

Primary Bilateral Cleft Lip-Nose Repair: The Tawanchai Cleft Center's Integrated and Functional Reconstruction[†]

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Background: The repair of a bilateral cleft is more difficult than a unilateral repair because of numerous anatomical challenges, such as difficulty of repairing the skin and muscle overlying the protruded premaxilla and bilateral nasal reconstruction with shortening of the columella. An optimum outcome is achieved when all of the deformities of the primary cleft palate, the problems of scar and secondary deformities have been addressed.

Objectives: To propose an integrated and functional reconstruction of the primary bilateral cleft lip-nose repair and to present the preliminary outcomes of this technique and its advantages.

Material and Method: An integrated, functional reconstruction process includes: 1) analysis of the bilateral cleft deformities; 2) interdisciplinary management and use of Tawanchai Center's protocol for cleft lip and palate care; 3) pre-surgical orthopedic treatments; and, 4) integrated primary cleft lip-nose repair and post-operative management. This approach to repair includes: 1) design of a prolabial flap and a modified, rotation advancement technique for skin surgery; 2) functional muscle reconstruction; 3) correction of nasal deformities and columella lengthening; 4) reconstruction of the vermillion; and, 5) final skin closure.

Results: Between 2002 and 2010, this technique was performed and evaluated on 42 patients who received primary bilateral cleft lip-nose repair, including 31 complete, 6 incomplete and 5 right complete and left incomplete, 27 males and 15 females. Six parameters (scar, Cupid's bow symmetry, vermillion border symmetry, philtrum anatomic fidelity, muscle function and nasal symmetry) were used for evaluating the results, based on 4 scales (0-3) by 2 plastic surgeons. Among the mean scores better rating scales were achieved in philtrum anatomic fidelity (0.69) and Cupid's bow symmetry (0.76) while the mean of the less satisfactory rating scale was found in scar (1.13) and nasal asymmetry (0.96). These preliminary outcomes showed satisfactory results. Secondary reconstruction is less difficult and may be performed at the age of 4-6 years if indicated.

Discussion and Conclusion: The authors introduced the Tawanchai Center's integrated concepts and functional reconstruction technique for bilateral cleft lip-nose repair. The technique offers the advantages of an integrated and assessment for all of the deformities of the primary cleft palate, the design of an integrated technique together with proper peri-operative care, pre-surgical orthodontic treatment, and a well-coordinated, holistic, interdisciplinary management. A satisfactory preliminary outcome was demonstrated but more improvement of the outcome can be achieved by: 1) continuing assessment of this group of patients until they reach maturity; 2) refining techniques; 3) improving interdisciplinary care; and, 4) setting benchmarks for the outcome.

Keywords: Integrated, Functional reconstruction, Protocol, Primary bilateral cleft lip-nose repair, Tawanchai Center

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The repair of a bilateral cleft lip is recognized as more difficult than unilateral repair because of the numerous anatomical challenges; such as, lip reconstruction when there is insufficient skin and/or muscle overlying the premaxilla, and complicated bilateral nasal reconstruction.

The severity of bilateral cleft deformity depends on whether or not the either or both clefts are complete or incomplete. When the cleft is incomplete on one or both sides, the deformity is less severe because of maxillary continuity. Many principles of bilateral complete cleft lip repair have been advocated such as maintaining symmetry, muscle repair, the proper design of the prolabial flap, and use of lateral lip tissue for reconstruction of the central vermilion and vermilion-cutaneous border⁽¹⁻³⁾. Previous descriptions of multiple-stage repair concern the external skin anatomy which may produce secondary abnormalities/deformities such as the lip-columella scar, boarded nasal tip, unstable premaxilla and naso-labial fistula.

Clinicians put great effort into finding out the best rehabilitation program for cleft lip and cleft palate patients. Large variations of treatment protocols for this group of patients have been implemented among different cleft centers. During the first year of life, primary cleft lip repair (primary cheiloplasty) is necessary to restore the upper lip for esthetics and function. Pre-surgical orthopedics appliances to help with repositioning of the primary palate or the alveolar segment before surgical correction are installed at some cleft centers (ours included).

The objectives of this article are to introduce the integrated concepts and functional reconstruction methods used for primary bilateral cleft lip-nose repair and to present the current outcomes of this technique in patients with bilateral cleft lip.

Materials and Method

The protocol of this study has been reviewed and approved by the Ethics Committee of Khon Kaen University, based on the Declaration of Helsinki and written informed consent was obtained for each patient.

Analysis of Bilateral Cleft Deformities

A physical examination is important to evaluate the associated congenital abnormalities and to classify the type of clefting. It is also important to differentiate between a syndromic or non-syndromic cleft lip because the syndromic patient has associated conditions which may take priority over conditions found with non-syndromic patients.

The width of cleft deformities, the presence and size of the prolabium and columella, the degree of alveolar collapse and associated nasal deformities are important factors in surgical and orthodontic planning as they may affect the difficulty of surgical closure of the clefts. In some cases, the associated cleft palate is also considered in treatment planning. The modified Kernahan and Stark's "striped Y" classification system⁽⁴⁾ is used for record keeping and future outcome research. Additionally, the LAHSal classification⁽⁵⁾ was adapted for comparison with the standard outcome registry of the American Cleft Palate and Craniofacial Association.

