Gac Méd Caracas 2025;133(3):967-972
DOI: 10.47307/GMC.2025.133.3.26

Management of soft tissues in post-extraction dental implant with connective tissue graft. Case report

Manejo de tejidos blandos en implante dental pos-extracción con injerto de tejido conectivo. Informe de un caso

Enrique Nuñez[1], Suani Torres-Tom[4], Brian Espinosa-Segira[2], Antonio Diaz-Caballero[3]

SUMMARY

Dental implants are a crucial component of dentistry, and the protocols for their use are continually evolving. One crucial aspect of success is the relationship between the implant and the surrounding tissue. Grafting procedures have shown potential benefits, although limited evidence is available. This article presents a 30-year-old patient who had to undergo exodontia due to failed internal tooth bleaching that caused internal radicular resorption. Patient's soft tissues were managed with connective tissue grafting, and a dental implant was successfully placed. Tissue grafts during immediate post-extraction implant placement are deemed effective and esthetically favorable, supporting their incorporation into clinical practice.

Keyword: *Surgery, dental implant, periodontics, aesthetics, graft.*

RESUMEN

Los implantes dentales son una parte importante de la odontología, y los protocolos para su uso mejoran constantemente. Un aspecto crucial para el éxito es la relación entre el implante y el tejido circundante. Los procedimientos de injerto han mostrado beneficios potenciales, aunque la evidencia disponible es limitada. Este artículo presenta a una paciente de 30 años que tuvo que someterse a una exodoncia debido a un blanqueamiento dental interno fallido que causó una reabsorción radicular interna. Los tejidos blandos de la paciente se trataron con injertos de tejido conjuntivo, y se colocó con éxito un implante dental. Los injertos de tejido durante la colocación de implantes pos-extracción inmediata se consideran eficaces y estéticamente favorables, lo que respalda su incorporación a la práctica clínica.

Palabras clave: *Cirugía, implante dental, periodoncia, estética, injerto.*

DOI: https://doi.org/10.47307/GMC.2025.133.3.26

ORCID: https://orcid.org/0000-0002-8090-4020[2]
ORCID: https://orcid.org/0000-0001-9693-2969[3]
ORCID: https://orcid.org/0009-0001-8090-4995[4]

[1]Faculty of Dentistry, Universidad de Sevilla. 41004 Seville, Spain. Professor of Integrated Adult Dentistry and Gerodontology.
[2]Universidad de Cartagena, Cartagena-Bolívar, Colombia. Faculty of Dentistry, Gitouc Research Group Seedbed.

Recibido: 5 de febrero 2025
Aceptado: 24 de julio 2025

[3]Dentist, Universidad de Cartagena. Cartagena-Bolívar, Colombia. Faculty Professor, Universidad de Cartagena. Gitouc Research Group Director.
[4]Universidad de Cartagena, Cartagena-Bolívar, Colombia. Faculty of Dentistry, Gitouc Research Group Seedbed.

Corresponding Author: Suani Torres Tom. Faculty of Dentistry, Universidad de Cartagena. Zaragocilla Health Campus, Cra. 6 #36-100 · Cartagena de Indias, Colombia. Postal code 130015, South America. Phone: +57 6698172 Ext. 110.
E-mail: storrest1@unicartagena.edu.co
Location of Work: Universidad de Sevilla and Universidad de Cartagena

INTRODUCTION

Dental implants function as a medical device in relation to the lower jaw, often facilitating the phenomenon of osseointegration, which provides optimal fixation to withstand masticatory and occlusal forces, and promotes patient rehabilitation in both functional and aesthetic aspects. The use of implants in the oral cavity is determined by the specific conditions present in each patient, such as restoring a dental organ or serving as a pillar for supporting two or more teeth in the mouth (1).

Among the first standard protocols dictated for dental implant placement, the importance of site healing after extraction was highlighted, followed by osteotomy and subsequent implant placement, designed to ensure maximum bone-implant contact by adapting the work site to the implant to be placed. The final protocols in the 1970s and 1980s advocated for dental implant placement exclusively in completely healed edentulous ridges. A 6 to 12-month healing period was also recommended before loading (2,3).

