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Timing and Frequency of Lip, Palate and Bone Graft Surgeries in Saudi Cleft Patients

Khalid M. Al-Balkhi
Associate Professor, Orthodontics,
Department of Pediatric Dentistry and Orthodontics,
College of Dentistry, King Saud University,
P. O. Box 60169, Riyadh 11545, Saudi Arabia

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Abstract. The study sample consisted of 76 cleft lip and palate (CLP) patients. Age, gender, region of residency, information related to the different types of CLP surgical repairs were investigated. The results showed that patients' age range was 5-37, with an average of 16.2 ± 5.3 years. Males 61.8% were more than female 38.2% (P=0.007). The majority 84.2% of patients were from the central region (P=0.000). The majority of lip repairs 74.4%, and palatal repairs 61.5% were performed within the professional recommended age of 3-6 months and 1-2 years respectively (P=0.000). The timing of alveolar bone graft showed a wide age variability. The majority 75.0% of lip repairs was done once (P-0.000), 18.4% were done twice, and 1.3% were done three times. The majority 67.1% of palatal repairs were done at least twice. 43.3% were done once, 23.7% were done twice, 7.9% were done three times and 2.6% were done four times. The majority (81.5%) of bone graft surgeries were done once (P=0.000). Satisfaction of the surgical results with no need for further revisions were 65.8% for lip, 70.9% for palatal and 86.8% for bone graft surgeries.

Introduction

Eventhough publications related to cleft lip and palate (CLP) patients in Saudi Arabia appears to be increasing, however they are still limited in both their number and their contents or topics. Few articles reported on the incidence and types of clefts (Kumar *et al.*, 1991; Borkar *et al.*, 1993; Al-Johar *et al.*, 2008; Al-Balkhi, 2008). Others reported on different topics such as; the prevalence of dental anomalies in CLP patients (Tahir, 1998), CLP patients with ectopic lentis as a case report (Sha'ban and Asfour, 2003), craniofacial characteristics in parents of CLP patients (Fatani *et al.*, 1999), growth status of patients with CLP (Barakati and Alkofide, 2002), the morphology and dimension of Sella Turcica (Alkofide, 2008; Alkofide, 2008), mandibular dimension and facial height in CLP subjects (Alkofide, 2008), and caries/oral hygiene status in CLP children (Chohan and Wyne, 2008).

The aim of this study was to assess the time and frequency of lip, palate and bone graft surgeries performed on CLP patients attending the orthodontic/CLP clinic, at the College of Dentistry at King Saud University, Riyadh, Saudi Arabia.

Method and Materials

The present study was a retrospective, descriptive study, conducted in the orthodontic/CLP clinic, at the College of Dentistry, King Saud University. Permission to conduct the study was obtained from the College of Dentistry Research Center (CDRC).

The data of all CLP patients referred to the orthodontic/CLP clinic, at the College of Dentistry from the year 1990 till the end of 2006, were collected, reviewed and analyzed between November and December 2006.

The selected sample of the study consisted of 76 CLP patients according to the following inclusive and exclusive criteria.

Inclusive criteria

- Syndromic and non-syndromic CLP, male and female patients attended the clinic.
- Patients who were at least ready for the first phase of orthodontic treatment (expansion of the buccal or anterior teeth).

Exclusive criteria

- Patients with facial clefting other than cleft lip and/or palate.
- Newly born patients who had not yet received lip or palatal surgeries.
- Inability to obtain proper information regarding the timing and/or the number of all related surgeries from the patients' chart or parent(s).

Special form was designed to collect and obtain the required informations for each patient. The form consisted of demographic information, age at the time of the study, gender, residency, number of surgeries done and, the need for further surgeries in regard to the lip, palate and alveolar bone graft. The age at which the above different surgeries were performed and the number of their revisions were obtained from the patients' chart and confirmed by the patient and/or parent(s) attending the clinic. The need for further related surgeries or a final revision was considered based on the following:

1. If the lip symmetry and/or its normal anatomical shape was not satisfactory at the time of the study.
2. If a palatal/oro-nasal fistula still existed at the time of the study.
3. If the bone graft surgery was not successful at the time of the study, and/or required further bone augmentation. The success of bone grafting was considered by the presence of the image of good bony bridge evaluated by the occlusal radiographs taken at least 3-4 months post grafting and/or the eruption of the permanent teeth through the bone graft.

The collected date was analyzed using the Statistical Package for Social Sciences (SPSS) version 12. Descriptive output was tabulated and analytical proportional Z-test ($P < 0.05$) was used.

Results

The range of the patients' age at the time of the study was 5-37 with an average 16.2 (standard deviation 5.93) years. Males 47 (61.8%) were more than females 29 (38.2%) ($P = 0.007$). Sixty-four (84.2%) were from the central region of Saudi Arabia, followed by Southern 6 (7.9%), Eastern 4 (5.3%) and Northern region 2 (2.6%) ($P = 0.000$) (Table 1).

