

Clinical Report

Clinical Statistical Investigation of Cleft Lip and Palate Patients Aged Over 18 Years at Department of Orthodontics, Suidobashi Hospital, Tokyo Dental College

Teruo Sakamoto, Kenji Sueishi, Haruyo Miyazaki*, Hidenori Katada*, Tamaki Ebihara* and Tatsuya Kosaka

*Department of Orthodontics, Tokyo Dental College,
1-2-2 Masago, Mihama-ku, Chiba 261-8502, Japan*

** Division of Orthodontics,*

*Department of Clinical Oral Health Science, Tokyo Dental College,
2-9-18 Misaki-cho, Chiyoda-ku, Tokyo 101-0061, Japan*

Received 19 December, 2007/Accepted for publication 22 February, 2008

Abstract

Since the fee for orthodontic treatment of malocclusion caused by cleft lip and palate (CLP) became covered by national health insurance in 1982, orthodontic treatment from school age has become the norm. However, in some CLP patients, orthodontic treatment is commenced in adulthood. A number of studies have reported on orthodontic treatment in adult CLP patients. The purpose of this study was to clarify the number and age of new patients, chief complaint, referral status, cleft type, malocclusion, history of orthodontic treatment, and acceptance and planning of orthodontic treatment.

The study investigated new CLP patients aged over 18 years who visited the Department of Orthodontics, Suidobashi Hospital of Tokyo Dental College, between April 1, 2001 and March 31, 2006.

During the investigation period mentioned above, 235 new CLP patients visited our department. Among them, 23 were aged over 18 years, accounting for 9.8% of the 235 CLP patients. In terms of chief complaint, occlusion-related complaints and occlusal dysfunction accompanying malocclusion were noted in 14 cases (61%). Eighteen patients were referrals. Unilateral CLP was the most prevalent cleft type. In terms of malocclusion type, reversed occlusion was noted in 13 cases (57%), accounting for over half of all cases. Patients with a previous history of orthodontic treatment accounted for half of all cases. Ten patients accepted orthodontic treatment. In terms of treatment plan, surgical orthodontic treatment was planned in 10 cases.

Key words: Cleft lip and palate—Adult case—Clinical statistical investigation

Introduction

In 1982, the fee for orthodontic treatment of malocclusion caused by cleft lip and palate

(CLP) became covered by national health insurance. Since then, public financial aid for orthodontic treatment of CLP patients has been established, influencing the supply and

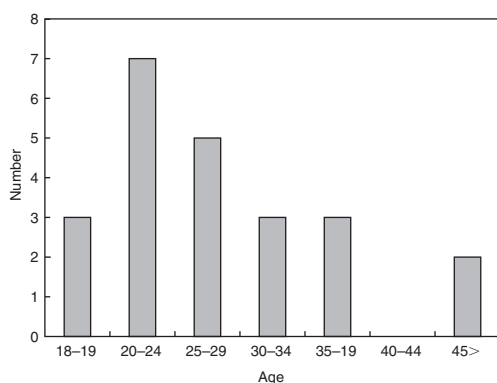


Fig. 1 Number and age of patients

demand of such treatment. Furthermore, orthodontic treatment procedures for CLP have been standardized.

Regarding orthodontic treatment for CLP patients, Otsuka *et al.*⁹⁾ and Sakuda¹³⁾ proposed a comprehensive treatment system from the early mixed dentition period onwards, and a health insurance system has been developed based on this. Therefore, orthodontic treatment from school age has prevailed, benefiting many CLP patients. One advantage of orthodontic treatment from childhood is that, to deal with maxillary hypoplasia due to scar tissue caused by palatoplasty, growth guidance can be achieved. Anterior and lateral expansion of the maxillary arch is performed between the deciduous to permanent dentition periods, to improve the maxillo-mandibular relationship, achieve positive overjet, and correct tooth crowding. This is an important treatment method in the improvement of oral function, together with bone grafting to the alveolar cleft. Furthermore, orthodontic treatment using multi-bracket appliances starts in the permanent dentition period, to establish static and functional normal occlusion of the permanent dentition. Multidisciplinary treatment should be performed in cooperation with an oral surgeon, plastic surgeon and prosthodontist.

