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CLINICAL REPORT

Implant placement for patients with cleft lip and palate: A clinical report and guidelines for treatment

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ABSTRACT

The multidisciplinary teams involved in the treatment of individuals with cleft lip and palate are challenged when implants are indicated in the cleft area. Difficulties include obtaining a healthy peri-implant area and, especially, obtaining the natural-looking papilla essential for esthetic success. The area affected by the cleft has a bone deficiency, which is typically augmented with an alveolar bone graft at adolescence. Guidelines for the 3-dimensional placement of implants at the cleft area are presented based on clinical reports. The patients were followed up for at least 1 year. Adoption of the proposed guidelines enables satisfactory esthetic and functional outcomes in patients with cleft lip and palate. (J Prosthet Dent 2019;121:9-12)

Cleft lip and palate are congenital anomalies characterized by areas of lip and/or palate discontinuity due to failures in the fusion of the embryonic facial process.[1] They represent the most prevalent congenital defects,[2,3] affecting 1 per 650 births, and are a public health concern. The etiology of nonsyndromic clefts is multifactorial, and both genetic and environmental factors play a role in this malformation.[4]

Replacing a lateral incisor in these patients is a challenge. Implant placement in the cleft area may be contraindicated, and local factors should be evaluated to determine optimal 3-dimensional positioning. De Barros Ferreira et al[5] evaluated the survival rate of implants installed in the cleft area and reported that implants in the cleft area are a viable and safe treatment option, with a mean survival rate of 94.3% 34 months after placement.

Obtaining an outstanding esthetic outcome involves the teeth, the lip architecture, and the gingival tissue. Any imbalance among these components[6-10] disturbs the esthetic principles, and the resultant disharmony is easily perceived as unattractive. When planning implant-supported treatment, clinicians should consider factors such as bone crest height, periodontal biotype, shape of the restoration or tooth crown, proximal contact location, and position of the tooth or implant on the dental arch. These factors play a significant role in the location and quality of

Table 1. Guidelines to determine whether cleft area is suitable for implant placement

1. Distance from bone crest to proximal contact of ≤5 mm to achieve interdental papilla formation[14,17] (Fig. 1A, B).
2. Use of surgical template for correct implant positioning, especially labial-palatal and mesial-distal relationship[18] (Fig. 1C).
3. Quality and quantity of keratinized mucosa to allow periodontal health.
4. Morse cone implant installed 2 mm below bone, with 3.3-mm or 3.5-mm platform[18] (Fig. 2).
5. Distance between roots of adjacent teeth to implant of between 1.5 and 2 mm, and for adjacent implants, at least 3 mm[19,20] (Fig. 3).
6. Labial-palatal thickness of bone ridge (evaluated with cone beam computed tomography) averaging 8 mm.
7. Minimum distance from center of implant to labial surface of alveolar ridge of 3 mm (Fig. 4).
8. Distance between mesial and distal surface of adjacent teeth to prosthetic space of between 6 and 7 mm as measured with dividers.[21]
9. Minimum vertical bone height for implant of 10 mm as measured with cone beam computed tomography.

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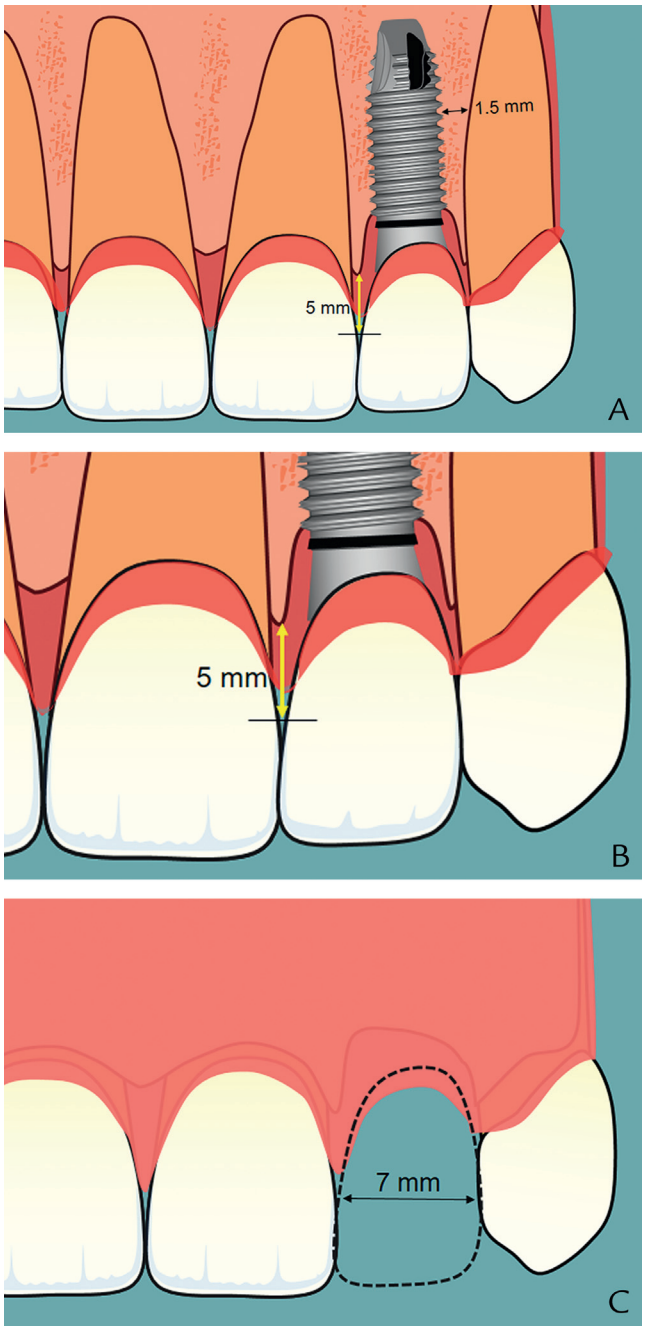

