

## Treatment Outcomes of 4 to 7-Year-Old Patients with Cleft Lip and Cleft Palate in Tawanchai Center, Srinagarind Hospital

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**Background:** Cleft lip and palate (CLP) are congenital deformities which require interdisciplinary team care and appropriate surgery to achieve best outcomes.

**Objective:** Our aim was to study the treatment and surgical outcomes in patients with CLP, according to the protocol of the Tawanchai Center.

**Materials and Methods:** This was a descriptive study of 93 patients with CLP between 4 and 7 years of age under treatment at the Tawanchai Center, Srinagarind Hospital. Data regarding general information, surgery, treatment, and rehabilitation were collected using records kept by the interdisciplinary team. Percentage and content analysis were determined from these data.

**Results:** There were 93 patients between 4 and 7 years of age who underwent CLP surgery. Fifty-six of the patients were male (74.2%). Four cases had late cleft lip operation (4.3%) and 3 had late cleft palate operation (3.23%). Nineteen cases had post-operative fistula (20.9%). All of the patients received treatment with 11 disciplines of the interdisciplinary team. The data revealed the maximum number of patient visits was 1,123 times (26.41%) for assessment, surgery, nursing care, and follow-up following the protocols.

**Conclusion:** Ninety patients between 4 and 7 years underwent cheiloplasty and palatoplasty following the protocol (95.7 and 96.8%, respectively). There was no wound separation post-operative cheiloplasty but palatoplasty had fistula 20.9%. Medical service with complete by interdisciplinary team reached 92.5%. The interdisciplinary team and nurse coordinator aim to develop medical accessibility so that patients would receive treatment with every discipline.

**Keywords:** Tawanchai center, Cleft lip and cleft palate, Interdisciplinary team

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Cleft lip and cleft palate are the fourth most common congenital deformities found in newborns (1 per 600 live births)<sup>(1)</sup>. Ratanasiri et al<sup>(2)</sup> reported the incidence of CLP in Thailand was 1.1 per 1,000 live births at Srinagarind Hospital. Ruangsitt et al—who conducted studies in three hospitals in Northeast—Thailand reported that there were 2.49 CLP per 1,000 live births<sup>(3)</sup> which is the highest number in Thailand and worldwide. Chowchuen et al<sup>(4)</sup> reported that the incidence CLP in Thailand was 1.62 per 1,000 live births.

The impacts of CLP include both physical and

psychological for both the patient and his/her caregivers, extending to community-wide, even national, socioeconomics. Typical challenges include facial deformities, speaking difficulties, otitis media with effusion, hearing deficits, sucking and swallowing problems, dental problems, occlusion disorders associated with bone structure abnormalities, and developmental delays.

The standards of care for patients with CLP at the Tawanchai Center, Srinagarind Hospital were established since in 1999, and include an interdisciplinary team providing holistic care. The team had regular meetings to develop the treatment protocol, which resulted in a cooperative work model and systematic implementation. The protocol has been revised 5 times with the latest revision made in May 2017<sup>(5)</sup>. A retrospective study was conducted by Pradubwong et al in 2012<sup>(6)</sup> to study 4 to 5-year-old patient's with CLP who received treatment and follow-up at the Tawanchai Center, Srinagarind Hospital after a decade of interdisciplinary team

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care. The study found that of the 123 cases who received treatment, 120 underwent surgery, and 74 cases (60.2%) had CLP. The highest number of patients examined in the out-patient surgical examination room was 960 through 706 visits and 22.3% were followed-up at the ENT outpatient clinic. Pradubwong et al<sup>(7)</sup> have also reported the average length of hospital admission was 5 days per person. Within the same study group, 30 patients with cleft lip (100%) received pre- and post-surgical information and care. Twenty-nine cases (96.7%) received surgery following the established protocol at 3 to 4-month's of age. Moreover, 63 patients (85.1% of cleft lip and palate cases) received pre- and post-surgical counseling and underwent surgery at the appropriate times per the established protocol.

Since Srinagarind Hospital was certified by the Healthcare Accreditation Institute (HA)<sup>(8)</sup>, the Tawanchai Center was renamed the Tawanchai Excellence Center for Patients with Cleft Lip Cleft Palate and Craniofacial Deformities, Khon Kaen University. Key performance indicators (KPIs) were developed and re-measured with interdisciplinary cooperation led by a surgical team from the Department of Nursing Surgery and Orthopedics, Nursing Division and Srinagarind Hospital. The Center was certified with a Disease Specific Certification (DSC) in cleft lip cleft palate by the Healthcare Accreditation Institute (HA) on March 5, 2018.

