

Clinical Paper
Cleft Lip and Palate

Donor site morbidity after reconstruction of alveolar bone defects with mandibular symphyseal bone grafts in cleft patients—111 consecutive patients

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Abstract. The aim of this study was to assess the objective and subjective morbidity after reconstruction of alveolar bone defects with mandibular symphyseal bone grafts in patients with cleft lip and palate. One hundred and eleven patients born between 1995 and 1999, who had undergone chin bone harvesting for alveolar cleft reconstruction in the period from 2000 through 2011, were included. A survey of medical records was conducted. Subjective morbidity after reconstruction was assessed using a questionnaire. Medical records revealed few postoperative incidents; 5.6% reported persistent sensory disturbances in the donor area. Postoperative pain averaged 3.6 ± 2.1 (scale 0–10). The overall satisfaction with the surgical result was 8.7 ± 1.7 (scale 0–10). This study revealed that chin bone harvesting for reconstruction of alveolar defects in patients with cleft lip and palate is a safe and predictable procedure, highly appreciated by the patients, and characterized by only minor postoperative incidents. Patients must be informed of the risk of sensory disturbances in the donor area.

Key words: cleft palate surgery; alveolar osteoplasty; bone grafting.

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An osseous defect of the alveolar process is an anomaly that affects approximately three out of four patients with cleft lip or cleft lip and palate.¹ An untreated alveolar cleft may result in an oro-nasal fistula, speech pathology, dental crowding,

antero-posterior and transverse deficiency of the maxilla, fluid reflux, lack of bone support for the anterior teeth, and facial asymmetry.² Enemark et al.³ advocated that those with a symptomatic oro-nasal fistula or with a lack of bone accommo-

dating tooth eruption in relation to an alveolar defect, which could impair orthodontic treatment and prosthodontic rehabilitation in the cleft area, should opt for secondary alveolar bone grafting. This is a widely accepted treatment modality, but

the type of bone graft and donor site remains controversial. Various bone sources, including anterior iliac crest, tibia, rib, calvarium, and mandible, have been proposed as graft material in the secondary reconstruction of alveolar defects in cleft lip and palate (CLP) patients.⁴ Most frequently, a graft from the anterior iliac crest has been used, and good outcomes have been reported after secondary reconstruction of alveolar defects in patients with CLP with this graft source.^{5–8} Donor site morbidity in relation to bone harvesting from the anterior iliac crest includes seroma, fracture, sensory disturbances, disturbances of gait, and hernia through the donor site.^{9,10}

In our institution, reconstruction of alveolar defects in patients with CLP has routinely been performed with a mandibular symphyseal bone graft (MSBG) since 1988.¹¹ An anterior iliac crest graft is used only in selected cases with bilateral cleft lip and palate (BCLP) or a large unilateral cleft lip and palate (UCLP). Good outcomes have been reported after reconstruction of alveolar bone defects with MSBG in patients with CLP.^{11–14}

Few studies have reported the morbidity associated with reconstruction of alveolar bone defects with MSBG in patients with CLP. Sindet-Pedersen and Enemark have stated that an MSBG reduces the operating time, the morbidity of the surgical procedure, and the duration of hospitalization.¹¹ With the MSBG procedure, a cutaneous scar at the iliac crest is avoided. Hoppenreijts et al. revealed a low occurrence of damage to the teeth in relation to harvesting of the MSBG, and minimal postoperative morbidity.¹³ In a more recent study by Booiij et al., it was concluded that the harvesting of an MSBG for reconstruction of alveolar clefts in young patients was a well-accepted procedure characterized by low objective and subjective morbidity.¹⁵

The aim of this study was to assess the objective and subjective morbidity after reconstruction of alveolar bone defects with MSBG in patients with CLP.

Materials and methods

Patients

The inclusion criteria for this study were: a UCLP or BCLP reconstructed with an MSBG during the period 2000–2011, and a date of birth between 1995 and 1999. Exclusion criteria were: the use of an anterior iliac crest bone graft, or a surgical procedure involving bone grafting and concomitant osteotomy and repositioning of the premaxilla in patients with BCLP.

Presurgical treatment planning

A team consisting of an experienced orthodontist and an experienced maxillofacial surgeon evaluated the indication and proper timing for reconstruction of the alveolar defect, as well as the indication for presurgical extraction of deciduous and supernumerary teeth, type of bone graft, and indication for a splint postoperatively. Treatment was initiated after orthodontic expansion of the upper dental arch was completed, the permanent upper incisors had erupted, and a radiographic examination could verify that the permanent canine on the cleft side had a correct eruption pattern. Deciduous teeth, supernumerary teeth, and malformed permanent incisors in the cleft area were extracted at least 6 weeks before reconstruction of the alveolar defect to allow proper healing of the mucosa before reconstruction.

Surgical procedure

The surgical procedure was performed under general anaesthesia after intravenous administration of penicillin according to weight. The mandibular symphyseal region was exposed through an extended labial incision and raising of the mucoperiosteal flap (Fig. 1). A monocortical spongy bone block comprising the outer cortical bone and cancellous part was harvested with a safety margin of approximately 5 mm from the dental apices and the lower border of the mandible. Up until 2005, the graft was harvested with the use of a rotating burr. Since 2005, most

procedures have been performed with a piezoelectric device (Piezosurgery, Mectron, Italy). Any sharp bony edges were smoothed, and the wound was closed in two layers with Vicryl 5-0 sutures (Johnson & Johnson, UK). The bone graft was preserved in wet gauze until transplanted into the alveolar cleft defect. Access to the alveolar defect area was gained through a four-flap approach, as described by Aabyholm et al.⁶ The nasal mucosa was dissected, sutured, and inverted towards the nasal cavity. The defect area was visualized and the block of graft bone adjusted and fitted tightly in the defect area without the use of osteosynthesis. The residual bone graft was particulated using a bone mill (Roswitha Quétin Dental Products, Germany) with 3-mm perforation to obtain bone graft particles with a size of 0.5–2 mm³. Residual defects were filled with the particulated bone graft. The oral mucosa was sutured with Vicryl 5-0 (Johnson & Johnson). When the alveolar cleft included palatal mucosa, the suture line was protected by use of a custom-made surgical splint lined with a gelatine sponge dressing (Curaspon, CuraMedical BV, Netherlands) and fixated with steel wires to the first molars. Elastic tape was routinely placed on the chin to minimize postoperative swelling. Three experienced surgeons performed the surgical procedures.

Postsurgical treatment course

The elastic tape was removed the day after surgery. All patients were discharged the

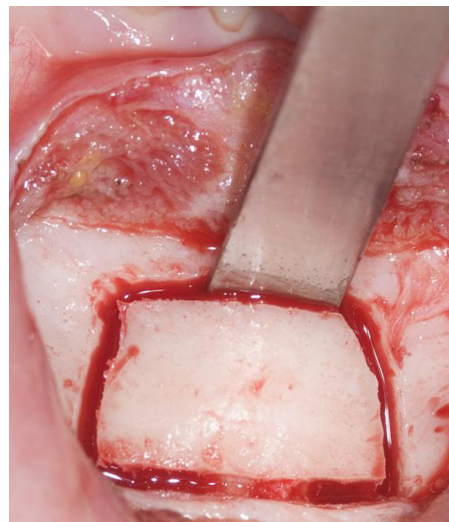


Fig. 1. The mandibular symphyseal region was exposed through an extended labial incision and raising of the mucoperiosteal flap. A monocortical spongy bone block comprising the outer cortical bone and cancellous part was harvested with a safety margin of approximately 5 mm from the dental apices and the lower border of the mandible.

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