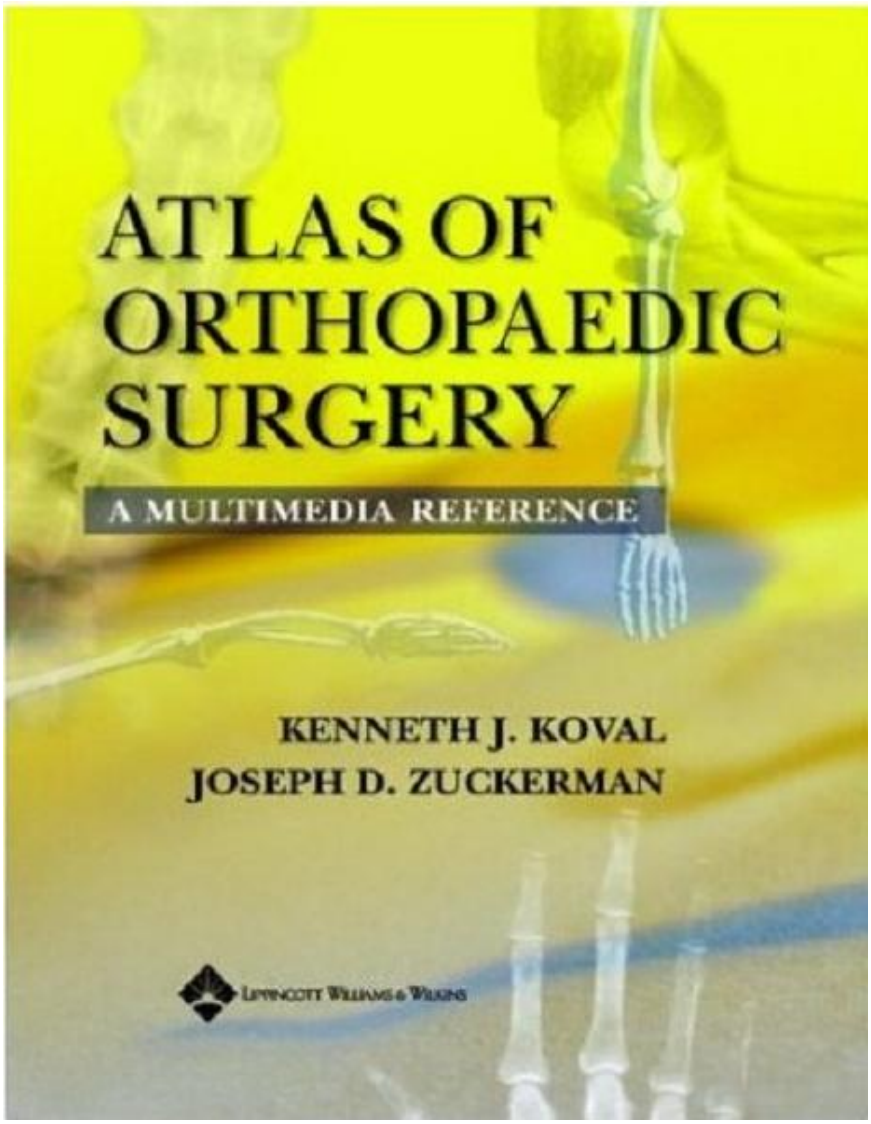
# Atlas of Orthopaedic Surgery - A Multimedia Reference

# Content

# 1. Frontmatter

## 1.1 Cover


ATLAS OF
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KENNETH J. KOVAL
JOSEPH D. ZUCKERMAN
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P.ix

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## 1.4 PREFACE

*Atlas of Orthopaedic Surgery: A Multimedia Reference* represents the effort of many members of the NYU-Hospital for Joint Diseases Department of Orthopaedic Surgery. The creation of an interactive video guide for use by practicing orthopaedists, residents, and fellows in training is the culmination of our many years of commitment to graduate medical education. The chapters and procedures included for presentation are based on a consensus of the most common procedures performed by orthopaedists and represent the subspecialty areas of adult reconstruction; shoulder and elbow; sports medicine; hand, spine, foot, and ankle pediatrics; and trauma. Chapters were prepared by contributors with special expertise and extensive experience in the operative case illustrated. Each chapter follows an outline consisting of: pertinent surgical anatomy; surgical indications; classification, when appropriate; preoperative planning, including equipment, patient positioning, a step-by-step approach to the operative procedure; and postoperative care. “Pearls” and “pitfalls” are provided throughout the text to help the clinician achieve successful outcomes; pearls are underlined and pitfalls appear in **bold**.

It is our hope that this reference will provide orthopaedic surgeons with important and useful information on commonly performed surgical procedures in our specialty, with the ultimate goal of enhancing the care we provide our patients.

Kenneth J. Koval M.D.

