

Single-Puncture Arthrocentesis—Introducing a New Technique and a Novel Device

Akram Rabal, MD, FRCSC,* Jean Poirier, DMD, FRCDC,† and
Christian Abmarani, MD, FRCSC‡

Arthrocentesis of the temporomandibular joint was introduced in 1991 by Nitzan et al¹ and has since gained widespread popularity among practitioners who treat temporomandibular joint disorders. It is considered by many as the first-line surgical treatment for patients who do not respond to conservative treatment (physical therapy, occlusal splint therapy, pain medication, and lifestyle and behavioral changes). It is regarded as a minimally invasive procedure and is easily performed in an office setting. It allows lavage of the joint space and lysis of adhesions via hydraulic distension.

The traditional procedure uses 2 needles inserted through 2 separate puncture sites. These 2 needles must triangulate and be exactly placed in the upper joint space for the procedure to be efficient. One of the needles serves for the inflow of the lavage solution and the second as the outflow. It is recognized that the procedure can be sometimes very challenging. The blind insertion of the second (outflow) needle can sometimes be difficult. Multiple punctures through the temporomandibular joint capsule are often necessary, which often leads to extra-articular leak of the lavage solution and decreases the intra-articular pressure required for lysis of the adhesions.

We have developed a new device where two 18-gauge needles 1.5 inches long are each bent 30 degrees toward their respective opening and welded

together in a Y fashion with the openings facing outward (Figs 1, 2). This is fabricated by a local medical instrument company (Instrumentarium, Ter-rebone, QC, Canada). The dual-needle device is packaged separately and sterilized. It is intended for a single use and is therefore disposable.

We have been using the dual-needle device since 2005. All our arthrocenteses have since been performed using only 1 single puncture to insert both needles together. No complication has been encountered using this technique in over 200 cases.

The purpose of this article is to introduce the dual-needle device and describe in detail our technique. We propose the term “single-puncture arthrocentesis” (SPA) that well describes the procedure.

Surgical Technique

The patient is given an oral sedative (lorazepam 1 mg) 1 hour before the procedure. Arthrocentesis is always carried out at the clinic. The patient is placed in a semiseated position. A cotton pledget is placed in the auditory meatus to protect the ear from the irrigation fluid. Disinfection of the preauricular area is

Received from the Otolaryngology–Head and Neck Surgery/Maxillofacial Surgery Division, Department of Surgery, Maisonneuve-Rosemont Hospital, Montreal, QC, Canada

*Assistant Professor.

†Assistant Professor.

‡Assistant Professor.

Address correspondence and reprint requests to Dr Rabal: Otolaryngology–Head and Neck Surgery/Maxillofacial Surgery Division, Department of Surgery, Maisonneuve-Rosemont Hospital, 5415 L’Assomption Boulevard, Montreal, QC, Canada H1T 2M4; e-mail: akramrahal@gmail.com

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FIGURE 1. Dual-needle device showing the two 18-gauge needles bent and welded together.

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FIGURE 2. Dual-needle device visualized from a different angle. Rabal et al. *Single-Puncture Arthrocentesis. J Oral Maxillofac Surg* 2009.

done with an antiseptic swab (chlorhexidine 2%/alcohol 70%). Local anesthesia is performed using 4% articaine with 1/200,000 adrenaline. We inject the solution subcutaneously at the area of puncture and then we direct the needle anteriorly and superiorly down to the zygomatic arch. We inject more of the solution in this region and around the temporomandibular joint capsule. After that, we penetrate the upper compartment of the joint and distend it with 2 mL of the same anesthetic solution. The injections are done very slowly to minimize discomfort. We allow at least 15 minutes for the medication to take effect.

We then precisely locate the site of our puncture. It is basically the same site as the first puncture in any arthrocentesis or arthroscopic procedure. Starting at the midpoint of the tragus, and following the tragal-canthal line (Holmlund line),² it is located 1 cm anterior and 2 mm inferior to the line. After the percutaneous puncture, the dual-needle device is directed anteriorly and superiorly until contact is made with the zygomatic arch. Keeping close contact with the bone in this area, we slide both needles in the upper compartment (which is distended by the anesthetic solution). We ask the patient to open the mouth and to shift the mandible to the opposite side to facilitate entry into the joint space. Once inside the joint space, we attach 1 of the needles to an intravenous line hooked to a 500-mL lactate ringer bag (Fig 3). Hydraulic pressure is obtained by inflating a tourniquet (300 mm Hg) around the bag. Next we flush 300 mL of lactate Ringer solution under pressure in the upper compartment. The dual-needle device needs to be manipulated to have an optimum inflow and outflow of solution. Sometimes it must be pushed deeper or pulled back a little and sometimes the device has to be rotated on itself or angled a little bit more.

During the lavage, we ask the patient to mobilize as much as possible the mandible and we passively manipulate the joint to aid in the release of adhesions. At the end of the procedure, we detach the intravenous tubing and 1 mL of methylprednisolone (40 mg/mL) is injected in the joint space through 1 of the needles while occluding the other with a finger. Then the device is completely withdrawn. A small Elastoplast covers the puncture site. The patient is discharged when stable, usually 30 minutes after the procedure.

Discussion

Two reports in the literature have described a technique similar to ours. Alkan and Bas³ reported only 1 clinical case where they successfully used a double-needle cannula to perform the procedure. Rehman and Hall⁴ suggested using a Shepard cannula to perform the procedure. The cannula has indeed the same configuration as our device but might not be available in every country. However, the investigators did not describe their technique in detail and called the procedure “single-needle arthrocentesis,” although it is evident that there are 2 needles in the cannula. The device we propose can easily be manufactured by any local medical instrument company, and it is affordable and disposable.

SPA using the dual-needle presented in this report is a fast and easy-to-perform procedure that should be considered when patients with temporomandibular joint disorders show no improvement after conservative treatment. SPA is a safe and minimally invasive procedure. It presents some advantages over the classic arthrocentesis technique: only 1 puncture is re-



FIGURE 3. Dual-needle device in place. An intravenous line is attached to the first needle. Irrigation fluid can be seen flowing out the second needle.

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quired for the procedure and there are more chances to have both needles in the same upper joint space with this technique. Clinically, we have not noticed a decrease in the efficiency of arthrocentesis since we adopted the SPA technique and, as mentioned, we have used it in more than 200 cases since 2005. Obviously, more studies evaluating the true benefits of this procedure and comparing it with the traditional technique are needed and we currently have a prospective single-blind study under way. We encourage others who use similar devices to also publish their results.

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