

Symphysis Graft and Implants: The Gold Standard for the Edentulous Prémaxilla

by Yvan Poitras, DMD

The replacement of failing anterior teeth in the premaxilla with implants is, aesthetically, one of the most difficult treatments to perform.

In fact, following tooth extraction, a long interruption of the functional loading on the alveolar bone leads to the reduction of the trabecular and vascular density of the surrounding bone tissues,^{1,6} as well as its volume. The most significant resorption of the maxillary occurs during the first post-extraction year specifically in the buco-horizontal direction.²

Such an atrophied osseous ridge forces the practitioner to place small diameter implants in a more palatine position than that of the teeth to be restored. Therefore the result is a substantial reduction in bone-implant contact surface^{3,15} and an increase in the moment of force due to the palatine position of implants.³ The reduction in the arcade perimeter also leads to a greater proximity of the implants, which reduces the mesio-distal width of the osseous septa and may compromise the quality and health of the interdental papillae.⁴

The reduced labial support inevitably leads to compromised aesthetics in the form of a de-

pressed upper lip. Moreover, the restoring dentist is often forced to use ridge lap on a fixed prosthesis, which also compromises appropriate hygiene.

The diagnosis must be the basis of any therapeutic approach, whereas the morphology of the osseous defect is still generally regarded as the basis of the decision-making in the implant placement.

On the basis of this diagnosis, the techniques for restoration of hard and soft tissues allowing the creation of the necessary conditions for the maintenance of the results can be introduced. Indeed the regeneration of the osseous ridge will allow the reconstitution of the ideal conditions by restoring the initial contour.

For this purpose, many methods such as the use of substitutes for filling bone defect, growth factors, membranes known as guided tissue regeneration or their combinations⁵ were used.

Autogenous hard and soft tissue grafts are superior to allogenic and xenogenic filling materials.^{7,8} They do not involve immunologic reactions and are replaced by the resorption/bone formation mechanisms of the host.

The intra-oral bone grafts used in the atrophied alveolar ridge treatment are the standard method for the re-establishment of bone dimension.⁹⁻¹³

The intra-oral donor sites are the maxillary tuberosity, the symphysis of the mandible, the external oblique line, the ramus and any available exostosis. The use of the symphysis of the mandible makes it possible to reduce the chance of scarring, to minimize the resorption of the graft, to maintain the osseous density, to allow an intra-oral access, to ensure the proximity of the donor and recipient sites, to have a low morbidity, to allow a maximum comfort, and to avoid a dermal scar.¹⁴

According to C.E. Misch,³ 95% of the cases of an edentulous premaxilla require an osseous graft prior to the placement of implants. It allows the possibility of using implants of suitable diameter^{16,17} placed in a position capable of resisting the repetitive stress to which they will be subjected. By restoring the ridge contour, the labial support is thus ensured as well as the possibility of appropriate hygiene to maintain a long-term aesthetic and functional restoration for the patient.

The time when the residual osseous ridge dictated the position

of implants is over. Today the importance of aesthetics to both patients and practitioners has driven the developments of surgical and prosthetic technologies through innovation, research, as well as the competition among manufacturers.

The only means to get good results is to follow a routine that rigorously takes into account the diagnostic wax-up. The emergence profile of the tooth determines implant position, as well as the hard and soft tissue restoration procedures, and remains the basis of the aesthetic success of the final restoration.

The following is a presentation of four clinical cases illustrating some characteristics of the technique for the restoration of the edentulous premaxilla using a symphysis graft and the placement of implants.

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Oral Health welcomes this original article.

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CASE ONE

A 39-year-old male with tooth #21 lost for 2 years.



FIGURE 1 A symphysis bone bloc was taken with a 10 mm trephine and fixed with a 10 mm fixation screw. Another screw was placed to tent the membrane.



FIGURE 2 The Bioguide barrier placed over the bone onlay graft and the autogenous bone powder collected from the symphysis.



