The All-on Approach

Using the New Biohorizons Multiunit Abutments

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The All-on approach, known as **All-on-4** has been around for almost 20 years now. Dr. Paulo Malo from Lisbon, Portugal was the first to pioneer this treatment modality of full arch immediate reconstruction. However, we do know that the tilting of implants have been around even before the All-on-4 treatment was introduced[1].

The All-on-4 procedure based on Dr. Paulo Malo, uses only 4 implants. One can think and question the fact that 4 implants are too few to support a full arch of teeth, especially in the maxilla when we have soft cancellous D3 and D4 bone [2]. If one implant fails, the whole prosthesis would be in serious jeopardy. If we look at studies by Dr. Carl Misch on load, masticatory dynamics and forces, as well as key implant positions, it is important to have implants in certain strategic positions and err on the side of more implants rather than less. Therefore why not place more than 4 implants if space and bone permits? Just an extra one or two implants in addition to the 4 implants in the All-on approach would provide that much more support, better force and stress distribution for such a prosthesis[3, 4].

The All-on-4 procedure is based on the concept where the optimal number of 4 implants supports an edentulous jaw with a complete arch prosthesis. The 2 posterior implants are tilted distal to the posterior, to avoid anatomical structures, and the other 2 implants are placed axial in the anterior. Once these posterior implants are tilted, an angulation correction is needed in order to properly restore the case. This is where multiunit abutments have come into play. Since the introduction of the All-on-4 procedures, Nobel Biocare (Nobel Biocare, Zurch, Switzerland) has been the only implant company to manufacture multiunit abutments for their implant systems to correct the angulation of the tilting of the implants. This is not so anymore. A number of companies have begun to manufacture multiunit abutments for their implant systems. BioHorizons (BioHorizons, Birmingham, AL, USA) is one such company that has done so. BioHorizons has created 3 different angulations or angles of multiunit abutments, which come in 0 degrees, 17 degrees, and 30 degrees, with a number of different height options. In addition, Nobel Biocare users can benefit with the fact that these BioHorizons multiunit abutments are compatible with Nobel's star shaped driver, and Nobel's multiunit impression copings, and cylinders. What we are quickly realizing is that the All-on-4 procedure is not at all limited to one and only one implant system and company, and that it can successfully be completed with other systems and companies.

Case Report

A 54-year-old healthy female presented with a fixed bridge from canine to canine, and a partial cast denture to replace the premolars and molars. Precision attachments were present on the distal of the canines to help retain the partial denture. Maxillary papillary hyperplasia was noted. The supporting