The most obvious and challenging feature of complete bilateral cleft lip is the protruding premaxilla due to the lack of connection of the premaxilla with the lateral alveolar segments. The lateral alveolar segments are not pulled forward and usually collapse toward the midline. The severity of these alveolar arch deformities can cause tension on the repair and increase the degree to which the dissection may affect the final surgical results. The footplates of the lower lateral cartilages are displaced posteriorly and laterally, pulling the medial and lateral crura causing the broad and flat nasal tip with absent or shortened columella. The wide and short prolabium, inadequate columella length and inadequate nasal tip projection are noted. The composition of the prolabium contains no muscle tissue. The prolabial skin is underdeveloped and no philtral columns are present. In the lateral lip segment, the orbicularis muscle travels medially from the oral commissure and turns upwardly along the cleft margin to insert to the nasal alar base.

In incomplete bilateral cleft cases with the Simonart band or a cleft involving only the lip-the premaxilla may be close to normal position. The muscle anatomy varies with the severity of the cleft, ranging from a small soft tissue bridge at the apex of the cleft in more severe deformity to muscle transversing over the cleft through the prolabium in a minor deformity. Other patients may have complete cleft on one side and incomplete cleft on the other side. It is a challenge to achieve symmetry after the surgical repair.

The nasal deformities in bilateral cleft, mostly result from discontinuity of the premaxilla and lateral alveolar segments. The lack of continuity of the orbicularis muscle of the lateral lip segment causes widening of the alar bases. The medial and lateral crura of the lower lateral cartilages are set in a downward and caudal direction. Shortening of the columella is caused by distraction of the lower lateral cartilage separation of the medial crura from the tip of the nasal septum.

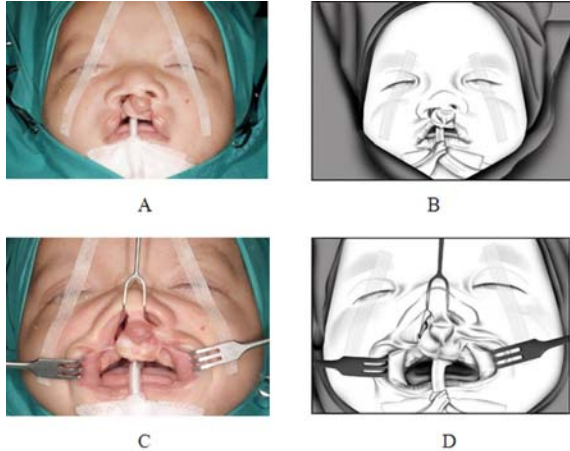


Fig. 1 Bilateral cleft lip deformities; the right side is complete while the left side is incomplete



Fig. 2 Patient with complete bilateral cleft lip and cleft palate during pre-surgical orthodontic treatment

The widening of the nasal tip is caused by separation of the lower lateral cartilage⁽⁶⁾.

Interdisciplinary Management, Goal and Protocol for Bilateral Cleft Lip Repair

Ideally, the newborn infant with a cleft should be evaluated by a cleft team in the first week of life. Interdisciplinary management with continuity and long-term follow-up are keys to successful cleft lip and cleft palate care.

The goal of cleft care is optimizing a holistic outcome. Each essential intervention performed at the critical period should be evaluated for its benefit(s)

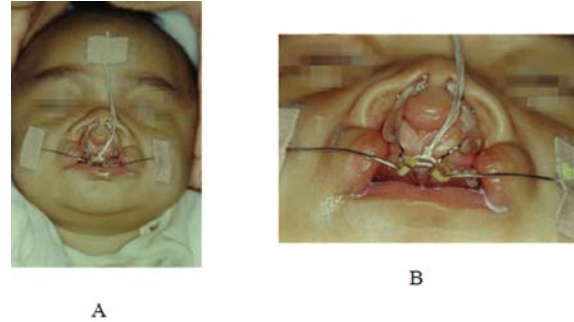


Fig. 3 Pre-surgical orthodontic appliance with the modified naso-alveolar molding appliance (NAM)

and burden(s). Our protocol (Table 1) was developed according to the critical needs at each age group of patient development until adulthood and maturity of the facial skeleton (at age 21).

Pre-surgical orthodontic treatment

The goal of pre-surgical orthodontic treatment in bilateral cleft lip is the control of the outward growth of the premaxilla while allowing the lateral alveolar segments to catch up vis-à-vis growth and expansion. A more normal arch relationship can be established with reduction of the width of the alveolar cleft to allow cleft lip repair with minimal tension.

The Tawanchai Center uses a hybrid appliance, consisting of either a passive plate or a semi-active alveolar molding plate and lip strapping. Gradual alteration of the tissue surface of the acrylic palates can be done with soft acrylic molding which gently molds the alveolar into the appropriate position.

In general, there are two options for the treatment protocol: 1) primary cleft lip-nose repair; or, 2) primary cleft lip-nose repair following pre-surgical orthopedics. The decision for pre-surgical orthopedics is discussed between the plastic surgeon, orthodontist and patient's parents to ensure optimum compliance.

