MANAGEMENT OF TEMPOROMANDIBULAR JOINT ANKYLOSIS BY INTERPOSITIONAL ARTHROPLASTY USING TEMPORALIS MUSCLE FLAP

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INTRODUCTION

Temporomandibular joint (TMJ) ankylosis is a Greek terminology meaning 'stiff joint'. Congenital, infection and trauma are the main etiologic factors. Due to better understanding of condylar fracture management and introduction of antibiotics, its incidence has decreased. It is one of the most common pathologies affecting facial skeleton. It is a disabling condition causing impairment of speech, difficulty with mastication, poor oral hygiene, disturbance of facial and mandibular growth, malocclusion and acute compromise of airway etc [1]. This condition presents a unique challenge in terms of patient's physical and psychological management.

CASE REPORT

A 14 years old girl reported to Armed Forces Institute of Dentistry with the presenting complaint of difficulty in opening the mouth and inability to chew for the last 09 years. Her history revealed that she sustained trauma 09 yrs back, which resulted in gradual restriction of jaw movements. Patient was on a semi solid and liquid diet since then. The clinical examination revealed facial asymmetry, deviation of the lower jaw towards right side and limited mouth opening with incisal edge distance (IED) of 8 mm. There was no palpable movement on the right side and only slight rotation on the left side TMJ. There was prominent scar on the chin. Anterior open bite, missing right maxillary canine and class II molar relation on right side was evident on intra oral examination.

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Radiographic investigations included Orthopantomogram (OPG) of the patient, which revealed complete bony ankylosis of the right TMJ (fig. 1).

Following treatment plan was devised: Arthroplasty of right TMJ with temporalis muscle interpositioning, post operative physiotherapy, orthodontic treatment for the correction of malocclusion and orthognathic surgery for improvement in facial asymmetry.

After necessary pre-operative work up for GA under aseptic conditions, TMJ was exposed through Bramley al-Khayat incision. T-shaped incision was made in capsular ligament to expose the ankylosed mass. Arthroplasty was completed by removing ankylosed mass and creating a gap of about 8 mm between roof of glenoid fossa and cut end of the mandible (fig. 2). Temporalis muscle flap was raised (fig. 3) and interposed in the surgically created gap. Per-operative mouth opening i.e. IED 36 mm was achieved. The wound was closed in layers.

Aggressive physiotherapy was started on 2nd post operative day and after four months of vigorous exercises, mouth opening was markedly improved and IED was 41mm. One year follow up completed and it showed the same satisfied level of mouth opening (fig. 4).

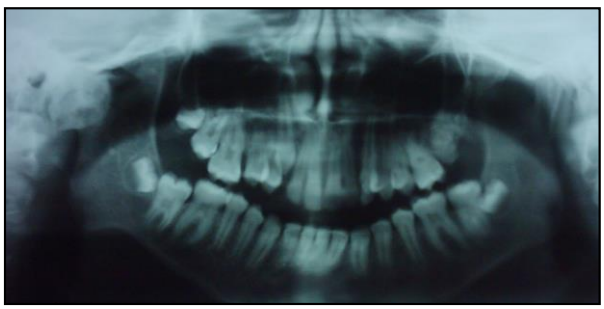

Fig-1: OPG of the patient showing right TMJ ankylosis.

Fig-2: Athroplasty of right ankylosed TMJ was completed.

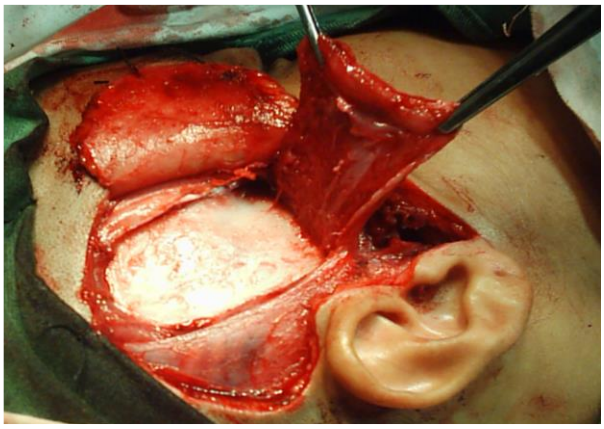

Fig-3: Temporalis muscle flap.