Currently, four different protocols for implant placement in the extraction socket are highlighted. Type 1 refers to immediate placement after tooth extraction, type 2 is considered when implants are placed after 4 to 8 weeks, achieving complete soft tissue coverage, type 3 consists of implants placed after 12 to 16 weeks when substantial clinical and/or radiographic bone fill has occurred, and type 4 refers to implants placed in healed sites (3).

The new balance established between the patient's needs and rehabilitation tilts the scale in such a way that dentists must investigate and use these new treatment techniques regarding dental implants. Among these is post-extraction implant placement, where the marked difference from original postulates is the absence of the extraction socket healing period, changing the original idea of alveolar remodeling for the implant by using irregular conditions for implant placement. Fortunately, in addition to innovation in implant placement techniques, research on new implant surface methods, implant designs, and biomaterials that aid the healing and fixation process reduces operative times, ensuring the success of these new techniques. Clinical data demonstrate that immediate post-extraction implants can undergo osseointegration, but the biomechanical mechanisms responsible for this success are not entirely clear (2,3).

In literature, the relationship between the wall space and the alveolus is a determining factor in ensuring implant success. If this peri-implant space is ≤ 2 mm, bone growth occurs naturally, and therefore, no regenerative bone material is required. However, if this space exceeds 2 mm, the use of regenerative material with or without a resorbable membrane is recommended to ensure better implant stability. Plastic periodontal procedures have been used to establish functional and biological stability around teeth and implants, such as the use of subepithelial connective tissue graft (SCTG). Additionally, various studies have associated this technique with the relief of soft tissue recession and marginal bone loss when used in immediate implant placement. However, there is a lack of clear evidence regarding the clinical and aesthetic benefits of simultaneous soft tissue augmentation around immediate or delayed dental implant placement using SCTG (4-6).

This report aims to demonstrate the clinical management of a post-extraction implant by outlining the surgical protocol used, which involves a subepithelial connective tissue graft (SCTG).

CLINICAL CASE

A 30-year-old female patient attends a dental consultation reporting pain in an anterior tooth. The patient mentions having undergone an internal dental whitening procedure, but upon the procedure's failure, internal root resorption was subsequently observed (Figure 1, A trough C). Upon evaluating and investigating her medical history, it is noted that the patient does not have any systemic diseases or clinically significant conditions.

Informed consent was obtained from the patient. An extraction was performed as atraumatically as possible to preserve the integrity of both hard and soft tissues. The patient's natural tooth crown was used to create an immediate provisional restoration. Subsequently, an exhaustive curettage of the socket was performed to remove ligament remnants and any remaining fibers. A computer-guided surgery was performed

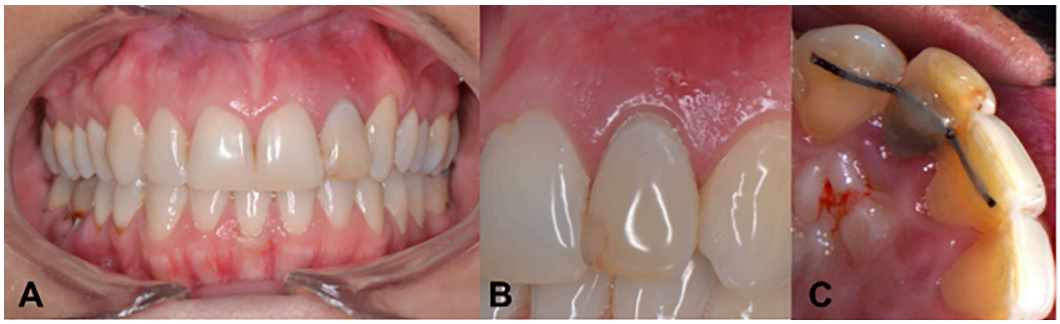

Figure 1. **A.** Initial aspect of the patient's condition. **B.** Detailed view of the periodontal phenotype of the area to be intervened. **C.** Splinting of the fractured tooth with a Maryland-type structure

since the space in this lateral area is very tight. The Implant Station software was used to plan the case to operate through the precise Galimplant 3D system. A Galimplant 4x12 implant was placed, filling the gap with Apatoss (osteobiol). At the exact moment, a 3mm straight aesthetic transepithelial was placed, taking into account that this transepithelial will create the subcritical zone of the implant crown. The transepithelial was fixed at 35N. Additionally, we placed an immediate loading abutment (Figure 2, A through D).

