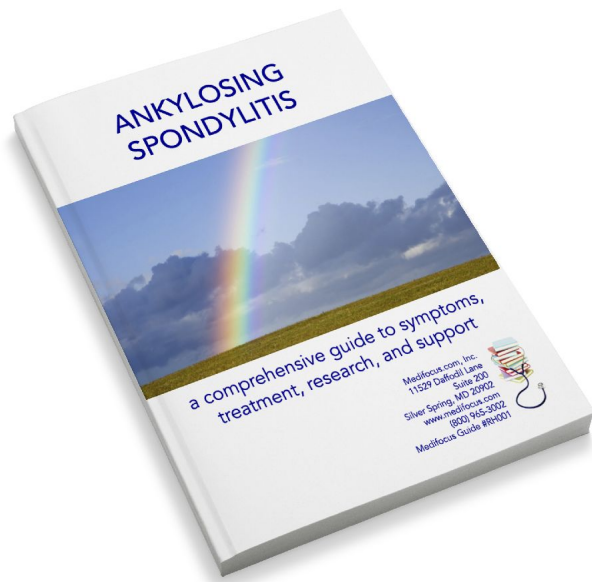


Preview of the Medifocus Guidebook on: Ankylosing Spondylitis

Updated March 25, 2010



This document is only a SHORT PREVIEW of the **Medifocus Guidebook on Ankylosing Spondylitis**. It is intended primarily to give you a general overview of the **format and structure** of the Guidebook as well as select pages from each major Guidebook section listed in the Table of Contents.

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1 - Background Information

Introduction

Chronic or life-threatening illnesses can have a devastating impact on both the patient and the family. In today's new world of medicine, many consumers have come to realize that they are the ones who are primarily responsible for their own health care as well as for the health care of their loved ones.

When facing a chronic or life-threatening illness, you need to become an educated consumer in order to make an informed health care decision. Essentially that means finding out everything about the illness - the treatment options, the doctors, and the hospitals - so that you can become an educated health care consumer and make the tough decisions. In the past, consumers would go to a library and read everything available about a particular illness or medical condition. In today's world, many turn to the Internet for their medical information needs.

The first sites visited are usually the well known health "portals" or disease organizations and support groups which contain a general overview of the condition for the layperson. That's a good start but soon all of the basic information is exhausted and the need for more advanced information still exists. What are the latest "cutting-edge" treatment options? What are the results of the most up-to-date clinical trials? Who are the most notable experts? Where are the top-ranked medical institutions and hospitals?

The best source for authoritative medical information in the United States is the National Library of Medicine's medical database called PubMed®, that indexes citations and abstracts (brief summaries) of over 7 million articles from more than 3,800 medical journals published worldwide. PubMed® was developed for medical professionals and is the primary source utilized by health care providers for keeping up with the latest advances in clinical medicine.

A typical PubMed® search for a specific disease or condition, however, usually retrieves hundreds or even thousands of "hits" of journal article citations. That's an avalanche of information that needs to be evaluated and transformed into truly useful knowledge. What are the most relevant journal articles? Which ones apply to your specific situation? Which articles are considered to be the most authoritative - the ones your physician would rely on in making clinical decisions? This is where *Medifocus.com* provides an effective solution.

Medifocus.com has developed an extensive library of *MediFocus Guidebooks* covering a wide spectrum of chronic and life threatening diseases. Each *MediFocus Guidebook* is a

high quality, up- to-date digest of "professional-level" medical information consisting of the most relevant citations and abstracts of journal articles published in authoritative, trustworthy medical journals. This information represents the latest advances known to modern medicine for the treatment and management of the condition, including published results from clinical trials. Each *Guidebook* also includes a valuable index of leading authors and medical institutions as well as a directory of disease organizations and support groups. *MediFocus Guidebooks* are reviewed, revised and updated every 4-months to ensure that you receive the latest and most up-to-date information about the specific condition.

About Your MediFocus Guidebook

Introduction

Your *MediFocus Guidebook* is a valuable resource that represents a comprehensive synthesis of the most up-to-date, advanced medical information published about the condition in well-respected, trustworthy medical journals. It is the same type of professional-level information used by physicians and other health-care professionals to keep abreast of the latest developments in biomedical research and clinical medicine. The *Guidebook* is intended for patients who have a need for more advanced, in-depth medical information than is generally available to consumers from a variety of other resources. The primary goal of a *MediFocus Guidebook* is to educate patients and their families about their treatment options so that they can make informed health-care decisions and become active participants in the medical decision making process.

