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# FUNDAMENTALS OF **Pain Medicine**

HOW TO DIAGNOSE AND TREAT YOUR PATIENTS

**J.D. Hoppenfeld**

 Wolters Kluwer

## How to Diagnose and Treat Your Patients



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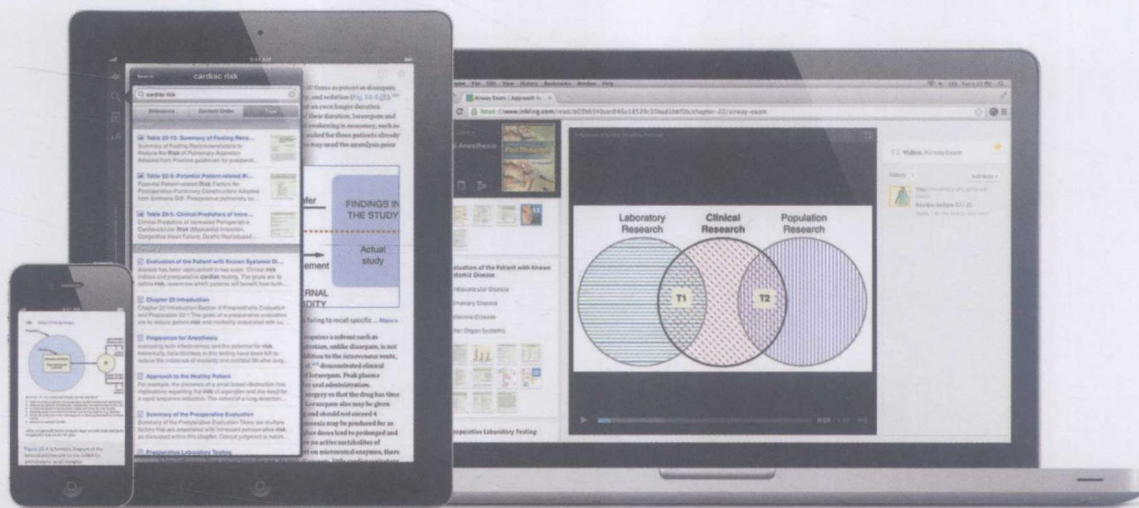
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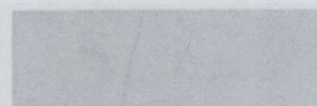
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## **Dedication**

*To my father who taught me the importance of the phrase that proceeded all of his books. "To all the men who preserved this body of knowledge, added to it and passed it on for another generation." To my mother for her continued love and support.*

*To my wife, Brie, you bring happiness to every aspect of my life. To my son Palmer who I am proud of every day*

*To Eileen Wolfberg who has been making generations of Hoppenfeld's look good.*

*To the Chicago Medical School*

*To the NYU Department of Neurology who provides superb training and a wonderful environment to grow.*

*To Dr. Kate Henry who exemplifies how influential a teacher can be in each of her students' lives.*

*To Dr. Russ Portonoy, for giving me a chance to prove myself.*

*To Dr. Jay Bakshi, for his technical training and life lessons, as well as, the fabulous team at Manhattan Spine and Pain.*

*To my colleagues at Southeast Pain Care. The level to which you take care of our patients on a daily basis exemplifies the best of medicine.*

*To my direct partner Dr. Tom Heil, I could not ask for a better teammate.*

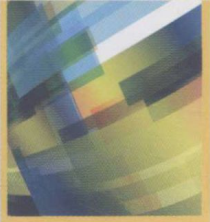
*To my colleagues who have reviewed the chapters of this book: Dr. Bert Vargas, Dr. Elizabeth Morgan, Dr. General Hood, Dr. Dave Hergan, Dr. Brian Thoma, Dr. Felix Muniz, Dr. Tom Heil, Dr. Kathryn Chance, Dr. Aaron Sharma, Dave Binkney, Katrina Traverso Justin Miller and Anne DePriest.*

*To my illustration team: Lead by Mike De La Flor a pioneer in medical illustration. Allison Keel, Melisa Silva, Ashley Helms, Renée Cauble, Denise Bowman, and "Big Mike" Erico.*