Fig-4: Post operative mouth opening.

DISCUSSION

Temporomandibular joint (TMJ) ankylosis is very debilitating condition which occasions much misery for the unfortunate victims and has deep influence on the psychosocial aspects of the affected individuals. Trauma is the most common etiologic factor, well documented in various studies and reaching up to 95.7% [1,2]. Mandibular hypomobility resulting from TMJ ankylosis is classified according to location, type of tissue involved, extent of fusion and side involved [3]. Sawhney has classified the condition into four well defined types [4].

The condition is usually characterized by a retrognathic appearance in bilateral cases and deviation of the chin to the affected side in unilateral cases. Alongwith attenuated functional and aesthetic deficit, the condition is usually associated with interference with speech, mastication and oral hygiene maintenance [5]. The diagnosis is rarely difficult and depends mostly on careful history and clinical examination. Basic screening radiograph include orthopantomogram (OPG), reverse town's view, Trans pharyngeal and lateral oblique view of the mandible and computed tomography (CT). Recently three dimensional CT (3D-CT) scan is employed as one of the pre surgical diagnostic tool for correct and precise diagnosis and to visualize the extent of ankylosed mass [6]. The management of TMJ ankylosis poses a significant challenge because of technical difficulties and high incidence of recurrence. The management not only includes the various surgical modalities but also has to be supported by post surgical rehabilitation. The various surgical modialities include interpositional arthroplasty, arthroplasty with costochondral graft (CCG), gap arthroplasty [7] and recently arthroplasty and condylar reconstruction by distraction osteogenesis.

In interpositional arthroplasty, different alloplastic materials and autogenous tissues are in use. Different alloplastic materials are: Metallic prosthesis such as moulded vitallium prosthesis which covers glenoid fossa, Proplast Teflon implant, Silastics, Acrylic spacer and Total joint prosthesis [8]. These alloplastic materials have shown variable results. Although they have optimal functional and aesthetic results, the

complications associated with their use outweigh the advantages. Infection, foreign body joint cell reaction to silicon debris [9], degenerative joint changes, altered occlusion, and limitation of movements, extension and extrusion through the skin, painful inflammation and implant removal [10] are few of the known complications. Different autogenous tissues used for interpositioning are temporalis muscle flap, auricular cartilage, dermis, fascia lata, lyo-dura and fat [11].

In 1989, Golovine described the use of temporalis muscle flap for orbital reconstruction after orbital exentration [12]. Murphy later described the temporalis muscle flap and its use in maxillofacial reconstruction [13]. This flap is being used for orbital, auricular, intra oral, facial, cranial and anterior skull base reconstruction with modifications [14]. The use of this flap has also been advocated in TMJ ankylosis.

It has certain advantages over other interpositional materials. Its autogenous origin and closed proximity to the TMJ makes it very favorable candidate for interpositioning. The flap can be harvested through the same incision used for TMJ procedures. It also avoids the involvement of an additional surgical site as with other autogenous tissues. Also its proximity, along with its resilience and adequate blood supply allowing for a pedicled transfer of a vascularized tissue into the joint area [14]. Another advantage of it is that the attachment of temporalis muscle with coronoid process is maintained which provide movement of the flap during function, simulating physiologic function of the disc [12].

Numerous modifications of temporalis flap have been documented for TMJ reconstruction. In 1989, Feinberg and Larson described a pedicled temporalis muscle and pericranial flap in TMJ surgery [12]. Progrel and Kaban described a flap that may include only the fascia or both the fascia and muscle, and is rotated over the zygomatic arch and into the joint space [15]. Bergey and Braun described the osteotomy of the zygomatic arch followed by rotation of the flap through the osteotomized arch. They use to replace the segment of the arch and secure it with rigid fixation [16].

CONCLUSION

Any pathology that afflicts and restricts the mouth opening in early childhood results in physical as well as psychological disabilities. TMJ ankylosis due to trauma is the most common cause of restricted mouth opening in children. Various surgical options are available for management of TMJ ankylosis. Interpositional arthroplasty with temporalis muscle flap has been proven the most favourable treatment option. Among other treatment modalities, distraction osteogenesis is an emerging procedure that can be used simultaneously with arthroplasty, but mostly it is used as a second procedure to correct facial asymmetry if required.

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