The *Guidebook* production process involves a team of professionals with expertise in diverse areas including experienced medical database researchers and practicing physicians who serve as members of the *Medifocus.com* Medical Advisory Board (MAB). This team approach to the development and production of the *MediFocus Guidebooks* is designed to ensure the accuracy, completeness, and clinical relevance of the information. The *Guidebook* is intended to serve as a basis for more meaningful discussions between patients and their health-care providers in a joint effort to seek the most appropriate course of treatment for the disease.

Guidebook Organization and Content

Section 1 - Background Information

This section provides detailed information about the organization and content of the *Guidebook* including tips and suggestions for conducting additional research about the condition.

Section 2 - The Intelligent Patient Overview

This section of your *MediFocus Guidebook* represents a detailed overview of the disease or condition specifically written from the patient's perspective. It is designed to satisfy the basic informational needs of consumers and their families who are confronted with the illness and are facing difficult choices. Important aspects which are addressed in "The Intelligent Patient" section include:

- The etiology or cause of the disease
- Signs and symptoms
- How the condition is diagnosed
- The current standard of care for the disease

- Treatment options
- New developments
- Important questions to ask your health care provider

Section 3 - Guide to the Medical Literature

This is a roadmap to important and up-to-date medical literature published about the condition from authoritative, trustworthy medical journals. This is the same information that is used by physicians and researchers to keep up with the latest developments and breakthroughs in clinical medicine and biomedical research. A broad spectrum of articles is included in each *MediFocus Guidebook* to provide information about standard treatments, treatment options, new clinical developments, and advances in research. To facilitate your review and analysis of this information, the articles are grouped by specific categories. A typical *MediFocus Guidebook* usually contains one or more of the following article groupings:

- *Review Articles*: Articles included in this category are broad in scope and are intended to provide the reader with a detailed overview of the condition including such important aspects as its cause, diagnosis, treatment, and new advances.
- *General Interest Articles*: These articles are broad in scope and contain supplementary information about the condition that may be of interest to select groups of patients.
- *Drug Therapy*: Articles that provide information about the effectiveness of specific drugs or other biological agents for the treatment of the condition.
- *Surgical Therapy*: Articles that provide information about specific surgical treatments for the condition.
- *Clinical Trials*: Articles in this category summarize studies which compare the safety and efficacy of a new, experimental treatment modality to currently available standard treatments for the condition. In many cases, clinical trials represent the latest advances in the field and may be considered as being on the "cutting edge" of medicine. Some of these experimental treatments may have already been incorporated into clinical practice.

The following information is provided for each of the articles referenced in this section of your *MediFocus Guidebook*:

- Article title
- Author Name(s)
- Institution where the study was done

- Journal reference (Volume, page numbers, year of publication)
- Link to Abstract (brief summary of the actual article)

Linking to Abstracts: Most of the medical journal articles referenced in this section of your *MediFocus Guidebook* include an abstract (brief summary of the actual article) that can be accessed online via the National Library of Medicine's PubMed® database. You can easily access the individual abstracts online via PubMed® from the "electronic" format of your *MediFocus Guidebook* by clicking on the corresponding URL address that is provided for each cited article. If you purchased a printed copy of a *MediFocus Guidebook*, you can still access the article abstracts online by entering the individual URL address for a particular article into your web browser.

Section 4 - Centers of Research

We've compiled a unique directory of doctors, researchers, medical centers, and research institutions with specialized research interest, and in many cases, clinical expertise in the management of the specific medical condition. The "Centers of Research" directory is a valuable resource for quickly identifying and locating leading medical authorities and medical institutions within the United States and other countries that are considered to be at the forefront in clinical research and treatment of the condition.

Inclusion of the names of specific doctors, researchers, hospitals, medical centers, or research institutions in this *Guidebook* does not imply endorsement by Medifocus.com, Inc. or any of its affiliates. Consumers are encouraged to conduct additional research to identify health-care professionals, hospitals, and medical institutions with expertise in providing specific medical advice, guidance, and treatment for this condition.

