Temporomandibular Joint Ankylosis - Retrospective Review of Forty-Five Patients

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CERTIFICATE

This is to certify that this dissertation titled **" TEMPOROMANDIBULAR JOINT ANKYLOSIS – RETROSPECTIVE REVIEW OF FORTY-FIVE CASES "** is a bonafide work done under my guidance by **DR. N. DHINEKSH KUMAR** during his postgraduate study period between 2002-2005.

This dissertation is submitted in partial fulfillment for the award of the degree of Master of Dental Surgery in Branch I- Oral and Maxillofacial Surgery of The Tamil Nadu Dr. M.G.R. Medical University.

It has not been submitted (partially or fully) for the award of any other degree or diploma.

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INTRODUCTION

Mandibular hypomobility results from a variety of disorders affecting the temporomandibular joint and surrounding structures. It may be classified by a combination of location (intra or extra articular), type of tissue involved (bony, fibrous or fibro-osseous) and extent of fusion (complete, incomplete). [34, 72]

Ankylosis is most commonly associated with trauma, local or systemic infection or systemic disease. In the case of trauma, it is hypothesized that intra-articular haematoma, with scarring and excessive bone formation, leads to hypomobility. Infection of the TMJ is most commonly secondary to the contiguous spread from otitis media or mastoiditis, but may also result from haematogenous spread, including tuberculosis, gonorrhea and scarlet fever. Systemic causes of TMJ ankylosis include ankylosing spondylitis, rheumatoid arthritis and psoriasis.[1,21,26]

A variety of techniques for treatment of ankylosis have been described in the literature.[1,5,10,11,13,14,15] However no single method has produced uniformly successful results. Limited range of motion and re-ankylosis are the most frequently reported complications. Restoration of normal motion and functions in patients with TMJ ankylosis has been a difficult goal to achieve. The most frequently reported operations include gap arthroplasty, interpositional arthroplasty, excision and joint reconstruction with autogenous or alloplastic materials.[34]

Studies have shown that TMJ ankylosis creates not only functional and aesthetic problems but also interferes with adequate nutrition and oral hygiene measures. The clinical manifestations of this condition depend to a large extent on the age at the time of onset, duration, anatomical location and involvement of one or both joints (unilateral or bilateral). However it ranges from limited mouth opening to severe morphogical and incapacitating anatomical alterations in the facial appearance of affected individuals. [50,65,74]

REVIEW OF LITERATURE

Ankylosis of the temporomandibular joint is a clinical condition in which there is bony and / or fibrous fusion of the mandibular condyle with the glenoid fossa of the temporal bone. It occurs relatively commonly in developing countries especially in Southasian populations. Various factors have been implicated in the etiopathogenesis of this condition and these include; trauma, local and systemic infections as well as systemic diseases like rheumatoid arthritis, psoriasis and and ankylosing spondyilitis.

Studies have shown that TMJ ankylosis creates not only functional and aesthetic problems but also interferes with adequate nutrition and oral hygiene measures. Several classifications of TMJ ankylosis are presently available in the literature.

J . RHEA BARTON (1826) stated that it is well known that no such deformity can be established until the original natural structure of a joint shall have undergone an entire change. The beautifully polished cartilages tipping the articulations, which, when supplied with synovia, admit of such perfect movements over their surfaces, must previously be

absorbed, leaving only the two rough ends of the bones to unite and become incorporated and as it were one bone. [4]

VILRAY PAPIN BLAIR (1914) presented that the advanced state at which some of these cases present themselves, and the length of time the ankylosis has persisted would alone be sufficient reason for a broad presentation of this subject. [5]

BLAIR (1914) advocated various principles for surgical treatment for temporomandibular joint ankylosis. [5]

MILLER GA, PAGE HL JR, GRIFFITH CR. (1975) described the factors predisposing to ankylosis and the probable pathogenesis are discussed, as treatment, both past and present. Arthroplasty with Silastic interposition is presented as an acceptable means of managing ankylosis, as shown in two case reports. The ultimate postoperative result is dependent on surgical timing, surgical technique, and attention to postsurgical physiotherapy. [51]

KAMEROS J, HIMMELFARB R. (1975) emphasizes that the case of manipulation and good tissue tolerance of methyl methracrylate make it an excellent material for interpositional arthroplasty. [35]

POPESCU & VASILU (1977) proposed the treatment of temporomandibular joint ankylosis with particular reference to the interposition of full thickness skin auto-transplant. [64]

TASANEN A, LEIKOMAA H. (1977) states that an ankylosis of the temporomandibular joint (TMJ) in early childhood may lead to growth disturbances. . In a follow-up 6 years later the patient revealed satisfactory opening movements and good chewing function. It was noted that the operated grafted side increased in length slightly more than the other side. [81]

NORMAN (1978) presented a surprising finding of the Australian series untreated with osseous ankylosis for many years. [58]

BRADY FA, SANDERS B. (1978) presented that traumatic injuries to the region of the temporomandibular joint (TMJ) may result in varying degrees of hypomobility of the mandible. The physical and psychological problems associated with restricted jaw opening are outlined. The different forms of ankylosis are mentioned. The rationale behind the various surgical approaches to the problem is outlined, and mention is made of current concepts in joint reconstruction. The importance of supportive adjunctive therapy in the postoperative period, is emphasized.

