Clinical Perspective

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David C. Ash

Michael R. Zetz

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DIAGNOSTIC AND OPERATIVE ARTHROSCOPY OF THE TEMPOROMANDIBULAR JOINT

David C. Ash, D.D.S. and Michael R. Zetz, D.D.S.

In the past, most efforts aimed at treating internal derangement of the temporomandibular joint (TMJ) have involved nonsurgical modalities and/or conventional open surgical procedures (i.e. arthrotomy). Common nonsurgical methods include physical therapy, bite splint appliances, anti-inflammatory medications and patient education regarding potentially destructive habits such as clenching and bruxing. If these methods failed to yield symptomatic and functional improvement, open arthrotomy of the joint was often proposed. These procedures consist of disk repositioning, arthroplasty, meniscectomy with and without implants and other treatments (AAOMS, 1984). The purpose of this article is to describe TMJ arthroscopy: a useful alternative to open surgery for the diagnosis and treatment of intracapsular TMJ pathology.

Arthroscopy of the TMJ was first described in 1975 by Ohnishi (1975). Williams and Laskin (1980) used arthroscopy with rabbit subjects to investigate the diagnostic potential of the procedure. In a detailed study by Murakami and Hoshino (1980), histologic and anatomic features within the TMJ were correlated to arthroscopic examinations in cadavers. In 1985 the first case in the United States of arthroscopy of the TMJ was reported by Burke. Since that time a number of studies have been published indicating the efficacy of arthroscopy in the diagnosis and treatment of intracapsular TMJ pathology (Murakami, 1986; Goss, 1986; Sanders, 1987; Liedberg, 1986).

Anatomy of the temporomandibular joint

The TMJ is divided into two compartments by the meniscus (disk). The superior compartment consists of the glenoid fossa, eminence and superior aspects of the meniscal and retrodiscal tissues. The inferior compartment contains the condyle and inferior aspects of the meniscus and associated retrodiscal tissues.

TMJ Arthroscopic procedure

Arthroscopy has the following advantages over traditional open arthrotomy: It is a less invasive procedure, recovery time is rapid, inpatient hospital care is not required, and scarring is minimal. The basic arthroscopic procedure is carried out under a general anesthetic as an outpatient surgery. The superior compartment or joint space is routinely the only part of the joint examined. The inferior joint space is usually too small for placement of the arthroscope, and most significant pathology occurs in the superior joint space. Exceptions to this are con-

dylar changes including chondromalacia (softening of the cartilage) and arthritic changes. The inferior joint space can be examined through any existing meniscal perforations.

The arthroscope is introduced into the joint via a cannula passed through the skin by a puncture technique. This is usually done in two sites to establish a viewing and working portal. Once the arthroscope is in place the superior joint space is examined.

The examination of the superior joint space usually starts in the posterior recess. The mandible is distracted anteriorly. One should then see the posterior aspect of the fossa and eminence above, the posterior attachment tissues below and the posterior aspect of the meniscus anteriorly as it meets the fossa roof. As the scope is passed anteriorly it usually has to be withdrawn slightly into the lateral recess to visualize the intermediate zone. In this zone the disk appears in intimate contact with the fossa. The arthroscope is then passed anteriorly into the anterior synovial pouch or recess. One can visualize the anterior slope of the articular eminence above, the meniscus below and the anterior and medial capsular wall.

Arthroscopy in Diagnosis

During the superior joint space examination, many different conditions can be identified. Adherence of the disk to the fossa, adhesions and pseudo-wall formation (a thick banded anterior adhesion that holds the meniscus immobile to the eminence) may be encountered. Pseudo wall formation is common in many "closed lock" cases involving significant disk hypomobility. Perforations of the meniscus and integrity of cartilaginous surfaces can be observed and explored with probes. Redundancy, tearing and hyperemia of the posterior attachment can also be observed with any concomitant synovial hyperplasia.