Section 5 - Tips on Finding and Choosing a Doctor

One of the most important decisions confronting patients who have been diagnosed with a serious medical condition is finding and choosing a qualified physician who will deliver high-level, quality medical care in accordance with currently accepted guidelines and standards of care. Finding the "best" doctor to manage your condition, however, can be a frustrating and time-consuming experience unless you know what you are looking for and how to go about finding it. This section of your *Guidebook* offers important tips for how to find physicians as well as suggestions for how to make informed choices about choosing a doctor who is right for you.

Section 6 - Directory of Organizations

This section of your *Guidebook* is a directory of select disease organizations and support groups that are in the business of helping patients and their families by providing access to information, resources, and services. Many of these organizations can answer your questions, enable you to network with other patients, and help you find a doctor in your geographical area who specializes in managing your condition.

2 - The Intelligent Patient Overview

ANKYLOSING SPONDYLITIS

Introduction to Ankylosing Spondylitis

Ankylosing spondylitis (AS), "stiffening of the spinal joints", is a chronic, rheumatoid, inflammatory joint condition which causes arthritic changes in the sacroiliac joint at the junction of the sacrum (lower spine) and the pelvis.

The human spine is a complex structure responsible for many tasks, including:

- Bearing weight of the upper body
- Keeping the body upright and erect when standing
- Providing structure and support to the skeletal system
- Maintaining flexibility of movement of the upper body
- Housing and protecting the spinal cord

The spine is comprised of many components including 24 vertebrae and more than 100 joints. The vertebrae are divided into three sections, namely:

- 7 *cervical* vertebrae in the neck region - these vertebrae provide the greatest mobility of the spinal vertebrae.
- 12 *thoracic* vertebrae in the chest region - each of the thoracic vertebrae has a rib attached to it which arches around to the front of the body and encompasses the lungs, heart, and the uppermost part of the abdominal organs.
- 5 *lumbar* vertebrae which lie behind the abdominal organs.

The *sacrum* is a triangular bone which sits below the lumbar vertebrae and attaches the spine to the pelvis. The joint that connects the sacrum and the pelvis is called the *sacroiliac joint*. Inflammation of the sacroiliac joint is the hallmark sign of ankylosing spondylitis and is the place where lower back pain associated with AS typically originates. Involvement of the *axial* joints (joints related to the spine), primarily the sacroiliac joint, is the earliest manifestation of ankylosing spondylitis although peripheral joints and extra-articular sites can be involved as well. Older names that have been used in the past to describe ankylosing spondylitis include "poker back," "rheumatoid spondylitis," and "Marie-Strumpell's spondylitis."

It is important not to confuse *spondylitis* with another spinal condition called *spondylosis*. While spondylosis reflects a condition resulting from 'wear and tear' of the spine more frequently seen in older people, spondylitis is an inflammatory condition that leads to new bone formation and fusion and is seen at a younger age.

Spondyloarthropathies

Ankylosing spondylitis is a member of a group of rheumatic diseases that affects the mobility of the spine, collectively known as *spondyloarthropathies* (SpAs). Spondyloarthropathies are a group of related inflammatory joint diseases associated almost exclusively with the presence of the genetic marker called HLA-B27 and are characterized specifically by sacroiliac joint involvement in addition to other symptoms. Spondyloarthropathies affect axial joints (the vertebral column, ribs, and the sternum) and can also involve peripheral joints (e.g., feet and shoulders). The clinical features of SpA are distinct from other rheumatologic conditions such as rheumatoid arthritis.

Spondyloarthropathies include the following subgroups of conditions:

- Ankylosing spondylitis - this is the most common subgroup and the subject of this Medifocus Guidebook.
- Reiter's syndrome (reactive arthritis) - a form of arthritis characterized by inflammation of the joints (especially in the legs), eyes, genital, urinary, or gastrointestinal tract.
- Enteropathic arthritis - this form of arthritis involves the lower extremities such as the knees and ankles. It is associated with inflammatory bowel disease (IBD). Inflammatory bowel disease refers to two similar but distinct conditions called *Crohn's disease* and *ulcerative colitis* that produce inflammation of the tissue lining the gastrointestinal tract resulting in abdominal pain, cramping, fatigue, and diarrhea.
- Psoriatic arthritis - a type of joint inflammation affecting people with the skin condition known as *psoriasis* (characterized by thick, inflamed patches of skin covered by silver or gray scales). Inflammation may occur in joints of the hands and/or feet, large joints (e.g., knees), and the sacroiliac joint.
- Undifferentiated spondyloarthropathy - *undifferentiated spondyloarthropathy* (USpA) is a term used to describe patients who have symptoms associated with ankylosing spondylitis but do not meet all of the criteria for diagnosis of AS or other specific types of SpA. Typically, some symptoms are present but not enough to make a definitive diagnosis. Over time, some people with USpA go on to develop ankylosing spondylitis or some other type of spondyloarthropathy. Patients who suffer from USpA face significant frustration when seeking a diagnosis since many health care providers do not recognize or identify the grouping of symptoms as an independent entity. Patients may be told that they are "anxious and depressed" or may be misdiagnosed with fibromyalgia. The prognosis of patients with USpA is generally good, though some will go on to develop ankylosing spondylitis. Some researchers theorize that patients with USpA who test positive for the presence of the HLA-B27 gene are more likely to develop AS. Therapy for USpA is usually to relieve symptoms and the condition may be chronic though not severe.

What Happens in Ankylosing Spondylitis?

Although ankylosing spondylitis (AS) affects each individual differently in symptom severity and disease progression, the primary symptoms of ankylosing spondylitis typically include back pain and back stiffness, especially in the morning. Chronic inflammation and irritation of the spinal joints (vertebrae) cause changes to those joints, since the body's natural process of healing and repair following inflammation can result in extra bone formation that eventually may lead to fusion of the vertebrae. The stiffening of the joints due to abnormal fusion is referred to as *ankylosis*. Thus if a person has severe ankylosing spondylitis for many years, the continuous inflammation and process of repair leads to bony fusion of ligaments in the spine and sometimes other joints as well.

Ankylosing spondylitis is characterized by *enthesitis* - inflammation at the junction where the joint capsule, tendons, and ligaments attach to the bone. In addition to the sacroiliac joint, enthesitis can take place in multiple sites called "hot spots" and may lead to painful swelling and tenderness. Subchondral tissue (smooth tissue at the ends of bones) becomes granulomatous (characterized by small or granular nodular inflammatory lesions) and is infiltrated with various types of immune cells such as plasma cells and lymphocytes. Joints that are affected show markings of *sclerosis* (hardening of tissue) and irregular erosion. The tissue is gradually replaced with fibrous cartilage and becomes ossified (bony) leading to ankylosis. Outer muscle fibers of the spine are replaced by bone which eventually fuses the vertebrae. When this process ascends the spine in the later stages of disease, the spine becomes a bony column and is often referred to as a "bamboo spine". Progression of the disease to this point, however, is rare.

The degree of fusion in ankylosing spondylitis can range from partial fusion (e.g., limited to the pelvic bones) to fusion of the entire spine. In its later stages, ankylosing spondylitis may cause total loss of spinal mobility and function, significantly impacting the individual's quality of life. Since bone formed during fusion is inherently weak, there is an increased risk of spinal fracture for patients with ankylosing spondylitis.

The pain in ankylosing spondylitis is initially caused by enthesitis that occurs at the sacroiliac joint. The number of sites of enthesitis and their location are two important determining factors as to how much impact AS will have on quality of life. For example, if enthesitis appears in the Achilles tendon at the back of the heel or in the plantar fascia at the base of the heel, walking can be significantly impaired. Enthesitis may deteriorate into *enthesopathy* - calcification of joints, tendons, and ligaments - that may further impair movement and mobility.

Because ankylosing spondylitis is also a systemic rheumatic disease, it can lead to inflammation that affects other parts of the body in addition to the spine. Patients with ankylosing spondylitis may develop arthritis, pain or stiffness in other locations such as:

- Hips
- Knees
- Ankles
- Heels
- Shoulders
- Ribs

Some people with ankylosing spondylitis can develop other complications as a result of the

chronic inflammation which can affect several organs including the eyes, heart, and kidneys.

