

Dental Caries in Saudi Cleft Lip and Palate Patients Attending a Teaching Dental Institution

Abdullah M. Aldrees

Assistant Professor, Chairman, Department of Pediatric Dentistry and Orthodontics,
College of Dentistry, King Saud University,
P. O. Box 60169, Riyadh 11545, Saudi Arabia
E-mail: amaldrees@ksu.edu.sa

(Received 28/10/2009; accepted for publication 22/12/2009)

Keywords: Cleft lip, Cleft palate, Dental caries, Oral hygiene, Saudi.

Abstract. The aim of this study was to investigate the dental caries experience in a group of patients with cleft lip/palate (CLP) in Riyadh, Saudi Arabia. A retrospective study was designed to review the dental files of all CLP patients referred to the College of Dentistry, King Saud University (KSU) between 1999 and 2006. Data including: demographic information, type of dentition, attendance to the CLP clinic, oral hygiene, treatment setting used, and caries status were recorded for each patient. A total of 165 dental files of cleft affected patients (108 male, 57 female) were included in the study. Only 21.2% of the patients were first seen before the age of 6 years. The majority of the patients (61.8%) had poor oral hygiene, and about 50% of the patients did not regularly attend to the dental clinic. Primary teeth were more carious (55.4%) than the permanent teeth (41.2%). The results of this study show that: Patients affected with CLP treated at KSU had a high level of dental caries experience, and two-thirds of them had poor oral hygiene.

Introduction

Dental treatments of cleft lip and/or palate (CLP) patients need team work including different dental as well as medical specialties. Dental and medical professionals need to direct their attention to the preventive part of the treatment for the benefit of the patients. Cleft lip and palate patients may face problems such as anatomical deformities, dental malocclusion, hearing impairment, and speech disorder (Chanchareonsook *et al.*, 2007). Such problems in CLP patients have been reported to be predisposing factors in the presence of poor oral hygiene in these individuals (Akos and Agnes, 1985; Paul and Brandt, 1998). In addition, it has been reported that CLP patients are at high risk for developing dental caries (Kirchberg *et al.*, 2004; Lin and Tsai, 1999; Stec-Slonicz *et al.*, 2007). Paul and Brandt have examined 114 children with CLP in the United Kingdom and found that these children have poor oral hygiene and 20% of them exhibited active decay (Paul and Brandt, 1998). Bian *et al.* have reported that 75% of Chinese children with CLP had caries experience and 26% of

them had rampant caries (Bian *et al.*, 2001). Similar findings of high caries prevalence and poor oral hygiene were reported in Irish, Vietnamese, German and Polish children with CLP (Besseling and Dubois, 2004; Hewson *et al.*, 2001; Kirchberg *et al.*, 2004; Stec-Slonicz *et al.*, 2007).

In Saudi Arabia, limited studies have been reported regarding the CLP patients. Studies in CLP individuals in Saudi Arabia have shown that the incidence of 0.3 and 2.19 cleft cases per 1000 live births (Borkar *et al.*, 1993; Kumar *et al.*, 1991). Aljohar *et al.* have recently studied all the CLP patients registered in the Cleft Lip/Palate and Craniofacial Anomalies Registry at King Faisal Specialist Hospital and Research Center, Riyadh from June 1999 to December 2005, and 807 cases of CLP were reported. Boys predominated in cleft lip and palate and cleft lip; whereas, girls predominated in isolated cleft palate (Aljohar *et al.*, 2008).

A recent study has investigated the oral hygiene and caries in 84 cleft children in the eastern part of Saudi Arabia (Chohan and Wyne, 2008). Results have shown that the mean dmft for these patients was

10.54 (SD 4.59), and the majority of them (54.7%) had poor oral hygiene. There is a cleft lip and palate team in the College of Dentistry, King Saud University, Riyadh, and studies in patients attending this clinic have been reported previously (Barakati and Alkofide, 2002; Al-Balkhi, 2008; Alkofide, 2008). No studies have investigated the caries experience of patients attending this team's clinic. Therefore, the purpose of this study was to assess the oral hygiene status and the presence of dental caries in patients with CLP attending the CLP clinic at the College of Dentistry, King Saud University.

