

Updates in microsurgical technique for cleft palate reconstruction

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Mini Review

Plastic Surgery



Background:

The soft palate is a crucial structure that plays a vital role in maintaining the airway open, facilitating swallowing, and enabling speech. Excisional surgery that disrupts the functional architecture of the soft palate leads to considerable morbidity, and neither prosthetic nor flap reconstructions can adequately restore the intrinsic velar musculature. The primary objectives in treating oral malignancies that impact the soft palate are to attain oncological control and minimize the occurrence of complications and undesired consequences.

In the present age of microsurgical practice, teams are striving to not only accomplish oncological excision and successful flap procedures but also to enhance functional results. In this case, a suprafascial ALT flap was surgically created to provide extra volume and optimize the functional benefit of the remaining velar muscles. The treatment method depends on the dimensions of the defect and the anatomical components removed. For full-thickness injuries, direct repair is recommended, while for full-thickness, "near-total to total," greater than 70%, a nonanatomic reconstruction is carried out, and a fascial sling is included to constrict the velopharynx.

Tips for addressing velopharyngeal constriction include using a two-layer closure technique, using a fascial sling, positioning the skin vessel/perforator, incorporating the vastus lateralis muscle, maintaining a minimum distance between the point of entrance into the muscle and the point where the perforator branches off, and verifying the vitality of the muscle prior to completing the closure.

In conclusion, employing an anterolateral thigh (ALT) free flap technique for palate reconstruction achieves favorable functional results with minimal complications at the donor site.

Keywords: Microsurgery, cleft palate, free flap

The soft palate is a complex, three-dimensional structure that is naturally movable and plays a crucial role in keeping the airway open, facilitating swallowing, and enabling speech. Excisional surgery that disrupts the functional architecture of the soft palate leads to considerable morbidity. Neither prosthetic nor flap reconstructions can adequately restore the intrinsic velar musculature. The possible need for more radiation is further incapacitating. The primary objectives in treating oral malignancies that impact the soft palate are to attain oncological control and minimize the occurrence of complications and undesired consequences. During the initial phase after surgery, certain complications may arise, such as infection and the formation of abnormal connections (fistulas) in the oropharynx and nasopharynx. The long-term happiness of patients after reconstruction is closely tied to the restoration of the functions of the palate, specifically speaking and swallowing^{1,2}.

In the present age of microsurgical practice, teams are striving to not only accomplish oncological excision and successful flap procedures, but also to enhance functional results. As a result, indicators of excellence now encompass measurements of quality of life and results reported by patients³.

Surgical technique

A suprafascial ALT flap, with or without the inclusion of the vastus lateralis muscle, was surgically created to provide extra volume. A free flap was used using a modified port method. A free flap was utilized to fill the empty area and optimize the functional benefit of the remaining velar muscles in order to facilitate the closure of the oronasopharyngeal opening, hence permitting the insertion of a nasogastric tube. The treatment method is delineated as follows and pertains to the dimensions of the defect as well as the anatomical components that were

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removed. In cases when muscle is part of the flap, a "combined" technique is used. This involves raising the anterolateral thigh (ALT) in a typical manner above the fascia, and the muscle segment is based on the distal runoff of the descending branch of the lateral circumflex femoral arteries. This allows for a higher level of flexibility in positioning the muscle segment for the purpose of eliminating dead space⁴.

Soft palate deficiencies, perhaps accompanied by hard palate abnormalities, that are separate or disconnected from other structures⁵.

Discussion

For full-thickness injuries that are less than or equal to 25% in size, direct repair is recommended. An initial attempt was made to narrow the velopharynx by 25%-70% using a full-thickness technique. The posterior mucosal layer and muscles of the soft palate were stitched together using a two-layer technique. A cutaneous ALT (anterolateral thigh) graft, which does not include the deep fascia, was taken from the thigh and used to replace the outer layer of tissue (oral lining) on the soft palate and maybe the hard palate. Full-thickness, "near-total to total," greater than 70%: A nonanatomic reconstruction was carried out, and the cutaneous anterolateral thigh (ALT) flap was partly folded to avoid exposing the pedicle to the airway. A fascial sling, positioned at a 90-degree angle with the long axis of the skin flap, was included and utilized to constrict the velopharynx. In cases when cutaneous ALT was required to address abnormalities, a thin flap was strategically created either by constructing the skin paddle distally or by physically thinning it in patients with thick thighs⁶.

Defects in the soft palate, as well as in the maxillectomy and/or marginal mandibulectomy areas. The method used to access the soft palate was identical to the one described before. However, in this case, the ALT flap was coupled with a portion of the vastus lateralis muscle, which was supplied by the distal runoff of the descending branch of the lateral circumflex femoral artery. The muscle fragment was utilized to completely destroy the maxillary sinus or to reinstate the vertical dimension of the mandible following marginal mandibulectomy and avoid the restriction of the newly formed soft palate. Similarly, the cutaneous part of the flap was intentionally made thin to make it easier to shape. This was achieved by creating it towards the end of the thigh and thinning it out as needed. If the low maxillectomy procedure did not achieve a fully open sinus, the thicker and closer section of the ALT flap was utilized instead of the muscle to seal the maxillary aperture. In these instances, the skin paddle was created closer to the body or left unaltered if the patient had a thick thigh. Typically, the need for a mixed or chimeric muscle-

containing flap would be anticipated in advance. However, in cases where there was uncertainty, the branch leading to the muscle was located and protected during the dissection of the flap. This allowed the decision to include the muscle to be made at the conclusion of the surgery, based on factors such as the size of the empty space or the extent of the defect resulting from the marginal mandibulectomy^{7,8}.

Tips

1. Velopharyngeal constriction is addressed by a two-layer closure technique. This involves suturing the posterior lamina using mattress sutures, followed by suturing the soft palate musculature.

2. The fascial sling: a. The fascial sling is 25% shorter than the breadth of the palatal defect to provide sufficient narrowing. b. It is preferable to use vascularized fascia. c. Flap is designed with precise pre-inset and pre-division. d. Alternatively, include a broader section of fascia at the far end of the flap and thereafter remove the excess portion while inserting the flap.

3. Skin vessel/perforator: a. Located in an off-center position. b. Ensure that there is a sufficient amount of skin paddle located closer to the body to adequately protect the skin veins and prevent them from being exposed to the airways.

4. The vastus lateralis muscle is based on the distal discharge of the descending branch. b. Incorporate the underlying fascia to enhance stability. c. Maintain a minimum distance of 5 cm between the point of entrance into the muscle and the point where the perforator branches off to prevent any restriction or limitation during the insertion process. d. Verify the vitality of the muscle prior to completing the closure.

5. Prevention of fistulas: a. When suturing the flap skin to the hard palate, it is important to make sure that the suture catches both sides of the flap at the full depth. On the palatal side, a full-layer catch implies that the periosteum, which is the tissue covering the bone, is included. b. Refrain from severing needles. However, if you must choose one, it is advisable to select reverse cutting. c. The flap must never be made thick or heavy. This is done in order to prevent the suture line from ripping or causing obstruction in the airways. Adjust to the desired level of thinness and neatness.

Conclusion

A technique to reconstructing the palate that restores the structure of related tissues while enhancing the function of the remaining velar muscles, employing an anterolateral thigh (ALT) free flap, achieves favorable functional results with minimal complications at the donor site.

Conflicts of interest

The authors have no conflicts of interest to declare.

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