ELSEVIER

Operative Techniques in

Sports Medicine

Arthroscopic Management of The Stiff Elbow: Osteoarthritis and Arthrofibrosis

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Indications for arthroscopic management of elbow stiffness and pain associated with elbow osteoarthritis have steadily increased in the last few years. Although technically demanding, the potential advantages, comprising increased joint visualization, decreased tissue disruption, and faster recovery have yielded growing interest into this technique. The reported complication rates are higher than in other joints and sound knowledge of the local anatomy is required to ensure a safe procedure. The technique and indications for arthroscopic management of osteophytes, soft tissue contracture, and associated ulnar nerve neuropathy as well as postsurgical care, as given by the senior author, have been described in this article.

KEYWORDS elbow, osteoarthritis, arthroscopy, technique

Introduction

Osteoarthritis (OA) of the elbow is characterized by loss of range of motion (ROM), pain, and weakness of the upper extremity. The pathophysiology comprises cartilage degeneration and fragmentation leading to intra-articular loose bodies generation, osteophyte formation, and reactive capsuloligamentous contraction.[1] It can present as a primary disease or be secondary to trauma, rheumatoid and crystalline arthropathies, infection, or hemophilia.[2,3] In the 3-part classification system by Morrey,[2] OA represents an intrinsic cause of elbow stiffness along with intra-articular adhesions and malalignment. It can frequently be associated with extrinsic causes of stiffness (capsular, collateral ligament, and muscular contractures, heterotopic ossification (HO), and extra-articular malunions), constituting a "mixed" category.

Precise recording of the history and clinical examination followed by a complete radiological workup as well as assessment of patient expectations are crucial steps. Thorough assessment of the range-of-motion deficit as well as of all the pathological soft tissue and bony structures implicated is required for discussion of optimal therapeutic options.

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Arthroscopic management of the stiff osteoarthritic elbow is becoming more prevalent.[4,5,1,6-11] Although technically demanding, the results have been favorable and its use has been recommended.[12] Its potential advantages include smaller incision size, limited soft tissue disruption, decreased blood loss, and faster recovery.

History and Clinical Examination

The collection of information relevant to therapeutic decision making starts with obtaining patient demographics including age, laterality, and professional and recreational activities. The patient's comorbidities, current medical treatment including pain medication, and complete past surgical procedures should be noted. The timing of onset of symptoms allows for differentiating between acute (less than 6 months to 1 year) and chronic cases of elbow stiffness. Catching and locking should be recorded. Pain occurring through or at the end of ROM, irradiation, association of joint swelling, and presence of night pain gives hints regarding etiology of the disease and possible coexisting medical conditions. The effect of the pain and limitation in range of movement on daily, professional, and recreation activities is the base for discussing patient expectations about the therapeutic procedures.

The elbow is inspected for previous surgical incisions and scars, swelling, and deformation. Palpation of the epicondyles, radiocapitellar joint, and mediolateral gutters allows precision of pain localization. Recording active and passive ROMs allows

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for diagnosis of elbow stiffness. ROM inferior to the functional 130°-30°-0° values described by Morrey et al[13] is generally accepted as an indication for treatment.[14] Stiffness can furthermore be characterized according to loss of arc of motion as minimal, <90°; moderate, 61°-90°; severe, 31°-60°; and very severe, <30°.[15]

Ulnar nerve neuropathy is commonly associated with elbow OA.[16,17] Ulnar nerve irritability, subluxation, and functional assessment should thus be included in the neurologic examination. Clinical diagnosis of ulnar neuropathy should be complemented by electromyographic examination.

Imaging

Radiologic workup consists of standard plain radiographs including anteroposterior and lateral views. Most bony blocks to motion are readily detected using this modality. The extent of osteoarthritic changes at the elbow joint has been classified into 3 categories and shown to correlate with functional postsurgical outcomes.[18] Computed tomography with 2-dimensional and 3-dimensional reconstructions is an invaluable tool in surgical planning of osteophyte removal. Evaluation of localization and volume of bone requiring resection based on computed tomography 3-dimensional reconstruction flexion-extension modeling has recently been described[19] and may provide the surgeon with supplementary useful information. Magnetic resonance imaging allowing for soft tissue imaging has not been demonstrated to be relevant in elbow OA management and is not required.[20]