FIGURE 3 Healing after 4 months.



FIGURE 4 Bone graft with almost no resorption allows the placement of the proper diameter implant in the right position.



FIGURE 5 The osteotomy is done in relation with the emergence profile of the tooth to be restore.

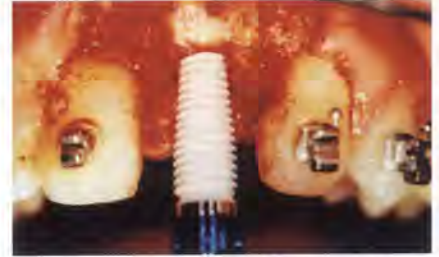


FIGURE 6 A 5 mm x 16 mm Replace implant is screwed in the axis and position to fill the aesthetic and functional requirements.

CASE ONE (continued)

A 39-year-old male with tooth #21 lost for 2 years.

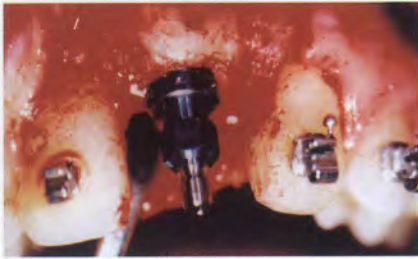


FIGURE 7 The head of the implant is placed 1½ mm to 2 mm above the level of CEJ of the adjacent tooth.

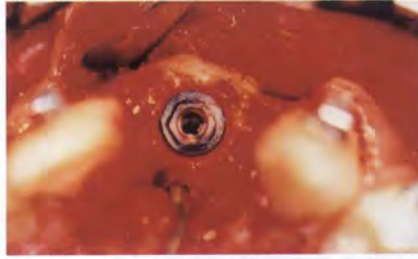


FIGURE 8 The restored contour of the hard tissues gives the anticipated support for the soft tissues and the lip.



FIGURE 9 The cover screw is placed.



FIGURE 10 Healing 6 months after the implant placement.

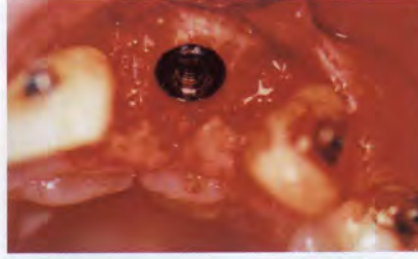


FIGURE 11 The good quality of the symphysis graft shows no resorption around the implant collar.



FIGURE 12 A temporary crown is cemented on the final abutment with temp bond. The shape of the crown respects the Tarnow's a rules with long contact points against adjacent teeth.



FIGURE 13 The first incision line was made lingually, then this gives a little excess on the buccal that will remodel, dictated by the morphology of the temporary crown.



FIGURE 14 The soft tissues healing after eight weeks is ready for the final impression; like in a crown and bridge regular procedure.



FIGURE 15 The final model.



FIGURE 16 A Procera crown is fabricated.



◀ **FIGURE 17** And cemented on the abutment. There is no overcontour of the crown needed because the implant was placed in accordance with the wax up. The soft tissues profile can support the lip correctly.

CASE TWO

A 42 year old male with teeth # 11 and # 21 missing for 3 years.



FIGURE 1 The pre-operative picture showing the classical lost of labial support.

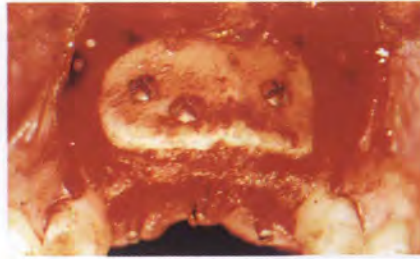


FIGURE 2 A symphysis graft was fixed with two 10 mm and one 8 mm fixation screws. Three mini transitional implants from Dentatus were placed in the thin palatine cortical plate.



FIGURE 3 The autogenous bone powder collected from the harvesting of the symphysis is placed around the graft.