Figure 1a and 1b

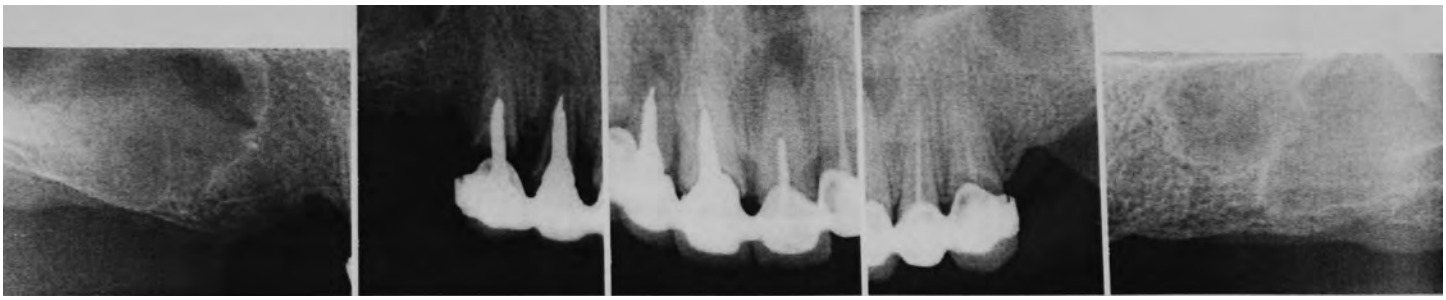

Figure 2

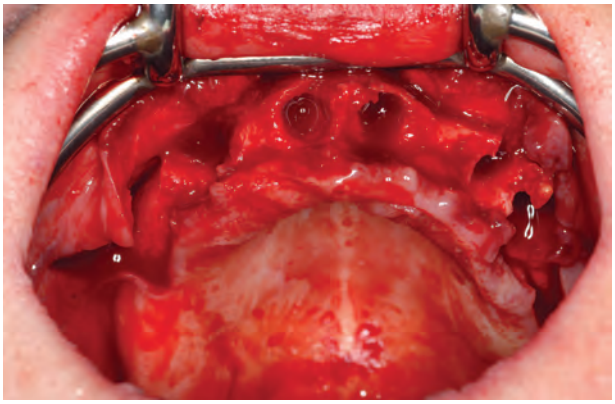

Figure 3

Figure 4

abutments were failing, and porcelain fracture was present. Patient had moderate periodontal disease of her fixed mandibular dentition, and a Class I occlusion (Figures 1a, 1b). The pre-operative radiographs revealed bilateral sinus pneumatization (Figure 2). Multiple treatment options were discussed and presented to the patient. After treatment discussions, the patient elected to proceed with an all on approach due to the fact that no bone grafting, and fewer surgical appointments would be needed. In addition, the patient was very happy about the fact that she would have a fixed temporary prosthesis immediately, therefore not needing to wear any type of removable prosthesis. The plan would be to place 5 to 6 implants with the most posterior implants on angles to avoid the sinus. A fixed temporary prosthesis would be fabricated chair side. An upper complete maxillary denture was fabricated based on the patient's existing occlusion, in order to be used to fabricate the temporary fixed prosthesis.

The patient was pre-medicated with 1g Amoxicillin 1 hour pre-operatively, and a chlorohexidine 0.12% rinse was used for one minute prior to surgery. The patient was anesthetized with lidocaine 2% 1:100,000 with epinephrine. Once the patient was fully anesthetized, the maxillary bridge and teeth were extracted using elevator and forceps delivery. After the extraction, defects and buccal destruction of bone were noted bilaterally in both canine regions (Figure 3). These defects would affect the placement sites for the implants. Prior to commencing with the osteotomy

