Taking care of our teeth is a fundamental part of good health

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By Neoss Ltd.

Taking care of our teeth is a fundamental part of good health: dental problems can affect what we eat, and the aesthetics of our teeth has a major impact on how we see ourselves and others.

Dental implants replace the roots of teeth and can be used to anchor a single dental crown(s), a bridge or a denture. Neoss has an approach to dental implants that keeps both the patient and the practitioner in mind: Intelligent Simplicity.

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By Neos Ltd.

Implant retreatment

When working with dental implants, a number of specific rules must be followed regarding both the implant surgery and the prosthesis itself (fixed prostheses tending to have a more favourable prognosis than overdentures). If these rules are not adhered to, the results are often unsatisfactory, requiring retreatment.

In such cases, and despite the patient's desire to quickly forget the previous treatment, a very strict protocol must be followed, specifically concerning the length of healing periods. Despite an increase in the overall treatment duration, this will ensure success of each stage of treatment. The implant retreatment case outlined in this article will emphasise these different stages in this type of clinical situation.

Initial case

At the age of 28, the patient was involved in a traffic accident, which resulted in significant trauma to her maxilla, including the loss of her central and lateral incisors and left canine. The shock also led to the loss of alveolar bone in the same area. The first premolars were absent, probably owing to previous orthodontic treatment.

The original treatment consisted of placing two implants in the residual bone and an anchorage reinforcement screw retained bridge to maintain a removable prosthesis, which included five teeth and a large false gingiva (Fig. 1).

Dissatisfied with the treatment, the patient was re-examined three years after the initial treatment. The patient’s smile showed an infiltration of the site conducted, an extremely negative prognosis for the implants owing to significant recession at the right maxillary canine. The shock also led to the loss of alveolar bone in the same area. The first premolars were absent, probably owing to previous orthodontic treatment.

The tissue was hyperplastic, making hygiene difficult. The framework of the implants, which explained the off-centre axis of the prosthetic teeth.

Over the past several years, many authors have observed recurrent

Figs. 1 & 2: Initial prosthesis. Lip support was ensured by a large false gingiva, and fractured cosmetic material at the right maxillary canine was evident. The patient’s smile showed the prosthetic teeth were placed off-centre and an infiltration at the right lateral incisal level.

Figs. 3: Examination after three years revealed a negative short-term prognosis for the implants owing to significant recession at the right implant and hyperplastic tissue.
gingival inflammation as a reaction to using implants for this indication. Engquist noted a gingival increase in 25 per cent of the cases; Naert et al. showed that out of 96 overdentures (6 maxillary, 80 mandibular), 8 observed gingival hyperplasia, primarily in the maxilla (9.3 per cent); and Jemt et al. observed that after one year out of 92 maxillary overdentures, 19 patients showed gingival hyperplasia (20.9 per cent), 13 patients had one gingival correction and five had two corrections. In a 1993 study on maxillary overdentures, Smedberg et al. observed: “The results show that the prevalence (p < 0.05) for Lactobacillus, Prevotella (subspecies) and yeasts in the subjects with removable prostheses was significantly higher than in subjects with fixed prostheses. Removable prosthetics were accompanied by a more aggressive peri-implant plaque.” In view of our patient’s unsatisfactory treatment results, it was thus decided to restart treatment completely.

Retreatment

The retreatment followed an extremely precise protocol, especially regarding the length of the healing periods. To begin, dental impressions were taken to create a resin-based temporary removable prosthesis. The prosthesis included palatal support to relieve the vestibular gingival tissue as much as possible. An aesthetic fitting of the appliance was conducted to straighten the axis of the incisors.

Implant removal

Owing to insufficient osseointegration, the removal of the implants was fairly easy (Fig. 4). Removal was accomplished with the aid of an implant removal tool. Immediately after implant removal, the temporary removable resin prosthesis with palatal support was inserted. It was contraindicated to suture the recipient implant site.

Assessment after implant removal

Three months after implant removal, a clinical and radiographic evaluation was performed to assess the healing process.

Figs. 5 & 6: Implant removal site showing even greater deterioration in bone volume.

Fig. 7: The grafts were harvested from the chin symphysis and firmly attached by surgical screws in the recipient site.

Figs. 8 & 9: The properly compressed PRF membranes permitted complete coverage of the surgical site, in this instance on the maxilla.

Fig. 10: Panoramic radiograph showing the grafts to be correctly healed and satisfactorily adhered to the recipient bone sites.

Fig. 11: Increased vestibular bone volume allowed positioning of the teeth at the crestal bone level and reduction of the false gingiva.

Fig. 12: A key of the added wax was taken and fabricated in clear casting resin.

Fig. 13: The reopened site showing correct graft integration, a notable increase in cortical bone and excellent vascularity.

Fig. 14: Tracing of the sterilised surgical drilling guide proved drilling would be at the centre of the reconstructed bone ridge.

Fig. 15: Alloha self-tapping implants were placed.

Fig. 16: All five implants equipped with threaded cover screws and the surrounding tissue sutured.

Fig. 17: Loaded implants, healing abutments in situ.

Fig. 18: The healing abutments were removed and replaced with pick-up impression copings secured with self-curing resin.

