

## COMPARATIVE STUDY OF SURGICAL TECHNIQUE FOR THE CORRECTION OF THE CONGENITAL CLEFT PALATE IN MONGOLIA

Ayanga Gongorjav<sup>1</sup>, Davaanyam Luvsandorj<sup>2</sup>, Purevjav Nyanrag<sup>2</sup>, Ariuntuul Garidkhuu<sup>2</sup>, Agiimaa Dondog<sup>1</sup>, Bayasgalan Rentsen<sup>1</sup>, Eun-Sik Jang<sup>3</sup>, Seong-Gon Kim<sup>4</sup>, Young-Wook Park<sup>4</sup>

<sup>1</sup>*Dept. of Maxillo-Facial surgery, Mongolian Maternal and Child Health Research Center,*

<sup>2</sup>*Health Science University of Mongolia, The School of Dentistry*

<sup>3</sup>*Dept. of Oral and Maxillofacial Surgery, Hallym University*

<sup>4</sup>*Dept. of Oral and Maxillofacial Surgery, College of Dentistry, Gangneung-Wonju National University*

### Abstract

**Objective :** The objective of this study was to compare the surgical techniques for the correction of congenital cleft palate.

**Techniques and approaches :** Four-hundred-sixty patients operated between 1993 and 2008 were included in this study. The collected data were age, sex, operating time, admission days, and complications. The comparison between techniques were done by independent t-test.

**Results:** The majority (86.9 %) of patients were received the operation later than 1.5 years old. The distribution of each surgical technique was 43.8 % by Bardach palatoplasty, 11.9 % by Furlow palatoplasty, 1.8 % by Veau palatoplasty, and 42.4 % by the new technique developed by us. Postoperative complication such as wound dehiscence, formation of oro-nasal fistulas in the soft and hard palates were shown in 23.0 % of Bardach technique, 44.2 % of Furlow technique, and 37.5 % of Veau technique. However, only 5.4 % of patients were shown complications in our technique (P<0.001). The operation time was recorded 70 minutes under new technique while the others were 110 minutes (P<0.001). The clinical treatment at hospital was required 7.4 days for our technique and 11.3-15.5 days for the other methods.

**Conclusion :** The surgical treatment of congenital cleft palate in Mongolia was conducted later than proper timing for surgery. As the results were indicated, our new technique should be considered for the correction of cleft palate in old aged patients.

**Key words :** Congenital cleft palate, Bardach technique, Furlow technique, Veau technique, Palatoplasty

### I. Introduction

Mongolia is located in Central Asia and borders with China and Russia. It has a territory of 1.5 million square meters and a population of 2.5 million. Approximately, 1 million live in Ulaanbaatar, capital city of Mongolia. The Mongolian Maternal and Child Health Research center where we made our studies is the one of main hospital that provides health ser-

vices throughout the country. Especially, it is the only center in the country that carries out the joint treatment of congenital cleft lip and palate together.

The incidence of congenital cleft lip and/or palate has been reported as a birth among 500-2500 births. In case of Mongolia, it is reported as a birth among 1314 live births<sup>1)</sup>. The syndromic cases are 29.2 %. In case of the syndromic cleft lip and/or palate, 43.5 % is associated with muscle and rheumatic abnor-

malities, 29.2 % defects in central nervous system, and 28.9 % defects in cardio-vascular system<sup>2)</sup>. Most cases, nonsyndromic cleft lip and/or palate (70.8 percent), can live normally in regards of physiology and can involve in social relationship when they are adult. Early surgical intervention is advantageous for the patient's social relation and psychological stability. The proper timing for the correction of congenital cleft palate has been reported between 6 months and 18 months to promote normal speech development<sup>3-10)</sup>.

For the correction of cleft palate, many different kinds of approaches have been reported. The complication rates are different to the techniques and reported as 0 to 63 percent<sup>11-15)</sup>. The complication rates may be determined by patient's factors like age/systemic disease, operator's skill, and operating technique. The patient having oro-nasal fistula is needed to have additional surgical treatment since it is impossible to develop normal speech due to loss of air from oral cavity to nasal cavity during the speech. If the other condition is the same, proper surgical technique must be selected for the best results and to avoid complications. The selection of proper surgical technique is determined by patient's condition. Since the average age of Mongolia patients is relatively high, the complication rates may be different to previous reports. We have done surgery using the techniques of Bardach<sup>16)</sup>, Furlow<sup>17)</sup>, and Veau<sup>3)</sup> as well as new technique developed by us. The goal of current study was to evaluate the result of each technique and to compare them in terms of various clinical variables like operation time, admission duration, and complications.