Figure 1. A, Distance between implant and roots of adjacent teeth should be 1.5 to 2 mm. B, Proximal contact of adjacent tooth should be less than 5 mm from bone crest to form interdental papilla. C, Implant crown should have 6 to 7 mm of space.

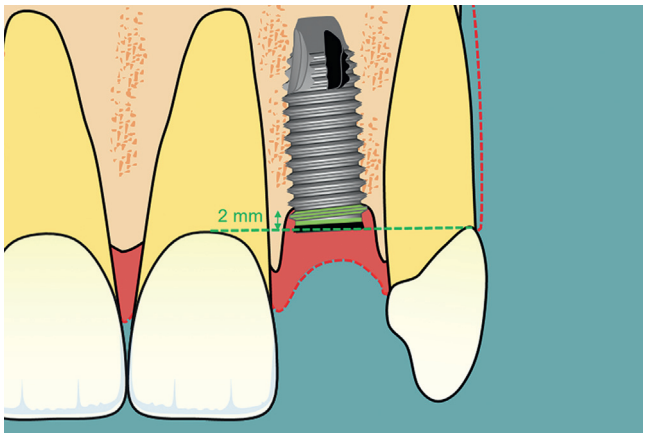

Figure 2. Morse taper implants should be installed 2 mm below bone.

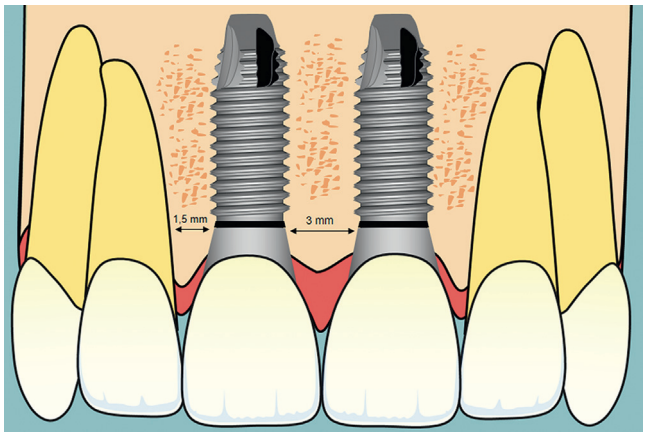

Figure 3. For 2 adjacent implants, distance between them should be 3 mm and distance from roots of adjacent teeth should be 1.5 to 2 mm.

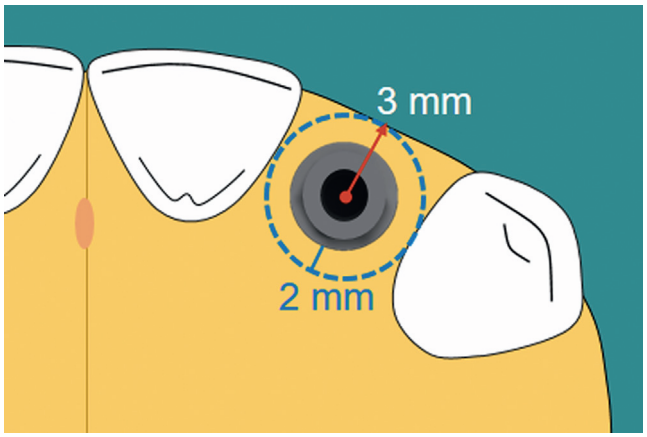

Figure 4. Distance from center of implant to labial surface of alveolar ridge should be 3 mm, and distance to adjacent tooth should be 1.5 to 2 mm.

the interdental papilla.[11-13] The lack of a papilla may result in esthetic (black triangle)[14] and phonetic (air leakage) problems.

