Minimally invasive implant placement without the use of biomaterials using the bone expansion technique

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The success rate in implantology is close to 96 percent. Thanks to well-established implant placement protocols, with a few differences according to the implant system used, the predictability of the result under optimum tissue conditions is quite significant. It is very different when these conditions do not meet the recognized standards in terms of volume and quality for reproducibility in implantology. For example, thin ridges, which are frequent occurrences, will require a long and costly process for patients because they entail bone augmentation or possibly support tissue grafts.

Is there a minimally invasive alternative for these patients that allows them to be treated without these problems? One line of thinking is to stop the systematic practice of implantology as subtractive at the tissue level, but rather to transfer these volumes and thereby ensure a minimally invasive procedure. This implies reviewing all the biomechanical principles of implantology, not only in terms of the implant structure and design but also in relation to peri-implant tissue.

The general surgical principle of modern implantology, called osteotomy, as close as possible to the dimensions of the implant that will be placed. This principle is still widely prevalent.

However, soft-tissue management has evolved, and the trend for the past few years has been to manage soft tissue from the first surgical step. With the arrival of self-tapping conical implants, a new technique was developed that enables lateral as well as vertical bone compressing, condensing or expanding. In addition, in 1994, Summers, practicing his crestal sinus lift technique with careful choice of conical taps, was the first to demonstrate the capacity of cancellous bone to be modeled (Fig. 1).

Through two clinical cases, we will see that it is possible to be minimally invasive, precise and also avoid the use of biomaterials simply by exploiting the biomechanical properties of bone tissue and its capacity to regenerate. Respecting guided regeneration principles, which means the implant implantation of physical barriers to isolate the epithelial and connective tissue cells from the operating site, enables regeneration of the different tissues.

These principles are (Fig. 2):

- Primary closure of the surgical site to enable undisturbed and uninterrupted healing
- Completion of the best possible angiosgenesis to provide the required vascularisation and undifferentiated mesenchymal cells
- Creation and maintenance of a space to facilitate bone formation inside this space
- Stabilization of the surgical site to induce blood clot formation and facilitate healing

Thanks to the careful choice of the healing screw or the implant abutment/temporary crown pair, these two entities with different regeneration potentials can be hermetically sealed, thereby avoiding cell competition, which we know contributes to the growth of epithelial cells which develop more rapidly.

Case 1

The patient presented with a fracture of #16 (Fig. 3) and periapical cysts. The patient was on standard premedication method (crestal sinus lift). The patient presented with a fracture especially in the vestibule where the cortical bone is very thin.

During sinus progression PRF membranes are used to fill the gap. If this gap is too big, a mucoperiosteal detachment of 6–10 mm and then a horizontal incision of the peristium of 6–8 mm are made. This technique serves to pull the gum around the healing screw by maintaining it with two sutures. The control X-rays clearly showed good osseointegration of the implant, significant filling and regeneration in only three months, and then perfect filling and regeneration four months after surgery.
The advantage of this technique was the implant that is chosen. placed is smaller in diameter than inserts suffice. The last insert that is completely in native bone, convex a maxillary implant is to be placed millimeter under the sinus floor. If ing of the bones of the lateral walls then concave inserts enable scrap- first to enable lateral expansion, and vex-tipped inserts should be used the gap by slightly compressing the marginal gums (Fig. 15).

It is mounted out of functional oc- currence. Of course, the patient was advised toighest chewing on this implant and only use local cleaning with cotton soaked in Chlo- rhexidine.

Following verification of the ose- genation (Fig. 16), the impression was made eight to 10 weeks after sur- gery, followed by placement of the permanent prosthesis (Fig. 17).

Conclusion The implant placement technique with the use of osteotomes is not a new concept. On the other hand, using an automatic osteotome pro- vides a better view of the site and makes it possible to practice flawless surgery, to position more precisely and obtain more homogeneous progression, in comparison to us- ing bone taps with a surgical mallet. From the patient’s perspective, sur-

Vital importance is attributed to the closure of soft tissue during implant placement, either by carefully choos- ing the healing screw (the height and diameter) or the implant abutment, enabling slight compression of soft tissue and providing the implant/ prosthetic connection system with a ‘barrier’ that enables the regenera- tion of the two families of tissues.

These minimally invasive tech- niques still require many improve- ments and more widespread valida- tion. However, for both technical and safety reasons, the practitioner should al- ways suggest the least invasive tech- nique that contributes to guiding and induces this tissue regeneration for which, most of the time, we have the matrix around these traumatized zones.


Conclusion Traumatic dental injuries present difficult challenges for both patients and their dentists. Current evidence allows the dental health care provid- er to manage situations that, in the past, often resulted in crippled den- titions and unsightly appearance. Ap- propriate treatment can turn what at first glance looks like a hopeless situation into a very satisfactory out- come for patients. The endodontic specialist can play an important role in the team approach to treating pa- tients with traumatic dental injuries.


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tromones, which were all that were available un- til then. The idea was actu- ally to enable lateral peri- implant bone condensing in order to increase noti- bly, primary stability and compensate for the lack of vertical dimension of the sub-sinus native bone.

The objective of this technique is to maintain, if possible, the entire maxillary bone by laterally pushing back the bone with minimal trauma while creating a precise osteotome that breaks the last millimeter of the sinus floor while protecting the si- nus membrane. The consequence is the notable increase in peri-implant bone density with a high elevation of BIC (Bone Implant Contact) and, therefore, bone stability.

Case 2 The patient presented with a fracture of 242 with significant perpalac- tion (Figs. 3–7).

It was decided that an extraction would be performed with immedi- ate placement and loading of an implant after complete decommit- ture of the extraction socket using lasers (Figs. 11, 12). Next, osteo Safe™ was used (Fig. 13) to enable gentle trabecular expansion and placement of a self-tapping conical implant (Aston™, P&O). An X-ray is shown.

In this case, where bone re-covery along the ostotomy walls was not necessary, only convex inserts were used. The palatal and subpalatal portion of the implant is respected (Fig. 14). The gap between the implant and the vestib- ular cortical bone is not filled. Care- ful choice of the implant abutments is necessary. The basics of this bone regen- eration are respected, which are ade- quate enough to enable bone growth without the use of biomate- rials. These advantages are decisive dur- ing preparation of the extraction sinus from the bone that is foreign in nature.

Conclusion (Fig. 7-8).

Highlight: The distal bridge was carefully evaluated and the prosthesis, making it possible to practice flawless surgery, to position more precisely and obtain more homogeneous progression, in comparison to using bone taps with a surgical mallet. From the patient’s perspective, surgical comfort is very significant and very noticeable. It should be borne in mind that if you want to avoid using filling materials, tissue must be conditioned to enable its regeneration. For immediate post- extraction implant, critical implants are of unvalued usefulness, because they enable socket deconcentration and induce bone regeneration.

From the patient’s perspective, sur-

pal necrosis, root resorption and/or arrested root development are con- firmned.

In the case of a closed apex, revascu- larisation is not expected. Therefore, endodontic treatment must be initi- ated two weeks after the tooth is im- planted, and prior to removal of the splint. Treatment should not be initiated earlier because any further manipulation of the tooth prior to or immediately after reimplantation can cause further damage to the PDL. In addition, it has been shown that placing calcium hydroxide as an in-


A complete list of references is avail- able from the publisher.