

Usage of Ringer's Lactate Treatment in Temporomandibular Joint Disorder

VIJAY EBENEZER, R. BALAKRISHNAN, M. VIVEK and M. ELUMALAI*

Department of Oral and Maxillofacial Surgery, Sree Balaji Dental College & Hospital, Bharath University, Chennai - 600 100, India.

*Department of Pharmacology, Sree Balaji Dental College and Hospital, Bharath University, Chennai - 600 100, India.

*Corresponding author E-mail: m_elumalai@hotmail.com

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ABSTRACT

The aim of this paper was to review the efficacy of Ringer's lactate solution in treatment of Temporomandibular joint (TMJ) disorder, especially those with closed lock. Arthrocentesis is a simple and minimally invasive procedure in treating patients with this disorder who failed to respond to conservative measures. Ringer's lactate solution under sufficient pressure is used to wash out the joint inflammatory cells and to release the stuck disc phenomenon. This has been a boon for both the patient and the clinician in treating this disorder. It is cost effective and safe with minimal morbidity. This review paper has been described about Ringer's Lactate in treatment of TMJ disorder.

Key words: Arthrocentesis, Ringer's Lactate, Temporomandibular Joint disorder, Closed Lock.

INTRODUCTION

The temporomandibular joint is a movable diarthroid synovial joint which is formed by mandibular condyle and temporal bone. The joint space is divided into two compartments by articular disc. The upper compartment allows translation of the condyle. The lower compartment allows rotation movement of the jaw around its axis, through both the condylar heads – a hinge joint. Various etiology have been described for the TMJ disorders, posing a challenge to the clinicians treating them. The treatment modalities ranging from non-surgical to surgical interventions have been advocated for variety of diseases. The important progress in the treatment of TMJ disorder is the use of arthroscopy. Arthroscopy is found useful for both diagnostic purpose and therapeutic procedures by the use of TMJ arthroscopic lysis and lavage.¹

Arthrocentesis is a simple and cheapest alternative to arthroscopic surgery^{2,3}. This procedure

can easily be done in outpatient under Local Anesthetic without using any arthroscope. This technique is very specialized and patients have a very good and quick recovery phase. Brennan (2006) advocated that the use of intra articular morphine injection with arthrocentesis have given good results. Ercument Onder (2009) have conclude that long term cure using arthrocentesis was found to be useful. The idea is to wash out the joint inflammatory cells in the jaw joint which causes the pain & restricted jaw⁶. Steroids may also be instilled into the jaw joint depending on the severity of the condition.

Arthrocentesis is a simple and a specialized technique using sterile needles and sterile irrigants to carry out the joint wash out. Ringer's lactate is one of the irrigants used for this purpose. Since Ringer's lactate is comparatively closer to human serum it is preferred to other irrigants used for this purpose. The patients with TMJ disorders present with sudden onset of pain in

TMJ region, presence or absence of clicking with jaw movements, limited jaw movements because of pain associated with temporomandibular joint.

DISCUSSION

The use of Ringer's Lactate in arthroscopic lysis and lavage of the superior joint space in reestablishing the normal jaw function has gained much recognition in recent times and it is thought that the concept of arthrocentesis evolved from these procedures. This mode of treatment has shown remarkable success rate despite not using major surgical interventions. This minimally invasive surgical procedure has gained much recognition in the recent times. Murakami *et al.*, (1995),⁷ while being the first to document a systematic description of the procedure, also reported a high success rate in treating patients with temporomandibular joint disorders using this procedure.

Nitzan *et al.*,² (1991) described this as a simplified form of arthroscopic lavage and lysis of the joint. The studies conducted by Nitzan *et al.*, (1991)² and ⁸Frost, (1999) showed a success rate of 91% in 17 cases while Forst *et al.*, suggested that this procedure is safe with minimal complications. The procedure proved reliable in patients with acute TMJ locking, others with chronic or osteoarthritic cases as well as patients with a history of jaw joint surgeries, did not show such satisfactory results.

Ohisini¹, (1975) described the use of the arthroscopy of the TMJ disorder. Since then various

modifications and improvement in the techniques have refined the treatment of the TMJ disorders. ⁹Hosaka *et al.*, (1996) have reported 78.9% success rate with arthrocentesis in patients with painful closed lock of TMJ while Murakami *et al.*, in 1995 have reported a 70% success rate in their study. ¹⁰Dimitroulis *et al.*, (1995) also have reported a significant improvement in such patients.

Internal derangement of Temporomandibular Joint varies from, clicking accompanied with normal mouth opening to clicking with restricted mouth opening (closed lock).

Nitzan¹¹, (1994) has reported that arthrocentesis is a turning point in treating TMJ disorders. He attributes the success of the procedure to arthroscopic lysis and lavage and hydraulic pressure used in the upper joint compartment. This procedure was found to be highly effective in restoring the normal jaw function and maximum mouth opening. ¹Ohisini, (1975) have suggested that the effectiveness of this approach was due to release of the trapped, anteriorly displaced disc by the basic arthroscopic instrumentation, thereby enabling its repositioning.

