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Limberg Flap Surgery in the Treatment of Mandibular Angle Fistula

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ABSTRACT

This paper presents a case of a 70-year-old patient from the Department of Plastic Surgery. The surgery involved closure of a fistula in the mandibular angle area on the right side. The patient also presented with non-functional dentures. Following qualification, the surgical team closed the fistula and applied a Limberg flap. They used two local flaps to reconstruct the cheek defect and covered the missing tissue with a flap harvested from the neck area. The team performed the procedure without complications, and the patient tolerated anesthesia and surgery well. Postoperatively, the medical staff discharged the patient home in good general and local condition with recommendations for further treatment, including fabricating new dentures in approximately 6-8 weeks.

Keywords: Mandibular angle fistula, Rhomboid flap surgery, Mandibular angle, Limberg's rhomboid flap

1. INTRODUCTION

Mandibular angle fistula is a pathological connection between the oral cavity and the skin in the mandibular angle region. Chronic infections, trauma, or postoperative complications often cause this condition. Treating fistulas in this area is a significant challenge due to the continuous movement of the mandible which creates high tension of the soft tissues (Vincent and Hohman, 2025).

Surgeons often use rhomboid flap surgery as an effective method in the mandible region (Kang and Kang, 2021). The mandibular angle encompasses complex anatomical structures, including the masseter muscles, attachments of the neck muscles, and numerous blood vessels and nerves. This region is rich in blood supply and considerable mobility further complicates the healing process (Breeland et al., 2025). Fistulas often develop secondary to illnesses, mandibular fractures, or previous surgical procedures in the facial region. Chronic diseases and trauma cause tissue necrosis and the formation of skin fistulas (Vincent et al., 2025).

Limberg's rhomboid flap is a local flap designed in the shape of a rhombus around the defect area. Surgeons move it so that it closes the wound without excessive skin tension. During surgery, they excise the fistula along with a margin of healthy tissue, creating a rhomboidal defect. Then, the adjacent flap is dissected

and transposed to the defect site. The flap is sutured in layers to ensure adequate blood supply and stability (Manceal et al., 2025). The incisions are aligned parallel to the skin tension lines, known as Langer's lines, which enhances the aesthetic outcome (Newell, 2007). Clinical reports indicate that rhomboid flap surgery achieves a success rate of over 90% in permanently closing mandibular angle fistulas, while providing satisfactory cosmetic outcomes (Hung et al., 2017). Complications, though uncommon, may include flap necrosis, infection, sensory disturbances, and the formation of unsightly scars. Proper surgical technique and attentive postoperative care significantly reduce the risk of these complications.

In general, this method offers a simple yet highly effective reconstructive technique for treating mandibular angle fistulas. This approach allows durable wound closure, also minimizing skin tension and the risk of fistula recurrence. Due to its excellent adaptation to natural anatomical lines, it also provides outstanding cosmetic results (Kang and Kang, 2021).

Fig. 1: Fistula in the angle of the mandible

2. CASE DESCRIPTION

A 70-year-old patient was admitted to the Department of Plastic, Reconstructive, and Burn Surgery for elective surgery to close a fistula in the mandibular angle area on the right side. The main deviations in the laboratory tests upon admission were:

Glucose: 103 mg/dl

WBC: 12.89 x 10^9/l

The medical team qualified the patient for surgery. Additionally, a maxillofacial surgeon conducted a consultation and recommended new dentures approximately 6-8 weeks after surgery. On March 14, 2025, the team performed fistula closure and flap surgery. The procedure began with the closure of the full-thickness cheek defect using two local flaps, mobilized and transposed according to the Limberg method. They performed the procedure under anesthesia following the anesthesiologist's protocol. The extent of tissue excision included the fistula from the cheek with a margin of macroscopically healthy tissue, and they marked flap mobilization lines on the cheek skin. They anesthetized the area with lidocaine containing epinephrine. The surgical team excised the lesion using scissors and a scalpel, ensuring the preservation of macroscopically healthy tissue margins, and performed hemostasis on small vessels and areas of increased bleeding. After local anesthesia with lidocaine, they dissected the flap along the marked lines both externally and intraorally. They prepare the marked tissue section for suturing into the defect wall intraorally. After mobilizing the tissue, they rotated the flap. They performed hemostasis of the wound bed and checked the flap's fit, with excess tissue removed to ensure proper flap positioning.

Fig. 2: Unusable dentures

The surgical team secured the flap with absorbable single stitches intraorally at critical points. They covered the missing tissue externally with a Limberg flap from the neck area, anterior to the sternocleidomastoid muscle (SCM). They checked the fit and trimmed the tissue as needed. Next, they place skin sutures and they confirm proper hemostasis. The surgeons applied a dressing (Figures 1-4). The team sent the surgical material for histopathological examination. The intraoperative and perioperative course was uneventful. The patient responded well to both the surgical procedure and anesthesia. The postoperative course was uneventful. They discharged the patient in good general and local condition with recommendations for follow-up.

Fig. 3: During surgery

Fig. 4: Result postsurgery

3. DISCUSSION

Osman Enver Aydin and co-authors presented clinical experiences using rhomboid flaps in 24 patients, demonstrating the Limberg flap as a safe and effective technique for reconstructing small to medium-sized skin defects. These procedures address various clinical indications, including the excision of neoplastic lesions and the release of burn contractures (Aydin et al., 2011).

In a retrospective study by Gustavo Steffen Alvares and co-authors, which included 50 patients, the most common cause of defects was neoplastic lesions, and the face was the most frequently operated area. The study reported a low complication rate. The results

confirmed that the Limberg flap is a reliable and safe technique, particularly effective in skin reconstruction procedures (Alvarez et al., 2012). Using four connected Limberg flaps provides an efficient and effective geometric method close significant skin defects, avoiding the necessity for grafts while guaranteeing sufficient coverage and reducing tissue damage (Turan et al., 1999).

4. CONCLUSIONS

In summary, fistulas in the mandibular angle region require precise diagnosis and a well-planned approach to treatment. With advanced surgical techniques, such as Limberg flap surgery, effective defect closure is achievable while maintaining the functionality and aesthetics of the patient's face.

Informed consent

Written & Oral informed consent was obtained from individual participant included in the study.

Ethical approval

Not applicable.

Funding

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Conflict of interest

The authors declare that there is no conflict of interest.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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