

SOLVING A MANDIBULAR KENNEDY CLASS II EDENTATION THROUGH BONE AUTOGRAFT AND DENTAL IMPLANTS

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Abstract: Kennedy Class II includes the dental arches with unilateral edentation in the terminal part, so the edentation is limited only mesially by the teeth on one hemi-arch. In the edentation aetiology, multiple factors occur, such as: tooth decay and its complications, periodontal disease, trauma etc. Kennedy class II edentation, where residual alveolar ridge is unfavourable to prosthetics, due to laborious extraction with significant loss of bone tissue, is a challenge in terms of achieving a proper morphofunctional restoration. Reconstruction of dento-alveolar arch involves the accomplishment of the mastication function, phonation, physiognomy, self-sustainability and physical comfort. Dental implantology has revolutionized the dental prosthesis by inserting implants wherever they are needed, and additional poles have been obtained so that multiple types of edentation which had previously benefited from mobilisable or mobile solutions only, can now be solved by fixed prosthetics restoration. In situations where the bone offer is not favourable to prosthetics, we may use the bone grafts.

Cuvinte cheie: edentație clasa II Kennedy, autogrefa osoasă, implantare dentare

Rezumat: Clasa II Kennedy cuprinde arcadele cu edentație unilaterală terminală, deci edentația este limitată doar mezial de dinți, dar pe o singură hemiarcadă. In etiologia edentației sunt incriminați mulți factori, dintre care menționăm :caria și complicațiile sale, parodontopatii, traumatisme, boala de focar. Edentația cls II Kennedy in care creasta alveolară restantă este nefavorabilă protezării, datorită extracțiilor laborioase cu pierderi importante de țesut osos, reprezintă o provocare din punctul de vedere al realizării unei restaurări coresunzătoare morfo-funcțional. Refacerea arcadei dento-alveolare presupune îndeplinirea funcției masticatorii, fonației, fizionomiei, autointreținerii și confortului psihic. Implantologia dentară a revoluționat protetica dentară, prin inserarea implantelor oriunde acestea sunt necesare, s-au obținut stalpi suplimentari, astfel o serie de edentații ce in trecut beneficiau doar de rezolvări mobilizabile sau mobile, pot fi azi rezolvate prin restaurări protetice fixe. In situațiile unde oferta osoasă nu este favorabilă protezării se pot folosi grefe osoase.

INTRODUCTION

Edentation represents the absence of one up to fifteen dentoperiodontal units per dental arch. The loss of one or several teeth by arch causes the appearance of edentate spaces known as gaps.

The correction of edentate gaps is achieved through tooth bridges, other dental prostheses or implant prosthetic restoration, the type of reconstruction which is chosen being established according to the aspect of the edentate gap.

In oral implantology, the prosthetic evaluation of the patient's conditions resembles the traditional dentistry, but there are specific elements that modify the evolution of a prosthetic treatment with implants.

These elements are evaluated before presenting the final treatment plan to the patient, and consist of: space interarch, transmucosal position of the implants, the existing occlusal plane and interarch relationship, alveolar ridge morphology, the existing occlusion, number and topography of absent teeth and jaw flexibility.

In order to insert an implant, the bone bed should measure at least 8-10 mm vertically and about 5.4 mm in width. In the clinical situation we have presented, the bone crest width was 2 mm.

The treatment of terminal edentation is indicated to

avoid systemic disorders in the dento-maxillary system.

The case emphasizes the clinical advantages of using dental implants and bone autograft in a gap that prior to the development of implantology, could be restored only through a mobile prosthesis.

CASE PRESENTATION

We had under observation and treatment a 42-year-old patient, in a good general health status, who presented an old terminal unilateral mandibular edentation resulting from the traumatizing extraction of 4.4., 4.5., 4.6, 4.7 units on the basis of tooth decay complications.

At the first specialized clinical visit, 4.8 had still been present on the arch, but it was extracted by the dentist of the patient due to increased inclination.

Both the clinical and paraclinical examination of the patient were performed through panoramic radiograph, and there was discovered a knife alveolar ridge, unfavourable to prosthesis (figure no. 1, figure no. 2).