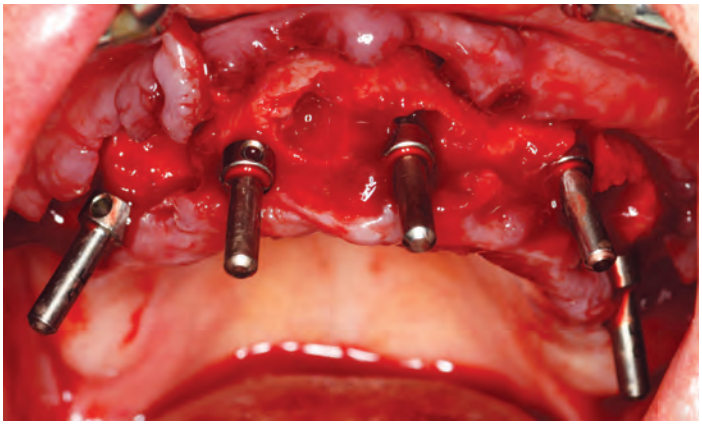

Figure 5

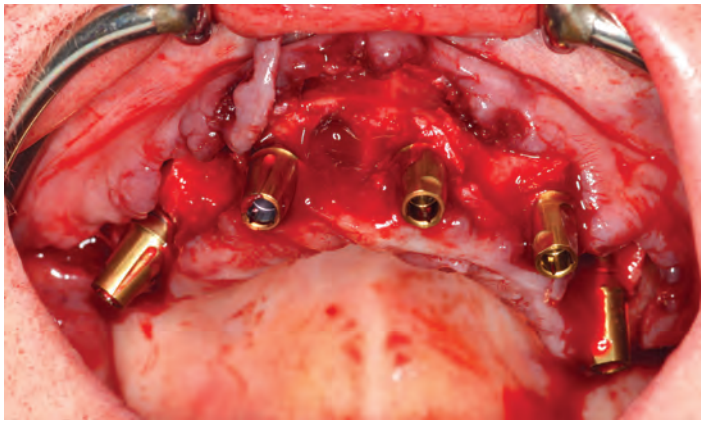

Figure 6

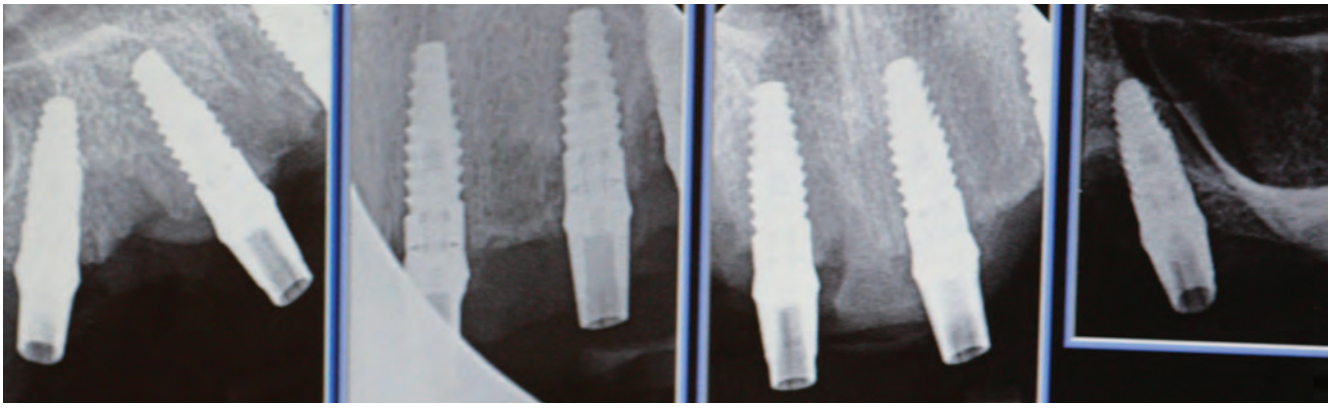

Figure 7

preparation for the implant placement, the complete denture was inserted to verify occlusion, and a new bite registration was taken (Figure 4). Based on the presence of bilateral defects in the canine regions and the anterior posterior spread with respect to the sinus pneumatization, there was only enough space for placement of 5 implants. An alveoplasty of the maxillary ridge was performed using a double action rongeur and a bone drill. Then, 2mm twist drill osteotomies were performed with the most posterior osteotomies at 30 degree angles to avoid the sinuses. Direction indicators were placed and periapical radiographs were taken to verify the angulation, direction, and spacial relation (Figure 5).

Once the osteotomies were verified, the osteotomies were enlarged for 4.6 x 12mm implants in all sites except the premolar region, which was prepared for a 4.6 x 10.5mm implant. All the osteotomies were under prepared to 3.7 mm diameter in order to make sure a minimum of 30 Ncm stability would be achieved, so that an immediate fixed temporary can be fabricated. All 5 implants placed were BioHorizons Laser-lok tapered internal (BioHorizons, Birmingham, AL, USA) and all achieved an initial stability of 35 to 45 Ncm stability (Figure 6). Periapical radiographs were taken to verify placement and positioning of all the implants (Figure 7). Once the verification was completed, the 3inOne abutments were removed, and the Biohorizons multiunit abutments were used to correct the angulation of the implant placements. A 30 degree, 3mm height, 4.5 platform multiunit abutment was used on the most posterior implant on the left and the right. A simple and easy way to place and torque down these 30 degree multiunit abutments is with a Torque Control from (Anthogyr Group, Sallanches, France) (Figure 8). Then 0 degree, 2mm height, 4.5 platform multiunit abutments were used on the 3 anterior implants (Figure 9). All the multiunit abutments were torqued to 30 Ncm stability. The multiunit healing caps were placed on top of the abutments, and the tissues were sutured closed around the healing caps using 3.0 chromic gut sutures (Surgical Specialties, PA, USA) (Figure 10).

The complete denture was then taken, and holes were made in the location of the anterior abutments. Once the openings in the denture were large enough and passive, the titanium temporary cylinders were screwed down onto the 3 anterior multiunit abutments (Figure 11a). The denture was then seated, bite and occlusion verified, and Voco Ufi-Gel Hard (Voco GmbH, Cuxhaven, Germany) was used

