International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2019): 7.583

Case Report: Partial Extraction Therapy in Implant - Socket-Shield Technique

Victoria Helena[1], Renan Lana Devita[2], Basilio Pires de Figueiredo Filho[3], Paulo pinto dos Santos[4], Marco antônio Carvalho[5], Jorge Luiz Da Silva Pires[6], Igor Da Silva Brum[7]

[1]Katia valeria seglia, jose rodrigues ribeiro alves, orcid: orcid.org/0000-0003-2282-7052

[2]Flavia Cristina Lana, Gilson Devita costa, orcid: orcid.org/000-000248961535

[3]Basilio Pires de Figueiredo, Floripes De Brito Figueiredo

[4]Gonçalo pinto dos santos, Ellyette pinto dos santos, orcid.org/0000-0001-8089-8751

[5]Alcides da silva carvalho, Neusaalencar de carvalho, orcid.org/0000-0001-88474531

[6]Jorgemanuel de aguiar pires, Leonilda augusta da silva pires, orcid.org/0000-0002-0572-2577

[7]Co-author, Ademir brum, Meire lucila esmerindo da silva, orcid.org/0000-0002-7522-205x

Abstract: ***Currently, the concern with how to preserve the gingival architecture and maintain the pink aesthetic in rehabilitation with dental implants has been increasingly present. The aim of this study was to demonstrate the effectiveness of the socket-shield technique in the tissue repair process, maintaining the gingival and bone architecture, comparing it with other guided regeneration techniques. Case report: the selected case presents loss of elements 11 and 21, without apical lesion and with endodontic treatment, the buccal walls of the elements were maintained, cone morse type dental implants were placed of the company systhex® and the gap grafted with alloplastic biomaterial. Results: Both implants were osseointegrated without any histological inflammatory reaction and the dental fragments did not present any resorption process. The buccal wall maintained the tissue structure contributing to the aesthetics and maintenance of the patient's gingival profile. In addition it avoided two surgical moments as described in more invasive techniques of guided bone regeneration.***

Keywords: dental implant, extraction, bone graft, socket-shield

1. Introduction

For years, the topic of osseointegration and the need for bone preservation during surgical procedures have been discussed among professionals in the field of implantology.

After tooth extraction, the socket undergoes a cascade of cellular and molecular events that act in order to heal, with the consequence of altering the morphology and resorption of the alveolar bone [1-2].

Currently, the replacement of a lost dental element is possible through osseointegrated implant placement techniques [2]. However, in cases with severe root resorption, prior graft treatment of the site is necessary before implant placement.

There are already established techniques in the literature of cases in which the patient does not have a favorable bone structure for surgery, such as bone graft, guided bone regeneration, interpositional graft, osteogenic distraction and titanium mesh [1-2].

As an alternative to the reported techniques, the Socket Shield (SS) technique has progressed from concepts introduced in the 1950s due to the retention of the tooth that limits tissue changes after extraction [3].

The SS technique consists of preserving the buccal wall of the root and placing the implant with this preserved part of the root. The body's inability to naturally regenerate the lost bone volume, whether due to illness or trauma, led to the need to develop materials and techniques capable of promoting this same regeneration in a guided way [4].

The SS technique prevents the resorption of the bone bundle, leaving a segment of the buccal root (alveolar shield) in place [5]. The retention of the root fragment adjacent to the crestal buccal bone and the positioning of the implant coupled to the palatal wall immediately after extraction are able to maintain the contour of the edge. The implant can achieve bone integration without any inflammation in the peri-implant tissue. However, a histological examination is necessary to verify the preservation of the buccal bone plate and regenerated tissue between the socket-shield and the implant [6].

Studies prove the potential of this technique in avoiding visible changes in the shape of the ridge and the gingival contour after tooth extraction, so that the pink aesthetic is maintained [7]. In addition it is a faster treatment option compared to other techniques described in the literature.

