SCIENTIFIC ARTICLE

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The outcome of arthroscopic treatment of temporomandibular joint arthropathy

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Abstract

Ninety patients underwent arthroscopic temporomandibular joint surgery to 124 joints for arthropathy which had failed to respond to at least six months of non-surgical treatment. They were surveyed at between 6 months and 5 years (mean 2.5 years) after surgery and 63 per cent responded to the survey. They reported an 82 per cent improvement for pain (50 to 100 per cent better), 80 per cent for clicking and 82 per cent for locking. There was no morbidity following the treatment. Arthroscopic surgery should be considered for advanced temporomandibular joint arthropathy which is refractory to non-surgical treatment.

Key words: Temporomandibular joint derangements, arthroscopy, clinical trials.

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Introduction

Temporomandibular joint (TMJ) problems are common and affect at least one third of all adults at some stage in their life.[1]

Diagnostically they can be grouped into the muscle-based group, which is the majority, or those which primarily involve the joint itself.[2] The intra-articular components may be either deranged or degenerated. An internal derangement is an intra-articular mechanical disturbance which interferes with the joint's smooth action.[3] The degree of internal derangement can be classified using the Wilkes staging system, where normal is zero and the most advanced changes are stage 5.[4] This staging system has been further refined by adding imaging[5] and arthroscopic criteria.[6] In advanced stages of internal derangement there are concurrent degenerative changes in the condyle and glenoid fossa.[7]

Psychological factors play a part in both muscular and joint types affecting both the perceived degree of pain and life-interference and also the response to treatment.[8]

Most TMJ symptoms are mild and intermittent and do not require treatment. Patients who do seek treatment usually respond to conservative non-surgical treatment such as reassurance, exercise, physical therapy or bite splints of various types.[9]

There is a small percentage of patients who do not respond to simple non-surgical treatment and the persisting symptoms interfere with the patient's everyday enjoyment of life, including talking and chewing. If specialist radiological investigations demonstrate advanced intra-articular pathosis, then interventional treatment such as open joint surgery (arthrotomy) or minimum interventional surgery (arthroscopy) should be considered.[10]

Arthroscopy allows the oral and maxillofacial surgeon to directly visualize the superior and inferior joint spaces of the TMJ. The technique is similar to that used in orthopaedics for the knee but requires considerably smaller instruments. The technique was first described in 1975 by Ohnishi of Japan.[11] It has subsequently been refined and developed by American,[12,13] Australian,[14] European[15] and Japanese workers.[16,17] Although technically demanding, the technique results in excellent visualization of the joint and allows surgical correction of intra-articular pathosis. Good therapeutic results with low morbidity have been reported.[12,14,16,18]

The indications for arthroscopic surgery are persistent signs and symptoms of intra-articular TMJ pathosis in medically and psychologically fit patients who have failed to respond to effective non-surgical treatment.[10] This paper reports the results of a retrospective review of a consecutive series of patients with intra-articular pathosis treated by arthroscopic surgery.

Materials and methods

The clinical imaging and operative records of all patients who had arthroscopic surgery for TMJ arthropathy by one of the authors (IR) in the period

