Kapetansky-Juri Technique to Correct the Whistlers Lip in the Multiple Operated Cleft Patient

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Abstract

Purpose One of the common sequels of a cleft lip repair may be “whistling lip deformity” but other deformities are also seen particularly in failed or multiple resurgery cases. This retrospective study was carried out to evaluate the usefulness of “Kapetansky-Juri” advancement flap technique to correct such deformities.

Methods Ten patients of bilateral cleft lip with history of minimum five failed cleft lip surgeries and having residual lip deformity were operated using “Kapetansky-Juri” advancement flap technique and were followed up to minimum 36 months.

Results All patients showed good tissue fullness and complete correction of the deformity. There was no contracture of surrounding skin or vermilion during follow-up

period. In eight patients minimal scar formation was seen while two showed midline scar formation.

Conclusion No tissue loss due to vascular insufficiency was observed. The technique gives good tissue distribution and minimal surface scar formation.

Keywords Kapetansky-Juri technique · Secondary lip correction · Median tubercle reconstruction · Whistler’s lip · Whistling lip deformity

Introduction

The repair of secondary deformities associated with bilateral cleft lip particularly post multiple failed surgeries continue to be one of the most challenging areas of the craniofacial surgery. New techniques and their various refinements have been proposed, discussed and applied since many decades. Yet residual deformities even after multiple surgeries continue to be a recurring feature. The results of these secondary corrective lip surgeries have an immense impact on psychology of patients because of high visibility of the lip region, which makes even minor deformity readily noticeable.

One of the common sequels of a cleft lip repair is the “whistling lip deformity”, which can be defined as a deficiency of tissue in the median tubercle. But a variety of other deformities continue to put the surgeon in dilemma and search for an answer, more so when multiple corrective surgeries have failed. The deformities may result after the primary repair of not only bilateral cleft lip, but also after the repair of unilateral cleft lip. With successful techniques for bilateral cleft lip repair described by Millard [1] and Mulliken [2], these are seen less frequently but are not obsolete. Millard [1, 3], attributed this deformity to solitary use of

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mucosa from prolabial vermillion–mucosa segment to form the central lip, while Puckett et al. [4], Kai and Ohishi [5] attribute it to the failure to attain continuity of the *orbicularis oris* muscle. When the primary repair leaves such deficiencies, a secondary corrective surgery is necessary. This retrospective study was carried out to evaluate the usefulness of Kapetansky-Juri (KJ) advancement flap technique to correct “whistling lip deformity” in bilateral cleft lip cases.

Materials and Methods

Ten patients of bilateral cleft lip having history of at least five previous surgeries in the same anatomical territory were included in the study (Table 1). Due to the retrospective nature of this study, it was granted an exemption in writing by the Institutional Review Board of the University. In our series of six males and four females, there was a pair of siblings of opposite genders. All patients were of ages between 18 and 27 years. KJ technique was used in all ten cases. The schematic diagram for the technique is shown in Fig. 1. Flap design was marked bilaterally and included most of the lateral lip segment with rounded central edges (Fig. 2). The superior marking was parallel to the muco-cutaneous junction and approximately 2–3 mm inferior to it. The inferior marking was along the junction of dry vermillion and the wet mucosa. The dissection was carried out in a subdermal plane superficially and submucosally inside (Fig. 3). The plane of dissection in medial part extended to the base of the nose superiorly. In lateral part the dissection reached the nasolabial folds. The lateral end of the flap was freed from its muscle attachments to achieve adequate mobilization (Fig. 4). Then central triangular vermillion flap was raised to allow inward rotation past the midline to a downward rotation in a 90 degree fashion. The central triangular flap was then brought down and interrupted non-absorbable monofilamentous sutures given using 6-0 prolene (polypropylene, manufactured by M/s Ethicon LLC., Road 183 km, 8.3. San Lorenzo, Puerto Rico 00754, product code W8718) over the “shoulders” of the L-shaped flaps. Double breasting of medial part of *orbicularis oris* muscle was done in two cases (Figs. 5, 6). Alternate sutures were removed on the fifth postoperative day to prevent stitch marks and the rest of the sutures were removed on seventh day. All patients were followed up till 36 months.

