
Feeding Plate Fabrication for Infants with Cleft Palate Congenital Disorder at Mitra Sejati Hospital Medan and Grandmed Hospital Lubuk Pakam

**Pembuatan Alat *Feeding Plate* untuk Bayi dengan Kelainan Celah Langit-Langit Bawaan
di Rumah Sakit Mitra Sejati Medan dan Rumah Sakit Grandmed Lubuk Pakam**

Ricca Chairunnisa¹, Syafrinani¹, Hendry Rusdy²

¹Department of Prosthodontic,
²Department of Oral and Maxillofacial Surgery,
Faculty of Dentistry, Universitas Sumatera Utara
Jl. Alumni No. 2, Medan, 20155, Indonesia
Corresponding e-mail: ricca@usu.ac.id

Abstract

Cleft lip and palate (CLP) are one of the birth defects commonly found in Medan and surrounding areas with approximately 150 cases handled annually at Mitra Sejati and Grand Med Hospitals. Generally, labioplasty surgery is the only given treatment, but fabrication of the feeding plate before or after surgery is important to cover the palatal defect. From the prosthodontics aspect, fabrication after surgery cannot be performed because most parents do not know the importance of the feeding plate. To overcome this problem, community service was conducted by fabricating feeding plates that will be given 1 week after surgery. This was achieved by getting information about patients with CLP, general examination by paediatricians, the impression of the oral cavity in the operating room before surgery, outline design, and feeding plate fabrication at the dental laboratory. Subsequently, the insertion was carried out to evaluate whether infants can drink normally using a bottle. A total of 18 infants with CLP recognized the benefits of the feeding plate in Mitra Sejati and Grand Med Hospitals. The education given had a positive effect on knowledge about the importance of feeding plate and motivation for its use to make infants drink normally and gain weight according to age.

Keywords: cleft palate, feeding plate, community service

Abstrak

Salah satu defek kelahiran yang paling sering ditemukan di Indonesia terutama di Kota Medan dan sekitarnya adalah kasus celah bibir dan langit-langit (CBL) dengan jumlah sekitar 150 kasus CBL pertahun yang ditangani di rumah sakit Mitra Sejati dan Medistra. Namun, selama ini perawatan CBL hanya terbatas tindakan bedah labioplasti. Padahal, perawatan lanjutan seperti pembuatan alat bantu minum yang dilakukan baik sebelum maupun sesudah bedah juga perlu dilakukan untuk menutup celah langit-langit. Dari sisi prostodonsia, pemasangan alat bantu minum pasca tindakan bedah pada pasien CBL belum dilakukan karena kurangnya memperkenalkan perawatan ini kepada masyarakat sehingga orang tua pasien belum mengetahui pentingnya pemakaian alat bantu minum. Untuk mengatasi masalah tersebut, kami melaksanakan pengabdian masyarakat dengan membuat alat bantu minum yang dipasangkan 1 minggu pasca bedah. Untuk mencapai tujuan pengabdian dilakukan pendataan pasien-pasien penderita CBL di kedua rumah sakit tersebut, pemeriksaan umum bayi oleh dokter spesialis anak, mengedukasi orang tua bayi, pencetakan rongga mulut bayi di dalam ruang operasi sebelum tindakan labioplasti, membuat desain dan pengiriman ke laboratorium dental untuk diproses menjadi alat bantu minum. Selanjutnya, pemasangan alat bantu minum dan dilakukan evaluasi kemampuan minum susu bayi menggunakan botol susu. Sebanyak 18 bayi dengan CBL telah menerima manfaat pembuatan alat bantu minum di RS Mitra Sejati dan RS Grandmed Lubuk Pakam. Penyuluhan yang dilakukan sebelum tindakan bedah telah memberikan pengaruh positif dalam hal pengetahuan mengenai pentingnya alat bantu minum serta memberikan motivasi untuk menggunakan alat bantu minum sehingga asupan nutrisi bayi dan berat badan bayi dapat tercapai normal sesuai usianya.

