

Case Report

Rehabilitation Management of Post Palatoplasty in Adolescent: Case Report

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ABSTRACT

The objective of this study is to report comprehensive physical medicine and rehabilitation management of post-palatoplasty in an adolescent patient. The cleft palate repair is usually done in the first year of life in order to gain optimal speech function. To achieve normal communication development, normal hearing, normal oral and pharyngeal structures, adequate stimulation, and reinforcement from the environment for communication efforts are needed. Patient was assessed comprehensively using The International Classification of Functioning, Disability and Health (ICF) and by perceptual assessment for speech. The results showed that after one month intervention, the perceptions of hypernasality in plosive /b/ and affricates /c/ were found reduced significantly. There was improvement in articulation after one month of intervention.

Keywords: *post-palatoplasty, cleft palate, rehabilitation*

Introduction

Cleft palate is the failure of fusion of the palatal shelves of the maxillary processes, resulting in a cleft of the hard and/or soft palates¹. The primary palate (anterior of the incisive foramen) develops between 4 and 5 weeks of gestation followed by the secondary palate (posterior of the incisive foramen) between 8 and 9 weeks of gestation². Cleft palate involves either the hard and soft palate; or the soft palate only³.

Overall incidence of cleft lip and palate is approximately 1 in 600 to 800 live births (1,42 in 1000) and isolated cleft palate occurs approximately 1 in 2000 live births. Cleft palate is seen more frequently in females than in males¹.

Cleft of lip and palate (CL/P) may occur either in isolated form or in combination with other congenital deformities. The etiological factors of CL/P can be grouped into non-genetic i.e. various environmental risk factors – maternal smoking, heavy maternal drinking, maternal disease, stress during pregnancy, increased maternal and paternal age, fetal exposure to retinoid drugs; and genetic i.e. syndromic – associated with other malformation; and non-syndromic - the cleft is mostly an isolated feature¹.

The cleft palate repair is very functional in nature, mostly focuses in the quality of speech.¹ The quality of life of a child, and the family, is enhanced by surgical repair at earlier age in terms of functional, aesthetic, psychosocial, and speech issues⁴. Two-flap palatoplasty technique is principally known for having a lower fistula rate and can achieve better levator muscular repositioning^{1,5}. Palatoplasty procedure is done at six months until two years of age according to medical service protocol⁶.

Normal communication development depends on normal hearing, oral and pharyngeal structures, adequate stimulation and reinforcement from the environment for

communication efforts⁷. Conditions that can be associated with cleft palate are speech difficulties, ear infection, and feeding problems. Due to the dysfunction of m. levator veli palatini, phonation is affected. Retardation of consonant sound (p, b, t, d, k, g) is the most common finding. Abnormal nasal resonance and difficulty in articulation are another characteristic feature in most individuals with cleft palate⁸. The minimum standards for the evaluation of velopharyngeal function are perceptual evaluation of resonance and assessment using at least one instrument during connected speech (i.e., flexible fiberoptic nasendoscopy or fluoroscopy or pressure flow)⁹. The mental status of patients with CL/P should be considered and supported by psychological rehabilitation. The multidisciplinary approach towards this problem led to a steady improvement in its end results¹.

Principle of speech therapy in the aspect of speech, resonance, and velopharyngeal dysfunction are to correct articulatory placement, to achieve light articulatory contacts, to attain a greater mouth opening, to decrease hypernasal resonance quality, and to promote more anterior placement of articulatory production. Speech therapy is provided following surgical intervention (three months post-surgical recovery). Speech therapy cannot manage hypernasality or nasal emission. Improved overall articulation decrease the perception of mild hypernasality⁹.

Case Report

A fifteen years old girl was referred from Plastic Surgery outpatient department with post two-flap palatoplasty thirty three days before. Her speech was not intelligible and hypernasal. She could communicate verbally with family, classmates, and teachers. However, she felt unconfident and her speech volume was low when communicating with unfamiliar person. She

was studying at an Islamic boarding school and was following online classes during pandemic situation.

History of cleft in family members was denied. Her mother was twenty two years old and her father was twenty four years old when she was born. Her father had been smoking during her mother's pregnancy. Antenatal care was done by a midwife without ultrasonography facility. She was born at term, spontaneously, and after birth they found out that she had cleft palate. And then she was referred to a doctor. When she was two years old, her parents chose to not undergo the palatoplasty procedure. She wanted to undergo palatoplasty procedure on her own decision after being mocked by her friend. She had never had speech therapy before.

