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Corrective Intervention

Immediate restoration after failure and replacement of basal implants

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ABSTRACT

Corrective interventions in basal implantology may be managed in one surgical intervention by qualified dentists. The failing implant is removed and the new implant is inserted. Given appropriate amounts of bone and a suitable state of dentition in the opposite jaw, the treatment may be finished by an immediate load procedure.

A corrective intervention using axial implants to replace failed basal implants immediately is usually not the method of first choice when the initial treatment was performed because vertical bone was missing. However basal implants are the devices of first choice, when failed implants of any design have to be replaced. An appropriate surgical technique and tools are mandatory.

KEYWORDS:

Basal implants, corrective intervention, implant failure, immediate implant replacement

INTRODUCTION

Although dental implantology is assumed to be a relatively safe procedure, failures may occur. A large body of literature on complications in axial implants is available. Qualified reports and analyses about problematic treatments outcomes with basal implants are rare. Our clinic has reported earlier on a case of failed basal implants and the methods to solve the problem [7].

This article reports on the occurrence of a complete failure and the treatment steps until the case was recovered.

Case Report

A 47 year old woman was treated in 1997 in our office with basal implants (Diskimplant®, Victory SA, Nice, France). A total of 7 implants had been inserted: 5 single-disk-implants and two double-disk-implants. A circular bridge was cemented after 12 days on the screw-on abutments. After this, the patient did not appear for occlusal and masticatory adjustments until the middle of 2000. During this period, several of the implants had become mobility inside the bone and decementations had occured. This could be diagnosed clinically and with x-ray (Fig. 1). Due to her absence from the mandatory follow-up appointments, the masticatory conditions had slipped into a very unfavorable situation, with heavy overloading having occurred in the distal mandible. We immediately corrected the bite situation by means of grinding and building up and recommended the necessary follow-up interval of at least 6 months. The patient was informed that a problematic situation had devel-

oped. She refused to undergo the proposed corrective surgical intervention, since she was able to function without any limitation and no pain at all.

After this we had the chance to monitor the gradual deterioration of the situation for another six years, because the patient appeard for follow-ups and x-rays, but refused any corrective intervention during this long time period.

In 2006, the patient had a new full upper denture fabricated alio loco. The dentist did not adjust the occlusion and mastication properly, but he created severe early contacts on the left distal side, inducing partial and punctual overloadings. This drastic change of resulting forces coupled with the unbalanced bite situation quickly led to severe deterioration in the implant-equipped opposite jaw (Fig. 2, 6/2006). Formerly separate defects in the lower left mandible became confluent and mobility severely increased. The bridge was only supported by two implants in area 43 and 42. The cementation on the implant in area 33 had been lost. Only when chewing became painful, the patient agreed to a corrective surgical intervention. This intervention was performed in late 2006. One of the existing implants was still fixed (area 33), so the implant in area 33 was left in place while all others were removed. Immediately, three new basal implants were inserted in strategic positions 43, 47, 37, to create a basis for an "all on four" circular mandibular bridge (Fig. 3, 12/2006). The resoration was well balanced until the last follow up in July 2007 and the actual panoramic picture shows a complete recovery of the bony defects, formation of new cortical bone, the well integrated implants and the new bridge. (Fig.4, 7/2007).

Failure analysis

1. Implant design related problems

When the initial treatment was performed, basal implants with round, rotation-symmetrical base-plates were all that were available. Achieving primary fixation was not easy and the possibility of initial basal implant rotation in the cavity was not hindered by implant design. As long as the fixation and splinting of the implants with the bridge is given, failures should not occur. As we understand today, the dual mechanism of integration involves callus formation in the void spaces of the cavity which forms and mineralizes quite fast. If the treatment protocol is delayed or infections occur, callus can not form and the integration gained from it will not be realized. In many cases, osteonal remodeling alone will be enough to secure integration.

Further, at the time when initial treatment was performed, no rotation-symmetrical abutments were available. The manufacturer had made only abutments with one flat vertical face but since the external connection of the implants was not designed to provide congruent design hindering rotation, the abutments were not screwed tightly onto the threads, but "positioned" in the correct direction to fit the bridge. This way the bridge was more or less "swimming" on the implants and it was thus impossible to intentionally distribute masticatory forces between all implants; In fact, the implants were not splinted at all due to this problem of implant and abutment design.