Changes in the upper joint compartment may be a causative factor in limitations in condylar movements, which causes this closed lock¹¹⁻¹³. This restriction in translation of the upper joint space may just be secondary to articular surface disturbances itself. Although a variety of TMJ disorders can be treated with the arthrocentesis, documented data is mostly available in favor of closed lock¹².

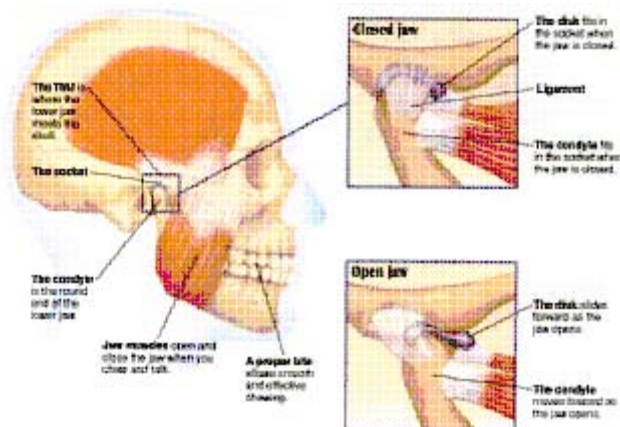


Fig. 1: Showing TMJ Closed Lock

Alkan¹⁴ and Etoz (2010) and ¹⁵Al Belsay (2007) described that the insertion of needles for arthrocentesis is similar to arthroscopic procedure. The posterior extent of the joint space is marked 10mm forward and 2 mm down from the tragus canthal line, whereas the anterior extent is marked 10mm further forward and 10mm down from this line. Sterile irrigation solution like ringer's lactate, normal saline or hartmann's solution is used for this purpose^{16,17}. The composition of the solution has no effect in influencing the result of the procedure. The idea of this procedure is to distend the joint and cause lavage without altering the structure or position of the disc. Release of the negative forces, reduction in the surface friction and release of the stuck disc phenomenon also, have been attributed to the possible correction of the jaw joint disorder.

Christopher schott¹⁸ (2010) has been reported Ringer's Lactate is isotonic with blood and generally used for intravenous administration. It grouped under Crystalloids. The osmolarity is 273mOsm/L. The solution contains calcium chloride , potassium chloride sodium chloride and sodium lactate

(NaCl -Sodium Chloride, SL - Sodium Lactate, KCl - Potassium Chloride, CaCl- Calcium Chloride, Na - Sodium, K - Potassium, Ca - calcium, Cl - Chloride, Lact- Lactate, LA. Lactated, RL. Ringer's Lactate, IUSP. Injection USP)

Since Ringer's lactate in comparison to other irrigants is close to Human serum so, it is considered to be better tolerated by the tissues¹⁶.¹⁹Howard A Israle, (1999) has reported that both

Table 1: Comparison of irrigants to human serum

Parameters	Human serum (0.9%)NaCl	Ringer's lactate	Albumin%
Na ⁺ (mmol/l)	154	131	140
K ⁺ (mmol/l)	-	5	-
Ca ₂ ⁺ (mmol/l)	-	2	-
Cl ⁻ (mmol/l)	154	111	128
HCO ₃ ⁻ (mmol/l)	-	29	-
Albumin (g/l)	-	-	50g/l
Na ⁺ / Cl ⁻ ratio	1:1	1.8: 1	1.09:1
pH	5.4	6	-
Osmolality (mOsm/kg)	308	276	265

Table 2: Showing Ringer's Lactate Composition and Ionic Composition

	Size (ml)	Composition (g/L)			Ionic Concentration/MEQ/L					Caloric con (KCAL/L)			
		NaCl	SL	kcl	Cacl	OS	pH	Na ⁺	K ⁺	Ca2 ⁺	Cl ⁻	Lact	
LA	25	6	3.1	0.3	0.2	273	6.5	130	4	2.7	109	28	9
	0					(6 to 7.5)							
RL	50												
	0												
IUSP	10												
	00												

(NaCl -Sodium Chloride, SL - Sodium Lactate, KCl - Potassium Chloride, CaCl- Calcium Chloride, Na - Sodium, K - Potassium, Ca - calcium, Cl - Chloride, Lact- Lactate, LA. Lactated, RL. Ringer's Lactate, IUSP. Injection USP)

procedures have shown to be effective in reducing the pain and improving the mandibular movements in patients with intra articular pathological conditions.

Efficacy of the arthroscopic lysis and lavage has been described by Holmlund *et al.*, (1994)²⁰. All the patients showed a significant improvement in the Maximum Mouth Opening (MMO) after the procedure. The overall success rate with MMO and the chewing ability has shown a remarkable improvement. Arthrocentesis is aimed at reducing the symptoms by removing the inflammatory cells by joint wash out²¹. Thereby allowing the normal cellular inflow and expediting joint repair.

CONCLUSION

The improvement in chewing ability and clicking of the joint post procedurally has given remarkable results. We therefore conclude that arthrocentesis is helpful for those who fail to respond to the conservative treatment. There is a clear improvement in the mouth opening and pain score which encourages us to offer this treatment to the patients. Based on our review. Arthrocentesis of TMJ with Ringer's lactate is easy, cost effective and less invasive procedure with minimal morbidity. This can be offered safely and effectively before doing more invasive procedures.

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