Table 1. Gender and region distribution

Age	Range	5-37 yrs
	Mean	16.2 ± 5.93 yrs
Gender	Male	47 (61.8%)*
	Female	29 (38.2%)
Region	Central	64 (84.2%)$^{+}$
	Eastern	4 (5.3%)
	Northern	2 (2.6%)
	Southern	6 (7.9%)

*P = 0.007
$^{+}$P = 0.000

The majority of lip repairs 57 (74.4%) ($P = 0.000$) were performed between the age of 3-6 months. Thirty-four (44.4%) were performed at the age of 6 months, followed by 23 (30.3%) performed at the age of 3-4 months. The majority of palatal repairs or surgeries 46 (61.5%) ($P = 0.000$) were performed between the age of 1-2 years. Twenty (26.3%) were performed at the age of 1.5 years, followed by 17 (22.4%) at 1 year, and 9 (11.8%) at 2 years. The timing of alveolar bone graft surgery was spread over a wide range of age (Table 2).

In regard to the number or the frequency of surgical revisions, the majority of lip repair were done once 57 (75.0%), 14 (18.4%) were done twice and one case was done three times, with 34.2% still required final lip revision. The repetition or revision of palatal surgeries were more frequent. They were done once 33 (43.4%), twice 18 (23.7%), three times 6 (7.9%) and four times 2 (2.6%), with still 21.2% requiring further palatal fistula closure. Regarding alveolar bone graft surgery, 62 (81.5%) were done once, and 4 (5.3%) were repeated twice, however, 13.2% need future bone graft surgery (Table 3).

Discussion

The two patients' age evaluated in this present study were; the patient's age at the time of the conduct of the study, rather than the patient's age at first seen in the clinic. This was more practical since the minimal patient's age in this study was more than and beyond the age at which primary lip repair and secondary palatal repair were usually recommended by surgeons. Thus, assuring that all participants in this study had received both lip and palatal surgical repairs, however in few patients, bone graft surgery was not yet done. The second related age, was the different patient's age at which the first lip, palate and alveolar bone grafts repairs were performed.

Table. 2. Age of 1st surgical repair for the different surgeries

	Lip Repair		Palatal Repair		Bone Graft	
Age	**N**	**%**	**N**	**%**	**N**	**%**
>1.5 month	3	(3.9)				
3-4 months	23	(30.3)	2	(2.6)		
6 months	34	(44.4)	4	(5.2)		
1 year	4	(5.3)	17	(22.4)		
1.5 years	-		20	(26.3)		
2.0 years	1	(1.3)	9	(11.8)		
2.5 years			1	(1.3)		
3 years	1	(1.3)	2	(2.6)		
7.0 years			1	(1.3)	1	(1.3)
8.0 years					1	(1.3)
9.0. years					3	(3.9)
10.0 years					4	(5.3)
11.0 years					3	(3.9)
12.0 years	1	(1.3)			6	(7.9)
13.0 years					2	(2.6)
14.0 years					6	(7.9)
15.0 years			2	(2.6)	4	(5.3)
16.0 years					1	(1.3)
17.0 years					5	(6.6)
18.0 years					2	(2.6)
19.0 years	1	(1.3)			2	(2.6)
20.0 years					1	(1.3)
24.0 years					1	(1.3)
28.0 years	1	(1.3)				
32 years	1	(1.3)				

57 (74.7%)* — 46 (61.5%)*

*P = 0.000

Table 3. Number of performed surgeries and the need for revisions

	Number of Surgeries					Need for Surgery/Revision	
Type of Surgery	**Not Required or Not Yet**	**Once**	**Twice**	**Three Times**	**Four Times**	**Yes**	**No**
	N %	**N %**	**N %**	**N %**	**N %**	**N %**	**N %**
Lip Repair	4 (5.3%)	57 (75.0%)*	14 (18.4%)	1 (1.3%)	-	26 (34.2%)	50 (65.8%)
Palatal Repair	17 (22.4%)	33 (43.4%)	18 (23.7%)	6 (7.9%)	2 (2.6%)	16 (21.1%)	60 (70.9%)
Bone Graft	10 (13.2%)	62 (81.5%)*	4 (5.3%)	-	-	10 (13.2%)	66 (86.8%)

*P = 0.000

The prevalence of male patients 61.8% was more than females 38.2%, this was in agreement with recent publications related to Saudi CLP patients (Al-Johar *et al.*, 2008; Al-Balkhi, 2008; Chohan and Wyne, 2008). The residency of the CLP patients in the present study indicated that patients from the Riyadh (Central) region 84.2% were the highest, followed by patients from Assir (Southern) region 7.9%, then Eastern 5.3% and Northern 2.6% regions. This order was similar to that reported by Al-Johar *et al.* (2008) who conducted his study in the Central region of Saudi Arabia, however at a different hospital.

In regard to primary lip repair, the majority of the cases 74.7% (30.3% + 44.4%) were between the age of 3-6 months. This was within the professionally acceptable age range for such surgery (Cleft Lip and Palate 2nd Edition, 2006). Fewer cases were done just before or after that age range, 3.9% and 5.3% respectively. Single cases were done at a very late age

which could be to the patient's late presentation to the clinic. This may be considered somewhat common in developing countries, but not in developed countries (Isiekwe and Soemimo, 1984; Lamabadusuriya *et al.*, 1988). However, regarding the number of lip repairs or revisions, the result may indicate that the performed surgeries for the primary lip repairs were satisfactory since the majority 75.0% were done once and 65.8% did not need further lip revisions.