Joseph D. Zuckerman M.D.

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# 2. Section I - Shoulder

## 2.1 1. Shoulder Arthroscopy - Diagnostic

The therapeutic use of arthroscopy in shoulder surgery has expanded rapidly in the last decade. Arthroscopic subacromial decompressions, instability procedures, and rotator cuff repairs are now all common interventions. However, diagnostic arthroscopy remains the foundation on which all of these procedures are built. The competent surgeon must be familiar with normal arthroscopic anatomy before pathology can be identified. The surgeon should be able to visualize all of the structures within the glenohumeral joint and subacromial before undertaking any reconstructive procedures. This chapter describes the steps necessary to perform a complete diagnostic arthroscopy of the glenohumeral joint, including positioning, setup, instruments, and technical advice to assist with full visualization.

# ANATOMY

A full understanding of both the surface and intraarticular anatomy of the glenohumeral joint and the subacromial space are prerequisites for successful arthroscopic surgery of the shoulder. Proper portal placement can allow the surgeon to routinely visualize the entire glenohumeral joint and subacromial space. A complete understanding of normal anatomy, including its normal variants allows the surgeon to quickly recognize the presence of pathologic conditions.

## *Biceps Tendon*

The proximal or long head tendon of the biceps brachii is the first major structure that should be identified within the glenohumeral joint, because it acts as a major landmark for orientation within the joint. When the patient is in the lateral decubitus position the biceps tendon is seen approximately 10 degrees to 15 degrees from an imaginary vertical line. In the beachchair position, the tendon runs quite parallel to floor before it enters the bicipital groove. The tendon originates from the supraglenoid tubercle at the superior rim of the glenoid and from the superior, usually posterior, glenoid labrum (Fig. 1-1). However, it is important to note that the sites of origin are variable. Studies have documented that 20% of normal biceps tendons attach only to the supraglenoid tubercle; 48% only to the superior, posterior glenoid labrum; and 28% originating from both points. To facilitate visualization of the tendon as it courses anterolaterally through the joint, the arm should be externally rotated. The tendon can be observed as it exits into the bicipital groove, between the tendons of the subscapularis and supraspinatus muscles. In the anatomic position, the intraarticular portion of the biceps tendon courses below the coracohumeral ligament, which strengthens the rotator interval, a space between the tendons of the subscapularis and supraspinatus muscles. The coracohumeral ligament and superior glenohumeral ligament aid in the support of the biceps tendon in the rotator interval.

The surface of a healthy biceps tendon appears smooth; glistening; and free of any adhesions, fraying, or partial tears. The arthroscope can be used to diagnose any dislocation or subluxation of the tendon out of the bicipital groove in addition to partial tears or detachment of the biceps anchor. Superior labrum anterior and posterior (SLAP) lesions of the biceps origin can also be identified and treated.

## *Articular Surfaces*

The appearance and integrity of the articular surfaces of the glenoid and the humeral head must be fully evaluated during arthroscopy. The glenoid is an ovoid or pear-shaped cavity that is approximately one fourth the size of the humeral head. Its surface is covered by articular cartilage. However, there is a normal central area with little or no cartilage present. At the anterior glenoid margin a notch or indentation is present, which should not be mistaken for an anterior lip or Bankart lesion related to anterior instability. The humeral head is typically round and covered with smooth articular cartilage. Posteriorly, it has a normal “bare area” or sulcus, which is a region of bare bone present between the edge of the articular surface and the insertion of the posterior

P.2

capsule (Fig. 1-2). This bare area should not be confused with a Hill Sachs lesion, a posterior humeral head compression fracture associated with anterior dislocations of the glenohumeral joint. A Hill Sachs lesion typically is found posterosuperiorly on the humeral head and has no vascular channels, whereas the bare area has normally appearing vascular channels. A reverse Hill Sachs lesion, associated with posterior dislocations is an extremely rare pathologic finding during arthroscopy. It appears as a wedge-shaped defect toward the lateral insertion of the subscapularis tendon on the lesser tuberosity. In all cases, the cartilage should be scanned for any traumatic lesions, inflammatory or degenerative conditions, or chondromalacia. In osteoarthritis, significant osteophyte formation tends to occur along the edges of the articular surface, particularly along the anteroinferior surface of the joint. In the presence of full-thickness rotator cuff tears, the edge of the articular surface near the cuff insertion often becomes roughened with small spurs and osteophytes.