SIEVERINK et al (1979) described the method used to remove a fibrous ankylosed condyle. Also stated some principles to overcome the complications of the conventional condylectomy, the risk of opening the neurocranium and laceration of the internal maxillary artery, the condyle is split in a latero-medial direction. [79]

AL-KAYAT A, BRAMLEY P. (1979) proposed the safety of approaching the malar arch through the pocket formed by the splitting of the lower part of the temporal fascia is emphasised. Minor modifications to the established pre-auricular approach were made and applied successfully to six sides in five patients. [2]

HATZIFOTIADIS D. (1979) states that the patient must be made to understand that a normal joint cannot be constructed by any surgical procedure and his part in the rehabilitation programme must be specifically stressed and assurance must be obtained from him that he is willing to carry out instructions during the postoperative treatment. The surgeon must be self disciplined enough to demand the best of himself in any situation and never to be satisfied with less. The surgeon must be generally optimistic, but his knowledge of the local anatomy and the surgical pathology must constantly remind him of his limitations. He

must know that we cannot construct a normal joint and we must not promise one. [28]

MATUKAS VJ, SZYMELA VF, SCHMIDT JF. (1980) A previously unreported approach to the treatment of temporomandibular ankylosis in the child is reported. The procedure involves using the iliac crest and fixing it to the zygomatic portion of the temporal bone, with the cartilagenous portion facing the stump of the mandibular ramus. The procedure is easier to accomplish than a costochondral graft, does not require maxillomandibular fixation, and offers the possibility of appositional growth. In this case, opening has been maintained and growth sustained in a five-year-old child for 18 months without physiotherapy. [48]

KHANNA NN, SINHA JK, TRIPATHI FM, SRIVASTAVA AB, (1981) stated that temporomandibular ankylosis is commonly seen in children and young adults. Trauma in childhood is the commonest cause. Treatment of choice is by surgical intervention. Depending upon the local findings a gap arthroplasty or interposition arthroplasty is the procedure carried out. Early mobilisation is recommended. [36]

ROWE (1982) designed stage wise treatment for temporomandibular joint ankylosis. [72]

MOORTHY AP, FINCH LD. (1983) The relevant literature relating to the etiology and treatment of intra-articular ankylosis of the temporomandibular joint is reviewed, and three cases of ankylosis (one unilateral and two bilateral) are reported. Two of these occurred subsequent to trauma, while the other was a manifestation of severe ankylosing spondylitis. They were successfully treated by interpositional arthroplasty with silicone rubber tubing. [53]

DAVID R. JAMES et al (1983) reviewed 41 patients in whom rib grafts were used has shown that this is a relatively simple, reliable and safe procedure for obtaining autogenous bone and the incidence of pneumothorax was significantly lower. [15]

ADEKEYE EO. (1983) A survey of 76 cases of ankylosis of the mandible in Nigerians is presented. Etiology, clinical features, radiographic findings, anesthetic techniques, surgical treatment, complications, and results are discussed. The operative technique used in each case depended on the site, extent, and type of ankylosis. Five-year follow-up data are reported. Of the 47 patients who were followed, the postoperative interincisal opening was retained in 25 (53.2%), varying degrees of reduction of mouth opening were observed in 17 (36.2%), and

ankylosis recurred in five (10.6%). Lack of jaw opening exercise was believed to be responsible for relapse. [1]

EGYEDI P, WITTKAMPF A. (1985) emphasized that if, in a case of ankylosis of the temporo-mandibular joint, a class II skeletal relationship exists, advancement of the mandible into a class I skeletal relationship should be an integral part of the treatment plan. The method advocated in unilateral cases is the insertion of a costo-chondral graft on the affected side and a lengthening osteotomy on the opposite side with fixation into a class I skeletal relationship initially disregarding the incisal relationship. [18]

