

Resolution of late failure with an immediate implant and use of flexible cortical sheet

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Description

In the autumn of 2009 a 37-year-old female patient was referred to our clinic to improve her smile (Fig. 1).

The patient was treated at the time with a DSD

(Digital Smile Design), which involved lengthening the clinical crown on the upper incisors, placing an implant in 22, GBR and connective tissue graft to improve the emergence profile of the tooth itself and restoration with individual crowns (Figs. 2, 3).



X-rays of the case completed in early 2010 (Fig. 4) show the precision of the work which was then maintained over the years.

The right central incisor 11 had been treated with an apicectomy in the past and it was the only non-vital tooth in the rehabilitation. The patient was followed-up by the prosthodontist, who completed the case.

The lady attended the clinic again in 2021 with symptoms in tooth 21. The work carried out in 2010 was still in good condition, with the exception of 11–12 where 12 showed gingival recession with exposure of the collar of the galvanic-formed coping that supported the ceramic crown and 11 showed a small fistula in the distal vestibular portion (Figs. 5–7).

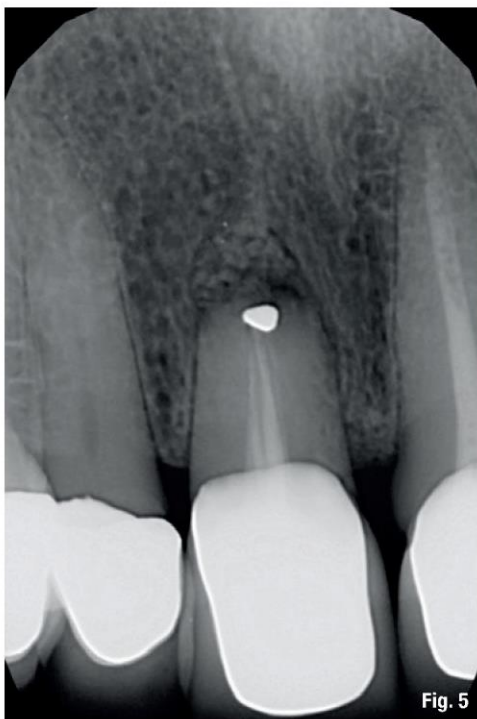
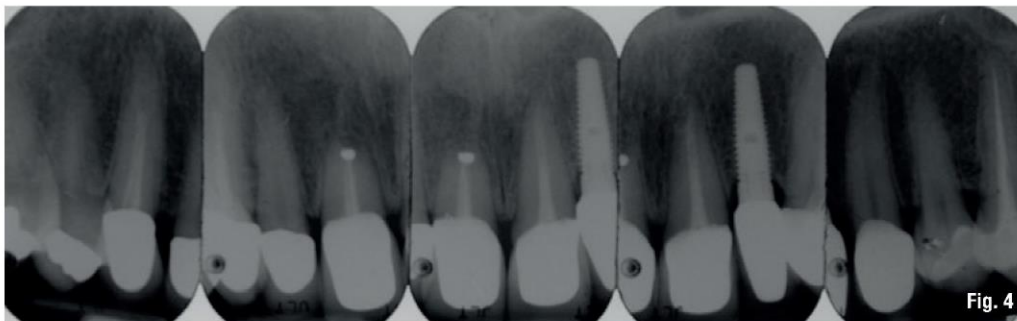
The diagnosis was fairly straightforward: 11 had a vertical fracture and a poor prognosis.

_Treatment Plan

The use of cortical sheet in implant surgery has been

routine since 2014¹⁻⁴. Various authors have described the efficacy of it in treating bone defects resulting from tooth extractions.

One very effective technique presented by Schuh et al 2021, is the “multi-layer technique” (MLT)⁵ which involves removal of the dental element in an aesthetic area, replacing it with an implant, placement of the cortical sheet in the vestibular area at the extraction site and finishing the procedure with placement of biomaterial between the implant and the sheet and possibly a vestibular connective tissue graft at the sheet where the periodontal biotype is thin. In the 2021 publication, this technique reports a 100% success rate and minimal complications⁴, linked among other things to fracturing of the prosthetic components and palatal cysts, but never to loss or incomplete integration of the prosthetic implant unit.



In the case in question this technique was considered to favour the possibility for the patient to have an immediate provisional, avoiding having to intervene with removable prostheses or compromise the adjacent elements, which were still functioning well. The patient was pre-medicated with 250 mg Ambramicina (tetracycline chlorhydrate, 4 cs daily) from two days before the procedure.