However, in some CLP patients, orthodontic treatment is commenced in adulthood. A number of studies have reported orthodontic treatment in adult CLP patients. Further-

more, although it has been reported that surgical orthodontic treatment is indicated in cases of severe skeletal malocclusion, no clinical statistical reports have addressed this issue. In this study, we carried out a clinical statistical investigation of adult CLP patients.

Materials and Methods

The target population consisted of new CLP patients aged over 18 years who visited the Department of Orthodontics, Suidobashi Hospital, Tokyo Dental College, between April 1, 2001 and March 31, 2006. We investigated number of patients, age, gender, chief complaint, referral status, cleft type, malocclusion, history of orthodontic treatment, and acceptance and planning of orthodontic treatment.

Results

1. Number and age of patients

During the investigation period, 235 new CLP patients visited our department. Among them, 23 (13 women and 10 men) were aged over 18 years, accounting for 9.8% of the 235 CLP patients. They were aged between 18 and 46 years, 3 were aged 18 and 19 years, and 12 were in their twenties, accounting for over half of the cases (Fig. 1).

2. Chief complaint

Figure 2 shows the chief complaint at first examination. Complaints concerning occlusion, including malocclusion (reversed occlusion and crowding), occlusal dysfunction accompanying malocclusion, and the necessity of prosthetic treatment were noted in 14 cases (61%). When 4 cases (17%) requesting the continuation of orthodontic treatment were added, complaints concerning occlusion were present in 18 cases (78%). Complaints regarding facial appearance, including maxillary hypoplasia and lip deformities, were noted in 4 cases (17%), and those regarding speech problems were noted in 2 cases (9%).

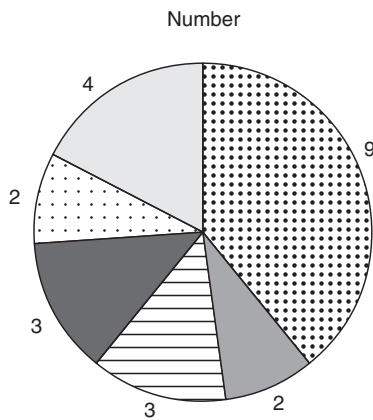


Fig. 2 Chief complaint

Malocclusion, Restoration, Masticatory function, Facial appearance, Speech problem, Continuation of treatment

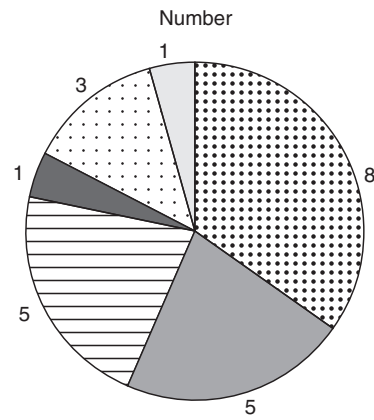


Fig. 3 Referral status

Plastic surgeon, Orthodontist, Dentist, Web, Non, Unknown

3. Referral status

We investigated referral status (Fig. 3). Eight cases (35%) were referred to us by plastic surgeons. Five cases (22%) were referred to us by orthodontists, and 5 cases (22%) were referred by dentists (general practice). In total, 18 cases (79%) were referred to our department.

4. Cleft type

Eight cases (35%) were unilateral cleft lip and palate (UCLP), and bilateral cleft lip and palate (BCLP) was noted in 6 cases (26%). Cleft lip (CL) was present in 4 cases (17%), cleft lip and alveolar (CLA) in 2 cases (13%), and cleft palate (CP) in 3 cases (13%) (Fig. 4).

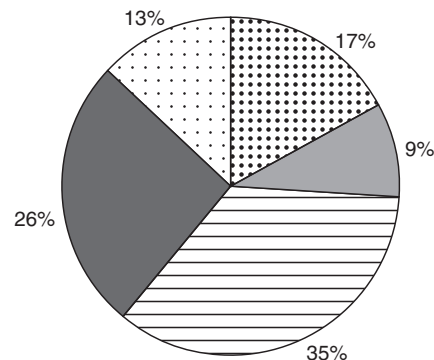


Fig. 4 Cleft type

CL, CLA, UCLP, BCLP, CP

5. Malocclusion

Anterior reversed occlusion was noted in 13 cases (57%), accounting for over half of such cases. Ten cases were skeletal mandibular protrusion. When 1 case of edge-to-edge occlusion and 2 cases of posterior cross bite were added, 16 cases (70%) showed anterior and lateral stricture of the maxillary arch. Maxillary protrusion was found in 3 cleft lip cases (Fig. 5).

