

UCL Repair: Emphasis on Muscle Dissection and Reconstruction

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Unilateral cleft lip repair is performed using rotation-advancement technique. Markings are made on columella base, redlines, Cupid's bow on medial lip segment and Noordhoff point on the white skin roll of lateral lip segment where the vermilion first becomes the widest, as well as the alar crest points (AC). Measurement of the lip skin dimension is not required. Lip lengthening in the cleft side and symmetry are achieved by muscle reconstruction.

Cm flap and inferior turbinate mucosa flap are used for lining of piriform and reconstruction of the nasal floor. Muscle dissection at the medial side extends up into the columella base and contralateral nasal floor. Adequate muscle rotation with leveling of the Cupid's bow is confirmed. Muscle dissection at the lateral lip segment is proceeded. The muscle dissection starts from the nasal floor, freeing the muscle from the nasal mucosa. Extensive dissection separating the layers of mucosa, muscle and skin is performed. Adequate length of muscle dimension is obtained from both medial and lateral lip segments. Muscle sutures are placed carefully, adjusting the same level on both side of muscle flap. The upper muscle suture is placed into the columella base, using subcutaneous sustaining suture (SSS technique). Then the cinching suture is placed between the columella base and cleft side alar base. The muscle repair technique helps to lengthen the lip and maintain the symmetry of the landmarks. The skin lengthening is made by a backcut just above the Cupid's bow, instead of the Mohler's method or Millard's upper backcut.

Reference: Lonic D, Morris D, Lo LJ. Primary overcorrection of the unilateral cleft nasal deformity: Quantifying the results. *Ann Plast Surg* 2016 Feb;77 Suppl 1:S25-9. doi: 10.1097/SAP.0000000000000708.

Microform Cleft Lip

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Microform cleft lip can exist as an isolated deformity (unilateral) or combine with another side cleft lip (bilateral). Mulliken defined the occult cleft lip as minor form, microform, and mini-microform. In the isolated case, the minor form cleft lip is usually repaired by rotation-advancement method, addressing the skin fissure, separated marginalis muscle, and nasal deformity. For microform or mini-microform, we may choose to observe the lip and arrange lip repair when it is required. Usually multiple z-plasty are used to correct the vermilion deficiency, separated Cupid's bow, and nasal floor deformity. A lenticular excision can be used to approximate the Cupid's bow. One must weigh the surgical lip improvement against the lip scars.

In the bilateral cases, identification of the occult cleft lip is important in order to plan the surgical method and explain the situation to parents. A microform or mini-microform cleft lip could be observed and do rotation-advancement to the greater side. When it is required to address the occult cleft lip, our experience showed that one-stage repair obtained better results than the two-stage repairs

Reference: Chung KH, Lo LJ. One-stage vs. two-stage repair of asymmetric bilateral cleft lip: A 20-year retrospective study of clinical outcome. *Plast Reconstr Surg* 2018 May;141(5):1215-1224. doi: 10.1097/PRS.0000000000004327).

Palate Repair: Dissection in the Pyramidal Space for Release of Tension

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Repairing a cleft palate under minimal tension to avoid the dehiscence and fistula is important. A repaired palate with oronasal fistula could have the problems of regurgitation or velopharyngeal insufficiency. In the palate repair, the mucoperiosteal flap is raised from the hard palate, exposing the palatine bone behind the transverse suture. We define the pyramidal space located in the lateral part of the palatine bone, where dissection in this area is important to release the flap tension. In this dissection, the pedicle, hamulus process, tensor veli palatini muscle, and the opening of the space of Ernst are found. The pedicle is elevated with the double hook, revealing the tight ligamentous fibers. The fibers are divided freeing the flap and pedicle. The hamulus process is fractured and moved medially. The flap is now loose and sutured in the midline without tension. The lateral raw surface is covered by buccal fat pad.

Reference: Yamaguchi K, Lonic D, Lee CH, Yun C, Lo LJ. Modified Furlow palatoplasty using small double-opposing Z-plasty: Surgical technique and outcome. *Plast Reconstr Surg* 2016 Jun;137(6):1825-31. doi: 10.1097/PRS.0000000000002181.

A Surgical Treatment Protocol for VPI

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Several methods, either alone or in combination, were introduced to correct velopharyngeal insufficiency (VPI). There is no consensus which technique or protocol is ideal.

