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Restorative surgery using modified Kazanjian vestibuloplasty and subepithelial connective tissue graft for severe trismus and mandibular denudation after facial contouring surgery: A case report

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ABSTRACT

Restorative surgery using modified Kazanjian vestibuloplasty and subepithelial connective tissue graft for severe trismus and mandibular denudation after facial contouring surgery: A case report

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Oral vestibule is important in oral health. Various vestibuloplasty techniques are used in cases involving vestibule loss. This case report describes the treatment outcomes from performing modified Kazanjian vestibuloplasty with artificial dermis graft and connective tissue graft for severe trismus and mandibular denudation caused by shallow vestibule and post-operative scarring after facial contouring surgery. Based on an accurate understanding of the anatomical structures within the oral cavity, problems caused by multiple surgery due to inflammatory complications after a facial contouring surgery, including scarring, discomfort during mouth and cheek movements due to loss of oral vestibule, trismus, alveolar bone exposure, and gingival recession, were resolved with a single surgery.

When performing intraoral surgery, it is necessary to understand the meaning and importance of vestibule and perform incision and suturing to minimize the shallowing of vestibule. In cases involving vestibule loss, appropriate techniques should be selected to ensure restoration of vestibule.

Key words : Oral vestibule, Vestibular deepening, Modified Kazanjian Vestibuloplasty, Connective tissue graft, Artificial dermis graft

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I. Introduction

Oral vestibule, which refers to the distance between the lip margin or the coronal margin of the attached gingiva to the mucobuccal fold, significantly impacts oral health¹⁾. A shallow vestibule can apply tension on the attached gingiva to cause a gingival recession and deep periodontal pocket while making oral hygiene more challenging^{1~3)}. Methods for obtaining an appropriate vestibule include mucosal advancement vestibuloplasty, secondary epithelization vestibuloplasty, and mucosal or skin grafting vestibuloplasty⁴⁾. These methods have demonstrated successful and predictable outcomes^{4~8)}.

In vestibuloplasty, prime examples of secondary epithelization vestibuloplasty using pedicle flap include the Kazanjian vestibuloplasty and Clark vestibuloplasty^{4~6)}. Of these, the Kazanjian vestibuloplasty is a method in which an incision is made on the inner mucosa of the lower lip. Then, partial-thickness dissection is performed on the inferior aspect of the mucosa towards the alveolar crest, followed by flap reflection and suturing to the periosteum at the position where the oral vestibule has been deepened^{4~6)}. Various modified versions of this technique are widely used in clinical practice^{7,8)}.

In secondary epithelization vestibuloplasty, leaving the periosteum exposed may cause increased pain. If epithelization occurs, vestibule can become shallow again with a resilience of 50% during the postoperative 2~3 years and a resilience of $\geq 80\%$ in the mandible^{4,5)}. Grafting mucosa or skin on the exposed periosteal surface can reduce pain and lower

resilience to 20~30%⁵⁾. Concerning resilience, keratinized oral mucosa is a better graft material than skin or buccal mucosa, typically harvested from the maxillary palate^{4,5,9)}. The method above has the disadvantages of requiring additional surgery on the donor site and being difficult to harvest a graft large enough to cover the recipient site if the defect is large⁴⁾. Alternatively, the method of grafting artificial dermis products, available in various sizes, can be used instead of mucosa or skin¹⁰⁾.

Connective tissue graft (CTG) and free gingival graft (FGG) are two of the most commonly used methods in periodontal plastic surgery. Both methods are used for root coverage during root exposure and gingival augmentation when the attached gingiva is insufficient. However, CTG has better blood supply than FGG, while it also has excellent predictability and aesthetics^{11~14)}. Unlike FGG, which involves harvesting the graft from the donor site and leaving an open wound to induce secondary healing, CTG involves harvesting the graft by making two horizontal, oblique incisions, parallel to each other and 1.5mm in length, on the donor site, which minimizes the wound and allows primary closure of the donor site for less postoperative pain^{11~14)}.