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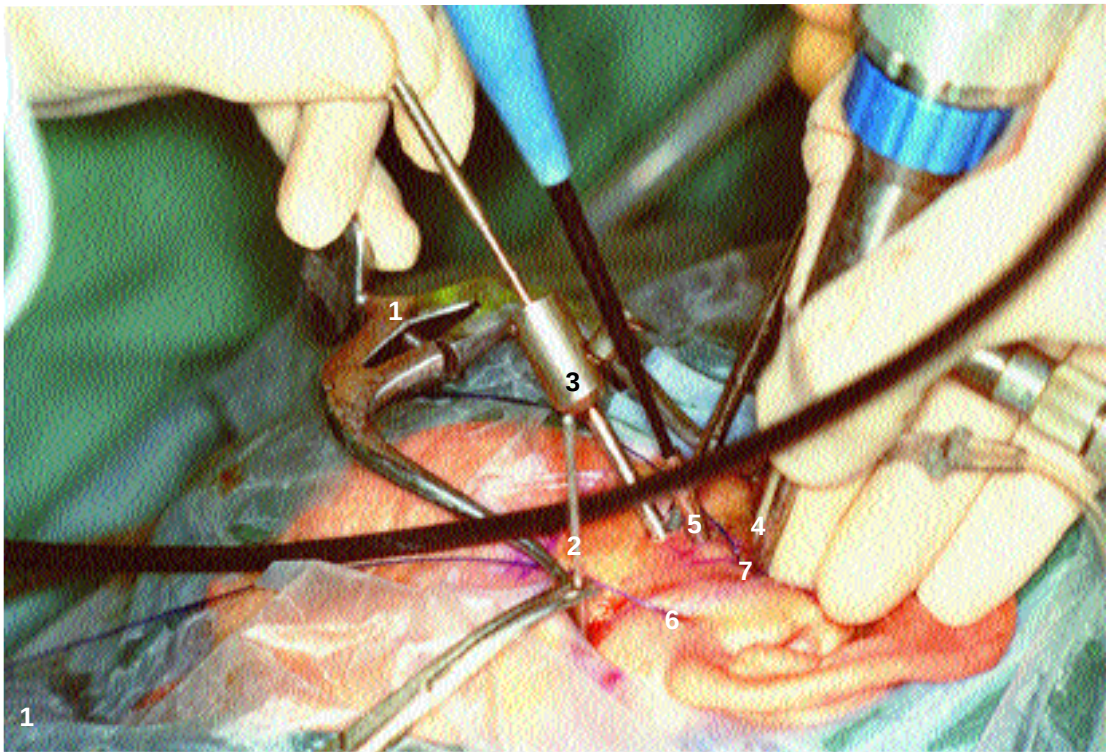

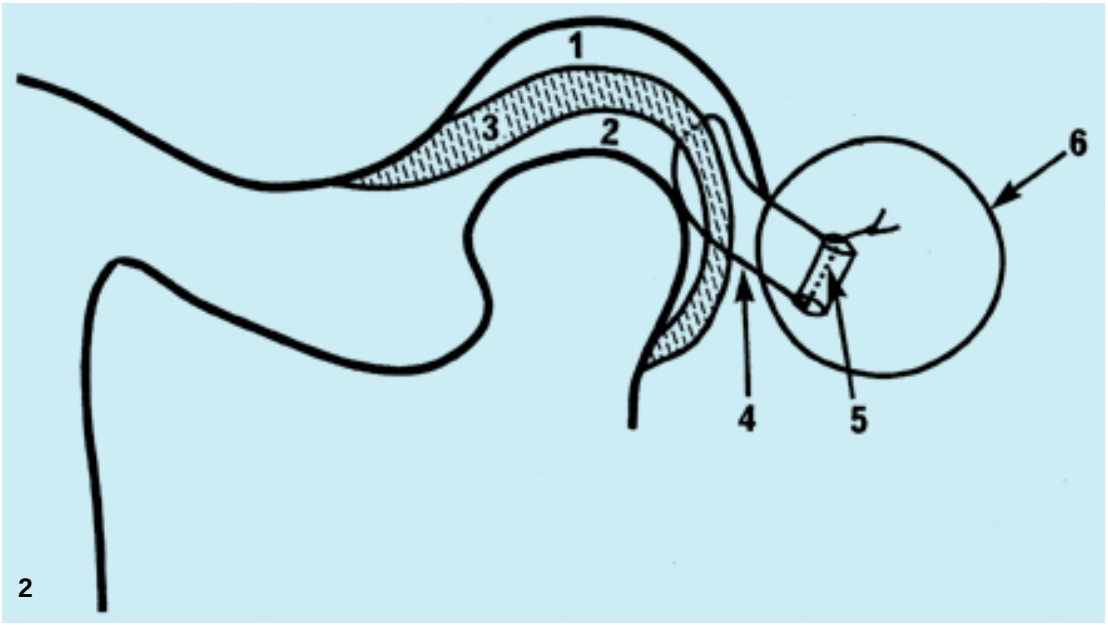

Fig. 1. – Arthroscopic surgery set up: distractor (1), distractor pins (2), anterior portal (3), posterior portal (4), middle puncture entry point for disc manipulation and surgery (5), lower entry point for endaural suture preparation (6), exit point for endaural suture preparation (7).