Results

No tissue loss due to vascular insufficiency was observed in any case. There was good tissue distribution and minimal surface scar formation in all the patients except two cases

where straight line closure was done. All patients showed good tissue fullness and reasonable correction of the deformity. There was minimal contracture of surrounding skin or vermillion at the end of follow-up period (Figs. 7, 8, 9, 10).

Discussion

The “whistling lip deformity” may be seen as an isolated entity in unilateral cleft lip. But sometimes it may be associated with deficient cutaneous portion due to multiple previous surgeries resulting in tight lip in bilateral cleft lip cases. Study of literature shows that over a century, numerous methods have been utilized to correct the whistling and other deformities of lip. Earlier in 1898, Abbe [6] described total pedicled tissue transfer from lower lip for the management of the deformity. The technique thereafter was modified by Cannon [7], Gillies and Millard [8], Millard [3], Kawamoto [9] and by Holmstrom [10] using cross-lip transfer of vermillion–mucosa.

Vaughn [11] and Cronin [12] have emphasized the need for vermillion flaps to augment the prolabium in the primary repair to prevent this deformity. Crickelair and Hickey [13] and Arons [14] described Z-plasties and other arrangements of local vermillion tissue for the correction of these deformities. During the same era, Guerrero-Santos [15] and Chong and Winslow [16] proposed staged tongue flap and free composite submucosal-muscle grafts. Sliding island flaps of orbicularis oris and vermillion was described by Kapetansky [17] in 1971, which was modified by Juri et al. [18] in 1976. In the same decade many more techniques were proposed to manage this deformity including V–Y advancement of mucosa and sub-mucosa proposed by Robinson et al. [19] followed by Hogan and Converse [20]. Later in 1973, O’Connor et al. [21] described the technique of wide advancement of buccal mucosa. Christine and Mulliken [22] used deepithelialized mucosal-submucosal

Table 1 Details of the cases included in the retrospective analysis

Case No	Age	Sex	No of previous surgeries
1	23	F	9
2	22	M	5
3	19	F	6
4	26	M	6
5	20	M	7
6	18	F	6
7	22	F	8
8	27	M	5
9	23	M	8
10	26	M	5

Fig. 1 **A** Two lateral flaps designed with central rounded edges. **B** Sagittal section of lip showing plane of dissection. **C** Mobilization of flaps subdermally and submucosally. **D** Inward and downward rotation of flaps at 90 degree. **E** Central rounded ends sutured with non-resorbable material. **F** Final suturing

Fig. 2 Flap design with rounded central edges

Fig. 3 Dissection in subdermal plane superficially and submucosally inside

flaps. This technique invokes the time-honored principle of plastic surgery, espoused by Sir Harold Gillies and often quoted by Millard [1]: “Thou shalt never steal from Peter to pay Paul unless Peter can afford it”. The statement shouts that there must be ample lateral lip tissue for victorious construction of central tubercle to use KJ technique for repairs.

Kapetansky [17] in 1971 described his technique of developing two planes of dissection, which extended just high enough to permit the necessary mobilization for the particular defect presented. The anterior plane divided the lip coronally with approximately one-third of the *orbicularis oris* muscle mass in front of it. The posterior plane was behind the labial vessels, deep in the submucosal layer. He preserved the superior labial vessels as pedicle. After dissection, two pyramidal flaps were made ready to be

mobilized. With vermillion at the bases, the flap remained attached in the upper part of the lip. Then both the flaps were swung together as pendulums to meet in the central portion. Continuity of the *orbicularis oris* muscle was established with non-absorbable sutures and catgut sutures were used for mucosal layer. A wide V-incision was made in the prolabial vermillion to accept the flaps and the excess mucosa was trimmed posteriorly for a smooth closure. Kapetansky found good tissue distribution in single stage with minimal apparent surface scar formation in his series of 9 patients and did not observe any tissue loss due to vascular insufficiency. This technique allowed direct transfer of lateral lip segments for augmentation of the prolabial tissue and avoided unwanted tissue transfer from other normal structures. In our two cases where the