## II. Patients and Method

Total 460 patients, who received the palatoplasty at Department of maxillo-facial surgery of Mongolian Maternal and Child Health Research Center (MMCRC) between 1993 and 2008, were included in this study. All patients were nonsyndromic congenital cleft palate. Since the objective of this study was to evaluate the effects of the design of surgical technique on postoperative complication, the patients who had acute infectious disease that might influence adversely on the wound recovery were excluded from

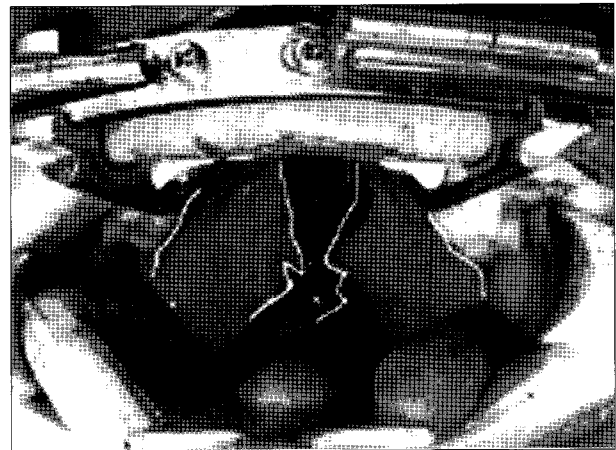


Fig. 1. Diagram of our surgical technique.

the study. The recorded variables were age, sex, operating technique, operating time, admission duration, and postoperative complications. The used surgical techniques were Bardach palatoplasty, Furlow palatoplasty, Veau palatoplasty, and our new technique.

The design of our new technique was described in Fig. 1. It could be summarized as follows. The top of the uvula in both sides were pulled and rotated to the oral side. Then, new triangular flap was made at the soft palatal mucosa. The soft palate and the uvula were connected by the flat surface, not by the edge facing each other, and they were sutured. As doing so, both flaps were more closely approximated and the soft palate could be pushed back more. Also it could be possible to close oral and nasal side separately.

The comparison between groups was done by independent samples t-test. The significant level was set by  $P < 0.05$ .

## III. Result

The age of patients was between 11 months and 10 years-old. Two-hundred-thirty-three patients were male and 227 were female. Twenty-four patients having post-operative acute infectious disease were excluded from this study. Therefore, 436 patients were included in this study. Three-hundred-seventy-nine patients (86.9 %) were older than 18 months (Fig. 2). Two-hundred-sixty-one patients (59.9 %) were from local area (countryside)

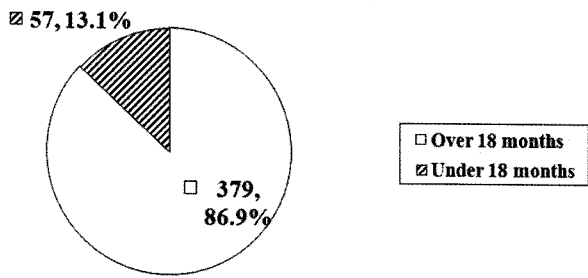


Fig. 2. Age classification of patients who have been operated.

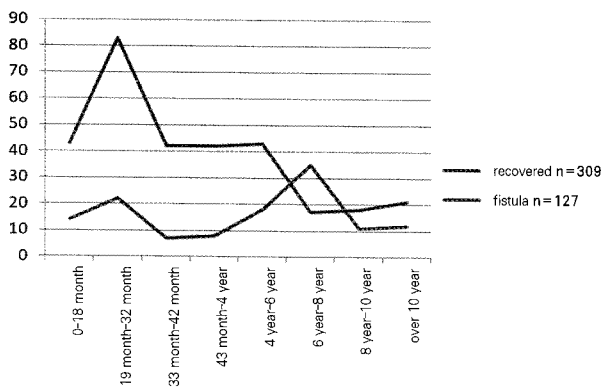


Fig. 4. Recovery of surgery wound of patients with congenital cleft of lip and palate by ages.

and 175 patients (40.1 %) were from capital city Ulaanbaatar (Fig. 3).

Four kinds of techniques for palatoplasty were used for the patients and recorded the results per technique by recovery of wounds, duration of surgery, hospitalization days. One-hundred-ninety-one patients (43.8%) were treated by Bardach technique. Fifty-two patients (11.9 %) were treated by Furlow technique. Eight patients (1.8 %) were treated by Veau technique. One-hundred-eighty-five patients (42.4 %) were treated by our new technique. As

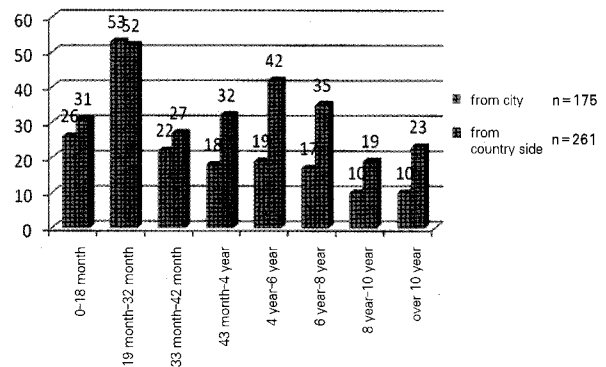


Fig. 3. The age of operated patients with congenital cleft of lip and palate by their regions.

