

Background

A significant remodelling of the bone crest, especially horizontally, always occurs after the extraction of a tooth¹. This makes it difficult to insert an implant, especially in the frontal areas where residual bone thickness is fundamental in order to obtain optimal aesthetic results². In order to reduce this contraction a socket preservation technique consisting of the insertion of a bone graft and of a resorbable membrane inside the socket, followed after 4 to 6 months, by the positioning of a delayed implant was usually proposed³. However, such a technique does not always have predictable results and requires a biphasic approach, thus extending the time needed in which to perform the implant-prosthetic therapy.

Aim

To present a minimally invasive socket preservation technique. Such a technique consists of the insertion of a graft and a non-resorbable membrane, which regenerates the previously resorbed buccal or palatal cortical bone, and simultaneously, the post-extraction implant⁴. In this way it is possible to avoid invasive regenerative techniques, thus notably reducing treatment time without impairing the aesthetic results or the predictability of the implant.

Methods and Materials

From February 2012 to March 2014, 15 dental elements, which had to be extracted and rehabilitated with implant-prosthetic therapy, were treated in a private dental practice. After tooth extraction, and after accurate debridement of the socket, an implant 3i® (Implant Innovation Inc, Palm Beach Gardens, FL, USA) was inserted and positioned with surgical guidance.

Subsequently, the distance from the gingival margin to the residual buccal or palatal plate of bone was measured with a millimetric periodontal probe, in order to verify the degree of bone crest resorption. If such a distance was more than 5 mm, a non-resorbable PTFE (Polytetrafluoroethylene) Cytoplast® TXT-200 (De Ore, Negrar Verona, Italy) membrane was introduced in order to reduce the dimensional contraction of the socket, and was stabilised at the buccal or palatal level, according to the lack of bone wall³. Subsequently, a bone particulate graft was inserted between the implant and the membrane. Such a graft was made of equal parts of bovine (Bio-Oss®, Geistlich Biomaterials, Thiene, Vicenza, Italy) and alloplastic (Puros®, Zimmer Dental, Carlsbad, CA, USA) biomaterial. The membrane, which had been previously stabilised, was overturned above the implant and above the bone graft and was sutured to the palatal and buccal mucosa, leaving it intentionally exposed. After a period of about 5 weeks the membrane was removed without the need for anaesthetic, leaving the exposed site to heal by secondary intention. After approximately 5 months the implant was uncovered and the placing of the prosthesis was finalised, initially by using a provisional prosthesis and then by placing the final one, using a custom abutment and a porcelain fused to metal crown.

Results

All 15 implants were osseointegrated with a follow-up ranging from a minimum of 3 months to a maximum of 18 months from the final fitting of the prosthesis. In all treated cases there was no dehiscence of the buccal or palatal portion of the implant at the moment of its exposure. There were no site infections either before or after the removal of the non-resorbable membrane, and no patient presented with oedema or post-surgery ecchymosis after implant surgery. Six months after placement, periapical radiographs revealed an average $0,82 \text{ mm} \pm 0,16 \text{ mm}$ resorption in the area surrounding the implant.

Conclusions

One of the limiting situations when using post-extraction implants, especially in areas presenting a high aesthetic value, is represented by the resorption of the buccal plate of bone, which is fundamental for soft tissue stability in the area surrounding the fixture and therefore, for long term aesthetic results. The reconstruction of such a bone wall almost always requires an additional regenerative surgery, usually invasive for the patient, and precedes the prosthetically guided insertion of an implant. The use of a non-resorbable membrane, which was intentionally left exposed inside the socket and removed after approximately one month, seems to work as a barrier in the separation of the soft tissues from the bone graft⁵. In this way, a post-extraction implant can be inserted even in the absence of the buccal plate of bone, allowing an atraumatic socket preservation technique to be carried out at the same time, and thus reducing treatment time, without impairing the final results. Further histological studies are needed to validate these promising clinical results.

