USE OF MUCODERM® COLLAGEN MATRIX IN PERI-IMPLANT AESTHETIC DEFECT CORRECTION.

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Abstract

Introduction: Soft tissue defects around osseointegrated implants have stimulated the development of techniques aimed at reducing these defects, especially when located in areas of the premaxilla. Case Report: A 40-year-old, female, non-smoker, sought dental care complaining of darkening around the region where is an implant corresponding to element 12. On clinical examination, it was observed that peri-implant mucosa was present thin with a depression revealing a shading in vestibular aesthetic area and a palatinized prosthesis on implant. Discussion: Allografts appeared in the market as a substitute for autogenous connective graft, with the proposal to avoid a second surgical area, besides shortening the procedure time and reducing postoperative discomfort. Conclusion: The use of Mucoderm® in aesthetic area provides excellent results, establishing and maintaining the facial bone wall; in addition, contributes to the formation of a thick soft tissue in the aesthetic area, besides providing a better postoperative and avoiding a second surgical site.

Introduction:

Soft tissue defects around osseointegrated implants have stimulated the development of techniques aimed at reducing these defects, especially when located in areas of the premaxilla.

Soft tissue reconstruction can be performed using techniques such as autogenous connective tissue graft and biomaterials grafts, especially Mucoderm® (Botiss Biomaterials - Straumann), which presents itself as a true

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alternative to connective tissue graft of the own patient\(^2\). This three-dimensional collagen matrix, originated from the dermis of animals is stable and used to replace soft tissue, contributing to rapid revascularization and tissue integration\(^3\).

The hard palate is considered as gold standard with regard to the donor area of connective tissue, but its disadvantages arise from the requirement of two surgical sites, be it the donor or the recipient, which causes an increase in postoperative morbidity, pain, surgical time and difficulty in performing oral hygiene during the cicatricial period\(^4\).

The biomaterial Mucoderm\(^\circledast\) (Botiss Biomaterials - Straumann) is a collagen matrix of porcine origin that, after passing through processes that avoid potential rejection, allows the proliferation of fibroblasts, revascularization and integration of the graft after its allocation in the surgical bed\(^5\). In addition, it has excellent characteristics, such as: high tensile strength due to its structural stability, being able to be stabilized by sutures, pins, even screws; can easily be cut into several sizes and inserted into surgical beds by the tunneling technique without any obvious risks of tearing the matrix\(^6\). Its structure is similar to that of human tissue, making it a viable alternative to tissue grafting, with regard to the complete integration of the patient's own tissue within 6 to 9 months. In addition, have a capacity of reduction of patient discomfort and donor site morbidity\(^7\).

It is necessary to rehydrate the Mucoderm\(^\circledast\) matrix in sterile saline solution or blood for 5 to 20 minutes before application; the rehydration time depends on the technique applied and the flexibility desired for the matrix, being that the longer the rehydration time, the greater the flexibility of the graft\(^8\). After rehydration, the size and shape of the matrix can easily be adapted to the defect if it is rehydrated for a short time and, therefore, if the matrix is not so flexible, it can be cut or rounded its edges to avoid the perforation of the gingival tissue during the closure of the flap\(^9\). For covering multiple recessions, the membrane may be elongated by cutting the matrix on alternate sides where the two ends are pulled to stretch it and the indication determines if the matrix should be covered or exposed; the exposure of the matrix should always be avoided in the treatment of recession defects, and it should be ensured that the repositioned flap completely covers the matrix\(^10\).

Full coverage ensures the growth of blood vessels and cells starting from the overlapped flap, and thus, the rapid incorporation of the graft\(^11\). Early exposure may lead to rapid absorption and contamination of the collagen matrix, causing graft failure of soft tissue\(^12\). Open healing is only possible if small parts of the matrix are exposed, and revascularization may occur from the adjacent margins of the flap. It is worth pointing out that this possibility still viable if the membrane is fixed very close to the underlying periosteum\(^13\).

The present study aims to report a clinical case on the use of the Mucoderm\(^\circledast\) collagen matrix in perimplant aesthetic defect corrections.

