One-stage cleft repair outcome at age 6- to 18-years – a comparison to the Eurocleft study data

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Abstract

The optimisation of the relation between quality of outcome and burden of care is difficult in the treatment of cleft lip and palate. We analysed long-term outcome after one-stage repair of clefts to assess the benefits and limitations of this form of treatment. Thirty-three patients aged 6–18 years who had had lip repair, two-flap palatoplasty, and corticocancellous alveolar bone grafts at 6 months of age were divided into three age groups (6–11, 12–14, and 15–18 years) and compared with mean outcome data from the Eurocleft centres and with cephalometric standards of healthy people. Fifteen of the 33 patients were assessed for nasalance. Maxillary protrusion (SNA) and intermaxillary relation (ANB) in the one-stage groups differed significantly from those of healthy people, but not from corresponding means in the Eurocleft study. In 61% the Bergland score for alveolar ossification was grade I or II, and in 15% it was grade III; 24% had secondary alveolar bone grafting. No palatal fistulas occurred and nasalance did not differ significantly from that of healthy controls. As each patient generally had a primary operation and one secondary procedure, they benefited from half the number of surgical steps of multistage procedures. However, one-stage procedures led to significant disturbance in growth, but the degree of this was similar to mean values of multistage procedures in the Eurocleft study. Primary alveolar bone grafting led to inconsistent alveolar ossification and was suspected to interfere with anterior maxillary growth so it has been abandoned.

Introduction

There are several ways to close a unilateral cleft in one procedure. These are double[1] or single layer[2,3] hard palate closure; hard palate repair with two-flap palatoplasty,[1] V-Y pushback,[4] or lateral releasing incisions;[2] a cranial pedicled,[1,3] or caudally pedicled[2,5] vomer flap; and alveoplasty,[4] or primary alveolar bone graft.[1] It must also be decided whether the one-stage repair is done in all patients[1,5] or only in those with narrow clefts.[3] Each of these variations might have a divergent influence on outcome for growth, occlusion, alveolar ossification, nasalance, and number of subsidiary procedures. We therefore assessed all these variables jointly.

Alveolar bone grafts done when the lip is repaired and early two-layer closure of the hard palate have been reported

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Table 1
Unilateral complete cleft lip and palate study groups after one-stage repair.

Variable	Total (n = 33)	Group 1 (n = 15)	Group 2 (n = 7)	Group 3 (n = 11)
Male/female	22/11	11/4	3/4	8/3
Cleft right/left	14/19	6/9	4/3	4/7
Mean (SD) age at study (years)	13 (4)	9 (2)	13 (1)	16 (1)
Mean (SD) age at repair (months)	7 (2)	6 (1)	6 (1)	7 (2)
Soft tissue lip band	7	3	1	3
Mean (SD) anterior width of cleft (mm)[a]	17 (4)	18 (5)	15 (4)	17 (3)
Mean (SD) posterior width of cleft (mm)[b]	13 (4)	14 (4)	14 (4)	10 (4)

Data are mean (SD) and rounded up to whole numbers.

  [a] Distance at cleft nostril at time of one-stage repair.
  [b] Distance at posterior nasal spine at time of one-stage repair.

to have unfavourable effects on growth.[2] Therefore, it is feared that growth could have been retarded in our patients.

In addition to growth and speech, the treatment protocol of clefts should consider burden of care, whereof the number of operations is one aspect.[6,7] We assessed the long-term benefits and limitations of one-stage repair combined with primary alveolar bone grafting in all patients between 1991 and 2002 who had had unilateral complete cleft lip and palate (UCLP) repair at 6 months of age.[1]

Patients and methods

Patients

From 1991 until 2002 when the surgeon retired, 53 non-syndromic patients had repair of complete UCLP. Of these, 33 participated in the study (age range 6–18 years) (Table 1), 8 had moved away, and 12 did not take part because of the extra effort required.

Photographs, cephalograms, orthopantograms, and dental casts were taken, and 15 patients were also assessed for nasalance. All patients gave written informed consent, and the local ethics committee gave approval for the study (EK 256/06).

Operation

All patients had had a palatal obturator after birth to keep the alveolar segments in place and to facilitate feeding. They all had a one-stage repair of the cleft that comprised cranial pedicled vomerflap, two-flap palatoplasty and a corticocancellous alveolar bone graft from the rib. The same surgeon did all the operations. A vestibular mucoperiosteal flap from the lesser maxillary segment was advanced to cover the alveolar bone graft.[1]

Method

Patients were classified into three age groups (6–11, 12–14, and 15–18 years) and the cephalometric variables for analysis of hard and soft tissue were chosen to allow comparability

with the Eurocleft study.[8] The cephalograms were analysed digitally using OnyxCeph™ software (Image Instruments, Chemnitz, Germany), and two assessors jointly identified the landmarks. Ten randomly selected radiographs were then analysed again by the same team after at least one month. Mean (SD) differences between both skeletal ratings were calculated.

The mean cephalometric values from all the centres that completed the Eurocleft study (centres A, B, D, E, and F) were used as comparative values for a variety of multistage procedures (centre C did not complete the study).[8] The comparative values of healthy controls were based on cephalometric standards from the University of Michigan.[9] Games-Howell post hoc comparisons, Student's t-tests or Welch tests were used as approrpriate.

The EUROCRAN Index was used to quantify an occlusal rating on dental casts.[10] The presence of permanent lateral incisors on the dental casts and orthopantograms was noted. Ossification of alveolar bone was evaluated using the Bergland score.[11] Patients were recorded reading four sentences with no nasal consonants using the Nasometer II 6400 (Kay Elemetrics Corporation, Lincoln Park, NJ, USA),[12] and the test was repeated in a matched group of healthy controls. The number and type of subsidiary operations were retrieved from patients' notes and were confirmed by their parents. Data from multistage procedures from the Eurocleft study were used for comparison.[13]

Results

The 33 patients were divided into three age groups of 15, 7, and 11 patients each (Table 1).

Cephalometric skeletal values are listed in Table 2. The maxillary protrusion (SNA) and intermaxillary relation (ANB) in the intermediate and oldest one-stage groups differed significantly from healthy cephalometric standards but not from the corresponding Eurocleft means. The angle of the maxillary plane and the midface-to-total-height proportion differed significantly between the one-stage group and the Eurocleft mean in the youngest age group, but not in the other groups. Mean (SD) differences between two ratings of 10 randomly selected radiographs were: S-N-A, $-0.4°$ (1.4);