Unilateral Cleft Lip Repair

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Cassio Eduardo Raposo-Amaral and Nivaldo Alonso

7.1 Introduction: Overview of the History of Unilateral Cheiloplasty

The history of cleft surgery overrides the history of plastic surgery. The principles outlined for the manipulation of the soft tissues in patients with cleft lip and palate gradually evolved and integrated to the arsenal of principles of modern plastic surgery. The first surgical attempts to correct a cleft lip and palate date from 390 BC year in China, and were carried out with the approximation of the cleft margins (Boo 1966). In the early fourteenth century, Jehan Yperman was the first to describe in detail the primary unilateral and bilateral cheiloplasty (Millard 1976). In 1564, Ambroise Paré illustrated the procedure used to obtain a straight-line closure of cleft lip (Millard 1976) and subsequently wrote the principles of plastic surgery, stating that "surgery is an art" (Paré 1964). In 1597, Gaspar Tagliacozzi described with illustrations surgical steps of primary cheiloplasty (Gnudi and Wester 1976). In the eighteenth century, Lorenz Heister, in his treatise named "*Chirurgie*," emphasized the need for delicate surgical instruments in the proper handling of cleft lip (Millard 1976). In 1843, Malgaigne described the primary cheiloplasty principles with local flaps, and in the following year, Mirault modified Malgaigne technique utilizing lateral segment flaps to establish length of the medial cleft segment (Malgaigne 1861; Mirault 1884).

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William Rose, in 1879, described the use of curvilinear incision along the lateral segment from alar base to lip vermilion in order to preserve tissue during cheiloplasty (Rose 1891) and was credited to be the first to observe the necessity to bow the incision in the prolabium to decrease scar contraction and vermilion notch (Rose 1891). James Thompson pointed out the need to build the cleft philtrum column that mirrors the contralateral side and emphasized the importance of repositioning of the alar base (Thompson 1912).

The primary cheiloplasty was constantly evolving and there were still many unanswered questions. At the time, the results showed a short lip and nose with the remaining deformity with cleft stigmata. There was a great avenue for innovation and refinement on cheiloplasty techniques.

Blair and Robinson also made their contributions describing the straight-line cheiloplasty (Blair and Robinson 1948; Blair and Letterman 1950). Nasal region remained as an anatomical paradigm in the lip surgery. It was believed that nasal approach would impair its growth. The first attempt to create a Cupid bow arch was described by Hagedorn (1892). Le-Mesurier in 1949 described a quadrangular flap to fill the medial element and recreate the Cupid bow (LeMesurier 1949).

A Brazilian plastic surgeon described in 1952 a cheiloplasty technique using triangular flaps with preservation of Cupid bow (Cardoso 1952). The Cardoso's concept of a triangular lip repair led Tennison to publish in 1954 the important principles of primary cheiloplasty with *orbicularis oris muscle* repositioning and execution of triangular flaps at the cleft lip margins to avoid scar contraction and lip deformity (Tennison 1952). Interestingly, the principles described by Tennison resisted the span of time and are still being used by some plastic surgeons who adopt the triangular cleft lip repair technique.

Randall modified the Tennison technique changing the direction of the triangular flaps and decreased the number of scars crossing the philtrum dimple (Randall 1959, 1986).

Spina realized important contributions to the field of cleft lip repair as he described the most important classification of cleft lip and palate used in Brazil as well as a cheiloplasty technique using triangular flaps (Spina and Lodovici 1960; Spina et al. 1972). His technique of correcting the bilateral cleft is still being used in most cleft centers in Brazil.

Ralph Millard and Sir Harold Gillies delineated the modern principles of plastic surgery in their famous tretise.[19] Millard developed during the Korean War the principles of primary cheiloplasty based on the rotation and advancement, which is the most popular technique to date worldwide, and his results were presented in 1955 during the International Plastic Surgery Congress held in Stockholm (Millard 1986). After his presentation, Millard was strongly criticized being said that the technique was obsolete (Millard 2003). In the same year, some surgeons in the world have recognized the significant impact of the rotation advancement technique. Millard technique has a significant advantage in comparison to the others, since it allows individual adaptations and modification considering the severity of cleft deformity and surgeon creativity. The principles of the rotation and advancement described by Millard are now widely used throughout the world.

In 1987, Mohler described a modification of Millard technique using a smaller C flap and extended the incision 2 mm vertically in the nasal region, allowing elongation of the columella (Mohler 1987; Cutting and Dayan 2003; Xu et al. 2009). In the Mohler description, the Millard back-cut incision does not extend beyond the contralateral philtral column and generates a straight-line scar that mirrors the contralateral philtrum column direction (Mohler 1987; Cutting and Dayan 2003).

7.2 Primary Rhinoplasty

The primary surgery of the nose started almost four decades ago with the principles of cartilage repositioning. In the early 1970s, Salyer developed the principles of undermining and repositioning the alar cartilages and since that period many authors gradually broke the paradigm that early surgery of the nose would prevent the facial and nasal growth (Xu et al. 2009).

In 1975, McComb emphasized the need for primary rhinoplasty during lip repair by suturing the alar cartilages at a higher anatomical point of the triangular cartilages, providing an overcorrection of anatomical structures (McComb 1975). Currently in Brazil, the vast majority of surgeons working with cleft patients admit the importance of primary rhinoplasty during primary lip repair.

Millard initially placed little emphasis on the nose. The columella "C" flap was built to lengthen the columella and recreate the nasal floor (Millard 1960). After a few years of experience with the rotation advancement technique, the author recognized the importance of increasing efforts in surgical nasal region by proposing maneuvers to improve the alar cartilage positioning, suturing the superior region of quadrangular cartilage and the alar cartilages together, and repositioning the incision on the nasal floor (Millard and Morovic 1998).

