An Integrated Approach to the Primary Lip/Nasal Repair in the Bilateral Cleft Lip and Palate

Operative Syllabus

Philip K. T. Chen, M. D.
M. Samuel Noordhoff, M. D., F.A.C.S.
Yu-Fang Liao, DDS, PhD
Louise, I-Ju Chen, DDS
Theresa, Su-Yeh Chou, NSP

Noordhoff Craniofacial Foundation
An Integrated Approach to the Primary Lip/
Nasal Repair in the Bilateral Cleft Lip and Palate

Authors:
Philip K.T.Chen, M.D.
M. Samuel Noordhoff, M.D. F.A.C.S.
Yu-Fang Liao, DDS, PhD
Louise l-Ju Chen, DDS
Theresa Su-Yeh Chou, NSP
Taipei: Noordhoff Craniofacial Foundation, 2008

p. cm.
Includes bibliographical references.
ISBN:978-986-83950-3-9

Authors:
Philip K.T.Chen, M.D.
M. Samuel Noordhoff, M.D., F.A.C.S.
Yu-Fang Liao, DDS, PhD
Louise l-Ju Chen, DDS
Theresa Su-Yeh Chou, NSP

Publisher:
Noordhoff Craniofacial Foundation

AN INTEGRATED APPROACH TO THE PRIMARY LIP/
NASAL REPAIR IN THE BILATERAL CLEFT LIP AND PALATE

ISBN :978-986-83950-3-9

Copyright © 2008 by Noordhoff Craniofacial Foundation.
All rights reserved. Reproduction in any form of the material found in the DVD
or the syllabus, requires the written permission of the publisher.

Printed by Huang Cheng Printing Company, Ltd
Foreword

The syllabus and accompanying video for the surgical correction of the bilateral cleft lip/nose and palate are useful educational tools for both the resident and experienced cleft surgeon. A fundamental application of sound surgical principles is necessary in order to achieve optimum results. A thorough application of these principles and this technique will result in predictable improved results.

All members of the Chang Gung Craniofacial Center have contributed in different ways to the present integrated technique. The surgical and orthodontic technique has evolved over a period of 25 years. Many other approaches have been used, evaluated, revised and abandoned resulting in the present integrated approach.

We owe a special thanks to Miss Lee-min Lee, our medical illustrator who made the detailed illustrations. The orthodontic procedure was done by Louise, I-Ju Chen and Yu-Feng Liao. The surgical procedure was done by Philip Chen. The nursing procedure after the surgery was demonstrated by Theresa, Su-Yeh Chou, Rebecca King-Ying Wang, Executive Director of the Noordhoff Craniofacial Foundation, helped with the taping and printing of the syllabus. Thanks to the Board of Directors of the Noordhoff Craniofacial Foundation for the support of this project.

I want to thank all for their superb contributions and support. We are especially grateful to the families and patients who have enriched our lives in countless ways. They are the persons to who we dedicate this work. May it be of help to all those who have the privilege of working with children who have clefts.

Sincerely,
M. Samuel Noordhoff, M.D., F.A.C.S.

[Signature]
Introduction

The reconstruction of a symmetrical bilateral cleft lip and a natural looking nose with adequate columnella length is a difficult challenge. The results have been improved considerably over the last twenty years through a better understanding of the primary pathology and an integrated multidisciplinary approach. The integrated multidisciplinary approach consists of

(1) presurgical management to improve the initial deformity,
(2) modification of surgical techniques according to the improved soft tissue as well as skeletal condition and
(3) postoperative management on scar care and maintenance of the reconstructed nasal shape.

Presurgical nasoalveolar molding has decreased the number of severe postoperative deformities making it easier for correction. The aim of this molding process is to centralize the premaxilla, narrow alveolar gaps, achieve symmetry of the alar cartilages and elongate the columnella. It can provide the surgeons a much better soft tissue and skeletal condition before the surgery.