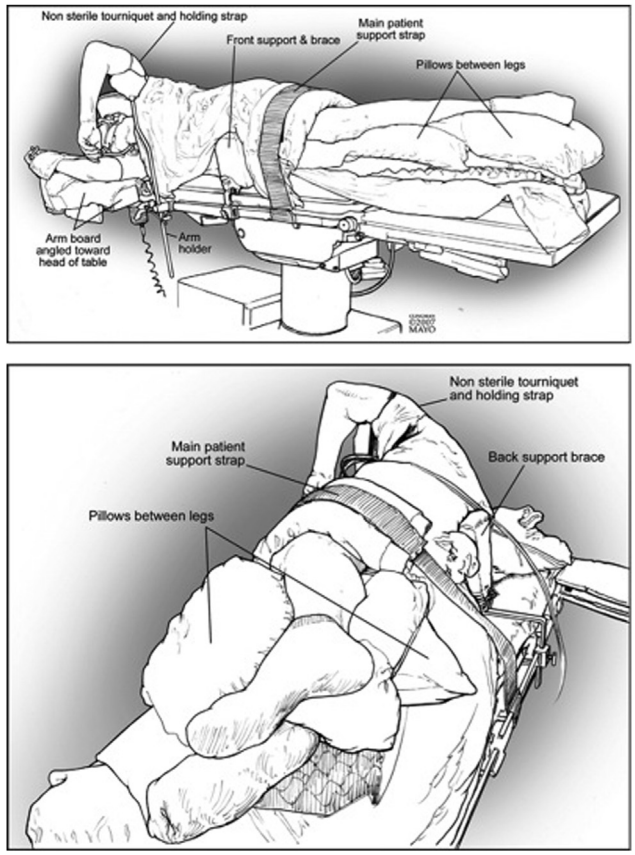

Figure 1 Patient positioning. Lateral decubitus setup positioning for arthroscopic left elbow procedure.

Arthroscopic Management

Indications

Arthroscopic treatment is ideally suited to address soft tissue contractures. Some features of OA can be addressed arthroscopically, such as loose bodies, marginal osteophytes, and associated ulnar neuropathy. Severe degenerative changes with bone loss and joint incongruity, HO, and muscular contractures are best managed by open surgery.

Complications

Before undergoing an arthroscopic elbow procedure, one should be aware of the potential complications of this technique, as their reported incidence is higher than in other joints.[21] Of particular importance, neurologic lesions of almost every nerve around the elbow have been reported.[22-25] Sound knowledge of nervous anatomy of the elbow is therefore compulsory.[26] Nerve lesions are nevertheless not completely preventable and should be discussed with the patient before surgery.[10]

HO has been reported as a rare complication of elbow arthroscopy.[27-29] The presenting symptoms are residual stiffness and loss of ROM 3 months postoperatively. The known risk factors in other articulations include trauma, neurologic lesions, previous surgery, previous HO, and disseminated idiopathic skeletal hyperostosis. Prophylaxis of HO using nonsteroidal antiinflammatory drug medication or radiotherapy or both has been recommended in the presence of risk factors such as disseminated idiopathic skeletal hyperostosis.[28]

Settings and Materials

Patients are positioned in a lateral decubitus position under general anesthesia. The arm is held in slight elevation to avoid impingement of the arthroscope against the lateral side of the body during the procedure and placed in a low-profile elbow arm holder fixed to the side of the table (Fig. 1). A nonsterile tourniquet is applied to the arm and secured to the arm holder. Standard draping is applied with addition of a compressive bandage from the hand up to the proximal third of the forearm. The patient is tilted 20° toward the surgeon to eliminate rollback and avoid compression of the antecubital fossa.

The material used is a standard 4.0-mm arthroscope with 30° angulation. Water inflow is controlled by a low-pressure (20-30 mm Hg), high-flow pump. Nonfenestrated outflow cannulas are used to limit tissue infiltration as compartment syndrome of the forearm has been reported after this procedure.[30] The instruments comprise a shaver of 4.5-5 mm, burrs, and radiofrequency probe as well as standard arthroscopy instruments such as scissors and graspers.