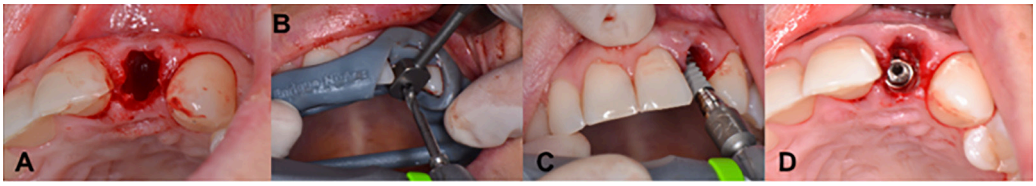

Figure 2. **A.** Post-extraction socket with closed method, attempting to preserve the maximum amount of bone and gingival tissue. **B.** Restrictive surgical guide in position during the drilling protocol and palatal approach. **C.** Implant placement. **D.** Implant placed, a wide space or gap is observed on the buccal side.

Subsequently, a detachment of the area was performed to prepare the bed that will receive the connective graft taken from the palatal area using a U-envelope technique, in order to suture the area after obtaining the graft. We place the graft in the most coronal area possible to provide stability and aesthetics through tunnelization (Figure 3, A through D).

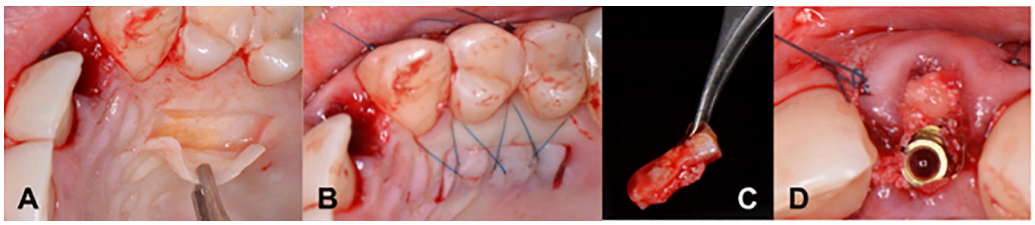

Figure 3. **A.** Connective tissue harvesting from the palate in the premolar area, with a window technique to avoid the epithelium. **B.** The donor site is sutured with 5-0 nylon. **C.** Connective tissue before placement in the gap area. **D.** Tunneling technique to position the graft in the desired location using sutures.

We adapted the patient's crown to serve as a provisional restoration, carefully polishing the area that will form the critical profile. The provisional crown, previously made to match the patient's crown, was placed and tightened onto the transepithelial area at 25 N. We remove the suture at 2 weeks and take impressions for the definitive crown at 4 months (Figure 4, A through D).

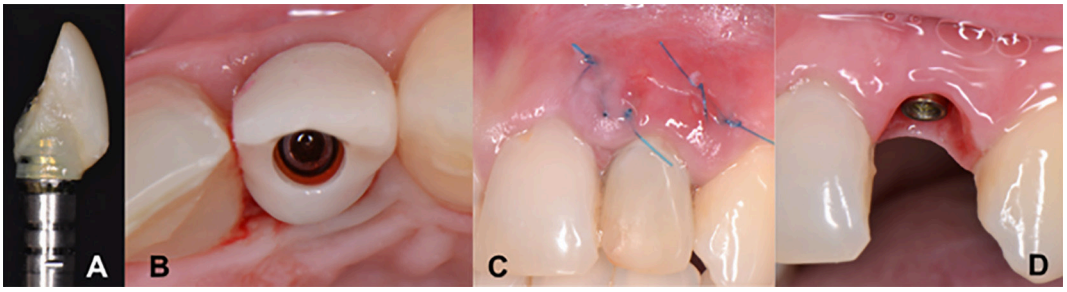

Figure 4. **A.** Crown integrated with the implant abutment to perform immediate loading. **B.** The coronal aspect of the crown is screwed to the abutment to initiate healing. **C.** Healing appearance at 10 days post-operation. **D.** healing conditions with maintenance of papillary height.