Conventional passive pre-surgical orthodontic treatment

Variations of pre-surgical orthopedics have evolved during the last 40 years and such devices are described as either active or passive. The Tawanchai Center uses passive appliances, consisting of an alveolar molding plate with soft acrylic molding. Gradual alteration of the tissue surface of the acrylic palates and alveolar segment gently molds the alveolar into

Table 1. The Tawanchai Center’s interdisciplinary protocol for cleft lip-palate care

Age	Treatment	Team Members
Prenatal	Prenatal imaging, and counseling	Multidisciplinary
Newborn	Feeding, management of associated anomalies, genetic counseling, providing information	Multidisciplinary
0-3 months	Pre-surgical orthopedics (Optional)	Orthodontist, plastic surgeon
3-6 Months	Primary cleft lip-nose repair	Plastic surgeon
12 months	Primary cleft palate repair with intravelar veloplasty with or without bilateral myringotomy and tubes	Plastic surgeon, otolaryngologist
4-6 years (preschool age)	Evaluation of THAICLEFT 5 year-index, Secondary cleft lip-nose correction, correction of velo-pharyngeal insufficiency	Speech pathologist, plastic surgeon, orthodontist, psychiatrist and multidisciplinary team
9-11 years (mixed dentition)	Evaluation of THAICLEFT 10 year-index, Secondary alveolar bone grafting	Orthodontist, plastic surgeon, oral surgeon and multidisciplinary team
18-21 years (Skeletal maturity, adulthood)	Pre-surgical orthodontics, definitive rhinoplasty, LeFort I with or without mandibular orthognathic surgery	Orthodontist, plastic surgeon, oral surgeon and multidisciplinary team

the appropriate position.

If possible, an acrylic passive obturator is delivered to the patient before the age of 2 weeks. The parents are instructed to apply the lip strapping for the patient and bring the patient to be checked approximately one month later to modify the appliance by grinding out the acrylic. The obturator is used for 3 months before doing the primary cleft lip-nose correction at the age of 4-6 months and its use is discontinued after surgery.

Pre-surgical columella elongation

This technique provides the additional advantage of ‘creating’ more skin for columella and nasal tip reconstruction. Grayson utilized the pre-surgical naso-alveolar molding appliance to bring the protruding primary palate back into proper alignment with lateral alveolar segment⁽⁷⁾. In 2001, Viwattanatipa et al reported treatment of bilateral complete cleft lip and palate by pre-surgical orthodontic appliance with a modified naso-alveolar molding appliance (NAM)⁽⁸⁾. The use of the NAM technique takes advantage of the plasticity of the cartilage in the infant under 6 weeks of age and addresses the alveolar, labial and nasal abnormalities.

The first obturator plate serves as a combined feeding and alveolar molding plate and is checked and adjusted for the baby’s comfort. The acrylic between

the lingual aspect of the primary palate and lateral palatal segment is released to allow growth and migration of the primary palate in a posterior direction and growth of the palatal segments in an anterior and medial direction. The extra-oral wire extensions are adjusted to conform to the contour of the baby’s cheeks. The obturator is held in place, first to the right then to the left cheek via the extra-oral wire extensions, then towards the forehead via dental floss tied over the anterior portion of the extra-oral wire extensions. Lip-strapping is taped over the right and left cheek, crossing over the prolabium to exert light continuous force in a posterior (lingual) direction against the primary palate. The advantage of using lip-strapping in this modified NAM technique is that it helps to reduce the number of family visits to the hospital. Once the cleft gap width is < 5 mms, a second impression can be made for the naso-alveolar molding appliance with two acrylic nasal extensions. The nasal molding parts help to lift the nasal tip and stretch the soft tissue columella.

The Integrated Primary Cleft Lip-Nose repair

The primary cleft lip-nose repair is performed at the age of 3-4 months using “the golden rule of 10s” (an age of at least 10 weeks, weights at least 10 pounds and hemoglobin of 10%). There may be higher risks with anesthesia before a 3-month of age because physiology still persists; additionally, orbicularis

muscle reconstruction may be more difficult if the surgery is performed before the age of 3 months⁽⁹⁾. For the patient who receives pre-surgical orthopedic treatment, the primary cleft lip-nose repair is performed at the age of 4-6 months.

After pediatric anesthesia with bilateral infraorbital nerve block, a pre-surgical impression is performed to achieve a dental model for clinical record and subsequent outcome evaluation.

The integrated technique of primary bilateral cleft lip repair was initially described by the author (BC) in 2004⁽¹⁰⁾ addressing the design of the prolabial flap and modified rotation advancement technique, primary functional muscle reconstruction, the correction of nasal deformities and columella lengthening, reconstruction of central lip vermilion and final skin closure.

Skin Surgery-Design of a Prolabial Flap and the Modified Rotation Advancement Technique

The objectives of skin surgery and skin flap are to design prolabial and lateral lip flaps with minimal skin incision, restoration and preservation of normal anatomical landmarks, support for restoration of the nose and muscle restoration. Skin in a bilateral cleft lip may be retracted and displaced secondary to hypoplasia and lack of normal muscle function. The primary repair of bilateral cleft lip-nose in conjunction with muscle reconstruction provides the basis of an integrated concept for achievement of these objectives.