Materials and Methods

This study was a descriptive, retrospective study done by reviewing the files of all CLP patients referred to CLP clinic in the College of Dentistry, King Saud University between 1999 and 2006. Permission to conduct the study was obtained from the College of Dentistry Research Center ethical committee. A special form was designed exclusively for collecting the required information of every subject. Saudi patients with cleft lip, cleft palate or both without any other systemic complications or syndromes were included. The form consisted of: demographic information (age, gender, nationality, and region), dental history, type of cleft and dentition, attendance to the clinic, oral hygiene status, treatment setting used, and caries status of the teeth. Dental caries was assessed by oral and radiographic examination based on the review of the dental charting performed during the first visit. Oral hygiene status was evaluated by the examining dentist during the first visit, and it was recorded in the patient's file as: excellent, acceptable (fair), or poor. Attendance to the clinic was described as regular when no more than 3 appointments were broken. Collected data were analyzed using Statistical Package Software System, version 16 (SPSS Inc., Chicago, IL, USA). Descriptive output including the frequencies of the data was tabulated, and the occurrence of dental caries was calculated by dividing the number of teeth with caries by the number of all teeth examined and expressed as percentage. Chi-square and proportional z-tests were applied to compare frequencies of categorical variables. The level of statistical significance for all tests was set by $P < 0.05$.

Results

A total of 165 subjects constitute the study population. Among the 165 subjects, 35 (21.2%) were

less than 7 years, 72 (43.6%) were between 7 and 12 years, and 58 (35.2%) were more than 12 years (Table 1). Study male (108) subjects were significantly more than females (57) (Proportional z-test, $P = 0.00$).

Table 1. Distribution of study subjects according to age and gender (n=165)

	Factor	Number	%
Gender	Male	108	65.5
	Female	57	34.5
Age Group (years)	0-6	35	21.2
	7-12	72	43.6
	>12	58	35.2

Table 2 shows the dental treatment method, oral hygiene status, and subjects' attendance to the clinic. The majority of the patients (n=78, 47.3%) did not have any treatment done in the College. Normal dental setting was used for the treatment of 46.1% (n=76) of subjects while sedation and general anesthesia were used to treat 6.7% (n=11) of the subjects. Some patients were treated in more than one setting. The majority of subjects were marked to have poor oral hygiene (n=102, 61.8%), and approximately half of the subjects attend regularly to the dental clinic (50.3%). Chi-square test to evaluate the oral hygiene status distribution in both genders revealed insignificant difference ($P = 0.82$), which means that the distribution of the male and female patients into the three oral hygiene groups is similar. Most of the subjects (n=72, 43.6%) have mixed dentition (Table 3).

The caries status of the primary and permanent dentition is shown in Fig. 1. The total number of the examined primary and permanent teeth was 466 and 403 respectively. Chi-square test results reveal a significant difference between primary and permanent teeth in the distribution of caries status groups ($P = 0.00$). Primary teeth were more carious (n=258, 55.4%) than the permanent teeth (n=166, 41.2%). However, the filled teeth were higher in the permanent teeth compared to the primary teeth (n=146, 36.2% and n=65, 13.9% respectively). Similar percentage of sound teeth was found in both dentition (7.5% of the primary teeth and 8.4% in the permanent teeth). Furthermore, recurrent caries occurred after the placement of a filling in both primary and permanent teeth (n=14, 3% and n=10, 4.9% respectively). Primary teeth (n=94, 20.2%) were extracted more due to pathological reason compared to permanent teeth (n=47, 11.7%).

