CASE REPORT


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Received on: 03 November 2022; Accepted on: 27 December 2022; Published on: 27 June 2023

ABSTRACT

The enhancement of ridge-split procedure by piezosurgery provides adequate buccolingual width for implant placement in atrophied alveolar ridges. A 50-year-old systemically healthy female reported with 3 mm of buccolingual width in the anterior mandibular alveolar ridge. The patient underwent immediate implant placement after alveolar ridge split done by piezosurgery and the use of expanders. Functional prosthetic rehabilitation was done after 3 months. The ridge-split procedure has predictable results in implant survival. The piezosurgical unit provides more favorable osseous results than hand instruments.

Keywords: Implant, Mandible, Ridge split.

Dental Journal of Advance Studies (2023): 10.5005/djas-11014-0001

INTRODUCTION

Dimensions of the alveolar ridge are considered to be critical for the placement of dental implants. The deformities related to the defect of alveolar ridge may be developmental, due to congenitally missing teeth, odontogenic cysts and tumors, tooth extractions, dehiscence, or advanced periodontal disease. A study by Schropp and other researchers has found that a reduction of 50% of the alveolar bone occurs by 12 months post extraction. This loss was calculated to be approximately 5–7 mm and challenges the prosthetic rehabilitation. A minimum of 6–7 mm bone width is required for implant placement using standard surgical protocol, and bone thickness should be at least greater than 1.5 mm both on vestibular and on lingual/palatal side. To achieve these dimensions, various alveolar ridge augmentation procedures/techniques have been used.

The most predictable treatment for the augmentation of the alveolar ridge in a horizontal or vertical direction is still the use of autologous bone graft in the form of blocks or particulates from the intraoral or extraoral donor areas. The limitations of morbidity and the problem of the second surgical site have motivated researchers to look for alternative techniques.

In this regard, the alveolar ridge expansion technique has been used for horizontal ridge augmentation, which was introduced by Tatum and later modified by Summers. The main advantage of such a technique is that the installation of implants can be accomplished in the same surgery, thereby decreasing the number of surgical procedures and the time of treatment for the patients. Ridge-split technique requires minimum buccolingual width of 3 mm for maintaining proper blood supply of separated cortical plates. This technique can be a one-step or two-stage procedure with implant placement giving predictable bone augmentation using microsaws or piezosurgical unit.

In this case report, we are presenting the implant placement in the mandibular atrophic anterior ridge area with a piezosurgical unit and bone spreaders.

CASE DESCRIPTION

A female patient aged 50 years reported to the Department of Periodontics with the chief complaint of missing 42, 41, 31, 32, and 33 from the last 6 years (Fig. 1). A clinical and radiological evaluation was completed, and all treatment options for prosthetic rehabilitation were given to the patient. The patient was interested in implant placement. The patient was systemically healthy, and on intraoral examination, there was a ridge width of 3 mm with class I defects, i.e., buccolingual loss of tissue (Siebert’s classification). Jha et al. in their systematic review have reported several advantages with the use of piezosurgery. So, we decided to perform the procedure in a single stage with the piezosurgical unit.

SURGICAL PROCEDURE

The procedure was performed under 2% lignocaine containing 1:2,00,000 epinephrine. The mid-crestal incision was made on
Ridge Split and Implant Placement

Once the bone was prepared, the implant osteotomy site was prepared using sequential drills. Two 3.3 × 11.5 implants were placed in the osteotomy site following the standard surgical protocol (Figs 3A and B).

The spaces between implants were filled with xenograft to enhance regeneration. The primary stability of implants was established, and the flaps were sutured with 3–0 vicryl suture material.

A periodontal pack was placed on the surgical area, and postoperative instructions were given to the patient. Antibiotics and analgesics were prescribed to the patient for 5 days.

Strict instructions for maintaining proper oral hygiene were recommended.

The patient was recalled after 7 days for suture removal, and uneventful healing was observed. The patient was recalled after 3 months, and prosthetic rehabilitation was done (Fig. 3C). The patient was followed up to 3 years, and implant stability and prosthetic components were found to be satisfactory (Figs 3D and E).

Discussion

Proper case selection is required in the cases of ridge split and implant placement in deficient alveolar ridges. The ridge deficient in buccolingual width and adequate amount of height (apico-coronal) are indicated for ridge-split technique.

The healing mechanism is similar to greenstick fracture repair observed in bone. The ridge-split technique yields better results in the maxilla than in the mandible because it is more cancellous and resilient. In the mandible, there are more chances of fracture of the cortical plate.

Ridge-split technique eliminates the need of the second surgical site for any type of onlay bone block and provides better patient compliance. It also allows immediate ridge expansion for

Fig. 1: Preoperative clinical photograph

Figs 2A and B: (A) Vertical cuts united with crestal depth; (B) Bone expanded with expanders

the ridge, followed by two vertical-releasing incisions beyond the mucogingival line. A mucoperiosteal flap was raised. A piezosurgical unit was used to cut the osseous crest mesiodistally. Vertical cuts were given with piezotips, and the cuts were aligned with crestal depth (Fig. 2A). Scoring was done on the buccal periosteum to remove any tension in the flap. The bone cut on the osseous crest was expanded with bone expanders until the desired buccolingual width was achieved (Fig. 2B).
immediate implant placement. Ridge-split technology can be performed with osteotomes, microsaws, or piezosurgery. Greater crestal bone loss was observed with hand instruments as compared with piezosurgery.  

Piezoelectric alveolar ridge split has several advantages over other techniques like minimal bleeding, soft-tissue preservation, intact periosteum, and minimal bone loss, and it can be used for long edentulous span.

In various studies, both the single-staged and two-staged procedures have shown high survival and success rate (>95%). After ridge split by piezosurgery, the bone was expanded with expanders, and implants were placed in the proposed areas. Xenograft placed in the gap between cortical plates provides osteoinduction stimulus for bone regeneration.

Our case presented implant stability over a period of 3 years with minimum alveolar bone loss. Implant survival and success rate have been demonstrated to be greater than 95% by ridge-split procedure.

There are a few limitations associated with these procedures that include fractures in the labial plate of the mandibular anterior area, which can also be corrected by fastening the screws across the cortical plate.

**Conclusion**

The ridge-split technique provides adequate width for immediate implant placement in atrophic ridges without the need for a second surgical site for harvesting bone graft. Implant success rate and survival rate are found to be quite predictable.

**References**

9. de Souza CSV, de Sá BCM, Goulart D, et al. Split crest technique with immediate implant to treat horizontal defects of the alveolar ridge.


17. Hartshorne J. How effective are different ridge augmentation strategies at resolving horizontal alveolar ridge deficiencies prior to (staged approach), or simultaneous with dental implant placement? J Dent Res 2015;94(Suppl 9):128S–142S.