



SHORT COMMUNICATION

Pedicated sandwich plasty: a variation on alveolar distraction for vertical augmentation of the atrophic mandible

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KEYWORDS

Preprosthetic;
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Summary We describe a method of vertical augmentation of an edentulous mandible that causes minimal weakening of bone and disturbance of sensation.

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Introduction

Surgical treatment of an atrophic mandible, formerly intended to augment the foundation for a prosthesis, nowadays aims to re-establish mandibular height and width for the anchorage of implants of appropriate length. From an anatomic standpoint, a mandibular height of less than 10 mm is the main indication for augmentation before implantation. Many procedures have been described,^{1–3} all of which have the disadvantages of early resorption of the autologous or allogenic transplants, and the hazards of injury to the mental nerve and disturbance of sensation.

Material and methods

We designed the pedicled sandwich plasty (PSP) for the augmentation of mandibular height in the anterior interforaminal region.

Surgical technique

The soft tissue dissection begins with a vestibuloplasty incision, the mucosa being undermined towards the alveolar crest. When the periosteum is reached, it is incised horizontally on the buccal aspect. Exposure of the bone is minimal, just enough to allow a horizontal osteotomy. Before osteotomy, the mental neurovascular bundle is identified and protected from the reciprocating microsaw. The osteotomy results in a cranial segment 2–3 mm wide.

The cranial segment is raised with minihooks (Fig. 1), care being taken not to disrupt the soft-tissue pedicle on the lingual surface. Two X-shaped microplates, both equidistant from the middle of the osteotomy line, are fixed with two screws each on the buccal aspect of the mobile segment.

The microplates are then screwed to the mandibular bone. The gap between the parent mandible and the refixed, formerly mobile segment is filled with a porous algae-derived HA (Algipore, Friadent, Mannheim, Germany) (Fig. 2). Biodegradable membranes (Bioguide, Geistlich Pharma AG, Wolhusen, Switzerland) are used to cover the

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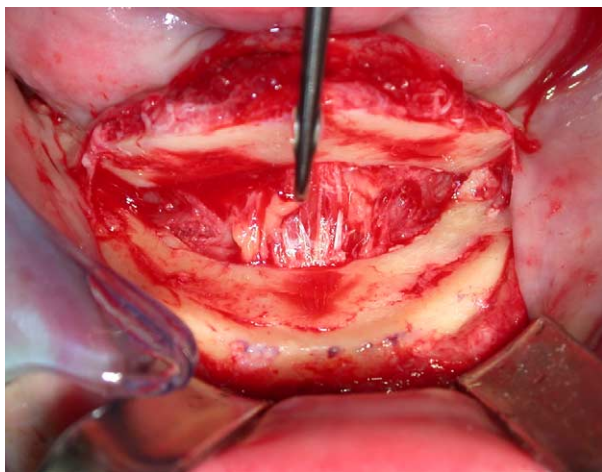


Figure 1 Osteotomized cranial segment is retracted with minihook.

grafted material and allow guided regeneration of bone.

The soft tissue closure must be water-tight and without tension. Further undermining of the buccal flap may have to be undermined further to provide adequate tissue. The soft tissues are usually closed with a non-resorbable 40 suture.

Results

We monitor the postoperative results with lateral cephalograms (Fig. 3) and orthopantographs (Fig. 4). To date we have operated on three patients, two of whom were given implants after the graft had been in place for 6 months. None of the

