hard and soft tissue augmentation is desired, and in situations of ridge deficiency involving a number of teeth, a commercially available such as alloderm proves to be a good alternative.

Ovate pontic along with soft tissue procedure was used to mimic the emergence profile. The advantage of ovate pontic is to achieve maximum esthetics along with positive tissue contact.^[14] However, sufficient faciolingual width and apicocoronal thickness are required for housing the ovate pontic. Hence, additional surgical procedures are frequently required to augment the edentulous ridge.^[17]

CONCLUSION

Both the clinical cases demonstrated an esthetic emergence profile at 3 months follow-up with excellent soft tissue support. Thus, interpositional graft used in conjunction with provisional ovate pontic is recommended to enhance emergence profile in cases of moderate bucco-lingual ridge deficits.

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Conflicts of interest

There are no conflicts of interest.

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