Kata kunci: celah langit-langit, alat bantu minum, bakti sosial

INTRODUCTION

Cleft lip and palate (CLP) or labiopalatoschizis are one of the congenital defects frequently found in Indonesia. It is defined as a combination of clefts on the upper lip and palate that cause direct communication between the nose and mouth. Cleft anomalies can affect either lip, palate or both.¹⁻³ The incidence varies depending on ethnical factors, for example, in the Asia race, the anomaly affects approximately 2,1:1000 birth, 1:1000 in Caucasoid and 0,41:1000 in the African-American race.³⁻⁵ Meanwhile, the prevalence in Indonesia, ranges from 3000 to 6000 birth per year or one infant per 1000 birth. The most common case is CLP for about 46%, 33% in isolated cleft palate, and 21% for isolated lip.^{5,6}

This anomaly causes difficulties in nutritional gains and speech, nutritional disturbance in infants leads to difficulty in sucking milk which causes a reduction in body weight. The second problem in CLP is speech disturbance.^{1,7,8} The treatment or management is challenging due to the continuous infant priority from birth until adulthood. Presently, there are still several infants who have not received standard treatment. This might be due to the failure to socialize and understand all aspects of the health problems associated with this anomaly, including education, employment and income factors that can cause a delay in surgical time.^{5,6}

CLP surgery can only be performed when infants have met the rule of 10, namely 10 weeks of age, 10 Hb, and 10 pounds of weight.^{9,10} Therefore, the prosthodontist plays a key role in giving good nutrition to infants by fabricating a feeding plate. This is an artificial palate used to allow infants to drink normally, thereby increasing the body weight and optimizing surgery time.^{2,9}

The selection of Mitra Sejati and Grand Med Lubuk Pakam Hospital as the place for community service was based on the amount of CLP cases that have been handled. Both hospitals are located in North Sumatra and are reported to handle approximately 150 cases each year. Given that surgery is the most common option, the treatment of CLP must be carried out comprehensively with a paediatrician, oral, and maxillofacial surgeon as well as a prosthodontist.^{2,8,9} This study aims to explain the procedure carried out during the community service from the patient selection to the insertion of a feeding plate in infants with CLP.

MATERIALS AND METHODS

Community service was carried out in two hospitals, namely Mitra Sejati Hospital Medan (Mitra 1)

and Grand Medistra Lubuk Pakam Hospital (Mitra 2). The first stage was socialization regarding the fabrication of feeding plates for infants with cleft palate through social media.

The second stage was data collection and screening at both hospitals. The screening was performed by oral and maxillofacial surgeons, paediatricians, prosthodontists and post-graduate prosthodontists. Subsequently, the general conditions, blood tests, body weight, and the oral cavity were examined. After the explanation of the importance and the need for a feeding plate, the informed consent form was signed by the parents.

In the third stage, the oral impression was performed by prosthodontists and post-graduate prosthodontists in the operation room in sterile conditions (Figure 2). Procedures carried out in the operating room are the preparation of breathing apparatus in the form of oxygen with the assistance of an anesthesiologist, infants were fasted for 2-3 hours before impression to prevent vomiting during the process, and the tray was soaked in the physiological solution before and after removing it from the oral cavity, the trial of impression tray to make sure the size is acceptable with the maxilla and can provide space for impression material, the impression was performed with polyvinylsiloxane putty material (Figure 3). After the material was set, the tray was removed from the oral cavity then an examination of residual impression material inside the oral cavity and evaluation of the impression. Then the oral maxillofacial surgeon would continue with the labioplasty procedure.

In the fourth stage, the impression was evaluated to determine whether the defect area and limiting structures have been covered for feeding plate fabrication (Figure 4). After the evaluation, the impression was washed and cast using a type IV gypsum. Afterwards, an outline form was designed and waxed up according to different patient conditions. (Figure 5).

The fifth stage was the packing procedure to fabricate the feeding plate at the UJI dental laboratory which includes (Figure 6): the model with the wax pattern was placed into the cuvette with dental gyps (flasking). After the gyps is hardened, then the cuvette was immersed in water and heated for about 30 minutes until the wax melted (dewaxing). Packing with a mixture of acrylic on the intaglio surface and cameo surface. The cuvette was placed in a water bath, heated to 70⁰ Celsius for 30 minutes, and then to 100⁰ Celsius for 90 minutes. The polymerized acrylic material was removed from the mold. The fini-

shing and polishing of the feeding plate and then the feeding plate were evaluated before insertion.

The sixth stage involved the insertion of the feeding plate, as well as checking the vestibule and posterior of the palate area. After the posterior length was confirmed to be acceptable, the vestibule area was reduced to gain space for soft reline material (Mollosil, Germany) which was then mixed and placed around the vestibule as well as the palate part. Afterwards, it was inserted into the infants' mouths until the material setting time was complete. The feeding plate with soft reline material was evaluated for retention and stabilization (Figure 7), and then the mother was instructed to give the baby milk using a bottle to observe the adaptation of the feeding plate to the supporting tissues (Figure 8). After the baby can suck well, parents are taught how to open, install, and clean the feeding plate periodically.