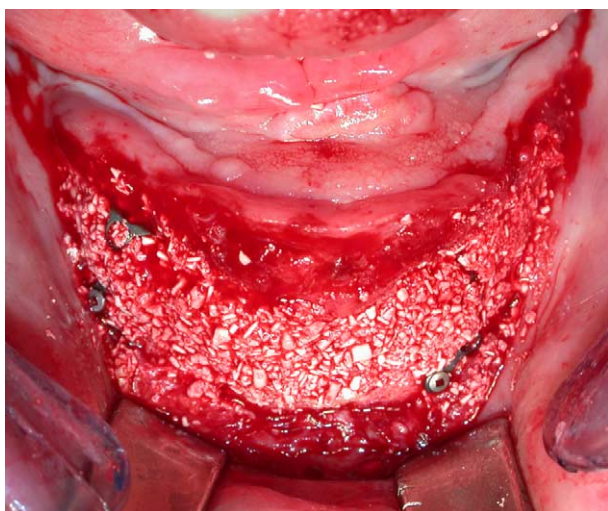


Figure 2 Xenogenic augmentation material in place after osteosynthesis with microplates which maintain distance between bony surfaces.



Figure 3 Lateral cephalogram: immediate postoperative view.

patients complained of permanent sensory disturbances and there have been no disturbances of healing.

Discussion

An appropriate increase in height of the mandible ensures that implants can be inserted after the osseous integration of the grafting material. Drawbacks such as persistent sensory disturbance and loss of height after resorption of the graft (only grafts were reported to lose 25%–33% of vertical height during the first 6 months⁴) are avoided by the minimally invasive nature of the operation, which preserves vascularization and uses a xenogenic augmentation material that does not resorb early.

We consider that the PSP is appropriate when the mandibular height is at or below 10 mm, because a height above 10 mm normally allows implants. On

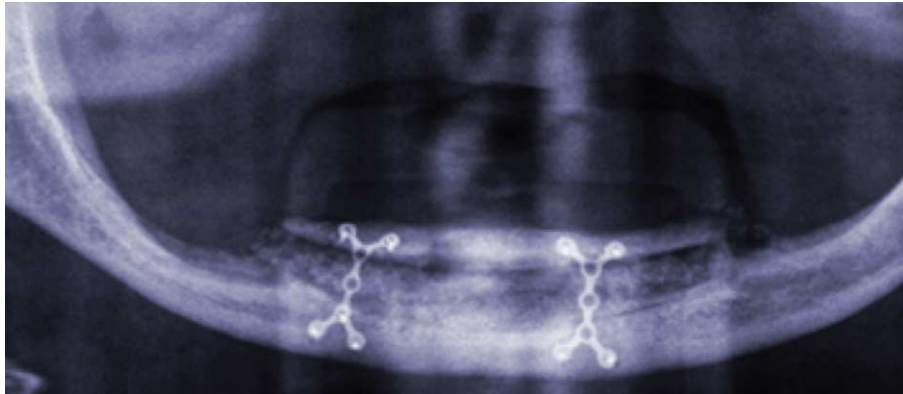


Figure 4 Orthopantomogram: immediate postoperative view.

the other hand, a mandibular height of less than 5 mm in the anterior region is a contraindication to PSP because of the high risk of mandibular fracture. Other techniques, such as vertical bone distraction, often cause fractures because the cranial segment has to have a reasonable height for fixation of the distractor and this weakens the basal bone. Bone transplantation from the iliac crest is usually painful, and not well accepted by patients.⁵

With PSP the gain in height is deliberately limited to 6–7 mm. There are various reasons for this. First, soft tissue tension can be kept to a minimum, allowing uneventful healing. Secondly, by limiting the expansion the vascular supply to the cranial segment is not put under undesirable strain, which may cause malperfusion and result in resorption of bone. Thirdly, the height of the grafted space is kept stable, firstly because of the slow incorporation of the graft, and secondly because of the rigidity of the metallic hardware. There is therefore no need for overcorrection with PSP, as is commonly done in conventional techniques for augmentation of the atrophic mandible in anticipation of resorption of the graft.

As far as timing is concerned, we recommend that the graft should be allowed to heal for 6 months, after which implants can be inserted. Whether overall gain of vertical alveolar height is better achieved with PSP or with alveolar distraction, which obviously results in new bone formation⁶ but has a large number of drawbacks and an overall complication rate of up to 70%⁷, has to be decided by prospective long-term studies.

Acknowledgements

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