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Connective tissue graft combined with autogenous bone graft in the treatment of peri-implant soft and hard tissue defect

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The use of dental implants to improve functional and esthetic demands of dentition has increased significantly over the past two decades. Soft and hard tissue management is one of the factors contributing to improved esthetic results. This report describes the correction of an esthetic problem in a single implant combined connective tissue graft and autogenous

bone graft. Four months after the surgical procedure, it could be observed that the combination of connective tissue graft and autogenous bone graft resulted in the augmentation of hard and soft tissue in the peri-implant area with favorable esthetic outcomes. (*Quintessence Int* 2015;46:139–144; doi: 10.3290/j.qi.a32824)

Key words: autogenous bone, connective tissue, dental implants, gingival defect, stage-two surgery

The use of dental implants to improve the functional and esthetic demands of dentition has increased significantly over the past two decades. Initially, implants were designed more as a functional replacement for lost teeth and dentitions.¹ Currently, the esthetic factor is also being considered. Soft and hard tissue management is one of the factors contributing to the improvement of esthetic results.

Bone defects that result in vestibular concavity secondarily alter the contour of adjacent soft tissues. These defects can be corrected by techniques that are based on a compensatory increase in the volume of these structures. It is widely accepted that the keratin-

ized mucosa is not essential to the existence of the tooth and its fixation device, but clearly it is needed to maintain periodontal health, mainly in prosthetic rehabilitation.² De Souza et al³ conducted research with the objective of assessing the impact of local and systemic factors on additional peri-implant bone loss. They concluded that fixed partial dental prostheses and full-arch fixed prostheses present higher rates of additional peri-implant bone loss. In addition, all types of prostheses showed greater additional peri-implant bone loss when in function for more than 4 years.³

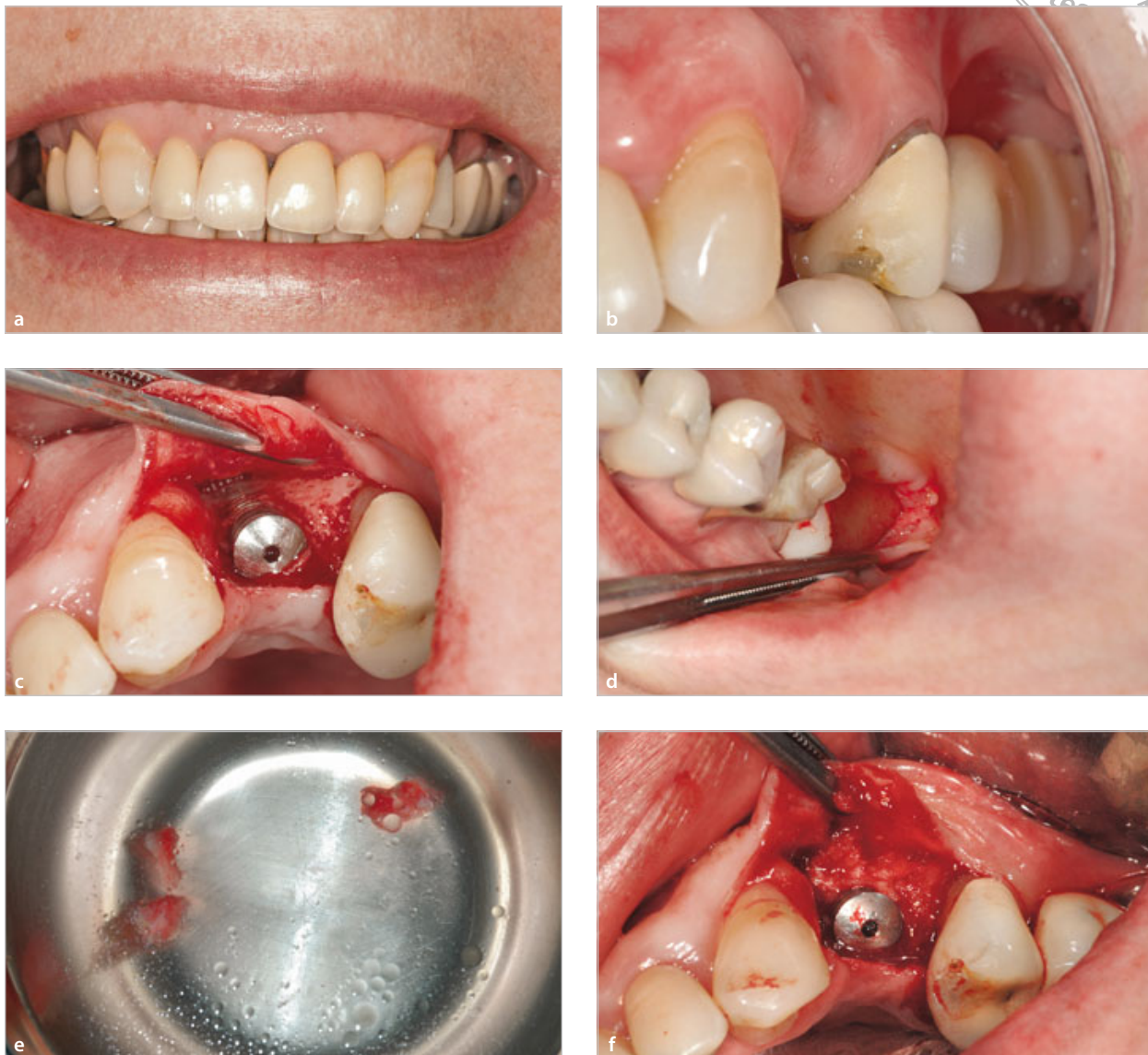
Some periodontal plastic surgery techniques have been used in the routine treatment of peri-implant soft tissue defects.⁴ Connective tissue grafting is a technique widely used to treat peri-implant soft tissue defects, mainly in single-tooth implant restoration.⁵ However, in some clinical situations, it is necessary to include in the treatment plan both hard and soft tissue ridge augmentation procedures.