FIGURE 4 A Bioguide resorbable membrane is placed to isolate the bone particles from the soft tissues.



FIGURE 5 After the sutures, a temporary restoration is cemented to the 3 M.T.I.



FIGURE 6 Healing after four months shows no significant resorption of the graft. The transitional implants avoided any pressure on the graft.



FIGURE 7 The temporaries can serve as a surgical guide.



FIGURE 8 The two osteotomy sites show the new vascularisation in the graft.



FIGURE 9 The placement of the final implant doesn't interfere with the transitional implants placed originally in the residual ridge.

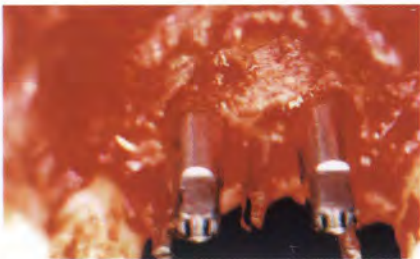


FIGURE 10 Two D-3, 4 mm x 13 mm Biohorizon implants were placed with their mounting devise that are also the final abutment.



FIGURE 11 The plateau of the implants are at 2 mm above CEJ of the adjacent teeth, after removing the abutments.



FIGURE 12 The autogenous graft allows the placement of the implants in the proper position and also gives a strong buccal plate.

CASE TWO (continued)

A 42 year old male with teeth # 11 and # 21 missing for 3 years.



FIGURE 13 The closure for a six months period.



FIGURE 14 The same temporary restoration is used on the same transitional implants avoiding any pressure on the final implants and giving a good comfort for the patient.



FIGURE 15 The x-ray shows the final implants in place and the three transitional implants that will be removed six months later when the final abutments will be inserted.

CASE THREE

A 37 year old female with the four anterior superior teeth missing.



FIGURE 1 The patient shows a lack of the upper lip support.



FIGURE 2 About 7 mm in width were lost from the original ridge after the teeth were lost.

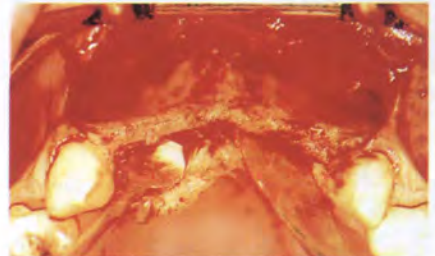


FIGURE 3 This 2 mm ridge at the top doesn't allow a proper diameter of the implants without a bone augmentation.



FIGURE 4 A piece of the symphysis is cut apically to the apex of the roots with a surgical # 557 bur to start and then with the Oscillomat hand piece from Dentatus.



FIGURE 5 A diamond file is used to smooth of the sharp angles of the cavity.



FIGURE 6 The closure is made with three horizontal mattress and a continuous suture.



FIGURE 7 The 8 mm thick block is fixed with two 10 mm and one 13 mm fixation screws.



FIGURE 8 The autogenous bone powder fill the gap between the onlay graft and the residual ridge.



FIGURE 9 A Bioguide membrane cut in two, isolates two areas where the powder is placed.

CASE THREE (continued)

A 37 year old female with the four anterior superior teeth missing.



FIGURE 10 The closure with one horizontal mattress, one continuous and six interrupted sutures are done. The scarification of the periosteum prior to the closure helps to prevent tension in the flap and decrease the risk of the incision line opening.

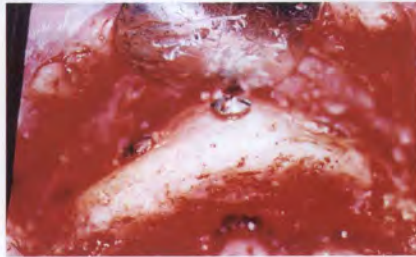


FIGURE 11 The fusion of the graft is enough after four months to place the implants.

