

Prosthetic solution for fixed full-arch maxillary prosthesis with implant divergent parallelism greater than 45°.

A case report

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SUMMARY

A non-ideal implant position and angulation may bring about some technical concerns because the abutment prosthetic possibilities may fail to correct the implant angulation or its consequent prosthetic restoration insertion plane. This case report describes a prosthetic solution for fixed full-arch maxillary prosthesis with six implants (Bone-Level Regular CrossFit®, Straumann AG, Basel, Switzerland) non-satisfactory position in maxilla; one of the implants showed buccal angulation and a divergent parallelism greater than 45° in relation to the other five implants. To correct the implant angulation and the insertion bar plane, a screw-retained RC non-engaging gold abutment for bridge was used in five out of six implants, and a combination of a screw-retained RC CrossFit™ gold abutment for crown and a Screw Bloc System (CNG Soluções Protéticas, São Paulo, Brazil) was used for the right-hand-side anterior implant that showed a greater buccal implant angulation (>45°). A satisfactory outcome was obtained, which totally met the patient's expectations. Hence, the case was successfully solved with the avoidance of buccal insertion of the prosthetic screw and the consequent esthetic appearance loss of the fixed full-arch prosthesis.

Key words: complications, fixed dental prosthesis, dental implants, treatment concept.

INTRODUCTION

Previous studies have stated that “implants placed immediately or shortly after tooth extraction have been shown to be a successfully predictable treatment modality”(1). The main idea behind the choice of immediate implant placement is that this procedure has several clinical advantages, such as preservation of the alveolar ridge width and height, reduced overall treatment time, and reduced number of surgical procedures (2-4). Nevertheless, if some specific steps are not strictly followed, several complications may emerge.

Thus, in order to avoid technical setbacks, implants must be accurately placed in a three-dimensional position to ensure that a proper emergence profile will be achieved for the final restoration (5). A non-ideal implant position and angulation may bring about some technical concerns because the abutment prosthetic possibilities may fail to

correct the implant angulation or its consequent prosthetic restoration insertion plane. Thus, following the norm in quality patient care that envisages a comprehensive pre-implantation diagnosis and planning (6), a surgical guide template must be fabricated during pre-surgical planning to facilitate implants insertion in the proper sites (7) and ensure treatment success.

This case report describes a prosthetic solution for fixed full-arch maxillary prosthesis with implant divergent parallelism greater than 45°. The treatment was carried out in accordance with the principles of the Declaration of Helsinki on research involving human subjects. Decision making regarding treatment choices respected the patient's wishes, including financial capacities (8).

CASE REPORT

A 60-year-old female patient had been seeking a prosthetic solution to her unsuccessfully treated teeth since her clinician had declined the case. After performing careful anamnesis and an equally careful dentistry history check, we had the

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Fig 1. Divergent parallelism of implants



Fig 2. Impression technique

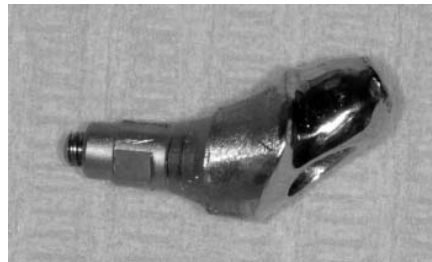


Fig 3. Custom abutment

information that the patient had undergone surgical implants placement six months before. A clinical examination followed by a radiographic image evaluation showed six implants (Bone-Level Regular CrossFit®, Straumann AG, Basel, Switzerland) in maxilla and another four implants (Tissue-Level Standard Plus Regular Neck®, Straumann AG, Basel, Switzerland) in mandible. Parallelism of the six maxillary implants was non-satisfactory; one of the implants showed buccal angulation and a divergent parallelism greater than 45° in relation to the other five implants (Figure 1).

Repeated and unsuccessful attempts to contact the oral surgeon left us with no choice other than obtain all the needed information from the patient herself. Thus, important data such as the initial planning for rehabilitation, the basis for choosing a specific type of implant, and the occurrence of anything relevant during the surgical procedure had been lost. According to patient's account, the initial treatment goal was to build fixed full-arch prostheses in both jaws in order to replace her lower total prosthesis and her esthetically unsatisfactory upper removable partial denture. In maxilla, where the implants were not parallel, the patient reported that dental elements 13, 14, 15, 25, 24, 23 had been removed, and six implants had been immediately placed in the corresponding sites. Besides this, two provisional total removable prostheses had been fabricated before the surgery; no tomography and/or surgical guide, however, had been performed or designed.

With this background in mind, and despite the patient's refusal to have the 45 degree-angulated implant removed, the treatment was started. Firstly, in order to begin the rehabilitation of the upper

fixed full-arch prosthesis, fully understand the case and analyze all possibilities, an implant transfer molding was carefully taken, allowing a later accurate choice of abutment components. A test was carried out before impression procedure to check whether the splinted implant impression posts

would move or not. As we imagined, because of the extremely high lack of parallelism, splinting the implant impression posts altogether would make the impression tray removal impossible. So the impression was taken by using a mix of open-tray and closed-tray techniques simultaneously. Hence, RC impression posts for open tray with guide screw were splinted for the implants that displayed acceptable parallelism (the three left-hand-side implants and the two right-hand-side posterior implants). For the implant placed with the biggest buccal angulation (the right-hand-side anterior implant) an RC impression post, for closed tray, with guide screw and cap was used (Figure 2). Finally, with a model study in hand, it was possible to choose the appropriate abutments and find the best solution to the case.

After thoroughly assessing the situation and discussing the feasible solutions with the prosthetic laboratory technician (KNEBEL Lab, Porto Alegre, Brazil), an unusual decision was made. We decided to use the screw-retained RC non-engaging gold abutment for bridge in five out of six implants, and a combination of a screw-retained RC CrossFit™ gold abutment for crown and a Screw Bloc System (CNG Soluções Protéticas, São Paulo, Brazil) for the right-hand-side anterior implant that showed a greater buccal implant angulation (>45°). This solution was used to correct the implant angulation and the insertion bar plane (Figures 3 and 4) because the other existing abutment possibilities would not be capable of improving such condition. In addition, since the gold abutment was our choice of restoration, the bar had to be fabricated from silver-platinum alloy. Clinically, this customized abutment was placed first in the implant, then the abutment screw was



Fig 4. Custom abutment – model view



Fig 5. Customized abutment placed



Fig 6. A 0.9-mm screw was used



Fig 7. Clinical final result



Fig 8. Clinical final result



tightened (Figure 5), and finally the bar structure was positioned in the other implants and onto the customized abutment. A 0.9-mm screw was used to tighten the bar on the customized abutment (Figure 6).

DISCUSSION

Eventually, a satisfactory outcome was obtained, which totally met the patient's expectations (Figures 7 and 8). Hence, the case was successfully solved with the avoidance of buccal insertion of the prosthetic screw and the consequent esthetic appearance loss of the fixed full-arch prosthesis.

The technique of immediate implant placement has been used because it presents predictably successful outcomes. However, for this to be possible, the implants should be properly placed and should be ideally parallel, or should not exceed a divergence of

an inclination of 45 degrees.

In the case reported, despite the limited options for performing the treatment, the result was satisfactory. Although the desired biomechanical solution has not been achieved, the treatment was finalized without impairing the aesthetics and meeting the patient's expectations.

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