The emergence profile was replicated as it has been maintained. Once the provisional crown has fulfilled its function, it is dismounted and fixed to an implant analog. This entire structure was introduced into a heavy silicone ball and set. After setting it up, the provisional crown was removed, leaving the analog in the silicone ball. A transfer impression was placed on this analog, and the GAP left by the impression of the provisional crown on the silicone was filled with flowable composite. Upon polymerization, the transfer was removed from the silicone, yielding a personalized transfer that replicates the achieved emergence profile. It was placed in the mouth in the correct position, and both a heavy and a light silicone impression were taken. The laboratory sent a crown mockup for in-mouth adjustment. It was tried on, and after making the pertinent modifications, it was sent back to the laboratory to finish the crown, which was placed and fixed at 25 N onto the transepithelial (Figures 5.1 and 5.2).

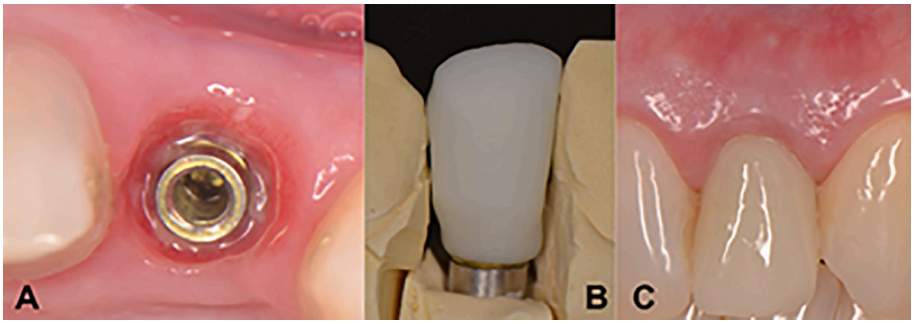

Figure 5.1. **A.** Appearance of peri-implant tissue maturation, maintaining a natural look. **B.** Laboratory handling of the definitive crown. **C.** Healing appearance with the crown already in position, after several months of healing.

Figure 5.2. Healing appearance with the crown already in position, after several months of healing.

DISCUSSION

The subepithelial connective tissue graft (SCTG) is a procedure that involves harvesting a portion of connective tissue from the hard palate or tuberosity region to thicken the peri-implant tissue and increase the amount of keratinized tissue. The connective tissue graft for covering implants affected by peri-implantitis is also favorable, with more favorable peri-implant health (including gain of keratinized mucosa, improved bleeding indices, and higher marginal bone levels) and aesthetic improvement. Among the results of various studies focused on this technique, many agree on the aesthetic results and its good management for alleviating soft tissue recession and marginal bone loss, especially in immediate post-extraction implants. The low percentage reported in healing problems and donor area necrosis is not excluded (4,7).

De Angelis et al. (8), indicate through a meta-analysis that the use of SCTG guarantees a statistically significant increase in the stability of the mean buccal marginal level, showing greater thickness and a better result in stability and aesthetics in periodontal plastic procedures related to dental implants, especially in thin periodontal phenotypes where achieving a high aesthetic result after an invasive procedure is complicated. This is where surgical and postoperative complications come into consideration. In the same research, the author highlights that complications such as bleeding, swelling, graft necrosis, and patient morbidity are factors to consider. However, proposals such as using a xenogenic collagen matrix (XCM) as a viable solution to avoid the aforementioned complications lack scientific support when comparing results, as they are unable to make a risk-benefit comparison of these two techniques due to a lack of evidence (8).

It has been demonstrated that immediate post-extraction implants yield favorable results in the osseointegration process and the resulting aesthetics, even when discussing immediate provisionalization. Groenendijk et al. (9) analyzed the aesthetic outcome one year after, in a prospective multicenter series of consecutive cases, in 100 patients undergoing immediate post-extraction implant placement and immediate provisionalization. Using the Chi-Square test, the overall changes in aesthetic scores between various points in time were examined using a mixed model with a random intercept for treatment center. They determined that throughout the year of study, 93 % of participants fell within the satisfied and acceptable range for the aesthetic result obtained, indicating that a high aesthetic outcome was achieved (9).