This case report describes the treatment outcomes of modified Kazanjian vestibuloplasty with artificial dermis graft and subepithelial CTG for severe trismus and mandibular denudation caused by shallow vestibule and postoperative scarring after facial contouring surgery.

II. Case presentation

A 28-year-old female patient with no pre-existing conditions was referred to our clinic with chief complaints of left mandibular denudation (#34~36) and severe trismus (Maximum comfortable opening(MCO): 20mm) that persisted despite three rounds of surgery to resolve inflammatory complications that occurred after a facial contouring surgery performed at local plastic surgery clinic. Shallow vestibule was observed in the surgical site in the left mandible, while postoperative scar tissues had caused reduced mucosal flexibility. These conditions caused tension to be applied to the gingiva whenever she moved her lips or opened her mouth, causing a gingival recession, alveolar bone exposure at the mucogingival junction, and even trismus. Trismus presented challenges for oral hygiene care, while plaque buildup further exacerbated gingival recession(Fig. 1). Clinically, mucosal flexibility was reduced to the point where even buccal retraction was difficult.

First, we performed alveoloplasty under local anesthesia, expecting soft tissue to replace the defect gradually. However, the procedure produced slight improvement and failed to resolve the problem completely(Fig. 2). The patient kept complaining about discomfort during lip and cheek movements and trismus.

To address the discomfort the patient was experiencing, we planned to perform the modified Kazanjian vestibuloplasty and CTG under general anesthesia to increase vestibule and create an attached

gingiva.

After making an incision on the buccal mucosa, we performed partial-thickness dissection of the bottom of the flap on the gingival side toward the alveolar crest up to the area with alveolar bone exposure and partial-thickness dissection of the flap on the buccal mucosal side in buccal direction, followed by using absorbable suture to suture the flap to the inferior connective tissue where maximum vestibule can be achieved(Fig. 3, 4). Retraction was difficult before the incision and dissection due to shallow vestibule and firm scar tissue. However, retraction became much easier after the incision and dissection owing to deeper vestibule and increased flexibility.

Next, we measured the size of the area with alveolar bone exposure and harvested subepithelial connective tissue graft (1.5mm thick) by making two horizontal oblique incisions, parallel to each other and 1.5mm in length, at sites apically located 3mm from the left premolar palatal gingival margin(Fig. 5). After flap reflection on the site of alveolar bone exposure, subepithelial connective tissue graft was adapted and sutured(Fig. 6).

Due to the wideness of the exposed periosteal surface and connective tissue, it was difficult to harvest mucosa or skin that would be large enough. However, leaving the area exposed could cause increased postoperative pain and shallowing of vestibule again due to contraction as epithelization occurs. Accordingly, we decided to perform an artificial dermis graft as an alternative. After measuring the size needed, we adapted the appropriately sized artificial dermis



Figure. 1. Preoperative clinical photo
Shallow vestibule, denudation, and gingival recession from #34-36 were observed.



Figure. 2. After alveoloplasty
Shallow vestibule, denudation, and gingival recession from #34-36 were not completely improved.