The gingival tissue is of fundamental importance because the quantity and quality of the keratinized gingiva around the prosthetic abutments and implants[15] creates a barrier against inflammation and facilitates oral hygiene.[16] The ideal position for the implant involves the apicocoronal, mesiodistal, and labial-lingual planes.[17] The apicocoronal and mesiodistal distances are directly linked to the formation of the interdental papilla. In patients with clefts, the quality and quantity of gingiva is generally

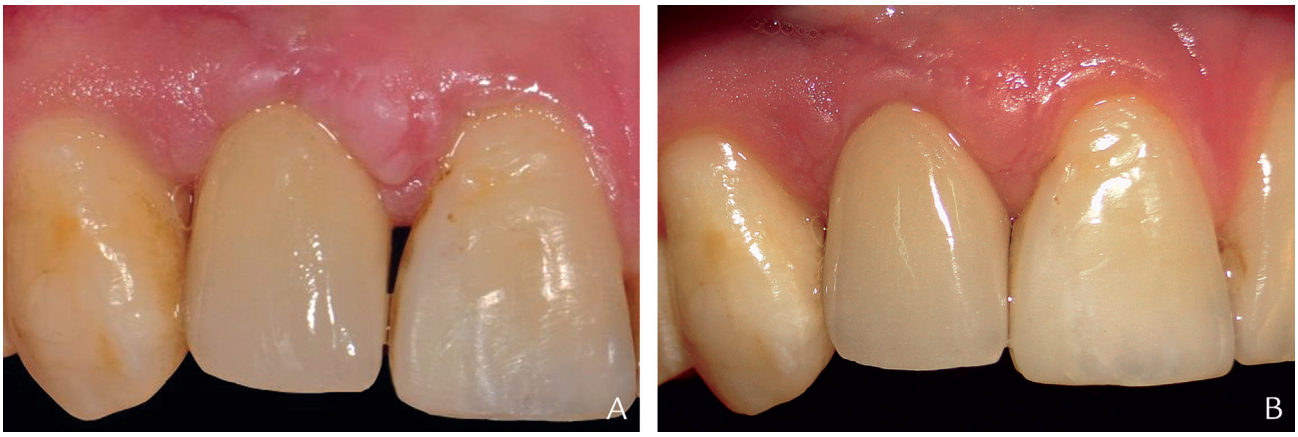

Figure 5. Implant crown replacing maxillary right lateral incisor. A, At day of delivery. B, One year after placement. Interdental papilla present at both proximal contacts.

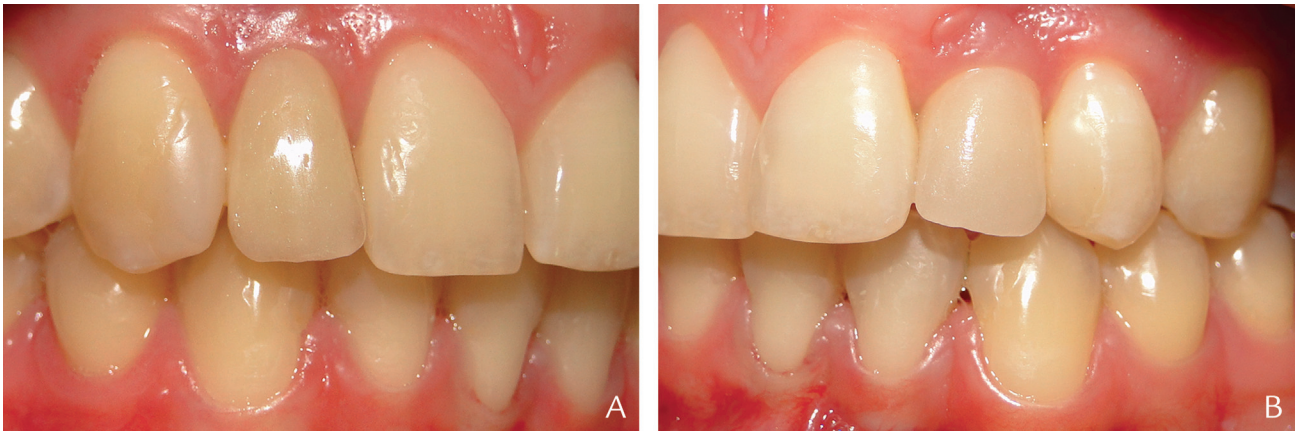

Figure 6. Complete formation of interdental papilla at proximal contacts. A, Left lateral view. B, Right lateral view.

