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Observational study of 67 wide platform implants treated with avantblast surface. Results at three year

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Abstract

Objective: This paper shows the results of the clinical and radiographic behavior, at 3 years, of 67 wide platform implants undergoing prosthetic load.

Study Design: This is an observational prospective study of 67 implants in 49 patients within the range of 54-69 years of age. Screening was performed after a radiological study with panoramic and tomographic radiographs followed by the implantological treatment with prosthetic load and clinical (15 days, 1, 6, 12, 24 and 36 months) and radiological control follow-up (6, 12, 24 and 36 months).

Results: During the healing period 1 implant failed, representing a 98.5% survival. After placing the prosthesis, it was not necessary to remove any implant, therefore 66 implants remain successfully in place.

Conclusions: The favorable results and follow-up after the prosthetic load of 66 implants (CSR of 100%) attest that wide platform implants can and should be applied after careful planning and case selection.

Key Words: *Implants, wide platform, avantblast, survival.*

Introduction

Nowadays treatment with endosseous implants continues in permanent development, and questions still remain unanswered. Initially, implants were mainly used in anterior edentulous areas both in the maxilla and the jaw; subsequently, their indications for use were extended to posterior areas, with varying results being found in a number of studies.

It is considered that factors such as implant length, bicortical anchorage and long periods of osseointegration will contribute to the long term success of implants placed in these areas (1).

Use of wide implants implies greater bone surface contact than standard platform implants, therefore representing a clear indication for posterior areas. However, heat production above the indicated level in the bone bed would be one of the main disadvantages, an aspect that has recently been resolved (2).

Some study results do not support wide platform implants, but it should be borne in mind that apart from being used in posterior areas, they have been conceived for complicated clinical situations, as well as to replace standard platform implants that have failed (3):

Ivanoff et al. (4) accepted these negative results, but also warned that the anatomic situation in which both work is not comparable. According to Attard et al. (5) the success rate for implant-supported prosthesis is very high in posterior areas both in the maxilla and the jaw, but it decreases substantially at five years.

In the case reported by Aparicio and Orozco (6), the conclusion also shows that results are not as good as for smaller diameters.

On the other hand, there are studies that support the results obtained with wide platform implants. From a biomechanical perspective, and according to Himmlová et al. (7), the ideal choice is an implant of the greatest possible diameter allowed by face anatomy to reduce the negative effect of occlusal forces that affect the implant in posterior areas, as well as to reduce the stress around the implant neck.

Mordenfeld et al. (8) also believe that implants of greater diameter produce acceptable results.

The purpose of this study is to offer results on the clinical and radiographic behavior of Defcon TSA® wide platform implants (Avantblast® surface) based on a 3-year study and follow-up of 67 wide platform implants (6 mm).

Materials and Method

This study was performed on a total of 49 patients (27 women and 22 men) with a mean age of 62 years, range from 54-69 years old.

Before being included in this study, the medical history of each patient was collected and a physical examination performed, those cases with severe systemic disorders or uncontrolled oral diseases being excluded. Special attention was also given to maxilla-jaw relationship and adequate prosthetic space.

Preoperative radiographic assessment consisted, in all cases, of one panoramic radiograph and Dentascan-type tomographic studies.

The surgical approach consisted of crestal incision and mucoperiosteal separation, placement of surgical splint and creation of bone bed using initial, pilot, series 3, series 4, intermediate, and series 5 surgical drills with permanent cooling (Defcon TSA® implant). After fixation insertion, by means of a submerged technique (two phases), the mucoperiosteal flap was repositioned and sutured with 000 silk.

All patients were informed about the possible onset of postoperative symptomatology and were prescribed antibiotics (seven days) and analgesic-anti-inflammatory drugs (four days).

They were recommended not to apply any type of load on the treated area during the rest period.

At ten days, the sutures were removed and clinical controls were established every 15 days until seven weeks at which stage radiological controls were performed prior to prosthetic load.