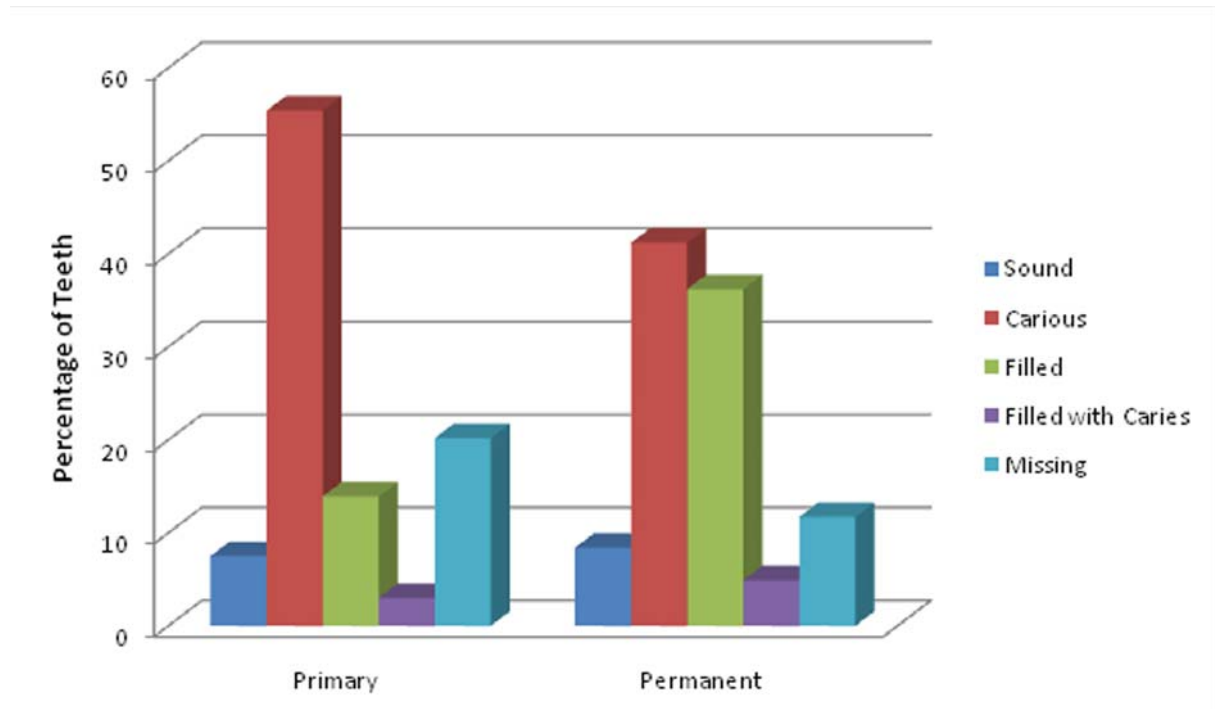


Fig. 1. The distribution of the primary and permanent teeth to different caries status categories.

Table 2. Distribution of subjects according to dental treatment method, oral hygiene, and attendance to clinic

Factor		Male	Female	Total	% (N=165)
Treatment Method	No treatment attempted	49 45.4%	29 50.9%	78	47.3
	Normal Setting	51 47.2%	25 43.8%	76	46.1
	Sedation or General Anesthesia	8 7.4%	3 5.3%	11	6.7
Oral Hygiene	Excellent	6 5.6%	2 3.5%	8	4.8
	Acceptable	35 32.4%	20 35.1%	55	33.3
	Poor	67 62%	35 61.4%	102	61.8
Attendance to Clinic	Regular	55 51%	28 49.1%	83	50.3
	Irregular	53 49%	29 50.9%	82	49.7

Table 3. Type of dentition in the study subjects

Type of Dentition	Male	Female	N	%
Primary	14 13%	15 26.3%	29	17.6
Mixed	50 46.3%	22 38.6%	72	43.6
Permanent	44 40.7%	20 35.1%	64	38.8
Total	108	57	165	100

Discussion

This study was conducted to assess the caries status of the teeth in CLP Saudi patients treated in the CLP team (in the orthodontic clinic) at the College of Dentistry, King Saud University. This study was a review of the dental files of these patients, and it included patients with a wide age range, examined by different clinicians. Bias due to the variability in caries charting and oral hygiene assessment criteria used by the examiners is possibly incorporated in this study. Examination of these patients by calibrated examiners should be the target of future studies with a matched control group to overcome these limitations.

The age reported is the age when the patients were first seen in the CLP clinic, and that represents the first examination for all of them by the CLP team, and the first dental visit for many of them. Nearly 35% of the patients attended for the first time when they were above the age of 12 years. It has been reported that cleft patients should begin seeing pediatric dentists on a regular basis by about 2 years of age for proper evaluation and administration of preventive dental procedures (Reisberg, 2000).

Results of this study have shown that approximately half of the sample did not attend regularly for their appointments. This result is not shown in Chapple and Nunn study (Chapple and Nunn, 2001). Results also showed a high percentage of subjects with no treatment attempted. This might be due to lack of dental education and/or transportation as the College's clinics receive referrals from different parts of the country. Some patients prefer to have the dental treatment performed at their local hospitals, while the orthodontic and the oral and maxillofacial surgical management of their cases done at the College.