*—J.D. Hoppenfeld, M.D.*

*For Larry and Sylvia Gatzke.*

*—Mike de la Flor*



## Preface

This book is designed to be used by all healthcare professionals to improve the quality of life of their patients. Pain is ubiquitous and presents itself in the practices of every doctor. Whether your practice is primary care, general surgery, or a specialty, you have patients with pain. No matter how different our practices may be, we all have patients who need better pain management. This book will present the basics of pain management, currently not a mainstay of medical school curricula or most residency training programs. The principles provided here will give you the tools to understand, work up, and alleviate your patient's pain. Multiple case examples are provided to make the book relevant and applicable. This book by no means is comprehensive; however, its purpose is to cover the most common causes of pain, those you will encounter frequently in your practice, and the most common treatment options. You will understand when and how to use pain medications as well as when a patient can benefit from a procedure.

Some patients present with a primary complaint of pain while others complain of pain secondary to a more generalized disease process or procedure. As a healthcare professional, you are trained to diagnose the pathology and then treat it. However, another layer of patient care needs more focus in the medical community. Our actions to alleviate pain will not hinder our ability to treat the underlying disease. Yet modern medicine often considers these goals mutually exclusive, with pain management a distant second. As medical professionals, when we have an incomplete understanding of how to treat a condition, we undertreat it, erring on the side of "do no harm." This book will give you the confidence to confront your patient's discomfort and succeed in conquering the pain.

The anatomical reasons for some causes of pain are well established, while other causes are not. In some cases we can identify the exact pathologic causes of the patient's pain, for example, lumbar radiculopathy, a fractured fibula, pancreatic cancer, and so on. In other cases, pain symptoms can be analyzed and lead us to the pain generator that cannot be detected by MRI or lab tests, for example, muscle spasm, abdominal adhesions, and peripheral neuropathy of unknown etiology.

It is frustrating that we cannot measure pain as objectively as we can, for example, systolic blood pressure in hypertension or white matter lesions in multiple sclerosis. This is a fact that we simply have to accept, at this point, in order to take better care of our patients. In medicine we are constantly dealing with modalities we do not completely understand. We do not know the exact mechanism of action of a number of our most common medications, but we know that they work and that we can help our patients with them. When a patient presents with hypertension we begin our work-up, knowing there is a high likelihood that we are not going to find a cause and effect for the diagnosis. When we cannot find the cause, we label the patient as having essential hypertension. Our foundation of medicine stresses that while we do not completely understand the cause of hypertension, it is imperative to treat it. Another common example is multiple sclerosis—we do not know what causes it yet we must treat it, and do so with medications whose mechanisms are currently not completely comprehended. We should function the same way in the case of pain.

While we cannot always make the anatomical diagnosis until science advances, we understand the symptoms and what treatment modalities work well for those symptoms. Your patient's symptoms can establish a general pain diagnosis, such as muscular spasm. As long as the symptoms are well understood, you can properly treat the pain. Treatment modalities for pain may include physical therapy, lifestyle modification, yoga, nonsteroidal anti-inflammatory medication, an injection, or possibly surgery.

If we understood pain completely, we could explain why some patients with an abnormal examination or abnormal images that normally represent a painful condition are pain free. A good example of this is that some patients with cervical spondylolisthesis (slippage of the vertebral bodies) who have both abnormal imaging and signs of myelopathy on examination (hyperreflexive, increased muscle tone) often can be pain free. People have different responses to the same pathology. It is not uncommon for two people to have different subjective responses to the same stimuli. The temperature from a faucet may be fixed, but you may

think the water feels cool while another thinks the water feels hot. This is how we are built.

At times we apply a cause and effect to something seen on imaging when one may not exist. Modern imaging has given us an unprecedented ability to understand the cause of pain, but it has also reinforced our known limitation in understanding pain. While pathology may be discernible on imaging, it may not be the cause of the patient's pain. A good example of this is as follows: If 100 people randomly selected off the street, age 40 years, are sent for an MRI regardless of whether they have back pain, 35% will have a herniated disc. Many asymptomatic people have a herniated disc. If a patient presents with nonspecific low back pain, a CT scan and/or MRI may be ordered to find the cause. There is a 35% chance that the patient will have a herniated disc regardless of whether pain is present. A 1994 *New England Journal of Medicine* study showed that over half the people observed with no back pain had at least one bulging disc.<sup>1</sup> This book will help you interpret test results and show you how to apply them to your patients with pain.

