

## Technical Note

# The Role of Capsular Distention in the Arthroscopic Management of Arthrofibrosis of the Knee: A Technical Consideration

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**Abstract:** Arthroscopic treatment of arthrofibrosis of the knee is a technically challenging procedure. Capsular distention with fluid before arthroscopy results in easier and safer insertion of arthroscopic instruments with improved arthroscopic visualization. In addition, it stretches the entire capsule, including the difficult to access posterior capsule. This report describes a simple technique for capsular distention before arthroscopic treatment of arthrofibrosis of the knee. **Key Words:** Knee—Arthrofibrosis—Treatment—Capsular distention.

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**A** rthrofibrosis is a specific process in which scar tissue or fibrous adhesions form diffusely within a joint.<sup>1,2</sup> A thickened, fibrotic capsule, which in its most severe forms can completely prohibit joint motion, is characteristic. The periarticular scarring of arthrofibrosis restricts both flexion and extension and may occur as a localized or a global process. A disordered cellular response results in fibrosis of the suprapatellar, medial, and lateral gutters. Fibrosis also occurs in the anterior capsule and frequently in the posteromedial and posterolateral capsule as well.

Although arthroscopic debridement and capsular release are often successful treatments,<sup>3-7</sup> they are among the most technically challenging of all arthroscopic procedures because of the thickened capsule, loss of joint space, adhesions, and scar tissue. We have found capsular distention with saline before ar-

throscopy to be an important adjunct in the arthroscopic treatment of arthrofibrosis of the knee.

## TECHNIQUE

With the patient under anesthesia and before arthroscopy, the knee joint of the patient with arthrofibrosis is palpated. The scarring is often so severe that it is difficult to make out the various surface landmarks. The extremity is prepped and draped and, under sterile conditions, normal saline is injected into the suprapatellar pouch from the lateral side. We are careful to watch and feel for joint distention as the fluid is injected to ensure that the fluid is entering the true joint space. We use a 60-mL syringe and an 18-gauge needle. A large-bore needle is preferable because this allows the tactile feedback that helps the surgeon discern between scar tissue and joint space. The fluid should flow easily if the needle is indeed in the true joint space. In patients with significant adhesions or compartmentalization of the suprapatellar pouch, care must be taken to verify that the fluid is entering the true joint space, and not a false compartment, because it is possible to create a false cavity or to infiltrate the quadriceps musculature. Normal knees easily accept 180 mL of saline, and we attempt to introduce that

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1526-3231/01/1707-2905\$35.00/0  
doi:10.1053/jars.2001.25240

volume of fluid into the arthrofibrotic knee as well. As the capsule is distended, care is taken not to rupture the true capsule as the fluid is inserted, although intra-articular adhesions may be disrupted as the capsule is distended. The last 60 mL are inserted slowly to allow the capsule to stretch over time. Preservation of the true joint capsule prevents extravasation of the fluid during the arthroscopy and facilitates visualization.

After the knee is maximally distended with saline, we insert the arthroscopic instruments through standard portals. We typically insert the inflow cannula into the knee through a superomedial portal and then initiate flow. This keeps the joint distended and facilitates insertion of the arthroscope through the inferolateral portal and helps with initial visualization within the joint. We then perform our standard arthroscopic debridement and releases as discussed elsewhere.<sup>4,5,7</sup>

## DISCUSSION

Capsular distention with saline before arthroscopy offers several important advantages in the treatment of arthrofibrotic knees. First, it re-establishes the effective joint space, which makes the insertion of arthroscopic instruments easier and safer. When the joint is distended, it is easier to insert the arthroscope and other instruments, and one is less likely to damage the chondral surfaces. Furthermore, visualization is enhanced because scarred joint spaces have been recreated and there is a relative tamponade of any vessels. Capsular distention also safely stretches the capsule in those regions, particularly the posterior capsule, that are not easily reached with standard arthroscopic portals. In our experience, this decreases the need for additional portals or incisions to release the posterior structures.<sup>5</sup> To date, we have had no complications from this adjunct and routinely use this technique on arthrofibrotic knees.

This technique may be also useful in treating capsular problems in other joints. Vad et al.<sup>8</sup> have recently described the role of capsular distention in adhesive capsulitis of the shoulder. They found that capsular distention under fluoroscopy was a valuable treatment for patients with stage 2 adhesive capsulitis who had persistent symptoms and loss of motion despite an adequate trial of physical therapy.

In summary, although arthroscopic treatment of the arthrofibrotic knee remains among the most technically challenging of all arthroscopic procedures, we have found that preoperative capsular distention with saline is a safe and effective adjunct. The technique offers the advantages of easier and safer instrument insertion, better visualization, and improved outcomes by effectively stretching the entire capsule of the arthrofibrotic knee.

## REFERENCES

1. Millett PJ, Williams RJ 3rd, Wickiewicz TL. Open debridement and soft tissue release as a salvage procedure for the severely arthrofibrotic knee. *Am J Sports Med* 1999;27:552-561.
2. Petsche TS, Hutchinson MR. Loss of extension after reconstruction of the anterior cruciate ligament. *J Am Acad Orthop Surg* 1999;7:119-127.
3. Sprague NF, O'Connor RL, Fox JM. Arthroscopic treatment of postoperative knee arthrofibrosis. *Clin Orthop* 1982;166:165-172.
4. Sprague NF. Motion-limiting arthrofibrosis of the knee: The role of arthroscopic management. *Clin Sports Med* 1987;6:537-549.
5. Steadman JR, Burns TP, Pelozo J. Surgical treatment of arthrofibrosis of the knee. *J Orthop Tech* 1993;1:119-127.
6. Shelbourne KD, Johnson GE. Outpatient surgical management of arthrofibrosis after anterior cruciate ligament surgery. *Am J Sports Med* 1994;22:192-197.
7. Cosgarea AJ, DeHaven KE, Lovelock JE. The surgical treatment of arthrofibrosis of the knee. *Am J Sports Med* 1994;22:184-191.
8. Vad VB, Hannafin J, Warren RF. Role of shoulder capsular distention in adhesive capsulitis. Presented at the 82nd Annual Meeting of the Hospital for Special Surgery Alumni Association, New York, 2000.