The seventh stage is an evaluation after insertion, it was performed one week after to check the feeding plate adaptation and retention to the oral mucosa, the ability of infants to suck milk using a bottle, the hygiene of the oral cavity and the feeding plate, weight gain, and to hear any complaint of the parents during the first week. The cooperation between the parents and operator is very important to make sure infants can use the feeding plate and gain the accompanying benefits. The next evaluation was scheduled for every one month to check the retention or reline of the feeding plate.

RESULTS

A total of 18 infants consisting of 12 boys and 6 girls; 13 unilateral and 5 bilateral CLP cases with cleft palate have received the benefits of fabricating the feeding plate at Mitra Sejati Medan and Grandmed Lubuk Pakam Hospitals. Both hospitals in this community service program played a role in providing information about patient data with cleft palate and providing operating room facilities for taking the impression of the oral cavity with cleft palate. Afterwards, laboratory procedures were carried out to obtain feeding plates. The insertion of a feeding plate which acts as an artificial palate is intended to make infants suck normally. The goal of the feeding plate is to increase the body weight, this is important because infants with cleft palate are usually unable to reach a normal weight due to inadequate nutritional intake.

Evaluation of the community service program was carried out by the Team Leader to ensure that the implementation has achieved the specified objectives and sustainability. The program is expected to be carried out continuously, because in Indonesia, specifi-

cally in Medan, there are still several similar cases that are not handled properly due to lack of information and costs. Meanwhile, feeding plates have different designs according to the defect which might be unilateral or bilateral. The differences in each case are caused by innovations made to provide optimal results regarding infants' growing jaw.

In the next stage, activities were continuously carried out to gather more infants with CLP who require feeding plate treatment, namely the publication of activities through social media and direct outreach to the general public who need this treatment.

DISCUSSION

CLP, also known as orofacial cleft, is a congenital condition in which the lip or palate exposes or splits abnormally.^{1,7,11} It arises due to an interruption in the fusion of the upper lip during the early embryonic phase. A severe cleft lip can occur on both sides of the upper lip and form a cleft from the gums to the nostrils and palate, while mild cases only appear as a small cleft above the upper lip and they are not easily visible.^{11,12} CLP deformities are divided into three categories namely cleft lip, palate, or both, with the cleavage occurring only on the lips, the palate, and entirely from the palate to the lips respectively.¹²

The fusion of the lips and the oral cavity usually occurs during the first trimester of pregnancy.¹¹ This process is disrupted in individuals with labioschizis, culminating in a lack of union between the two portions of the body, namely part or all of the maxillary with the medial nasal bulge on one or both sides. Furthermore, palatoschizis or cleft palate development is produced by the fusion of the palatine plates or the upper oral cavity. The split might develop to a deeper depth in extreme instances, becoming the maxillary cleft.^{11,12}

Embryologically, facial development is coordinated by complex morphogenetic events with rapid proliferative expansion, hence, it is highly susceptible to environmental and genetic factors. During the 6th-8th weeks of pregnancy, the shape of the embryo's head is formed. Five primitive tissue lobes grow, namely the frontonasal, 2 maxillary, and 2 mandibular prominences. When these tissues fail to meet, a gap appears, leading to the formation of the cleft. The fusion failure reflects the location and severity of the cleft namely from a "small fissure" to a "completely malformed face".^{12,13} Genetic factors contribute to CLP formation. This anomaly might be present in several chromosome disorders including Van der Woude, Stickler's, Loeys-Dietz, Patau syndrome etc.¹²

Infants with CLP have trouble eating, as well as experience difficulties in various activities such as sucking, swallowing, and aspiration, thereby hindering the child's growth.^{1,3,4,6} Currently, there are still several patients who have not received standard treatment. This is due to a failure to recognize and comprehend all aspects of the health issues associated with this anomaly, as well as insufficient timing and treatment procedures.^{5,12} The majority of new patients or 82% were between the ages of 5 and 15 and originated from lower socio-economic backgrounds.^{5,6}

