Geometric triangular vermilion flap for correction of whistle deformity in unilateral cleft lip.

Dr. Faisal Ashfaq

Abstract: Whistle deformity is one of the several deformities that a child with repaired unilateral cleft lip may develop. An incidence of 45% of this deformity following Millard repair has been reported. A lot of surgical repairs have been described for correction of this deformity. We utilized the technique based on Nordhoff’s lateral triangular vermilion flap described for repair of primary unilateral cleft lip. The objective of this study is to assess the results of modification of this technique in correction of whistle deformity of unilateral cleft lip.

Patients and Methods: 21 patient with whistle deformity were identified since December 2011. There were 11 males and 10 females. Mean age was 12.5 years with range from 2 to 22 years. Initial lip deformity was complete in 16 patients and incomplete in 5 patients while it was left sided in 12 and right sided in 9 patients. All initial surgeries were performed by other surgeons. All patients had deficient vermilion and notching. Whistle deformity was mild in 10 patients and severe in 11 patients. It was associated with short lip in 14 patients and tented vermilion in 16 patients. Preoperatively scar was abnormal and obvious in 13 patients. All patients were operated in General anaesthesia except one who was operated in local anaesthesia. All patients underwent complete takedown of initial repair and vermilion was reconstructed with modified y-v plasty of Nordhoff’s. pre and post-operative assessment was done by using Hashem’s criteria of five variables that included assessment of lip length as compared to the non-cleft side (short/equal), integrity of Cupid's bow (smooth/ tented), vermilion fullness on either side of the notch (near normal fullness/deficient), the severity of the notch (mild/severe) and the quality of the scar (masked/obvious). Each variable with positive outcome was given one number and there are a total of five variables noted, hence a total of 1-5 score. A patient with 5 score has excellent result, 4 with good result and 3 average, 2 below average and 1 poor.

Results: Postoperatively, all patients had near normal fullness on either side of notch and none of the patients exhibited residual notching. 16 patients had score of 5 i.e had excellent results. 4 patients had a score of 4 i.e good results and only one patient had score of 3 that is average result.

Conclusion: Primary lip repair utilizing Nordhoff’s repair has reduced the incidence of whistle deformity. This can still be used in secondary cases that do present with whistle. Modified Nordhoff repair with exact measurements of lateral vermilion flap can correct this secondary deformity with excellent results.

Key words: whistle deformity, triangular flap, vermilion, unilateral cleft lip.

Dr. Faisal Ashfaq
FCPS (Plastic Surgery)
Assistant Professor Plastic Surgery
Bolan medical college and Hospital, Quetta, Balochistan, Pakistan.
Jilani hospital, satellite town, Quetta.
Bolan medical complex Hospital, Brewery road, Quetta.
House no. 10-9/1700 jail road, Quetta, Pakistan.
00923214922310, 0092812830391
Email: faisalashfaque@hotmail.com
Introduction:
Following primary cheiloplasty for a unilateral cleft lip, child may develop secondary deformities'. One of such deformity: whistle deformity is because of deficient vermilion and orbicularis oris and is more visible while whistling hence called whistle deformity. Incidence of this deformity is variable. Mulliken reported 42% of labial revisions in his 15 years' experience with Millard's repair in which whistle deformity was the second most common deformity while Chirophecides reported 45% incidence of whistle deformity in unilateral cleft lip repaired by Millard's repair. Henke et al reported a 29% incidence of whistle deformity from a single centre. A lot of surgical repairs have been described for correction of this deformity. Nordhoff's technique when used for primary cheiloplasty yields very low rate of whistle deformity following repair. The same technique can be used for correction of whistle deformity. The objective of this study is to assess the results of modification of this technique in secondary correction of whistle deformity of unilateral cleft lip cases.

Patients and methods:
All patients with whistle deformity operated in Bolan medical complex hospital and Jilani hospital since 2011 were included in the study. Patient's age, gender, type of cleft, side of lip, initial deformity were documented. All patients with whistle deformity of unilateral lip were included in the study. Preoperative assessment was performed clinically and then by standard photography. We used the same pre and post operative assessment criteria as used by Hashem et al. Assessment included lip length as compared to the non-cleft side (short/equal), integrity of Cupid's bow (smooth/ tented), vermillion fullness on either side of the notch (near normal fullness/deficient), the severity of the notch (mild/severe) and the quality of the scar (masked/obvious). Postoperative assessment was performed clinically and photographically using same variables used in preoperative assessment. Each variable with positive outcome was given one number and there are a total of five variables noted, hence a total of 1-5 score. A patient with 5 score has excellent result, 4 with good result and 3 average, 2 below average and 1 poor (Table 1). SPSS 20 was used to assess the results. No specific test applies to this particular study.