Currently, the pink aesthetic has been a key element during the planning of oral rehabilitation with dental implants. The preservation of the gingival contour is extremely important for the final aesthetic result. The SS technique brings an immediate proposal for rehabilitation when compared to techniques for increasing the volume of the buccal wall. The technique allows the implant placement to happen

immediately while maintaining both the buccal bone wall and the gingival contour. In addition, it avoids other surgical times for placing bone or gingival graft, as described in other techniques. Thus, it has been used more and more.

2. Objectives

The aim of this study was to demonstrate, in the present case, the effectiveness of the Socket Shield technique in the tissue and bone repair process compared to other guided bone regeneration techniques.

3. Case Report

A 23-year-old, male, non-smoker and non-alcoholic patient reported having suffered avulsion of teeth 11 and 21 after an accident. As treatment, teeth replantation and endodontic treatment were performed. Five years after the treatment, tooth 21 showed internal resorption and tooth 11 fractured after an accident, losing its crown. During the consultation, through the x-ray examination, a fracture of the root of the upper right central incisor (11) and internal resorption in the upper left central incisor (21) were found. As a result both were indicated for extraction. The patient reported social problems due to the absence of the crown of the upper right central incisor tooth (11). (fig 1)

In computed tomography, a thin layer of the bone buccal wall was observed, revealing necessary graft therapy for subsequent implantation technique in the region of teeth 11 (fig 2) and 21 (fig 3). As the patient did not have a provisional prosthesis and reported social and psychological problems due to the lack of a crown in the anterior region, it was suggested that the implantation technique used would be the SS, due to the decrease in surgical time when compared to the block graft technique.

The implant technique chosen was the Socket-Shield (SS) technique, which consists of the removal of the palatal wall of the tooth using the Zecrya drill, curettage of the buccal wall and the preparation of the palatalized implant bed to the buccal wall left in position.

It was planned to place two implants, of the systhex® company a cone morse 3.5 x 13mm in the region of tooth 11 and a cone morse 4.3 x 13mm in the region of tooth 21.

The patient was medicated preoperatively with 4 (four) 500 mg amoxicillin tablets and 2 (two) 0.5 mg dexamethasone tablets. Lidocaine infiltrative anesthesia with epinephrine 1:100,000 was performed in the regions of the upper central incisors. Removal of the crown of tooth 21 and detachment of the gingival edges were performed. The roots of teeth 11 and 21 were sectioned along the long axis in the mesiodistal direction with the Zecrya drill, (fig 4) leaving the buccal wall of both teeth (fig 5). The buccal portion of the roots maintained were curetted and the implants were placed in a palatal position of the buccal wall of the roots (Fig 6).

In the region of tooth 11, an Attract model Systhex brand 3.5 x 13mm cone morse implant was placed. In addition, an Attract model Systhex brand 4.3 x 13mm cone morse implant was placed in the region of tooth 21. An alloplastic graft - 0.5 mg was placed in both gaps, as the SS technique dictates (Fig 7). During placement, the implants reached 35 Ncm of torque, which allowed immediate loading (fig 8).

After 6 months, the molding and making of the definitive crowns started. Both were planned and made of screwed ceramic. The final aesthetic that resulted was quite satisfactory, as the technique allowed a good gain in gingival volume, contributing to the final aesthetic result (fig 9).

4. Discussion

Nowadays, studies looking for ways to accelerate bone neoformation have been more and more frequent. As a result, the influence of blood cells on biomaterials applied in the human body has long been researched. This evolution, comes from the end of the 1990s, with the dissemination of platelet-rich plasma (PRP) 1, followed by the second generation of platelet aggregates, namely, platelet-rich fibrin (PRF) 2, to the recent advanced clot platelet-rich fibrin (A-PRF) 3. These platelet concentrates propose an acceleration in the healing of soft and hard tissues by increasing the concentration of growth factors 8. Fibrin-rich plasma (PRF) is a by-product obtained from Platelet Rich Plasma and was developed to intensify the acceleration of reparation of bone and soft tissues [9]. L-PRF is a material rich in autologous platelets, growth factors which have an immunological and platelet concentrate that enables osteoconduction and intensifies the regenerative response of the patient's own cells. The L-PRF technique can be used together with the SS technique, because, according to studies, the use of these platelet concentrates accelerates the healing process. However, it is necessary to subject the patient to a blood collection for the procedure to be performed.

