BONE SPREADING TECHNIQUE – A CASE REPORT

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ABSTRACT: Bone spreading technique (BST) is horizontal augmentation with minimal trauma for simultaneous implant placement and is an alternative Summer’s osteotome both clinical use as well as the armamentarium. The foremost advantage of the crest dilation technique is a substantially less invasive method; the buccal wall expands after the medular bone is compressed against the cortical bone. The lateral dilation and compaction of medular bone improved primary stability. The vital difference is that the BST used in this case report avoided discomfort of the patient, thus eliminating the need for malleting.

KEY WORDS: ridge expansion, deficient alveolar bone width, bone spreading, dental implant

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**INTRODUCTION**

One of the major problems encountered after the tooth extraction is the hard and soft tissue loss. Reduction of the buccal alveolar bone caused by bone resorption in partially edentulous maxilla is a frequent problem\(^1,2\). Implants need an adequate volume of bone to stabilize the fixture. In partially edentulous patients often maxilla atrophy requires to be augmented. Numerous augmentation techniques\(^3-8\) have been reported in dental literature to facilitate implant placement in atrophic ridge using blocks grafts, which require several steps before prosthetic restoration. In an effort to shorten the length of treatment, avoid an additional surgical appointment, challenge to the patient a decrease patient morbidity. A technique which would both lessen the trauma to patient and conserve the maximum amount of alveolar bone at precise site of anticipated implant placement would offer clinical benefits. Spreaders of increasing diameters are gently introduced sequentially to expand the implant site. With each insertion of a larger diameter spreader the bone is pushed laterally. The implant should be slightly larger in diameter than the site created by the largest diameter spreader. BTS is an alternative Summer’s osteotome\(^9-13\) both clinical use as well as the armamentarium.

This paper describes a technique for widening the maxillary cortical bone to improve the placement of implant.

**Surgical Technique**

Patients were instructed to take 2.0g of amoxicillin or 600mg clindamycin 1 or 2 hours prior to surgery. After administering 2 carpules of 2% mepivacaine this technique begins with a crestal incision. A full-thickness flap is raised to expose the alveolar ridge. To secure a proper alignment of the implants, the surgical template was used. The BTLock expanders kit (BTLock s.r.l. Alte di Montecchio Maggiore-Vincenza) were used in this case, as described next. The proposed implant site was cleared marked with a pilot drill used at 18,000 rpm under copious irrigation with sterile saline, removing the cortical plate. The pilot drill (1.3 mm of diameter) penetrated to the desired height. The pilot drill produced a sub-dimensional bone cavity. There is a successive
deployment of a series of smaller spreader in a progressive way (first 1.8mm, second 2.15mm, 2.5mm, 3.3mm-green code, then 3.75mm-yellow code). Care is taken to proceed as slowly as possible. With the help of the appropriate carrier and, if necessary, with the help of the driver, the spreaders must be screwed in cautiously. By having widened the implant cavity in this manner it is now possible to place the suitable implant (BTLock s.r.l. Alte di Montecchio Maggiore-Vincenza). Furthermore, the clearly increased bone rigidity achieved by bone condensation, results in optimized primary stability. Finally, the flaps are sutured in their original positions. The patients were provided with home care; do not rinse their mouth vigorously and use ice packs over the surgical area during the first 24 hours after the operation. Patients were maintained on preoperative antibiotics for additional 6 days and analgesic medications (600mg ibuprofen) and .02% chlorhexidine-gluconate mouthwash twice a day, was prescribed. The sutures were removed at the seventh postoperative day.

Case Report
A 43-year-old woman presented for replacement of a missing premolar in the maxilla. The premolar had been extracted 7 years ago. Clinical exam revealed significant buccal bone loss in the premolar maxilla, although adequate ridge height was present for implant placement (Fig. 1). The patient requested that we avoid any bone-grafting procedure. With the use of a periapical radiograph, it was decided to place a 10mm length, 3.75mm diameter tapered screw implant. A full-thickness flap was raised and showed further bone concavity on buccal aspect (Fig. 2). The following sequence was used to BST. When bone spreading the pilot drill used was 1.8mm diameter bur. The pilot drill produces a sub-dimensional bone cavity. The pilot drill penetrated to the desired height (Fig. 3). Following the osteotomy, widening was begun by the use of the primary spreader-1.8mm of diameter (Fig 4). After placing the thinnest spreader, the following spreaders in ascending order can be used without drilling (Fig 5-6-7). The successive deployment of a series of spreaders with increasing diameters lead to bone spreading and horizontal condensing. The final lateral expansion prepared to receive a
3.75-mm diameter tapered screw implant (BTLock s.r.l. Alte di Montecchio Maggiore-Vincenza) (Fig. 8-9). As can be seen, an increase was achieved in bone dimension. Primary stability was achieved by torquing the implant to 35 Ncm. The flap was approximated and sutured.

Discussion

The ultimate objective of implant treatment is to provide support for the replacement of missing teeth. As with any treatment, presurgical planning is decisive to the success.

In response to changing treatment concepts, different surgical approaches implant placement has been developed, including immediate implant placement following the cortical plate dilation in maxilla. The edentulous ridge expansion (ERE) technique was development by Scipioni et al.\textsuperscript{14} to slowly dislocated the buccal plate in a facial direction. An aspect of ERE technique is the partial thickness flap; the integrity of periosteum is maintained. The healing period for implant insert with ERE technique seems to be the same as other implant\textsuperscript{14-16}. Elian et al. have\textsuperscript{17} used the split ridge expansion technique in fully edentulous maxilla. The BST is an immediate bone dilation and implant placement is preferred than ERE two-stage approach. The BST is essentially dissimilar than ERE and Summers’osteotome both in pattern of design as well the technique of use. The BST utilizes a “screw type” design are smoothly introduced in increasing diameter for lateral bone dilation and condensing the medular bone for simultaneous placement of dental implants. With each insertion of a larger spreader the bone is pushed laterally. Patient acceptance of this technique has been very high. The ERE technique and Summer’s osteotome are based on “palm-held” design and the mallet. Sethi and Kau\textsuperscript{18} have used D shaped in cross section osteotome and mallet to progressively separate the cortical plate. Such force application and repeated malleting could be disconcerting the patient. The chances of achieving a sufficiently lateral dilation with the BST are excellent\textsuperscript{19}.
CONCLUSION

BST for ridge horizontal augmentation with immediate implant placement has been shown to be predictable and successful in treating the maxilla with deficient alveolar bone width. BST is superior to drilling technique for application in soft maxillary bone. The BST offers a number of advantages over both the Summer’s osteotome and ERE technique. The BST has proven to be highly advantageous for the comfort of patients, increasing their acceptance and overall satisfaction. This surgery technique is a predictable procedure when patient selection and surgical technique are appropriate.

DISCLOSURE

The authors claim to have no financial interest, directly or indirectly, in any entity that is commercially related to the products mentioned in this article.

References


FIGURE 1

FIGURE 2

FIGURE 3

FIGURE 4