shown in Table 1, 175 patients (94.6%) by our new technique were recovered by single surgery. The recovery rate by single surgery was 77.0%, 55.8%, and 62.5% by Bardach technique, Furlow technique, and Veau technique, respectively. The difference between our new techniques and the others was statistically significant ( $P < 0.001$ ). The average duration of surgery was 70 minutes by our new technique. The average duration of surgery was 110 minutes, 120 minutes, and 100 minutes by Bardach technique, Furlow technique, and Veau technique, respectively. The difference between our new techniques and the others was statistically significant ( $P < 0.001$ ). The average hospitalized days were 7.4 by our new technique. The average hospitalized days were 15 days, 15.5 days, and 11.4 days by Bardach technique, Furlow technique, and Veau technique, respectively. The difference between our new techniques and the others was statistically significant ( $P < 0.001$ ). The relation between patient's age and complications was shown in Fig. 3. The prevalence of fistula was highest at age of 6-8 years (Fig. 4).

Table 1. Recovery of wound after surgery, duration of surgery and average hospitalization days

	Bardach palatoplasty	Furlow palatoplasty	Veau technique	New technique
Total cases	191 (43.8 %)	52 (11.9 %)	8 (1.8 %)	185 (42.4 %)
Recovered by single surgery	147 (77.0 %)	29 (55.8 %)	5 (62.5 %)	175 (94.6 %)*
Wound dehiscence, formation of fistula	44 (23.0 %)	23 (44.2 %)	3 (37.5 %)	10 (5.4 %)*
Average duration of surgery (minutes)	110	120	100	70*
Average hospitalized days	15	15.5	11.4	7.4*

(\* $P < 0.001$ )

#### IV. Discussion

The number of patients from outside of the capital has been increased. Since the proper medical care is delayed in rural area, the patient's age at the time of surgery has been increased. Thus, the average age of this study was comparatively higher than previous study. As shown in Fig. 3, the number of patients from Ulaanbaatar was not different to that of local area between 6 months and 3-year old. However, there was difference between groups from 43 months (Fig. 3). Most patients (86.9 %) was received the operation at the age later than the international recommendation. These patients came from the countryside, mostly. Since proper timing of surgery is highly important to give best results, medical service for the congenital deformities must be improved in the countryside.

The complication after palatoplasty is usually fistula formation. The fistula formation rate has been reported from 6 to 42.3%<sup>11-15</sup>. The excessive tension applied to the flap may be the main etiology of the fistula formation. The palatal flap must be generated by tension-free and receive proper blood supply. The suture must be done separately from oral side and nasal side. To avoid excessive tension, many techniques have been published. Our new technique was particular useful in wide palatal defect. Since most patients in our study were aged people, the palatal defect was wide. When the defect width is more than 15mm, the patient has significantly higher risk of oro-nasal fistula formation<sup>18</sup>.

There are many differences between primary cleft repair for infants and for adults. They are summarized as follows<sup>19</sup>: (1) since maxillary growth is finished in adults, aggressive correction is possible; (2) correction of the anterior part of the nasal deformity is more difficult than in infants; (3) since the palatoplasty is more invasive and results in higher morbidity, it must be done separately; and (4) cheiloplasty can be done under local anesthesia. In case of Furlow technique, the formation of an oronasal fistula is reported in 3.6% of patients<sup>20</sup>. In our case, Furlow technique was shown fistula in 36.5% of patients (Table 1). It might be due to the wide defect of the cleft palate and older age of patients. The palatoplas-

ty for the aged patients has been shown higher complications<sup>19</sup>. However, the wound dehiscence rate was 5.4% by our technique in our patients' group (Table 1). Compared to the other techniques, significantly low rate of fistula formation was observed the patients treated by our new technique ( $P<0.001$ ).

However, this conclusion was made from the assessment based only on recovery of surgical wounds, duration of surgery, and average period of hospitalization in the clinic. Another crucial result from surgical treatment of congenital cleft of palate is condition of speech. The secondary surgery for the correction of velopharyngeal insufficiency is 36% of patients who received Bardach technique<sup>21</sup>. Therefore, we need to estimate the result by performing the survey jointly with speech therapist in the future in order to make sure that new technique is effective in speech, too.

#### V. Conclusion

1. In Mongolia, the surgical treatment of congenital cleft palate was performed at later age than the international recommendation.
2. The rate of complication was significantly lower in our new technique than the other techniques ( $P<0.001$ ).
3. The duration of surgery and the hospitalized days of patients treated by our new technique were less and shorter than the other techniques ( $P<0.001$ ).

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#### 저자 연락처

우편번호 210-702  
강원도 강릉시 강릉대학교 120번지  
강릉원주대학교 치과대학 구강악안면외과학교실  
김성곤

원고 접수일 2009년 8월 10일  
게재 확정일 2009년 9월 22일

#### Reprint Requests

**Seong-Gon Kim**  
Dept. of OMFS, College of Dentistry, Gangneung-Wonju National University  
Gangneung Daehangno 120, Gangneung, Gangwon-do. 210-702, Korea  
Tel: 82-33-640-2468 Fax: 82-33-640-2477  
E-mail: epker@chol.com

Paper received 10 August 2009  
Paper accepted 22 September 2009