Implant connection to scar formation pillars was made, in most cases, through a circular incision, thus preserving correct insertion in the gum.

Once the planned prosthetic treatment was complete, instructions on hygiene and maintenance were provided, with clinical controls at 15 days, 1,6,12,24 and 36 months to assess mucogingival peri-implant mobility and condition. Radiological studies consisting of panoramic and periapical radiographs were requested at 6,12,24 and 36 months.

Results

The first variable analyzed in this study was distribution by sex, showing that, among 49 patients, 58.62% were women and 41.38% were men, which is equal to a female-male ratio of 1/0.7.

As for anatomic distribution (Fig. 1), the percentage ratio shows that, depending on the region, 43.28% (29 implants) were in the maxilla region and 59.71% (38 implants) in the jaw. Moreover, the distribution according to quadrants was 19.12% (first quadrant), 24.16% (second quadrant), 30.23% (third quadrant) and 26.48% (fourth quadrant).

Another variable analyzed corresponded to implant length (Fig. 2), which ranged between 8.5 and 11.5 mm. 14.9% were of 8.5 mm (10 implants), 50.74% of 10 mm (34 implants) and 34.32% of 11.5 mm (23 implants).

From a surgical point of view, 56.76% of implants were placed crestally and the remaining 43.24% supracrestally (1 mm) mainly because of the close location of the inferior dental canal.

During the clinical control period, only one implant failed during the pre-load phase. In all the other cases

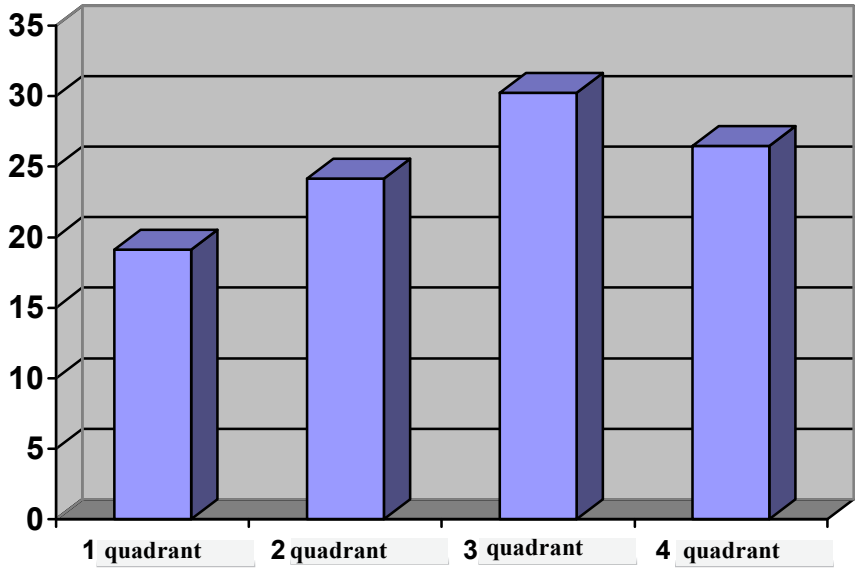

Fig. 1. Percentage distribution of anatomic location treated.

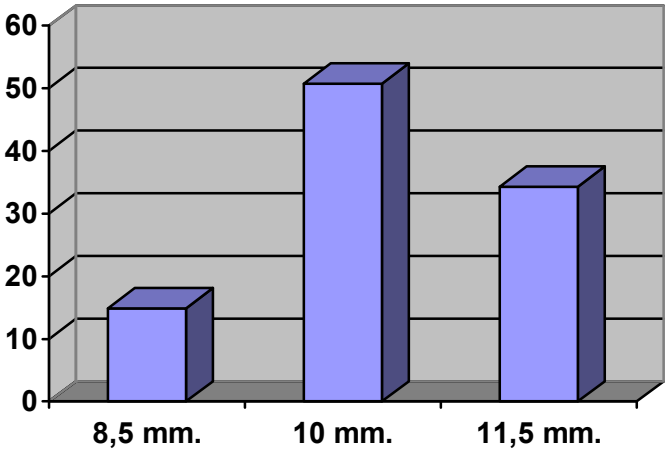

Fig. 2. Percentage distribution of implants length.