Better understandings of the primary pathology and refined surgical technique have resulted in a decrease of severity in secondary deformities and the classic stigmata of the repaired cleft. The key surgical principles are as follows:
(1) Preserve the presurgical columellar length.
(2) Keep the probial width narrow without compromising blood supply.
(3) Advance the probial columellar complex cephalically to allow for muscle reconstruction in front of the premaxilla.
(4) Release of the LLC from the overlying skin and pyriform rim.
(5) Reposition the LLC medially and superiorly.
(6) Adequate dissection over maxillary periosteum.
(7) Closure of pyriform area with mucosal flaps that also reconstruct the nostril floor.
(8) Reconstruct the probial buccal sulcus with probial mucosal flaps.
(9) Reconstruct the Orbicularis muscle and attach it to the nasal septum.
(10) Reconstruct a new Cupid’s bow, central vermillion and lip tubercle with lateral flaps from lateral lips.
(11) Balance the height of both lateral lips without incisions around the ala.
(12) Maintain the presurgical nasolabial angle.
(13) Accentuate the tip and columellar length with a Tajima procedure.

Thorough instructions for feeding and wound care can assure the surgical result avoiding any complications as wound dehiscence or infection. Scar care and maintenance of reconstructed nasal shape are equally important as the preoperative management and surgical refinements in achieving a satisfactory result.
General protocol of management

In Taiwan, more than half of the new born cleft babies have prenatal diagnosis before their birth. The prospective parents are well informed during their prenatal counseling. The initial visit is as soon as possible after birth. Besides the initial evaluation done by pediatrician, basic studies including dental casts, photographs and classification of the pathology are done. The family history is obtained and genetic counseling is provided if there is any positive family history. Feeding instruction is given and compact discs of the treatment plan are provided. Volunteers from the parent support groups will explain the course of treatment to the family and help them understand their role in the treatment of their infant. Social workers from the Noordhoff Craniofacial Foundation will introduce all the possible social and medical resources to the family. The orthodontist and plastic surgeon carefully examine the pathology of the infant to record tissue deficiencies and tissue distortion. Careful recording of the pathology is helpful in assessing postoperative results. The treatment plan is developed and explained to the parents.

Presurgical nasoalveolar molding is started on the first visit. In Chang Gung Craniofacial Center, three different kinds of nasoalveolar molding (Grayson, Figueroa...
and Liou) are used dependent on the different orthodontists. It usually takes 3 to 4 months to achieve an optimal outcome. The timing of the initial surgery is also dependent on the general nutrition and growth of the infant.

The infant is discharged from the hospital the next day after surgery if the general condition is good and wound care is well educated. The stitches are removed 5 to 7 days after surgery in outpatient clinic under the sedation of oral Chloral Hydrate (10%). The parents are instructed for scar care with micropore tapes and silicone sheets and maintenance of the nasal shape with silicone nasal splint. This postoperative care takes 8 to 9 months until the scar is matured and nasal shape stabilized.

The palate is repaired at approximately 9 to 12 months of age together with insertion of Grommet tubes when indicated. General assessment of development is performed at 2 years old for screening of developmental delay. Speech assessment is started at 2.5 years at a 6-months to 1 year interval. If the patient requires speech therapy, it is started at 3.5 years. Velopharyngeal insufficiency when diagnosed is confirmed by nasendoscopy at 4 years and corrected before the child goes to school. Residual alveolar clefts are closed before eruption of canine teeth, usually around 9 to 11 years of age. The patient is then followed at regular intervals till adolescence to determine if an orthognathic surgery is necessary to correct any skeletal deformity. Whenever the patient has any psychological problems related to any residual lip or nasal deformity, a revision is done, usually it will not be done until adolescence.

Any patient with conditions deviated from the regular protocol will be discussed in the craniofacial conference for the subsequent treatment with special considerations in psychosocial aspect and family interactions. The participants of the conference consist of plastic surgeons, orthodontist, speech pathologist, psychologist, social worker and clinical coordinator.

<table>
<thead>
<tr>
<th>Team-based, Sequenced Treatment</th>
<th>Plastic Surgery</th>
<th>Lip Repair</th>
<th>Palate Repair</th>
<th>Surgery for Velopharyngeal Insufficiency</th>
<th>Alveolar Bone Grafting</th>
<th>Orthognathic Surgery (revision for lip and nose)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

General protocol of management