

Dentistry

KEYWORDS: Implant, osteotome, periosteum, ridge expansion/split

IMPLANT PLACEMENT IN DEFICIENT BONE USING RIDGE SPLIT TECHNIQUE : A CASE REPORT



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OF PURE MEDICAL RESEARCH**ABSTRACT**

Dr. Hilt Tatum 1970s introduced a method of ridge splitting or bone spreading, which over a period have been used in implant dentistry for esthetic rehabilitation and implant site preparation in cases of deficient alveolar ridges to satisfy the basic ideal need of hard tissue augmentation for functional and esthetic outcome of implant. In this case report, we describe a case of horizontal ridge augmentation using ridge split and simultaneous implant placement in esthetic mandibular anterior region

A major limitation for successful implant placement remains the problem of inadequate alveolar ridge width. Thus, to satisfy the ideal goals of implant dentistry, the hard and soft tissues need to present in ideal volume and quality. Various methods have been documented in the literature regarding different technique to enhance the bone width so that proper diameter implants can be placed in the thin resorbed ridges, these techniques are as follows (1)

Table 1 – Various Methods of splitting the ridge.

Traditional devices to expand bones	Modern devices to expand bone
Chisel and hand mallets	Motorised ridge expanders
Osteotomes	Threaded bone expanders
Surgical burs, microsaw and blades	Expansion Crest devices
	Lasers and Piezoelectric devices

Out of the above-mentioned techniques osteotomes was most common used devices followed by motorised expanders.

GOAL

Expand the ridge to allow placement of the appropriate size implant for proper prosthetic / biomechanical support, due to its dynamic viscoelastic nature thinner ridges (<3.5 mm) can be expanded with better instrumentation with less risk for fracture, trauma and bone perforations. The softer the trabecular bone quality, the lower the elastic modulus and greater the viscoelastic nature of the ridge. Therefore, the less dense the bone, the easier and more predictable the bone expansion (2)

A proper case selection and evaluation is important to achieving a successful surgical and prosthetic outcome. In this case report, we describe a case of horizontal ridge augmentation using ridge split and simultaneous implant placement in esthetic mandibular anterior region.

Case report:

A 24 years old female reported to the dept of prosthodontics with the chief complaint of missing lower anterior teeth for last 2 years due to trauma . on intramural examination , Kennedy's classIII space irt 11,13 with siberts class class 3 (i.e combination of buccolingual and apicocoronal loss of soft and hard tissue).The patient was interested in pursuing a method that would avoid the use of a secondary donor site for augmentation, a ridge split procedure was planned in order to achieve adequate ridge width to facilitate implant placement. The complete treatment plan was explained to the patient, and duly written consent was obtained.

Surgical procedures:

1. Site was anesthetized using 2% lignocaine 1:100,000 epinephrine.
2. Crestal incision was made between 11,13 and vertical reliving incision was made on medial sides of 11 and 13 and complete thickness soft tissue flap was raised. (Fig 1a and b and Fig 2)
3. Round/pear shaped bur was used to flattened the sharp and uneven crestal region.
4. Saw was used to give perfect mid-crestal cut between 11 and 13 region sparing at-least 1mm from the adjacent tooth structure. (Fig 3)
5. Ridge spreader was used in sequential manner and bone was expanded to required width and implant of 3.75 mm * 10mm admin implant was placed. (Fig 4 and Fig 5)
6. Implant was left untouched for 5 months for complete osseointegration to occur. (Fig 6)
7. After 5 months, cover screws were exposed and impression was made, jig trial were performed and prosthesis was delivered.

Discussion:

Augmentation of deficient alveolar ridges is required in implant treatment plan so as to reduce stress at crestal bone region since; facio-palatal bone is often only 4–6 mm wide at the crest with/without an "hourglass" facial deformity. Therefore, an improved understanding of biomechanical requirement for long-term prosthesis survival often requires ridge reconstruction before implant placement. For a favorable outcome, a minimum of 6 mm ridge width is necessary, thus leading to a minimum of 1–1.5 mm bone around the implant(3).Dr. Hilt Tatum 1970s introduced a method of ridge splitting or bone spreading using specific

instruments like D-shaped graduated osteotomes/wedges and tapered channel formers. He inserted >5000 maxillary anterior implants using ridge splitting before 1985 wherein, he expanded atrophic ridges >3 mm for simultaneous implant placement and augmentation keeping the periosteum intact(4). Later, Summers and Scipioni et al. in 1994 revived and published articles on edentulous ridge expansion with 98.8% implant survival rate for over 5 years.(5,6) With the emergence of implant dentistry and introduction of microsaws, piezosaws, and specific ridge split osteotomes this technique has become an integral part of implant dentistry, wherein primarily bone expansion techniques were indicated in regions of division B bone volume and density of D3 or D4. Bone due to its dynamic viscoelastic nature thinner ridges (<3.5 mm) can be expanded with better controlled instrumentation with less risk for fracture, trauma and bone perforations.(7,8,9,10,11) The softer the trabecular bone quality, the lower the elastic modulus and greater the viscoelastic nature of the ridge. Therefore, the less dense the bone, the easier and more predictable the bone expansion.

Conclusion

There are many methods for augmentation for implant placement in deficient alveolar ridges of which ridge split or spreading are advocated in cases where ridge width is >3.5 mm. The most important factor for successful ridge split cases is careful patient selection and bone evaluation. Generally, the site heals similar to fracture repair of bone wherein, the gap is filled by clot that organizes over a period and is replaced with woven bone and later by load bearing lamellar bone at the interphase. Although, this surgical approach may be used in both jaws. Thus, to satisfy the ideal goals of implant dentistry augmentation of deficient alveolar ridges is an important aspect of dental implant therapy with the end goal to provide functional restoration that is in harmony with the adjacent natural dentition as in this case report.

Fig 1.a.: pre operative intraoral image of the surgery site. b. midcrestal incision and vertical relieving incisions between 11,13



Fig 2: Full thickness flap was raised.

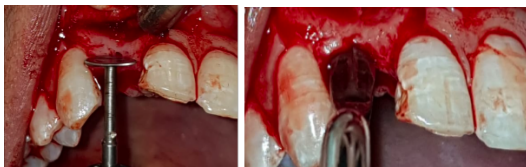
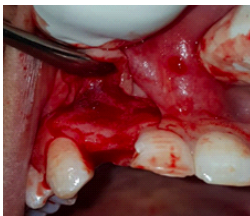


Fig 3. Saw was used to give mid crestal cut in the bone through which chisel can be placed to expand the bone.

Fig 4. Bone expander drills were used sequentially from no.1 to no3. drills followed by osteotomy preparation and implant placement.



Fig 5. post op IOPA of implant placement

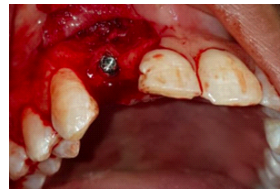


Fig 6. post op healing of implant site.



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