In the developed world, most scientists believe that clefts occur due to a combination of genetic and environmental factors comprising maternal illness, drugs, and malnutrition. In these countries, CLP is typically identified before birth by ultrasonography. Meanwhile, early detection allows time for parental education about the potential causes and procedures needed after the child's birth. Patient with orofacial cleft deformity needs to be treated at the right time and age to achieve functional and aesthetic well-being. The treatment process is complex, involving a multidisciplinary and interdisciplinary approach. The cleft of the lip and/or palate occurs in a strategic place in the orofacial region, and at a crucial time namely before birth, hence, it is a complex congenital deformity.¹⁴

The feeding obturator is a prosthetic aid designed to obturate the cleft and restore the separation between the oral and nasal cavities. This is important to improve sucking and swallowing as well as to keep the right and left maxillary parts in their proper position until surgery is performed.^{15,16} It produces a rigid platform for the infants to press against and obtain milk from the nipple.^{3,12} Moreover, it makes feeding easier, decreases nasal regurgitation, lowers the risk of choking and reduces feeding time.¹⁷ The obturator also keeps the tongue out of the defect, preventing it from interfering with the palatal shelves' natu-

ral growth toward the midline.¹² It can also assist to rectify the tongue position, thereby helping it to perform functional roles in the development of jaws and promoting speech development. This tool disallows food from entering the nasopharynx, consequently reducing otitis media and nasopharyngeal infections.¹⁸

The obturator is also useful in lowering parents' irritation with feeding issues and relieving anxiety associated with the birth of a child with this condition.¹ Based on the results, a total of 18 infants with CLP have already recognized the benefits of the feeding plate in Mitra Sejati and Grand Med Hospitals. The education gave positively affected the knowledge about the cause and treatment of CLP and motivation for using the feeding plate to make infants drink normally from the bottle. The evaluation was carried out every month to check the retention, the growth of the maxilla, and the fitting. Reline procedure was performed when the feeding plate was not fit the maxilla.

In this community service, it can be concluded that the counselling provided positively influenced the knowledge about the benefit and treatment of CLP, as well as motivation to use a feeding plate. This tool helps infants to suck milk from the bottle and gain weight according to their age. Different feeding plate designs can be made through modifications to provide optimal results by considering infants' growing jaws.

ACKNOWLEDGEMENT

The authors are grateful to LPPM Universitas Sumatera Utara for funding this program according to grant number 184/UN5.2.3.2.1/PPM/2021, signed on 7 June 2021 and also to Mitra Sejati Medan and Grandmed Lubuk Pakam Hospitals for the cooperation during the community service.

FIGURES

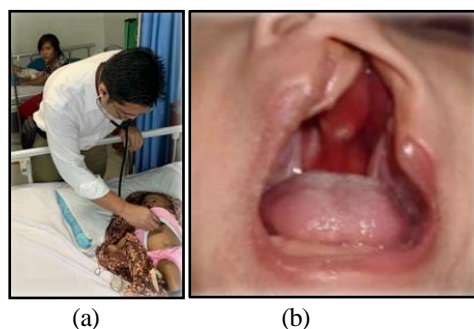


Figure 1 (a). Patient Examination, (b) Infant with CLP

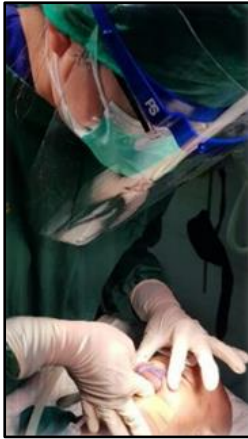


Figure 2. The impression process was performed in the sterile operating room



Figure 3. Impression with putty material using the custom tray



Figure 4. Impression covering all of the defects and limiting structure



Figure 5. Waxed up following the outline form according to the defect condition



(a)



(b)

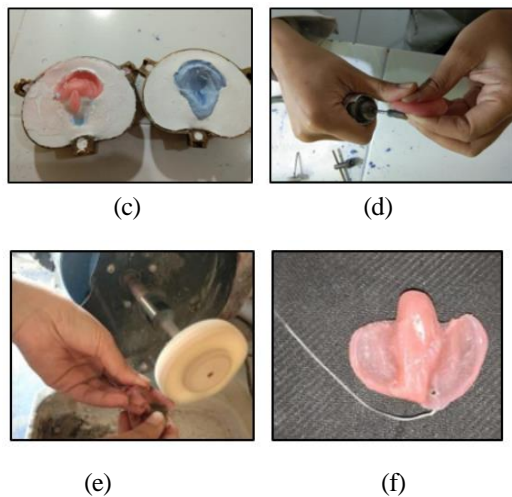


Figure 6. (a) Flasking procedure in cuvet (b) Dewaxing (c) Packing with acrylic material (d) Finishing (e) Polishing (f) Final result of the feeding plate



