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CASE REPORT

Bone allografts on maxillary reconstruction for oral rehabilitation with dental implants on cleft lip and palate patients

Enxerto ósseo homólogo na reconstrução maxilar para reabilitação de paciente fissurado com implante dentário

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RESUMO

Fundamentação: A reabilitação oral de pacientes fissurados é um grande desafio a Odontologia devido às opções de reabilitação convencionais (próteses parciais fixas ou removíveis). **Objetivo:** Relatar um caso de um paciente fissurado submetido a procedimento de enxertia com osso homólogo para posterior reabilitação com implantes dentários. **Relato de Caso:** Homem, 24 anos, fissurado apresentou-se para reabilitação com implante osseointegrável. O paciente apresentava elementos decíduos 52 e 53 e agenesia do 12°, além de grave defeito ósseo maxilar na região da agenesia, contudo sem apresentar fístula oronasal (fenda pré-forame unilateral). Realizou-se esvaziamento do canal incisivo e preenchimento com osso liofilizado inorgânico GEN-OX® (BAUMER). **Resultados:** O defeito maxilar foi preenchido com osso homólogo. O complexo enxertivo foi coberto por membrana de colágeno GEN-DERM® (BAUMER). **Conclusão:** Dentro das limitações desse estudo, pode-se concluir que os procedimentos de enxertia em pacientes fissurados apresentam grande taxa de sucesso cirúrgico, fornecendo bases fortes para uma reabilitação oral plena, dos pontos de vista funcional, estético e social, promovendo maior satisfação do paciente.

Palavras-chave: implantes dentários, cavidade oral, enxerto ósseo.

ABSTRACT

Background: Oral rehabilitation of patients with fissures is a great challenge to dentistry due to conventional rehabilitation options (fixed or removable partial dentures). **Objectives:** To present a case of a cleft lip and palate patient undergoing a grafting procedure with homologous bone for posterior rehabilitation with dental implants. **Case Report:** A 24-year-old cleft lip and palate man, presented for rehabilitation with an osseointegrable implant. The patient had deciduous elements 52 and 53 and agenesis of the 12th, in addition to severe maxillary bone defect in the region of agenesis, but without oronasal fistula (unilateral pre-foramen cleft). The incisor canal was emptied and filled with the inorganic lyophilized bone GEN-OX® (BAUMER). **Results:** The maxillary defect was filled with homologous bone. The graft complex was covered by GEN-DERM® collagen membrane (BAUMER). **Conclusion:** Within the limitations of the study, it can be concluded that the grafting procedure in cleft patients presents large success rate, supporting strong bases for a full oral rehabilitation from the aesthetic and social points of view, promoting greater patient satisfaction.

Keywords: dental implants, oral cavity, bone graft.

BACKGROUND

Rehabilitation of cleft lip and palate patients is a major challenge for Implantology since these patients require bone grafting procedures not only to achieve sufficient bone support for the installation of osseointegrable implants, but also to obtain a bone height suitable for the aesthetics of the prosthesis[6,10,15,18,19,23,24].

Bone grafting is the procedure of choice for the closure of oronasal fistula[3,4,6,8,12,14,18,19,25] and thereby allows dental eruption at the site, provides bone support for adjacent dental elements, stabilizes the premaxilla and creates support for the alar base[6,18,19].

The rehabilitation of these patients through conventional prostheses presents functional, aesthetic and social problems[2,6,10,19,23]. In addition to circumventing these factors, rehabilitation with dental implants in these areas promotes bone stimulation, preventing reabsorption of the graft and ensuring the longevity of the benefits[2,6,18,23].

With the introduction of dental implants, the qualification of the professionals and the biotechnologies involved, the indications for oral rehabilitation were expanded, modifying the treatment in several presentations of partial or total edentulism[2,6,18,19]. Thus, dental problems that, historically, were the most difficult to solve, can now be solved more efficiently[2,6].

Cleft palate and cleft lip are among the most frequent congenital malformations, with an incidence of 1/1000[3,4,6,8,11,12,14,25]. Approximately 75% of cases include a defect in the maxillary alveolar bone, and bone grafting, which is the therapy of choice, is necessary in 30% to 40% of patients[3,4,6,11].

Regarding the classification of the various types of clefts, Kernahan et al. (1958) identified three main groups: I) Primary cleft palate - lip and alveolar ridge; II) Secondary palate clefts - hard palate and soft palate; III) Primary and secondary palate clefts - lip, dental alveolus and hard and soft palate.

Another classification, one of the most commonly used, is by Spina et al. (1972), modified, because it is simple, objective and practical enough to facilitate communication between professionals of a multidisciplinary team. This classification comprises four different groups and has as an anatomical reference point the incisive foramen that separates the primary palate from the secondary palate. I) Incisive pre-foramen clefts: Unilateral (incomplete or complete); Bilateral (incomplete or complete); Median (incomplete or complete). II) Incisive trans-foramen clefts: Unilateral; Bilateral; Median. III) Incised post-foramen clefts: Incomplete; or Complete. IV) Rare face clefts. It is necessary to take into account that the pre-foramen are related to the structure of the lips and alveoli, and that the trans-foramen and post-foramen are related to the hard and soft palate.

