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Long term follow up of prosthetic treatment for cleft lip and palate patients in Hokkaido University Hospital

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ABSTRACT : Cleft lip and palate patients need various approaches and treatments. At Hokkaido University Hospital, medical, dental, para medical, and para dental specialists have a team approach, and worked with cleft lip and palate patients since 1990. Moreover, final treatment of cleft lip and palate are usually prosthetic which should be stable and function in their oral space for long periods of time. This is usually with good prognosis. This study investigated the past 23 years of prosthetic treatments and analyzed their effectiveness. This long term follow up revealed that the availability of metal retainers, or bridge work prevented post-orthodontic relapse.

Key Words : prosthesis, minimal intervention, cleft lip and palate

Introduction

Nowadays the treatment of cleft lip and palate is built up by several medical and dental team approaches and planned systematically from birth to adolescence. In the whole treatment process, the prosthetic appliance is a very important and the final process, however not many studies have reported about it^{1, 3)}. This report analyzed the past 23 years' follow up of the prosthesis for cleft lip and palate patients.

Patients and Methods

The number of patients was 101 and all of them come to Hokkaido University Hospital between 1993-2016. They received prosthodontic treatment at removable prosthodontics, oral rehabilitation division.

The survey items were ;

- 1) Male female ratio
- 2) Cleft type
- 3) Missing teeth number
- 4) Prosthesis type
- 5) History of usage

- 6) Number of re-fabricated prosthesis
- 7) Reason of re-fabricating prosthesis

Results

The number of patients was 101 and all of them had come to Hokkaido University Hospital between 1993-2016 and received prosthodontic treatment. The results were

- 1) male/female ratio was 35%/65%. Males were 35 and females were 66 persons. (Fig. 1)
- 2) Cleavage type was; bilateral 24 persons (24%), unilateral ; 61 persons (60%) (left ; 43%, right ; 18%), others ; 16%. (Fig. 2)
- 3) Missing teeth number was ; 46 persons (46%) were missing over 2 teeth and 54% were missing below 1 tooth. (Fig. 3)
- 4) The prosthetic appliance type was ; metal retainer ; 75%, denture ; 9%, bridge ; 9%, implant ; 4%. (Fig. 4)
- 5) History of usage was ; over 10 years ; 19 cases (including 9 cases of re-fabricated), 5-10 years ; 18 cases (including 1 case of re-fabricated). (Table. 1)
- 6) Number of re-fabricated prosthesis were 11 devices.
- 7) The reasons for re-fabricating were ; broken prosthesis

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were 3 cases, caries of abutment tooth were 4 cases, tooth extract or other reasons were 4 cases.

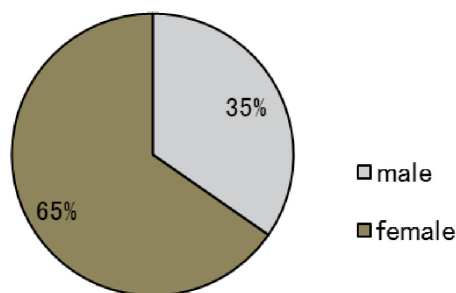


Fig. 1 Male female ratio

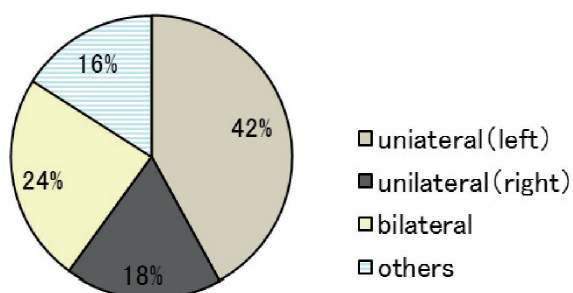


Fig. 2 Cleft type

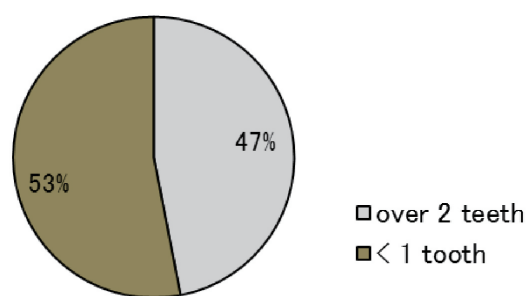


Fig. 3 Missing teeth type

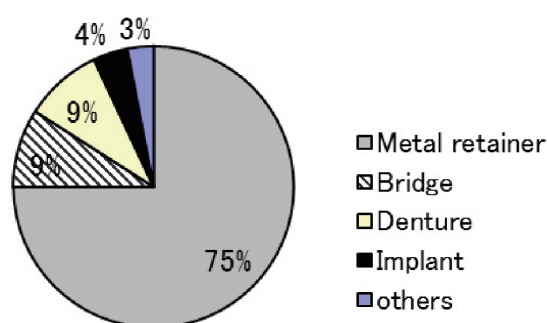


Fig. 4 Prosthesis type

Discussion

In Japan the probability of one being born with cleft lip and palate is 1/500. These patients are usually treated

Table. 1 Number of long-term follow up patients with re-fabricated prosthodontic devices

Years since installation	number of device	Number of re-fabricated devices
over 10 years	19	9
5-10 years	18	1

by several aspects specialists for a long time. Hokkaido University Hospital Dental Clinic Division has been using the team-based approach treatment on cleft lip and palate patients for a long time. Moreover the final setup of these team care treatments is prosthodontic treatment, which should be stable in each mouth and maintained to prevent relapsing.