Autogenous bone grafts are removed from a donor area of the patient, requiring two surgical sites, which can be obtained from extra-oral sites: skullcap, iliac crest, tibia, and rib; or intraoral sites: maxillary tuberosity, mandibular symphysis, mandibular body, ascending branch and zygoma [10-11]. Autogenous bone is considered the gold standard for grafting. However, given the surgical morbidity and some disadvantages inherent to this technique, the use of allografts alone or associated with xenogens, are being increasingly sought after [12-13]. The homologous bone can be frozen, dried, demineralized or not, and lyophilized.

Currently, the most used homogenous bone is dry frozen bone. This is readily available in large quantities; however, revascularization takes longer compared to autogenous bone and has no osteoinductive potential [13]. In SS technique, homologous bone is used as the material of choice to avoid two surgical times for autogenous graft removal.

Bone grafts are often associated with guided bone regeneration (GBR) techniques, especially when a good increase in bone volume is desired and in cases of the risk of collapsing membranes. GBR has been introduced as a therapeutic option to promote new bone tissue formation and resorption through the use of membranes, providing tissue regeneration from osteogenic cells [14]. For this purpose, autogenous bone grafting has been the most used to support the collapse of the membranes. However, the disadvantages

of autogenous grafting are well known, among them, postoperative morbidity and limited graft availability, which leads to the search for alternatives. Recently, the use of titanium meshes as barriers has stood out [15]. GBR is a technique used in association with the SS technique, when the homologous graft is placed during the technique, bone regeneration is expected to occur in the operated area.

The preservation of the gingival profile has been an important issue in the choice of the surgical technique, so techniques of extraction and immediate implant placement, such as immediate dentoalveolar restoration (IDR), have been increasingly indicated. IDR allows the immediate restoration of the implant, the maintenance of bone and gingival architecture and the reduction of treatment time [16], thus contributing to the maintenance of pink aesthetics, as it avoids common cellular events after extraction, as well as the SS technique [17].

Authors carried out a prospective clinical and radiographic study of 12 months in which they evaluated cellular events of bone and soft tissue healing after extraction. In this study, they evaluated that in relation to the dimensions of the infection-free alveolar bone, it would be favorable to place the implant as soon as possible after tooth extraction, due to the important impact caused by the extraction on the subsequent aesthetic result [18]. The SS technique recommends that part of the buccal root is maintained so that, in addition to preventing buccal resorption of the alveolar bone, part of the residual periodontal ligament is preserved and can connect the dental cement with the peri-implant bone; thus, peri-implant tissue can become more like normal periodontal tissues, and can better protect against soft tissue recoil [19-20].

5. Conclusion

This case allowed us to conclude that the SS technique decreased the patient's morbidity, treatment time and cost when compared to other surgical techniques. In addition, the technique has long-term predictability, especially in relation to preserved gingival architecture.

6. Clarification Note

We, the authors of this work, do not receive financial support for research given by organizations that may have gained or lost with the publication of this work. We, or the members of our families, did not receive consulting fees or were paid as appraisers by organizations that may have gained or lost from the publication of this work, we have no shares or investments in organizations that may also have gained or lost from the publication of this work. We do not receive presentation fees from organizations that may have gained or lost profit with the publication of this work, we are not employed by the commercial entity that sponsored the study and we also do not have patents or royalties, nor do we work as a specialized witnesses, or perform activities to an entity with a financial interest in this area.