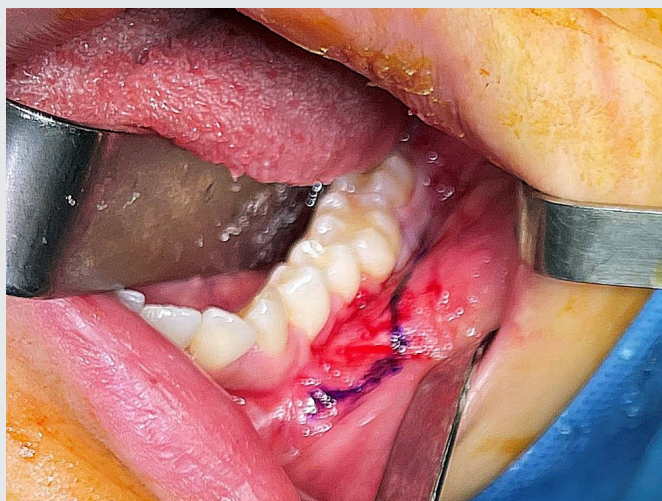


Figure. 3. Incision line on the buccal mucosa

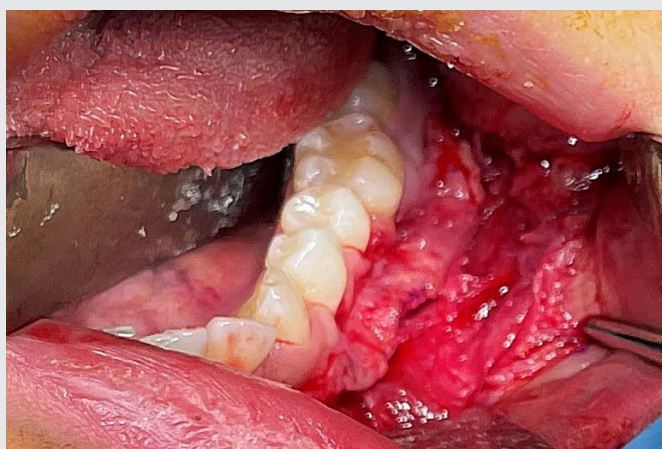


Figure. 4. Vestibule deepened after flap dissection, reflection

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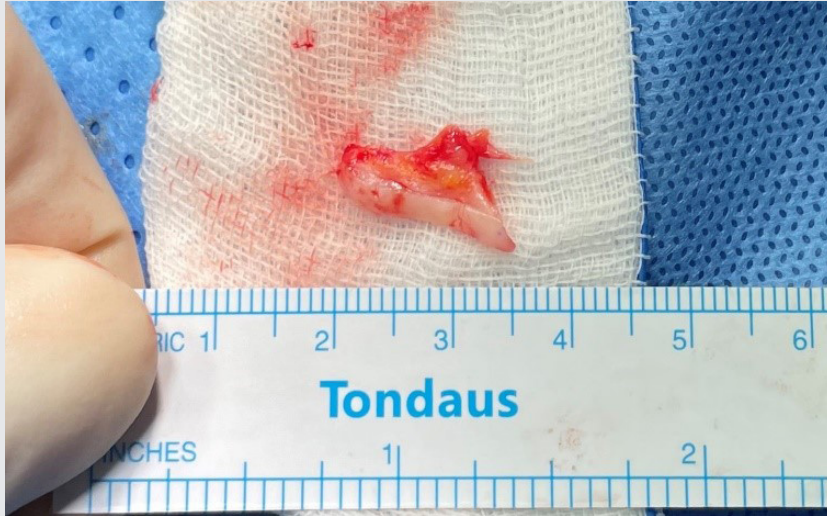