Fig. 2. – Endaural plication suture: upper joint space (1), lower joint space (2), disc (3), prolene suture (4), yeates drain (5), external auditory meatus (cartilagenous) (6).

1990 to 1994 were reviewed. All of the patients with internal derangements were at least Wilkes Stage III or greater as demonstrated by arthrograms or magnetic resonance images. All had persistent symptoms following at least six months of non-surgical treatment. All fulfilled the International Association of Oral and Maxillofacial Surgeons (IAOMS) criteria for surgical intervention for their TMJ problem.[10]

The arthroscopic surgery followed a standardized protocol. All patients had a general anaesthetic using nasal intubation, full muscle relaxation and hypotension. The TMJ region was surgically prepared and isolated. The arthroscopic surgical technique with modification is described in a previous paper.[19] This is a double portal technique using additional needle entry points to insert a proline endaural plication suture at the junction of the disc and posterior attachment. A needle probe

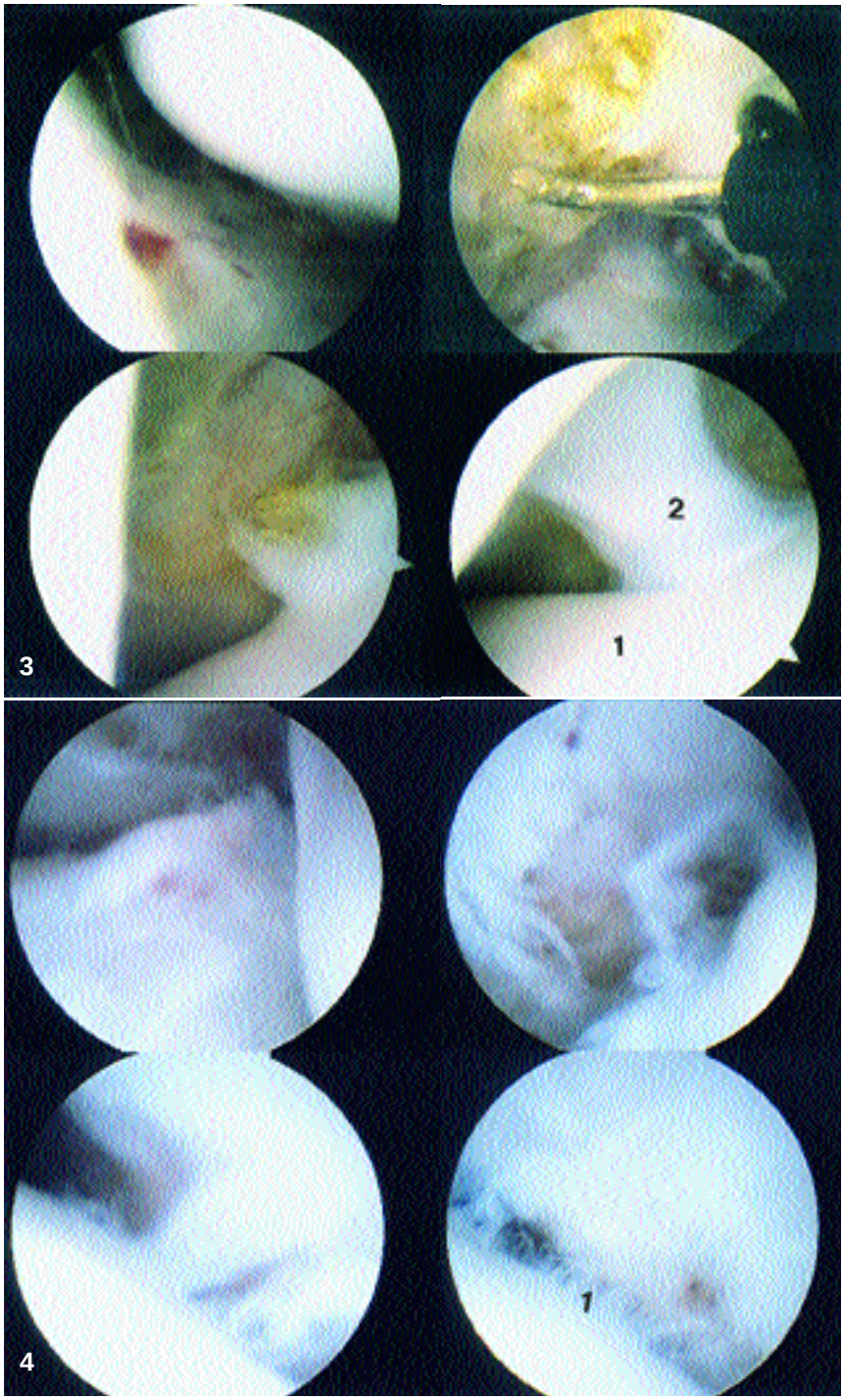

Fig. 3. – Adhesions: disc (1), adhesion (2).
Fig. 4. – Fibrillation (1).

was also inserted to control the disc during the surgical manouevres (Fig. 1, 2).

A videoscope was used with a videocamera. Two video monitors were used to offer good visualization of the procedure to the surgeon and the assistant.

The precise procedure performed depended on the arthroscopic findings. Adhesions and fibrous ankylosis were released (Fig. 3); fibrillation and bony deformities smoothed (Fig. 3, 4); and displaced discs repositioned using cauterization and an endaural suturing technique (Fig. 5, 6). All patients were followed up for a minimum of six months and received additional non-surgical therapy as necessary.

A questionnaire was posted in mid-1995 to the patient's last known address. The questionnaire was designed to determine the patient's current TMJ status and his or her opinion of the benefit received from the arthroscopic procedure.

Results

Ninety patients underwent arthroscopic surgery to 124 TMJs in the 5 year period 1990 to 1994.

