

A New Application of the Vomerine Flap for Repair of Unilateral Complete Cleft Hard and Soft Palate: A Proposed Single Stage Technique

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ABSTRACT

Background: The study proposes double layer vomer flaps technique for closure of unilateral complete cleft palate and shows the preliminary outcome of that technique after one year.

Patients and Methods: Twenty patients with non-syndromic unilateral complete cleft lip and palate, aged 9-15 months were operated randomly in this study. They were submitted for double layer vomer flaps technique for closure of unilateral complete cleft palate. Follow-up continued for one-year post-operative for each patient. Healing and functional outcomes are assessed objectively and subjectively. Approval of Institutional ethical Committee has been obtained.

Results: All patients showed sound healing and functional outcome repair after single stage interference. Only one patient revealed partial uvular disruption. Otherwise, no reported cases revealed complete disruption, marked scarring or fistula either in hard or soft palate.

Conclusions: This study proposes a technique for the unilateral complete cleft palate repair in a single stage by using double layer vomer flaps with closure without tension. This technique has a less invasive approach and minimizes the dissection of palatal mucoperiosteal flaps, and no lateral hard palatal incision and subsequently no denuded bones and less blood loss. The technique could have a positive outcome that has very minimal or even no risk of mid-face hypoplasia and its subsequent squeals.

Key Words: Cleft palate – Proposed technique – Vomer flaps – Minimal invasive.

Conflict of Interest: Authors declare that there aren't any conflicts of interest or financial support to disclose.

INTRODUCTION

A variety of techniques prescribed for surgical repair of the cleft palate. The use of mucoperiosteal flaps [1] from the hard palates usually facilitates the flap approximation at the midline to get closure

without tension. The most commonly practiced techniques for the repair of the cleft hard palate are the Von Langenbeck, the push-back, and the two-flap palato-plasty. Furlow double-opposing Z-plasty and the intra-velar veloplasty are commonly used for the cleft soft palate [2]. Most of these used techniques for hard palate repair, unfortunately reported to cause mid-facial growth affection with subsequent shortening of the palate, deformities of the maxillary arch [3]. Always the Vomer bone is present in the vicinity of the defect. So Vomerine mucoperiosteal tissue is utilized for the repair of the nasal mucosa [4,5] in conjunction with the common hard palate techniques.

Pichler introduced the vomer flap technique for the cleft palate repair, long time ago, in 1926 and this technique is still used nowadays. The clinical reports [6,7,8] showed its functional outcomes with a small adverse effect on long-term maxillary growth.

After long arguments and controversy, it becomes clear that; the vomerine flaps are safe regards mid face growth distortion in cleft palate reconstruction that in contrary to previous believes [9,10]. Sommerlad in 2003 reported that; there is no any evidence, the vomer flap technique is hazarding or has negative influence on maxillary growth and development [8].

This study is proposing a new simple cutting-edge technique in a single stage reconstruction for unilateral complete cleft soft and hard palate using double vomerine flap Palatoplasty technique. It also evaluates the functional outcome of this technique.

PATIENTS AND METHODS

Twenty patients with non-syndromic unilateral complete cleft palate (Fig. 1) at the age of 9-15 months were operated randomly in this study using double layer vomer flaps. They were 12 boys and 8 girls. Arm restraints were not used. All patients were discharged 24 hours after surgery. Parents or guardians consents and institutional approval for the study were obtained. All surgeries were done under general anesthesia at the university hospitals in period from January 2017 to May 2019. All patients were followed for one year post-operative. Outcome analysis in functional objective and subjective forms were assessed at pre-operative, one-week post-operative, then at 1month, 3 months, 6 months, and finally at one year.

Objective assessment included pre-operative type of the cleft, recording of any feeding problems and body weight percentiles for age, respiratory problems. Then compare with post-operative c feeding problems, respiratory problems. In addition to assessment of the healing, fistula, disruption, and degrees of palatal scarring around the repair, in grades; Grade 1: no scars or less than 2mm. Grade 2: 2m-5mm. Grade 3: Scarring tissue more than 5mm.