We should use a patient's history, physical examination, and our proper interpretation of imaging to guide us to a generator of the pain. We then can target therapy toward that generator. We have specific treatment modalities that work based on the pain generator. The treatment of pain that may have stumped us in the past now becomes much more manageable. We will know what to do and how to do it, and be better physicians for it.

There are three hurdles that the practitioner faces upon encountering a patient with pain. The first is uncertainty as to why the patient has pain. The second not knowing how to treat it properly. The third is knowing why the patient has pain and being aware of appropriate treatment, but not treating for fear of taking action. Pain does not always get better on its own, and is considered chronic after 3 months. The longer treatment is delayed, the harder pain is to alleviate. Only 50% of people return to work when they are out for 6 months. Only 25% return to work when they are out for 1 year. After reading this book, you will be better motivated to diagnose and properly treat your patient's pain in a reasonable timely fashion.

There are instances in which the proper choice and use of a medication or procedure is critical. For example, it has been well demonstrated that the use of tricyclic antidepressants (TCA) such as Elavil is an effective treatment for postherpetic neuralgia. Stellate ganglion block for complex regional pain syndrome of the upper extremity is a proven treatment for painful symptoms. When pain is not controlled early, it can become chronic. The brain internalizes the pain in an area of the cortex that represents the area experiencing it. Once the brain's cortex undergoes synaptic modulation,

further treatment of the pain can become very difficult. This can be seen in phantom limb pain.

There are five common scenarios you will encounter when treating patients with pain.

**First scenario:** *The source of pain does not warrant a diagnostic work-up the pain is temporary and will subside on its own.* Your goal is to manage the painful symptoms until the underlying pain pathology corrects itself on its own. An example of this is after the first snowfall of the year, a patient presents with new low back pain. The pain is without radiation and occurred after shoveling his driveway. After a full history and physical examination, the diagnosis is nonspecific myofascial low back pain. Even with this nonspecific diagnosis, we can treat the patient's symptoms of low back pain with a nonsteroidal anti-inflammatory drug (NSAID) and some rest. You may not have a specific diagnosis, but you still have the ability to properly treat your patient. This book will provide guidelines on appropriate use of NSAIDs and other pain medications, so that your patients can obtain the best results. It will give you the starting doses of medications and tell you how to titrate them.

**Second scenario:** *The source of pain warrants a diagnostic work-up, the work-up shows the pathology and necessitates intervention because the pain will not resolve on its own.* Severe osteoarthritis of the hip is a good example of this. After seeing the patient you astutely order an MRI, which shows severe arthritis of the right hip. You try conservative treatment: Physical therapy and an NSAID. The pain does not improve with these conservative measures and surely will not improve on its own. A surgical option to control the underlying cause of the pain exists. The patient wants the surgery and the surgeon is willing to do it. A hip replacement is done correctly and the patient's pain improves.

**Third scenario:** *The source of pain warrants a diagnostic work-up, the work-up does not show the source of pathology and the pain necessitates intervention because the pain will not resolve on its own.* An example of this is the patient presenting with symptoms that indicate a painful peripheral neuropathy. A work-up should always be done looking for correctable causes of such a neuropathy, including alcohol, diabetes, HIV, and medications. Even though a work-up is justified, however, be aware that most likely the cause of the peripheral neuropathy will not be determined. Peripheral neuropathy can be easily identified on history, and you can implement a treatment plan tailored to it. Guidelines for the appropriate use of neuropathic pain medications are fully covered in this book.

**Fourth scenario:** *Everything is done right – work-up, diagnosis, treatment – yet the pain does not get better.* A good example of this is spine fusion surgery for low back pain. The surgery is done correctly, but the patient does not get completely better. The patient is now given

the diagnosis of failed back surgery syndrome. Some patients have great results, but some continue to experience significant pain despite a technically well-performed surgery. This book presents the best pain management options currently available for this type of situation including spinal cord stimulation therapy.

**Fifth scenario:** *The palliative setting.* You see a patient who presents with hemoptysis; after a full work-up you determine that the patient has lung cancer. She is pain free for 6 months but develops pain as the cancer metastasizes to her thoracic spine. Despite treatment, the cancer continues to spread. While you eventually will not be able to treat the cause of the pain, in this case Stage IV lung cancer, you understand the painful symptoms it will generate—for example, bone pain from metastasis and nerve pain from chemotherapy. This book will help you target treatment for

the pain generators to control the painful symptoms effectively.

