Acta Scientific Orthopaedics

Volume 1 Issue 1 October 2018

Mini Review

Double Lumen Single Barrel Needle Customization and Fluid Dynamics for Single Puncture Temporomandibular Joint Arthrocentesis

Darpan Bhargava[1], Shaji Thomas[2], Pratiksha Pawar[3]* and Pankaj Pathak[4]

[1]*Associate Professor, Oral and Maxillofacial Surgery, People's College of Dental Sciences and Research Centre, People's University, Bhopal, Madhya Pradesh, India*

[2]*Professor and HOD, Oral and Maxillofacial Surgery, Dean, People's College of Dental Sciences and Research Centre, People's University, Bhopal, Madhya Pradesh, India*

[3]*Resident, Oral and Maxillofacial Surgery, People's College of Dental Sciences and Research Centre, People's University, Bhopal, Madhya Pradesh, India*

[4]*Senior Lecturer, Oral and Maxillofacial Surgery, People's College of Dental Sciences and Research Centre, People's University, Bhopal, Madhya Pradesh, India*

***Corresponding Author:** Pratiksha Pawar, Resident, Oral and Maxillofacial Surgery, People's College of Dental Sciences and Research Centre, People's University, Bhopal, Madhya Pradesh, India.

Received: May 08, 2018; **Published**: September 25, 2018

Abstract

Temporomandibular joint (TMJ) disc derangement is the malpositioning of the articular disc relative to the condyle and eminence, where joint lavage may be utilized for treating such patients when symptomatic. Arthrocentesis of the TMJ is a minimally invasive chair side and has been documented to relieve symptoms. This technical note highlights the use of double lumen single barrel for single puncture arthrocentesis and illustrate the technique for needle customization. Flow dynamics for such needle design is discussed.

Keywords: Arthrocentesis; Temporomandibular Joint; TMJ; Lavage

Introduction

Arthrocentesis of the temporomandibular joint was introduced in 1991 by Nitzan., *et al.* [1] and ever since this has gained a widespread popularity among practitioners who are involved in treating temporomandibular joint disorders [4]. The conventional technique to perform temporomandibular joint arthrocentesis requires two needles, for saline or Ringer's lactate inflow and outflow. This technique has its own limitation and disadvantages. Guarda-Nardini L., *et al.* adopted a single-needle technique for both fluid inflow and outflow. It has the advantages over conventional technique in terms of execution time, patient's tolerance, and retention of medication [2]. Ska´rmeta NP., *et al.* introduced the use of an intravenous catheter to provide simultaneous inflow/outflow for low or high-volume irrigation in the TMJ and concluded that this technique allows good control of the inner needle position and uses a relatively narrow-gauge needle for its execution and provides a less traumatic experience for the patient [3]. This is a furtherance in arthrocentesis technique which is simpler to perform, reduces patient discomfort and the procedural duration.

Technical Note

A needle was customized to obtain a double lumen single barrel, using two 20-gauge needle from an intravenous cannula. The bend was given at 30-degree angle to each needle and soldered from the barrel convergence up to 3 mm short of biangular bevel. Keeping the solder 3 mm short of the bevel prevents thermal damage to the needle tip and the bevel (Figure 1, 2). The effectiveness of irrigation under high pressure (40 KPa) was investigated by comparing arthroscopic findings before and after the irrigation [5-7] along with the measurement of intracapsular pressure during irrigation [6]. To ensure the ballooning effect with the irrigant before obtaining the outflow, the bevel of the needles were oriented in such a way that the needle tips remain approximating and bevel facing the opposite direction. (Figure 3). For measuring the depth of insertion, a silicon stopper was incorporated on the needle barrel. The two plastic adapters were used for solution inflow and outflow (Figure 1). The needle is inserted via the standard posterior insertion point located along the canthotragal line 10 mm from the middle of the tragus and 2 mm below the line and follows the insertion path similar to conventional posterior needle insertion track in a postero-anterior direction [8].