Arthroscopy as a Treatment Procedure

The most efficacious use of the arthroscope as an operative tool is for treatment of closed lock disorders (opening of the jaw is difficult and typically restricted and painful). The vast majority of closed lock conditions occur secondary to a physical limitation of meniscus motion. This can be secondary to the phenomenon of disk stickiness to the fossa as described by Sanders (1987), i.e., the suction cup effect, or due to anterior adhesion of the disk with concomitant pseudowall formation limiting disk translation (Schwartz, 1988). These situations are best treated by lysis (release and/or removal) of adhe-

sions and mobilization of the meniscus under direct visualization. This can be accomplished with either a blunt trocar or probe. Copious lavage of the joint is then carried out with Ringers lactate to remove debris. Areas of synovial hyperplasia can be resected with synovial shavers or biopsy forceps. Inflamed tissues can also be treated with a direct steroid injection into the superior joint space.

Other conditions that can be treated include persistent painful joint clicking, perforation of the meniscus, chondromalacia and mild arthritic changes. The meniscus can be mobilized and lavaged to resolve persistent painful clicking. Perforations can be debrided and smoothed with shavers to allow for smoother condyle to meniscus translation. Areas of chondromalacia can be resected to eliminate joint noise and pain. Mild arthritic changes can be smoothed with abraders and hand files. These conditions are less reliably treated than closed lock disorder, but the success rate is still high.

Post-surgical care and rehabilitation

Post operatively the wounds are closed by a single 5-0 nylon suture and covered with a small bandage. A pressure dressing is then applied to the head for 24 hours and ice is applied. The patient's mandible is immediately mobilized in the recovery room and again on the day following surgery. This is best achieved with active physical therapy. Lateral and protrusive movements are encouraged with only mild emphasis placed on maximal opening during the first week post operative. Maximal mouth opening is pushed after the first week or as soon as patient comfort will allow. All patients are fitted with a post operative muscle relaxation bite splint that is a centric splint with an anteriorly guided occlusion. Habits such as clenching, grinding, nocturnal bruxism and abnormal mandibular positioning should be addressed aggressively as these can cause joint reinjury.

Complications

Complications of this surgery include damage to the external, middle and inner ear, the facial nerve, the surrounding vessels causing hemorrhage and the parotid gland yielding a salivary fistula. Infection may occur but is infrequent.

Report of arthroscopy outcomes for 19 patients

At present we have data from a series of 19 patients treated with arthroscopic surgery for closed lock TMJ conditions. Measurements of maximal interincisal opening were taken preoperatively and over one year after surgery (Table 1). Ten of the patients had bilateral arthroscopies and nine had unilateral arthroscopies (five on left and four on right). All patients' operative procedures included lysis of adhesions, synovial resection where indicated and thorough superior joint space lavage. Steroid medication was also injected into the superior joint space under direct arthroscopic vision. Vigorous physical therapy and bite splint therapy was instituted post operatively. The average maximal interincisal opening preoperatively was 25mm with a range from

17 to 35mm. The average maximal interincisal opening postoperatively was 41mm with a range of 36 to 45mm.

TABLE I

Pt. #	Preop Interincisal opening (mm)	Postop Interincisal opening (mm)	Joints operated Bilateral (B); Right (R); Left (L)
1	34	40	L
2	28	42	B
3	20	44	B
4	30	38	B
5	33	44	B
6	35	42	L
7	28	36	B
8	17	45	B
9	24	40	L
10	20	40	R
11	22	42	B
12	25	37	B
13	30	42	R
14	27	43	B
15	18	41	B
16	20	39	R
17	34	42	R
18	22	41	L
19	20	41	L
MEANS:	25	41	

Emphasis postoperatively is placed on physical therapy for joint mobilization and procedures to eradicate destructive habits. The orofacial myologist can be a valuable resource for some of these patients. When patient education and splint therapy are not sufficient, the orofacial myologist with expertise in behavior management can help the patient eliminate damaging habits and develop a relaxed appropriate oral posture and function conducive to optimum recovery of the TMJ.

In conclusion, arthroscopy of the TMJ appears to be a viable modality for the evaluation and treatment of a myriad of disorders affecting the joint. The most effective use operatively is in the treatment of closed lock conditions although many other disorders can be evaluated and treated.

Address correspondence to:

David C. Ash, D.D.S.
4181 Holiday Street N.W.
Canton, Ohio 44718

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