

Ridge Split Procedure

in the Atrophic Maxilla

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Loss of teeth causes extensive resorption of the alveolar ridge. In the maxilla the resorption pattern occurs towards the midline, which causes reduction in bucco lingual dimension of the alveolar ridge. The challenges faced by clinicians in such situations are to achieve accurate implant position and to augment the buccal bone to support soft tissues.¹

The ridge slit procedure is a bone manipulation technique used to place implants in sites having bucco lingual deficiencies.^{2,3} It entails making horizontal and sometimes vertical cuts in the bone to mobilize the bony fragment labially in order to place implants in a restoratively driven position. The objective is to achieve at least 1-1.5mm of healthy bone labial and palatal to the implant, which will provide long-term support to soft tissue.^{4,5}

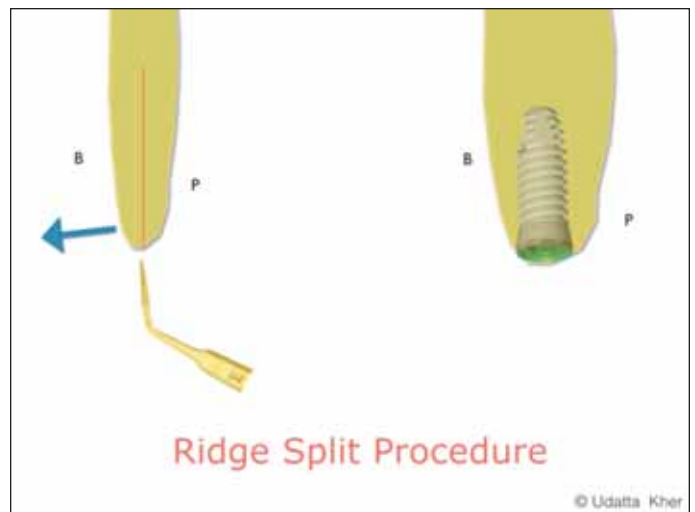


Figure 1: The Ridge Split Procedure –
The following is a series of cases done using
the above-mentioned surgical procedure.

The technique is best suited in situations where the bucco lingual width of bone is 3-4mm. The technique is not suitable in knife edged ridges and in cases requiring vertical augmentations. The procedure can be performed in a staged manner or in one step by placing implants simultaneously. Primary stability for the implants is achieved by engaging the apical portion of the implants in sound bone.⁶

A piezo surgical device is an invaluable tool in making very fine cuts into the bone which will allow introduction of ridge split chisels to manipulate the bone labially. Occasionally bone expansion screws maybe used to simultaneously widen of bone.⁷ In cases requiring further increase in volume, a Guided Bone Regeneration procedure is done using a slowly resorbing bone substitute material along with collagen membrane.^{9,11}

Case 1



Figure 2: Base line situation. Missing lateral, canine and bicuspids.



Figure 3: Minimal flap reflection to maintain periosteal attachment in apical region.



Figure 4: Piezo surgical device used to achieve horizontal cut in the bone.



Figure 5: Chisel used to mobilize the bone labially



Figure 6: Implants placed in restoratively driven position.



Figure 7: Bone graft placed between in the gap between the implants.



Figure 8: After complete healing. Cement retained abutments.



Figure 9: Porcelain fused to metal bridge.

Case 2



Figure 10: Baseline situation.

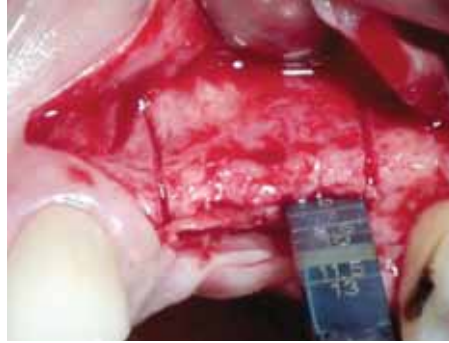


Figure 11: One horizontal and 2 vertical cuts. Ridge split chisel used to mobilize the labial plate of bone.

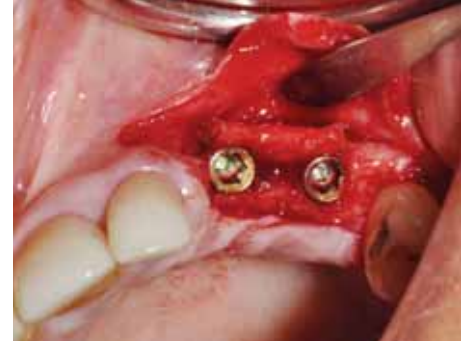


Figure 12: Ridge split with horizontal and vertical cuts. 2 implants placed.

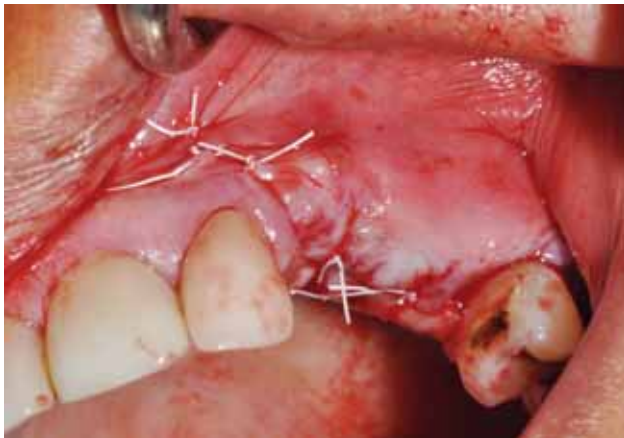


Figure 13: Suturing flap to achieve complete closure.



Figure 14: After complete healing.