6. History of orthodontic treatment

Eight patients (35%) had previous history

of orthodontic treatment, 4 patients (17%) were referred to us to continue treatment, and 11 patients (48%) had received no previous orthodontic treatment (Fig. 6).

7. Acceptance of treatment

In 19 cases, excluding 4 in which orthodontic treatment was continued, treatment was accepted in 10 cases, but rejected in 9. Among the 10 cases in which treatment was started, 4 had previous orthodontic treatment experience, whereas 6 had no such experience.

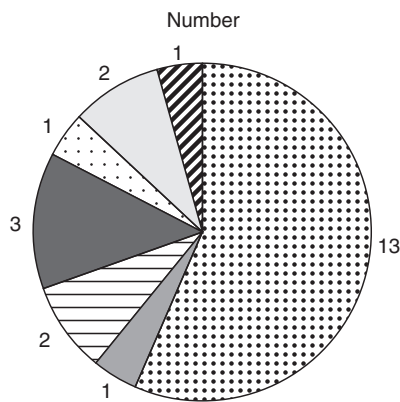


Fig. 5 Malocclusion

Anterior crossbite, Edge-to-edge occlusion, Posterior crossbite, Maxillary protrusion, Crowding, Open bite, Unknown

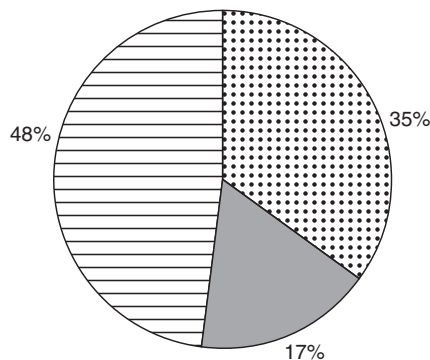


Fig. 6 History of orthodontic treatment

yes, transfer, no

Table 1 Relationship between acceptance or rejection of orthodontic treatment and history of orthodontic treatment and planning of orthodontic treatment (n=19)

	History of orthodontic treatment		Planning of orthodontic treatment	
	Yes	No	Surgical-orthodontics	Non surgical-orthodontics
Acceptance of treatment	4	6	5	5
Rejection of treatment	4	5	5	4

Furthermore, among the 9 cases in which treatment was not started, 4 had previous treatment experience, whereas 5 did not. Regarding the treatment plan, surgical orthodontic treatment was planned in 5 cases in which treatment was started, and in 5 in which it was not started. There were no differences in the presence of history of orthodontic treatment and the planning of surgical orthodontic treatment between acceptance or rejection of orthodontic treatment (Table 1).

8. Planning of orthodontic treatment

Surgical orthodontic treatment, including corticotomy, was planned in 10 cases, and non-surgical orthodontic treatment was planned in 9 (Table 1).

Discussion

1. Number and age of patients

In the investigation period of this study, the number of CLP patients aged over 18 years was approximately 1/10 of the total number of such new patients who visited our department. According to our previous investigation¹⁶⁾, the number was 19 (10.9%) out of 174 patients, showing almost no changes in the percentage. According to reports by other dental college orthodontic departments^{1,3,7,8,14,15)}, the percentage was between 2.9% and 26.4%, showing differences among facilities, and no relationship with the investigation period was noted.

The percentage of those aged over 18 years among all new orthodontic patients who

visited our department in this investigation period was 69.4% (2,053 patients), a much higher value than the percentage of patients aged over 18 years (9.8%) among all new CLP patients who visited our department. Since the fee for orthodontic treatment of CLP cases became covered by national health insurance in 1982, and even patients who were born around 1982 became aged over 18 years in this investigation period, it was considered that because orthodontic administration in the primary and mixed dentition periods has prevailed, the number of new adult patients was low.

2. Chief complaint

In this investigation, if we include patients with continuation of orthodontic treatment, the chief complaint of 78% of patients was related to occlusion. One questionnaire-based investigation reported that adult complete CLP patients who received plastic surgery and orthodontic treatment in their teens had significantly more complaints regarding their nasal and lip deformities, and malocclusion, and facial appearance, in comparison with non CLP patients, and 47% of the patients requested additional surgery⁵⁾. In the present investigation, the number of patients whose chief complaint concerned facial deformity was 3 (13%), showing a low value. We believe that this was because our investigation, which was performed only on patients who were referred to us for orthodontic treatment, did not necessarily reflect the degree of patient satisfaction with their facial appearance.