The first author (BC) chooses the modified rotation advancement technique as it is the most common and widely accepted method of the lip repair. The advantages of this method are the lines of the scar are placed at the correct anatomical position, the lengthening of columella is addressed, the nostril floor is reinforced and it allows the surgeon to make adjustment at the time of surgery. The proper design of the prolabial flap is made. Medially, the lip incision is made by a modified rotation advancement technique. The portion of mucosa attached with premaxilla is preserved to provide adequate sulcus depth. Creation of upper gingivo-labial sulcus prevents a tethered lip and mucosal exposure. Proper markings are made on the prolabial flap and lateral lip flap to provide Cupid's bow symmetry and a good portion of upper lip. Laterally, the advancement skin flap is dissected from underlying orbicularis and alar base muscle and advanced into the rotation gap at the columella base. Traditional incision around the alar base is avoided because it produces an unnatural scar and may lead to

post-operative muscle denervation. The nasal floor closure is achieved by the use of a median alveolar flap and a lateral buccal mucosal flap.

Functional Muscle Reconstruction

In a patient with bilateral cleft lip, there are abnormal attachments of the orbicularis muscle to the alar base and periosteum of pyriform aperture laterally and no muscle under the prolabium in complete bilateral cleft lip. The objectives of muscular reconstruction of lip repair are to provide normal motion of the lip, prevent distortion (an optimal length and morphology of the lip during facial expression) and the strong framework to provide a stimulation of development of the lip and nose. Restoration of the normal muscular anatomy is essential to balance facial growth and prevent secondary deformities.

The author (BC) uses a technique of functional muscle reconstruction which is performed differently from the geometric arrangement of the skin flaps and divides into superficial and deep muscle reconstruction. The deep muscle reconstruction involves dissecting and mobilizing the nasal muscle complex medially toward the nasal septum after the release of the deep fibers from attachment at the border of each pyriform aperture and anterior part of the maxillary periosteum. The superficial dissection of the orbicularis muscle also extends into different parts of the muscle bulk of the lip and vermilion border. The muscle of the alar base is repositioned and attached to the lower part of nasal septum just above anterior nasal spines to raise the nostril floor, the alar base pulled toward the midline, and the flaring of the alar base corrected. The muscle of the lip is repositioned and attached to the muscle from the opposite side under the prolabium. An important point is that abnormal orbicularis muscle insertion should be released from the skin and alar base and reoriented horizontally across the midline of the upper lip and attached to the base of the nasal septum.

Correction of Nasal Deformities and Columella Lengthening

Because of the fear of interfering with growth from primary nasal surgery and the challenges of short columella, a number of techniques have previously been used with two stages of delayed columella lengthening by transferring tissue from the prolabium (forked flap) or nasal floor. However, the satisfactory appearance of minimal secondary deformities has changed this concept into relying on primary repair of the nose at

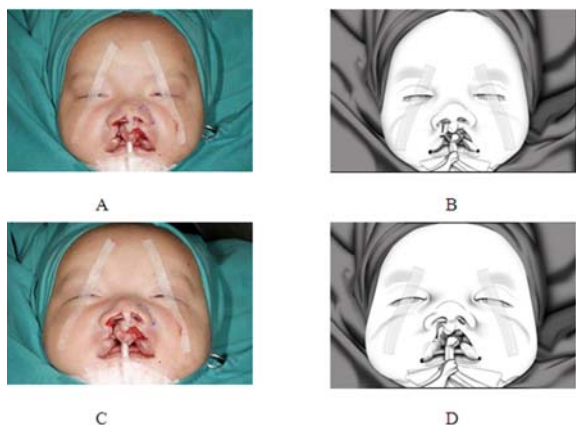


Fig. 4 Design of prolabial flap, modified rotation advancement incision and bilateral alar rim incisions for primary bilateral cleft lip-nose reconstruction

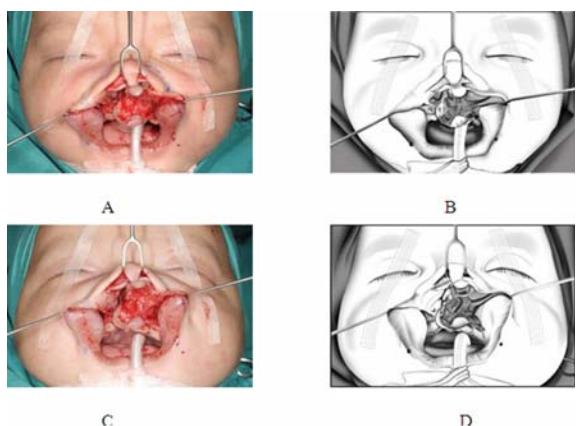


Fig. 5 Functional muscle reconstruction in bilateral cleft lip-nose reconstruction

the time of lip surgery. At the present time, many surgeons have addressed their primary emphasis to the nasal tip cartilage deformities before correction of the lip skin deformities. McComb reported the struggle using a forked flap, abnormal nostril shape, board tip and overly long columella, and nexus scar at the columella-labial junction⁽¹¹⁾ and subsequently described the two-stage approach to correction of complete bilateral cleft lip⁽¹²⁾. His first stage included a nasal surgery by V to Y “gullwing” external nasal incision on the nasal tip, repositioning and fixing of the dome of the lower lateral cartilages and V to Y closure of the skin incision and the lip adhesion, while the second stage was the definite lip repair. A modified Mulliken technique was also proposed with the use of

bilateral alar rim incisions, elevation and fixation of the dome of the nasal cartilages⁽¹³⁾. Boo-Chai⁽¹⁴⁾ also stressed the primary repair of the cleft lip and nose with emphasis on minimal incision on the cleft side and consideration of possible anatomic difference of the oriental nose.