In our center, a simple algorithm is applied to treat velopharyngeal insufficiency (VPI). The diagnosis section includes the speech perceptual assessment and a nasopharyngoscopy focusing on velopharyngeal closure ratio. The treatment is composed of a double-opposing Z-plasty (DOZ) for marginal VPI or pharyngeal flap (PF) for moderate to severe VPI. Retrospective chart review was conducted for 84 consecutive non-syndromic postpalatoplasty patients undergoing VPI surgery from Aug 2007 to December 2014. The demographic, perioperative, and follow-up data were collected. Statistical analyses were performed. The overall improvement rate for patients was 86.9%. 9 patients in the DOZ group and 2 patients in the PF group were refractory to VPI surgery. The improvement rates for each surgical group were 80.4% for the DOZ and 94.7% for the PF group. Postoperative VP function showed no significant differences between the coronal and non-coronal groups. Airway-associated complications were observed in 9 (10.7%) patients. The complications in the DOZ group were observed in 2 patients (4.3%), none of the patients presenting obstructive sleep apnea (OSA). 7 patients (18.4%) in the PF group showed airway complications, and one (2.6%) of them presented OSA. Our algorithm is a simple patient- and surgeon-friendly strategy to gain satisfactory improvement of velopharyngeal function for VPI patients with a low risk of airway complications.

Reference: Yamaguchi K, Lonic D, Lee CH, Wang SH, Yun C, Lo LJ. A treatment protocol for velopharyngeal insufficiency and the outcome. *Plast Reconstr Surg* 2016 Aug; 138(2): 290e-9e. doi: 10.1097/PRS.0000000000002386.

Septal Extension Graft in Secondary Cleft Lip Nasal Deformity

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One of the common characteristics for secondary cleft lip nasal deformity is the lack of nasal tip projection. When this problem is addressed, the nasal tip projection is best achieved using the septal extension graft. This operation is performed on adult patients. The graft is harvested from the nasal septum or conchal cartilage if the septal cartilage is not adequate.

The operation is performed under general anesthesia. Open tip rhinoplasty is performed via columella, intranasal and reverse U incisions. The scar tissue is carefully dissected. Care was taken to avoid mucosa perforation. The septal cartilage is exposed. It is noted that the septal cartilage is always small and weak in Asian patients with cleft. The anterior and lower part of perichondrium is preserved. Harvest of the septal cartilage is performed 8mm from the edge. A piece of cartilage graft 8x20mm is sufficient. The graft is sutured to the tip of septal frame, and the lower lateral cartilages were approximated each other and with the extension graft. Using this method, an average of 5mm further tip projection could be obtained.

Cleft Orthognathic Surgery: 3D Simulation

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Although conventional two-dimensional (2D) methods for orthognathic surgery planning are still popular, the use of three-dimensional (3D) simulation steadily increases. In facial asymmetry cases such as in cleft lip/palate patients the additional information can dramatically improve planning accuracy and outcome. In our practice, most patients received two-jaw single-splint orthognathic surgery. 2D orthodontic surgery plans were transferred into a 3D setting. Severe bony collisions in the ramus area after 2D plan transfer were noted. The position of the maxillo-mandibular complex was evaluated and eventually adjusted. Position changes of roll, midline, pitch, yaw, genioplasty and their frequency within the patient group were recorded as an alternation of the initial 2D plan. In one of our study, 83.3% of 2D plans were modified, mostly concerning yaw (63.3%) and midline (36.7%) adjustments. Yaw adjustments had the highest mean values in total and in all subgroups. Severe bony collisions as a result of 2D planning were seen in 46.7% of patients. Possible asymmetry was regularly foreseen and corrected in the 3D simulation. Based on our experience, 3D simulation renders important information for accurate planning in complex cleft lip/palate cases involving facial asymmetry that is regularly missed in conventional 2D planning.

Reference: Lonic D, Pai BC, Yamaguchi K, Chortrakarnkij P, Lin HH, Lo LJ. Computer-assisted orthognathic surgery for patients with cleft lip/palate: From traditional planning to three-dimensional surgical simulation. PLoS One. 2016 Mar 22;11(3):e0152014. doi: 10.1371/journal.pone.0152014. eCollection 2016.