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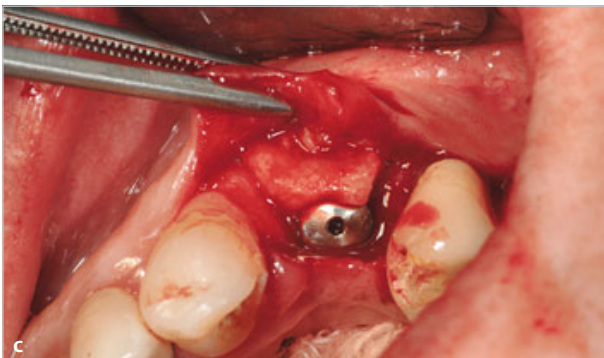
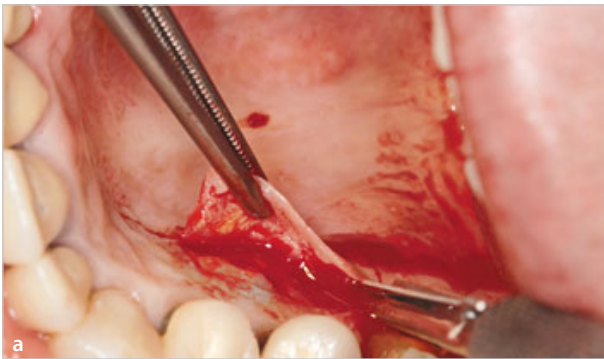


Figs 1a to 1f Initial aspect of smile. (a) Anterior view. (b) Intraoral view. Bone and soft tissue defect in the region of maxillary left first premolar with implant already installed. (c) Clinical view. The incision on the bone crest flap-type envelope and bone loss in buccal surface. (d) Area of removal of autogenous bone graft. (e) Autogenous bone graft removed from the maxillary tuberosity. (f) Autogenous bone graft placed over implant installed previously.

Autogenous bone grafts are a reliable treatment modality for the reconstruction of mandibular bone defects with predictable esthetic and functional results. In particular, the maxillary tuberosity has been a prime intraoral donor source site for cancellous bone and marrow tissue for osseous grafting. This area is anatomically convenient, and use of harvested tuberosity tissue for osseous grafting has been reported for maxillary sinus augmentation, small defect augmentation of

the alveolar ridge, preservation of the alveolar ridge following tooth extraction, and treatment of periodontal intrabony defects. Despite widespread use, there is a scarcity of literature regarding the tuberosity as a donor site and the efficacy of this harvested tissue as an osseous graft.⁶

The present report describes the correction of an esthetic problem in a single implant combined connective tissue graft and autogenous bone graft.



Figs 2a to 2d (a) Removing the connective tissue of the palatal area. (b) Connective tissue removed from the palate. (c) Connective tissue graft positioned over the autogenous bone graft. (d) Immediate postoperative view.

CASE PRESENTATION

A 47-year-old Caucasian woman was referred to a periodontics specialist, complaining of the unesthetic appearance in the region where an implant had been performed (Figs 1a and 1b). During the clinical examination, the presence of hard and soft tissue loss in the region of her maxillary left first premolar was noted, which had been an implant for 3 months. The tooth loss happened due to a root fracture after the installation of a prosthesis many years ago. A radiographic exam showed that the implant was well positioned, with osseointegration. The patient presented excellent control of buccal hygiene, and there were no signs of gingival inflammation. Given this context, the treatment plan was chosen to surgically correct the hard and soft tissue loss with an autogenous connective tissue graft and autogenous bone graft. The patient was informed of the procedures and asked to sign an informed consent.