The author’s technique (BC) is primary nasal reconstruction at the time of lip repair. The surgical access for cleft lip nose repair is a bilateral alar rim incision with the incision slightly higher into the normal skin. For adequate mobilizing of nasal cartilages, the nasal skin is widely undermined over mucoperichondrium from the nostril rim to the nasion to elevate the lower lateral cartilage into its proper position. The displaced medial cruses of the alar cartilages are mobilized from abnormal attachment upwardly from the premaxilla. Laterally, the alar cartilage also is mobilized from the pyriform aperture and maxilla. The prevention of relapse is by transfixing sutures at the site of the dome of alar cartilage, columella and lateral part of lower lateral cartilages to create columella lengthening, concave nasal fold, redraping and transfixing the vestibular lining with cartilage and external skin. Fig. 4 demonstrates the skin incisions and the surgical approach for correction of nasal deformities and columella lengthening at the time of lip repair.

Reconstruction of Central Lip Vermillion and Final Skin Closure

The author (BC) creates the central vermilion tissue by a flap from each lateral lip segment to reconstruct the central vermilion and vermilion-cutaneous border, a modification of Millard’s technique and the technique previously described by Noordhoof⁽⁷⁾. The proper design of vermilion tubercle and wet-dry vermilion reconstruction is achieved by the design of the small triangular portion of dry vermilion which is left and attached to prolabium, and wet-dry vermilion from the flaps of lateral lip segments. The final skin closure is demonstrated in Fig. 6.

Post-operative management

Infra-orbital nerve blocks during surgery are given to patients undergoing bilateral cleft lip-nose repair to keep them comfortable for 6 hours after surgery. Post-operative feeding is started as early as possible. The authors advocate breast or nipple feeding, whatever was used pre-operatively. The parents are advised to clean the lip with normal saline and place antibiotic ointment over the suture line twice daily. Skin tape is used the first day post-operatively. Fine

Table 2. The results of integrated and functional reconstruction technique, evaluated by 6 parameters.

Parameters	Number of Cases	Mean	Standard Deviation
Scar	42	1.13	0.47
Cupid' bow symmetry	42	0.76	0.46
Vermillion-free border symmetry	42	0.88	0.65
Philtrum anatomic fidelity	42	0.69	0.40
Muscle function	42	0.81	0.55
Nasal symmetry	42	0.96	0.34

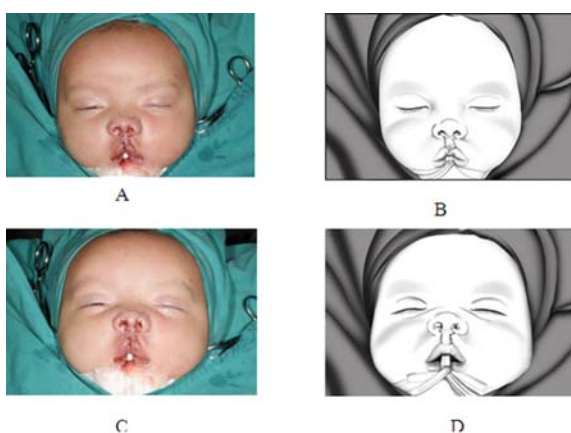


Fig. 6 Reconstruction of central lip vermilion and final skin closure of bilateral cleft lip-nose repair

absorbable sutures are used to avoid the need for their removal. Information with hand book and video media, empowerment and training for wound care are provided. After wound healing, the parents are given instructions to massage the scar to ensure the scar does not become hard and inflexible starting at 4 to 6 weeks after surgery until scar maturity.

Results

Between 2002 and 2010, an integrated and functional reconstruction technique was used by the author (BC) and evaluated on 42 patients (27 males; 15 females) receiving primary bilateral cleft lip-nose repair. There were 31 complete, 6 incomplete and 5 complete of the right side and incomplete on the left side. Syndromic patients and patients who had inadequate clinical records for evaluated their results were excluded.

The surgical outcome evaluation was performed by a plastic surgeon (BC) and a peer (another

plastic surgeon) using 6 parameters- scar, Cupid's bow symmetry, vermilion-free border symmetry, philtrum anatomic fidelity, muscle function and nasal symmetry. Each parameter was rated on 4-point scales: non cleft side or normal (= 0), mild deviation from normal (= 1), moderate deviation from normal (= 2) and severe deviation from normal (= 3). The mean score for each parameter of 42 patients were shown in Table 2.

Among the mean scores better rating scales were achieved in philtrum anatomic fidelity (0.69) and Cupid' bow symmetry (0.76) while the mean of the less satisfactory rating scale was achieved found in scar (1.13) and nasal asymmetry (0.96). These preliminary outcomes showed satisfactory results. Secondary deformities are evaluated in the child's pre-school period and secondary correction was performed when indicated.