Our goal of treating disease has not changed, but our intrinsic knowledge of controlling pain has. With the principles outlined in this book, you will have a strong grasp on how to treat pain. You will be able to overcome any fear of mishandling treatment of pain, knowing you can set a safe and effective pain management plan into motion including spinal cord stimulation therapy.

## REFERENCE

1. Jensen MC, Brant-Zawadski MN, Obuchowski N, et al. Magnetic resonance imaging of the lumbar spine in people without back pain. *New Engl J Med.* 1994;331(2):69-73. Study found that over half of people with no low back pain that were imaged had a least one bulging disc.



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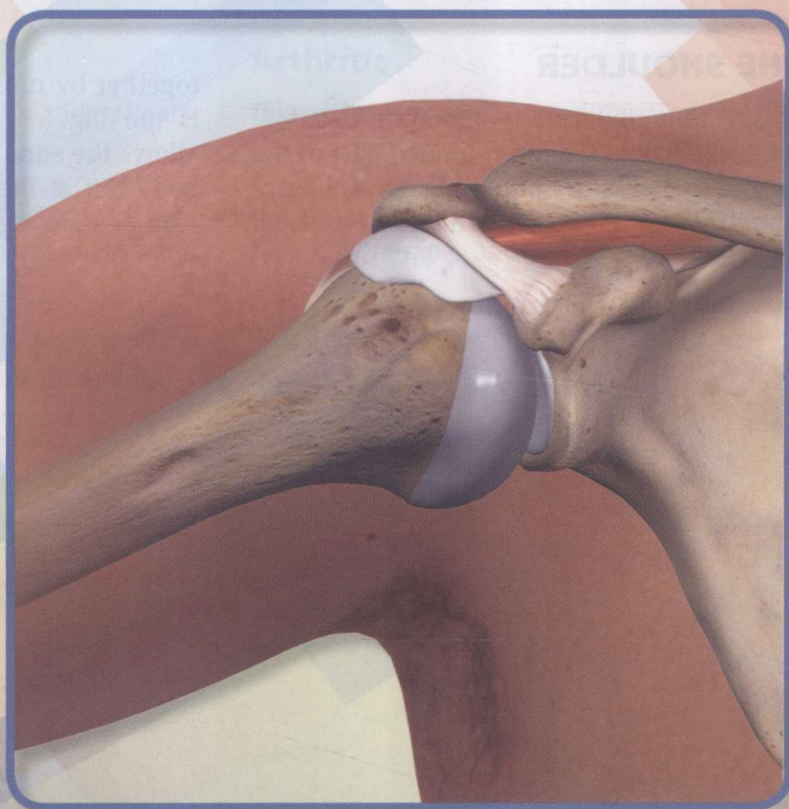
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## Symptoms and Conditions



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- › Facet Joints
- › Vertebral Discs

### PAIN IN THE HIP

- › Arthritis
- › Ischemic (Avascular) Necrosis
- › Fractures

### PAIN IN THE BUTTOCK

- › The Sacroiliac Joint
- › Greater Trochanteric Bursitis
- › Ischiogluteal Bursitis