Regarding the aesthetic results that can be achieved by combining immediate post-dental organ extraction implant placement and SCTG use, there is a disparity in understanding whether this technique, characterized by increasing thickness in periodontally related procedures, manages an aesthetic margin that is comfortable for the patient and makes them feel satisfied with the results. De Angelis et al. (10) demonstrated in another investigation that patients reported high levels of satisfaction regarding aesthetic results in immediate implant placement procedures with provisionalization and SCTG use. It also records a reduction in operative time for patients who did not undergo soft tissue augmentation, while resorting to XCM resulted in an easier and faster solution than subepithelial connective tissue grafting.

CONCLUSION

Based on the evidence, the authors of this report agree that the use of SCTG in immediate

post-extraction implant placement and immediate provisionalization is adequate and effective, provided that the healthcare professional has optimal management of the subject and is familiar with the anatomical relationships and potential surgical complications. The cost-benefit ratio, as evidenced in the literature and studies, promotes this practice based on the success of its results and the aesthetic benefits obtained after communicating and explaining such information to the patient. In the present case, healing was achieved without any inconvenience, both at the donor site and in the final result after patient rehabilitation, yielding a favorable and expected aesthetic outcome.

Conflict of Interest Statement: No conflicts to declare.

REFERENCES

1. Gibbs S, Roffel S, Meyer M, Gasser A. Biology of soft tissue repair: Hingival epithelium in wound healing and attachment to the tooth and abutment surface. Eur Cell Mater. 2019;38:63-78.
2. Yuan X, Pei X, Zhao Y, Li Z, Chen CH, Tulu US, et al. Biomechanics of immediate postextraction implant osseointegration. J Dent Res. 2018;97(9):987-994.
3. Ragucci GM, Elnayef B, Criado-Cámara E, Del Amo FSL, Hernández-Alfaro F. Immediate implant placement in molar extraction sockets: A systematic review and meta-analysis. Int J Implant Dent. 2020;6(1):40.
4. Aldhohrah T, Qin G, Liang D, Song W, Ge L, Mashrah MA, et al. Does simultaneous soft tissue augmentation around immediate or delayed dental implant placement using sub-epithelial connective tissue graft provide better outcomes compared to other treatment options? A systematic review and meta-analysis. PloS One. 2022;17(2)
5. Thoma DS, Buranawat B, Hämmerle CHF, Held U, Jung RE. Efficacy of soft tissue augmentation around dental implants and in partially edentulous areas: A systematic review. J Clin Periodontol. 2014;41(Suppl 15):S77-S91.
6. Naji BM, Abdelsameaa SS, Alqutaibi AY, Said Ahmed WM. Immediate dental implant placement with a horizontal gap more than two millimeters: A randomized clinical trial. Int J Oral Maxillofac Surg. 2021;50(5):683-690.
7. Dalago H, Perrotti V, Torres De Freitas S, Ferreira C, Piattelli A, Iaculli F, et al. Prospective longitudinal comparison study of surgical therapies for peri-implantitis: 3-year follow-up. Aust Dent J. 2019;64(3):237-245.
8. De Angelis P, Manicone PF, Rella E, Liguori MG, De Angelis S, Tancredi S, et al. The effect of soft tissue augmentation on the clinical and radiographical outcomes following immediate implant placement and provisionalization: A systematic review and meta-analysis. Int J Implant Dent. 2021;7(1):86.
9. Groenendijk E, Staas TA, Bronkhorst E, Raghoebar GM, Meijer GJ. Immediate implant placement and provisionalization: Aesthetic outcome 1 year after implant placement. A prospective clinical multicenter study. Clin Implant Dent Relat Res. 2020;22(2):193-200.
10. De Angelis P, Manicone PF, Gasparini G, De Angelis S, Liguori MG, De Filippis I, et al. Influence of immediate implant placement and provisionalization with or without soft tissue augmentation on hard and soft tissues in the esthetic zone: A one-year retrospective study. BioMed Res Int. 2021;2021:1-9.