Furthermore, a high percentage of the sample has poor oral hygiene. This is in agreement with previous studies (Akos and Agnes, 1985; Fitzgerald, 1990; Wong and King, 1998; Chapple and Nunn, 2001; Chohan and Wyne, 2008). Dental caries detected in the present study was high which has been shown in previous studies (Paul and Brandt, 1998; Bian *et al.*, 2001; Hewson *et al.*, 2001; Besseling and Dubois, 2004; Kirchberg *et al.*, 2004; Stec-Slonicz *et al.*, 2007). Several reasons have been suggested for the high caries prevalence in children with CLP such as irregularity of teeth (Wong and King, 1998), inadequate advices to the parents regarding the feeding and oral hygiene (Fitzgerald, 1990), presence of enamel defect in these patients (Chapple and Nunn, 2001), and longer oral clearance times of foods

and the consequent generation of fermentable sugars from starches (Ahluwalia *et al.*, 2004). In addition, cleft patients may not receive adequate dental care which is shown by the high caries incidence and the low restorative treatment. This is in agreement with Hewson *et al.* study (2001). Furthermore, results showed the occurrence of recurrent caries in cleft patients which may indicate lack of proper dental education in these patients. The results of the present study also indicated that over half of the primary teeth are carious and lesser percentage is restored. High percentage of permanent teeth was restored compared to primary teeth. This might be due to lack of dental education about the importance of primary teeth. Previous studies have shown that caries in the primary teeth is an excellent predictor for the caries risk in the permanent teeth (Ardenghi *et al.*, 2008; Motohashi *et al.*, 2006; Skeie *et al.*, 2006; Zhang *et al.*, 2006), and the best predictor of caries at older ages is the DMFT at a younger age (Sheiham, 1997). In addition, a previous study has shown that Saudi parents do not consider the primary teeth important (Al-Saad *et al.*, 2002). The number of teeth affected by caries in the children evaluated was very high. This also has been reported for Saudi children from the general population (Al-Shammery *et al.*, 1990; Akpata *et al.*, 1992; Al-Tamimi and Petersen, 1998; Wyne *et al.*, 2002; Al-Dosari *et al.*, 2004).

Finally, elaborating the dental status in CLP patients may help dental planners to increase the staff as well as the facilities to help them. In addition, similar studies should be conducted in other hospitals and dental centers in Saudi Arabia that provide dental treatment for CLP patients. Collectively, a well organized preventive, treatment and follow-up programs should be implemented for patients with CLP.

Conclusions

Based on the results of this study and within its limitations, it can be concluded that:

1. Most of the CLP patients were seen for the first time by the CLP team members when they were above the age of 7 years.
2. High percentage of the sampled subjects did not attend regularly for their dental appointments, and two-thirds of them present with poor oral hygiene.
3. High caries incidence and low restorative treatment were found in the studied CLP patients.

Acknowledgment. The author would like to thank Dr. Khalid M. Al-Balkhi and Prof. Thakib A. Al-Shalan for their help with data collection, and their valuable contribution to the manuscript.