3. Referral status

Approximately 90% of our CLP patients were referred to us by the departments of plastic surgery in medical college hospitals in Tokyo and pediatric hospitals in Saitama Prefecture, and patients between 5 and 8 years accounted for 70%¹⁶⁾. Since plastic surgeons are involved in treatment after birth, we believe that they refer patients to orthodontists, depending on the necessity of orthodontic treatment before or during the permanent tooth eruption period. This indi-

cates that, unlike referred pre-adult CLP patients, patients aged over 18 years are referred by orthodontists and dentists.

4. Cleft type

Eight cases were UCLP, and 6 cases were BCLP, accounting for 61% (14 cases) of CLP. A CL was present in 4 cases (17%), CLA in 2 cases (13%), and CP in 3 cases (13%). The percentage of each cleft type in CLP patients treated in the department of orthodontics in Japanese university hospitals^{3,7,8,12,16)} has been reported as follows: CLP: 54.0–59.8%, CLA: 11.2–21.4%, CP: 16.7–20.0%, and CL: 5.5–9.8%. Therefore, the percentage of CL was slightly higher, and that of CP was slightly lower in our department. However, since the number of patients was small in this investigation, our results are still considered to reflect the trend in each cleft type in CLP patients.

5. Malocclusion

Malocclusion accompanying anterior and lateral stricture of the maxillary arch, so called maxillary collapse, including reversed occlusion and posterior cross bite, accounted for 70%. It has been reported that scar tissue occurring after palatoplasty is a chief cause of maxillo-facial growth disturbances¹¹⁾, and, regardless of surgical technique, maxillary constriction accompanying reversed occlusion and cross bite is a common symptom⁶⁾. Furthermore, regarding the results of orthodontic treatment performed in teenagers, it has been reported that constriction of the maxillary second premolar and first molar dentition areas was apt to occur, causing deterioration of occlusal conditions⁴⁾. Therefore, although half of the patients investigated had received orthodontic treatment, they came to us seeking an improvement in malocclusion.

6. History of orthodontic treatment

The number of patients with previous experience of orthodontic treatment, including 4 cases of change in hospital during treatment, was 12 (52%), accounting for half of the cases. We believe that this was because the necessity of orthodontic treatment was under-

stood by both medical doctors and patients, and because orthodontic treatment has become more commonplace due to the availability of coverage of orthodontic treatment by health insurance and medical expense aid through the disabled person's self-reliance law. However, orthodontic treatment takes a long time, and when the degree of malocclusion is high, surgical orthodontic treatment is required; therefore, not all patients are willing to accept this.

7. Acceptance of treatment

Generally, demand for orthodontic treatment is influenced by the degree of esthetic disorder and malocclusion. In this investigation, excluding 4 patients who visited our department requesting the continuation of orthodontic treatment out of 23 patients, orthodontic treatment was not started in 9 (47%) of the remaining 19 patients. Furthermore, there were no differences in the presence of previous experience of orthodontic treatment and the planning of surgical orthodontic treatment between acceptance or rejection of orthodontic treatment. Almost half of the patients had received no previous orthodontic treatment, in spite of the availability of national health insurance coverage. This suggests the presence of certain socio-psychological disadvantages regarding orthodontic treatment.

8. Planning of orthodontic treatment

Regarding orthodontic treatment in adult CLP patients, surgical orthodontic treatment is indicated in cases in which antero-posterior discrepancies between maxilla and mandible are marked. Although there have been reports that non-surgical orthodontic treatment was useful in the treatment of maxillary constriction cases¹⁰⁾, it has recently been reported that distraction osteogenesis was useful for lateral expansion and anterior movement of the maxilla and closure of cleft gaps²⁾. Our results suggest that surgical orthodontic treatment is a major therapy in treatment planning, and that orthodontic treatment becomes complicated when skeletal improvement is required.