Her mother could not directly breastfeed her, but she gave milk to the patient with a spoon. Nasal regurgitation often occurred until she was seven years old. There was a history of ear infection during a

fever and rhinitis when she was six years old. There was no more ear infection after six years old. She started to babble at twelve months old, communicate fluently at four years old, drinking with straw at 4 years old. Gross and fine motor development were appropriate with age.

She was the first child of three siblings. Her mother is a teacher and her father is an entrepreneur. She was taught to communicate verbally by her family.

Physical Examination

The patient was *compos mentis*, vital signs, nutritional states, internal states, neuromuscular and musculoskeletal states were normal. From the face and oral local status, her face was symmetrical; nasal tip and columella at the center, ala nasi was symmetrical; lip was symmetrical, there was no scar; scar and oral thrush on palatum durum and uvula; malocclusion was seen on upper incisive teeth (figure 1).



Figure 1. Oral status of the patient

Communication assessments were done with the results being normal for cognitive and pragmatic aspects, playing ability, language function. In the aspect of social interaction, she was ashamed to initiate contact with unfamiliar persons, but joint attention, turn-taking, and attachment behavior patterns were good. In term of speech production, lip and tongue were good; upper second incisors grew behind the first incisors; scar and oral thrush was seen on

palate; velopharyngeal mislearning; hypernasality on resonance function; compensatory articulation, glottal stop, weak or omitted consonant on articulation pattern; and the intelligibility was 75%. Hearing function was good. Cardiorespiration and phonation were good.

On oral-facial examination, there was no facial abnormality, fistula, and submucous cleft. There was no upper lip stiffness, tongue tip, asymmetrical face movement, nasal flare,

nasal grimace, facial grimace on visual examination when she talked.

Perceptual assessment was done by video recording of the patient reading aloud a set of words and sentences. And after that, assessment of the video recording was done to assess the speech production. Perceptual assessments were done twice, one before intervention, and the other one after

intervention in order to objectively compare pre- and post-intervention speech production.

Single words perceptual assessment pre-intervention can be seen on table 1 and perceptual assessment of sentences can be seen on table 2. From the tables, there were substitutions of /c/ to /t/, /j/ to /d/, /z/ to /y/; omitted /k/, and /s/ hypernasality.

Table 1. Single words perceptual assessment before intervention⁸

	/a/	/i/	/u/
/b/	Balon	Bibir	Buku
/c/	Cacing X	Cicak X	Cuci X
/d/	Daun	Mandi	Duduk
/g/	Gajah	Gigi	Dagu
/h/	Paha	Hijau	Hujan
/j/	Jambu X	Jinjit	Keju
/k/	Kaca X	Kaki X	Kuda X
/l/	Lalat	Tali	Palu
/m/	Mandi	Minum	Mulut
/n/	Nanas	Anisa	Banu
/r/	Kerang	Lari	Rumah
/s/	Sapi X	Dasi X	Susu X
/p/	Papa	Api	Sapu

Table 2. Sentences perceptual assessment before assessment⁸

b	bibi beli buku	l	luki lalu lalang
c	<i>cuci cepat celanamu</i>	w	wisata ke ciawi
d	duduk depan pintu	y	yadi main yoyo
g	gani gosok gigi	r	robot raksasa
h	hutanku hijau	m	mina masuk mobil
p	papi pamit pulang	n	nisa naik bendi
t	tali sepatu titi	z	<i>marzuki membayar zakat</i>
k	<i>kaki kakek kaku</i>	ng	memanggang pisang
f	film fantasi	ny	banyak nyamuk
s	<i>sisi suka susu</i>	kh	pasukan khusus
j	juki jalan <i>jinijt</i>	sy	syukuri syukuran