Figure. 5. Harvesting of subepithelial connective tissue graft

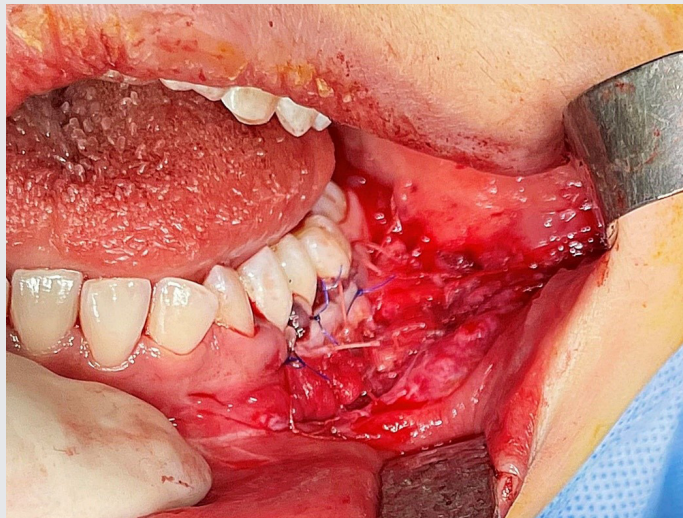


Figure. 6. After adaptation and suture of subepithelial connective tissue graft

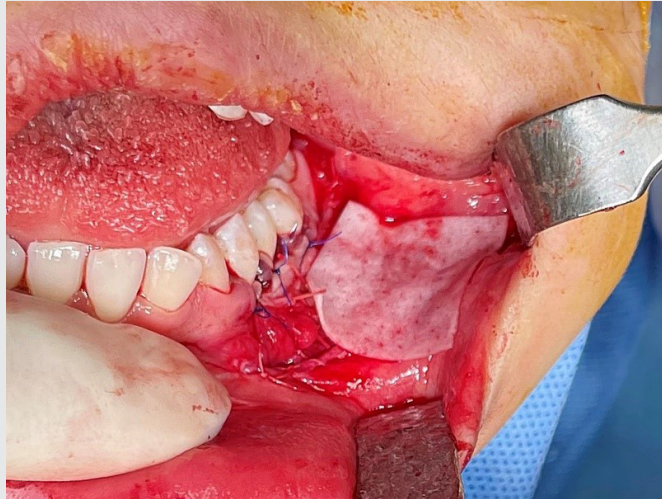


Figure 7. Adaptation of artificial dermis (Megaderm, 2*2)

product (Megaderm, 2*2)(Fig. 7). We completed the procedure by suturing the artificial dermis to the exposed periosteal surface and connective tissue(Fig. 8). In other words, we used a modified Kazanjian vestibuloplasty that combined conventional Kazanjian vestibuloplasty with an artificial dermis graft.

There was a vestibule loss at the 1.5-month postoperative follow-up and additional vestibule loss at the 2.5-month postoperative follow-up. However, the resilience was not large, and vestibule loss was no longer observed after postoperative 2.5 months. Due to the deeper vestibule and buccal mucosal flexibility achieved after the surgery, discomfort during lip and cheek movements improved; mouth opening also recovered to normal level (MCO: 38 mm). Moreover, alveolar bone exposure did not re-

cur, and gingival recession decreased after the surgery. Poor oral hygiene due to plaque buildup in the gingival margin and slight gingivitis were observed at the 2.5-month postoperative follow-up. Consequently, oral hygiene care education was performed (Fig. 9~10).

At the 5-month postoperative follow-up, the patient reported no discomfort during lip and cheek movements, and mouth opening had recovered to the normal level, while oral hygiene care was good. Moreover, the color and shape of the gingiva matched that of the surrounding gingiva. Ultimately, the patient recovered to a healthy oral environment both functionally and aesthetically(Fig. 11).



Figure. 8. After suture of artificial dermis (Megaderm, 2*2)



Figure. 9. One and a half month after surgery



Figure. 10. Two and a half months after surgery



Figure. 11. Five months after surgery

III. Discussion

In our case, discomfort during lip and cheek movements, trismus, alveolar bone exposure, and gingival recession were due to a combination of causes. First, one of the causes was scars that had formed after multiple rounds of surgery for inflammatory complications after the first surgery. In addition, the vestibule loss occurred during suturing due to the incision line being too close to the attached gingiva, which had a significant impact on the symptoms experienced by the patient. Even if the incision is made far enough from the attached gingiva, a vestibule loss may still occur if suturing is not performed properly, which may occur if the insertion point of the suturing needle is too far away from the incision line or too much tension is applied.