At each stage of the planning of treatment and services, the care process of the interdisciplinary team with the primary goal of achieving patient safety, satisfaction, and ability to live normally in society. The objectives of the current research were to study the 4 to 7-year-old patients with cleft lip and cleft palate who received treatment, nursing care, and follow-up with the interdisciplinary team at the Tawanchai Center, Srinagarind Hospital to assess the quality and suitability of the interdisciplinary care system. The results have value for (a) planning CLP service accessibility to treatment per the established protocol and (b) evaluating whether international standards have been met (Table 1).

## Objective

Our aim was to study the treatment of patients with cleft lip and palate at the Tawanchai Center, Srinagarind Hospital according to the established protocol.

## Materials and Methods

After the ethics considerations were reviewed and approved by Khon Kaen University (HE601414), the retrospective study was conducted drawing upon the medical record data of 93 CLP patients between 4 and 7 years old, diagnosed and continuously treated by the Tawanchai Center, Srinagarind Hospital. Data collection included general information, operations, treatment, and rehabilitation records; as provided by the interdisciplinary team between January and March, 2018. Qualitative data, statistical percentages, and content analysis were used to analyze the data.

## Results

According to the 93 cases of 4 to 7-year-old patients with CLP receiving treatment at the Tawanchai Center, Srinagarind Hospital, 56 cases (60.2%) were male. The majority of the 44 cases had left unilateral cleft lip and palate (47.3%). Based on the protocol, 4 cases received late cheiloplasty (4.3%) and 3 received late palatoplasty (3.3%). Nineteen cases had palatal fistula after surgery (20.9%), and overall, 4 patients had syndromes (4.3%) (Table 2).

According to the follow-up of the 93 cases who received treatment, most visits were with plastic surgeons (1,123 times or 26.4%). The main purpose of follow-up included: surgical evaluation; surgery; nursing care; and, following-up treatment outcomes. ENT logged the greatest number of visits, for a total of 1,013 times (23.8%), mostly to assess otitis media function and to provide treatment (Table 3).

## Discussion

The current review of patients with CLP receiving treatment from an interdisciplinary team—per the treatment protocol of the Tawanchai Center—confirmed that every case was assessed and received instruction, surgery, rehabilitation, and was followed-up by the interdisciplinary team. The fact that all patients were helped demonstrates the effectiveness of the cooperation of the interdisciplinary team—viz., true comprehensive and integrated hospital services within one excellence center with a mission to coordinate, administer, and encourage patients to receive age-appropriate treatment. Pradubwong et al<sup>(7)</sup> documented that treatment of 4- to 5-year-old patients with CLP in the Tawanchai Center reflected the dedication and efficiency of the interdisciplinary team as well as the standard of care at the Tawanchai Center. Notwithstanding, of the 90 CLP patients, two did not receive an assessment from an otolaryngologist or audiologist, and five failed to receive a speech assessment and training with a speech therapist. The possible reasons include (a) miscommunication between the care team and the caregivers, (b) problems with the referral system and/or travel, or (c) ineffective follow-up. These challenges represent an opportunity to further develop the team's caring process and referral system for patients.

The surgery record of patients with CLP, according to the protocol of the center, revealed that some patients failed to receive surgery as targeted. The most common ailments were fever and cold, causing a delay in surgery. Pradubwong et al<sup>(9)</sup> clarified that the dual risks of respiratory tract infections and physical disorders ranked as the two reasons for delayed surgery. Retrospective data for 2015 to 2017 shows that a respective 89.5, 100, and 95 percent of patients received cheiloplasty<sup>(10)</sup>. The current study had a similar percentage of cheiloplasty (95.7%). The respective rate of palatoplasty was 80, 100 and 96.96 percent, while in the current study it was 96.8 percent. The challenge for the interdisciplinary team and nurse coordinator is to improve the system so that 100% of patients get their age-

**Table 1.** Guidelines for the care of patients with cleft lip and cleft palate, according to patient age, from *in utero* to 7 years of age by the Tawanchai Center interdisciplinary team. Reviewed in May, 2017<sup>(5)</sup>