If the grafting procedure is performed before the canine eruption, orthodontic movement allows complete closure in 90% of the cases, and only 10% of prosthetic reconstruction is necessary. If the grafting occurs after the canine eruption, the possibility of closure by orthodontic mechanics is reduced to 72%, increasing prosthetic demand[4,6,20].

Because of this indication of orthodontic therapy, as to the choice of materials for grafting, bone substitutes such as hydroxyapatite and lyophilized bone are not considered adequate, since they do not allow dental movement, either natural (eruption) or orthodontic[1,6,7,10,20,22].

Cleft lip and palate patients often present agenesis, especially of lateral incisors[10,17]. Therefore, the importance of orthodontic intervention is highlighted, promoting the closure of the diastema by the mesialization of the tooth subsequent to the failure. In patients with agenesis of more than one tooth, this exclusively orthodontic closure is practically impossible, leading to the need for prosthetic rehabilitation[10,20].

The most frequent method of rehabilitation is fixed and removable partial dentures[6,18,19,23]. However, because they require wear of healthy dental elements and present functional, aesthetic and/or social difficulties, another therapeutic option was necessary for the effective resolution of these cases. The great success rate of osseointegrated implants has provided this new rehabilitation possibility, since a correct preparation of the receptor site has been performed through correct bone grafting techniques and after the end of the orofacial region[2,6,18,23].

Three factors should be analyzed when performing bone grafting as a preparation of the implant site for implants[4,6]: 1) Extension of the bone defect - the bone defect may be incomplete or complete (if it presents oronasal fistula); 2) Adjacent soft tissues - always present low quality, result of the congenital defect, hypoplasia and scar fibrosis; 3) Fill material - it should be considered that two materials must be combined: one that fills the bone defect and another that serves as a framework for the first.

Although there are several types of materials for grafting, the one of choice is the autogenous bone, because it provides osteogenic cells (important in the first stage of bone formation) and does not activate the immune response[1,5,7,15,16,22,23,24]. The main disadvantages of autogenous bone are the need for another surgical site, increasing the morbidity of the procedure as a whole, and the availability of material from donor sites[1,5,7,15,23].

Thus, the search for a viable alternative to the autogenous bone led to the homologous bone (allogeneic). Despite reducing surgical morbidity, the main disadvantage of the homologous bone is that it does not have osteogenic cells (lost during the preparation process, so as not to activate the immune response), not participating in the first stage of osteo-formation. Its contribution occurs only in the second phase of osteogenesis (osteoinduction) being purely passive, serving only as a framework[1,5,7,10,15,16,23,24].

The present article aimed to report the procedure of bone grafting in a cleft lip and palate patient, aiming at the correction of the recipient bed for posterior rehabilitation with dental implant.

METHODS

A 24-year-old cleft lip and palate male patient (Fig. 1A, 1B) presented the clinical course of a postgraduate course in Implant Dentistry for rehabilitation with an osseointegrable implant. He had undergone previous orthodontic treatment for 26 months. The patient presented with deciduous elements 52 and 53 and agenesis of 12. A computed tomography (CT) scan of the region revealed a severe maxillary bone defect in the region of agenesis (Fig. 1C), with communication of the bone defect with the incisor canal (Fig. 1D, 1E), however, without oronasal fistula (unilateral pre-foramen cleft).

Based on the data from the complementary exams, surgical planning was performed to correct the implantation site. The proposal presented to the patient included the use of autogenous bone graft (obtained from the region of mandibular angle) and inorganic lyophilized bone. However, according to the patient's objection, the use of homologous bone and inorganic lyophilized bone was chosen. Despite the differences between the properties of these grafting options, there would be no compromise of the final result, since there would be no more orthodontic movement at the site.

RESULTS

After intrasulcular incision with total mucoperiosteal flap (Fig. 1G), the deciduous elements and curettage of the bone defect were removed, in order to remove any remaining tissues internally adhered to the defect. Secondly, the incisor canal was emptied and filled with inorganic bovine lyophilized bone (Fig. 1H, 1I) GEN-OX® (BAUMER). The maxillary defect was filled with homologous cortical bone of patella (from Bone Bank of Marília) and inorganic lyophilized bone GEN-OX® (BAUMER), the blocks were fixed by graft fixation screws (Fig. 1J) of 12 Mm and 10 mm (inches). The graft complex was covered by a GEN-DERM® collagen membrane (BAUMER) to protect the area (Fig. 1K). The surgical site was then closed without tension in order to avoid exposure during healing, with simple and horizontal and vertical mesodermal sutures (Fig. 1L).

DISCUSSION

Although several studies on bone grafting have shown excellent histological, radiographic and clinical results[1,6,15,18] few studies have examined these results in grafts performed in cleft lip and palate patients[10,13]. An important difficulty in these patients is the fixation of the bone graft, since the instability may promote its reabsorption[5,6,7,15]. This leads to insufficient alveolar bone height and a large volume of graft becomes necessary[1,10,15,18]. In addition, frequently, acquired bone height is insufficient, requiring new grafting[10,15].