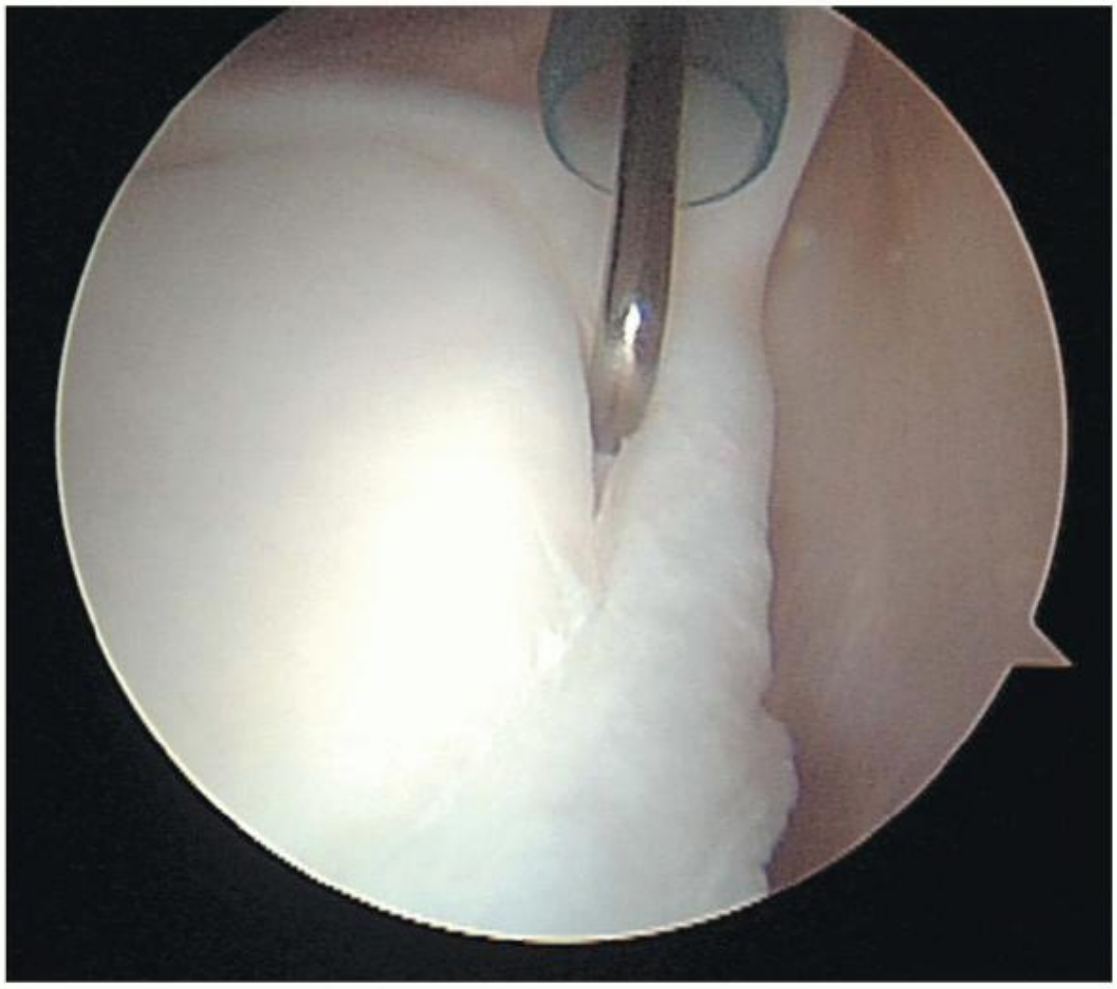

**FIGURE 1-1.** The long head of the biceps tendon acts as a major landmark for orientation within the joint. When the patient is in the lateral decubitus position the biceps tendon is seen approximately 10 to 15 degrees from an imaginary vertical line. In the beachchair position, the tendon runs quite parallel to floor before it enters the bicipital groove. The tendon originates from the supraglenoid tubercle at the superior rim of the glenoid and from the superior, usually posterior, glenoid labrum. Variable sites of origin include the supraglenoid tubercle and either or both of the anterior and posterior labrum.

**FIGURE 1-2.** The humeral head is typically round and covered with smooth articular cartilage. A normal "bare area" of bare bone is present between the edge of the articular surface and the insertion of the posterior capsule. This bare area should not be confused with a traumatic Hill Sachs lesion. A Hill Sachs lesion typically is found posterosuperiorly on the humeral head and has no vascular channels, whereas the bare area has normally appearing vascular channels.

## *Glenoid Labrum*

By deepening the glenoid fossa, the wedge-shaped glenoid labrum serves to provide substantial stability to the glenohumeral joint and extends its arc of stable rotation. The labrum consists of hyaline cartilage, fibrocartilage, and fibrous tissue. Its capsular surface blends with the joint capsule, whereas the glenoid surface is directly continuous with the hyaline cartilage of the glenoid fossa. The labrum varies greatly in its anatomy, ranging in width from 1 to 5 mm and in shape from ovoid to meniscoid. Five normal labral anatomic variations have been described. A wedge labrum located only at the superior glenoid margin, a wedge labrum at the posterior glenoid margin, a wedge labrum at the