Fig. 19 & 20: Removal of the impression and fitting of the impression copings with their laboratory equivalent.

Fig. 21: Model of the framework, temporarily including the canine, cast in pattern resin.
assessment was conducted. The assessment showed further significant vertical bone loss and loss in bone volume (Fig. 5). Significant vertical bone loss is difficult to correct owing to random gingival recovery. It was thus decided to augment the bone volume by performing a chin bone graft.

**Bone graft**

Anaesthetic was administered in the maxillary and mandibular anterior region. For the mandible, the sample was taken from the cortical bone and a section of the cancellous bone by piezoelectric surgery. The grafts were harvested from the chin symphysis, as close as possible to the mandibular inferior ridge to avoid disturbing the incisor’s sensitive innervation, which can be a frequent complication of the procedure. The vestibular cortical bone scar was perforated with a small round bur, allowing for rapid revascularisation of the grafts. The grafts were then positioned and secured in place with mini screws (Figs 6 & 7).

To increase success, a blood sample was taken and centrifuged according to the Choukroun platelet-rich fibrin (PRF) technique in order to recuperate the fibrin clots. The clots...
were compressed between two com-presses to evacuate the serum and to form the membranes which were then applied to the surgical site and in the mandibular harvesting sites (Figs. 8 & 9).

Pre-implant prosthetic study
After four months, according to radiographic examination, the tissue had healed and the bone mass appeared stable (Fig. 10). New impressions were taken to prepare for the next step in treatment: the implant drilling guide. After four months of healing, the increased vestibular bone volume allowed positioning the teeth at the crestal bone and re-duction of the false gingiva using additional wax (Fig. 10). A key of the added wax was taken and fabricated in clear casting resin. The implant positioning was determined and the exact position of the implants (Fig. 12). The correct positioning of implants in relation to the tooth position is an important prerequisite for aesthetic and functional success.

Implant placement
Local anaesthesia was administered and the bone site remodelled. The site showed correct integration of the teeth at the crestal bone and restoration of bone volume allowed positioning the teeth at the crestal bone and reduction of the false gingiva (Fig. 14). After removal of the screws stabilising the grafts, the guide was placed and drilling (using physiological saline solution) completed. Five Auda (GC Tech.Europe) self-tapping Grade 5 titanium microscrew implants were inserted by slow drilling (Fig. 15). Aspiration with physiological saline solution was not used at this time so that the first contact with the titanium oxide would be the patient’s blood, thus promoting the implants’ osseointegration. This specific implantation technique was validated by Brun et al. All of the implants were equipped with threaded cover screws and the surrounding tissue was sutured (Fig. 16).

To minimise risk, the implants were stabilised and unloaded prior to the immediate loading of a site such as this one could have proven to be problematic.

Implant loading and impressions
After four months, the implants were loaded using an apically positioned flap. The healing abutments were placed and the flap sutured around them (Fig. 17). Radiographic analysis and especially a percussion test showed the implants’ perfect osseointegration. After 15 days of gingival healing around the abutments, they were removed and the impression copings were placed and secured with a self-curing resin (Fig. 18). Impressions were taken and the healing screws were reinserted (Figs. 19 & 20).

Validation prosthesis
Rather than calling the appliance at this stage a “temporary prosthesis” or “provisional prosthesis”, it is more appropriate to call this temporary prosthesis “osseointegration prosthesis of the implants” (concept recommended to the patient).”

After the course of several months, this prosthesis validated data — the osseointegration of the implants.

The aesthetic aspect, especially for the anterior teeth, — phonation, which is also important for the maxillary anterior region.

In this case, the ability of the anterior to guide the discus of the canine groups in protrusion.

This prosthesis serves as a model for easily modifiable material like resin, but with a metal framework to guarantee a certain level of rigidity. In the first step, a model of the framework, which temporally included the canine to increase stability, was cast in pattern resin (Fig. 21). The model was then scanned (Auda, GC Tech.Eur-ope; two cameras, 2 MP, precision: 10 µm) before being transferred to a machining centre (OM 2000, GC Tech.Europe; Figs. 22–24). Once back from the machining, the titanium framework was tested on the working model and its stability was verified (Figs. 25 & 26).

The cosmetic material (UNIFAST III resin, surface rendering; OPTILAZ colour, GC Tech.Europe) was then placed on the framework (Fig. 27). The bone graft permitted a maximum reduction of the vestibular false gingiva.

In the following step, the prosthesis was attached in the mouth with screws and the necessary occlusal verification was conducted, including maximum intercuspation, protrusion and lateral excursion. The screw channels were filled with composite (Figs. 36 & 37).

The final cosmetic check-up, validated by the patient’s prosthesis, showed the lip support with the new extremely reduced false gingiva to be correct (Figs. 38 & 39). This was achieved owing to the bone graft.

Regular check-ups
Retreatment was regularly monitored with patient check-ups (Figs. 40–41). All implant treatments, no matter of what type, must be rigorously monitored in all treatment phases, but a retreatment requires even more diligence. A patient affected by the failure of a previous treatment will not accept even the smallest problem. To this end, the role of healing periods is thus essential to retreatment suc-

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