New is well forgotten old

3D printed customize Subperiosteal implant.

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3D CRAFT
Customize reconstruction of aesthetic and function with technology

Endosseous dental implants provide a highly predictable solution for the prosthetic rehabilitation of partially and completely edentulous patients, with medium and long-term survival rates and success. In order to place endosseous dental implants, an adequate quantity and quality (height, width and density) of bone are required.

However, for some extraordinary sufferers with a bad bone condition, such as those who had tooth extractions a long time ago, those who experienced a trauma (with bone loss) patients who have undergone bone resection due to cancer, and those who had to take bone reconstruction, it is difficult to place endosseous implant for dental rehabilitation as the patient's bone condition is inadequate.

In such patients, it is impossible to place endosseous dental implants without the use of regenerative surgical techniques. Several surgical techniques for bone regeneration have been proposed to enable the subsequent placement of endosseous implants, including onlay / inlay bone grafting, guided bone regeneration (GBR), ridge split, sinus augmentation and distraction etc

All of these regenerative strategies, make use of different graft materials (autogenous bone harvested from intraoral/extraoral sites; it may be homologous, heterologous, or synthetic bone grafts) to some extent it restores bone quantity that allows the right placement of endosseous dental implants but, those surgical strategies are complex and might have a instead high percentage of complications.

a compromised anatomical scenario (i.e., without bone regeneration) were proposed: using short, narrow, or tilted implants or the usage of zygoma or pterygomaxillary implants. The former 3 techniques have been a success in cutting-edge implantology and are more and more used, while the latter two remain niche treatments. In any case, a minimal degree of endosseous bone volume is wanted to area quick, narrow, or tilted endosseous implants; in instances of extreme or superior bone atrophy, the use of such non-regenerative surgical strategies might not be feasible. Implant-prosthetic treatment in the case of severe maxillary and mandibular bone atrophy has usually been a task for surgeons. In the case of aged patients with severe atrophy, the subperiosteal implant represents another possible alternative for dental rehab.

Prior to the extreme success of the root shape implants that Dr. Branemark introduced with the notion of osseointegration in 1981, the subperiosteal implant along with blade and plate implants were routinely used to support both a fixed, or removable, complete, or partial prosthesis.

By definition, a subperiosteal implant is a framework specifically fabricated to fit the supporting areas of the mandible or maxilla with per-mucosal extensions for support and attachment of a prosthesis. The framework consists of permucosal extensions with or without connecting bars and struts.

Conventionally this implant was fabricated and placed in two stage surgery. In first surgery impression was taken at bone level and implant were fabricated on models and fixed in second stage surgery. With the advent of computed tomography (CT) and freeform fabrication strategies (such as stereo-lithography and fused deposition modeling) new approaches in treatment had been introduced in medication in general, and in dentistry in particular. Rapid prototyping technological know-how accelerated the use of CT beyond diagnostics into surgical planning and the making of patient-specific tools and implants.

It is possible to make subperiosteal dental implants using any of the following four methods:

1. Conventional: bone impression and lost wax casting metal

3.Digital: CT, modeling on virtual jaw model, printing in metal using DMLS or similar technology

4.Hybrid: bone impression, silicone impression or stone model optical scanning, modeling of implant on virtual jaw model, printing in metal using DMLS or similar technology.

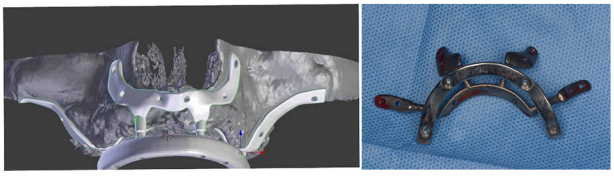
We use digital 3D-CBCT scanning to gain bone geometry, create our model in a virtual environment and perform important static analyses. The product is made of titanium, which is osseointegration, so that it can be incorporated into the bone tissue. A surface finishing process is carried out and state-of-the-art technical possibilities are used to evaluate the finished structure.

Criteria of Use.