References

- Ahluwalia, M.; Brailsford, S. R.; Tarelli, E.; Gilbert, S. C.; Clark, D. T.; Barnard, K. and Beighton, D. "Dental Caries, Oral Hygiene, and Oral Clearance in Children with Craniofacial Disorders." *J. Dent. Res.*, Vol. 83, No. (2), (2004), 175-179.
- Akos, N. and Agnes, R. "Oral Hygiene in Children with Cleft Lip and Palate." *Forgov. Sz.*, Vol. 78, (1985), 308-310, English abstract.
- Akpata, E. S.; Al-Shammery, A. R. and Saeed, H. I. "Dental Caries, Sugar Consumption and Restorative Dental Care in 12-13-year-old Children in Riyadh, Saudi Arabia." *Community Dent. Oral Epidemiol.*, Vol. 20, No. (6), (1992), 343-346.
- Al-Balkhi, K. M. "The Distribution and Classification of Clefts in Patients Attending a Cleft Lip and Palate Clinic in Riyadh, Saudi Arabia." *Saudi Med. J.*, Vol. 29, No. (5), (2008), 739-742.
- Al-Dosari, A. M.; Wyne, A. H.; Akpata, E. S. and Khan, N. B. "Caries Prevalence and Its Relation to Water Fluoride Levels among School Children in Central Province of Saudi Arabia." *International Dental Journal*, Vol. 54, (2004), 424-428.
- Aljohar, A.; Ravichandran, K. and Subhani, S. "Pattern of Cleft Lip and Palate in Hospital-based Population in Saudi Arabia: Retrospective Study." *Cleft Palate Craniofac. J.*, Vol. 45, No. (6), (2008), 592-596.
- Alkofide, E. A. "Sella Turcica Morphology and Dimensions in Cleft Subjects." *Cleft Palate Craniofac. J.*, Vol. 45, No. (6), (2008), 647-653.
- Al-Saad, S.; Al-Bokhamseen, M. and Al-Shalan, T. A. "Saudi Parents' Knowledge About the Importance of Children's Primary Teeth and Prevention of Dental Diseases in Al-Ahsa Region, Saudi Arabia." *Pak. J. Orthodont. Ped. and Comm. Dentistry*, Vol. 1, No. (1), (2002), 53-56.
- Al-Shammery, A. R.; Guile, E. E. and El-Backly, M. "Prevalence of Caries in Primary School Children in Saudi Arabia." *Community Dent. Oral Epidemiol.*, Vol. 18, No. (6), (1990), 320-321.
- Al-Tamimi, S. and Petersen, P. E. "Oral Health Situation of Schoolchildren, Mothers and Schoolteachers in Saudi Arabia." *Int. Dent. J.*, Vol. 48, No. (3), (1998), 180-186.
- Ardenghi, T. M.; Sheiham, A.; Marcenés, W.; Oliveira, L. B. and Bonecker, M. "Maxillary Anterior Caries as a Predictor of Posterior Caries in the Primary Dentition in Preschool Brazilian Children." *J. Dent. Child (Chic)*, Vol. 75, No. (3), (2008), 215-221.
- Barakati, S. F. and Alkofide, E. A. "Growth Status of Saudi Patients with Cleft Lip and Palate." *Saudi Med. J.*, Vol. 23, No. (7), (2002), 823-827.
- Besseling, S. and Dubois, L. "The Prevalence of Caries in Children with a Cleft Lip and/or Palate in Southern Vietnam." *Cleft Palate Craniofac. J.*, Vol. 41, No. (6), (2004), 629-632.
- Bian, Z.; Du, M.; Bedi, R.; Holt, R.; Jin, H. and Fan, M. "Caries Experience and Oral Health Behavior in Chinese Children with Cleft Lip and/or Palate." *Pediatr. Dent.*, Vol. 23, No. (5), (2001), 431-434.
- Borkar, A. S.; Mathur, A. K. and Mahaluxmivala, S. "Epidemiology of Facial Clefts in the Central Province of Saudi Arabia." *Br. J. Plast. Surg.*, Vol. 46, No. (8), 1993, 673-675.
- Chancharonsook, N.; Whitehill, T. L. and Samman, N. "Speech Outcome and Velopharyngeal Function in Cleft Palate: Comparison of Le Fort I Maxillary Osteotomy and Distraction Osteogenesis: Early Results." *Cleft Palate Craniofac. J.*, Vol. 44, No. (1), (2007), 23-32.
- Chapple, J. R. and Nunn, J. H. "The Oral Health of Children with Clefts of the Lip, Palate, or Both." *Cleft Palate Craniofac. J.*, Vol. 38, No. (5), (2001), 525-528.
- Chohan, A. N. and Wyne, A. H. "Caries and Oral Hygiene Status among a Group of Saudi Cleft Lip and Palate Children." *Pak. Oral Dent. J.*, Vol. 28, (2008), 275-278.
- Fitzgerald, J. "The Unique Challenge of Isolated Populations." *Birth Defects Orig. Artic. Ser.*, Vol. 26, No. (2), (1990), 115-117.
- Hewson, A. R.; McNamara, C. M.; Foley, T. F. and Sandy, J. R. "Dental Experience of Cleft Affected Children in the West of Ireland." *Int. Dent. J.*, Vol. 51, No. (2), (2001), 73-76.
- Kirchberg, A.; Treide, A. and Hemprich, A. "Investigation of Caries Prevalence in Children with Cleft Lip, Alveolus, and Palate." *J. Craniomaxillofac. Surg.*, Vol. 32, No. (4), (2004), 216-219.
- Kumar, P.; Hussain, M. T.; Cardoso, E.; Hawary, M. B. and Hassanain, J. "Facial Clefts in Saudi Arabia: An Epidemiologic Analysis in 179 Patients." *Plast. Reconstr. Surg.*, Vol. 88, No. (6), (1991), 955-958.
- Lin, Y. T. and Tsai, C. L. "Caries Prevalence and Bottle-feeding Practices in 2-year-old Children with Cleft Lip, Cleft Palate, or Both in Taiwan." *Cleft Palate Craniofac. J.*, Vol. 36, No. (6), (1999), 522-526.
- Motohashi, M.; Yamada, H.; Genkai, F.; Kato, H.; Imai, T.; Sato, S.; Sugaya, A. and Maeno, M. "Employing Dmft Score as a Risk Predictor for Caries Development in the Permanent Teeth in Japanese Primary School Girls." *J. Oral Sci.*, Vol. 48, No. (4), (2006), 233-237.
- Paul, T. and Brandt, R. S. "Oral and Dental Health Status of Children with Cleft Lip and/or Palate." *Cleft Palate Craniofac. J.*, Vol. 35, No. (4), (1998), 329-332.
- Reisberg, D. J. "Dental and Prosthodontic Care for Patients with Cleft or Craniofacial Conditions." *Cleft Palate Craniofac. J.*, Vol. 37, No. (6), (2000), 534-537.
- Sheiham, A. "Impact of Dental Treatment on the Incidence of Dental Caries in Children and Adults." *Community Dent. Oral Epidemiol.*, Vol. 25, No. (1), (1997), 104-112.
- Skeie, M. S.; Raadal, M.; Strand, G. V. and Espelid, I. "The Relationship between Caries in the Primary Dentition at 5 Years of Age and Permanent Dentition at 10 Years of Age: A Longitudinal Study." *Int. J. Paediatr. Dent.*, Vol. 16, No. (3), (2006), 152-160.
- Stec-Slonicz, M.; Szczepanska, J. and Hirschfelder, U. "Comparison of Caries Prevalence in Two Populations of Cleft Patients." *Cleft Palate Craniofac. J.*, Vol. 44, No. (5), (2007), 532-537.
- Wong, F. W. and King, N. M. "The Oral Health of Children with Clefts: A Review." *Cleft Palate Craniofac. J.*, Vol. 35, No. (3), (1998), 248-254.
- Wyne, A. H.; Al-Ghorabi, B. M. and Al-Asiri, Y. "Caries Prevalence in Saudi Primary Schoolchildren of Riyadh and Their Teachers Knowledge-attitude and Practice." *Saudi Dent. J.*, Vol. 23, (2002), 77-81.
- Zhang, Q. and van Palenstein Helderman, W. H. "Caries Experience Variables as Indicators in Caries Risk Assessment in 6-7-year-old Chinese Children." *J. Dent.*, Vol. 34, No. (9), (2006), 676-681.