**Case Report:-**
A 40-year-old, female, non-smoker, sought dental care complaining of darkening around the region where is an implant corresponding to element 12. On clinical examination, it was observed that peri-implant mucosa was present thin with a depression revealing a shading in vestibular aesthetic area and a palatinized prosthesis on implant. (Fig 1 and 2).
In the planning, there was a need for graft surgery in the region where the depression was found, and as a less traumatic option was used a soft tissue substitute, called Mucoderm® (Botiss biomaterials, Straumann). The preoperative medication was Amoxicillin 500mg, two capsules, one hour before surgery. Intra-oral antisepsis was performed with chlorhexidine 0.12%, and povidine 1% was used during the extra-oral antisepsis. After local anesthesia, a horizontal incision was made that extended from the distal of the element 13 to the distal of element 11. Later, the mucoperiosteal in the graft receiving region was detached (Fig. 3).
Then the Mucoderm® graft (Botiss Biomaterials, Straumann) was positioned and sutured in the recipient area, using monofilament yarns. The flap was repositioned and coronally sutured (Fig. 4 and 5).

Figure. 3: Mucoperiosteal detachment at the recipient region.

Figure. 4: Sutured graft in recipient area.

Figure. 5: Clinical condition of the grafted region (immediate postoperative).
In a 5-month postoperative clinical examination, a scar was observed in the grafted region and a significant decrease in the initial depression (Fig. 6 and 7).

![Vestibular view (five months postoperative).](image1)

**Figure. 6:** Vestibular view (five months postoperative).

![Occlusal view (five months postoperative).](image2)

**Figure. 7:** Occlusal view (five months postoperative).

After 10 months of the graft placement surgery, a new prosthetic abutment was made; we chose to use an aesthetic pillar because of the initial shading complaint and therefore the zirconia pillar was chosen. It is possible to observe that at the end of the case, soft tissue shading and depression were corrected and gingival aesthetic were reestablished, with remarkable gain of keratinized soft tissue in the vestibular region (Figs. 8, 9 and 10).
**Figure 8:** Occlusal view (ten months postoperative).

**Figure 9:** Zirconia abutment in vestibular view.
Figure 10: Final appearance of peri-implant tissue.

Discussion:
For a long time, free gingival grafting techniques and connective tissue grafts were used with great success. However, it is not widely used, due to the fact that the technique requires a second surgical site, second intention healing, generate painful postoperative, limitation in multiple teeth in the same session - due to the limited supply of the donor tissue - and the aesthetic question because it results in a patchy appearance. According to Matos et al. (2017) the allografts appeared in the market as a substitute for autogenous connective graft, with the proposal to avoid a second surgical area, besides shortening the procedure time and reducing postoperative discomfort.

According to Pereira et al. (2017) when a partial thickness flap is prepared, the collagen membrane should be sutured to the intact periosteum to ensure close contact between the matrix and the periosteal wound bed, and single or “x” sutures may be used. However, the use of absorbable sutures is normally recommended, allowing an intimate fixation of the surgical borders.

After surgery, any mechanical trauma should be avoided at the treated site and patients should be instructed not to brush their teeth over the operated area until four weeks after surgery. The prevention of plaque can be done by the use of a mouthwash with a chlorhexidine solution 0.2%; besides this, the patient should be examined weekly for plaque control and evaluation of the healing process.

The Mucoderm® collagen matrix has been increased in recent years, Puišys et al. 2017 described a technique for single aesthetic implant placement with thickening of soft tissue, where they use Mucoderm®. The collagen matrix demonstrated excellent aesthetic results, establishing and maintaining the bone wall and obtaining thick soft tissue.

Pabst et al. (2016) in order to analyze the influence of Mucoderm® on endothelial progenitor cells (EPC) in vitro, have reported a good biocompatibility of this matrix, without any cytotoxic effects in EPC, thus promoting rapid revascularization and integration of soft tissues.

Nocini et al. (2014) and Schmitt et al. (2016) concluded that the Mucoderm® collagen matrix may be a promising material as a substitute for autogenous connective tissue graft.

It is important to note that although Mucoderm® is a promising replacement for the autogenous graft, the literature does not have long-term follow-up clinical studies. Therefore, further studies are needed to evaluate the biological behavior of the material.
Final considerations:

It can be concluded from this study that:

The use of Mucoderm® in aesthetic area provides excellent results, establishing and maintaining the facial bone wall; in addition, contributes to the formation of a thick soft tissue in the aesthetic area, besides providing a better postoperative and avoiding a second surgical site.

Conflicts of interest:

The authors declare that there are no conflicts of interest.

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