MUNRO IR, CHEN YR, PARK BY. (1986) presented that;over the past 6 years, 18 patients in Canada and Taiwan were treated by excision of a large block of bone at the ankylosis and repositioning of the jaw, with the addition of osteotomies as necessary to produce a symmetrical face with good occlusion. Bilateral cases were treated at one operation in a similar way. The temporomandibular joint and absent ramus were constructed with a costochondral graft taken from the opposite chest. Some patients were treated with intermaxillary fixation for 8 weeks, while others had no fixation, but there was no difference in the effectiveness of correction of the ankylosis. [54]

LINDQVIST C, PIHAKARI A, TASANEN A, HAMPF G. (1986) presented a clinical study of 60 patients who underwent 66 costochondral arthroplasties during the period 1969-1984 is presented. In nearly half of the cases ankylosis was the main indication for operation, followed by dysplasia, tumours and osteomyelitis. The results showed that all cases in which the rib was decorticated to fit into the mandible as an inlay healed well. The mean time of IMF was 3.5 weeks. In the majority of the patients (67%) the postoperative function of the mandible was considered to be good or excellent, and nearly all patients were pain free. There were no postoperative chest infections and only one case of pneumothorax. Motor and sensory disturbances in the lower lip were each diagnosed in ten per cent of the patients. [43]

KUMMOONA R. (1986) presented that in 6 children, an ankylosed temporo-mandibular joint was replaced by a chondro-osseous graft from the iliac crest. The technique is described. The long term results show that this procedure is technically successful. It is also demonstrated that the graft has the possibility to react to functional stimuli. This enables it to grow in a multidirectional manner. [40]

SAWHNEY et al (1986) subdivided ankylosis into four groups based on the severity of the condition and evaluated the anatomic relationship of the joint using tomograms. [77]

DELUKE DM. (1987) emphasized that with the aid of recent refinements in temporomandibular joint surgery, it is often possible to release a bony ankylosis directly within the joint space. The causes of bony ankylosis, various surgical techniques, and preoperative management are discussed within the framework of this report of case. [16]

RAVEH J, VUILLEMIN T, LADRACH K, SUTTER F.(1989) stated the surgical treatment of 26 patients with ankylosis of the temporomandibular joint, as well as various methods and materials used for functional restoration are described. The significance of radical removal of the ankylotic bone, as well as the advantages of the interpositioning of the lyophilized cartilage, are emphasized. [68]

ZINS JE, SMITH JD, JAMES DR. (1989) discussed that a better understanding of facial growth processes and pathophysiology of temporomandibular joint ankylosis should lead to an improved surgical outcome. Surgical anatomy, pathophysiology, and treatment options are reviewed. Suggestions for varying the procedure in patients in whom facial growth is not complete are discussed. [84]

FAERBER TH, ENNIS RL, ALLEN GA. (1990) reported a case of TMJ ankylosis following otitis media and mastoiditis is described and its treatment presented. The infectious etiology of ankylosis is reviewed, with emphasis on mastoid infections. Theories are presented as to the possible mechanisms by which such infections can spread into the glenoid fossa. [24]

POGREL MA, KABAN LB (1990) states that temporalis fascia, with a varying thickness of temporalis muscle, may be harvested as an axial flap based on the middle and deep temporal arteries and veins. The dependable blood supply, the proximity to the temporomandibular joint, and the ability to alter the arc of rotation by basing the flap inferiorly or posteriorly make this a versatile flap for lining the temporomandibular joint. In this report, the anatomy is reviewed, the harvesting technique is described, and multiple uses of the temporalis muscle-fascia flap in temporomandibular joint surgery are described. [63]

LELLO GE. (1990) stated that achieving a functioning joint often precludes the maintenance of the occlusion and depends on resection of large amounts of bone and the use of alloplastic implants. The results in 13 patients (17 joints) with a follow-up range of 1.5 to 5.5 years show that in all but one instance (of fibrous re-ankylosis following

postoperative joint infection), satisfactory postoperative mandibular function and mouth opening was achieved. [42]

KABAN LB, PERROTT DH, FISHER K. (1990) A management protocol for temporomandibular joint (TMJ) ankylosis consisting of 1) aggressive resection, 2) ipsilateral coronoidectomy, 3) contralateral coronoidectomy when necessary, 4) lining of the TMJ with temporalis fascia or cartilage, 5) reconstruction of the ramus with a costochondral graft, 6) rigid fixation, and 7) early mobilization and aggressive physiotherapy is presented. The protocol was retrospectively evaluated in the first 14 patients (18 involved TMJs) treated and followed postoperatively for at least 1 year. The facial asymmetries present in all unilateral cases remained corrected. The mean maximum postoperative interincisal opening at 1 year was 37.5 mm (292.36% mean increase), lateral excursions were present in 16 of 18 joints (vs 0 of 18 joints preoperatively), and pain was present in 2 of 18 joints (vs 13 of 18 preoperatively). The results of this study indicate that this protocol is effective for treatment of TMJ ankylosis. [34]

