

Case Report

All-On-4 Implants Supported Prosthesis with a Modified Approach: A Case Report of Upper Jaw Rehabilitation

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Abstract: Young patients tend to prefer quick treatments and fixed restorations compared to older patients. Fixed reconstructions on implants now offer a variety of treatment options for various situations. However, despite the aesthetic and functional benefits, there are currently no clear clinical guidelines regarding the number of implants, loading type, and reconstruction type. Although various recommendations do exist, micro/macrosopic factors significantly influence treatment plans and surgical approaches in nearly every case. In this case report, we describe the rehabilitation of a triangular-shaped upper jaw of a 35-year-old non-edentulous patient using an implant-supported CAD/CAM designed prosthesis. Instead of using the All-on-4 method, five implants were inserted and immediately loaded after a series of extractions. The treatment plan involved placing three implants in the frontal region, with two tilted distally. The plan was designed not only to meet the patient's immediate demands but also to consider any possible future requests in the lower jaw. We also took into account the patient's current dentition and potential risk factors. As a result, we inserted a fifth security implant in the front region between the two front implants. The overall functional, aesthetic, and phonetic outcomes were satisfactory, and the patient expressed excellent satisfaction with the results.

Keywords: Full-arch rehabilitation; Fixed- implant reconstruction; Implant prosthesis.

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INTRODUCTION

Sufficient adaptation to removable complete and partial dentures is considered challenging to many practitioners despite the age of treated patients. Therefore, the usage of implant-supported dentures has grown widely. This kind of implant-supported prostheses provides not only better life quality for patients, but also considered to be an optimal solution for full mouth rehabilitation treatments [1-4].

Patients pursuing quick full-arch functional and cosmetic results can benefit from the All-on-4 treatment concept, which require shorter treatment time and costs, enhanced esthetics, and high patient's satisfaction. However, this type of treatment remain challenging to many, as it requires solid experience and thorough planning [5-7]. Also, in many cases, it needs to be adapted to suit the presented situation. Therefore, this treatment option is unfortunately not always taken into account. This treatment rely on a hybrid screw-retained prostheses supported by 4 dental implants. In general, the implants are positioned in biomechanically

appropriate positions which allows a balanced loading after designing the prostheses and during mastication. Till the time of this publication these sites are only recommended in literature and not considered as guidelines [8-10]. This positioning process, along with the design of the prosthesis, is influenced by a variety of factors, including the type/quality of existing bone, inter-occlusal space, and the patient's preferences. Other clinical and anatomical difficulties can also vastly influence or even change the treatment plan. Such cases require special individual multidisciplinary approach and most likely treatment-plan adaptations [8-11].

It is well known, that orthodontic treatment in early ages can help in avoiding many problems. However, adult patients who did not have the benefit of such treatments provide special kind of challenges. Furthermore, younger patients seek faster results and fixed restorations when compared to older ones. This article reports a full rehabilitation and an All-on-5 treatment procedure in the upper jaw of a 35 years old

male with a high-arched- narrow palate and a triangular shaped maxilla.

CASE REPORT

A male patient 35 years of age, with non-significant medical history presented with general aesthetic complaints especially in the upper frontal region. Clinical and radiological examination revealed further details about other problems in the oral cavity had with many compromised carious teeth in both jaws and also many destroyed teeth (Figure 1 and Figure 2). However, bone volume in both jaws was considered adequate after Cone beam computerized topography examination (CBCT) as bone quality of type II and III were documented in the maxilla according to the Lekholm & Zarb classification.

Several treatment options were discussed with the patient to treat both upper and lower jaws, and restore the vertical dimension. The patient was keen in the beginning to restore only the upper jaw first and as fast as possible, as the appearance of the lower jaw was not disturbing for him. Therefore, and on the basis of bone's quality and quantity in the maxilla, an implant supported fixed prosthesis was planned along with the

extraction of all teeth in the upper jaw. Taking into account the anatomical topography of the upper jaw and the fact that the alveolar is much arched with deep narrow palate, All-on-5 implant supported and CAD/CAM designed prosthesis was planned. This decision was made after CBCT measurements were conducted, and implant size selection was made. Such design would help in achieving equal force distribution on all 5 implants and eliminate cantilever effects. The remaining dentition in the lower jaw is a clear sign that the patient will use mainly the frontal region during the primary mastication phase. Therefore, the insertion of three implants in the frontal region was planned in addition to two implants in regions 15 and 25.

All possible complications were discussed with the patient. The surgical and prosthetic approaches were explained, and consent forms were signed. The operation was performed under general anesthesia. First step included atraumatic teeth and roots extractions, followed by mucoperiosteal full-thickness flap elevation. Second step started with an osteotomy procedure as planned to insert the implants in an optimal functional and aesthetic positions. Selected implants were placed at osteotomy sites.



Figure 1: Initial situation. Notice the tight arched-shaped maxilla is obvious



Figure 2: Pre-operative panorama X-ray

One implant each in the 15/25 regions were planned to be angled at 30°, while the other distal implant was angled at 40° due to the anatomical nature of the bone. The remaining three implants were inserted in regions 12, 11, and 21, respectively, at a 0° angle. All implants were cylindrical-shaped Nobel Biocare® implants and achieved an initial primary stability of more than 35 Ncm at all sites. All implants were placed below the bone level. All implants were placed below bone level. Figure 4 is a control panorama after the insertion of the implants and the installation of provisional abutments.

Afterwards the operated area was controlled. A removal of all bony sharp edges was performed. All extraction sites and bony irregular formations were managed by what is known as the sticky bone technique using a mix of auto-grafted bone and allograft bone substitutes Puros® and plated rich fibrin (PRF). The grafted region was afterwards covered by a PRF membrane. The flap was adequately re-positioned and sutured. Figure 3 shows the initial situation after suturing the operated area.