Cortically supported individual implant can be used where implantation and bone replacement are needed in any edentulous situation. The titanium frame around the jawbone is ideal as it protects the adjacent bone graft from mucous membrane stress and other mechanical stimuli. The treated surface structure also makes it possible for bone tissue to expand around and integrate the implant

The benefits of subperiosteal implants include the outcome predictability and the high rate of effectiveness. This technique is less invasive and therefore preferable over grafts. Subperiosteal implants value and potential benefits are obvious, being the only way to restore jaws in cases where endosseous implants cannot be placed. Therefore, it is an earnest appeal to the field of dentistry not to disregard this option of care. Instead, more and more research should be done on this topic to achieve more prognostic results.

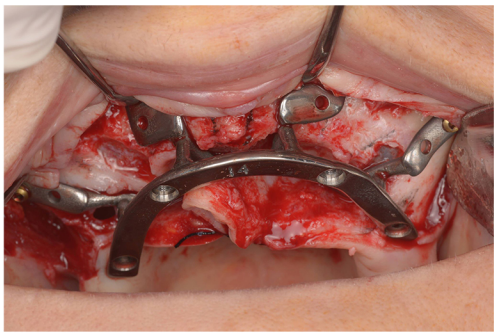
Virtual Designing of Implant :
a: 3D Printed Implant b: Virtual designing of implant



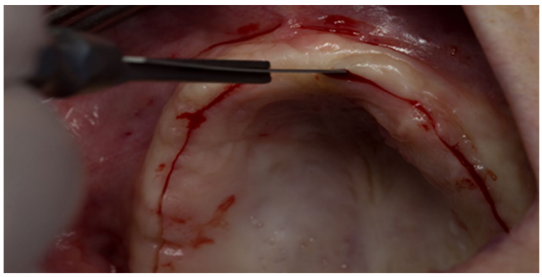
Case 1 :

a: pre-operative image

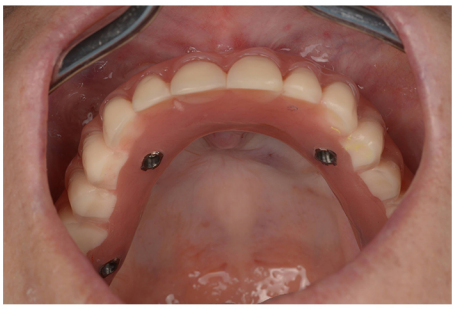
b:intra-operative image



c: incision



d: implant supported prosthesis



e: cortically fixed implant

Case 2

a: pre-operative image

b: intra-operative image.

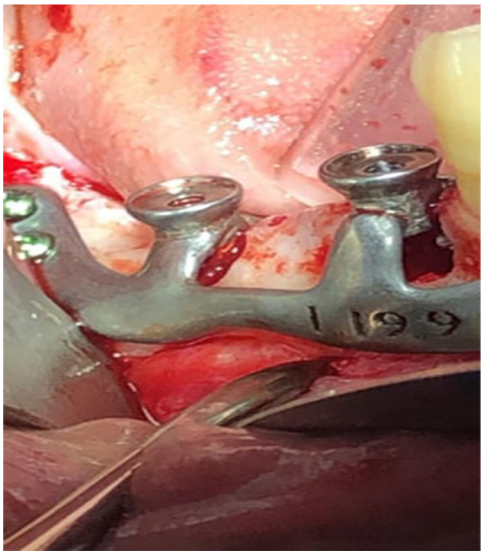
c: immediate post-operative image

d: final prosthesis

Case 3

a: post-operatuve image of partial case,

b: partial case



About the Authors:

Dr. Abdul Hameed after having acquired his postgraduate qualification from the prestigious KLE institute of dental sciences, Bangalore, worked with an oncosurgeon, plastic/cosmetic surgeons, neurosurgeon and orthopaedic surgeon's in Bangalore and Mumbai. Besides his academic qualifications he has had extensive training in diverse areas of Maxillofacial Surgery such as Trauma Surgery, TM Joint Surgery, Orthognathic Surgery, Onco rehabilative Surgery, Facial Plastic Surgery and dental implants. After further training in various leading centers across India and abroad, he started his private practice in Mumbai. He has keen interest in 3D-printing technology and utilizes this technology for precise accurate and successful surgery. He is the recipient of several awards and has several publications in national and international journals.

Dr. Rui Coelho is an expert in 3D printed tailored implant concept designing & is the principal investigator of clinical trail of "BC-HA" Regenerative barrier. He is based in Portugal.