BRUSATI R, RAFFAINI M, SESENNA E, BOZZETTI A. (1990) proposed that in the treatment of the severely damaged TMJ structural components (ankylosis, arthrosis, tumour, perforation or degeneration of

the disc), it is advisable to insert a biological interposition between bony articular surfaces. The temporal muscle, due to its anatomical, topographical, and functional properties, can be successfully employed for this purpose. Based on the experience of Tessier, Delaire and Rowe, a temporalis muscle flap, inferiorly based, is rotated downwards and medially to the zygomatic arch, interposed and then fixed to condyle and capsule. Using this surgical technique, 12 patients and 13 temporo-mandibular joints were treated with good functional results and without any complication. [8]

HERBOSA EG, ROTSKOFF KS. (1990) emphasized that fifteen temporomandibular joint patients were evaluated preoperatively and postoperatively to evaluate the effectiveness of a composite (fascia, muscle and periosteum) temporalis pedicle flap as an interpositional disc replacement. A modified Craniomandibular Index (CMI) and Symptom Severity Index (SSI) were used to assess clinical and subjective symptoms. However, a significant reduction of translation (P less than .01) was evident indicating that the increased mandibular opening was owing to a compensatory rotational movement. This study indicates that the composite temporalis pedicle flap is a good autogenous tissue for the reconstruction of the temporomandibular joint. [30]

NEIL H. LUYK et al (1990) described the aetiology and diagnosis of clinically evident jaw trismus and reviews the outline. [55]

POGREL , PERROTT et al (1991) stated that the bicoronal scalp flap provides an excellent approach to the temporomandibular joint, particularly in cases where bilateral operation is required. [62]

KIMBERLY S. SWANSON et al (1991) presented the etiology and the management of auriculotemporal syndrome following the preauricular approach to temporomandibular joint surgery. [37]

SARMA UC, DAVE PK. (1991) Seventy-five condylectomy and coronoidectomy specimens of temporomandibular joint ankylosis in 61 patients were studied. Fourteen patients had bilateral ankylosis, six of whom had fibrous ankylosis on one side. There were two types of ankyloses: intra-articular and juxta-articular. Intra-articular ankylosis was seen only in reankylosis or in postinfective cases. Sixty-six cases were posttraumatic juxta-articular ankylosis. A rudimentary temporomandibular joint with an atrophic condylar articular surface was found in all juxta-articular ankyloses. The size of new bone in the specimens varied from 0.5 to 3 cm. Fusion of the extra-articular bone mass with tympanic plate was also observed. Contracture of temporalis

muscle was noted in all the cases, which made excision of the coronoid processes mandatory in all the arthroplasties. Arthroplasty early in childhood did not hamper growth; instead, facial remodeling was enhanced. [76]

SCHOBEL G, MILLESI W, WATZKE IM, HOLLMANN K. (1992) undertook a postoperative clinical study of 13 patients with ankylosis of the temporomandibular joints. The study consisted of an evaluation of the surgical concepts of resection and subsequent surgical reconstruction by osteotomy in previous height of the joint space and lining of the glenoid fossa with lyophilized dura. Early mobilization and aggressive physiotherapy are mandatory postoperative measures. Further addes that; according to the theory of mandibular growth as a result of functional matrix, early surgical intervention to correct ankylosis should be performed, regardless of the age of the patient, to prevent recurrence and later asymmetry or distoclusion. [78]

GUYURON B, LASA CI JR. (1992) This is a report on the long-term follow-up of eight adolescent patients who underwent reconstruction of the temporomandibular joint and ramus for correction of hemifacial microsomia or trauma-related temporomandibular joint ankylosis during varying periods of growth. Based on this study, we

recommend that this procedure be performed only on severe deficiencies. Adequate amounts of soft tissue should be retained between the skull base and the graft, and we further recommend harvesting the graft from the fourth or fifth rib, which may reduce the potential for over growth. [27]

CRAWLEY WA, SERLETTI JM, MANSON PN. (1993) emphasizes that costochondral rib grafting with rigid internal fixation and a temporoparietal fascia flap allows complete functional reconstruction of the temporomandibular joint with autogenous tissue. Thirteen joint reconstructions in 11 patients were followed for up to 7 years and the stability of the reconstruction is good and adequate. [13]