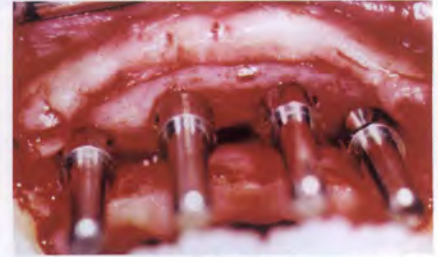


FIGURE 12 Four implants are planned to be inserted in the axis and the position with respect to the direction of forces and the aesthetic requirements.



FIGURE 13 The blood vessels are present in the graft and the osteotomy shows the bleeding.



FIGURE 14 Two 4.3 mm x 16 mm replace select implants for the teeth #11 and #21 and two 3.5 mm x 16 mm Replace Select implants for the laterals are placed.



FIGURE 15 When the bone density is good a preliminary impression can be taken of the prepared final abutments and the temporary crowns placed before the next surgical procedure six months later.



FIGURE 16 The close tray impression taken with the mounting devices.



FIGURE 17 The four implants in place before the placement of the cover screws.



FIGURE 18 Closure after removing the last fixation screw.

CASE FOUR

A 36 year old male with the 6 anterior superior teeth missing and presenting a cl. III skeletal relationship.



FIGURE 1 The lack of support of the upper lip increases the appearance of the cl. III profile of this patient.



FIGURE 2 The symphysis is cut with a surgical #557 bur and the bone powder is collected in a sterile filter.

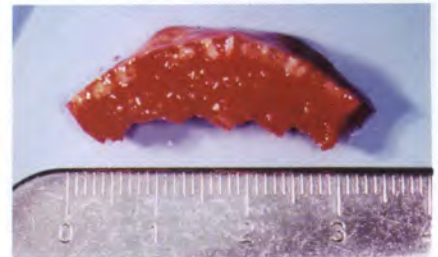


FIGURE 3 The 10 x 12 x 33 mm bone block.

CASE FOUR (continued)

A 36 year old male with the 6 anterior superior teeth missing and presenting a cl. III skeletal relationship.



FIGURE 4 The Osteoharvester with its bur is connected to the suction.

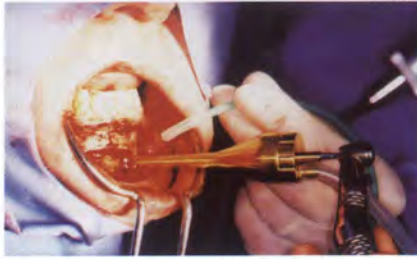


FIGURE 5 Additional bone powder is taken disto-apically from each side of the donor site.

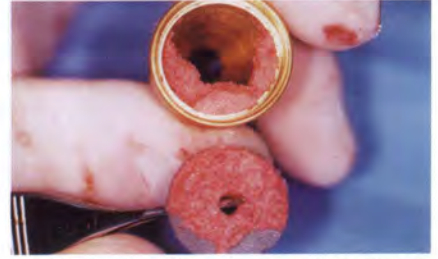


FIGURE 6 The filter in the Osteoharvester collects the precious autogenous bone powder.

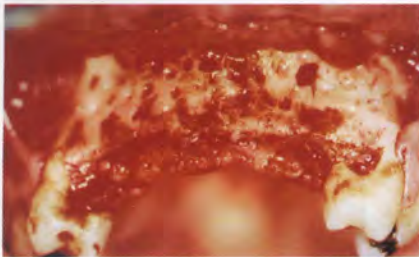


FIGURE 7 The upper anterior residual ridge is prepared with little holes to create a bleeding from the trabecular bone.

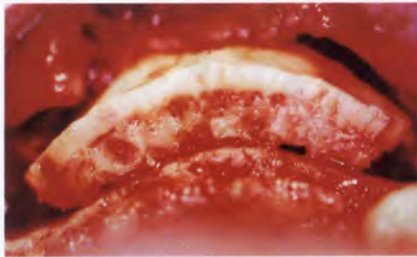


FIGURE 8 The block is adapted in place in order to have the best surface of contact with the ridge.