Surgical modifications of Cutting and Mulliken for primary rhinoplasty provided a significant improvement in nasal symmetry of cleft patients (Cutting 1994; Wong et al. 2002; Mulliken and Martinez-Pérez 1999). Cutting changed the McComb stitches by using a horizontal mattress suture to elevate the dome and the medial crus of the alar cartilage (Cutting 1994). Mulliken completely undermines the entire region of the alar cartilage and places it in a more anatomically appropriate region. Additionally, he includes an absorbable plate that prevents the recurrence of nasal deformities (Mulliken and Martinez-Pérez 1999).

Despite the great effort to obtain the nasal symmetry there is always a great tendency to recurrence of nasal deformity at the dome and at the nasal floor by the lateral displacement of the nasal base.

7.3 Anatomical Aspects

The anatomical features of a patient with cleft lip and palate delineate their morphological characteristics, both in complete and in incomplete forms. Therefore, the degree of hypoplasia of the craniofacial skeleton associated with the distance

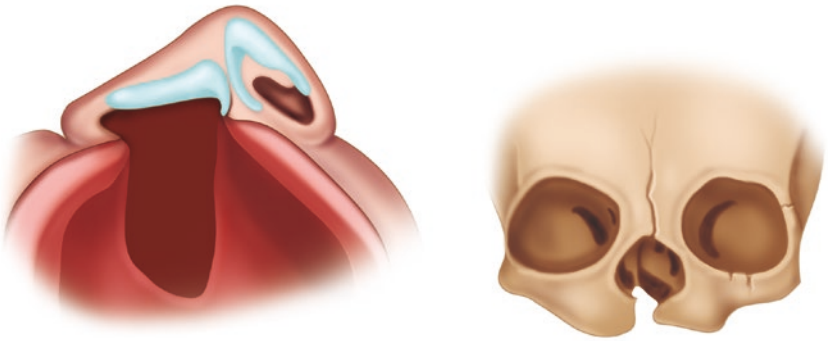

Fig. 7.1 Abnormal anatomic characteristics of soft tissue and skeletal unilateral deformity presented in patients with unilateral complete cleft lip and palate

between the palatine bone plates inherent to the bony cleft leads to a significant distortion in soft-tissue structures, skin, muscle, and cartilage. The main anatomical abnormalities of the nasal region are didactically itemized below:

- The columella is short on the cleft side, and the lateral crus of the alar cartilage and nasal base are posteriorly displaced.
- The base of the columella is deflected to the noncleft side.
- The medial crus of the alar cartilage is shorter in the cleft side and the reflection angle is more obtuse compared to the contralateral side.
- The lateral crus of the alar cartilage is long in the cleft side and deformed in the form of "S" following the asymmetry of the maxillary cleft segment.
- Nasal dome on the cleft side presents a more obtuse angle of reflection compared to the contralateral side.
- The nasal lining is missing or inferiorly located in the cleft side.
- The anterior septum and the anterior nasal spine are deviated to the noncleft side.
- The pyriform aperture can be clefted, without bone continuity, asymmetrically compared to the contralateral side and retro-positioned (Fig. 7.1).

7.4 Surgical Goals

Both authors utilize a variation of Millard repair in their practice. Senior author described his own modification and first author has been using a Cutting-Mohler modification of Millard repair (Stal et al. 2009). Mohler described a more rectilinear incision than the incision generated by Millard and therefore the possibility of using the columellar C flap to fill the space generated by the back-cut incision and rotation of the medial cleft segment (Noordhoff 1984). The final scar tends to mirror the contralateral philtrum column.

7.5 Alonso's Personal Modification of Millard Repair: Markings

The key anatomical points were marked with brilliant green dye. First, the midline and alar contour of the nose and the dome position of both nasal lower lateral cartilages and the transition between dry and wet vermilion were marked. Next, on the medial lip, points of the median tubercle and of the Cupid's bow on the noncleft side and on the cleft side were marked on the white roll. Reference points for the nasal floor were established on the noncleft side, and, by transferring this dimension on the cleft side, other two landmarks were established in this segment. The base of philtrum column on the noncleft side was delimited, observing the philtral column conformation. A rotation incision was marked from the Cupid's bow on the cleft side to the base of the philtral column on the noncleft side and of the medial vertical height, and the marked incision was somewhat arched. Whenever the lip was very short, lengthening at 90° on the philtrum column on the noncleft side was possible, delimiting the rotation flap. An incision on the medial margin of the cleft from the cleft-side Cupid's bow was established delimiting the C flap. On the lateral lip, The Cupid's bow on the cleft side on the white roll coincides with the location in which the narrowing of the vermilion lip begins. Lip height on the noncleft side allows the establishment of the height on the lateral lip. Through a small incision located 1 mm from the naris, the advancement flap was delimited (Figs. 7.2, 7.3, and 7.4; Alonso et al. 2010).