(66 implants) plaque build-up was not observed and periodontal exploration did not exceed values of 1.5 mm during the entire follow-up period.

The radiological controls, in all cases through panoramic and periapical radiographs, showed absence of peri-implant radiolucency that could provide evidence of signs of failure, there being bone loss in the mesial part of the implant in only one case.

Finally, regarding the success rate, only one out of 67 implants failed (1.5%) and it failed in the pre-load period, representing a 98.5% survival, whereas in the follow-up period of the remaining implants (66 post-load), the accumulated survival was 100% at three years.

Discussion

Treatments which target aesthetic and function replacement after tooth loss through osseointegrated implants have undergone enormous improvement over the last few years. This situation allows, among other things, to reduce the negative effect that occlusal loads produce in posterior areas of the maxilla and the jaw, resulting in a more favorable response to treatments in these areas (9).

There are numerous studies and authors that support this statement, as in the case of Henry et al. (10), whose study at five years after insertion of 107 implants resulted in 96.6% and 100% success rates in the maxilla and jaw, respectively.

The conclusion of the study by Martínez-González et al. (11) is similar, reporting a 96.27% success rate after two years of follow-up. This data is very similar to that provided in this article.

Some authors, apart from providing results related to implant survival, refer to marginal bone loss around the implant, as is the case of the studies published by Lekholm et al. (12) and Jemt et al. (13), in which bone loss never exceeded 1 mm per implant at five years after insertion, and, also in the case of the former, they maintain that plaque build-up around the implant, a vital condition for implant survival was the same as for natural teeth. In our case, juxta-implant bone loss was almost non-existent.

In various articles, wide platform implants do not produce results as favorable as those of the standard platform, but it should be considered that neither do they work under the same circumstances.

This is the case of studies such as that by Ivanoff et al. (4) which, in the case of the jaw for instance, report wide platform implant failure rates of up to 25.81% compared to 5.13% or 13.3% for narrow or standard platform implants, respectively. Similarly, studies by Attard et al. (5), Mordenfeld et al. (8) or English et al. (14) show that the wide implant failure rate is 4-fold that of standard implants.

In the case of Attard et al. (5), 44 wide platform implants, which suffered 10 failures, were compared to 314 standard platform implants, which suffered 17 losses, implying a 22.73% failure rate in the former and 5.41% in the latter. Mordenfeld et al. (8) studied 78 wide diameter fixations of which 8 failed before three years, more specifically, 7 in the first year and another one in the second, resulting in a success rate of only 89.74%, whereas English et al. (14) clearly favored standard size over wide size.

Eckert et al. (14) divide the study into maxilla and jaw. In this study, 64.9% of implants were placed in the jaw and the remaining 35.1% in the maxilla. After the loss of 9 implants in the jaw and 6 in the maxilla, the overall success rate was 82.35% at 9 months.

The results of all these articles contrast with those provided in this study in which pre-load survival was 98.5% and post-load survival 100%.

Our opinion about the benefits provided by wide implants is supported by many other studies.

Bahat (16), in one article, studied 213 patients receiving between 1 and 9 fixations for 30 months. The total number of implants in the study was 732 in the posterior maxillary area and it reported results very similar to those obtained in molars and premolars, the former having been treated with wide platform implants. 34 implants failed in 29 patients, representing a 95.2% success rate for the total number of implants. By areas, the success of implants replacing molars was 94.7% compared to 95.5% for those placed in the premolar area.

