

## A 5 Year Retrospective Study on the Clinical Outcomes of Performing Arthrocentesis in Basildon Hospital

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### Abstract

**Aim:** We would like to raise awareness and educate the General Dental Practitioner (GDP) about the positive effects arthrocentesis has on patients where non-surgical treatment has failed. We would like to assess the success rates in performing this surgery in our department and compare the figures against the literature.

**Method:** A list of 67 patients who underwent arthrocentesis in the last 5 years was compiled. A comparison of pain scores and inter-incisal opening was made before and after treatment to see if there was any improvement.

**Results:** An 82% success rate of patients (55/67) who had arthrocentesis in the last 5 years noticed a significant improvement in symptoms and mouth opening.

**Conclusion:** There is a high success rate for arthrocentesis in our department when compared against the literature. We will continue the audit as a prospective study to increase the cohort of patients. Dentists should be aware of what arthrocentesis is, know the success rates and reassure their patients who may have this treatment in the future.

**Keywords:** Arthrocentesis; Maxillofacial Surgery; Temperomandibular Joint; Arthroscopy

**Abbreviations:** TMJDS: Temperomandibular Joint Dysfunction Syndrome; NSAIDs: Non Steroidal Anti-Inflammatory Drugs; GDP: General Dental Practitioner; VAS: Visual Analog Scale for Pain

### Introduction

TMJDS presents commonly in Oral & Maxillofacial departments across the United Kingdom on a daily basis. Managing patients with this condition can be challenging especially when non-surgical treatments have failed. First and second line treatments may include jaw exercises, intense physiotherapy, and bite raising appliances, soft diet, NSAIDs and anti-depressant medication. These conservative methods prove to be hugely successful as only 5% of all TMJ disorders are actively operated on [1].

Arthrocentesis is the first line of surgical intervention for patients suffering from internal derangement of the TMJ, especially closed lock [2]. Treatment aims to release the articular disc and remove adhesions between the disc surface and mandibular fossa via hydraulic pressure [3]. The physical action of lavage helps remove inflammatory mediators including cytokines and interleukins which contribute to chronic pain [1]. Intra-articular medication (corticosteroids or morphine) can be injected immediately after the procedure which provides further therapeutic effects [4].

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Complication	Comment
Vascular Injury	The distribution of vascular structures increases the risk of haemorrhage. The superficial temporal artery is most at risk. Bleeding may be prevented by wound suturing and/or pressure. If this fails then open exploration is warranted.
Facial muscles weakness	Needle insertion may come within close proximity of the temporal branch of the facial nerve. Injury rates can be up to 1% which causes an eyebrow lag and weakness in the obicularis oculi preventing eye closure.
Otologic complications	The literature has reported ear drum perforations due to the ear being in close proximity to the TMJ. Surgeons must maintain proper horizontal patient head position and close attention to landmarks.
Inferior alveolar & lingual nerve injuries	Nerve injury can result from extravasation of fluid during lavage resulting in a numb lip, chin & tongue.
Facial Scarring	The extra-oral insertion of needles may cause facial scarring.

**Figure 1:** A table highlighting common complications associated with arthrocentesis [11].

Should arthrocentesis prove unsuccessful, it may be followed by further surgical interventions such as meniscectomy, disc repositioning, and condylotomy [5]. These surgical procedures are aggressive, invasive and may even lead to more serious symptoms and/or complications. As a result Arthrocentesis has become the most popular first line of surgical intervention [1]. Dentists need to be aware of this procedure and its advantages including its low expense, the treatment being minimally invasive and with minimal complications [6].

Our objectives are to carry out an audit in Basildon University Hospital's Oral & Maxillofacial department to determine the success rate of arthrocentesis in the past 5 years under Oral & Maxillofacial surgeon, Mr. Jamal Siddiqi. As it is the first time we have done an audit in this area, we would like to find and correct any deficiencies to optimise success rates. The article should be informative and educate GDP's who have had minimal experience with surgical intervention in the management of TMJDS.