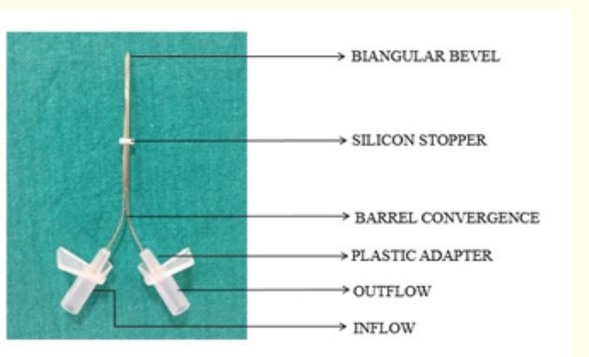

Figure 1: Modified Double Lumen Single Barrel Needle.

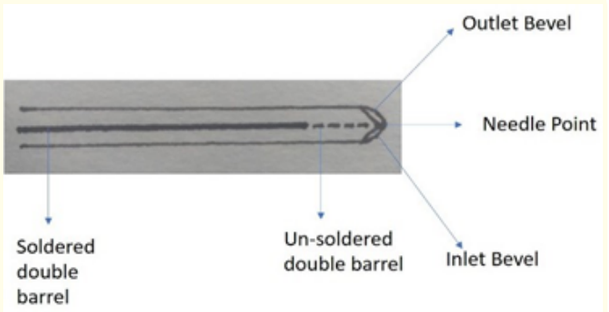

Figure 2: Soldering Technique to maintain the accuracy of needle tip and bevel.

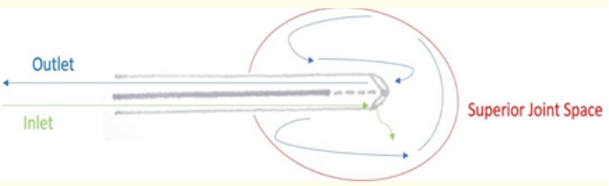

Figure 3: Flow dynamics with opposing oblique bevel design to obtain outflow after superior joint filling with the lavage solution.

Conclusions

Single puncture arthrocentesis performed by using double lumen single barrel needle reduces the number of the entry ports. It makes the procedure simple by ensuring a relatively simpler access to the joint space for inflow and obtaining the out flow. It also reduces the operative time as compared with the standardized conventional technique. The depth of insertion can be assessed using silicon stopper in the device to avoid injury to the underlying structures. It also reduces the possibility of discomfort of multiple punctures and needle manipulations. Most importantly this modification in the needle makes the procedure simple and easy to perform in clinical practice with minimal training and practice with precision.

Funding

Self-funded.

Conflict of Interest

None.

Ethical Approval

Not Applicable.

Informed Consent

Not Applicable.

Bibliography

1. Nitzan DW., *et al*. "Temporomandubular joint arthrocentesis: a simplified treatment for severe, limited mouth opening". *The Journal of Oral and Maxillofacial* Surgery 49.11 (1991): 1163-1167.
2. Guarda-Nardini L., *et al*. "Arthrocentesis of the temporomandibular joint: a proposal for a single-needle technique". *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology* 106.4 (2008): 483-486.
3. Skármeta NP., *et al*. "A single-puncture arthrocentesis technique, using a peripheral intravenous catheter". *The International Journal of Oral and Maxillofacial Surgery* 45.9 (2016): 1123-1125.
4. Rahal A., *et al*. "Single-puncture arthrocentesis - introducing a new technique and a novel device". *Journal of Oral and Maxillofacial Surgery* 67.8 (2009): 1771-1773.
5. Yura S., *et al*. "Can arthrocentesis release intra-capsula adhesion? Arthroscopic findings before and after irrigation under sufficient hydraulic pressure". *The Journal of Oral and Maxillofacial Surgery* 61.11 (2003): 1253.
6. Yura S., *et al.* "Measurement of intra-articular pressure of the temporomandibular joint during arthrocentesis under sufficient hydraulic pressure". *Japanese Journal of Oral and Maxillofacial Surgery* 48.10 (2002): 515-519.
7. Yura S., *et al*. "Arthrocentesis following arthroscopic examination in patients with closed lock of the temporomandibular joint". *Japanese Journal of Oral and Maxillofacial Surgery* 49 (2003): 246.
8. Bhargava D., *et al*. "Temporomandibular joint arthrocentesis for internal derangement with disc displacement without reduction". *Journal of Maxillofacial and Oral Surgery* 14.2 (2015): 454-459.

Volume 1 Issue 1 October 2018