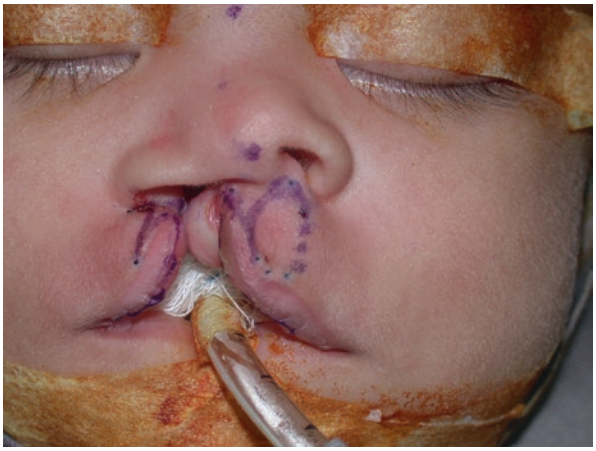

Fig. 7.2 Intraoperative photograph of a patient with right unilateral complete cleft lip and palate showing markings on the medial margin of the cleft from the cleft-side Cupid's bow. On the lateral lip, the Cupid's bow on the cleft side on the white roll coinciding with the location in which the narrowing of the vermilion lip begins. Lip height on the noncleft side allows the establishment of the height on the lateral lip. A rotation incision was marked from the Cupid's bow on the cleft side to the base of the philtral column on the noncleft side and of the medial vertical height, and the marked incision was somewhat arched

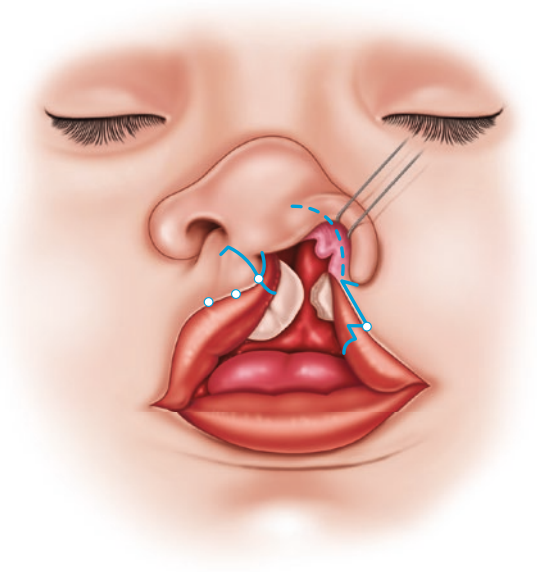

Fig. 7.3 Illustrative drawing showing the markings on medial and lateral lip. A triangular flap is performed in the lip vermilion and markings extent in the nasal vestibular region in the transition of nasal skin and nasal mucosa

7.6 Operative Technique

Initially, on the medial lip, an incision in the cleft margin above the cutaneous roll was made through the skin and subcutaneous tissue and not through the muscle. Cleft marginal tissue was discarded. Dissection of the orbicularis oris muscle from the overlying skin, vermilion, and underlying mucosa was performed. In the skin, to preserve the philtral dimple, the muscle was dissected and limited to 1 mm from the cut edge. Through a small releasing incision in the gingivolabial sulcus, the labial frenulum was sectioned. The orbicularis oris muscle was released from its insertion in the columellar base and from the upper alveolar cleft portion, allowing the exposure of the anterior nasal spine. By positioning the lip and nose, the symmetry between the philtral column and the planned rotation incision was verified. An incision on the previously marked markings was made through the skin creating the rotation and C flap. For those cases in which the downward rotation was insufficient, lengthening on the philtral column could be performed inferiorly.

On the lateral lip, an incision on the cleft margin above the cutaneous roll was made, similarly that it was performed on the medial lip, preserving the

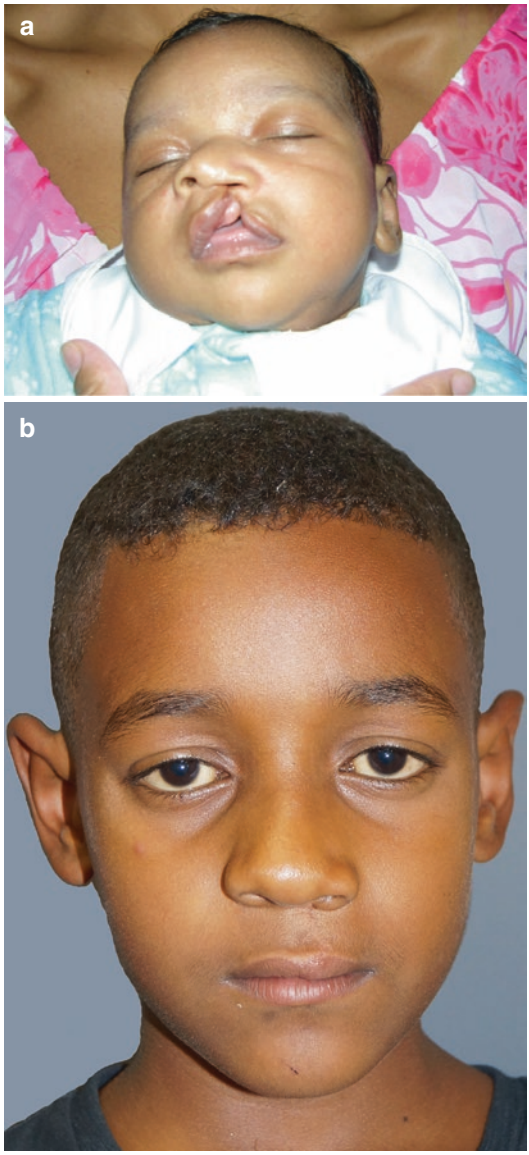

Fig. 7.4 (**a**, **b**) Pre- and postoperative pictures of Alonso's technique 10 years later showing the stability of the result and good quality of lip scar

muscle. Below the cutaneous roll, a vermilion flap was created. Cleft marginal tissue was discarded. Dissection of the orbicularis oris muscle from the overlying skin, vermilion, and underlying mucosa was performed. Dissection between the skin and muscle was more extensive in the lateral lip than in the medial lip. Below the alar base, wide dissection of the orbicularis oris muscle was performed. Through an incision in the gingivolabial sulcus, the lip was released relative to the alveolar ridge and to the pyriform aperture. Supraperiosteal