Many patients do not seek help early in the disease process because the symptoms may be vague and insidious. Inflammatory back pain may occur 5-10 years before being diagnosed and in that time period, progressive structural damage is taking place. The diagnosis is only established when the damage and structural abnormalities of the sacroiliac joint and/or spine become visible on X-ray images.

Progression of Ankylosing Spondylitis

Though the progression of ankylosing spondylitis may be mild in some patients, others may experience progressive structural deterioration, pain, and functional disability. Enthesitis-related "hot spots" can be very painful and, depending on their location (e.g., heel or spine), can significantly impact mobility and quality of life. Patients may experience periods of painful, active inflammation called "flares", and periods during which the disease is inactive, known as "remissions". Typically, for patients whose AS is progressive, symptoms become chronic, pain becomes more persistent during flares, and remissions are not very long. Within a few months of onset, pain in the lower back/buttocks may become unilateral (affect one side only) or may alternate from side to side. Over time (months or years) the pain and stiffness may spread up the spine and into the neck. Often, pain and tenderness also affect the ribs, shoulder blades, hips, thighs, and heels. Progression and severity are not related to age or gender.

Some patients may develop bone tenderness together with back pain or stiffness. Others may develop arthritis of the hips or shoulders early in the course of ankylosing spondylitis. Neck pain and stiffness are usually indicators of advanced disease. Disease activity usually persists for decades and patients seldom experience a long period of remission. Ankylosing spondylitis is typically more severe in men than in women.

If ankylosing spondylitis is not treated in a timely fashion, it continues to deteriorate and can cause significant health problems, including:

- Postural changes
- Destruction of normal lumbar lordosis (exaggeration of the forward curve of the lower part of the back, sometimes called "sway-back")
- Atrophy of the buttocks
- Exaggerated thoracic spine kyphosis (outward curvature of the upper back giving a "hunchback" appearance)
- Forward positioning of the neck over the chest

Complications of Ankylosing Spondylitis

The patient with progressive AS may encounter *joint-related complications* or *extra-articular complications* (complications outside the joints).

Joint-Related Complications

Spinal ankylosis

Chronic inflammation of the spine can cause the vertebrae of the spinal column to fuse together, a condition known as *ankylosis*. Ankylosis, or fusion, causes stiffness/rigidity of the spinal column leading to loss of normal spinal flexibility and deformity of the spine as well as loss of function/mobility. Fusion can sometimes lead to *kyphosis*, a forward-directed curvature of the spine which causes a stooped posture. However, this condition is not as common nowadays due to increasingly effective treatments for AS. The most serious complication for patients with ankylosing spondylitis is spinal fracture. Since the bone that forms is inherently weak, the spine becomes very rigid and fragile, and even mild trauma can result in fracture. The cervical spine is at greatest risk and fractures at this level may result in quadriplegia.

Hip and shoulder

Hip and/or shoulder involvement affects approximately one-third of patients with ankylosing spondylitis. Hip symptoms (inflammation and pain) typically develop slowly and may initially be felt in the groin. Sometimes the patient may feel referred pain from the hip in the back of their knees or the front of their thigh which can confuse the diagnostic workup. Hip involvement is more common when onset takes place in younger patients and is thought to indicate a risk for severe progression of AS. Shoulder involvement is usually mild in part because the shoulder is not a weight-bearing joint.

Other joint complications of the leg in AS include:

- Knee
- Ankle - ankle and hip pain are more common initial symptoms of juvenile AS.
- Heel - involved areas may include the Achilles tendon at the back of the heel or the plantar fascia at the base of the heel which results in a painful condition called *plantar fasciitis*.
- Occasionally, chronic inflammation of the small joints of the toes can produce "sausage"-shaped toes

Chest

The joints between the ribs, spine, and where the ribs attach at the chest may show increased scarring from long-term inflammation in the patient with ankylosing spondylitis. The scarring and continued inflammation may limit chest expansion causing chest pain that mimics angina (heart spasms) or pleurisy (inflammation of the outer layer of the lung). It is important to seek medical attention quickly to determine the source of the pain.

Jaw

It is estimated that approximately 10% of patients with ankylosing spondylitis experience inflammation in the jaw which can limit the extent of mouth opening and also affect eating and speech.