### PAIN IN THE KNEE

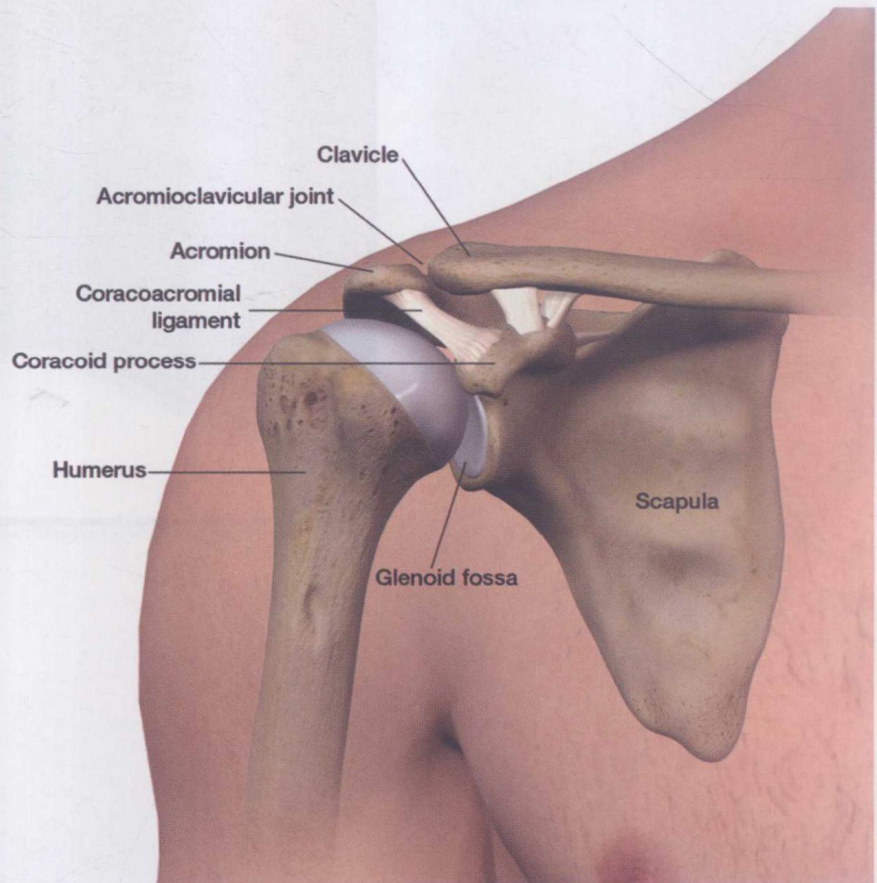
- › Arthritis
- › Meniscal Tear
- › Patellar Tendonitis
- › Osteochondritis

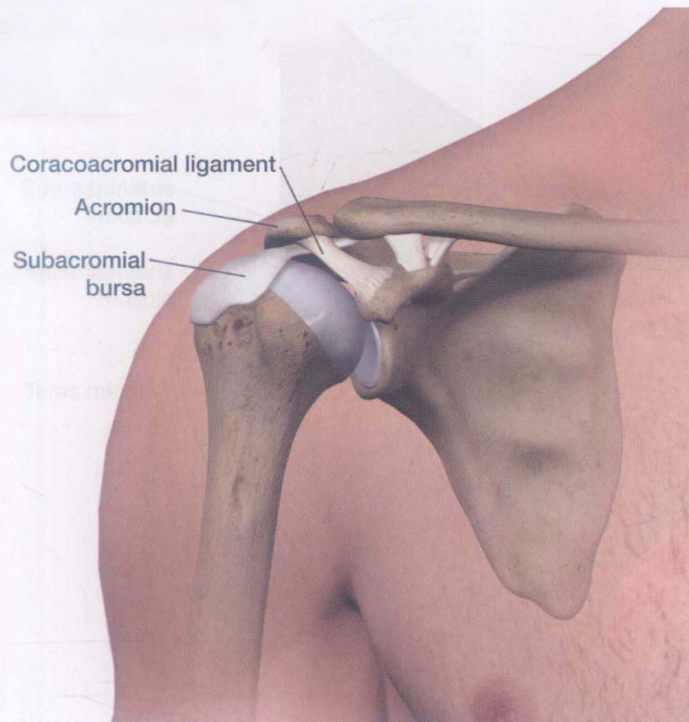
### PAIN IN THE SHOULDER

The shoulder is a common location of pain. In this ball-and-socket joint, the ball is the top, rounded part of the humerus, and the socket is the outer edge of the scapula (the glenoid fossa, Fig. 1-1). The joint is held

together by muscles, ligaments, and tendons. The ball is too big for the relatively flat socket. This design allows the shoulder to be the most movable joint in the body but at the same time most prone to dislocation. Pain can come from the shoulder joint itself or may be

**Figure 1-1** Anatomy of the shoulder. ►





**Figure 1-2** The subacromial bursa.

referred—from diseases affecting the gallbladder, heart, or cervical spine.

This section will focus on common sources of chronic pain originating from the shoulder itself. They include (1) bursitis, (2) arthritis—both glenohumeral and

acromioclavicular (AC), (3) rotator cuff injury, and (4) adhesive capsulitis (frozen shoulder).