The average results of many of the patients who received primary bilateral cleft lip-nose repair by integrated concepts and functional reconstruction are presented in Fig. 7 to 14.

Discussion

The problems encountered in infants born with cleft lip and palate pose several challenges. The repair of a bilateral cleft lip has been recognized as more difficult than a unilateral repair because of the numerous challenges of anatomical deformities, such as in lip reconstruction with difficulty of the skin and muscle overlying the premaxilla, and in bilateral nasal reconstruction with shortened columella. There have been a number of advances and new concepts, but there are still challenges to be overcome to achieve optimum results.

The Tawanchai Center's integrated concepts and functional reconstruction method provides optimum results, which are easily adapted, in accordance with the analysis of the initial primary cleft

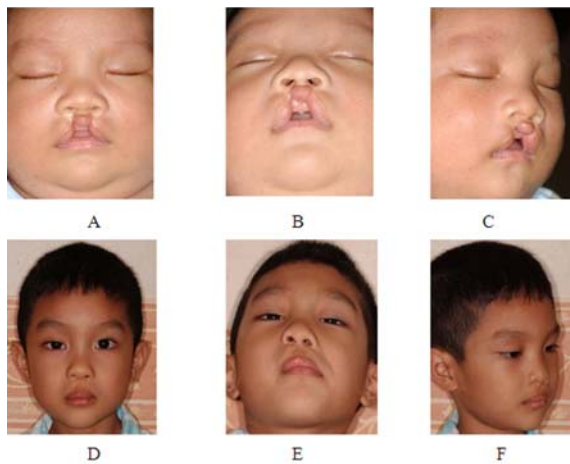


Fig. 7 Pre- and post-operative photos of a male patient with a bilateral incomplete cleft lip. A, B, and C are pre-operative photos taken in 2004 at the age of 2 months. D, E, and F are post-operative photos taken in 2009 at the age of 4 years, 9 months.

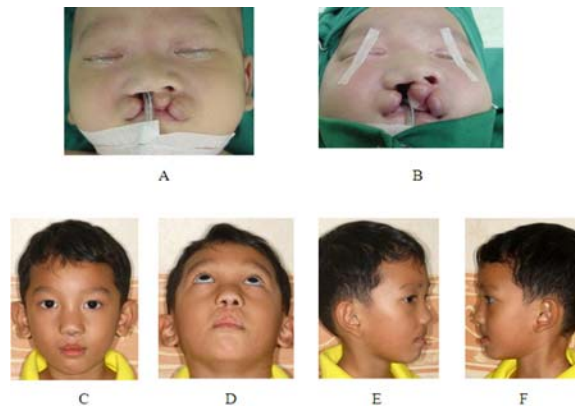


Fig. 8 Pre- and post-operative photos of a male patient with bilateral cleft lip and palate, complete of the right side and incomplete on the left side. A, B, and C are pre-operative photos taken in 2001 at the age of 3 months. D, E, and F are post-operative photos taken in 2005 at the age of 4 years, 1 month.



Fig. 9 Pre- and post-operative photos of a male patient with complete bilateral cleft lip and palate. A, B, and C are pre-operative photos taken in 2007 at the age of 3 months. D, E, and F are post-operative photos taken in 2009 at the age of 2 years, 7 months.

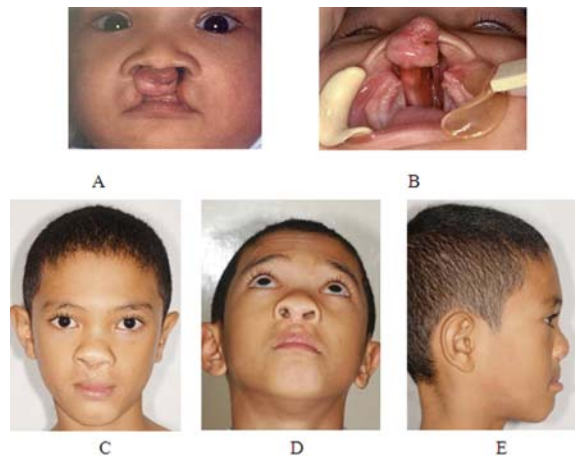


Fig. 10 Pre- and post-operative photos of a male patient with bilateral complete cleft lip and palate. A, B, and C are pre-operative photos taken in 2000. D, E, and F are post-operative photos taken in 2009 at the age of 9 years, 3 months.

lip-palate deformities. The principles of an integrated concept and functional reconstruction include: pre-surgical orthodontic treatment as an integral part of primary cleft lip-nose repair; skin surgery using a modified rotation advancement technique with optimum design of the prolabium, sulcus depth and Cupid's bow position; functional muscle reconstruction; primary

cleft lip nose repair for correction of nasal deformities with adequate cartilage dissection, positioning and transfixing and columella lengthening; and, reconstruction of the central lip vermilion, ensuring adequate vermilion tubercle and wetdry vermilion reconstruction.