Author contact details
Victoria Helena Seglia - 21 98393-1993 / email: helena.seglia@gmail.com

References

[1] Dias SBF. Preservação de rebordo para terapia com implantes dentários: Uma revisão da literatura, Faculdade de Odontologia de Piracicaba, 2015.
[2] Junior HM, Beltrão CF, Furlani JC, Kassardjian F, Mugayar LR, Genovese WG. Enxerto ósseo em bloco autógeno na maxila: relato de caso clínico 2016;70(2):198-203.
[3] Gluckman H, Toit J, Salama M. The socket-shield technique to support the buccofacial tissues at immediate implant placement. International dentistry – African edition 2015; 5(3): 6-14.
[4] Musatova S. Estratégias para a preservação do rebordo alveolar. Dissertação - Instituto Superior De Ciências Da Saúde Egas Moniz, Portugal 2016.
[5] Glocker M, AttinT, Schmidlin PR. Ridge Preservation with Modified "Socket-Shield" Technique: A Methodological Case Series. Dentistry Journal 2014; 2:11- 21.
[6] Mahajan T, Massey NS, Bajawa W, Sinha A, Banerjea A, Tandon P. Socket shield technique. Indian Dental Journal 2015; 7:31-34.
[7] Chen CL, Pan Y. Socket Shield Technique for Ridge Preservation: A Case Report 2013; 2(2): 16-21.
[8] Mourão CFAB, Valiense H, Melo ER, Mourão NBMF, Maia MDC. Obtenção da fibrina rica em plaquetas injetável (i-PRF) e sua polimerização com enxerto ósseo: nota técnica Rev. Col. Bras. Cir.2015; 42(6):421-423.
[9] Almeida RCC, Baia AEC, Souza ACS, Dutra KM, Lemos MVSA. Aplicabilidade da membrana de fibrina rica em plaquetas e leucócitos (l-prf) na odontologia: uma revisão de literatura. Jornada odontológica dos acadêmicos da católica – joac 2016; 3(1).
[10] Nóia CF, Netto HDMC, Lopes RO, Chessa JR, Mazzonetto R. Uso de Enxerto Ósseo Autógeno nas Reconstruções da Cavidade Bucal. Análise Retrospectiva de 07 Anos. Revista Portuguesa de Estomatologia, Medicina Dentária e Cirurgia Maxilofacial. 2009; 50 (4): 221-225.
[11] Triplet RG, Schow SR. Autologous Bone Grafts and Endosseous Implants: Complementary Techniques J Oral MaxillofacSurg 1996; 54: 486-494.
[12] Salmen FS, Oliveira MR, Gabrielli MAC, Piveta ACG, Filho VAP, Gabrielli MFR. Enxerto ósseo para reconstrução óssea alveolar. Revisão de 166 casos. Rev. Col. Bras. Cir. 2017; 44(1): 33-40.
[13] Faverani LP, Ferreira GR, Santos PH, Rocha EP, Júnior IRG, Pastori CM, et al. Técnicas cirúrgicas para a enxertia óssea dos maxilares – revisão da literatura Rev. Col. Bras. Cir. 2014; 41(1): 61-67.
[14] Pereira SP, Junior NGO, Vieira FLD, Rodrigues CRT, Vieira AF, Elias WC. Regeneração óssea guiada (rgo) com uso de membrana não reabsorvível de polipropileno-boneheal em alvéolo pós-exodontia – relato de caso. FullDent. Sci. 2016;7(28):42-48.
[15] Ayub LG, Júnior ABN, Grisi MFM, Júnior MT, Palioto DB, Souza SLS. Regeneração óssea guiada e suas aplicações terapêuticasBraz J Periodontol – 2011; 21(4):24-31.
[16] Rosa JCM, Rosa DM, Zardo CM, Rosa ACPO, Canullo L. Restauração dentoalveolar imediata pós-exodontia