Figure 15: Post operative Radiograph



Figure 16: Definitive PFM restorations



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Case 3



Figure 17: Baseline. 27 year old male with 2 missing incisors.

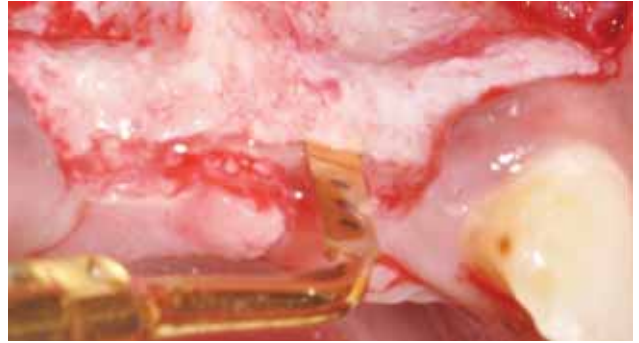


Figure 18: Piezo surgical device for making a cut on the crest of the bone.



Figure 19: Expansion screw used to widen the bone.

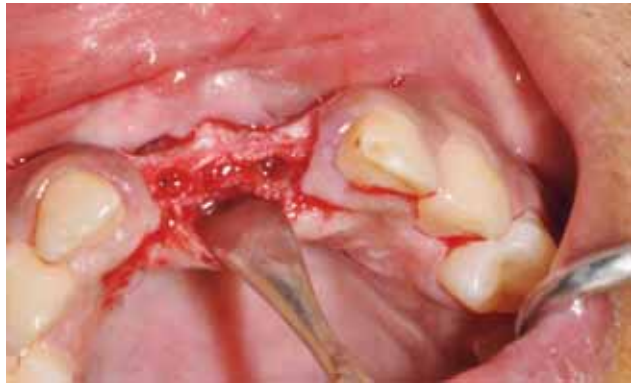


Figure 20: After preparation of osteotomy sites.



Figure 21: Implant placement.



Figure 22: Simultaneous GBR using slowly resorbing graft material.



Figure 23: Collagen membrane secured with mattress suture.



Figure 24: Complete closure of surgical site.



Figure 25: Lithium Disilicate restorations over Zirconia abutments.

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Case 4



Figure 26: Missing tooth #21 in a 31 year old female patient.

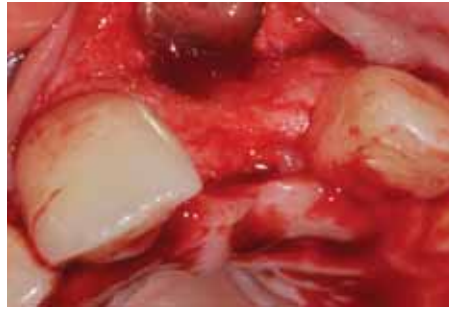


Figure 27: Bucco lingual deficiency.



Figure 28: Ridge split done with 2 vertical cuts.



Figure 29: Implant in accurate 3 dimensional position. Note displacement of labial fragment.



Figure 30: Connective tissue graft done to increase soft tissue bulk.



Figure 31: After complete healing.



Figure 32: Screw retained Zirconia based crown



Figure 33: Post operative view of the final restoration and satisfactory soft tissue contours.

The ridge split procedure is applied in selected cases where there is a small amount of cancellous bone in between the buccal and palatal cortical plates.^{7,8} In cases where there has been considerable amount of alveolar ridge resorption, the procedure carries a higher risk of failure. In cases with bucco lingual dimensions of less than 3mm with no cancellous bone are best treated with block grafts or particulate bone graft and a titanium mesh.⁹

The key to successful ridge split procedure is achieving

primary stability for the implants, intactness of the buccal bone fragment, good soft tissue coverage and an undisturbed healing period. The commonest complications associated with the surgery are wound dehiscence, inadvertent fracture of the labial plate during manipulation and extensive resorption of the labial bone during the healing phase.^{10,11}

However, when performed in the correct clinical situation, it is an effective way of placing implants in a good restoratively driven position. ■

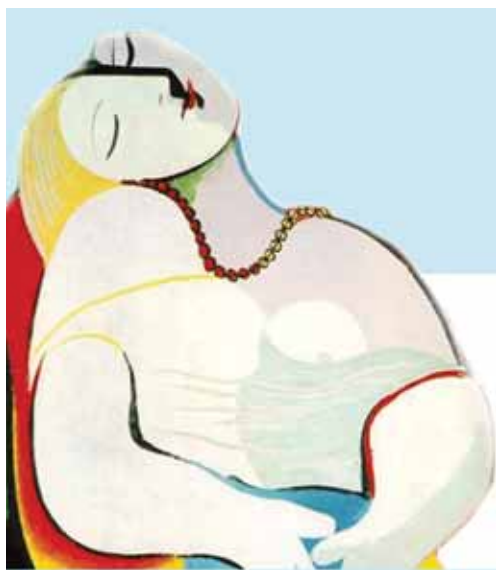
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Dr. Udatta Kher graduated from Government Dental College and Hospital, Mumbai in 1990 and followed that up with masters in Oral Surgery from the same institute. He maintains two practices at Pali Hill and Lokhandwala complex, Mumbai. His main focus in practice is towards implantology, laser dentistry and restorative dentistry. He is a visiting Professor in the 'Implantology Department' at SDM Dental College, Dharwad. He is the 'Study Club Director' for the Mumbai Seacoast Study Club of the 'International Team for Implantology'. He is also a registered 'ITI Speaker'. He is the Director of 'Impart Education' an academy for guiding and nurturing clinicians towards evidence based dental practice. He is an Xpert on Dental XP the largest portal for dental education in the world.



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