After administering local anaesthesia with the P-ASA technique⁶ using the Wand (Milestone) with articaine 1:200,000 element 21 was very carefully extracted (Fig. 8). The granulation tissue present in the extracted apex was removed with curettage and the post-extraction alveolus disinfected with H₂O₂ and 0.12% Chlorhexidine.

Preparation of the procedure with consequent

immediate loading involved the use of a surgical stent, which was useful both for positioning the implant and the subsequent cementing of the temporary crown onto the implant (Fig. 9).

The site was prepared with the drills for the case and a Diagram implant (Schütz Dental) was fitted palatally (Fig. 10).

Once the fixture was inserted at the right depth and position, using a tunnelling scalpel (where the fracture had completely resorbed the cortical bone), the vestibular space was created for insertion of a 0.5mm-thick flexible cortical sheet (Flex cortical sheet, Bioteck). The sheet was first cut (Fig. 11) then hydrated with sterile saline solution for approximately 30 seconds, and finally placed into position (Fig. 12).



Fig. 8



Fig. 9



Fig. 10



Fig. 11



Fig. 12

At this point, a temporary abutment was screwed onto the implant, completed with the collagenated equine-derived (OX granules, Bioteck) biocompatible material graft in the gap between the fixture and the sheet, then the resin temporary crown was connected to the temporary abutment (Fig. 13). The post-procedure control x-ray showed the good outcome of the procedure and the correct connection between the abutment and

the fixture (Fig. 14).

Six months later at review and removal of the temporary crown (Fig. 15), it is evident how this procedure allowed the peri-implant tissues to remain intact, and fostered the creation of a thick and mature mucosa tunnel. The tissues with and without the temporary crown have a natural appearance and the characteristics of healthy gum (Figs. 16a, 16b).

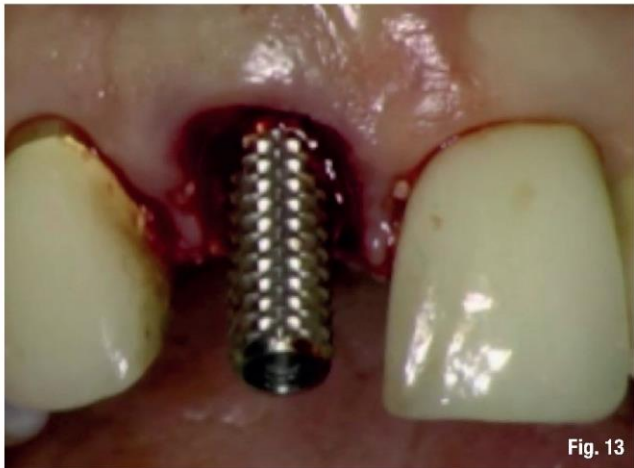


Fig. 13



Fig. 15

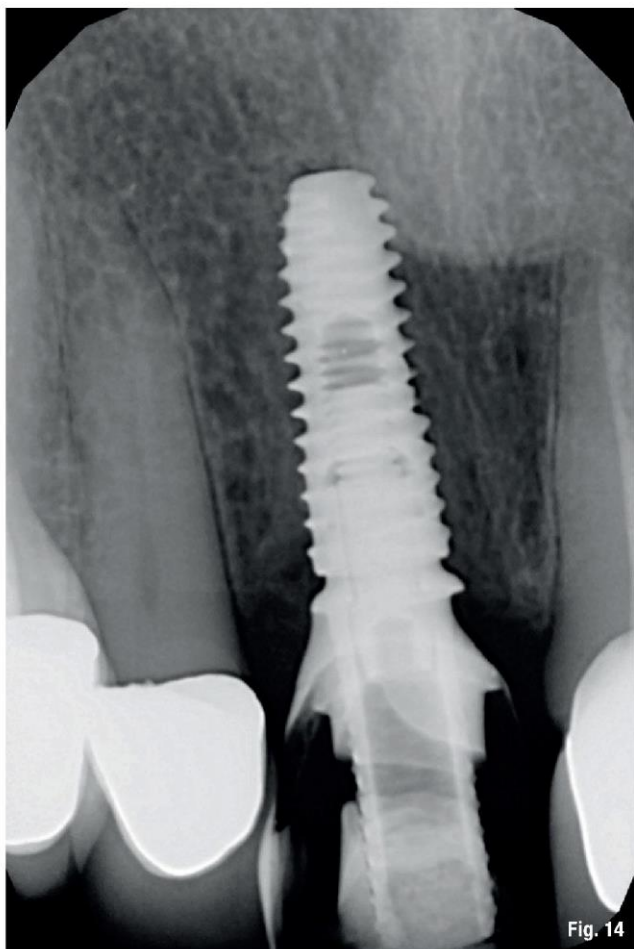


Fig. 14



Fig. 16a



Fig. 16b

The finalisation of the case then involved reconstructing the old crown on 12 along with that on 11 in layered zirconia, designed using CAD/CAM, thus encouraging restoration of function where a complication had compromised the result obtained ten years previously (Figs. 17–19).