Extra-articular Complications

In addition to the changes that take place in the sacroiliac joint, there are additional complications that are associated in varying degrees with AS including:

Fatigue

Most individuals with AS experience fatigue and it is a major complaint among patients that significantly impacts activities of daily living and quality of life in general. It may be caused by

lack of sleep, pain, or as part of the natural inflammatory process that takes place in AS.

Anterior Uveitis or Iritis

The eye is the most common organ affected by ankylosing spondylitis. Approximately 40% of patients with AS develop a condition called *anterior uveitis* (inflammation of the uvea) or *iritis*. The *uvea* is the middle layer of the eye beneath the *sclera* (the white part of the eye). It consists of the iris (the colored part of the eye), ciliary body (changes the shape of the lens when focusing), and choroid (vascular layer in the eye). These structures control many of the functions of the eye such as adjusting to different levels of light or different distances of objects.

Symptoms of anterior uveitis include:

- Blurred vision usually in one eye
- Sharp pain in the eye
- Bloodshot eye
- Increased lacrimation (tear production)
- Photophobia (fear and avoidance of light)

It is important for patients who develop symptoms of anterior uveitis to seek medical attention promptly in order to avoid permanent damage to the eye.

Inflammatory Bowel Disease

Up to 60% of patients with ankylosing spondylitis are reported to have asymptomatic inflammatory bowel disease. Approximately 20% of patients with inflammatory bowel disease (Crohn's disease and ulcerative colitis) also experience spinal inflammation which highlights the close association between IBD and AS. Symptoms of inflammatory bowel disease include abdominal pain, cramping, fatigue, and diarrhea.

Cardiac Complications

Cardiac involvement in AS has been increasingly recognized as a complication that affects many patients. According to an article published in 1998 in the *Journal of the American College of Cardiology* (vol.32(5):1397-1404), aortic root disease and valve disease are thought to possibly occur in up to 82% of patients and are associated with AS-related morbidity. Complications include:

- Aortic root disease - thickening, stiffness, and dilatation of the portion of the aorta that is attached to the heart.
- Aortitis (inflammation of the aorta) - related to aortic root thickening
- Leakage of the aortic valve - the mitral valve can also be affected.
- Cardiac insufficiency - inability of the ventricle to eject a sufficient amount of blood during contraction of the heart

To read more about aortic complications of AS, please click on the following link:

<http://www.ncbi.nlm.nih.gov/pubmed/18799070>

Other cardiac conditions that may develop include:

- Angina pectoris - chest pain due to coronary heart disease
- Pericarditis - inflammation of the pericardial membranes surrounding the heart
- Arrhythmia - electrical conduction heart abnormalities

Osteoporosis

Osteoporosis (reduced bone mineral density) is a common complication in patients with ankylosing spondylitis and occurs in up to 62% of patients. The occurrence of osteoporosis increases with increasing patient age and disease duration. In AS patients, osteoporosis is usually limited to the spine while peripheral bones remain unaffected. Affected patients are at greater risk for developing spinal fractures.

Pulmonary Complications

Development of pulmonary complications in patients with ankylosing spondylitis is rare and is usually related to poor chest wall movement. Some patients with ankylosing spondylitis may develop pulmonary fibrosis (chronic inflammation of the lungs associated with progressive fibrosis or scarring of lung tissue) which is detected on X-ray. Some health care providers recommend that patients with ankylosing spondylitis should have an X-ray every five years to check for presence of lung fibrosis.

Ankylosing spondylitis can also affect the ribs and may result in painful deep breathing, sneezing, coughing, or yawning. *Costochondritis* - chronic inflammation of the cartilage around the sternum (breast bone) - can lead to reduced chest expansion and difficulty breathing. Poor chest wall movement results in reduced lung capacity and, as a result, the lungs are not fully ventilated (filled and emptied to capacity) during inhalation and exhalation.

Chest pain associated with ankylosing spondylitis can mimic angina or *pleurisy* pain associated with breathing when the outer lining of the lung is inflamed. If either of these symptoms occurs, medical attention is needed quickly to rule out serious cardiac or pulmonary conditions.

Some patients with ankylosing spondylitis who develop limited chest expansion find that it takes them longer to recover from colds or other upper respiratory infections. Smoking cessation is vitally important for patients with AS.