POSNICK JC, GOLDSTEINJA (1993) This paper presents a consecutive series of nine pediatric patients (mean age 7.7 years) who underwent a standardized treatment protocol to 13 affected joints. Operative protocol included excision of the involved ankylotic structures through a coronal and Risdon incision, followed by immediate costochondral grafting. Fixation with miniplates and screws allowed for early mobilization. Mean follow-up was 2 years; only one patient was followed for less than 1 year. Pain symptoms were relieved after surgery. Perioperative complications were minimal, with no evidence of infection, facial nerve injuries, or bleeding. Patients with unilateral or bilateral

ankylosis of traumatic cause achieved satisfactory functional results after surgery, while those in our bilateral congenital patients were far more limited. Rationales for this divergence in results are presented. [65]

DAVID A. BERGEY et al (1994) emphasized the posterior zygomatic arch osteotomy to facilitate temporalis flap placement in the lining of temporomandibular joint ankylosis. [14]

EVANS GR, CLARK N, MANSON PN. (1994) The technique described here provides superb rigid fixation. This fixation technique is multifaceted and can be used in all settings of acute and chronic costochondral graft replacement. [23]

PERROTT DH, UMEDA H, KABAN LB. (1994) This is a retrospective study of 26 patients (seven growing and 19 non-growing) who received costochondral grafts (n = 33) for construction or reconstruction of the ramus/condyle unit (RCU). Three patients developed lateral contour overgrowth of the articulating surface; no patients developed clinically significant linear overgrowth with malocclusion. The results of this study indicate that a costochondral graft may be used successfully to construct/reconstruct the RCU and that linear overgrowth of the graft does not appear to be a clinical problem with the method described in this paper.[61]

N.SAMMAN, L.K. CHEUNG et al (1995) first reported the overgrowth of a costochondral graft in an adult male and states that this graft partly exhibits features of a primary growth center with inherent potential for growth.. [75]

MERKX MA, FREIHOFER HP. (1995) The case of a 35-year-old woman with a history of several temporomandibular joint (TMJ) operations, including condylectomy, is reported. She presented with myofacial pain and partial fibrous ankylosis of her right TMJ. The ankylosis was released and an autogenous costochondral graft was used to restore the vertical dimension of the ramus. About 3 months after surgery, a fracture of the graft occurred during physical therapy. [50]

HEGGIE AA. (1996) proved that aggressive resection of the ankylosis with or without coronoidectomies is performed followed by growth centre transplantation and active postoperative physiotherapy. In the adult patient, a large-gap arthroplasty must be created followed by an interpositional tissue transfer such as a temporalis flap or an alloplastic reconstruction. [29]

OMURA (1996) advocated the modification of the temporalis muscle and fascia flap for the management of ankylosis of the temporomandibular joint. In this procedure, the fascia faces both the

condyle and the glenoid fossa, and the space between the condyle and the glenoid fossa is occupied by the muscle wrapped in the fascia. [60]

MOLLA MR, SHRESTHA KR. (1996) stated the clinical observations on 14 cases of temporomandibular joint (TMJ) ankylosis including age and sex incidences as well as surgical management are presented in this paper. Ankylotic TMJ arthroplasty which include condylectomy with or without interpositional materials such as auricular cartilage and temporalis muscle flap to prevent reankylosis was used as the corrective measure. Six subjects were treated with condylectomy along with interpositioning of temporalis muscle flap; the result was good in 5 and moderate in 1 case. Condylectomy with temporalis muscle flap appeared to be the best method for TMJ ankylosis. [52]

EL-SHEIKH MM, MEDRA AM, WARDA MH.. (1996) This paper describes experience in the treatment of 10 patients with bilateral longstanding temporomandibular joint ankylosis occurring during the active growth period and causing severe bird face deformity. [21]

L.K. CHEUNG et al (1996) described the vascular anatomy of the human temporalis muscle and its implication for surgical splitting techniques in the use of temporomandibular joint ankylosis. [9]

ARUN K. GOSAIN et al (1997) questioned about the temporal branch of the facial nerve and expressed the reliability and predicting its path by soft and hard tissues landmarks used during the temporomandibular joint surgeries. [3]

GUNASEELAN R (1997) proposed a new method of condylar reconstruction after gap-arthroplasty in extensive ankylosis of the temporomandibular joint in adults is presented. An autogenous graft, consisting of the excised ankylotic mass, was contoured, reimplanted and used for condylar reconstruction. This technique has given good results and is a simple alternative to other methods of reconstruction in adults. Successful results in three cases with more than 12 months' follow up, has prompted us to use this technique routinely in adult patients. [25]

EL-SHEIKH MM, MEDRA AM. (1997) presented surgery was performed on 27 patients to release the joint ankylosis and to correct the facial deformity. Very satisfactory results were obtained during a follow-up period ranging from 2 to 6 years, regarding the restoration of joint function, improvement in aesthetic appearance and relief of respiratory obstruction.[21]