dissection on the maxilla released the alar base. Through an intercartilaginous incision, the lateral crus of the lower lateral cartilage and its vestibular portion were released from the posterolateral insertion in the pyriform aperture, allowing anteromedial advancement of the alar base. Cutaneous detachment of the nasal lower lateral cartilages and upper lateral cartilages on the cleft side was performed. After positioning of the cleft-side dome anteromedially, two or three stitches with 5-0 Vicryl (Ethicon, Inc.®, Somerville, NJ) were placed, closing the intercartilaginous incision to maintain the lateral crus advancement of the lower lateral cartilage. To achieve tip symmetry, a U-shaped transdomal suture was made using 5-0 Monocryl (Ethicon, Inc.®). Transfixation sutures around the ala fixed the lower lateral cartilage back, preventing dead space formation. By sectioning the labial frenulum, medial advancement of the mucosa corrected lip height on the medial lip. Closure of medial and lateral mucosa was performed with separate stitches using 5-0 Vicryl. The releasing incision was sutured with two to three stitches of this same thread laterally. The orbicularis oris muscle was sutured with simple stitches using 5-0 Nylon (Ethicon, Inc.®). The nasal band was sutured on the anterior nasal spine, and deep fibers of the vermilion were united. C-flap positioning was adjusted, and the length of the incision delimiting the advancement flap was calculated with a double-hook retraction of the nose and landmark on the cutaneous roll. Regardless of the cleft size, this incision, of short length on all occasions, was positioned 1 mm from the alar base, never exceeding the lateral half of the naris. Three subdermal stitches using 5-0 Monocryl were placed, and, at the end, the cutaneous suture was obtained with simple stitches using 6-0 Vicryl Rapid (Ethicon, Inc.®). Considering the difference of the vermilion height medially and laterally, the laterally based vermilion flap was positioned to correct this difference. By respecting the anatomic reference of the median tubercle, dimension of this flap was modeled, and the flap was medially inserted through a small incision on the transition between the dry and wet vermilion. Suture was obtained with separate stitches using 6-0 Vicryl Rapid, ending the procedure. A silicone nasal stent was placed. An antibiotic ointment was applied to the suture line. The patient was extubated and sent to postanesthetic recovery. Discharge occurred on the first postoperative day. During the first week, the use of bottles and pacifiers was restricted. Outpatient returned at 7, 15, and 30 days and thereafter patients were periodically evaluated with a multidisciplinary approach according to the routine established in the unit (Figs. 7.5, 7.6, 7.7, 7.8, 7.9, 7.10, 7.11, 7.12, and 7.13).

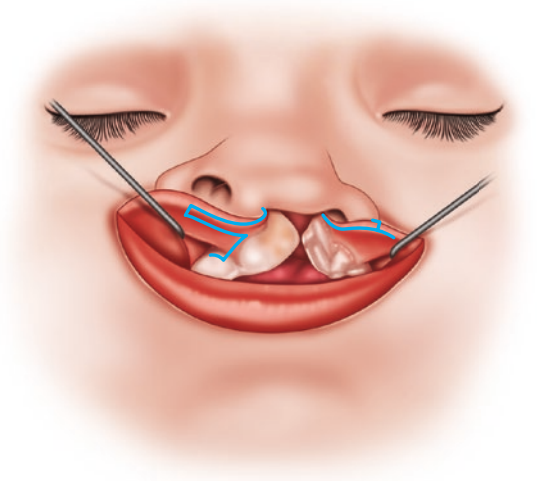

Fig. 7.5 Intraoral view of the markings of Alonso's personal modification of Millard repair

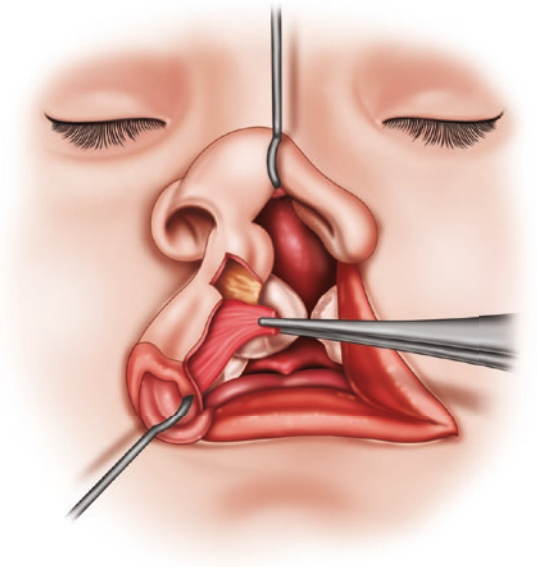

Fig. 7.6 Illustrative drawing showing the dissection of the *orbicularis oris* muscle and the skin back-cut to allow length gain at the medial philtrum column

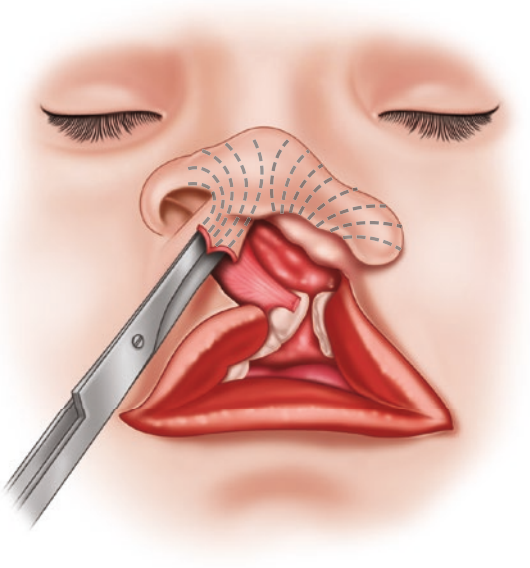

Fig. 7.7 The collumelar incision is used to offer access to the nasal tip and delicate scissor to harvest the medial and lateral crus of the alar cartilage