Renal Complications

In rare cases, chronic inflammation associated with AS may produce *renal amyloidosis* (deposits of amyloid proteins in the kidney) which may cause *albuminuria* (presence of albumin protein in the urine) with subsequent deterioration of kidney function. Amyloidosis may also occur with long-term use of non-steroidal anti-inflammatory drugs (NSAIDs).

Neurologic Involvement

Neurologic complications are very rare and may be seen only after very long-term illness. Some patients with advanced ankylosing spondylitis may develop a condition called *cauda equina syndrome* that is caused by compression of a bundle of nerves called the *cauda equina* at the base of the spine. This may lead to:

- Urinary retention and/or incontinence
- Sexual dysfunction

- Pain/weakness in the legs

Systemic Involvement

Because ankylosing spondylitis is a systemic disease, it can produce other symptoms in addition to those listed above. Systemic manifestations of ankylosing spondylitis may include:

- Low-grade fever
- Fatigue - this is a common complaint of patients with AS
- Weight loss
- Anemia - lower than normal levels of red blood cells in the bloodstream

Measuring Disease Activity in Ankylosing Spondylitis

Information from a team of rheumatologists, physical therapists, and ankylosing spondylitis (AS) research specialists formed the basis on which a system of tests was created to measure various aspects of disease activity. Known as the Bath Indices, these tests are used to measure disease activity in ankylosing spondylitis and include:

- BATH AS Metrology Index (BASMI)
- BATH AS Functional Index (BASFI)
- BATH AS Disease Activity Index (BASDAI)
- BATH AS Patient Global Score (BAS-G)

BATH AS Metrology Index (BASMI)

This test measures clinically significant changes in spinal movement and consists of measuring the status of cervical, dorsal, and lumbar spine, hips, and pelvic soft tissue. A high score indicates more severe limitation of movement due to ankylosing spondylitis.

BATH AS Functional Index (BASFI)

This test determines the degree of functional limitation of the patient with ankylosing spondylitis. It consists of 10 questions about coping with activities of daily living. Responses are made in conjunction with a *visual analog scale*. A visual analog scale is a questionnaire that is formatted in such a way that a person can rate the intensity of certain sensations and feelings, such as pain, by indicating their level of agreement to a statement on a continuous line between two end-points (e.g., "very painful" to "no pain"). It provides the patient with a broad range of possible responses and thus offers a more accurate representation of functional status. Another advantage of the visual analog scale is that it reflects a greater sensitivity to any change of status with subsequent testing.

The *Dougados Functional Index* (DFI) is another score used to evaluate functional capacity of patients with ankylosing spondylitis. The BASFI may be more precise in its discriminative capacity and examine a wider range of parameters than the DFI.

BATH AS Disease Activity Index (BASDAI)

This test is also administered in conjunction with a visual analog scale and measures responses relating to:

- Fatigue
- Spinal pain
- Joint pain and swelling
- Areas of localized tenderness
- Morning stiffness

The BASDAI is also sensitive to changes that may occur with subsequent testing.

BATH AS Patient Global Score (BAS-G)

This test enables the health care provider to objectively measure how patients evaluate their own well-being over the past week and over the past six months. It is not meant to be administered as a stand-alone test, but rather is evaluated in context with the scores from other BATH indices. Scores are measured from 1-10 with the higher numbers indicating a greater degree of AS involvement in everyday life. The BATH indices can be given to all ages, are user friendly, and can be completed quickly.

Incidence of Ankylosing Spondylitis

Symptoms of ankylosing spondylitis (AS) usually begin between the ages of 15-40 although the disease can also affect children or adolescents as well as adults over 40 years of age. A study of 3,000 patients with ankylosing spondylitis from Germany reported that:

- 4% of patients exhibited their first symptom of AS before the age of 15
- 90% of patients exhibited their first symptom between the ages of 15 and 40
- 6% of patients exhibited their first symptom after 40 years of age

Ankylosing spondylitis is three times more common in Caucasians than in African Americans. It has been estimated that approximately 350,000 Americans suffer from ankylosing spondylitis. Internationally, ankylosing spondylitis is thought to occur in up to 1% of the general population with the highest incidence in northern European countries and the lowest occurrence in sub-Saharan Africa. The prevalence of ankylosing spondylitis is about 2 to 3 times higher in males than females, with males accounting for about 65%-80% of cases.