On the other hand, Renouard et al. (3) studied 98 wide implants in which 97.8% of fixations were successful and 60% did not expose any whorl; in the remaining implants, losses never exceeded three whorls, more specifically, 13 implants (16.2%) exposed one whorl, two exposed whorls were observed in 7 fixations (8.8%) and in the remaining 12 implants (15%) three or more exposed whorls were observed. In the case of the results obtained by Renouard et al. (3), the success rate was acceptable, but the data obtained in our study is considerably better regarding information on marginal bone loss around the implant.

Jemt et al. (17) studied 150 edentulous patients with high maxillary resorption for a period of five years. They compared autogenous graft placement in which wide platform implants will be subsequently inserted, with overdentures on standard implants, before preferring the first possibility.

Bahat et al. (18), in another study, attempted to reduce the risk of implant failure in posterior areas and enable those implants to effectively withstand occlusal forces by increasing the prosthesis base using wide platform implants, inserting two or even three standard implants or combining them with wide implants. In the case of wide implants placed individually, the failure rate was 3.39% in 16 months of follow-up. When two wide platform implants controlled for 14 months were inserted, the success rate reached 100%. If the implants were of 5 mm, together with another of 3.75 mm or 4 mm, there was a 1.5% failure rate at 13 months for both wide implants and the accompanying standard implant. Overall, the wide platform implants used in the study resulted in a 97.7% success rate.

Cho et al. (19) also provide encouraging results for wide platform implants. In one article, a study was made of 106 patients with 213 implants, of which 68 were wide and 145 standard. Bone loss was observed in 5.8% and 14.5% of wide and standard implants, respectively.

Polizzi et al. (20) observed 38 implants for 3 years and concluded that wide implants owe their success to the size of their surface area and its ability to withstand primary stability, after achieving a 92% success rate in individual molars at the end of the observation period.

In another study, Khayat et al. (21) obtained a 95% success rate at 4 years with wide implants inserted in tuberosity.

Graves et al. (22) and Sullivan (23) support the use of wide platform implants in their papers, more specifically, the former studied 268 wide implants for 2 years in 196 patients, achieving a 96% survival rate. All the failures recorded occurred before secondary surgery as a result of lack of primary stability at the end of the primary surgery.

Krennmair et al. (24) published an article with many details about wide platform implants. 114 patients participated in the study which considered the different pros-

thetic circumstances of a total of 121 wide implants inserted in the maxilla (74) and jaw (47): 36 implants were fitted with individual crowns, 68 implants in 63 patients were for fixed partial prosthesis, 7 implants in 6 patients were for overdentures and 8 implants in 3 patients were for fixed complete prosthesis. Of all implants, 87 were placed in the third molar position. In the maxilla, two implants were lost. Follow-up was 42 months and the results were a 98.3% overall success rate, divided into 97.3% in the maxilla and 100% in the jaw. In addition, mean resorption was 1.4 mm and plaque and bleeding indexes were 0 in 80% of cases, showing how predictable wide implants are after using a correct surgical technique. We draw your attention to the similarity between these results and those obtained in our study.

Hoyer et al. (25) compared the influence of material fatigue on wide and standard implants, obtaining similar results and concluding that this parameter is very important in subsequent implant success.

Finally, other studies provide solutions to maxillary implants in the areas in which bone height is limited by maxillary sinus proximity.

Artzi et al. (26) studied 12 wide implants placed immediately after extraction of the molar to be replaced with sinus elevation, and concluded that it is a predictable technique. Time, cost and morbidity are reduced with subsequent benefit for the patient.

On the other hand, Vergara et al. (27) favor immediate wide implants in the area of the upper molars, anchoring them to the maxillary sinus floor and filling the areas of discrepancy with the alveolus with biomaterial. They studied 8 cases and got "excellent" results after 6 months, in both hard and soft tissue. By using this technique they managed to avoid surgery and the need to act directly on the maxillary sinus.

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