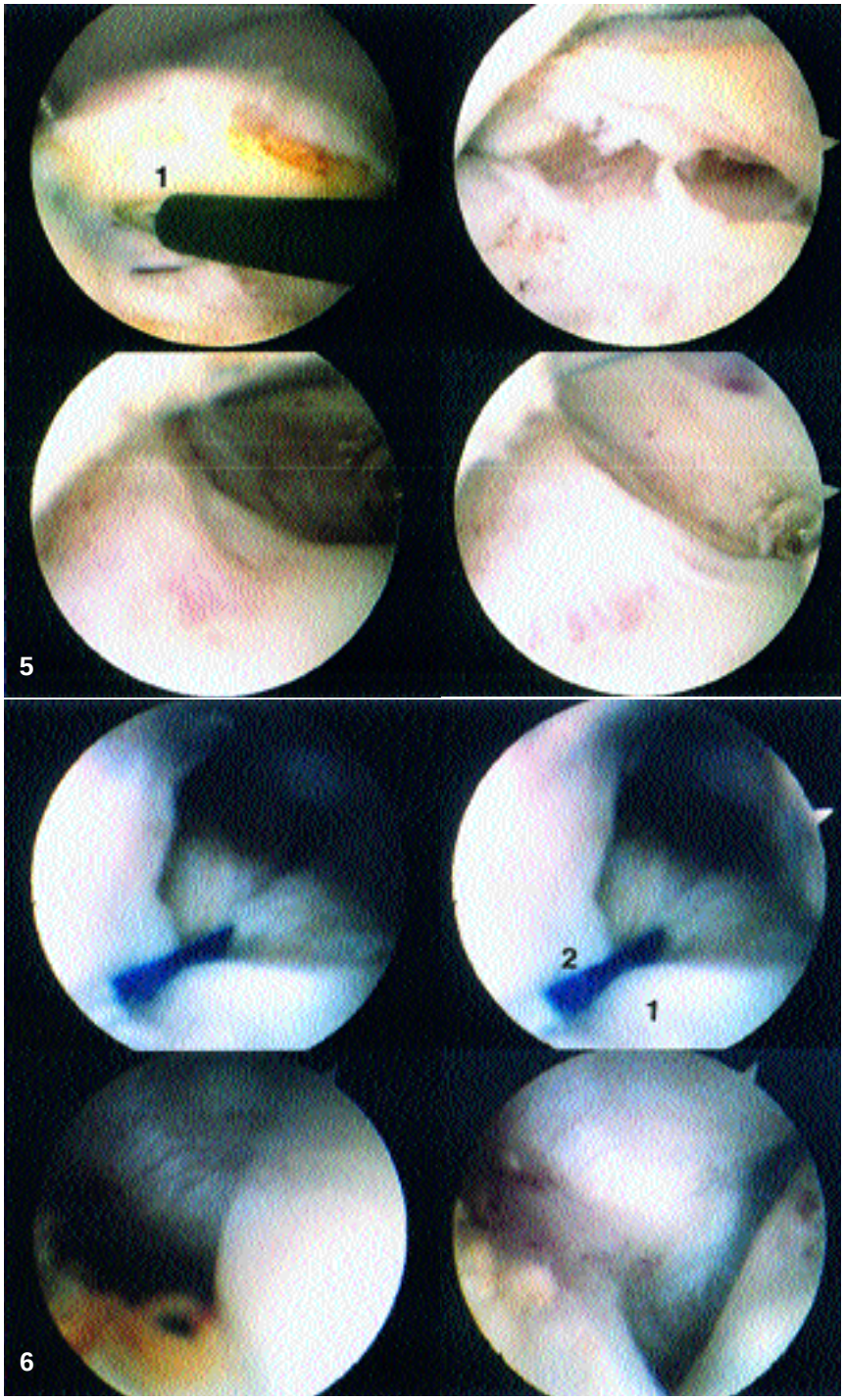

Fig. 5. – Cauterization of posterior attachment and osteoarthritis: posterior attachment (1).
Fig. 6. – Endaural plication suture reducing the disc: disc (1), endaural plication suture (2).

Fifty-seven patients (53 per cent) who had surgery on 77 joints (62 per cent) responded to the postal survey. The patient data are presented in Table 1.

There was no significant difference in age, sex and joint involvement between those who responded to the survey and those who did not.

The pre-operative status of the patients is shown in Table 2. The operative findings are shown in Table 3. Illustrations of pathosis found are shown in Fig. 3, 4, 5. The type of post arthroscopic non-surgical treatment is presented in Table 4. The current TMJ symptomatology as reported by the patient is presented in Table 5.

The patient's opinion as to the benefit obtained from the arthroscopic procedure is presented in Table 6. Eighty-two per cent (82.3 per cent) of patients with pain reported 50 per cent to 100 per cent improvement in pain, whereas 80 per cent (79.8 per cent) and 82 per cent (82.0 per cent) of patients reported over 50 per cent improvement in clicking and locking respectively.

Table 1. Patient data

Patients	57 total 10 male 47 female
Age	33 years (mean) 16-63 years (range)
Joints	78 total 39 right 39 left 21 bilateral
Follow-up	2.5 years (mean) 0.5-5 years (range)
Post trauma	19%

Table 2. Pre-operative status

Pain	100%
Clicking	100%
Locking	100%
Opening	32 mm (mean) 10-50 (range)

Table 3. Arthroscopic findings

	n	%
Disc displacement	72	92
Adhesions	30	38
Synovitis	30	38
Fibrillation	14	18
Fibrous ankylosis	3	4
Disc perforation	3	4
Osteoarthritis	2	3
Haematoma	1	1
Loose bodies	1	1

Some patients had multiple findings.

Table 4. Additional postoperative treatment

	n	%
Nil	11	14
Bite splint	46	59
Ultrasound	12	15
Laser	10	13
Physiotherapy	9	12

Some patients received more than one form of treatment.

The results in terms of temporomandibular joint internal derangement staging are shown in Tables 7 and 8.