From the perspective of The International Classification of Functioning, Disability and Health (ICF), the patient's health condition, body structure, body function, activity, participation, personal and

environmental factors can be seen on diagram 1. Health condition of this patient was cleft palate post palatoplasty. This patient had malocclusion of the teeth and oral thrush on palate. Good function of her eyes and ears

were found one her body structure integrity. She had impaired articulation with compensatory articulation production, velopharyngeal mislearning, glottal stop, and weak or omitted consonant; hypernasality on resonance function. Visual and auditory attention, and cognition were good. Activity limitation involves substitution of /j/ to /d/, /c/ to /t/, and /z/ to /y/, weak or omitted /k/, and /s/ hypernasal voices are heard. The patient can follow instructions well, marking the wellness of her activity functioning. The only thing restricting participation was that the child was unconfident to talk with unfamiliar person, and as for the functioning of participation, she can communicate verbally

with familiar person and she was studying at Islamic boarding school. Barriers from personal factors were the age of the patient (she was 15 years old), female gender, oldest child, and her unconfident communication with unfamiliar persons. Facilitators from personal factors were she was studying at regular school; she could communicate verbally with familiar persons. Family support, an educated mother, and a best friend are facilitators of environmental factor. Friends that mocked her and help from her family if she needs to communicate verbally with unfamiliar persons can decrease her opportunity to practice speech, barriers from environmental factors.