FIGURE 9 Four holes for the lag screws are created in the graft.

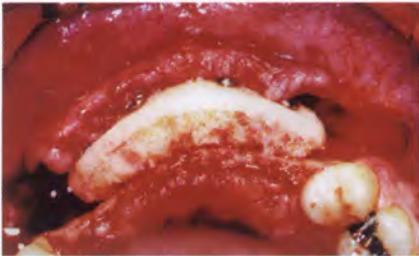


FIGURE 10 The bloc fixed in place with four 13 mm Salvin fixation screws.



FIGURE 11 The anterior nasal spine was cut to allow the onlay graft to fit tight so as to help in stabilizing the block.

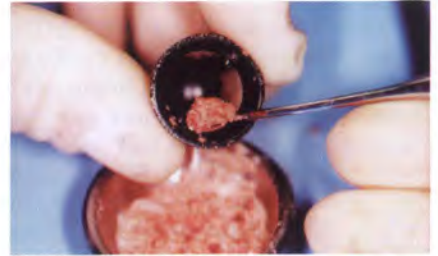


FIGURE 12 The autogenous bone powder collected from the filter is added to the one taken with the Osteoharvester.



FIGURE 13 Two 7 cc vials of blood were taken just before surgery and centrifuged to take the platelet rich plasma. This adds growth factors to the graft in order to obtain a better density of bone and in less healing time.



FIGURE 14 The growth factors are mixed with the autogenous bone particles.

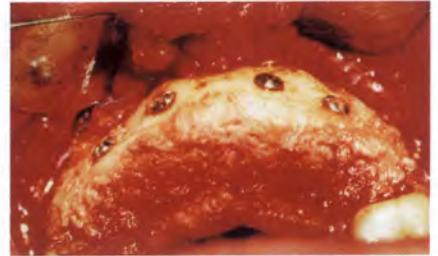


FIGURE 15 This mixture is then placed around the block to fill the space between it and the residual ridge.

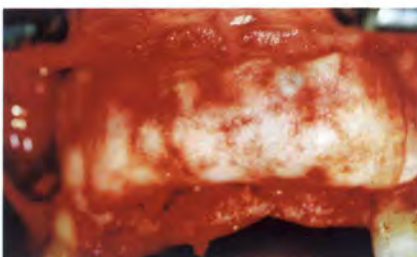


FIGURE 16 A Bioguide barrier is placed over the bone powder and a Colletape covers everything over.

CASE FOUR (continued)

A 36 year old male with the 6 anterior superior teeth missing and presenting a cl. III squelettal relationship.

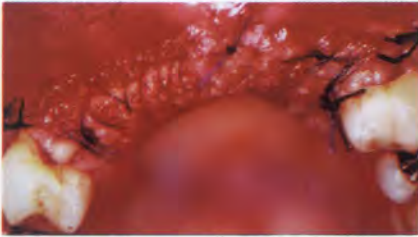


FIGURE 17 Closure after scarification of the periosteum with three horizontal mattress, one continuous and six interrupted sutures.

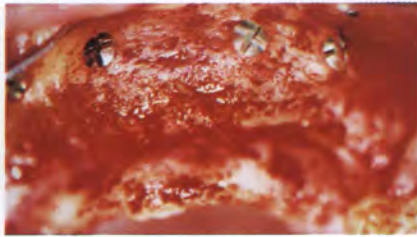


FIGURE 18 Healing after four months.



FIGURE 19 The good quality of the graft shows the bleeding into the osteotomy sites and also a good fusion with the residual ridge.



FIGURE 20 Two 5 mm x 12 mm and two 4 mm x 13 mm Biohorizon implants were placed.



FIGURE 21 Implants are in the graft for almost 100 % of their volume.



FIGURE 22 Closure and the adaptation of the partial denture without any pressure on the surgical site.

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