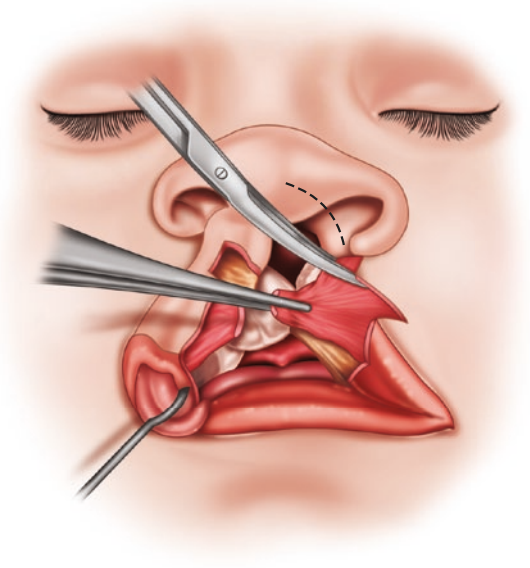

Fig. 7.8 Illustrative drawing showing the rotation of medial and lateral segments and isolation of the *orbicularis oris* muscle

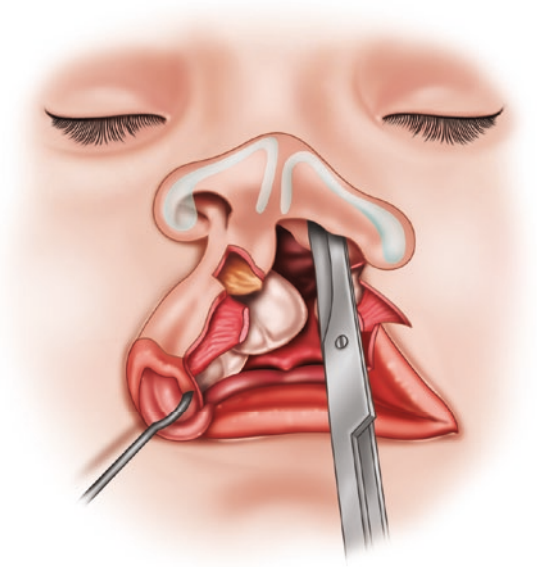

Fig. 7.9 Illustrative drawing showing the upper incision of the lateral segment used to gain acess to lateral crus of lateral cartilage. The wide dissection allow the alar cartilage to be freed of the nasal skin and mucosa and to subsequently be positioned with percutaneous suture

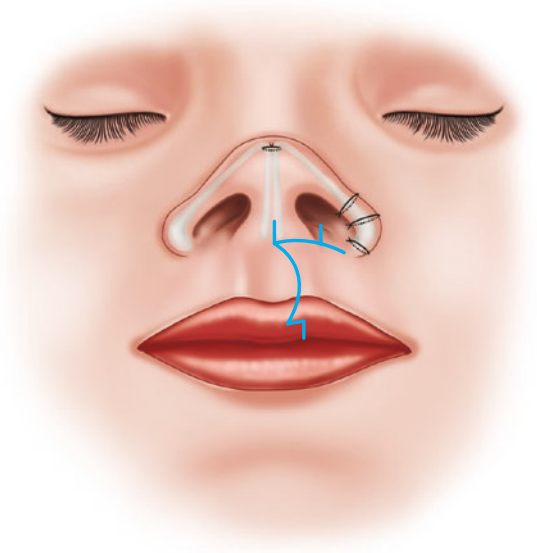

Fig. 7.10 Illustrative drawing showing the final appearance of the lip repair

Fig. 7.11 Preoperative frontal photograph of an adult primary right unilateral incomplete cleft lip (*left*). Postoperative photograph of the same patient after Alonso's personal modification of Millard repair (*right*)

Fig. 7.12 Preoperative basal view photograph of an adult primary right unilateral incomplete cleft lip (*left*). Postoperative basal view photograph of the same patient after Alonso's personal modification of Millard repair (*right*)

Fig. 7.13 Preoperative frontal photograph of a primary left unilateral complete cleft lip and palate (*left*). Intraoperative frontal view of the same patient *(center)*. Postoperative photograph of the same patient after Alonso's personal modification of Millard repair (*right*)

7.7 Mohler Technique

7.7.1 Preoperative Marking

Preoperative marking is performed with methylene blue. Magnifying lens for better identification and precise marking of anatomical landmarks is routinely used. The lowest point of Cupid's bow is marked as point 1, and point 2 corresponds to the contralateral philtral column's lowest point at the white roll and point 3 corresponds to the replication of the distance 1–2. For a 4-month-old patient, the distance between the points 1 and 2 usually measures 3 mm, thereby forming Cupid's bow, which measures 6 mm (distance between points 2 and 3). Point 4 is the most important of the preoperative marking as it determines the final symmetry of the lip in terms of width and height. It determines the lateral Cupid's bow point.

