

Is It Safe to Re-Harvest the Anterior Iliac Crest to Manage Le Fort I Interpositional Defects in Young Adults With a Repaired Cleft?

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Purpose: Re-harvesting the anterior iliac crest to obtain autogenous bone grafts is a controversial practice. The purpose of this study was to assess the feasibility and associated disability of re-harvesting the anterior iliac crest.

Material and Methods: To address the research purpose, the authors executed a retrospective case series study. The sample consisted of young adult patients with cleft (<26 yr old) with prior harvesting of the anterior iliac crest during mixed dentition for management of an alveolar cleft(s) and then re-harvesting of the same donor site for management of interpositional defects after Le Fort I advancement. Wound-healing parameters were reviewed at the donor and recipient sites. A survey questionnaire was provided after completion of treatment to document patient perception of early and any long-term donor-site disability. Descriptive statistics were computed for the variables.

Results: The sample was composed of 27 patients with a mean age at re-harvesting of 17 years (range, 14 to 25 yr). Patients underwent on average 7.4-mm horizontal advancement, 2.4-mm lengthening, and 2.6-mm transverse expansion of the maxilla. Adequate bone graft was re-harvested to accomplish objectives in all cases. There were no perioperative complications at the donor or recipient sites. Twenty-six of the 27 patients (97%) had fewer donor-site recovery difficulties at the time of re-harvesting compared with the first time graft was taken. There were no cases of lateral femoral cutaneous nerve injury and no long-term discomfort with walking, running, or other activities.

Conclusions: The study confirms the safety and efficacy of re-harvesting corticocancellous bone from the anterior iliac crest for management of interpositional defects associated with Le Fort I advancement in young adults with a repaired cleft.

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J Oral Maxillofac Surg 73:S32-S39, 2015

For adult patients with cleft presenting with midface deficiency, the extent of maxillary advancement often combined with vertical lengthening and transverse correction will result in large osteotomy site defects that benefit from grafting.¹⁻⁴ Many of these patients are believed to be at increased risk for wound-healing com-

plications and long-term skeletal relapse because they also can present with chronic sinus drainage impairment, a residual oronasal fistula, and soft tissue scarring.^{3,4} For these reasons, the use of autogenous corticocancellous bone might be recommended to manage interpositional defects during orthognathic surgery.

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Conflict of Interest Disclosures: Dr. Posnick receives royalties from Stryker. Dr. Gray has no disclosures to report.

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Received March 23 2015

Accepted April 9 2015

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0278-2391/15/00432-2

<http://dx.doi.org/10.1016/j.joms.2015.04.016>

The anterior iliac crest is a common source for autogenous cancellous and corticocancellous bone graft in patients with cleft. Most young adult patients with cleft will have already undergone anterior iliac crest cancellous bone harvesting during mixed dentition for management of the alveolar cleft(s).⁵⁻⁸ When autogenous anterior iliac crest is selected to obtain needed graft at the time of cleft orthognathic surgery, the surgeon must decide to re-harvest the same donor site or use the opposite hip to manage interpositional maxillary defects.^{3-7,9,10} The uncertainty about risk of complications and the available volume of bone can dissuade the surgeon from re-harvesting the same site.^{9,11}

The purpose of this study was to review 1 surgeon's experience with re-harvesting at the same site of the anterior iliac crest to manage interpositional defects at the time of Le Fort I advancement in young adults with a repaired cleft. The authors hypothesized that in these circumstances there would be adequate quantity and quality of iliac bone to serve its purpose at the recipient site with minimal donor-site morbidity. The specific aims of the study were to 1) assess donor- and recipient-site morbidity, 2) assess the patients' perception of recovery after anterior iliac bone harvest initially carried out during mixed dentition, 3) assess the patients' perception of recovery after re-harvesting at the same site of the anterior iliac crest as a young adult, and 4) assess for any long-term donor-site disability.

Material and Methods

STUDY DESIGN AND PATIENTS

This is a retrospective case series with a sample derived from patients with cleft jaw deformity presenting to the senior author (J.C.P.) and then undergoing orthognathic surgery at 14 to 25 years of age. To be included, patients had to be younger than 26 years at operation, have a previously repaired cleft lip and palate, and have undergone anterior iliac harvesting to graft alveolar cleft defects during mixed dentition. Although all patients had undergone anterior bone grafting during mixed dentition, the procedure was not successful in all cases. If the Le Fort I repositioning did not require sufficient horizontal, vertical, and transverse changes to require interpositional grafting, then patients were not included in the study group. If their malformation was part of a known syndrome, they were excluded from the study. For all patients, the surgery was carried out at a single hospital (MedStar-Georgetown University Hospital, Washington, DC). The Georgetown University institutional review board received and approved the study protocol.

STUDY VARIABLES

The study variables were grouped into 5 categories: demographic, medical, operative, donor- and recipient-site wound healing, and long-term morbidity.

Demographic Variables

The demographic variables collected included age at the time of operation, gender, and additional procedures carried out.

Medical Variables

Medical variables included known drug allergies and patient management after surgery. For patients not allergic to penicillin, an intravenous prophylactic antibiotic of cefazolin sodium (1 g) was administered just before the surgical incision and then repeated every 6 hours for 4 additional doses. This was followed by an additional 4-day course of cephalexin elixir (500 mg every 6 hours). Patients allergic to cephalosporin were given clindamycin (300 mg every 6 hours) as an alternative antibiotic. Patients were followed on an outpatient basis by the primary surgeon (J.C.P.) at weekly intervals through the initial 5 weeks after surgery. Then, ongoing care was transferred back to each patient's orthodontist. Further long-term assessment by the surgeon (J.C.P.) was after completion of orthodontic treatment and at a minimum of 12 months after surgery.

Operative Variables

The graft was re-harvested from the same anterior iliac crest donor site using the same incision where bone had previously been taken during mixed dentition for management of an alveolar cleft(s) (Fig 1). The iliac crest was mature in all patients (ie, no cartilage cap remained) at the time of orthognathic surgery. The previous incision was often in a slightly different location than ideal, but could be used to accomplish objectives in all cases. The incision was carried through the skin, the subcutaneous tissue, and the superficial (Camper) and deep (Scarpa) fascia directly over the iliac crest where the graft was to be harvested. The cutting of, or major contusion of, the gluteus medius muscle and tensor fascia latae laterally or the abdominal oblique and transverse abdominis muscles medially was minimized. The periosteum was scored directly over the midline of the crest, beginning just posterior of the anterior superior iliac spine. The incision continued posteriorly for a distance that depended on the extent of exposure required for the planned harvest. In all cases, the crest was found to be intact, but typically with mild irregularities from healing after the initial graft harvesting. Subperiosteal dissection continued down the medial crest and then the medial plate. A block of corticocancellous bone was harvested using oscillating and

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