After antisepsis and anesthesia, an incision on the bone crest was made, and a flap-type envelope was performed without perpendicular incisions. After flap elevation, it was possible to observe that the dental implant was well installed, and there was bone loss in the buccal surface (Fig 1c). The autogenous bone graft was removed in the region of the maxillary tuberosity (Figs 1d and 1e). The bone removed was placed in the region of bone defect over the implant installed previously (Fig 1f).

To obtain more volume and protect the bone graft, an autogenous connective tissue graft from the palate was obtained (Figs 2a and 2b) according to the technique described by Langer and Langer.⁷ The connective tissue graft was immediately placed onto the bone graft and stabilized with a compressive suture (4-0 Vicryl, Ethicon) (Fig 2c). The flap was advanced coronally, covering the bone and soft tissue graft completely with simple interrupted sutures (4-0 Vicryl, Ethicon), taking care to avoid excessive tension (Fig 2d).



Figs 3a to 3d Postoperative view: after 30 days.

After surgery, the patient received pain control medication (paracetamol 750 mg every 6 hours for 4 days), antibiotic (amoxicillin 500 mg every 8 hours for 7 days), and chemical plaque control (0.12% chlorhexidine gluconate rinse every 12 hours for 14 days). The periodontal dressing was changed after 7 days and was removed together with the sutures on the 14th postoperative day. The patient was maintained under professional supervision for oral hygiene control.

Clinical follow-up was performed 30, 60, and 120 days postoperatively. The post-surgical healing phase was uneventful for the patient. Thirty days after the procedure, the patient reported being completely satisfied with the esthetic outcome (Fig 3). Four months after the surgical procedure, favorable esthetic results and excellent augmentation of hard and soft tissue in the peri-implant area could be observed (Fig 4).

DISCUSSION

Bone resorption resulting from tooth loss, periodontal disease, tooth fracture, and endodontic lesions often creates esthetic defects that can severely compromise the results of modern-day dentistry. In conjunction with this bone loss, soft tissue deformity occurs following the contour of the underlying bone.¹ In the present case report, the unesthetic situation was created by the loss of the maxillary left first premolar, and consequently loss of hard and soft tissue. However, the bone loss did not limit the installation of the dental implant.

Successful results in implant dentistry require restoration of the functional demands of the dentition as well as re-creation of the esthetic form of bone and soft tissue.¹ In the present case report, the implant was well positioned, with osseointegration. However, the unesthetic form of bone and soft tissue that was present needed surgical correction. An assessment of the peri-implant anatomical site provides a helpful guide in



Figs 4a to 4d Postoperative view: after 120 days.

choosing proper treatment options for reaching a desirable, functional, and esthetic outcome.⁸

The increasing esthetic demand in implant dentistry has led to the development of several surgical techniques, mainly using a connective tissue graft or connective tissue pedicle flap approach, in order to improve soft tissue integration and potentially reduce patient discomfort associated with the free gingival graft procedure.⁹ The combination of bone and soft tissue additive surgeries provided optimal alveolar ridge support for optimal implant placement and esthetics.⁸ In the present case, it was chosen to associate a connective tissue graft and autogenous bone graft to correct the unesthetic defect. This choice was made because the bone and soft tissue defect was extensive, and it would not be possible to correct it with only soft tissue procedures. Particulate grafts are effective in correcting defects of the alveolar process; however, with no intention of leading to a re-osseointegration. Complications are few and they have a high success rate.¹⁰

Recent publications describe other techniques that can be used to correct peri-implant defects. Biomaterials, such as human mineralized allograft bone, alone¹¹ and/or combined with resorbable membrane¹² or just the use of acellular dermal matrix¹³ were shown to be predictable and esthetic forms of treatment. Saade et al¹⁴ reported the use of the Pouch Roll Technique, which was also effective in correcting peri-implant soft tissue. In the present case report, the authors made the choice to use only autografts of soft and hard tissue. Although this procedure is more invasive to the patient, it is known that autogenous graft is considered the gold standard.

The major advantage of connective tissue grafting is recontouring the peri-implant margin and increasing the buccal volume of the peri-implant soft tissue.⁵ This technique can be used at stage-one or stage-two surgery, offering very predictable results in terms of quantity and quality of tissue support.¹ This case report was associated with soft tissue graft and bone tissue. However, the goal of using autogenous bone graft in stage



two did not help re-osseointegration but increased tissue volume.

The soft tissue augmentation procedure was able to improve esthetics and functional demands in areas where hard and soft tissue defects were present. This case report presented a useful treatment for correcting the buccal volume of peri-implant soft and hard tissue. The connective tissue graft combined with autogenous bone graft allowed the development of improved soft and hard tissue contours and implant restoration emergence profile. In addition, the concavity at the entrance region of the implant was corrected. This combination can be considered a predictable technique that results in excellent augmentation of hard and soft tissue in the peri-implant area, without re-osseointegration, and with favorable esthetic outcomes. However, clinical studies should be conducted.

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