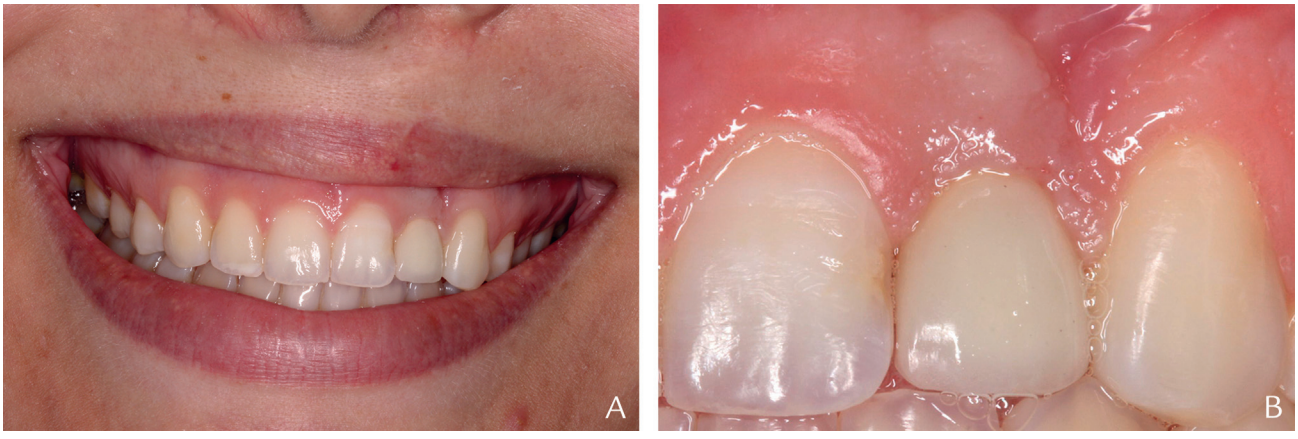

Figure 7. A, B, Satisfactory esthetic result in cleft area.

compromised,[8,16] so additional planning is needed to optimize the esthetic outcome. The distance between the proximal contact and the bone crest is correlated with the presence or absence of an interdental papilla. If this is 5 mm or less, the interdental papilla is almost always present, but if this distance is greater than 7 mm, the interdental papilla is typically deficient.[14,17]

Guidelines to determine whether the cleft area is suitable for implant placement are presented in Table 1.

CLINICAL REPORTS

The following clinical reports demonstrate optimal planning for implant placement at the cleft area,

respecting the suggested guidelines. The patients with cleft lip and palate had undergone primary corrective surgeries for the lip at 3 months and for the palate at 12 months. These corrective surgeries resulted in restrictive maxillary growth; therefore, these patients required orthodontic treatment with maxillary expansion. Additionally, bone grafting from the iliac crest was needed to stabilize the alveolar defect. This surgery was performed before the eruption of the maxillary canines, between 8 to 12 years. The alveolar bone graft also allowed implant placement, which was installed after growth had been completed as assessed with a wrist radiograph.

Clinical report 1

A 26-year-old man with right complete unilateral cleft lip and palate and missing lateral incisor underwent restoration with an implant-supported crown. An internal Morse taper connection implant (Drive Acqua; Neodent) with physical-chemical surface treatment was placed in the area of the lateral incisor. Placement was consistent with the proposed guidelines. The interdental papilla was present 1 year after the cementation of the definitive prosthesis (Fig. 5), and the esthetics in the cleft area were favorable.

Clinical report 2

A 17-year-old girl with left complete cleft lip and palate and right incomplete cleft lip and alveolus underwent restoration with an implant-supported crown (Drive Acqua; Neodent) to replace her missing left lateral incisor. The interdental papilla was complete both mesially and distally, and harmony was achieved between the pink and white esthetics (Fig. 6).

Clinical report 3

A 20-year-old woman with left complete cleft lip and palate underwent restoration with bone-level implants with internal Morse taper connection and SLActive surface treatment (SLActive; Straumann Holding AG). Satisfactory pink and white esthetics were achieved (Fig. 7).

All these patients have been followed up for 2 years with satisfactory function and esthetics. Correct planning is the key to implant-supported prosthesis success.

SUMMARY

The dental rehabilitation of a patient with craniofacial anomalies presents challenges to the oral rehabilitation team, who, because the prosthesis involves the esthetic area, must work within the limitations of this group of patients. This report describes esthetic rehabilitation with implants placed in the cleft area, which requires careful planning based on the 3-dimensional position proposed in the guidelines. All these patients followed the same protocol treatment: secondary alveolar bone grafting in adolescence and orthodontic and oral rehabilitation with implants following the guidelines. The esthetic and functional outcomes were highly satisfactory.

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