To begin the prosthetic process, impression posts were installed on all implants, and two definitive impressions were taken using a pre-made individual tray with silicone impression material (Aquasil, Dentsply). The first impression was a bone-level impression, while the second was a tissue-level impression. The bone-level impression captured the exact length and axis of the impression posts as a whole unit. Subsequently, healing abutments were installed, and the recovery process was performed by the anesthetist. Instructions were provided to the patients, and an appointment after 24 hours was organized. 24 hours later the general situation was controlled again and a multi-unit abutments were inserted with a torque of 15 Ncm on all implants. Next, a Polymethyl methacrylate (PMMA) screw-retained prosthesis was installed. Figure 5 shows the installed prosthesis 24 hours post-operation. The patient was instructed to follow a soft food diet for the first two weeks, and regular follow-up appointments were scheduled, including an appointment after 10 days to remove the sutures. Intra-oral pictures (Figures 6 and 7) taken four months after the operation show complete healing of the soft tissues. Figure 08 shows an overall facial picture reflecting satisfactory aesthetic results.

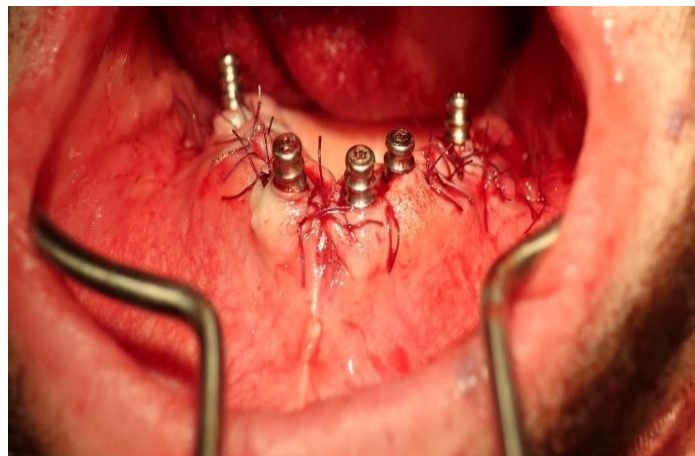


Figure 3: Initial situation after suturing

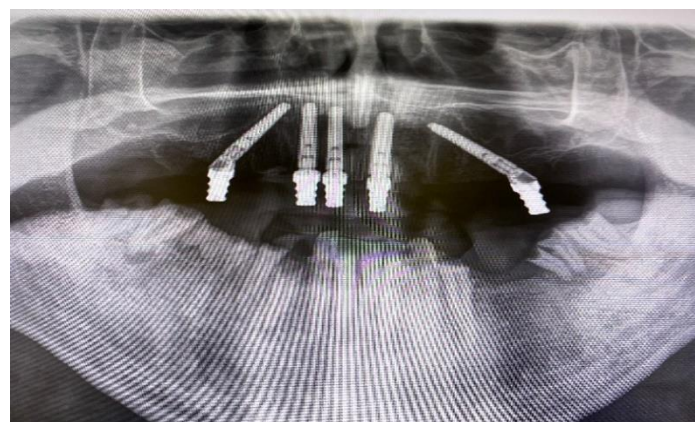


Figure 4: A post-operative panorama X-ray



Figure 5: The installed prostheses 24 hours after the operation



Figure 6: Intra-oral frontal view of the upper jaw after 4 months



Figure 7: Intra-oral occlusal view of the upper jaw after 4 months



Figure 8: An overall face picture 4 months after operation

DISCUSSION

Generally speaking a number of four to six implants is recommended in the total rehabilitation of the maxillary arch, despite the fact that in literature no ideal number nor preferred positions are considered as clear guidelines [12, 13, 9]. However, different systematic reviews recommend that any implant supported overdentures should rely on at least 4 implants. Therefore, the concept of the All-on-four treatments is gaining slow but steady popularity among practitioners and patients. On the other hand, surgeon's clinical experience plays an important role, as clinical and anatomical factors can change the whole surgical approach. Factors like the shape of the maxilla, the condition of the remaining dentition, and other untreated previous orthodontic-related conditions highly influence the surgical decisions [8, 14, 10, 15].

In this case report the maxilla of the patient and the triangular shape of the frontal part of it led us into rehabilitating this region with 3 frontal implants, and two distally placed angled implants to minimize the cantilever length. This treatment plan was considered to be the most realistic approach to meet the patient's demands, as he was keen to obtain fast aesthetic results. This was also the reason of the immediate loading in this case. The bone quality/quantity, the achieved primary stability, and patient's age were decisive in that matter.

Research results are fluctuating while discussing success/failure rates, as microscopic and macroscopic components play a crucial part in each patient [16]. This makes each case completely different and individual thorough assessment is of great importance [17]. Furthermore, and despite the fact that the patients main concern was the cosmetic appearance, after this fast satisfying results he is now considering taking a similar approach in the lower jaw. A short-term documentation of this case will later on be supported by long term follow ups and updates about any future treatments of the mandibular. It is of a huge significance to share case reports in un-utopian matter, as such cases practitioners face on a daily bases. Therefore, short and long-term documentations are equally important to avoid any possible post-operative complications.

CONCLUSION

Implant-supported fixed restorations are an optimal solution for young patients seeking both aesthetic and functional results. However, achieving these outcomes requires thorough and accurate planning, taking into account the anatomy of the underlying structures, which may require adaptations to the treatment plan. Additionally, short and long-term documentation is equally important to avoid any possible post-operative complications.

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