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Ridge Split Technique with Simultaneous Implant Placement in the Upper Lateral Incisor Region: A Case Report

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Abstract

This case report describes the successful application of the ridge split technique with simultaneous implant placement in the upper lateral incisor region of a 24-year-old male patient presenting with a hourglass shaped alveolar ridge. The patient exhibited inadequate bone width for conventional implant placement, necessitating ridge augmentation. The ridge split procedure was performed under local anesthesia, involving a controlled osteotomy and expansion of the alveolar ridge to achieve a width of 6.5 mm. A 3.5 mm diameter implant was placed concurrently, achieving primary stability. Postoperative cone-beam computed tomography confirmed optimal implant positioning and increased ridge width. After a 4-month osseointegration period, the implant was restored with a porcelain-fused-to-metal crown, yielding excellent esthetic and functional outcomes. No complications, such as wound dehiscence or implant failure, were observed at the 12-month follow-up. This case highlights the efficacy of the ridge split technique as a minimally invasive approach for managing narrow alveolar ridges, facilitating immediate implant placement and predictable long-term results in the esthetic zone.

Keywords: Microsaw Osseointegration, Ridge Split Technique, Tomography

Introduction

The ridge split implant placement technique provides a very crucial surgical method in the specialty of implant dentistry. This technique can be favorable when the alveolar bone is indeed very narrow for traditional placement of implants, typically because resorption takes place on the bone after the loss of teeth or other anatomical limitations. Careful splitting and expanding the alveolar ridge allows this ridge split technique to provide adequate space for placing an implant with preserved bone integrity, keeping the process natural as well by promoting osseointegration. The procedure qualifies under minimal invasiveness when compared to bulkier alternative procedures for bone grafting and translates into reduced treatment time along with associated morbidity. The case presentation below demonstrates clinically how to use this technique, its indications, procedural steps, and outcomes towards successful restoration through implants.

Case report

A 24 year old male patient reported to opd with a chief complaint of missing upper lateral incisor which was extracted 1 year back. On intraoral examination a Kennedy's class 3 space and a Siberts class A ridge defect was seen. A complete case history with preoperative procedures consisting of a Cone Beam Computed Tomography, diagnostic cast, oral prophylaxis and routine blood investigations were done. The patient was willing to follow a process that did not involve using an additional donor site for agumenting, a ridge split procedure was scheduled to gain enough ridge width to help implant placement. The full treatment plan was told to the patient, and written consent obtained.

Surgical Procedure

The site was anesthetized using 2% lignocain 1:100,000 epinephrine. A no.15 blade was used midcrestal incision was made to raise a full thickness flap so as to expose the ridge the Buccopalatal width was measured to be _____. According to protocol initial ossteotomy was done with a twist drill (1.8mm x13mm) to a depth of 13mm followed by a microsaw (diameter-7mm) (Esset Kit Osstem) which was used to split the ridge to a depth of 3mm. The visco-elastic nature of the bone was utilized so as to prevent fracture. The expansion drills where used in sequence of ø1.6/2.8 x 11.5 then ø2.2/3.6 x 11.5, the expansion drill where allowed to sit in the final position so as to facilitate the changes in bone microstructure. One TSIII SA 3.5mm x 13mm implant was placed. Interrupted sutures where use for a close approximation. Postoperative instructions were advised to the patient. Antibiotics and analgesics were prescribed with chlorhexidine mouth wash 0.2% for 5 days. Sutures were removed after 7 days. Patient was periodically reviewed for 8 months, followed by prosthetic rehabilitation with full ceramic crowns.

Discussion

The ridge split procedure leverages controlled osteotomy to expand the alveolar bone, creating space for implant placement while preserving the cortical plates. In this case, the use of osteotomes and sequential expanders ensured minimal trauma to the surrounding bone, promoting optimal healing conditions. The immediate placement of implants following ridge expansion capitalized on the freshly prepared site, reducing treatment time and enhancing patient satisfaction. The selection of implants with appropriate diameter and length was critical to achieving primary stability, which is a key determinant of successful osseointegration in such cases.

Intraoperative findings, including bone quality and ridge dimensions, guided the surgical approach. The case highlights the importance of preoperative imaging, such

as cone-beam computed tomography (CBCT), in assessing ridge morphology and planning the osteotomy. CBCT allowed for precise measurement of bone width and identification of vital structures, minimizing complications such as perforation of the cortical plates or damage to adjacent anatomical landmarks.

Postoperative outcomes in this case align with existing literature, which reports high success rates for ridge split techniques when performed with meticulous surgical technique and appropriate patient selection. Studies indicate implant survival rates exceeding 95% in such scenarios, with predictable bone augmentation and minimal postoperative morbidity. The avoidance of donor site morbidity, as seen with autogenous grafts, underscores a significant advantage of this technique. However, challenges such as the risk of fracture in highly cortical bone or limited applicability in severely atrophic ridges warrant careful case selection and surgical expertise.

Figure 1:

Figure 2:

Figure 3:

Figure 4:

Figure 5:

Figure 6:

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