Figure 7. Feeding plate insertion



Figure 8. Infants try to drink milk normally using the feeding plate and showed good result

REFERENCES

1. Turagam N, Mudrakola DP. Meeting the challenge of feeding a new born infant with cleft lip and palate - A case report. *Dentistry* 2016; 6(8): 8–11.
2. Sowmya S, Shadakshari S, Ravi M, Ganesh S, Kumar Gujjari A. Prosthodontic care for patients with cleft palate. *J Orofac Res.* 2013; 3: 22–7.
3. Jangra B. Management of feeding problem in a patient with cleft lip/palate. *Int J Clin Pediatr Dent.* 2016; 9(2): 143–5.
4. Tirupathi SP, Ragulakollu R, Reddy V. Single-visit feeding obturator fabrication in infants with cleft lip and palate: A case series and narrative review of literature. *Int J Clin Pediatr Dent.* 2020; 13(2): 186–91.
5. Elfiah U, - K, Wahyudi S. Analisis kejadian sumbing bibir dan langit: Studi deskriptif berdasarkan tinjauan geografis. *J Rekonstruksi dan Estet.* 2021; 6(1): 34.
6. Gupta R, Singhal P, Mahajan K, Singhal A. Fabricating feeding plate in CLP infants with two different material: A series of case report. *J Indian Soc Pedod Prev Dent.* 2012; 30(4): 352–5.
7. Shi B, Losee JE. The impact of cleft lip and palate repair on maxillofacial growth. *Int J Oral Sci.* 2015; 7(000): 14–7.
8. Gracco A. Orthodontic, maxillofacial surgery, and prosthodontic rehabilitation supported by miniscrew in a patient with cleft lip and palate. *Case Rep Dent.* 2021; 5: 40–48
9. Rahmayani L. Fabrication of Prosthetic Feeding Plate as a Treatment Plan for Infant with Complete Unilateral Cleft Lip and Palate (Case Report). In: *Inter-*

- national Dental Conference of Sumatera Utara. Medan, 2017
10. Acheampong AO, Addison W, Obiri-Yeboah S, Amuasi A, Joojo Gowans LJ, Newman-Nartey M, et al. The rule of “10’s” in the management of unilateral cleft lip children: The komfo anokye teaching hospital experience. *J Clin Res Dent*. 2019; 2(1): 1–4.
 11. Abu-Hussein M. Cleft lip and palate - Etiological factors. *Dent Med Probl*. 2012; 49(2): 149–56.
 12. Ahila S, Anitha K. Technique of managing a cleft palate in a newborn. *Dent Oral Biol Craniofacial Res*. 2019; 2(2): 2-3.
 13. Dewi PS. Management of Cleft Lip and Palate (Literature Review). *Interdental J Kedokt Gigi*. 2019; 15(1): 25–9.
 14. Vyas T, Gupta P, Kumar S, Gupta R, Gupta T, Singh HP. Cleft of lip and palate : A review. *J Fam Med Prim Care*. 2020; 9(6): 2621–5.
 15. Rocha R, Ritter DE, Locks A, De Paula LK, Santana RM. Ideal treatment protocol for cleft lip and palate patient from mixed to permanent dentition. *Am J Orthod Dentofac Orthop*. 2012;141(4):140–8.
 16. Mink van der Molen AB, van Breugel JMM, Janssen NG, Admiraal RJC, van Adrichem LNA, Bierenbroodspot F, et al. Clinical practice guidelines on the treatment of patients with cleft lip, alveolus, and palate: An executive summary. *J Clin Med*. 2021; 10(21): 1-14
 17. Kannan RK, Nagappan C, Banu CMS, Raghunathan J, Sameera Y, Prasad NCA. Fabrication of Single Visit Feeding Plate in Cleft Lip and Palate Patient – A Case Report. *J Res Adv Dent*. 2021; 12(5): 264–6.
 18. Ghiya K. Feeding Plate of an Eight-day-old Patient Having Veau Type III Cleft Lip and Palate. *Eur J Dent Oral Heal*. 2021; 2(5): 1–3.