CHOSSEGROS C, GUYOT L, CHEYNET F, BLANC JL, GOLA R, BOUREZAK Z, CONRATH J. (1997) The purpose of this

retrospective study of our experience was to compare the different materials (skin, temporal muscle, homologous cartilage) used for interposition arthroplasty over a period of 22 years. A total of 25 patients (32 joints) with at least 3 years of follow-up were included. Good results were achieved in 92% of cases using total full thickness skin graft and 83% of cases using temporal muscle flap. Homologous cartilage gave poor results. [12]

KOZAK J, RAMBA J. (1998) stated thatAnkylosis of the temporomandibular joint leads in children to serious disorders such as loss of dentition, growth retardation of the lower jaw, facial asymmetry etc. . In entire all patients the temporal muscle or a silicone plate was interposed between the skull base and mandible. Postoperative complications were minimal. Surgical treatment, which is only half of the issue of treatment, must be followed by long-term careful rehabilitation. The results which were achieved contributed in a significant way to a more favourable further development of the children. [39]

NITZAN DW, BAR-ZIV J, SHTEYER A. (1998) This article proposes a hypothesis regarding the value of saving the fractured condyle and disc in their displaced position in ankylosis type III for optimal temporomandibular joint (TMJ) function and growth, and describes four

cases treated in this manner. Treatment of patients with type III TMJ ankylosis should involve retention rather than removal of the displaced condyle and disc. The condyle and disc are left untouched in their precarious medial position so as to provide normal function and growth. [56]

SALINS P.C (1998) presented a soft and hard tissue correction of facial deformity associated with bilateral temporomandibular joint ankylosis by plication of platysma and relocation of the displaced soft tissues from the cervical to the mental region. [74]

JUNG I. PARK et al (1998) described the preoperative percutaneous facial nerve mapping for any temporomandibular joint surgeries. [33]

TOPAZIAN, CHOSSEGROS et al (1999) described that the full-thickness skin graft interposition after temporomandibular joint ankylosis surgery. This retrospective evaluation confirms the reliability of this graft interposition. [82]

ELLEN WEN CHING KO et al (1999) aimed to study and evaluate the postoperative growth of the mandible after reconstruction of the condylar process using costochondral grafts in children. [20]

NOJAN TALEBZADEH et al (1999) described the anatomy of the structures medial to the temporomandibular joint. [57]

CHIDZONGA MM. (1999) had reviewed aetiology, sex, age at time of treatment, clinical features, radiographic findings, anaesthetic techniques, surgical treatment, complications, and results in 32 patients with ankylosis of the temporomandibular joint. Trauma and infection were the commonest causes of ankylosis: 50% and 41%, (n = 13), respectively. The 21-30 year age group had the most trauma cases. Twenty (63%) of the patients presented with bilateral ankylosis. Failing to do jaw-opening exercises was the main cause of relapse was reported. [10]

ROYCHOUDHURY A, PARKASH H, TRIKHA A. (1999) The purpose of this study was to determine the cause of temporomandibular ankylosis and the long-term results of gap arthroplasty with coronoidectomy followed by immediate postoperative jaw exercises as a treatment of the condition. Finally concluded by stating that Trauma is the major cause of temporomandibular joint ankylosis in India. The long-term functional results of gap arthroplasty are satisfactory and comparable to those obtained through use of other treatments. Postoperative exercises play a crucial role in lasting success. [71]

OBIECHINA AE, AROTIBA JT, FASOLA AO. (1999) determined the relationship between the aetiological factors, duration of ankylosis

and the types of ankylosis and to evaluate the outcome of different treatment modalities used. Infection related aetiological factors were 66.6% while trauma was 27.8%. The relationship between aetiological factors and type of ankylosis classified by anatomic site, was statistically significant. Results suggest that infection-related aetiological factors are likely to give rise to extracapsular ankylosis, while trauma results in intracapsular ankylosis. As regards treatment, interpositional arthroplasty with the masseter muscle produced results that were more consistent and satisfactory than gap arthroplasty. [59]

KO EW, HUANG CS, CHEN YR. (1999) The aim of this study was to evaluate the postoperative growth of the mandible after reconstruction of the condylar process using costochondral grafts in children. Temporomandibular joint (TMJ) ankylosis was surgically treated and the joint reconstructed with a costochondral graft (CCG) in two boys and eight girls with a mean age of 7.4 years. Postoperatively, in the eight children with unilateral TMJ reconstruction, the mandible (Co-Gn) grew an average of 14.7 mm in length on the affected side and 15.1 mm on the nonaffected side; ramus length (Co-Go) increased an average of 7.1 mm on the affected side and 7.3 mm on the nonaffected side. Using CCGs to reconstruct TMJ ankylosis in children provides a functional condyle with

growth potential. However, there is a possibility of excessive growth of the graft, resulting in deviation of the chin and mandibular prognathism years later. [38]