References

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Fig.1



Fig.2

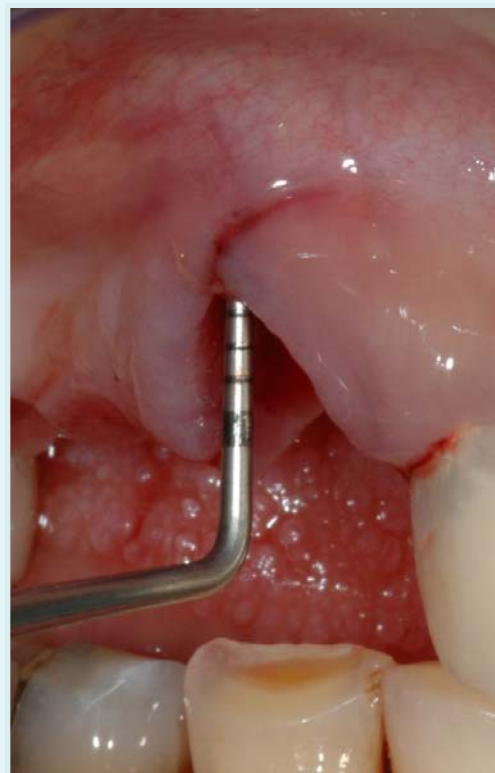


Fig.3

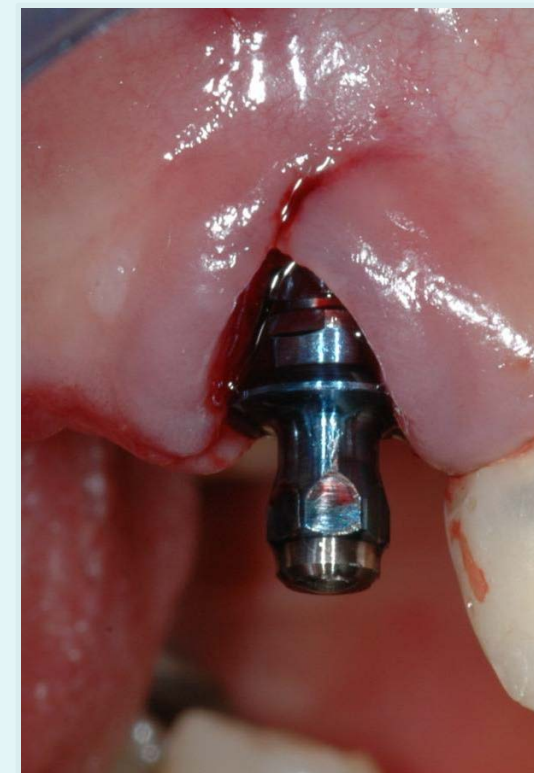


Fig.4



Fig.5



Fig.6

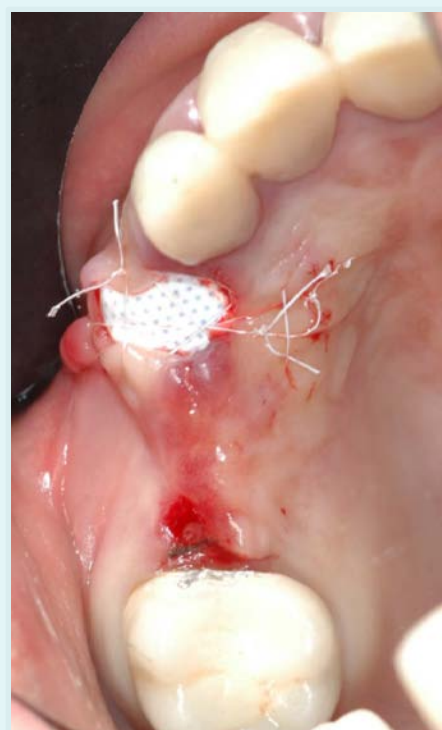


Fig.7



Fig.8



Fig.9



Fig.10



Fig.11

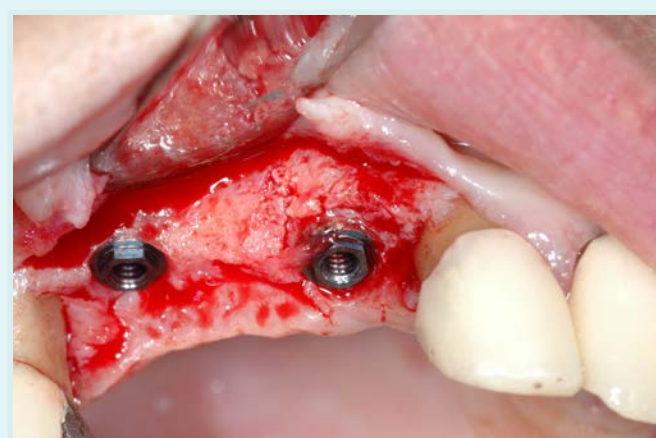


Fig.12



Fig.13



Fig.14

Legend

- Fig. 1 pre-operative view of # 6
Fig. 2 socket after # 6 extraction
Fig. 3 buccal plate probing
Fig. 4 immediate implant placement
Fig. 5 occlusal view of the gap
Fig. 6 graft and membrane in situ
Fig. 7 suture of the membrane
Fig. 8 membrane after 5 weeks
Fig. 9 membrane removal
Fig. 10 healing after 5 months
Fig. 11 occlusal view after II stage
Fig. 12 frontal view after II stage
Fig. 13 custom abutments on # 4 and # 6
Fig. 14 FPD from # 4 to # 6