Children born with complete bilateral cleft lip have more difficult deformities to repair than with

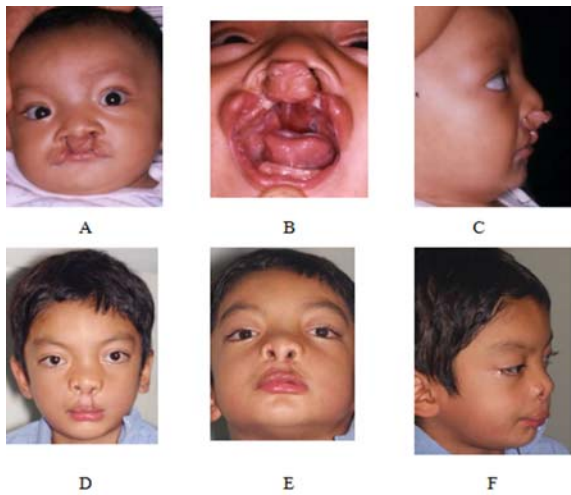


Fig 11 Pre- and post-operative photos of a male patient with bilateral complete cleft lip and palate. A, B, and C are pre-operative photos taken in 2003. D, E, and F are post-operative photos taken in 2005. D, E, and F are post-operative photos taken in 2008 at the age of 6 years, 5 months.

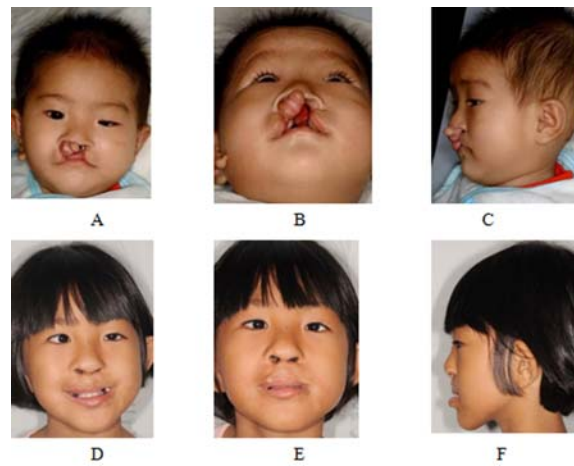


Fig. 12 Pre- and post-operative photos of a female patient with bilateral complete cleft lip and palate. A, B, and C are pre-operative photos taken in 2003. D, E, and F are post-operative photos taken in 2010 at the age of 7 years, 9 months.



Fig. 13 Pre- and post-operative photos of a female patient with bilateral complete cleft lip and palate. Small primary palate with marked premaxillary protrusion was noted. A, B, and C are pre-operative photos taken in 2003 when she presented to hospital with nasogastric tube feeding. D, E, and F are pre-operative photos taken in 2008 at the age of 5 years, 6 months. G, H and I are photos taken in 2010 at the age of 7 years, 3 months.



Fig. 14 Pre- and post-operative photos of a female patient with bilateral complete cleft lip. A, B, and C are pre-operative photos taken in 2007 at the age of 4 months during pre-surgical orthodontic treatment. The operation was performed at the age of 6 months. D, E and F are photos taken in 2009 at the age of 2 years, 11 months.

complete unilateral cleft lip. One of the most challenging of the bilateral cleft lip deformities is the correction of the premaxillary protrusion. To do this, pre-surgical orthopedic treatment is an integral step in primary cleft lip-nose repair which optimizes the primary surgical

outcome. It is most useful in complete bilateral cleft lip when pre-operative lip tension may prevent appropriate surgical outcome, and thus should be started within the first 2 weeks of life; after planning between the plastic surgeon and orthodontist and agreement from the patient's parent to ensure optimum compliance.

The optimum results for cleft lip repair depend on: 1) the use of integrated concepts for the assessment of all deformities of the primary cleft lip, 2) a holistic, multi- and inter-disciplinary approach, and, 3) well-coordinated management of follow-up assessments and treatments. The factors that may affect the outcome of cleft lip repair are likely related to the severity of the primary deformities, surgical technique(s) and protocol, competency and the coordination (or lack thereof) of the interdisciplinary team. The factors for complete rehabilitation of cosmetic, functional and psychosocial/economic aspects have to be evaluated according to critical needs for each age group and completion of facial development at the end of adolescence.

Early, well-executed surgery releases the patient from both physical and social handicaps and allows normal physical growth and development and socialization. The plastic surgeon who performs cleft surgery should: 1) be able to follow-up the patient from birth to adulthood, 2) have access to important clinical records, 3) establish universal and holistic outcome parameters to evaluate the results at each critical stage of development and at complete skeletal maturity, and, 4) be able to compare outcome results with other centers.

Conclusion

The authors advocate the Tawanchai Center's integrated concepts and functional reconstruction methods for bilateral cleft lip-nose repair, in conjunction with consideration of pre-surgical orthodontic treatment. Children with significant cleft deformities are best managed by a well-coordinated, interdisciplinary, cleft team. More improved outcomes can be achieved by refinement of techniques, improvement of interdisciplinary care and team management, long-term evaluation and benchmarking of the staged outcomes.