CHOSSEGROS C, GUYOT L, CHEYNET F, BLANC JL, CANNONI P. (1999) states that Recurrence is a major problem after release of temporomandibular joint ankylosis. Early physiotherapy and choice of interpositional material are important in preventing recurrence. This retrospective review of 31 patients confirms the reliability of full-thickness skin graft interposition. Results were successful in 90% of the 20 patients with follow-up longer than one year. [11]

RAMIL NOVO VM, GARCIA AG, BERINI AYTES L, ESCODA CG.(1999) states that the following report describes 4 clinical cases in which autologous grafts or Christensen joint prosthesis are employed in temporomandibular joint reconstruction. [67]

LATA J, KAPILA BK. (2000) presented a case of 16-year-old girl had a history of unilateral ankylosis of the temporomandibular joint, which was reconstructed with an autogenous costochondral graft. About 2.5 years after surgery, the patient presented with overgrowth of the

costochondral graft, resulting in deviation of the jaw toward the unaffected side. [41]

ROBERT BRUSATI, MACINTOSH (2000) described the use of autogenous tissues for temporomandibular joint reconstruction. He further emphasise that until the physiologic fundamentals of host-alloplast intolerance are circumvented, autogenous reconstruction of the TMJ should remain the method of choice. [70]

SU-GWAN K. (2001) in his study sought to determine the efficacy of interpositional arthroplasty with temporalis muscle and fascia flap in the treatment of unilateral temporomandibular joint (TMJ) ankylosis in adults. This retrospective study of seven cases evaluated the postoperative results of interpositional arthroplasty on temporalis muscle and fascia flap in adults. The results of kabans protocol were encouraging, while the functional results of interpositional arthroplasty on temporalis muscle and fascia flap were satisfactory. The findings of this study support the use of temporalis muscle and fascia flap in adult patients with unilateral TMJ ankylosis. Early postoperative initial exercise, physiotherapy, and strict follow-up play an important role in preventing postoperative adhesions. [80]

MATSUURA H, MIYAMOTO H, ISHIMARU J, KURITA K, GOSS AN. (2001) The purpose of this study was to show the effect of partial immobilization of a costochondral graft reconstruction of an ankylosed temporomandibular joint (TMJ) in five adult sheep. Histologically, the grafts were well attached to the mandibular rami in three of four joints. In one joint, the graft showed signs of resorption and a foreign body reaction. We conclude that, if the reconstructed joint is partially immobilized, then there will be a degree of reankylosis. There was also a high failure rate. [47]

MATSUURA H, MIYAMOTO H, OGI N, KURITA K, GOSS AN. (2001) The aim of this study was to demonstrate the functional and anatomical changes after gap arthroplasty release of unilateral temporomandibular joint (TMJ) ankylosis. This study shows that the gap arthroplasty for TMJ ankylosis did not restore the TMJ functionally and histologically to the preexisting state. [46]

MCFADDEN LR, RISHIRAJ B. (2001) states that bony ankylosis of the temporomandibular joint (TMJ) in a male patient was not diagnosed until the patient reached his early teens, at which time the condition was treated with a costochondral graft. However, with the release of the ankylosis and growth of the costochondral graft, a good

functional and esthetic result was achieved without further surgery. It is important that family dentists be aware of the clinical signs and symptoms of TMJ ankylosis, to allow early diagnosis and treatment. [49]

BRIAN L. SCHMIDT, POGREL et al (2001) identified the terminal temporal and zygomatic branches of the facial nerve as they enter the orbicularis oculi muscle and related these branches to identifiable surface markings. [7]

HONG Y, GU X, FENG X, WANG Y. (2002) This article describes the use of autogenous coronoid process grafts for lengthening the ramus in patients with long-standing temporomandibular joint (TMJ) ankylosis and severe mandibular retrognathia. Very satisfactory postsurgical results were obtained in terms of function of the TMJ, the airway, and aesthetics. In children suffering from TMJ ankylosis, the coronoid process can be used for mandibular lengthening. [31]

VALENTINI V, VETRANO S, AGRILLO A, TORRONI A, FABIANI F, IANNETTI G. (2002) Follow-up was performed at 12, 24, and 48 months and 5 years postoperatively.In our opinion the gold standard surgery of TMJ ankylosis today is represented by shaving of articular surfaces and subsequent arthroplasty with or without temporal muscle myofascial flap interposition. [83]

