“Immediate loading implant surgical protocol in fresh socket with simultaneous connective soft tissue graft, in the aesthetic zone – Two years follow-up”

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Abstract

Background
Immediate implant placement into an extraction socket, in an aesthetic demanding place, followed by immediate provisionalisation can shorten rehabilitation time and preserve patients' comfort at all treatment stages. However, these treatment protocols always pose a great challenge to clinicians. Buccal volume loss, following tooth extraction, due to bone resorption is certain. Techniques have been developed to prevent tissue loss or minimize its occurrence basically by using biomaterials and/or two surgical stages. This protocol shows that with proper implant positioning and immediate provisional restoration in association with connective tissue graft, buccal volume can be maintained, using a minimally invasive flapless technique and avoiding biomaterials. This one-stage technique optimizes implant placement and soft tissue aesthetics while providing the patient with immediate fixed restoration.

Material and methods
Thirteen implants were placed in esthetically demanding sites in 13 patients (6 women, 7 men; age range of 20 to 59 years, mean 37.7 years, non-smokers), following a one-stage approach. All implants were placed immediately after extraction with simultaneous connective tissue graft and a provisional crown immediately placed. Clinical observations were performed and photographs were made to register soft tissue changes.

Results
All implants were successfully osseointegrated and definitive restorations were placed approximately after 4 months. For all cases, the gingival level remained stable at 24 months. Meaning no significant soft tissue volume reduction was observed.

Conclusion
This report evaluated the buccal volume maintenance after tooth extraction and immediate implant replacement with an autogenous connective tissue graft. This technique intents to compensate the lack of volume by bone resorption, for soft tissue. It seems to be reliable and to allow above-average soft tissue outcomes, together with immediate patient satisfaction.

1. Background and Aim
Single tooth replacement in the aesthetic zone is probably the most challenging procedure in implant dentistry. [1,2,3] Buccal volume loss due to bone resorption is assured, following tooth extraction. [4-11] Techniques have been developed to prevent tissue loss or minimize its occurrence [1,12-15]; but despite the use of barrier membranes or bone grafts, horizontal resorption of 13% to 25% still occurs. [4,16,17] Immediate implant placement in a fresh extraction socket fails to preserve hard tissue ridge dimensions [4-6]; but has the great advantage of shortening the recovery process, improving patient's confort. [18,19] Narrow implants were used (Ø3.5mm) to increase distance between tooth/implant, placed palatally, predicting buccal bone resorption. Marginal gaps occurring between the implant surface and socket wall may predictably heal with bone formation. [4,7-11]
The present study describes a surgical protocol for immediate implant placement in a fresh extraction socket and a simultaneous connective tissue graft [1-3] with immediate provisional tooth replacement [1,3,20,21] in 13 patients and evaluates buccal volume maintenance over a period of 2 years. No bone grafts or barrier membranes were used.

2. Methods
Thirteen patients (6 women, 7 men) with a mean age of 38 years (range, 20 to 59 years) were included. All patients were healthy and non smokers. Pre-surgical clinical and radiologic examinations (ortopantomography and intra-oral X-ray) revealed healthy conditions of the surrounding tissues.
All surgical procedures were performed under local anaesthesia (4% Articaine with epinephrine 1:100.000 Inibsa® S.A.). Preoperative antibiotics were orally administered 2 hours before surgery (Amoxicilin and Clavulanic acid 875+125 mg). A preliminar sion was taken to register the anathomy of the failing tooth. The tooth was then carefully extracted, in an attempt to preserve bone plates, without flap reflection. Flapless implant placement helps to preserve site morphology by protecting and supporting existing hard and soft tissues while minimizing surgical trauma to the adjacent tissues. [18,22] Implants were placed in the sockets, leaned to the palatal plate, predicting buccal bone resorption. [4, 7-11] The minimum insertion torque accepted in this protocol was 35 Nm/cm^2. Implant depth was 2 to 4mm below the amelocemental junction of the adjacent teeth.
A connective tissue graft originated from the palatal mucosa was placed on the buccal surface to increase volume and compensate the decrease in bone volume, using the Bilaminar Envelope Technique and sutured with a monofilament, non-absorbable 4-0 suture (Cytoplast® PTFE Suture). A provisional crown restoration was immediately placed, using the preliminary impression. It has to enclose the socket to retain the blood clot and maintain soft tissue profile. Suture is not used but to fix the connective tissue graft. Definitive impressions were taken 4 months after surgery along with a radiographic control and all-ceramic crowns placed. Non-steroidal anti-inflammatory drugs were prescribed for 3 days and antibiotic treatment was continued for 5 days postoperatively. Sutures were removed 5 to 8 days after surgery. No postoperative changes were noteworthy; no infections were recorded. Monthly clinical observations were performed for the first four months and every 6 months after.