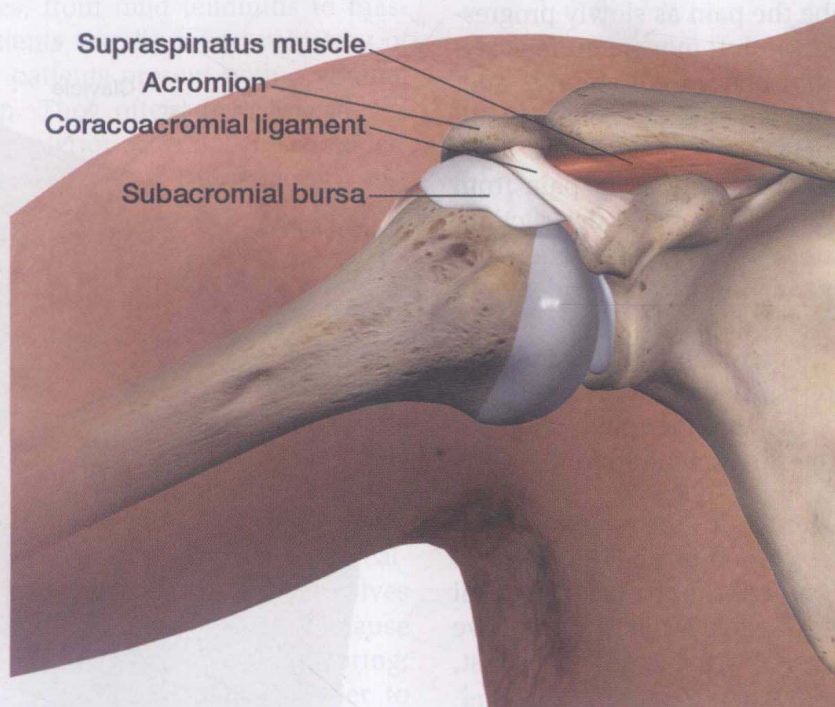
## Bursitis

A bursa is a fluid-filled sac that functions as a gliding surface to reduce friction between tissues of the body. The major bursa of the shoulder is the subacromial bursa. The shoulder's subacromial bursa (Fig. 1-2) separates the supraspinatus tendon (one of the four tendons of the rotator cuff) from the coracoacromial ligament. When the arm is resting at the side, the bursa lies laterally below the acromion. When the arm is abducted, it moves medially beneath the acromion (Fig. 1-3). When subjected to increase friction and overuse the subacromial bursa can become inflamed. Pain is usually of slow onset. Discomfort occurs in the shoulder or upper arm at the site of the bursa. On examination, the pain is worse when the patient abducts the arm, specifically from 70 to 100 degrees.

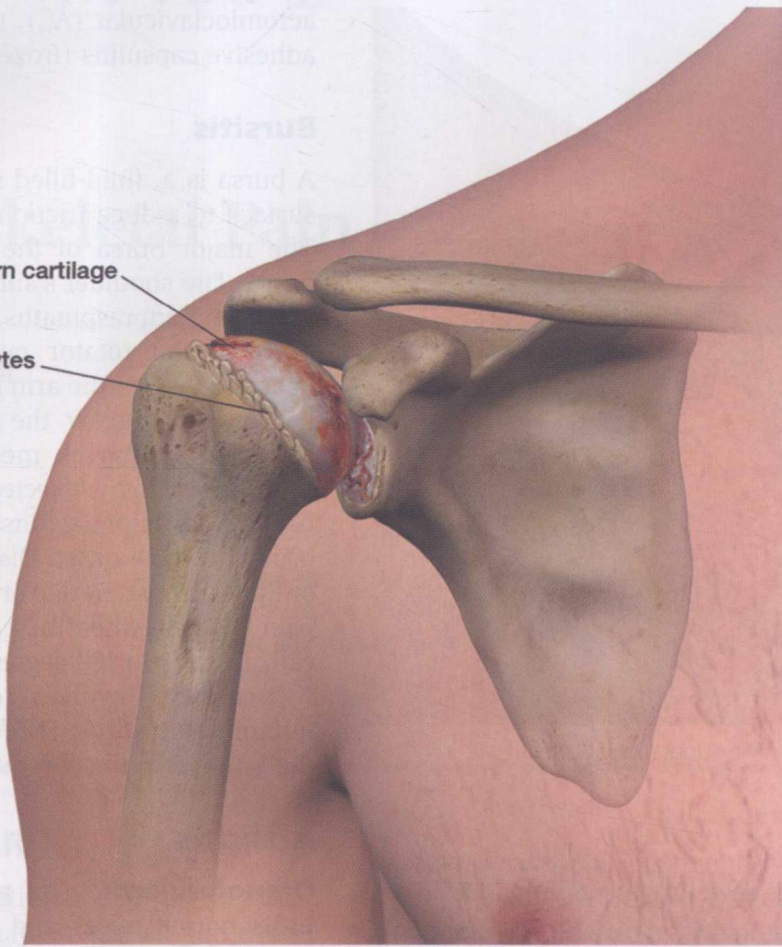
Treatment involves rest and a nonsteroidal anti-inflammatory drug (NSAID). A cortisone injection at the bursa effectively reduces inflammation and pain.