## Methods

The IT department at Basildon Hospital were contacted and able to compile a list of patients who underwent arthrocentesis in the past 5 years (2010-2015). In total, 67 patients were included in this study and all were under the care of Mr. Siddiqi. The notes for the patients were evaluated with particular interest in the pain scores and inter-incisal distance which were documented in the notes. Success of treatment in this study was defined as an improvement in pain scores/symptoms and an increase in inter-incisal mouth opening.

Pain was measured on a VAS of 1 to 10 prior to the procedure, 1 being no pain and 10 being excruciating pain [7]. The inter-incisal distances were measured in millimetres and using a ruler. These figures were compared before and after surgery to determine whether successful treatment had been accomplished.

Criteria for patient selection included:

- Those who had failed to respond to conservative management.
- Where pain scores and inter-incisal recordings were documented in the notes before and after surgery.
- Surgery performed by Mr. Siddiqi Only.

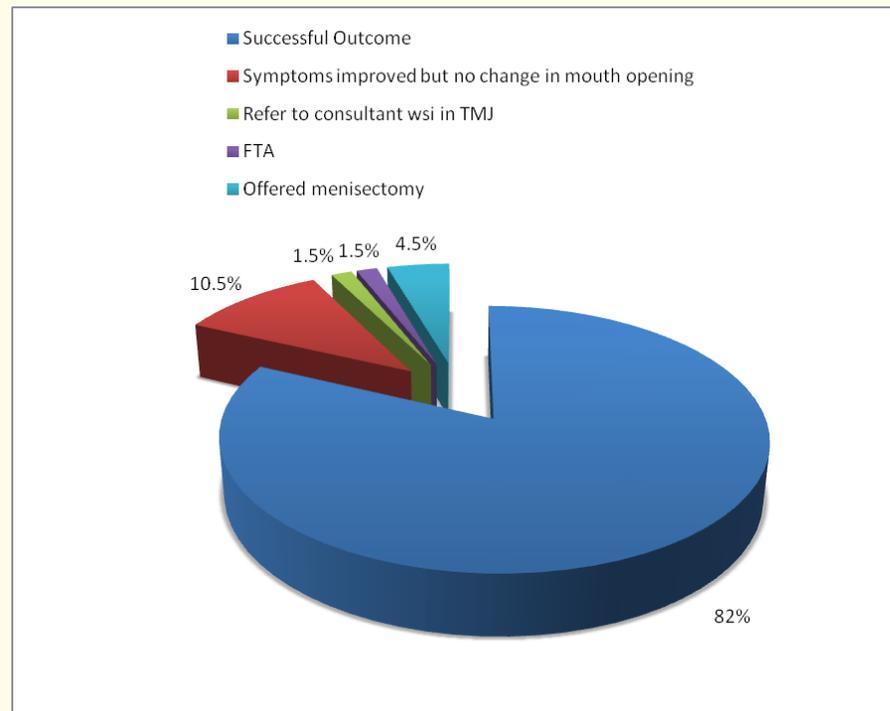
## Technique for Arthrocentesis [7]

All patients were consented for arthrocentesis under general anaesthetic at Basildon Hospital. Although not practised in our department, the procedure can be carried out under local anaesthetic.

- The head is turned towards the unaffected side to provide an easy approach to the affected side.
- The site is scrubbed with betadine solution and draped. The external auditory meatus is blocked with cotton wool.
- The posterior entrance point is located along the canthotragal line 10mm from the middle of the tragus and 2mm below it for an 18 gauge needle to enter the superior compartment at the articular fossa.

- d. An anterior entrance point is located 10mm farther and 2mm below the posterior entrance point in the area of the articular eminence to enable the free flow of physiological saline during the irrigation/lavage process.
- e. The mandible is moved through opening, excursive and protrusive movements to facilitate lyses of adhesions
- f. At the end of the procedure, an intra-articular long lasting corticosteroid (Kenalog 40 mg) is injected.
- g. The patient will be recalled at 1, 3 & 6 month intervals.