Discussion

This study shows that arthroscopic surgery resulted in substantial symptomatic relief of symptoms in a group of patients who failed to respond to conventional non-surgical treatment. There was no anaesthetic or surgical morbidity from the procedure. The results were similar to that previously reported for arthroscopic surgery.[12,17]

The study design was a retrospective review of contemporaneously recorded pre-operative and operative data. This does not follow the ideal criteria for TMJ surgery studies.[20] It does, however, closely identify patient, not surgeon, satisfaction. For symptomatic conditions such as patient TMJ pain, clicking and locking, patient satisfaction is the real key determinant of outcome. The response rate to the survey was moderate and reflects the usual response to a single-mailing postal survey. Urban Australia has a high incidence of people changing address, with some 20 per cent moving every five years. The non-responding group to the postal survey was, however, similar in patient demographics and perioperative data. Hence there is no reason to suspect a positive or negative bias.

Arthroscopy, by providing a means of direct visualization of the joint space, has revolutionized concepts of joint pathosis. In particular, the presence of adhesions between the disc and joint surfaces was unsuspected from anatomical and imaging studies. The adhesions, although often fine, are quite firm and hold the disc in its displaced position. Once established, intra-articular adhesions will not allow disc repositioning by extra-articular means such as occlusal appliances.[21] The genesis of intra-articular adhesions is from the inflammatory process and

Table 5. Patient reported residual symptoms at final review, 2.5 years mean (0.5-5 years range) post-arthroscopy

	Nil		Mild		Moderate		Severe	
	n	%	n	%	n	%	n	%
Pain	52	67	19	24	6	8	0	0
Clicking	18	23	28	36	25	32	6	8
Locking	52	67	0	0	20	26	5	6

Movement: mean 31 mm, range 18-50 mm.
n=number of joints.

Table 6. Patient opinion of the improvement gained from arthroscopic surgery

Improvement	Nil		25%		50%		75%		100%	
	n	%	n	%	n	%	n	%	n	%
Pain	6	11	4	7	5	9	19	33	23	40
Clicking	8	14	4	7	10	18	18	32	17	30
Locking	3	5	6	11	8	14	3	5	36	63

n=number of patients.

Table 7. Stages of internal derangement

I	Early
II	Early intermediate
III	Intermediate
IV	Intermediate late
V	Late

Table 8. Post-operation result classification (stages of internal derangement)

		N	%
I	Early	43	55.6
II	Early intermediate	23	29.4
III	Intermediate	10	12.5
IV	Intermediate late	2	2.5
V	Late	0	0

either micro- or macro-trauma.[22] Nineteen per cent of patients in this series had macro-trauma. Arthroscopic treatment should be considered as a step in treating refractory temporomandibular joint problems. It is important that effective non-surgical treatment is not only tried first, but continued after surgery to minimize recurrence.

The arthroscopic surgery in this series was based on the philosophy of returning the joint anatomy and function to as near normal as possible. The adhesions were released, foreign bodies removed, irregularities smoothed and displaced discs repositioned.

The matter of repositioning displaced discs has recently become the subject of debate.[22] When the patient treatment reported in this study was commenced, abnormal disc position was considered a major factor in ongoing pain and locking. However, more recent studies where the disc was not in position have shown equivalent results.[13] Indeed, the additional manipulation required to reposition the disc may account for the still quite limited range of mouth opening found in this study. Disc mobility is reduced by cauterization and the endaural suture. Maximal opening, however, should not be constituted as the only criterion of successful treatment. Mouth opening must be considered with other criteria of improvement to assess success of treatment.

Not all patients benefited, with 32 per cent of joints remaining with mild/moderate pain and 6 per cent of joints with unremitting closed lock. Similar low rates of non-responsiveness are reported with most surgical series.[23] For such patients careful re-evaluation is required. Ongoing management is necessary and may be by acceptance of the symptoms, as TMJ is not a life-threatening condition, by chronic pain management or by arthrotomy.

Overall, most patients reported good relief of symptoms, so arthroscopic surgery should be considered as a treatment option for TMJ arthropathy which fails to respond to conventional treatment.

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