Objective analysis includes pre-operative and post-operative mother's complaints and/or observations regards feeding, respiratory or sleep disorders because of nasal regurgitation choking and recurrent otitis media or chest infection.

Exclusion criteria:

Study excluded syndromic cases, or cases associated with any other anomalies, sub-mucosal cleft, bilateral cleft palate, children above 15 months, previously operated or wide cleft who needing a pre-operative orthodontics job.

Patients will be assessed for hearing function as well as speech and velo-pharyngeal competence in next stage of follow-up which are not included in this study methodology.

Surgical technique:

Senior author proposed this technique, to use double layered vomerine flaps (DLVF) with closure at the junction of hard and soft palate in the repair of unilateral complete cleft hard and soft palate in one stage operation.

Surgical steps:

- 1- Under general anesthesia with oral central down endotracheal tube, the palate is infiltrated with a concentration of 1:200,000 epinephrine with 0.5% lidocaine.
- 2- Creation of double layer vomer flaps; an incision anteriorly is made along the junction of the cranial one third and caudal two thirds of the vomer exposed surface. The incision is continued posteriorly and up to the free border of the vomer and then the soft palate. (Fig. 2A,B).
- 3- The oral and nasal mucosal layers of the soft palate is the continuation of the caudal and cranial vomer flaps respectively. Then, two vomerine mucoperiosteal flaps are raised cranially (nasal layer) and caudally (oral layer). (Fig. 3A,B).
- 4- Then, creation of the contralateral oral and nasal layer through an incision in the hard and soft cleft margin is done as usual. (Fig. 4).
- 5- The palatal muscles are freed completely from their abnormal attachment into the posterior edge of the hard palate.
- 6- On each side of the cleft, minimal dissections were done which was not reached beyond 0.5cm. there were no need for release incisions for all patients.
- 7- Then, closure was done for the nasal layer with Vicryl 5/0 (Fig. 5), muscle layer sutured together with 4-0 absorbable sutures to form a functional muscle sling and lastly oral layer repaired with Vicryl 4/0. (Fig. 6A,B,C).

Post-operative medications:

All patients received injection antibiotic with adjustable dose according to body weight for 3 days follow by oral antibiotic for 5 days also received analgesia and oral wash drugs for one week (Fig. 7).

Post-operative feeding:

From the first day up to three weeks oral feeding was allowed with spoon, cup, or syringe without needle. The oral feeding was in the form of milk, clear juices, and water and egg yolk.

All mothers were advised to dress their babies to wear stockings in both hands in the first week.



Fig. (1): Unilateral complete cleft palate preoperative view.



Fig. (3B): Double layer vomer flaps creation.

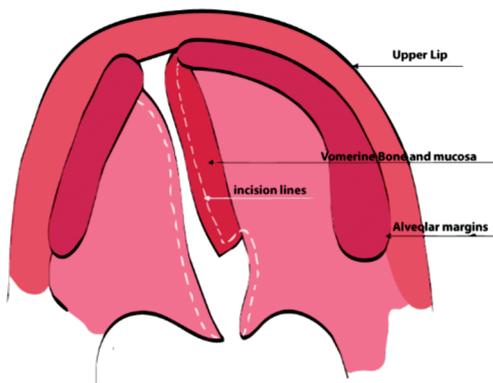


Fig. (2A): Diagrammatic illustration of vomerine flap design.

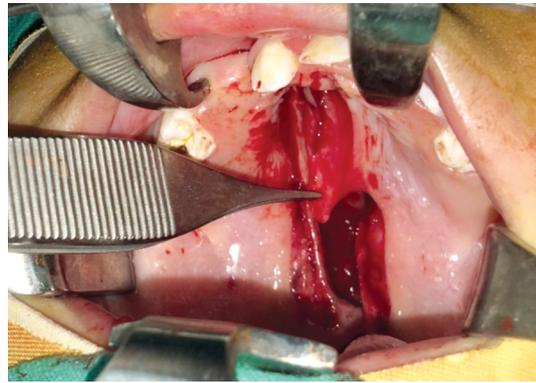


Fig. (4): Creation of the contralateral oral and nasal layer.