Another difficulty is the loss of elasticity of the adjacent soft tissue, due to the healing fibrosing of other surgeries on site[4,6,18] which leads to a great difficulty of closing by first intention. Due to its biological properties, the gold standard grafting material is the autologous bone, allowing the continuity of all the local physiological processes[4,5,6,7,15,22,23,24]. However, studies have shown a high rate of resorption in this region of bone clefts. The reason for this is attributed to the probable compression resulting from the upper lip and movement during phonation[4].

Despite its physiological limitations[1,5,7,15,16,23,24] homologous bone presented a high success rate in these patients, even presenting a lower level of resorption when compared to autologous bones[1,5,7,15,24], but the mechanisms responsible for such differences are still unknown.

There are several products on the market designed to replace human bone (autologous or homologous). Each professional should select the best product, according to its characteristics and studies performed on it, for each clinical case[1,7,10,15,20,22].

After years of research, as no substance with properties equivalent to autogenous bone was found, studies are have been performed for a better understanding of the process of incorporation of the grafts, in order to develop an ideal substitute, thus reducing surgical morbidity for the patient[1,5.7,15,16,22,24].

Many studies report the experiences with osseointegratable implants in patients with fissures[6,10,18,19,24]. However, in most studies the sample was small and the follow-up period was relatively short[10,18]. Because of these limitations, potential risk factors for implant loss in these patients are difficult to determine. In addition, there is a lack of studies comparing the success rate of implants in both cleft lip and palate and non-cleft lip and palate patients[10].

CONCLUSION

The grafting procedures in cleft lip and palate patients, aiming at preparing the receptor site for subsequent installation of osseointegrable implants, present a high rate of surgical success, providing strong bases for a full oral rehabilitation, from the functional, aesthetic and social points of view, promoting greater patient satisfaction.

Grafts with homologous bone for these situations can be performed safely and with significantly success rate, since correctly

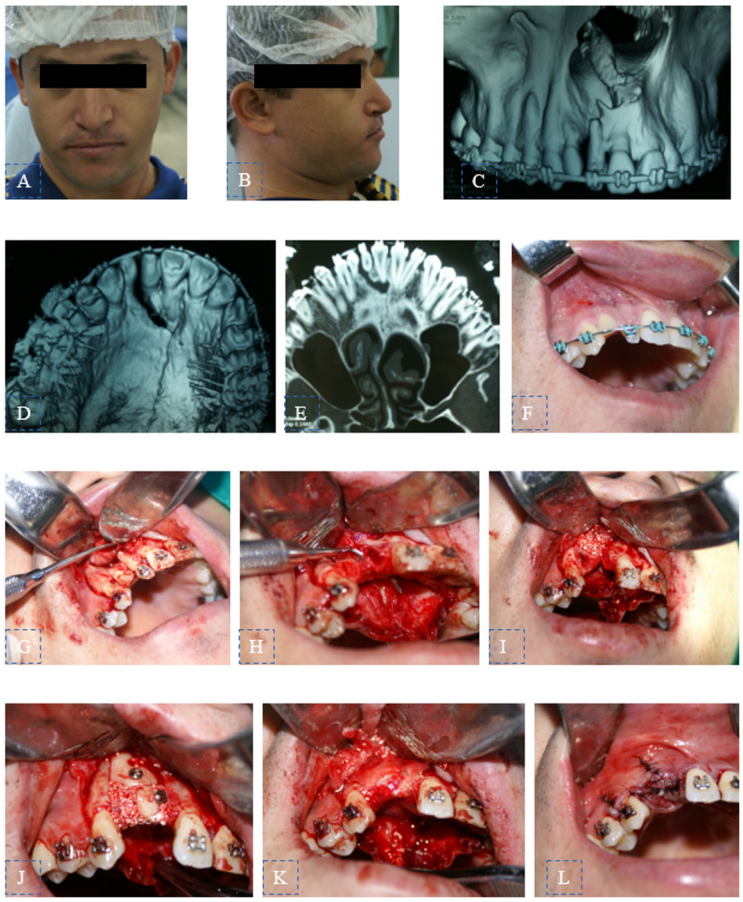

Figure 1. Procedure of homologous grafting in a cleft lip and palate patient. A, Front view; B, Side view; C, CT - front view; D, CT - occlusal view; E, CT - cut demonstrating communication of the bone defect with the incisor canal; F, intraoral view; G, detachment and exposure of the receptor site. Presence of deciduous elements 52-23 and agenesis of element 22; H, Probe demonstrating the communication of the bone defect with the incisor canal; I, Filling with inorganic bovine lyophilized bone; J, Fixation of the two blocks of homologous bone; K, Adaptation of the collagen membrane; L, Post-suture closure.

employed according to the type of rehabilitation treatment plan proposed by the professional.

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