### Results



**Figure 2:** A Pie Chart highlighting the Success & Failures of Arthrocentesis.

The pie chart highlights:

- a. 55/67 patients (82%) had an improvement in pain scores as well as an increase in inter-incisal mouth opening.
- b. 12/67 (18%) patients had unsuccessful treatment which has been broken down into further components.
- c. 7/12 patients (10.5%) had improved symptoms but with no change in mouth opening.
- d. 1/12 (1.5%) failed to attend any further consultations after surgery.
- e. 1/12 (1.5%) was referred to another consultant in the United Kingdom with a special interest in TMJ for advice and further treatment.
- f. 3/12 (4.5%) of patients were offered a meniscectomy. 1/3 patients accepted this treatment who noticed an improvement in mouth opening and pain scores.

### Discussion

There have been many studies over the last 30 years which have looked at success rates of arthrocentesis. In order to make a judgement about the quality of our clinical outcomes, the literature must be reviewed. Murakami, *et al.* [8] carried out a 10 year study of 37 patients who underwent arthrocentesis between (1986-1990). The mean VAS reduced from 5.15 to 0.34 and only 3/37 had limited mouth opening compared to 36/37 pre-operatively. The success rate was 83.8% [8].

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AUTHOR (year)	N Joints	N patients	MOO PRE	MOO POST	VAS PRE	VAS POST	SUCCESS RATE (%)
Nitzan y cols.(1991)(11)	17	17	24,1	42,7	8,75	2,31	91
Nitzan (1994)(10)	29	29	25,3	44,6	-	-	96,5
Murakami y cols. (1995)(14)	20	20	30,6	42,5	5,7	1,2	70
Hosaka y cols.(1996)(18)	20	20	30,6	44,5	5,7	0,6	78,9
Friedrich y cols. (1996)(19)	6	5	-	-	-	-	100
Ness y Crawford (1996)(15)	19	15	14,9	43,9	-	-	64
Nitzan y cols. (1997)(20)	40	39	23,1	44,3	9,24	1,45	95
Emshoff y cols. (2000)(21)	15	15	26,4	33,7	-	-	60
Carvajal y Laskin (2000)(6)	32	22	25,3	37,6	8,45	1,77	91
Alpaslan y Alpaslan (2001)(12)	22	15	24	31,1	7,5	2,0	100
Nishimura y cols. (2001)(22)	103	100	32,9	42,9	-	-	71
Yura y cols. (2003)(17)	6	6	34,3	39,5	-	-	80
Emshoff y y cols. (2003)(23)	38	38	24,2	33,5	-	-	63,2
Emshoff y Rudisch (2004)(24)	29	29	24,6	33,1	-	-	82,8
Fernández Sanromán (2004)(16)	8	8	24	41	10	2	100
Yura y Totsuka (2005)(25)	65	65	28,6	38,4	5,86	2,15	97
Emshoff y cols. (2006)(26)	28	28	27,3	40,3	-	-	78,6
Kaneyama y cols. (2006)(13)	14	14	26,4	44,4	-	-	64
Guarda- Nardini y cols.(2007)(27)	25	25	36,8	40,7	4,4	2,6	84
Manfredini y cols. (2009)(28)	76	76	37,9	40,9	3,9	2,2	-
<b>TOTAL</b>	<b>612</b>	<b>586</b>					<b>83,5</b>

**Figure 3:** A table summarising the clinical results of arthrocentesis from 1991-2009 [5].

Carvajal, *et al.* [9] did a 4 year follow up involving 26 patients. Post arthrocentesis, there was a mean improvement of mouth opening by 18 mm. 54% of patients no longer experienced pain and the remaining portion had less pain then before arthrocentesis. 23/26 of patients were completely satisfied with treatment giving a success rate of 88%.

Florencio and Nitzan [3] produced a comprehensive table (Figure 3) of clinical outcomes of arthrocentesis spanning 18 years (1991-2009) and involving 586 patients. The mean success rate is 83.5%.