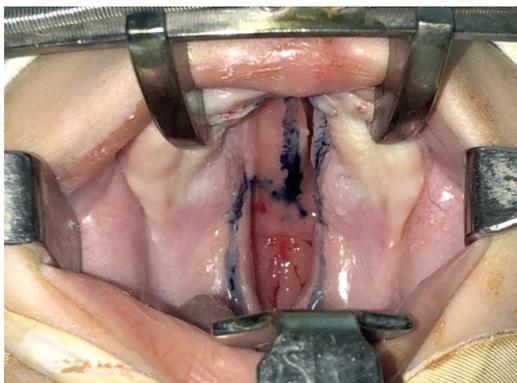
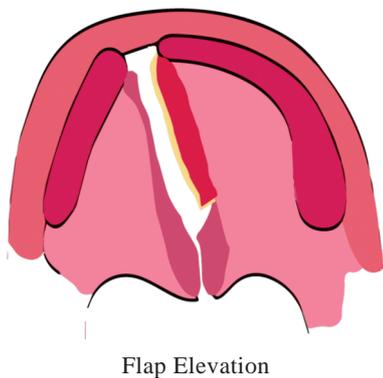


Fig. (2B): Intraoperative marking of vomerine flap design.

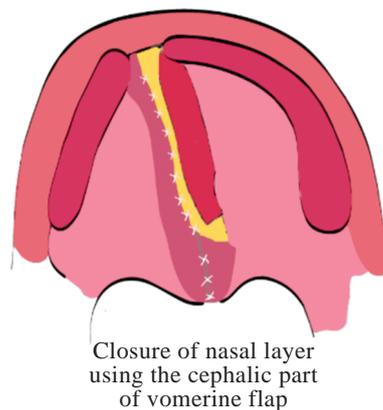


Fig. (5): Closure of the nasal layer.



Flap Elevation

Fig. (3A): Diagrammatic illustration of flap elevation.



Closure of nasal layer using the cephalic part of vomerine flap

Fig. (6A): Diagrammatic illustration for closure of the nasal layer using the cephalic part of vomerine flap.

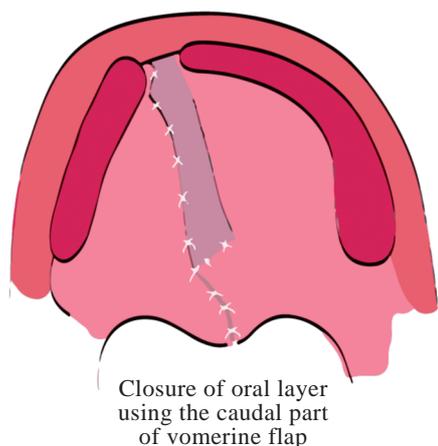


Fig. (6B): Diagrammatic illustration for closure of the oral layer using the caudal part of vomerine flap.

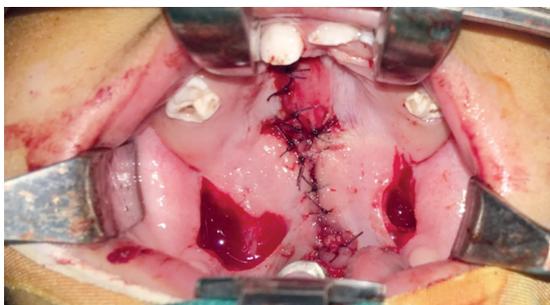


Fig. (6C): Immediate post-operative view after complete closure of all layers.



Fig. (7): 4 weeks post op. with sound healing and complete closure using vomerine flap.

RESULTS

We have reviewed all the pre-operative and post-operative, objective and subjective data for analysis in all included patients to note the efficacy of vomer flaps.

All patients were followed for one year postoperatively with sound healing. Only one from twenty patients revealed partial uvular disruption. Other-

wise, No reported cases revealed complete or partial disruption or fistula either in hard or soft palate.