Point 4 is identified at the end of skin pigmentation area of the white roll, typically 1 mm medially to the point recommended by Cutting[45]; thus smaller amount of tissue is lost. If it is marked too medially in order to avoid losing tissue, one can end up with whistled deformity with inappropriate vermilion volume to reconstruct the median tubercle; otherwise it is marked too laterally that one can end up with a short lip in transverse terms. Noordhoff describes this point as the most medial point where the volume of the dry vermilion is greater. We tend not to replicate the distance from the alar crease to the height of the bow from noncleft side to cleft side as proposed by Cutting, because we believe that one can end up losing important tissue laterally specially in those severe cases with the absence of nasoalveolar molding with a significant discrepancy between the palatine plates. Depending on the surgeon experience the position of this point may vary, as one can anticipate the final position of the lip elements at the end of the surgery. More recently, a small laterally based triangular flap above the cutaneous white roll has been incorporated to the preoperative marking. A quadrangular flap is also marked medially to the lateral segment that is usually based either in the nasal turbinate region or in the alveolus as proposed by Millard. This flap will be rotated inside in the transition of nasal skin and nasal mucosa. The most medial region of this flap will be rotated to be sutured

to septal flap and form the floor of the nose. The septal flap is usually not marked and the incision is performed based on the extension of the medial portion of "L" flap on the septum. The floor of the nose cannot be too small as there is a chance for obstruction secondary to scar contraction. We have used the diameter of the oral-tracheal tube as a reference for the diameter of upper airway constructed based on the suture between the "L" flap and "S" flap. Point 5 is marked in the region of the cleft alar base about 1 mm into the nostril. Point 6 is marked in the alar base of noncleft side. The point 7 is a reference of lateral based "L" flap and point 8 is drawn at columellar base (Raposo-do-Amaral 2008; Raposo-Amaral et al. 2012) (Figs. 7.14, 7.15, 7.16, 7.17, 7.18, 7.19, 7.20, 7.21, 7.22, 7.23, and 7.24).

7.7.2 Anthropometric Measurements

After the preoperative marking all points are carefully measured with surgical caliper and recorded in the patient chart.

Fig. 7.14 Intraoperative photograph showing a prolabial incision and columella ["C"] flap to elongate the columella in the Mohler technique, using Millard principles

Fig. 7.15 Intraoperative photograph showing nasal undermining using the Converse angulated scissor

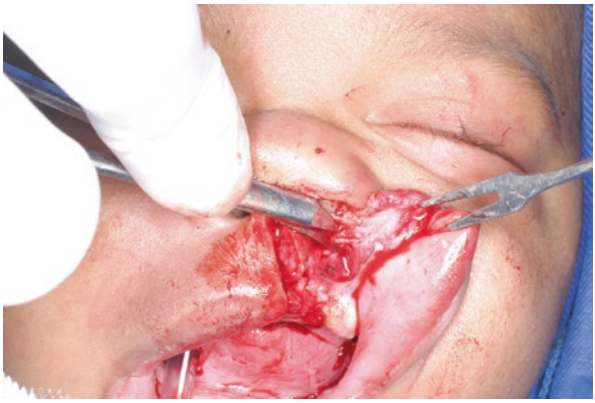

Fig. 7.16 Intraoperative photograph showing the dissection of abnormal nasal muscle fibers attaching the nasal ala to the bony structures of the lateral pyriform aperture. These fibers need to be released to elevate the nasal ala

Fig. 7.17 Preoperative and postoperative photograph of right unilateral incomplete cleft lip. Satisfactory nasal symmetry was obtained during the follow-up period (*right*)

Fig. 7.18 Preoperative photograph of 3-month-old patient with left unilateral complete cleft lip and palate (*left*). Postoperative photograph of the same patient 2 years after cleft lip and nasal repair (*right*)

Fig. 7.19 Preoperative basal view of the same patient (*left*). Postoperative basal view of the same patient (*right*)

Fig. 7.20 Preoperative photograph of 3-month-old patient with right unilateral complete cleft lip and palate (*left*). Postoperative photograph 3 years after surgery (*right*)

Fig. 7.21 Preoperative basal view of the same patient (*left*). Postoperative basal view of the same patient 3 years after surgery (*right*)

Fig. 7.22 Preoperative (*left*) and postoperative frontal photograph of left unilateral complete cleft lip. Satisfactory nasal symmetry was obtained during the follow-up period (*center*) and after alveolar bone grafting at 7 years of age (*right*)

Fig. 7.23 Preoperative (*left*) and postoperative basal photograph of left unilateral complete cleft lip. Satisfactory lip and nasal symmetry was obtained during the follow-up period (*center*) and after alveolar bone grafting at 7 years of age (*right*)

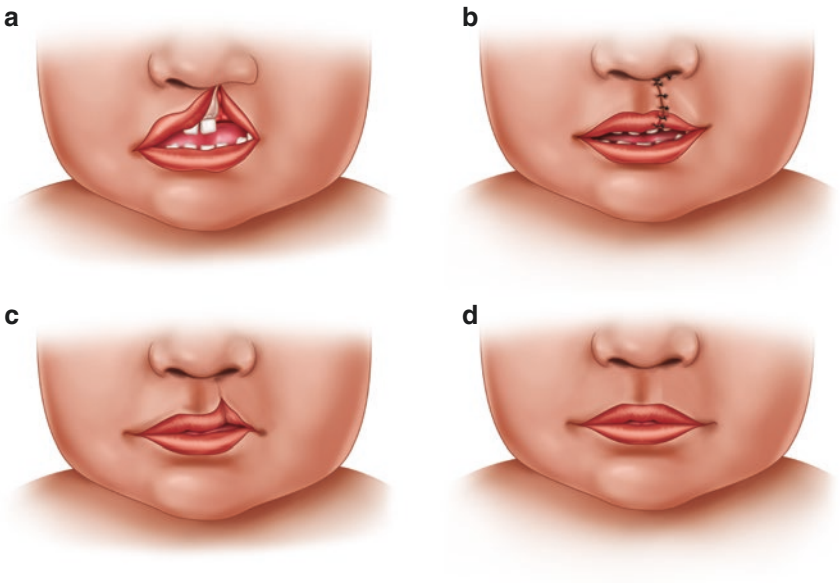

Fig. 7.24 (**a**) Patient with left unilateral complete cleft lip. Illustrative drawings of the physiologic behavior of the straight line scar in the Mohler technique (**b**), after 12 weeks of surgery (**c**) and after a year of surgery (**d**).