## Arthritis

**Glenohumeral:** The primary cause of osteoarthritis is normal wear and tear. It can also occur when a significant trauma disrupts the cartilage covering the proximal humerus. In osteoarthritis, the joint surface degenerates and the subchondral bone remodels,



**Figure 1-3** Subacromial bursa movement. The bursa lies in a lateral position when the arm is at rest; as the arm is abducted the bursa moves medially. Subacromial bursitis pain is worse as the arm is abducted.



Worn cartilage

Osteophytes

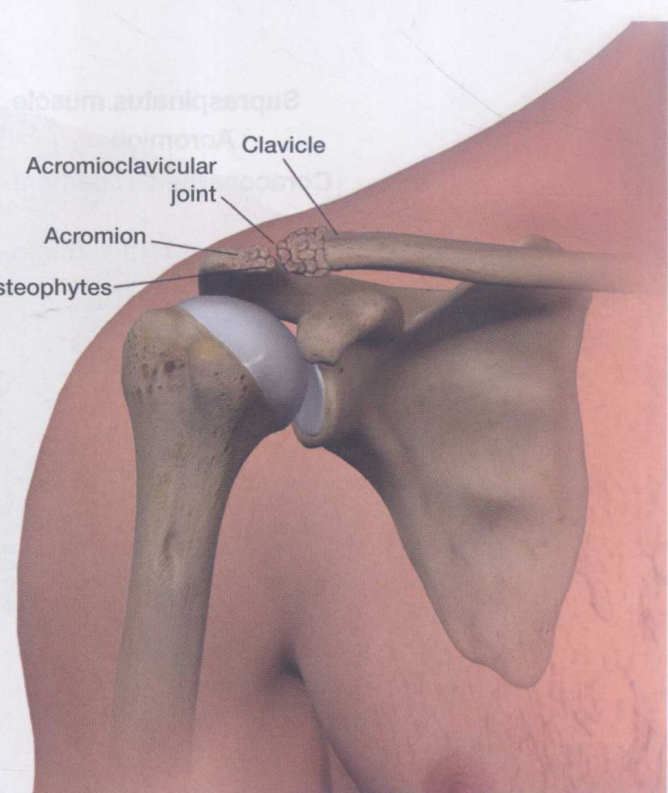
**Figure 1-4** Arthritis of the shoulder at the glenohumeral joint.

leading to pain and decreased range of motion (Fig. 1-4). Patients describe the pain as slowly progressive, diffuse, and deep in the joint; movement makes it worse. Physical examination may reveal crepitus and, in advanced cases, decreased range of motion. Radiography may show only subtle changes to the bone in a patient with clinical manifestations of pain from arthritis. Until there is more advanced destruction, x-ray results may be underwhelming. Magnetic resonance imaging (MRI) can provide greater evidence of articular cartilage wear.

Painful symptoms are treated with NSAIDs and/or a cortisone injection and physical therapy. If conservative means do not control the shoulder pain, shoulder replacement may be a proper treatment option.

**Acromioclavicular:** Arthritis in the shoulder can also develop between the acromion and the clavicle (Fig. 1-5). The AC joint is superior to the glenohumeral junction. On examination, to elicit AC joint pain, have the patient bring the affected arm across the chest, which compresses the AC joint.

Treatment of AC arthritis is the same as for glenohumeral arthritis except that the cortisone injection is placed into the AC joint.



Clavicle

Acromioclavicular joint

Acromion

Osteophytes

**Figure 1-5** Arthritis of the shoulder at the acromioclavicular joint.