Pre and Post-operative comparison of feeding problems, middle ear and respiratory problems were reviewed in details. In addition to assessment of the healing process, fistula and disruption incidence, and the degrees of palatal scarring around the repair. All results showed positive outcome with ending of the usual pre-operative feeding, recurrent middle ear and respiratory problems.

Subjectively, all children showed at least one or more dangerous presentation per each month in form of pre-operative nasal regurgitation for fluids and foods, respiratory distress, recurrent otitis media or chest infection. Post operatively the clinical incidences of such health problems are completely ceased by the 3rd month after surgery.

Objectively All children showed improvement of weight percentile for age to near normal values in the first 3 months after the surgery and they reached normal weight for age after 3 months and till one year of follow-up.

The healings were sound, and the scar tissues were less than 5mm in all cases and it was improved and almost unnoticeable by 3 months to be about 2mm or less on the repair line. Then the scars' line completely got unapparent in 12 children after one year of surgery. Only one patient revealed partial uvular disruption, and was managed by second session Platoplasty after 6 months. Otherwise, no reported healing's complications in form of; complete or partial wound disruption, marked scarring or fistula either in hard or soft palate.

Study found that; Double layered vomer flaps for unilateral complete cleft hard and soft palate was an ideal one if the width of exposed surface of vomer equal or exceeding the cleft defect. The double layer idea gives the repair watertight strength without tension and without lateral relaxing incision or invasive muco-periosteal flap dissection.

All patients showed sound healing and functional outcome repair after single stage interference.

DISCUSSION

Subperiosteal flaps [4,5,6] commonly used in cleft palate closure are working well but always they carry the potentialities of maxillary growth affections and marked palatal scarring because of aggressive dissection.

Vomerine mucoperiosteal technique [7,8,9] depends only on vomerine mucoperiosteal tissue

without or with a very minimal sub-periosteal flaps elevation from medial edges of the hard palate.

The proposed double vomerine mucoperiosteal flap depends on the idea of double layer sealing when making the suture lines in nasal and oral layers. So theoretically and according to our finding no chance for wound dehiscence, dynamic disruption and that could minimize the negative oral pressure impact on the repaired palate during early stage of wound healing.

Study proposed technique was in agreement with Sommerlad's findings [7] and concept about the availability of vomerine flap as good choice for palatal repair.

This study was designed depending on the recent studies' findings that documenting the minimal side effects of raised vomerine flap [5,7,8].

Also, in this study, the two vomerine flaps in the prescribed technique were highly reliable in closing the hard palate simultaneously with soft palate in a single stage repair.

Arguments [9,10] and debates [11,12,13] about vomerine flaps strongly have concerns coming from previous studies as the famous one came from Friede and Johanson [6] study in 1977, regards the poor facial growth results, but their study in particular used vomerine and "push back" technique and the later basically requires extensive palatal dissection [9,10,11]. But in this technique Authors didn't use extensive palatal dissection it is just dissections of the medial palatal edges, in less than 5mm and away from the main body of palatal bone where the growth centers could be present [14].

However Desh Pande et al., [15] in 2015 reported worry about vomer flaps as an option for cleft palate repair and he doubted about second interventions, due to scarring when vomerine flap operated in the first stage, but this study findings support the utilization of vomer flaps without second intervention and recorded less post-operative scars.

In this study the double layers vomerine flaps technique (DLVF) showed good potentials for a single stage repair of cleft hard and soft palate. It showed better functional outcome with sound healing and less post-surgical scar. Postoperative healing could minimize the incidence of post-primary repair fistulae [16] however longer follow-up and wider groups are recommended in next studies.

Conclusions:

The proposed technique manages the unilateral complete cleft palate as a single stage using double layer vomer flaps. It allows a minimal dissection of palatal mucoperiosteal flaps. This technique could possibly minimize the common risk of mid-face hypoplasia and improves the functional outcomes.

Acknowledgement: I Acknowledge Dr Yahia Emara, Dr Hatem usama and Miss Tasnim Ali for their editing support.

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