7.7.3 Mohler Operative Technique

The surgery starts with the skin incision with number 15 scalpel blade in the premarked area in the lip region toward 2 mm in the nasal columella. The columella "C" flap is created (Fig. 7.3). The blade number 11 with a pointed end is positioned in white skin roll in the marking point number 3. A transverse movement is performed generating a slight vermilion excess that can be eventually used at the end of the operation. Upper labial arteries are cauterized with electrocautery level 7 intensity. The small columellar incision is used to offer a skin route for nasal tip dissection. The medial crus of the alar cartilage is freed. The lateral dissection of the lateral crus of the alar cartilage will be completely performed using a lateral access after the elevation of the "L" flap (Fig. 7.5).

The lateral segment of the cleft is incised following the transition of skin and vermilion.

The blade scalpel number 11 is used for a perpendicular cut at point number 4, incising the lip vermilion and carefully following a quadrangular flap (L flap) based on the nasal turbinate. The L flap is completely elevated. The transition of

nasal skin and nasal mucosa is incised for the subsequent inset of the L flap. The alar base is completely freed. This route is used for the dissection of lateral alar crus toward the nasal tip and triangular cartilage. Before the rotation of the L flap to nasal vestibule, the gingivobuccal incision is performed lower in the lateral and medial segments. The lateral region is carefully dissected at supraperiosteal plane. We tend to perform a conservative dissection but this decision should be carefully balanced. A wide dissection at this region avoids tension of the lip suture but can cause scarring and maxillar growth restriction. This decision has been empirically based on the severity of the cleft. Medially, the gingivobuccal incision can facilitate downward rotation of the medial segment, and we usually do not undermine the medial segment. When all the structures are freed and completely mobile in all dimensions, the distal portion of the L flap as well as the inner portion are sutured within the nasal mucosa. The septal flap is elevated and the lower portion of L flap is sutured to the S flap creating the floor of the nose. At this time, considering that all nasal structures are freed and floating over the craniofacial skeleton, percutaneous suture at the lateral nasal region is performed to adjust the nasal morphology. We use three sutures at the region of nasal fold, to mold the alar cartilage using as a template the contralateral side and one or two sutures at the tip of nose to allow upward rotation of the medial crus of the alar cartilage. This maneuver aims an overcorrection of the height of cleft nasal tip. However, this goal may be difficult to achieve specially in severe cleft patients with distorted anatomy and significant discrepancy of the palatine shelves, in an anteroposterior and transverse direction. The gingivobuccal incision is advanced and sutured together. The *orbicularis oris* muscle is released both in the medial and lateral segments and the back-cut incision on the base of the columella is performed to allow downward rotation of the medial segment. At this point, the length of the medial segment should have similar dimension of the lateral segment. The first stitch is performed to union the alar base to anterior nasal spine recreating the nostril contour. Then, a series of subsequent stitches are done and at the bottom of the Cupid's bow, where the dermis is also grasped and suture deep at the *orbicularis oris* of the lateral segment. This maneuver tends to recreate the natural depth of this region. Then a double hook is used to lift the cleft nasal tip, allowing the surgeon to identify the excess of the "C" flap. One or two millimeters of excess of "C" flap is trimmed and sutured to the contralateral columellar side. This maneuver lengthens the columella with tissue of "C" flap. The lateral segment is advanced toward the medial segment and the skin is carefully sutured with 5-0 nylon with atraumatic needle. We also use a small triangular flap at the tip of the Cupid's bow in order to decrease secondary elevation of the peak of the bow owing to scar contraction.

The transition of wet vermilion and dry mucosa at the lip region is identified. This point is fundamental in black and Brazilian pardo patients. In white patients this transition is not so evident. These lateral and medial points are approximated to avoid mismatch of lip color. Lip is sutured with absorbable thread.

At the end of the operation, if the nasal tip is not overcorrected in comparison to the contralateral side, additional stitches are performed to elevate the nasal

tip, in the same manner as previously described. Either a silicone nasal stents or the orotracheal tube has been used to mold the nostril for 3–6 months after surgery.

The criticism of straight-line closure lies in the potential of scar contraction in postoperative period that may decrease the lip height. We have overcome the criticism about straight-line closure by using some specific maneuvers as follows: hermitic suture of *orbicularis oris* muscle, a small triangular flap at the Cupid's bow peak, implementation of the medial segment lip height that is equal to the contralateral side achieved by the back-cut incision, and small linear incision at the lower medial segment, where the triangular flap is inserted and meticulous skin closure is done by using atraumatic needle and careful removal after 6–7 days of surgery under sedation. We have been using this lip management protocol at SOBRAPAR with pleasing results. In addition, we have shown satisfactory result in incomplete cleft patients, whose lip height does not differ from the normative data, and we also showed that even in major cases with a significant discrepancy between the alveolar arch and without any type of infant presurgical orthopedics, satisfactory lip height has been achieved at 1 year after surgery. Having these data, we can anticipate all the evolution of postoperative lip dynamics to the parents who become aware of the scar contraction in early and late postoperative period, and the need of stitch removal under sedation at operation room. We have been counseling the parents to perform a lip massage at 1 month after surgery. Although there is not a confirmatory positive data about the benefit of postoperative lip massage in the current literature, parents may feel involved in the process and it may generate potential psychological effects until the healing process and scar contraction phenomenon is diminished (Raposo-do-Amaral 2008; Raposo-Amaral et al. 2012; Somensi et al. 2012).