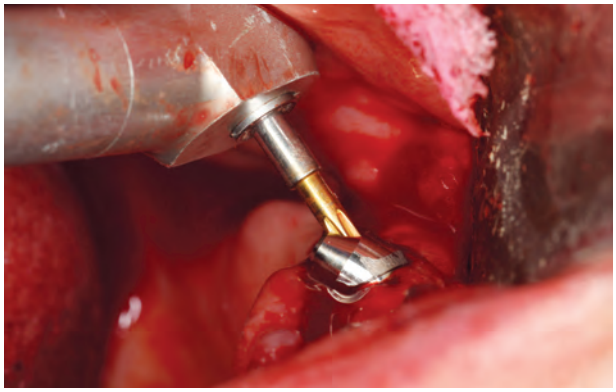

Figure 8

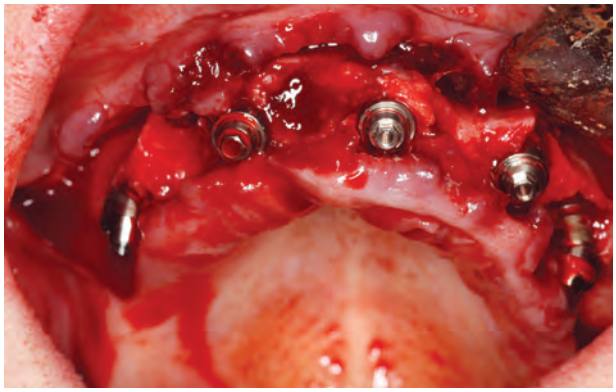

Figure 9

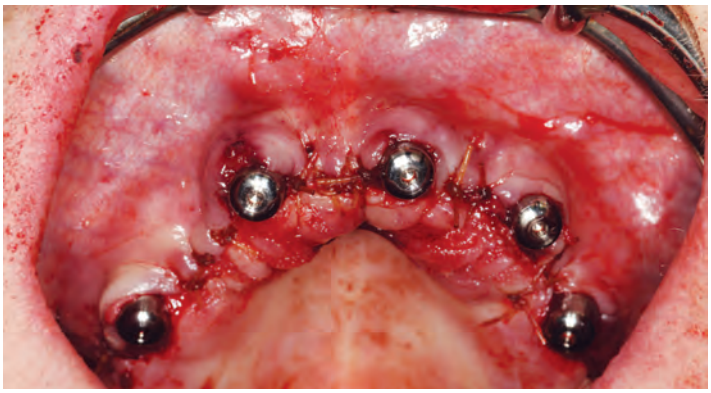

Figure 10

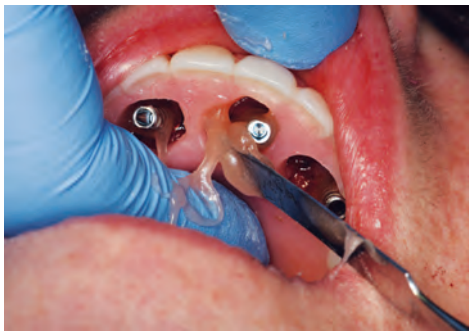

Figure 11a, 11b, and 11c

to lute the cylinders to the denture (Figures 11b, 11c). Once the luting gel was set, the denture was removed, and closed tray BioHorizons multiunit impression copings were placed on all 5 multiunits, and a final impression was taken using medium and heavy body polyvinyl siloxane (Figure 12). This impression was poured up in stone with multiunit replicas, and the denture was mounted to the model in order to start the conversion process by the denturist (Figures 13 and 14). The multiunit healing caps were placed back onto the abutments, and the patient now had some time to rest while the lab conversion was taking place.

Once the denturist finished incorporating the temporary titanium cylinders into the denture, he trimmed the denture back, and adjusted the occlusion. The temporary bridge was then polished and ready for insertion (Figures 15 and 16). The multiunit abutment healing caps were then removed, and the temporary bridge was hand tightened, and occlusion checked and adjusted. Once the occlusion was balanced, the bridge was torqued down to 15 Ncm, cotton pellets were placed in the access holes, and a PVS bite registration material was used to seal off the access holes (Figures 17 and 18). The patient was put on a strict restricted diet for 4 to 6 weeks, and was also given a prescription for an antibiotic, analgesics, and a chlorohexidine rinse.

This case depicts the fact that the All-on approach can be

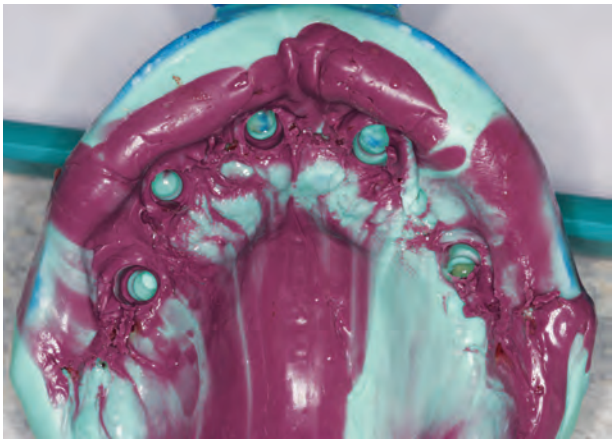

Figure 12

Figure 13

Figure 14

Figure 15

Figure 16

Figure 17

Figure 18

successfully completed using another implant system such as BioHorizons. This is not only due to the fact that their tapered implants are very aggressive, and easily attain excellent initial stability, but also the fact that they have excellent multiunit abutments that correct implant angulations such as Nobel Biocare's. One will also notice that I refer to this as the All-on approach, and this is due to the fact that I use the concept, but I am using more than 4 implants, therefore it is no longer an All-on-4.

Based on the above case, and research that shows great long-term results, this is definitely a treatment modality that every practitioner should have for individuals that are completely edentulous, or have terminal existing dentition[5, 6.] ■

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