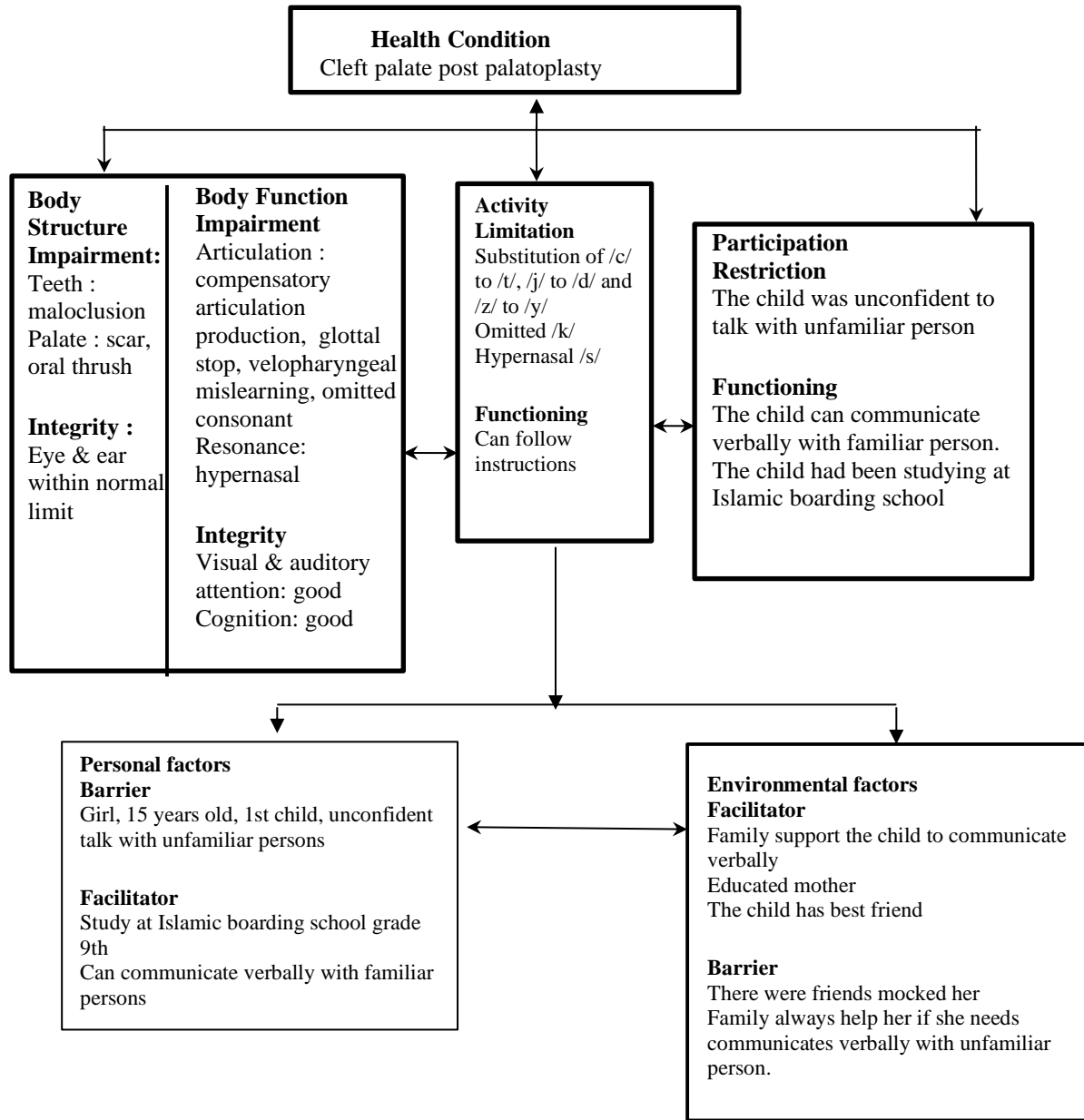


Diagram 1. ICF diagram of the patient

Rehabilitative goals of this patient were to increase her confidence, to improve her oral hygiene, to decrease hypernasality, and to improve articulation. Rehabilitative programs to increase her confidence, which consisted of mental support, parents' education for giving opportunity for her to communicate with unfamiliar persons verbally. Educate the patient to gargle with water regularly in order to improve her oral hygiene. To improve the

articulation, the patient was programmed for speech therapy twice a week to correct the manner and point of articulation gradually. She was also taught to give attention for auditory and visual feedback with voice recording and mirror consecutively. After one month of intervention, perceptual assessment was done once again, and the results can be seen on table 3 and table 4.

Table 3. Single word perceptual assessment after intervention⁸

	/a/	/i/	/u/
/b/	Balon	Bibir	Buku
/c/	Cacing	Cicak	Cuci
/d/	Daun	Mandi	Duduk
/g/	Gajah	Gigi	Dagu
/h/	Paha	Hijau	Hujan
/j/	Jambu	Jinjit	Keju
/k/	Kaca X	Kaki X	Kuda X
/l/	Lalat	Tali	Palu
/m/	Mandi	Minum	Mulut
/n/	Nanas	Anisa	Banu
/r/	Kerang	Lari	Rumah
/s/	Sapi X	Dasi X	Susu X
/p/	Papa	Api	Sapu

Table 4. Sentences perceptual assessment after intervention⁸

b	bibi beli buku	l	luki lalu lalang
c	cuci cepat celanamu	w	wisata ke ciawi
d	duduk depan pintu	y	yadi main yoyo
g	gani gosok gigi	r	robot raksasa
h	hutanku hijau	m	mina masuk mobil
p	papi pamit pulang	n	nisa naik bendi
t	tali sepatu titi	z	marzuki membayar zakat
k	kaki kakek kaku	ng	memanggang pisang
f	film fantasi	ny	banyak nyamuk
s	<u>sisi suka susu</u>	kh	pasukan khusus
j	juki jalan jinijit	sy	syukuri syukuran

There were improvements that can be seen on table 3 and 4 involve there was no substitutions of /c/ to /t/, /j/ to /d/, inconsistent /z/ to /y/; however there was still inconsistent omitted /k/, and consistent of /s/ hypernasality. Intelligibility improved from 75% to 85%.

Discussion

Patients can be seen comprehensively through the ICF perspective, and then goals and management can be set precisely. Goals were set based on priority in which to

increase her confidence and oral hygiene, to decrease hypernasality, and to improve articulation consecutively. Increasing her confidence was an important factor in this patient because the patient should be able to communicate with unfamiliar person during intervention and this is the main factor that can determine the success of other programs. And oral hygiene is important to prevent complications such as fistula¹⁰. Improved articulation can be achieved by correct manner and point of articulation. This patient had good visual, hearing, and cognition so the patient can follow the instructions. Those

were supporting factors to the success of the program.

There were improvements that can be clearly seen, which were no more substitutions of /c/ to /t/, /j/ to /d/, inconsistent /z/ to /y/; however there were still inconsistent omitted plosive /k/, and consistent of fricative /s/ hypernasality. Intelligibility also improved from 75% to 85%.

Palatoplasty procedure is usually done in the first year of life in order to gain optimal speech function⁷. This patient underwent palatoplasty procedure too late which was done at 15 years old. Intelligibility of speech of this patient was 75% before intervention. Fortunately, this patient had a supporting factor, which was a family that supported her to communicate verbally. She also had the opportunity to study at regular school which enabled her improve her social interaction. To summarize, her environment was the main factor which supported the successfulness of this program.

One month intervention was able to improve her intelligibility to 85%. She was able to follow the instructions and practiced it in her daily life. Intervention should be continued to gain more improvement. There was no direct assessment of this patient, this is the limitation of this case report.

Conclusion

The outcome that was expected in patients with cleft palate that had undergone palatoplasty was the increase of intelligibility, which can be achieved by improving the manner and point of articulation. This patient showed articulation improvement in one month. Intervention must be continued to achieve better articulation.

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