7.7.3.1 Future Perspectives

As was said previously in the beginning of this chapter always new paradigms challenge the surgeons. The news points of discussion are different now, which mainly focus on two concepts of final results: social rehabilitation with final functional and cosmetic result and cost-effectiveness. After these we are back to operative technique and long-term evaluation of facial growth.

We prefer less invasive technique with minimal scars and position the scars in the anatomic landmarks. Fisher's technique (Fisher 2005) is very attractive for unilateral. It is a modern idea based on old straight-line technique concepts but with a very interesting mathematics approach that allows the teaching to be very easy for residents. After 3 years our service starts to adapt the points of Fisher's technique with the previous approach for the nose and the orbicularis oris muscle used as describe above.

The initial results are very interesting because of many reasons but the most important is that the final scar is straight positioned in the philtral crest. There is no scar around the alar base or in the central portion of the columella or in the contralateral philtral column.

The analysis of pros and cons of the technique as we have found include the fact that besides the position of the scar it is very easy to move medially the nasal alar without wide lateral undermining of soft tissue. In the opposite side it is possible to observe some difficulty achieving the final size of the medial part of the upper lip, and some shortness was seen in few cases. If we compare with other techniques too much tissue from the lateral side of the lip is discharged. On the resident's each point of view it is very easy to draw after you learn very precisely the function of which point.

7.7.3.2 Basic Markings

To determine the central points in the columella and also the lateral points in the alar base, philtral crest and white roll in the nonaffected side are the most important steps to learn the size and also the contralateral deformity to be corrected. The rotation of the lateral lip depends on the size of the cleft and lateral position of the alar rim. The medial height of the upper lip in the cleft side will determine the size of the flap that should be drawn on the lateral side of the lip. The described technique by D. Fisher did not touch the nose in the same time, but we always add the maneuver of Skoog's with the elongation of the incision until the intercartilage area. Sutures are always done, after extended dissection in between the two cartilages, lower lateral and upper lateral cartilage. For oral mucosa elongation on medial side of the lip, one medial incision is done in the gingival labial sulcus (Figs. 7.25 and 7.26).

Fig. 7.25 (**a**–**c**) Intraoperative markings of straight-line technique (Fisher), intraoperative and immediate results showing the final position of the scar

Fig. 7.26 (**a**–**c**) Wide left cleft pre- and intraoperative straight-line technique associated with rhinoplasty with the postoperative results. Lip scar in the philtral crest

7.8 Summary

There are many techniques developed over the years and straight-line closure was one of them. The principles described by Millard have been used worldwide and serve as a basis to the development of tactics and maneuvers adapted to patients' racial cleft features. The regional characteristics of each patient cohort may change the way cleft surgeon thinks and conducts his/her operation. However, the final goal and endpoint of all surgeons around the world are similar and we believe that the most difficult one is to find consistency in the results and a technique that can be learnt and taught in a standardized manner. Considering that cleft presentation is broad and nonstandardized, maneuvers to consistently achieve a normal face in these population have been described in the literature. In this chapter, Alonso and Raposo-Amaral's experience working in the largest Brazilian centers has been proposed (Figs. 7.27, 7.28 and 7.29).

Fig. 7.27 Preoperative photographs of a left unilateral incomplete cleft lip patient with an unusual presentation of a hemangioma on the superior lip and immediate postoperative

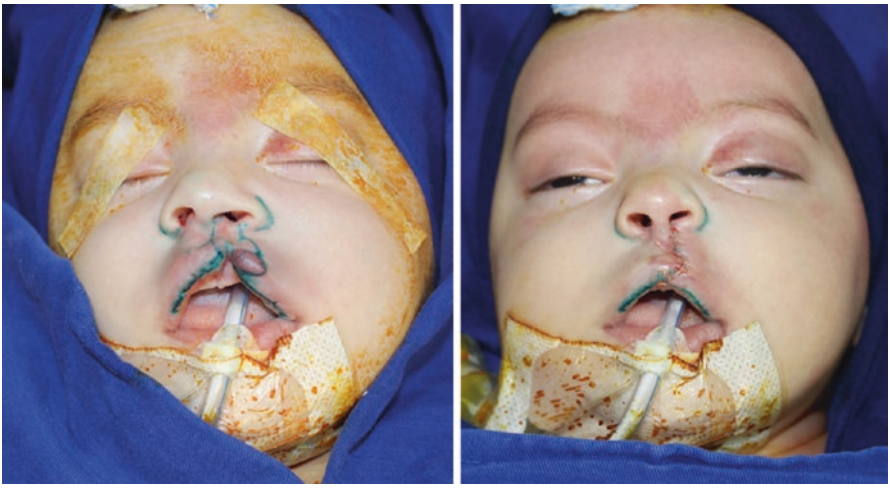

Fig. 7.28 Intraoperative photograph of left unilateral incomplete cleft lip patient with an unusual hemangioma of the superior lip marked using Fisher technique (*left*). Intraoperative photograph of the same patient immediately after surgery (*right*)

Fig. 7.29 Postoperative photograph of the same patient using Fisher technique

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