Six months after the procedure, it is clinically and radiologically evident how good biological and aesthetic outcomes have been achieved (Figs. 20–22).

_Conclusions

The benefit of cortical bone sheets has been proven for some years now and this case report shows the efficacy of using this device in aesthetic zones that allowed a targeted and minimal intervention to resolve late complications linked to the fracture of a dental element that had been previously treated with apicectomy.

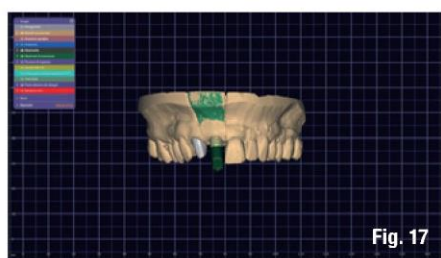


Fig. 17



Fig. 18
exocad

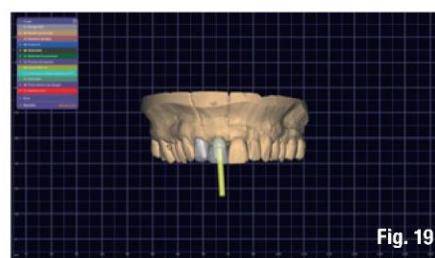


Fig. 19



Fig. 20



Fig. 21

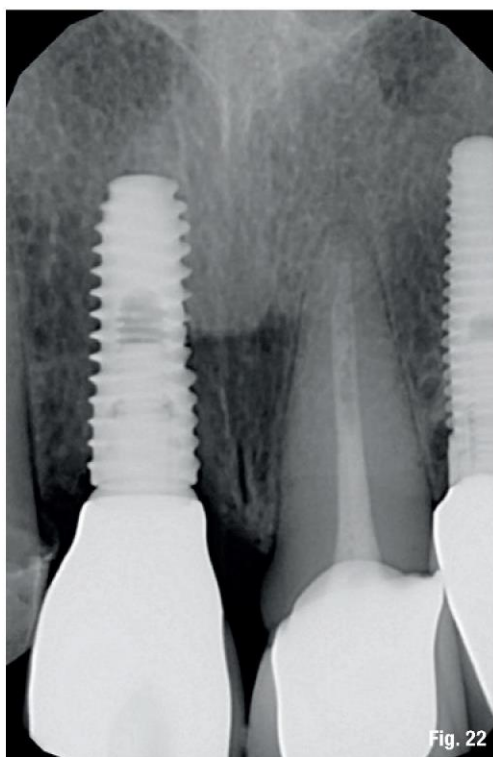


Fig. 22

_References

implants

1. Pagliani L, Andersson P, Lanza M. et al. A collagenated porcine bone substitute for augmentation at Neoss implant sites: a prospective 1-year multicenter case series study with histology. *Clin Implant Dent Relat Res* 2012;14:746-758.
2. Wachtel H, Fickl S, Hinze M, Boltz W, Thalmair T. The bone lamina technique: a novel approach for lateral ridge augmentation – a case series. *Int J Periodontics Restorative Dent* 2013;33:491-497.
3. Rossi R, Rancitelli D, Poli PP, Rasia Dal Polo M, Nannmark U, Maiorana C. The use of collagenated porcine cortical lamina in the reconstruction of alveolar ridge defects. A clinic and histological study. *Monerva Stomatol* 2016;65:257-268.
4. Rossi R, Ghezzi C, Tomecek M. Cortical lamina a new device for the treatment of moderate and severe tridimensional bone and soft tissue defects. *Int J Esthet Dent* 2020;15 Vol4: 2-21.
5. Schuh PL, Wachtel H, Beuer F, Goker F, Del Fabbro M, Francetti L, Testori T. Multi-Layer Technique (MLT) with porcine collagenated cortical bone lamina for bone regeneration procedures and immediate post-extraction implantation in the esthetic area: a retrospective case series with a mean follow up of 5 years. *Materials* 2021.
6. Friedman M, Hochman M. A 21st century computerized injection system for local pain control. 1997 *Compend Contin Educ Dent*.