/

أستاذ مساعد، رئيس قسم طب أسنان الأطفال وتقويم الأسنان، كلية طب الأسنان، جامعة الملك سعود،
ص ب ٦٠١٦٩، الرياض ١١٥٤٥، المملكة العربية السعودية
amaldrees@ksu.edu.sa

(قدم للنشر في ٢٨/١٠/٢٠٠٩م، وقبل للنشر في ٢٢/١٢/٢٠٠٩م)

شق الشفة، شق سقف الحنك، تسوس الأسنان، صحة الفم، السعوديون.

هدفت هذه الدراسة إلى استقصاء انتشار تسوس الأسنان في مجموعة من المرضى الذين يعانون من شق الشفة / سقف الحنك في الرياض، المملكة العربية السعودية. صُممت هذه الدراسة الاستقصائية لمراجعة ملفات طب الأسنان لجميع مرضى شق الشفة / سقف الحنك المراجعين لعيادة شق الشفة / سقف الحنك في كلية طب الأسنان بجامعة الملك سعود خلال الفترة من عام ١٩٩٩م وحتى عام ٢٠٠٦م. تضمنت الدراسة تسجيل المعلومات التالية لكل مريض: الخصائص السكانية، ومرحلة الأسنان، والحضور إلى العيادة، والعناية بنظافة الفم، وطبيعة المعالجة، وحالة تسوس الأسنان. اشتملت الدراسة على ١٦٥ ملفاً لمرضى يعانون من شق الشفة / سقف الحنك (١٠٨ من الذكور، و٥٧ من الإناث). راجع ٢١.٢٪ من المرضى فقط العيادة لأول مرة قبل بلوغهم سن السادسة. معظم المرضى (٦١.٨٪) حضروا بمستوى متدنٍ من العناية بنظافة الفم، وحوالي ٥٠٪ منهم لم يحافظوا على زيارات منتظمة لعيادة طبيب الأسنان. عانت الأسنان اللبنية من التسوس (٥٥.٤٪) أكثر من الأسنان الدائمة (٤١.٢٪). تُظهر نتائج هذه الدراسة أن المرضى الذين يعانون من شق الشفة / سقف الحنك يعانون أيضاً من مستوى عالٍ من الإصابة بتسوس الأسنان، بالإضافة إلى أن ثلثا المرضى حضروا بمستوى متدنٍ من العناية بنظافة الفم.