In addition at the time of treatment, the surfaces of the disk-plates and the vertical shaft were roughened by sandblasting. The intention of this surface treatment was to enable better

bony integration. Roughened implants do provide a better chance for the blood cloth to stabilize near/at the implant. On the other hand, the hose surfaces provide a lower chance for re-integration. They irritate the matrix of the bone during the movement. Modern basal implants are not sandblasted any more, their surface is machined & blanc.

2. Problems relating to the treatment protocol & the treatment itself

It is understood today, that "immediate loading" means loading within no more than 3 days postoperatively. At the time of the treatment this was not known as a general rule. Implantologists working in immediate load protocols tried to place prosthetics within 2-3 weeks, depending on the capacity and willingness of their dental laboratories [1]. With today`s experience and knowledge, loading around day 12 must be considered to be of high failure risk. Implants should be loaded immediately or considerably later.

We also have to face the fact, that especially the distal implants in this case have been placed within the alveolar bone and not in the basal bone. As we know today, basal implants have to be placed in the resorption resistant basal bone (i.e. below the white linea oblique), a bone region which resists the masticatory forces better. At the time of the initial treatment, the term "basal implantology" had not been "invented" yet.

3. Problems stemming from missing follow-ups during the first post-treatment phase. When the patient reappeared in our office three years post surgery the first time, several crowns had become unfixed in the abutments. This caused additional overload on the remaining fixed implants, resulting in increasing mobility in these implants. This envirunment may cause mobility to spread and reach additional implants during functional time, until all implants became mobile. Since "dropping out" is not an easy option for implants at all, the situation will deteriorate gradually, if no intervention takes place.

4. Tertiary problems during the last phase of usage.

If basal implants are ailing, a recovery may be attempted, as long as the interface with bone does not develop infections and stability can be guaranteed by any means, thus allowing the unstable implant to re-integrate[2].

Well trained and experienced basal implantologists manage early implant mobilities by means of prosthetic adjustments and the reduction of load by different means [6]. However this has to be repeated regularly and early, as soon as mobility is discovered. Since we were able to evaluate and treat the patient after 2002 regularly, we adjusted the occlusal surface extremely carefully and managed to keep the situation more or less stable. The dentist, who inserted the new upper denture in 2006, likely did not have adequate experience and the insight into the necessity of precise adjustments. His careless intervention without any contact to our clinic quickly ruined the unfavorable, but balanced situation.

Discussion

We are reporting about this case in such detail, because a number of basal implant specifics can be learned from this case.

First of all, it is interesting that it is was possible to maintain the implants in situ for such a long time, despite in the year 2000, the necessary surgical revision was obvious. The indication for removal of the implants in area 35, 36, 45, 46 was recommended as early as 2000[3], because sharp black zones of osteolytic were visible around the implants circularly.

Recently in the german literature, two articles were published [4, 5], stating that after the loss or (unqualified) removal of basal implants large bony defects are to be expected and that those defects can only be treated by means of major bone transplants (e.g. from the hip, parietal bone, etc) in order to allow the placement of another set of axial implants. The case shown here, clearly demonstrates, that this is not true. As a matter of fact, the authors of the above mentioned citations are maxillofacial surgeons who have at their disposal the ability to perform such autologous bone transplantations and a large financial incentive to do so.

It would have been the duty of those surgeons instead, to clearly inform the patient, that the maximally-invasive intervention is not necessary at all- that bone transplants are not necessary. Hospitalization is avoidable and no waiting time is required replacing the failed basal implants with new ones.

Had they revealed this truth frankly to the patient, the patient would probably never have agreed to their ambiguous "treatment" plan. It must be stated at this point that the treatments of Tetsch and Neukam were probably not based on a truly informed consent, which leads to a situation where their "treatment" must be categorized as an intentional damage of the patient's health. Both groups of authors can not excuse themselves, because they must have known details of the existing scientific literature, namely the works of Scortecci [10-22] and Donsimoni et al. [23-28], Bocklage [8,9] (just to name a few).