Age period	Care service
Perinatal to 3 months	<ul style="list-style-type: none"> <li>- Registration for newborns with cleft lip, cleft palate, and craniofacial deformities and provision of healthcare and follow-up.</li> <li>- Provision of genetic counseling (prevention of recurrence in next pregnancy) and diagnosis of syndromes (Pediatricians).</li> <li>- Explanation of anomalies and syndromes to encourage caregiver awareness of disease severity, anomalies, and syndromes, including critical problems, goals of care, and treatment plans (Plastic surgeons and team).</li> <li>- Assistance and instruction on breastfeeding (Postpartum nurses and breastfeeding clinic at Ward 2B)</li> <li>- Supply assistive devices (i.e., lip/nostril retainer as necessary) (Orthodontic and plastic surgeons)</li> </ul>
3 to 6 months	<ul style="list-style-type: none"> <li>- Preparation for surgery. (Nurse coordinator, examination room, and patient wards)</li> <li>- Provision of cheiloplasty (primary lip-nose repair) (Plastic surgeons)</li> <li>- Provision of pre- and post-surgical care counseling (Nurses of patient ward, nurse coordinator and examination room)</li> <li>- Checking ears and hearing within first 6 months. In case Otitis Media (OME), hearing checkups must be every 3 months, vs. every 6 months without OME. Checkups to continue until 7 year of age when ET tube has a good function (ENT and Audiologist).</li> <li>- First development evaluation to be done within 1 year (Psychiatrists and psychologists)</li> <li>- Growth stimulation within the first year of life every 3-6 months (Psychiatrists and psychologists)</li> <li>- Assessment before anesthesia induction at every age prior to surgery (Anesthesiologists and nurses anesthesia)</li> <li>- Follow-up treatment outcomes through online registration system (Nurse coordinator).</li> </ul>
10 to 18 months	<ul style="list-style-type: none"> <li>- Speech assessment before palatal surgery (Speech pathologists)</li> <li>- Palate surgical repair, including hard and soft palate cleft cases plus myringotomy (as necessary) (Plastic surgeons and ENT).</li> <li>- Provision of pre- and post-surgical care counseling (Nurses of patient wards, nurse coordinator, and examination room)</li> <li>- Follow-up treatment outcomes through the online registration system (Nurse coordinator)</li> </ul>
1 1/2 to 3 years	<ul style="list-style-type: none"> <li>- Speech and language therapy, ear, and hearing check ups</li> <li>- Monitoring development of teeth and general dental healthcare (Pedodontists and orthodontists, together with sub-district healthcare team and school)</li> <li>- Development of learning and social skills</li> <li>- Second development evaluation. Disability and health assessment per International Classification of Functioning (ICF) between 2 and 5 years of age (Psychiatrists and psychologists)</li> <li>- Oronasal fistula closure (as necessary) (Plastic surgeons)</li> <li>- Follow-up treatment outcomes through online registration system (Nurse coordinator)</li> </ul>
4 to 7 years	<ul style="list-style-type: none"> <li>- Secondary cleft lip/cleft lip nose correction (as necessary) (Plastic surgeons)</li> <li>- Speech and language incompetency (VPI) assessment Hearing and audiogram check up.</li> <li>- Dental health care and malocclusion check up (Pedodontists and orthodontists)</li> <li>- IQ and ICF test between 6 and 18 years of age (Psychiatrists and psychologists)</li> <li>- 5-Year THAI CLEFT Outcome (Interdisciplinary team)</li> </ul>

appropriate surgeries.

interdisciplinary team.

### Conclusion

Of the 93 surveyed patients between 4 and 7 years of age, 95.7% and 96.8% of them were treated following the protocol. There were no post-operative separated wound, but post-operative fistula continues to account for 20.9%. Most (92.5%) received medical service by a complete

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**Table 2.** General information categorized by sex, diagnosis, late surgery, rate of palatal fistula after surgery, and syndromes (n = 93)

Information	Number (cases)	Percentages
Sex		
Male	56	60.22
Female	37	39.78
Diagnosis		
LCLP	44	47.31
RCLP	24	25.81
BCLP	23	24.73
CL	2	2.15
Delayed surgery		
Cheiloplasty	4	4.30
Palatoplasty (n = 91)	3	3.29
Rate of palatal fistula after surgery (n = 91)	19	20.88
Fistula closure more than 1 time	4	19.04
Surgery more than 3 times	10	10.75
Patients with associated diseases	4	4.30
Interdisciplinary team care service		
Plastic surgery	93	100
Nursing care and coordination	93	100
Otolaryngology and audiology (n = 91)	89	97.80
Speech therapy (n = 91)	86	94.50
Pediatric	66	70.97
Orthodontic	23	24.73
Breastfeeding and nutrition	21	22.58
Pediatric dentistry	16	17.20
Growth and development	5	5.37
Others	6	6.45

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### What is already known on this topic?