3. Results
No major adverse reactions or complications were observed during the period of the report. No implant or connective soft tissue graft failed after insertion, resulting in a 100% survival rate. In 3 cases, connective tissue graft was repeated due to a volume reduction in the 2 to 4 Months after surgery. Marginal gaps between the implant surface and socket wall were confirmed to be absent as observed in the 4 months radiographic control.

4. Conclusion
The present study evaluated the buccal volume maintenance after tooth extraction and immediate implant replacement with an autogenous connective tissue graft. This technique intents to replace the lack of volume by bone resorption with soft tissue. Connective tissue graft is stable over time [23] unlike autogenous bone graft that suffers resorption. [4,16,17] Narrow implants appear to be a good option. It provides space for soft tissue between implant/tooth [24] and socket gap is healed by new bone. [4,7-11] Thin gingival biotypes should have a connective tissue graft proper in thickness or might as well be repeated when necessary (the 3 cases repeated fitted this type). This one-stage approach simplifies the overall implant procedure, preserves patients' aesthetic appearance at all stages of treatment and should be considered for preservation of tissue volume and architecture.

5. References
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Surgical Protocol


Fig. 3 - Non-restorable radicular fracture – Xray


Fig. 4 - Initial case - buccal view

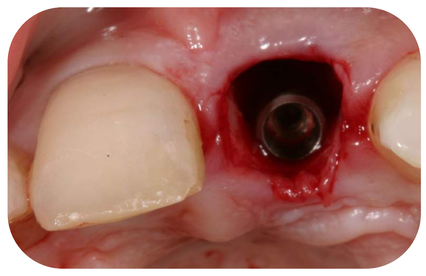
Fig. 5 - Implant placement in palatal position


Fig. 6 - Abutment conection at implant surgery – Xray


Fig. 7 - Abutment conection at implant surgery


Fig. 8 - Autogenous connective soft tissue graft separated from epithelium

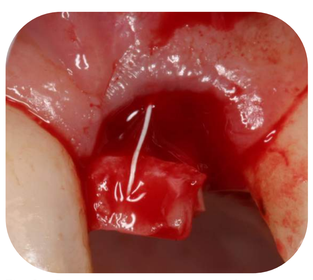
Fig. 9 - Connective soft tissue graft placement using Bilaminar Envelope Technique


Fig. 10 - Soft tissue graft - buccal view with provisional crown restoration at surgery

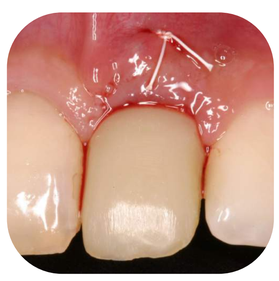
Fig. 11 - Soft tissue graft - occlusal view with provisional crown restoration at surgery

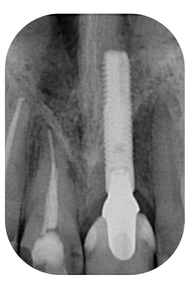
Fig. 12 - Provisional crown fabrication at surgery


Fig. 13 - Soft tissue graft - buccal view with provisional crown restoration one week after surgery


Fig. 14 - Soft tissue graft - occlusal view with provisional crown restoration one week after surgery


Fig. 15 - Three month implant follow-up


Fig. 16 - Soft tissue contour at three month follow-up

Follow up


Fig. 17 - Soft tissue contour at 6 months - buccal view


Fig. 18 - Soft tissue contour at 6 months - occlusal view


Fig. 19 - Soft tissue contour at 24 months - buccal view


Fig. 20 - Soft tissue contour at 24 months - occlusal view

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