SAEED et al (2002) compared the alloplastic material and autogenous grafts in the reconstruction of temporomandibular joint after ankylosis resection. Found out that patients where autografts were used needed resurgery. [73]

DEVGAN A, SIWACH RC, SANGWAN SS. (2002) evaluated the long term functional results of excision arthroplasty in treatment of temporomandibular joint (TMJ) ankylosis. The results were assessed according to a criteria based on inter-incial month opening, deviation of jaw and complications. They were satisfactory in 29 cases and there were 3 recurrences. Childhood trauma is a major cause of TMJ ankylosis in India. Long term results of excision arthroplasty are satisfactory & comparable to other surgical modalities that are in vogue, provided the patients are operated when young, the ankylosis is in early stage, gap created is adequate and post operative exercise regimen is followed diligently. [17]

EL-HAKIM IE, METWALLI SA. (2002) the objectives of the study to compare the pre-operative clinical and radiographic findings of temporomandibular joint (TMJ) ankylosis with those found at operation and propose new classification. Post-contrast coronal CT was the best imaging modality for planning surgery as it displayed the anatomical

relationship between the ankylosed segment and the surrounding vital structures, particularly where the sphenoid and temporal bones were involved. : Surgical planning should be based on coronal and axial CT. A new classification of TMJ ankylosis based on the CT findings is proposed. [19]

MANGANELLO-SOUZALC,MARIANIPB.(2003) The authors presented a review of 14 patients with temporomandibular joint ankylosis treated between March 1992 and February 1997. Etiology of the ankylosis was trauma in four patients, ear infection in two, systemic infection in one case, congenital in another, and unknown in six. Patients were divided into two groups, according to their age: 16 years and under and over 16 years of age. The basic principle of surgical treatment in both groups is ample access for osseous resection and coronoidectomy. Costochondral grafts were used in group one (nine patients), while interposition of a silicone block, was performed in the second group (five patients). Follow-up evaluations were from twelve to 53 months (average 28.2 months). One case of recurrence occurred in the first group and no recurrences in the second group. The average long-term mouth opening in both groups was32.8mm. [45]

RAJESH P. (2003) mentioned a clinical profile to assess the etiologic factors on TMJ ankylosis, In this study an evaluation of 18 cases according to the age of onset, sex, etiologic factors, sides affected on the face and the type of ankylosis. This article strives to project a relationship between the etiology and clinical presentation of TMJ Ankylosis. [66]

MAJUMDARA, BAINTONR (2004) presented technical note illustrates a simple and effective technique of suturing the interpositional temporalis fascia and muscle flaps in temporomandibular joint surgery. [44]

GUVEN O. (2004) emphasised that treatment of temporomandibular joint ankylosis is a challenge and suffers from a high incidence of recurrence. Although treatment of ankylosis has been tried as early as nearly 200 years ago, no single technique produced satisfactory results. An alternative technique and a modified spacer system are described in this paper. Modified fossa implants were used in all cases. . Postoperative interinsicial opening values were remarkably different from the preoperative ones and the long-term results were satisfactory. [26]

SUMMARY & CONCLUSION

This is a retrospective study in which forty-five patients treated surgically for Temporo Mandibular Joint ankylosis has been evaluated. The age, gender, ankylosis (bony / fibrous), complications (intra/post op), the mouth opening (intra op, immediate post op, 1,6,12 months post op) have been considered.

The following parameters were strictly followed in our group of patients;

1 The joint exposure most commonly was done by using the pre-auricular incision with temporal extension.

1. The ankylotic mass resection was followed by temporalis muscle interposition and coronoidectomy if needed.

2. An intra operative mouth opening of more than 35 mm was achieved.

3. TMJ reconstruction was done using autografts, cortochondral grafts if there is severe reduction in ramal height.

4. Aggressive physiotherapy was started in the first post op itself using wooden spatulas. Great care was taken to educate the patients and their parents regarding the importance of physiotherapy.

5. Adequate motivation given to patient for regular follow-up.

6. Adjunctive orthognathic procedures to restore facial aesthetics.

The only major intraoperative complication encountered was hemorrhage in two patients which was immediately controlled using gauze pack.

The post operative complications observed were facial nerve weakness (8 patients), openbite in 8 cases, post op infection in two cases which was resolved soon.

Recurrence was seen in only 3 patients who had not turned up after 1 month post op review.

The current standard for surgical correction is to operate when the ankylosis is recognized regardless of the age of the patient. All patients were supported with early mobilization and aggressive physiotherapy. Our relapse rate was 6.7 % when compared with 19 % relapse rate in review of 32 cases done by Chidzonga et al.,[10] so the diligence and perseverance of the patients in exercising accounted for retention of mouth opening.

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