The comprehensive care for patients with CLP should be implemented by an interdisciplinary team, coordinated by a center of excellence for the specific disease, with team administration by an experienced nurse coordinator.

### What this study adds?

Patients with syndromes should be excluded from the surgical treatment protocol assessment. The complexity of syndromic patients requires a different protocol for evaluating treatment outcomes. The interdisciplinary team continues to meet challenges in providing treatment for all patients.

### Potential conflicts of interest

The authors declare no conflicts of interest.

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**Table 3.** Information on patient follow-up with the interdisciplinary team

Interdisciplinary team	Number of visits	Percentage	Treatment information
1) Plastic surgeons	1,123	26.4	<ul style="list-style-type: none"> <li>- Provide assessment, counseling, follow-up appointment, hospital admission before surgery; surgery, surgical wound assessment</li> <li>- Provide counseling, coordinate interdisciplinary team (e.g., pediatricians, otolaryngologists, speech pathologist, audiologists, orthodontists, pedodontists).</li> </ul>
2) ENT	1,013	23.8	<ul style="list-style-type: none"> <li>- Assess for otitis media and provide treatment, co-ordinate with plastic surgeons to perform ventilation tube surgery if needed, provide follow-up appointments</li> </ul>
3) Speech pathologists	826	19.4	<ul style="list-style-type: none"> <li>- Assess speech and language, and provide speech training until patient can speak clearly as age-appropriate</li> <li>- Assess articulation disorder using perceptual speech assessment, nasometer checkup, video nasopharyngoscopic check-up directly or by videofluoroscopy. Use combination of methods to achieve 3-d views</li> <li>- Consult with plastic surgeons after assessment to surgically address articulation problems</li> </ul>
4) Audiologists	620	14.6	<ul style="list-style-type: none"> <li>- Evaluate hearing according to patient age using various methods (i.e., hearing screening test, behavioral observation audiometry, and tympanometry to diagnose mobility of middle ear system). Evaluation outcomes should benefit treatment planning by otolaryngologists</li> </ul>
5) Nurse coordinator	353	8.3	<ul style="list-style-type: none"> <li>- Evaluate understanding and acceptability vis-a-vis mother and family, and give counseling.</li> <li>- Evaluate breastfeeding and nutrition, give counseling, and refer to pediatricians and nursing team at post-partum ward.</li> <li>- Provide information of comprehensive care and rehabilitation by interdisciplinary team; give guidebook for comprehensive cleft care, guidebook of breastfeeding infants with cleft, and baby gift set</li> <li>- Coordinate to achieve patient accessibility to age-appropriate, comprehensive care</li> <li>- Assess post-op wound and provide wound cleansing instructions</li> <li>- Provide nursing care and instructions, and ensure the massage of baby's surgical wound and utilization of nostril retainer</li> <li>- Evaluate oral hygiene, give counseling, and refer the patients to pedodontists</li> <li>- Provide nursing care and instructions on PNAM and plate appliance</li> <li>- Encourage and empower the family, and organize group activities</li> <li>- Evaluate treatment outcomes, satisfaction, and economic condition of the patients, and give assistance according to their needs</li> <li>- Coordinate patient referral so as to receive treatment from the interdisciplinary team.</li> </ul>
6) Pediatricians	182	4.3	<ul style="list-style-type: none"> <li>- Classify type of associated syndrome in cleft patients, diagnose endocrine system, chromosome probe, and evaluate echocardiography and thalassemia</li> <li>- Provide genetic counseling; arrange hospital admission for breastfeeding or pre nasoalveolar molding</li> </ul>

**Table 3. Cont**

Interdisciplinary team	Number of visits	Percentage	Treatment information
7) Orthodontists	35	0.8	- Provide pre-surgical correction of alveolar segments as necessary, using tape across cleft (strapping), nasoalveolar molding (NAM), and stimulating the maxillary growth of (growth modification)
8) Ophthalmologists	31	0.7	- Identify abnormalities of ocular structures in patients with associated disease
9) Pedodontists	16	0.38	Evaluate, give counseling and dental care in dental carries groups.
10) Postpartum ward nurses	15	0.4	Provide nursing care and assistance of breastfeeding position, including breast squeezing techniques. Child will be discharged from hospital when he/she gains weight according to criteria, and mothers or caregivers receive follow-up appointments
11) Psychiatrists and team	15	0.4	Assess and stimulate development at age-appropriate stages
12) Physiotherapy and others	23	0.5	Assessment of skeleton dysplasia (polydactyly), or arrange physiotherapy sessions in cases of clubfoot, as well as provide treatment in emergency cases
Total	4,252	100	

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