References

- 1) Aragaki Y, Ishii C, Hashimoto K, Matsumoto N, Kambara T, Kawamoto T (2005) Statistical observations of cleft lip and/or palate patient in the department of orthodontics, Osaka Dental University, during the past 10 years from April 1992 to March 2002. *J Jpn Cleft Assoc* 30:254–258.
- 2) Figueroa AA, Polley JW, Ko E (2001) Distraction osteogenesis for treatment of severe cleft maxillary deficiency with RED technique. *Craniofacial Distraction Osteogenesis*, Samchukov ML, Cope JB, Cherkashin AM eds., pp. 485–493, Mosby Inc., St. Louis.
- 3) Kouno K, Suzuki A, Watanabe M, Kondou Y, Mukai Y, Ohmizo N, Takahama Y (1989) Clinical statistics on patients with cleft lip and/or palate for 19 years in the orthodontic clinic, Kyushu University. *J Jpn Cleft Assoc* 14:159–170.
- 4) Marcusson A, Paulin G (2004) Changes in occlusion and maxillary dental arch dimensions in adults with treated unilateral complete cleft lip and palate: A follow-up study. *Eur J Orthod* 26:385–390.
- 5) Marcusson A, Paulin G, Östrup L (2004) Facial appearance in adults who had cleft lip and palate treated in childhood. *Scand J Plast Reconstr Surg Hand Surg* 36:16–23.
- 6) Mars M, Asher-McDade C, Brattström V, Dahl E, McWilliam J, Mølsted K, Plint DA, Prah Andersen B, Semb G, Shaw WC, Palph PS (1992) A six-center international study of treatment outcome in patients with cleft of the lip and palate. Part 3. Dental arch relationships. *Cleft Palate Craniofac J* 29:405–408.
- 7) Mori S, Negoro T, Ito T, Iwata T, Goto S (2005) Investigation on clinical statistics of patients with cleft lip and palate in the department of orthodontics at Aichi-Gakuin University Dental Hospital. *J Jpn Cleft Assoc* 30:259–269.
- 8) Nakayama T, Kisanuki S, Kuroe K, Ito G (2001) Transitional changes of orthodontic patients with cleft lip and/or palate for 20 years in the orthodontic clinic of Kagoshima University Dental Hospital. *J Jpn Cleft Assoc* 26:339–348.
- 9) Ohtsuka S, Shibasaki Y, Fukuhara T (1982) Orthodontic treatment for cleft lip and palate patients—Procedures and timing—. *J Jpn Cleft Assoc* 7:66–76.
- 10) Ranta R (1989) Orthodontic treatment in adults with cleft lip and palate. *J Craniomaxillofac Surg* 17:42–44.
- 11) Ross RB (1975) The management of dental arch deformity in cleft lip and palate. *Clin Plast Surg* 2:325–342.

- 12) Saito S, Mikawa M, Takeda N, Suzawa T, Ohtsuka S, Fukuhara T, Shibasaki Y (2002) Clinical and statistical study on cleft lip and/or palate patients in the orthodontic department, Showa University Dental Hospital. *J Jpn Cleft Assoc* 27:101–112.
- 13) Sakuda M (1988) Cleft lip and palate, orthodontic treatment. *Oral and Maxillofacial Surgery*, Miyazaki T eds., pp. 293–300, Ishiyaku Publishers, Inc., Tokyo. (in Japanese)
- 14) Sorihashi Y, Yamamoto T, Nakagawa K, Yashiro K, Takada K, Sakuda M (1994) Statistical study on cleft lip and/or palate patients in the department of orthodontics, faculty of dentistry, Osaka University Hospital. *J Jpn Cleft Assoc* 19:257–264.
- 15) Tominaga R, Ito D, Amano H, Yamamoto M, Iwata K, Uji M, Baba Y, Susami T, Motohashi N, Ohyama K, Kuroda T (1994) Statistical study on cleft lip and/or palate patients. *J Jpn Cleft Assoc* 19:164–176.
- 16) Yoshimura R, Abe T, Miyazaki H, Ono A, Mishiro M, Hasebe T, Sakamoto T, Sueishi K, Yatabe K, Yamaguchi H (2006) Statistical analysis on patients with cleft lip and/or palate in the past 5 years at the orthodontic clinic, Suidobashi Hospital of Tokyo Dental College. *J Jpn Cleft Assoc* 31:39–44.

Reprint requests to:

Dr. Teruo Sakamoto
Department of Orthodontics,
Tokyo Dental College,
1-2-2 Masago, Mihama-ku,
Chiba 261-8502, Japan