Details of Hokkaido University Hospital's team approaches are as follows ; A baby born as a cleft patient receives lip operation at 3-5 months old, undergoes palate closure operation at 1-2 years old, bone grafting to the frontal cleavage at 7-10 years old and orthodontic treatment at 6-18 years old. If after the above treatments the patient has a defect on the upper dentition, prosthetic treatment is needed. The prosthodontic doctor has to consider how the alignment of upper and lower relationship stabilizes the condition just after the orthodontic treatment and has to ensure that the alignment does not relapse.¹⁾ To prevent relapsing of the alignment, patients should wear the retainer after orthodontic treatment and if necessary any defect has been compensated by artificial teeth.

The patient gender ratio in this study indicates that the number of females in the hospital investigated is higher than that past studies.^{2,5)}

Similar to past reports^{3, 4)}, cases of cleavage type and left unilateral type were more prevalent with higher percentage than other types.

About 50% of patients had 2 teeth or more missing. To maintain the alignment and fill the defect and missing teeth, metal retainer was selected to cover the lingual site prevent relapsing of the teeth into lingual and fill up the defect space with artificial teeth and plate.

Among the patients who came to see our hospital consistently, a considerable number had devices installed, and functioning, in their mouths for over 10 years in their mouth. However, patients who didn't brush their teeth properly or those with poorly fitted device, new devices had to be re-fabricated. To reduce the number

of re-fabrication cases, except when devices are broken, patients should be taught how to brush properly and come for checkups more frequently.

Taniguchi *et al*⁶⁾ reported that prosthetic treatment as a final stage is mainly a fixed bridge and recommended that the number of abutment teeth in the bridge work should be decreased. However some patients have anxiety about the posterior teeth relapse. This is the most important concern and it requires strict follow up to keep the alignment of the upper and lower jaws. Our team aimed at having minimal intervention by avoiding drilling of intact teeth when conducting bridge work. Another reason to select the metal retainer is the majority of our patients have learnt good brushing techniques as they have been visiting dental clinics from a younger age. Consequently patients would be treated by metal retainer. According to our study many patients have used the devices for a long time but we don't determine when patients with the metal retainer can stop using them.^{1, 7, 8)}

Among the patients we treated, some did not come back for checkups. It is therefore important that soon as possible, our team develop strategies to build up the strong motivation for the patients to come for checkup.

At the period of orthodontic treatment to width increasing of upper jaw, as a result of cleavage and congenital missing teeth cause discontinuity teeth alignment, prosthodontist compensate these situation.

If the prognosis was done properly, the final restoration should last and maintain in fair condition for a long time.

If patients lost the teeth neighboring the cleavage, the bone surrounding the cleavage decreased or disappeared, which in turn made the prosthetic treatment more difficult. To avoid this problem, half of the cleft patients with over 2 teeth missing were treated using metal retainer and the bridge.⁹⁾

The criterion using to choose bridge remedy is not related to the defect type, however less orthodontic teeth movement and lateral expansion is preferred because of the low possibility of relapse.¹⁰⁾

The reason for re-fabricating the metal retainer was not the unfit interfacial lingual site contact between teeth and retainer or clasp, which suggested that the metal retainer prevented the posterior teeth from relapsing.¹¹⁾

Long-term Follow-up Cases

Case 1 ; This is a case of unilateral cleft lip and palate, and missing anterior teeth, so we selected metal retainer. This patient has been wearing the metal retainer for 17 years, but it was re-fabricated 8 years after the first prosthesis because of upper teeth caries. However the patient's relation of occlusal condition is still good. (Fig. 5- 1, 2, 3)

Case 2 ; This case also involves unilateral cleft lip and palate. The patient has used the first metal retainer continuously for 13 years. He has a fistula on the palate,



Fig. 5-1 Maxilla intra-oral view of left unilateral cleft lip and palate patient



Fig. 5-2 Intra-oral view with metal retainer



Fig. 5-3 Frontal view with metal retainer

so the metal retainer covers the area around the fistula and the metal cap of the microdontia. (Fig. 6-1, 2, 3)



Fig. 6-1 Fistula exists on the palate



Fig. 6-2 Intra-oral view with which covers the fistula



Fig. 6-3 Frontal view with metal retainer

Conclusion

There are few studies on the long term follow up of cleft lip and palate prosthesis. This report investigated prosthetic treatment over the past 23 years and revealed metal retainer and bridge availability for long period in the patient's mouths. Some patients treated with prosthodontic devices have been followed up for over 10 years and these prosthesis have been maintained in good condition.

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