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การซ่อมแซมภาวะปากแหว่งและการแหวกของจมูกสองข้างแบบปฐมภูมิ โดยวิธีการแบบบูรณาการและเสริมหน้าที่การทำงานของศูนย์ตะวันฉาย

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ภูมิหลัง: การซ่อมแซมภาวะปากแหว่งสองข้างมีความยากกว่าปากแหว่งข้างเดียวเนื่องจากความท้าทายด้านกายวิภาค เช่น ความผิดปกติของผิวหนังและกล้ามเนื้อที่อยู่บนปริมาตรซิลลาที่ยื่นไปด้านหน้าและการเสริมสร้างจมูกที่มีสันกลางจมูกสั้น การพิจารณา ความพิการทั้งหมดของการแหวกของเพดานปากปฐมภูมิเหล่านี้ใน การผ่าตัดแบบปฐมภูมิ แผลเป็นและความพิการแบบทุติยภูมิเป็นสิ่งที่สำคัญต่อผลการรักษาที่เหมาะสม

วัตถุประสงค์: เพื่อนำเสนอวิธีการผ่าตัดเสริมสร้างแบบบูรณาการและเสริมหน้าที่การทำงานของปากแหว่งและการแหวกของจมูกสองข้าง และนำเสนอผลการรักษาในระยะเบื้องต้นและข้อดีของวิธีการนี้

วัสดุและวิธีการ: การผ่าตัดเสริมสร้างแบบบูรณาการและเสริมหน้าที่การทำงานประกอบด้วย การวิเคราะห์ความพิการของภาวะปากแหว่งสองข้าง การดูแลแบบทีมสหวิทยาการ การสร้างแนวทางการดูแลผู้ป่วยปากแหว่งเพดานโหว่ของศูนย์ตะวันฉาย การจัดสันเหงือกก่อนการผ่าตัด การผ่าตัดซ่อมแซมปากแหว่งและการแหวกของจมูกแบบปฐมภูมิ เทคนิคการผ่าตัด ประกอบด้วย การออกแบบโปรโตคอลเบี่ยงและการประยุกต์วิธีการหมุนและเคลื่อนที่ของการผ่าตัดผิวหนัง การเสริมสร้างกล้ามเนื้อแบบเสริมหน้าที่การทำงาน การแก้ไขความพิการของจมูกและเพิ่มความยาวของสันกลางจมูก การเสริมสร้างเยื่อปริมฝีปาก และการเย็บปิดผิวหนัง

ผลการศึกษา: ตั้งแต่ปี พ.ศ. 2545-2553 ได้มีการผ่าตัดและประเมินผลการรักษา โดยวิธีการนี้ในผู้ป่วย ที่มารับการซ่อมแซมภาวะปากแหว่งและการแหวกของจมูกสองข้าง 42 ราย เป็นปากแหว่งสองข้างแบบสมมาตร 31 ราย แบบไม่สมมาตร 6 ราย และแบบสมมาตรข้างขวาและแบบไม่สมมาตรข้างซ้าย 5 ราย เป็นชาย 27 ราย และหญิง 15 ราย การประเมินไข้ปัจจัยการประเมิน 6 ด้าน (แผลเป็น ความสมมาตรของคั่นศรควิวิต ความสมมาตรของขอบเยื่อขอบริมฝีปาก ความละเอียดถูกต้องของสันกลางร่องริมฝีปากบน การทำงานของกล้ามเนื้อ และความสมมาตรของจมูก) ใช้ 4 มาตรฐาน (0-3) โดยศัลยแพทย์ตกแต่ง 2 คน ค่าเฉลี่ยของมาตรฐานที่ได้ผลดีกว่า ได้แก่ ความละเอียดถูกต้อง ของสันกลางร่องริมฝีปากบน (0.69) และ ความสมมาตรของคั่นศรควิวิต (0.76) ขณะที่ค่าเฉลี่ยของมาตรฐานที่ได้ผลดีน้อยกว่า ได้แก่ แผลเป็น (1.13) และ ความสมมาตรของจมูก (0.96) ผลลัพธ์เบื้องต้นเหล่านี้เป็นที่น่าพึงพอใจ การผ่าตัดเสริมสร้างแบบทุติยภูมิทำได้ง่ายและสามารถทำได้ที่อายุ 4-6 ปี ได้ถ้ามีข้อบ่งชี้

สรุป: ผู้มีพินธ์นำเสนอแนวความคิดแบบบูรณาการและการผ่าตัดเสริมสร้างแบบเสริมหน้าที่การทำงานในการซ่อมแซมภาวะ ปากแหว่งและการแหวกของจมูกแบบปฐมภูมิของศูนย์ตะวันฉาย วิธีการนี้มีข้อดีคือการประเมินความพิการทั้งหมดของการแหวกของเพดานปากปฐมภูมิ การออกแบบวิธีการบูรณาการ การดูแลก่อนและหลังการผ่าตัดที่เหมาะสม การจัดสันเหงือกก่อนการผ่าตัด การดูแลแบบองค์รวมโดยทีมสหวิทยาการที่มีการประสานงานกันเป็นอย่างดี ผลการรักษาในเบื้องต้นได้รับผลที่ดี การปรับปรุงผลการรักษาให้ดียิ่งขึ้นทำได้โดยการติดตามและประเมินกลุ่มผู้ป่วยเหล่านี้จนโตเป็นผู้ใหญ่โดยสมบูรณ์ การพัฒนารายละเอียดของเทคนิคและวิธีการผ่าตัด การพัฒนาการดูแลแบบทีมสหวิทยาการ และการเทียบเคียงผลการรักษา
