ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at:www.ijdsir.com

Volume – 8, Issue – 1, January – 2025, Page No. : 16 - 21

Treatment of long standing recurrent temporomandibular joint ankylosis: Inter - positional arthroplasty using temporalis muscle flap

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Citation of this Article: Dr. M. R. Haranadha Reddy, Dr. C N Srinivas, Dr. Lavanya Ummadi Singh, Dr. Sarah Fatima, "Treatment of long standing recurrent temporomandibular joint ankylosis: Inter- positional arthroplasty using temporalis muscle flap", IJDSIR- January – 2025, Volume – 8, Issue – 1, P. No. 16 – 21.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

The adhesion of mandibular condyle to the glenoid fossa by bony or fibroblastic tissue is called temporomandibular joint (TMJ) ankylosis. Trauma and infection are the main causes for TMJ ankylosis. TMJ arthroplasty is the treatment of choice. This is a case report for the treatment of recurrent TMJ ankylosis in a 19-year-old female patient caused as a result of a fall from the terrace when she was 4 years old. The primary Maximum Mouth opening (MMO) of the patient was 0 mm. Inter-positional arthroplasty was done using Temporoparietal Fascia Flap (TPFF), along with condylectomy. TPFF is thin and has a reliable blood supply. The MMO was increased to 45 mm after regular post-operative physiotherapy and 1-year follow-up. There was no sign of re-ankylosis during this time.

Keywords: Temporomandibular joint, Ankylosis, Arthroplasty, Flap**.**

Introduction

Temporomandibular joint (TMJ) ankylosis happens when bone or fibrous tissue attaches to the glenoid fossa. This condition can lead to problems with chewing and speaking. It can also impact oral hygiene and the growth of facial bones in children. In children, the effects can be much worse than in adults. The main causes of TMJ ankylosis are trauma, infection, systemic disease, and past TMJ surgery. Among these, trauma is the most common cause, followed by infection.[1]

Hemarthrosis following trauma is a key factor in the bone formation seen in TMJ ankylosis. Traumatic injury to the condyle can cause hemarthrosis due to damage to the periosteum and capsular ligament. As the intracapsular hematoma organizes, hypertrophic bone forms from the disrupted periosteum or from the metaplasia of connective tissue, potentially leading to hypomobility and bony ankylosis. TMJ ankylosis can be diagnosed using plain films, orthopantomograms (OPG), computed tomography (CT), and magnetic resonance imaging (MRI). [2-4]

TMJ location, tissue involvement, extent of adhesion, and bone stiffness are characteristics used to classify TMJ ankylosis into four types. [5-8]

Surgery serves as the primary treatment for TMJ ankylosis. Various interposition materials, including temporalis fascia or muscle, skin, ear cartilage, fat, and temporoparietal fascia flap (TPFF), have been suggested to help avoid re-ankylosis.[9]

Various terms have been used to describe the temporoparietal fascia (TPF), including superficial temporal fascia and epicranial aponeurosis. TPF is located beneath the hair follicle and subcutaneous fat, positioned more superficially than the temporalis fascia and muscles. There is loose areolar tissue between these layers, which also contains the superficial musculoaponeurotic system (SMAS) and the superficial temporal artery and vein. Due to their proximity, careful dissection is essential. [10,11]

This case report aims to present a successful treatment method for recurrent TMJ ankylosis. Interposition arthroplasty with TPFF is used and the benefits of this approach are discussed.

Case Report

A 19–year–old woman with good general health who had a fall 15 years ago was referred with the chief complaint of minimal mouth opening and the inability to chew. The patient signed and approved her ethical consent form.(Fig 1)

Previously, two surgeries had been done: gap arthroplasty followed by physiotherapy at the age of 10 and TMJ release and interposition arthroplasty using a silicon pack at the age of 16. Both surgeries failed, and the clinical examination revealed a maximum mouth opening (MMO) of 0 mm (Fig 2) and poor oral hygiene.

Fig. 1: Extra oral picture of the patient

Fig. 2: 0 MM mouth opening showing retrognathic mandible

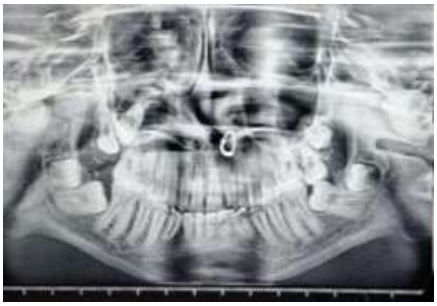

Fig. 3: OPG showing bilateral TMJ ankylosis

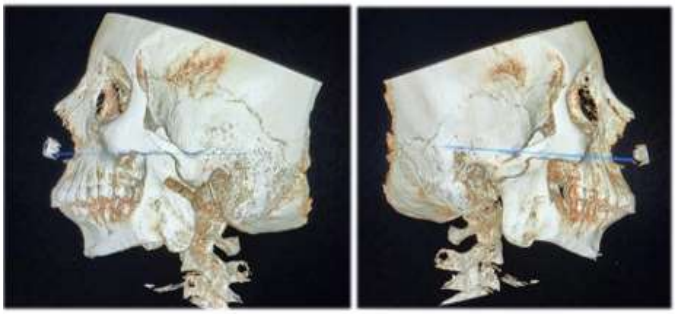

Fig. 4: CBCT View of Right and Left Sides Showing Bilateral TMJ Ankylosis.

Radiographic investigations, including Orthopantomogram (OPG) and Cone Beam Computed Tomography (CBCT), revealed bilateral bony ankylosis of the TMJ. (Fig 3,4)

Inter-positional arthroplasty with TPFF was considered the standard of care. Under general anaesthesia, hair was partially trimmed over the right and left temporal region, a Bramley al-Khayati incision (Fig 5) was made, and the superficial temporal artery and vein were carefully exposed by sub-follicular dissection and the vascular path in the temporoparietal fascia was traced. Extending the incision into the preauricular region, the right condyle was exposed, and the ankylosed condyle was freed from the temporal bone with a bur. After this step, the MMO was increased intraoperatively to 60 mm.

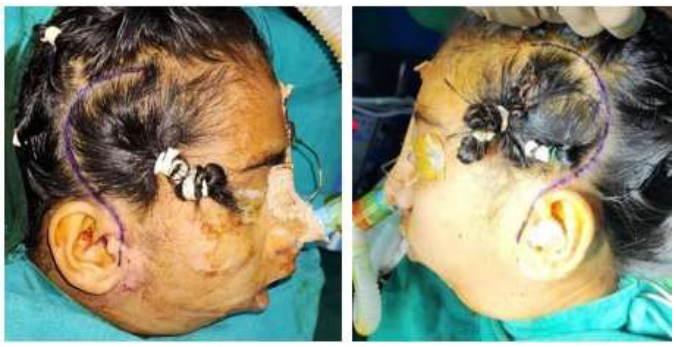

Fig. 5: AL-Khayati Bramley Incision Markings Were Made

Fig. 6: AL-khayati bramley incisions were made and TPFF flap was raised

To prevent re-ankylosis, an inter-positional arthroplasty was performed using a TPFF based on the superficial temporal artery. A 1.5 × 3 cm flap was elevated and rotated into the resulting cavity between the newly formed condyle and the temporal bone. (Fig 7,8)

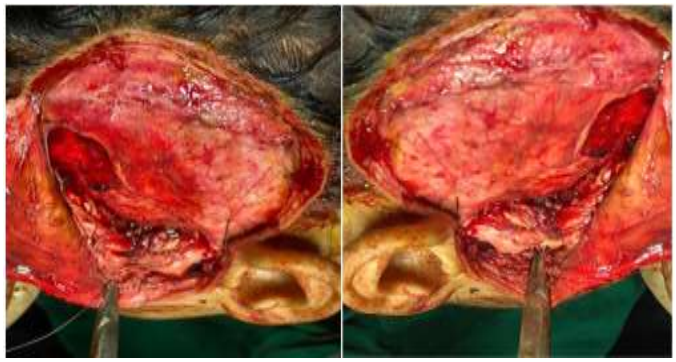

Fig. 7: Elevated and Rotated into Created Gap Between Formed Condyle and Temporal Bone

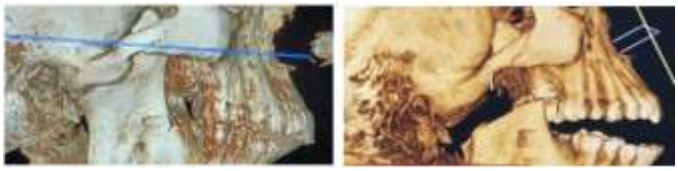

Fig. 8 A : Right Side Before Surgery, Right Side After Surgery

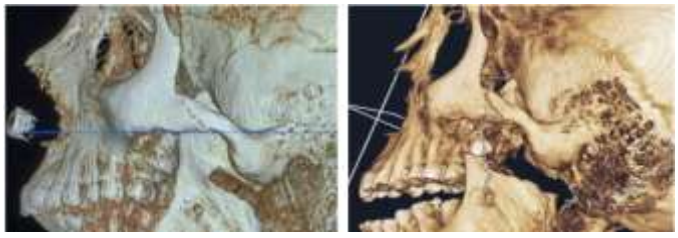

Fig. 8 B: Left Side Before Surgery, Left Side After Surgery

Fig. 9: Post-Operative Picture After 1 Year Follow-Up Showing 45 Mm Mouth Opening

It was sutured and fixed to the remaining lateral pterygoid muscle and retro disc ligaments. After one week, the patient was discharged, and active physiotherapy was started. At 6 months' follow-up, no sign of re-ankylosis was observed, and the patient's MMO had increased to 45 mm. At 1 year's follow-up, the patient maintained a mouth opening of 45 mm and had no other complaints. (Fig 9)

Discussion

The temporoparietal face flap is commonly used in the head and neck area due to its thinness and good blood flow compared to other tissue layers like temporalis and fascia.[12] Reconstruction utilizing the temporoparietal fascia flap (TPFF) can be effectively applied to several anatomical regions, including the orbits, oral cavities, ears, jaws, and mammary glands. TPFF is particularly advantageous for nasal reconstruction, serving as a lining to cover cartilage and facilitating the reconstruction of the nasal dorsum.[13]

Re-ankylosis is a frequent complication that follows gap arthroplasty. Chossegros et al. identified the type of interposing material as a significant predictor of re-ankylosis. To address this, various mediating materials such as acrylic, ear cartilage, costochondral grafts, fat grafts, muscle, or myofascial flaps are commonly utilized. [11, 14]

The disadvantages associated with alloplastic materials include the potential for migration and infection. Furthermore, the immune response elicited by the presence of a foreign body heightens the risk of graft rejection. In contrast, fat grafting involves the use of non-vascular tissue, which presents its own challenges, particularly regarding longevity.[15]

The temporalis fascia flap (TPFF) presents several advantages, including its accessible location and proximity to the temporomandibular joint (TMJ) region. Its adaptability allows for precise adjustments to accommodate the specific defect, while its reliable blood supply significantly diminishes the risk of complications such as gangrene and re-ankylosis. [16,17]

Conclusion

The TPFF is characterized by its thin and flexible structure, which allows for effective blood perfusion. Its anatomical positioning renders it suitable for various adjacent operative areas. TPFF is extensively utilized in multiple clinical contexts, including orbital, oral cavity, and auricular reconstructive procedures. Additionally, it plays a critical role in inter-positional temporomandibular joint (TMJ) arthroplasty for the treatment of TMJ ankylosis. This case study demonstrates that TPFF serves as a reliable material for mediating the repair and reconstruction associated with TMJ ankylosis.

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