A shallow vestibule can cause various problems, including gingival recession, periodontal pocket formation, and poor oral hygiene. Meanwhile, it can also cause reduced retention in patients who require removable partial dentures. Therefore, dentists should be careful to prevent vestibule loss. However, the challenges encountered in our case may occur when physicians from other departments who lack understanding of the role and meaning of the oral vestibule perform oral mucosal incision and suturing without considering vestibule. Therefore, to prevent such a situation, the incision should be made on the labiobuccal mucosa as far away as possible from the attached gingiva, and the suturing needle should be inserted as close as possible to the incision

line while suturing should be performed delicately to prevent excessive tension from being applied. If a shallow vestibule is expected due to excessive tension applied during primary suture, then inducing partial secondary healing may be advantageous.

If the oral vestibule is shallow, various vestibuloplasty techniques may be used to overcome this. The most widely used method is the modified Kazanjian vestibuloplasty. The Kazanjian vestibuloplasty is a type of secondary epithelization vestibuloplasty, which has the disadvantage of leaving the labial or buccal connective tissue exposed for secondary epithelization to occur. Consequently, postoperative pain may increase, and as scars form and contract, the oral vestibule becomes shallow again. To improve these problems, clinicians may consider mucosal or skin grafting. However, that approach has the disadvantages of requiring additional surgery for another donor site and difficulty finding the appropriate donor site if the defect is large. In our case, we made an overcorrection to ensure that the vestibule was deeper than required, considering the resilience that may occur after the surgery. As a result, the exposed area without mucosa inevitably became large. If the area is left exposed, resilience due to contraction would increase, while postoperative pain would also increase. However, it was also difficult to perform an additional surgery on a donor site to graft skin or mucosa that would be large enough to cover the exposed area. Thus, we used artificial dermis to perform the graft on the defect.

Artificial dermis products are convenient to use since they are available in various sizes. Meanwhile,

they also promote hemostasis, reduce pain, promote granulation, and prevent contraction, making them a good alternative to mucosa or skin for grafting¹⁰⁾. As demonstrated in our case, vestibule became slightly shallow up to postoperative 2.5 months, while vestibule was well maintained without resilience after postoperative 2.5 months. Based on such findings, we confirmed that excellent outcomes can be achieved by grafting artificial dermis instead of skin or mucosa.

In our case, we used CTG for the exposed alveolar bone because CTG has better blood supply than FGG and has excellent predictability. Because the tissues surrounding the area with alveolar bone exposure were not healthy, sufficient blood flow to the graft may not have been possible with FGG. Moreover, compared to FGG, which induces secondary healing in the donor site, CTG has the advantage of less postoperative pain and discomfort since primary closure is possible. After the surgery, the patient had almost no complaint about discomfort in the palatal side, the donor site. Lastly, FGG retains the color and texture of the gingiva from the donor site. However, CTG places the graft on the inferior aspect of the gingiva. Thus, it has the advantage of preserving the aesthetics of the surgical site. The surgical results also showed harmony with the color and texture of the surrounding gingival tissues.

IV. Conclusion

In our case, problems that persisted after a facial contouring surgery, including discomfort during lip and cheek movements, trismus, alveolar bone exposure, and gingival recession, were resolved with a single round of surgery combining modified Kazanjian vestibuloplasty with artificial dermis graft and subepithelial CTG. This was possible because of an accurate understanding of the role of an appropriate vestibule. Discomfort during lip and cheek movements, trismus, and gingival recession were resolved with deeper vestibule, and increased mucosal flexibility was achieved through modified Kazanjian vestibuloplasty with artificial dermis graft, while exposed alveolar bone was aesthetically restored through CTG, along with the influence of deepened vestibule. Using an artificial dermis graft, we minimized vestibule becoming shallow again due to contraction and reduced postoperative pain. Through this, we have confirmed that artificial dermis can sufficiently substitute for skin or mucosa grafts.

As demonstrated in our case, appropriate vestibule has a very important impact on oral health. Dentists should understand the meaning and importance of vestibule and perform incision and suturing to minimize vestibule shallowing. Appropriate techniques should be used to restore vestibule in cases of vestibule loss.

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