Name: \_\_\_\_\_ Address: \_\_\_\_\_  
 D.O.B: \_\_\_\_\_ Hospital Number: \_\_\_\_\_  
 Gender: \_\_\_\_\_ NHS Number: \_\_\_\_\_

Patient's Complaint & History of Complaint:

Relevant Medical History:

Social History:

Family History:

Past Dental History:

Pain Scores before Arthrocentesis - /10  
 Mouth Opening before Arthrocentesis - mm

What 1<sup>st</sup> & 2<sup>nd</sup> line treatment has the patient had to help with symptoms? *Please Circle*  
**Analgesia (NSAIDS) Mouth guard Jaw exercises Physiotherapy Soft Diet Anti-depressants**

Were there any improvements in Pain scores & Mouth opening after 1<sup>st</sup> & 2<sup>nd</sup> line treatments?

Pain Scores after 1<sup>st</sup> & 2<sup>nd</sup> line Treatment - /10  
 Mouth Opening after 1<sup>st</sup> & 2<sup>nd</sup> line treatment - mm

Did the patient find any of these 1<sup>st</sup> & 2<sup>nd</sup> line treatments useful?

**6 Weeks** Pain Scores after Arthrocentesis - /10  
 Mouth Opening after Arthrocentesis - mm

**6 Months** Pain Scores after Arthrocentesis - /10  
 Mouth Opening after Arthrocentesis - mm

**3 Months** Pain Scores after Arthrocentesis - /10  
 Mouth Opening after Arthrocentesis - mm

**1 Year** Pain Scores after Arthrocentesis - /10  
 Mouth Opening after Arthrocentesis - mm

Is the patient pleased with the post-operative results and would they recommend Arthrocentesis?

Figure 4: Basildon Hospital's TMJDS Proforma.

The use of intra-articular medication is a discussion of hot debate. Morphine can be used with good clinical effects suggesting opiate receptors may be present within joints. Long acting local anaesthetic such as bupivacaine has also shown therapeutic benefits [4].

In unpublished data by Ilankovan [1], 10 patients were injected with intra-articular morphine (10 mg), fentanyl (25 µg in 1 ml), bupivacaine (1 ml of 0.5% solution) and normal saline (1 ml). Bupivacaine and fentanyl had pain relieving effects for only 8 to 12 hours, saline had no analgesic effects and morphine was most effective, relieving pain for several days or weeks.

Basildon Hospital uses corticosteroids which have shown long term analgesic benefits. Samiee., *et al.* [10] assessed their effectiveness with 17 patients. They have shown an improvement in mouth opening by a mean of 10 mm.

The literature demonstrates that morphine and corticosteroids especially have good therapeutic effects and it is the preference of the surgeon on which drug is used. This may open the door of initiating a randomised controlled trial and compare the medical efficacy of various intra-articular medicaments.

The audit has not only expressed a positive outcome in treatment but has demonstrated some deficiencies that must be approached to ensure results are recorded over a longer period of time and involve a larger cohort of patients. The study has documented patient's symptoms and mouth opening 6 weeks post operatively only. Although patients were followed up at 3, 6 and 12 months, it will be beneficial to record our findings in future TMJDS audits in our department at these follow up stages.

The patient list compiled by the I.T department had initially 80 patients. After evaluating each patient's notes, 13 of these patient notes either had no VAS and/or inter-incisal opening measurements pre or post surgery. Therefore, based on the criteria for patient selection, we were unable to incorporate those patients in the audit. Although this demonstrates an obvious disadvantage in retrospective studies, our department have now produced a TMJDS proforma (Figure 4) ensuring all relevant information is available for prospective patients.

### Conclusion

- a. There is a high success rate in the clinical outcomes in performing arthrocentesis in Basildon hospital when compared against the literature.
- b. The audit will continue as a rolling audit to become a prospective study. This will allow for a large cohort of patients to be investigated over a longer period of time.
- c. We have only measured post operative VAS and inter-incisal openings 6 weeks after surgery. For more in-depth results, we need to record and include our findings at 3, 6 and 12 months.
- d. The formulation of a TMJDS proforma will ensure all relevant details about the patient and their condition is recorded to avoid any discrepancies. This is also important from a medico-legal stand point.
- e. This audit can lead to further investigations in the use of intra-articular medication. Randomised controlled trials may test the efficacy of such drugs to decide upon optimal treatment that is in the best interest for patients.

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