Surgical technique:
Markings: a total of six points are marked, Three on the white roll (low point of cupid's bow and high points of cupid bow on cleft and non-cleft side) and the other three on redline (one below midline and others below peaks of cupid bow). Incision is marked on red line from midline to peak of cupid's bow on non cleft side. This is opened to accept lateral vermilion flap from lateral element. Peak of cupid's bow on lateral element is selected laterally so that a vermilion triangular flap can be designed. Length of flap is equal to distance from low point of cupid bow to peak of cupid bow on non cleft side. A straight line is marked from peak straight downwards till it matches the length on non cleft side. Rest of vermillion is the width of vermilion triangular flap.
Procedure: surgery was performed in general or local anaesthesia by single surgeon. After infiltrating lip with lignocaine and adrenaline, complete repair is taken down with modified Millard's incisions in skin part of lip while vermillion is incised according to markings described above (figure 1a). Lip is repaired in three layers with non-absorbable sutures on the skin to be removed on fifth postoperative day. Lateral vermilion flap containing orbicularis marginalis as well is fitted into defect on medial side to create fullness and compensate deficiency (figure 1b). Additional procedures like rhinoplasty were...
done after lip repair. No dressings were used and patient were asked to apply antibiotic ointment till sutures are removed. Gentle massage of scar was advised after two weeks of surgery.

Results:
21 patient with whistle defromity were identified since December 2011 to December 2014. There were 11 males and 10 females. Mean age was 12.5 years with range from 2 to 22 years. Initial lip deformity was complete in 16 patients and incomplete in 5 patients while it was left sided in 12 and right sided in 9 patients. All initial surgeries were performed by other surgeons. All patients had deficient vermilion and notching. Whistle deformity was mild in 10 patients and severe in 11 patients. It was associated with short lip in 14 patients and tented vermilion in 16 patients. Preoperatively scar was abnormal and obvious in 13 patients. All patients were operated in General anaesthesia except one who was operated in local anaesthesia. All patients underwent complete takedown of initial repair and vermilion was reconstructed with modified y-vplasty of Nordhoff's. In one patient, autologous fat grafting was also performed to address associated thining of upper lip. In 14 patients nasal deformity was also addressed. 5 patients were dealt with semi open rhinoplasty, and 7 patients with Potter's open rhinoplasty and in 2 patients rib graft as L strut for augmentation was also used.

All patients did well intraoperatively with no medical or surgical problems. Postoperative, all patients had near normal fullness on either side of notch and none of the patients exhibited residual notching. 16 patients had score of 5 i.e had excellent results. 4 patients had a score of 4 i.e good results and only one patient had score of 3 that is average result. Some representative results are shown in figures 3,4 and 5.
Discussion:
It is noted that vermilion is always deficient on cleft side in unilateral cleft lip. Suturing this to lateral thicker vermilion will result in inequality and notching of the vermilion. Thus in an ideal lip repair, vermilion should be reconstructed in such a way so that white roll and red lines are parallel and widest at the base of philtral column. Another important aspect is to repair orbicularis oris deficiency as well. The technique we used is what Nordhoff suggested to use in primary unilateral cheiloplasties. A lateral triangular vermilion flap is fitted into medial element to prevent future vermilion deficiency. Several studies have found Nordhoff flap superior to Zplasty in vermilion in reducing the incidence of notching following primary repair. He, however did not mention the exact size and measurements of lateral vermilion flap. Fisher gave measurements of flap that were further elaborated by Powaretal. The main difference from original Noordhoff's technique is calculation of exact dimensions of flap to fit in deficiency on medial lip segment. Secondly, a straight line incision is used upto base of flap so that the dimensions of the flap were calculated to exactly compensate for the deficiency on the medial lip segment. Nordhoff extended the base of triangular flap upto white roll that may compromise the approximation of this important landmark and may lead to asymmetry of cupid's bow.

The only critique to this technique is need to revise the whole lip with paring of peak of cupid bow more laterally on lateral element. This may result in horizontal shortening of upper lip. However, it is worth noticing that patients with whistle deformity have other deformities as well like poor scar, short upper lip that nonetheless requires complete take down of repair. This finding is supported by other authors as well. 16 out of 21 patients required additional procedures and this technique did not hinder performance of other procedures. This is another advantage of this technique. This technique can also be applied to bilateral cleft lips and good results have been documented.

Table 1: Postoperative Scoring of Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lip length</td>
<td>Short=0, Equal=1</td>
</tr>
<tr>
<td>Cupid's bow integrity</td>
<td>Tented=0, Smooth=1</td>
</tr>
<tr>
<td>Vermilion fullness</td>
<td>Deficient=0, Near normal fullness=1</td>
</tr>
<tr>
<td>Notch</td>
<td>Mild/severe=0, None=1</td>
</tr>
<tr>
<td>Quality of scar</td>
<td>Obvious=0, Masked=1</td>
</tr>
</tbody>
</table>

Score of 5= excellent, 4 is good, 3 is average, 2 is below average, 1 is poor.
Conclusion:
Vermillion deficiency is common after Millard repair. This can be corrected secondarily by horizontal Y-V flap of Noordhoff. It is recommended to use this technique in primary cleft lip repairs to decrease the incidence of whistle deformity.

References: