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Review Article

Outcome of Temporalis Myofascial Flap as an Interpositional Material in Temporomandibular Joint Ankylosis

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Abstract

Temporomandibular joint ankylosis is a common problem in Bangladesh due to trauma and infection. Diverse interpositional materials have been proposed in this regard with especial advantages and limitation. Interpositional arthroplasty is the best solution. The aim of this review article is to provide a useful clinical update about interpositional arthroplasty in temporomandibular joint ankylosis, its advantages and limitations. For this purpose eighteen articles were selected through searching internet, reviewed and are summarized here. Dental surgeons need proper training for proper diagnosis and adequate treatment. Research in this field will be helpful for both patients and doctors. Temporomandibular joint ankylosis, treatment objectives of TMJ ankylosis and update of temporalis myofascial flap as an interpositional material are described here.

Key words: *Temporomandibular joint ankylosis; Temporalis fascis flap; Interpositional arthroplasty*

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Introduction

Temporomandibular joint (TMJ) ankylosis is a condition associated with stiffening of the joint due to disease process resulting in fibrous or bony fusion of the mandibular condyle to the skull base. The resultant significant reduction in the mouth-opening manifests primarily as impaired speech, difficulty in mastication, facial deformity (bird face deformity)[1] and associated features, viz. poor oral hygiene and periodontal disease, occlusal and growth disturbances involving maxilla and mandible, difficulty in breathing and compromised airway characterized by sleep apnea.

TMJ ankylosis may be classified as false or true[2], extra-articular or intra-articular, fibrous or bony, unilateral or bilateral, partial or complete.

The most common etiological factors are trauma followed by infections, inflammatory conditions and systemic disease. Laskin[3] in 1978 outlined various factors that may be implicated in the genesis of ankylosis following trauma to mandible. Miyamoto et al[4] emphasized that hemarthrosis alone does not lead to ankylosis. It is hypothesized that intra-articular hematoma with scarring results in hypomobility of the joint and subsequent bone formation which leads to ankylosis. Treatment of TMJ ankylosis and its associated complications along with its high recurrencerate[5,6] pose a significant challenge to the clinician.

Treatment aims at restoring joint function, improving patient's esthetics, quality of life (as many TMJ ankylosis patients are malnourished) and also to prevent recurrence. The treatment of TMJ ankylosis is always surgical. Gap arthroplasty and inter-positional arthroplasty are the treatment of choice. Various autogenous interpositional graft materials

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such as temporalis and masseter muscle, temporalis fascia, fascia lata, dermis, auricular cartilage and costochondral graft have been used for the above purpose. Non-biological options comprised insertion of silastic[7], silicon[8] and T-plate.

A temporalis myofascial flap is used in maxillofacial reconstructive surgery. It has the advantages of a vascularized tissue flap, easy pedicled transfer and simulates physiological action.[9] The interpositional arthroplasty with a temporalis muscle flap is advocated by Feinberg & Larsen[10] and Su-Gwan[11]. The aim of this review article is to provide a useful clinical update about inter-positional arthroplasty in temporomandibular joint ankylosis, its advantage and limitations.

Materials and Methods

Study documents were identified through Google Scholar and Health Inter Network Access to Research Initiative (HINARI). Informations were collected form texts and scientific documents. Used searching keys were mainly temporomandibular joint ankylosis, outcome of temporalis myofascial flap and benefits of temporalis myofascial flap. So full free articles focusing only on outcome of temporalis myofascial flap in temporomandibular joint ankylosis, both original and review types, were included. Articles associated with other topics like other treatment option of temporomandibular joint ankylosis and its outcome were excluded.

Overview of temporomandibular joint ankylosis

Temporomandibular joint ankylosis is a pathologic condition where the mandible is fused to the fossa by bony or fibrotic tissues. This interferes with mastication, speech, oral hygiene and normal life activities and can be potentially life-threatening when struggling to acquire an airway in an emergency. Attempting to open the mouth, stretching the periosteum can also result in pain.[12]

Classification of temporomandibular joint ankylosis

It may be classified into type-I, type-II, type-III and type-IV. Type-I: In this the condyle is present and there are only fibrous adhesion. Type-II: Here there is bony fusion, the condyle is remodeled, and the medial pole is intact. Type-III: In this type there is an ankylotic block, the mandibular ramus is fused to the zygomatic arch, the medial pole remains intact. Type-IV: Here there is true ankylotic block and the anatomy is deranged because the ramus is fused to the skull base.[13]

Causes of temporomandibular joint (TMJ) ankylosis

Trauma is the most common cause of temporomandibular joint ankylosis. Other causes include infection and inflammatory destruction of the synovial lining of the joint. Inflammation of the joint may be resulting from infection of the joint or may result from extension of neighboring infection.[14]

Clinical features of temporomandibular joint ankylosis

It causes facial disfigurement as well as difficulties in eating, breathing and speech.[15]

Treatment objectives of TMJ ankylosis

Treatment objectives of TMJ ankylosis are

- Release of bony mass
- Release of all restrictive forces preventing the opening of jaw
- Allow for normal movements of TMJ
- To ensure maintenance of the gap created, both to prevent re-ankylosis and to maintain vertical height of the mandible
- To promote growth and correct subsequent occlusal and cosmetic deformities[2]

Interposition arthroplasty for treatment of TMJ ankylosis

An ideal interposition would fulfill the following criteria:

- Autogenous tissue
- Available in the same operative field
- No change in volume and characteristics over time
- Promotion of growth

- Recreating as close to a normal joint as possible[16]

Outcomes of different interpositional materials for interpositional arthroplasty in treatment of TMJ ankylosis

A variety of interpositional materials have been used to prevent recurrence after arthroplasty in treatment of temporomandibular joint ankylosis. Good results are achieved in 92% of cases using full thickness skin graft and 83% of cases using temporal muscle flap. Homologous cartilage gives poor result.[17]

Advantages of interposition arthroplasty in TMJ ankylosis

Pedicled temporalis fascia axial flap based on superficial temporal artery is used for interposition arthroplasty. The advantage is that it is available at the operative site, easy to raise, well-vascularized, reliable with better long term results.[18]

Complications of interposition arthroplasty

The most frequently encountered complication is postoperative restriction of jaw movement, facial disfigurement, and difficulty in mouth opening, recurrence, adhesion and bleeding.[19]

Prevention of postoperative adhesion

Early postoperative initial exercise, physiotherapy and strict follow-up play an important role in preventing postoperative adhesion.[20]

Gap arthroplasty with temporomyofascial flap

The gap arthroplasty with temporalis muscle flap interpositional graft is an effective method in the treatment of TMJ ankylosis. The osteoarthrectomy of the callus to create at least 10 mm gap and enough bulk of temporalis muscle flap as interpositional graft followed by at least a 6-month physiotherapy play an important role in prevention of reankylosis.[21]

Research findings from Bangladesh

Condylectomy with temporalis flap in interpositional arthroplasty appears to be the best method for TMJ ankylosis. It can prevent reankylosis.[22]

Conclusion

TMJ ankylosis is a common problem in Bangladesh due to trauma and infection. Interpositional arthroplasty is the best solution. Use of temporalis myofascial flap is an alternative interpositional graft for the treatment of TMJ ankylosis to achieve better result. The authors agree with the statement that the success in preventing reankylosis is related primarily to the early postoperative physiotherapy, and it maintains long term benefit. It is used in clinical and research practice around the world. Dental surgeons need proper training for proper diagnosis and adequate treatment. Research in this field will be helpful for both patients and doctors.

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