The alveolar ridge was corrected by applying an autograft from the homolateral jaw ramus, the size being 4 cm long and 3 cm wide. The first stage of the intervention involved the taking of the graft under local anaesthesia and its fastening on the edentulous ridge which had been exposed through an

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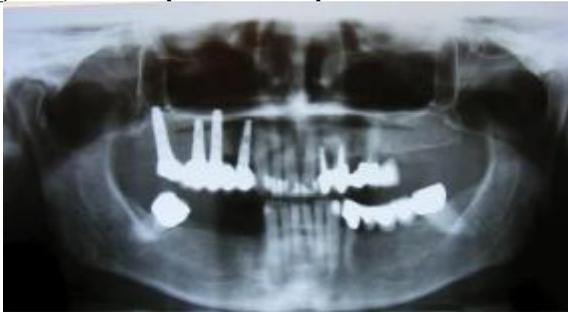
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envelope incision followed by a periosteal decoliation.

Figure no. 1. First clinical aspect



Figure no. 2. First paraclinical aspect



The graft was subsequently fastened by two titanium microscrews (figure no. 3), and was sheathed with biobone in order to eliminate all the empty spaces between the particles and the bony walls.

Barrier membranes for tissue regeneration were applied so that the bone graft should be covered and kept in place and prevent the proliferation of the epithelial and conjunctive tissue between the graft and the edentulous ridge.

In large bone defects, barrier membranes are required in order to prevent the elimination of alveolar grafting material (particles). The suture was performed, the antibioprofilaxy was installed for 10 days and 4 months later, the graft integration was achieved (figure no. 4).

Figure no. 3. Fixing the autograft



The local application of antibiotics is not recommended during grafting as the low pH of antibiotics can modify (reduce) the local physiological pH, diminishing the stimulator effect of bone formation, but the use of antibiotics in the general way is welcome.

Due to its biocompatibility, osteogenic and osteoinductive capacity, the autologous bone tissue is the elective graft and taking it from the level of oral cavity has the advantage of minimal morbidity of the donor area and the biocompatibility with the receptor bed.

The main types of bone grafting materials used today are:

- Autograft: graft taken from the patient (their own or bone), the elective graft

- Allograft: a graft taken from another human being, lyophilised human bone
- Alloplastic graft: graft of synthetic material
- Xenoplast graft: graft of animal origin (mammal): bovine or porcine

Autologous bone graft has been considered the "golden standard" among various types of grafts, and the solution we have chosen.

Figure no. 4. Integration of bone autograft-Rx image



The integration of bone grafts in the receiving area passes through the following three phases: incorporation, replacement and remodelling.

The osseointegration process depends crucially on the qualities of the receiving area, surgical technique, tissue vitality and the complete coverage with soft parts (tissue).

Subsequently, an envelope incision was made, the titanium fixation microscrews were removed, and three 11.5 mm implants were fixed to the new alveolar ridge (figure no.5).

Figure no. 5. Paraclinical aspect-after the implants were fixed



After implant integration, fixed restoration with implant support was done (figure no.6).

Figure no. 6. The final paraclinical appearance



The decision adopted was in favour of implant prosthetic restoration, primarily because of the patient's age, and after clinical and laboratory analysis of the case, this method proved to be the most appropriate.

The number and topography of absent teeth influence the therapeutic plan, the lack of molars and premolars requires a

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treatment plan which is more difficult to accomplish, as other changes can occur at dental and joint level.

In a fixed partial prosthesis distally-supported on implants, molar II is usually not replaced, as the mandibular canal begins its ascent from this level, the bone is less dense than in other regions of the mandible, 90% of masticatory efficiency takes place before the mesial half of the inferior molar I, and the occlusal pressure exerted on the molar II is usually 10% higher than on the molar I, a fact that during some parafunctions may lead to loosening and fracture of the implant pole or lysis to the bone/implant interface.

Therefore, we have used three implants, their size being chosen by reference to the new alveolar ridge that resulted from the integration of bone autograft.

Conclusions:

Edentation leads to local complications (reduction of jaw lifting muscles, ATM diseases, bone atrophy, decreased the vertical dimension of occlusion, or VDO) and remote complications (digestive/mental disorder). The advantages of dental implants are: maintenance of bone ridge height and width, maintenance of bite height, ideally esthetic tooth positioning, improved psychological health and increase of masticatory efficiency.

It is important to correlate all pieces of information, to determine all possibilities of treatment and then to conduct the appropriate therapeutic procedure. The treatment of terminal edentation is indicated in order to avoid the systemic disorder within the dento-maxillary system. The use of the bone autograft is the most appropriate solution, having the highest integration rate in small- and medium-sized defects.

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