com implante platformswitching e enxertia. Revista implantnews 2009; 6(4):581-385.
[17] Bramanti E, Norcia A, Cicciu M, Matacena G, Cervino G, Troiano G, et al. Postextraction Dental Implant in the Aesthetic Zone, Socket Shield Technique versus Conventional Protocol. The Journalof Craniofacial Surgery 2018; 29(4): 1037-1041.
[18] Schropp L, Wenzel A, Kostopoulos L, Karring T. Bone healing and soft tissue contour changes following single-tooth extraction: A clinical and radiographic 12-month prospective study. The International Journal of Periodontics & Restorative Dentistry 2003; 23(4): 313-323.
[19] Guo T, Nie R, Xin X, Wang H, Manlin QIM, Yu M, et al. Tissue preservation through socket-shield technique and platelet-rich fibrin in immediate implant placement. Medicine Open, 2018: 97-50.
[20] Hurzeler MB, Zuhr O, Schupbach P, Rebele SF, Emmanouildis N, Fickl S. The socket-shield technique: a proof-of-principle report. J ClinPeriodontol. 2010; 37: 855-862.

Figures


Figure 1

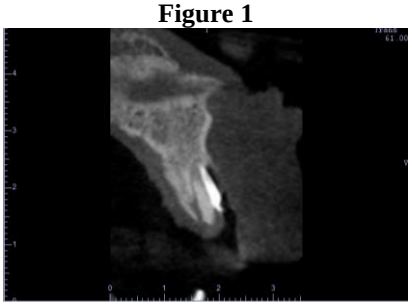
Figure 2

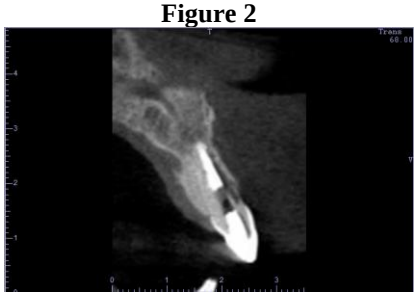
Figure 3

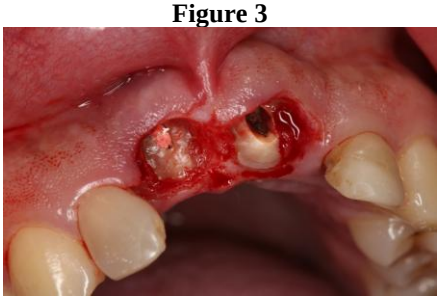
Figure 4

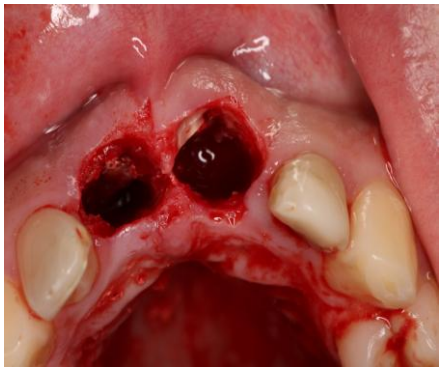
Figure 5

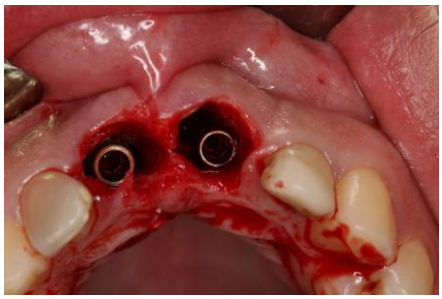
Figure 6

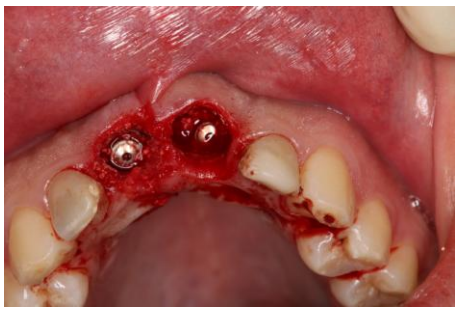
Figure 7


Figure 8


Figure 9