Fig. 4 Adequate mobilization of flap freed at lateral ends

Fig. 7 Preoperative photograph of a male showing whistling deformity

Fig. 5 Preoperative photograph of a case in which double breasting of medial part of *orbicularis oris* muscle was done

Fig. 8 Postoperative photograph of same case (Fig. 7) in which tissue fullness can be seen

Fig. 6 Postoperative photograph of the same patient in Fig. 5. Scar of straight line closure is seen

prolabium was adherent to premaxilla, the *orbicularis oris* muscle on either side was advanced medially and double breasted to achieve midline fullness, while the skin was

closed in midline. The prolabial skin in these cases was utilized to serve as mucosa.

However, in Juri's opinion Kapetansky did not contour the central part of the lip adequately. So, he modified the technique by freeing the mucomuscular flaps laterally enough to increase the mobility of the flaps [18]. This was done to get further mobilization of the flaps towards the central line, so that they can be fitted together in an 'L' shape to make up the central tubercle. In this way, almost the entire thickness of the lateral segments of the lip could be moved. The anterior incision in this flap was just under the mucocutaneous line and the dissection plane was directed upward in front of the *orbicularis oris* muscle. The posterior incision was at the posterior edge of the vermillion

Fig. 9 Preoperative photograph of a female showing lip deformity associated with nasal tip defect

Fig. 10 Postoperative photograph of same case (Fig. 9) showing reasonably good result

and a dissection plane was made just in front of the mucous membrane. Pedicle remained with the superior aspect in the central part of the lip. From both sides, flaps were lifted upward to permit the medial approximation with their medial edges turned-in posterior, in the shape of “L”. This gave greater thickness to the central part of the lip resulting in better central tubercle construction. During dissection, a broad subdermal and submucosal undermining was performed, reaching to the base of the nose in the medial part and to the nasolabial folds in the lateral part. The lateral part of the flap was freed by cutting the *orbicularis oris* muscle in that area. The completely freed flaps, hanging from their superior wide pedicles and easily nourished through them, did not require circulation from the lateral part of *orbicularis oris* muscle or superior labial artery. Taking into account, the changes that occurred in blood vessel patterns in cleft lips [23] and more so when repeated surgeries have been performed, the flaps are nourished by the rich anastomosis network present in this region

between the superior labial artery and the angular arteries. The central triangular flap of vermillion, which is lifted upward, is brought down and sutured over the shoulders of ‘L’ shaped flaps. In a series of 10 successful repairs of “whistling lip deformity” presented by Juri et al., one patient had lost central tubercle after radiation of upper lip. We followed the standard “KJ” method in all our cases with some exceptions. In two cases we did double breasting of upper part of the flap after splitting it into two, superior and inferior bands, which resulted in better anatomical fullness.

The recent advancements in surgical and orthopedic techniques have minimized the severe sequel after cleft lip repairs, which were commonly seen in past. Still, it is very difficult to get perfect results in single surgery. Therefore, the revision surgeries must be considered as a part of the treatment plan. The possibilities of subsequent surgeries must be communicated to the patient well in advance to eliminate any unrealistic expectations. To get satisfactory results in cases of cleft lip deformities the exact nature of the deformity must be determined. Not many surgeons have tried “KJ” technique due to lack of adequate reports and consensus. No tissue loss due to vascular insufficiency was observed in our series. This technique gives good tissue distribution and minimal surface scar formation.

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