Conclusion

Basal implants are the devices of first choice, when it comes to replacing implants. This is especially true, when basal implants have to be replaced. The patients have chosen this therapy for good reasons: they wanted an affordable, straight forward therapy and they wanted to avoid risky bone augmentations. For corrective interventions, there is no reason to change the therapy plan towards crestal implant designs and bone augmentations.

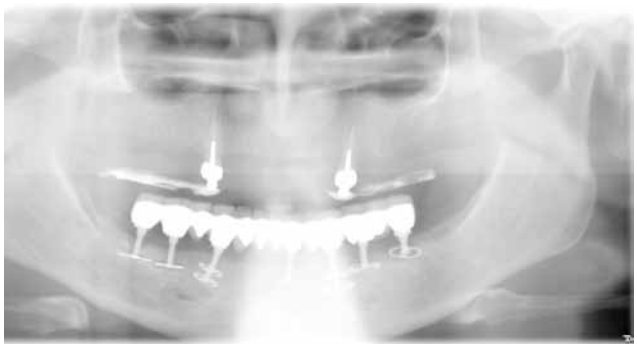

Fig.1 The first rediagraphic picture after the patient had been out of controll for more than 3 years after the placement of the prosthetical workpiece (2000)

Fig.2 A further radiological picture as taken in April 2001; the black zones around the implants present almost unchanged compared to Fig. 1

Fig.3 The radiological control in February 2002.

Fig.4 In 2005 confluent black zones in the left lower mandible are visible. However the patient did not agree to a corrective intervention at that time.

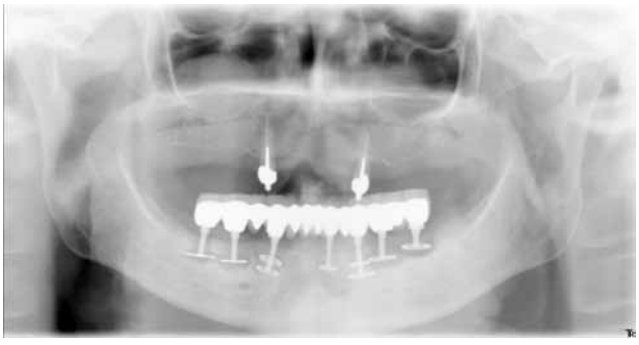

Fig.5 After the upper jaw had received a new denture without adequate adjustment of the mastication, the integration of the basla imlpants was reduced rapidly. Only now the patient agreed to a corrective intervention.

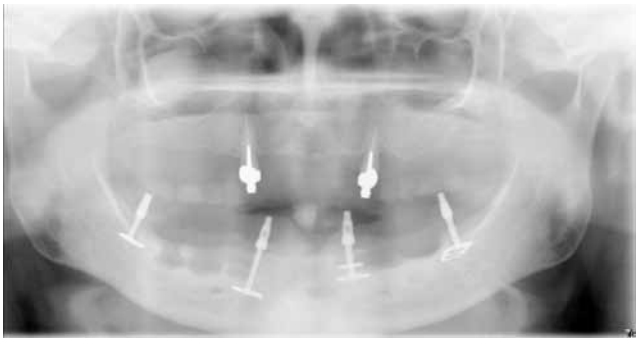

Fig.6 Immediately after the removal of six (out of seven) basal implants, thre new basal implants were placed. The implant in area 33 remained in function.

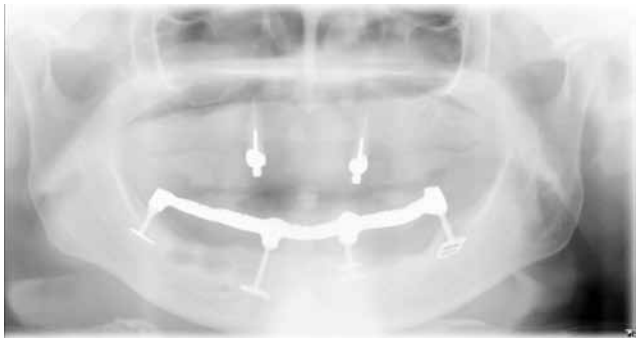

Fig.7 Six months after the corrective intervention the bony defects have healed without any augmentation. The implants and the bridge are stable.

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