In regard to the palatal surgery, the majority of the surgeries 60.5% (26.3% + 22.4% + 11.8%) which were done between the age of 1-2 years, indicated that the majority of the palatal surgical repairs were done in accordance with the professionally acceptable 1-2 years age range (Cleft Lip and Palate 2nd Edition, 2006). However, the scattered earlier and later performed palatal as well as the previously discussed lips surgeries could also be due to the different surgeons, hospitals and/or regions performing such surgeries. Regarding the number of palatal repair or closure, the result may indicate that the palatal/fistula closure of the palatal cleft which is usually a challenge to the surgeons, was satisfactory accomplished after at least two palatal surgeries, and the majority 78.9% did not need further palatal/fistula closure.

In regard to the bone graft surgeries, the findings indicated that such surgeries were conducted throughout a very wide age range 7-24 years. This was in contrary to what is commonly recommended 7-9 years age range (Cleft Lip and Palate 2nd Edition, 2006). This could be due to the late presentation of patients to the orthodontic clinic, especially with the known knowledge that bone graft surgery requires a prerequisite orthodontic treatment phase in the form of expansion of the maxillary buccal segments.

Similar to the surgical lip repairs, the majority of bone graft surgeries were satisfactory after performing the first surgical bone grafting. This was in contrary to the palatal surgical repairs, which requires at least two surgeries for it to be satisfactory. The very few cases 5.3% that received a second bone graft surgery were in the form of alveolar bone augmentation or enhancement of the alveolar bone level. The 13.2% needed bone graft surgery however waiting to reach the proper age. Therefore, despite the very wide age range for the performed bone graft surgeries, such surgeries appeared to be satisfactory.

Comparing the findings of the present study to (Semb *et al.*, 2005), who reported on surgical treatment protocol of five participating CLP Centers, showed that; their age range was 9-17 years. Their lip repairs were conducted between the age of 3-5 months, with lip revision ranging from 4-69%. Palatal repairs were conducted between the age of 9-24 months, with palatal revision ranging from 4-19%. Bone grafting were conducted between the age of 8-11 years with no information about their revisions. Thus, the treatment outcome for the investigated provided surgeries of the present study appeared to be acceptable and comparable to those reported by other international centers.

Conclusions

1. The majority of lip repairs were conducted between the professionally recommended 3-6 month of age.
2. The majority of palatal repair were conducted between the professionally recommended 1-2 years of age.
3. The timing of bone graft surgeries expressed a wide age variability.
4. The majority of lip and palate surgeries were satisfactory after conducting between 1-2 surgeries.

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توقيت وتعداد عمليات جراحات الشفة وسقف قبة الحنك وزراعة العظم في المرضى السعوديين

خالد محمد البلخي

أستاذ مشارك تقويم الأسنان، قسم طب أسنان الأطفال والتقويم،
كلية طب الأسنان، جامعة الملك سعود،
ص ب ٦٠١٦٩ ، الرياض ١١٥٤٥ ، المملكة العربية السعودية

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ملخص البحث. شملت الدراسة ٧٦ من مرضى شق الشفة وقبة الحنك. تم تحديد العمر والجنس ومنطقة السكن وأيضاً دراسة جوانب متعلقة بالعمليات التصحيحية المختلفة لهذه الحالات. بينت النتائج بأن مدى عمر المرضى هو ٥-٣٧ سنة بمتوسط ١٦,٢ ± ٥,٣ سنة. نسبة الذكور ٦١,٨٪ وهم أكثر من الإناث ٣٨,٢٪. غالبية المرضى ٨٤,٢٪ من المنطقة الوسطى. تمت غالبية عمليات تصحيح شق الشفة ٧٤,٤٪، وتصحيح شق قبة الحنك ٦١,٥٪ مابين ٣-٦ أشهر و١-٢ سنة على التوالي، وهي الفترات العمرية المقترحة مهنياً. بينت الدراسة وجود تباين كبير في توقيت عمليات زراعة العظم .غالبية عمليات تصحيح الشفة ٧٥٪ تمت من خلال عملية واحدة، ١٨,٤٪ تمت مرتين، و١,٣٪ تمت ثلاث مرات. غالبية عمليات تصحيح شق قبة الحنك ٦٧,١٪ تمت على الأقل مرتين، حيث إن ٤٣,٣٪ تمت مرة واحدة و٢٣,٧٪ تمت مرتين و٧,٩٪ تمت ثلاث مرات و٢,٦٪ تمت أربع مرات. غالبية عمليات زراعة العظم ٨١,٥٪ تمت مرة واحدة .قبول نتائج العمليات الجراحية بدون الحاجة إلى تعديلات إضافية بلغت ٦٥,٨٪ لعمليات تصحيح الشفة و٧٠,٩٪ لعمليات شق قبة الحنك و٨٦,٨٪ لزراعة العظم.