There is increasing evidence that ankylosing spondylitis is commonly under-diagnosed in women since its presentation often differs considerably than that in men. This has led some researchers to believe that ankylosing spondylitis may be more prevalent in women than formerly thought.

Ankylosing spondylitis may appear in children as young as 11 years old and is called *juvenile ankylosing spondylitis*. When AS develops in children or adolescents, it tends to involve the knees, ankles, feet, hips, and buttocks. Back pain, however, is rare.

Risk Factors for Ankylosing Spondylitis

Despite an extensive amount of research that has been conducted over the past few decades, the exact cause of ankylosing spondylitis (AS) remains unknown. Investigators are puzzled by the insidious onset that leads to diagnosis only after several years. The pathogenesis appears to be

related to a complex interaction of immunological, genetic, and environmental factors which are not yet clearly understood. Scientists, however, have identified certain risk factors that may increase a person's chances of developing ankylosing spondylitis.

Risk factors for ankylosing spondylitis include:

- Genetic predisposition
- Inflammatory bowel disease
- Presence of immune response mediators
- Male gender

Genetic Predisposition

Ankylosing spondylitis tends to run in families. Evidence for a possible genetic predisposition to AS is supported by the findings that a specific Human Leukocyte Antigen (HLA) tissue type known as HLA-B27 occurs in approximately 90-95% of individuals with AS. In contrast, the HLA-B27 genetic marker is only found in about 6% of the overall general population suggesting that individuals with the HLA-B27 tissue type may be more genetically predisposed to developing AS than people who do not possess the HLA-B27 genetic marker. The presence of the HLA-B27 marker is considered to account for 20-40% of the overall risk of developing AS.

Most people with the HLA-B27 marker do not develop AS, nor does the HLA-B27 marker need to be present in order to develop AS. It is estimated that less than 2% of individuals with the HLA-B27 gene in the general population develop AS. The HLA-B27 gene does not cause AS but seems to make people more susceptible to the condition.

Ankylosing spondylitis is 10 to 20 times more common among individuals with a first-degree relative (parent or sibling) who has AS than in the general population. If one parent is positive for the HLA-B27 gene, there is a 50% that each of the children of this parent will inherit the gene. The likelihood of the child developing ankylosing spondylitis, however, is less than 10%.

Recently, researchers have identified additional genes that may be involved with the predisposition for developing ankylosing spondylitis.

Immune Response Mediators

Ankylosing spondylitis may be related to secretion of *cytokines* (immune response mediators) such as *TNF-alpha* that develop as a result of prolonged immune response to infection. Studies have suggested a role for *TNF-alpha* in the pathogenesis of ankylosing spondylitis based on the following observations:

- Elevated levels of *TNF-alpha* in the sacroiliac joints of patients with AS
- Elevated levels of *TNF-alpha* in certain joints of patients with psoriatic arthritis which is one type of spondyloarthropathy
- Elevated levels of *TNF-alpha* in the mucosa of the gut (intestines) in biopsy samples of patients with Crohn's Disease, which is highly associated with AS

Several other pro-inflammatory cytokines including *interleukins 23 and 17* are also under investigation in their role in the etiology or origin of AS.

Inflammatory Bowel Disease

There is some evidence that bacterial infections may "trigger" the underlying chronic inflammation that leads to the development of ankylosing spondylitis. The association between ankylosing spondylitis and inflammatory bowel diseases (Crohn's disease and ulcerative colitis) suggests that an exaggerated immune response to bacteria in the gastrointestinal tract may be involved in the underlying pathogenesis of AS. Ankylosing spondylitis may develop when host defenses in the intestine break down and bacteria from the intestines travel through the bloodstream into the region of the sacroiliac joint where they trigger a chronic inflammatory response.

The **Intelligent Patient Overview** in the complete **Medifocus Guidebook on Ankylosing Spondylitis** also includes the following additional sections:

- **Diagnosis of Ankylosing Spondylitis**
- **Treatment Options for Ankylosing Spondylitis**
- **Quality of Life Issues and Ankylosing Spondylitis**
- **New Developments in Ankylosing Spondylitis**
- **Questions to Ask Your Health Care Provider About Ankylosing Spondylitis**

To Order the Complete **Guidebook on Ankylosing Spondylitis** [Click Here](#)
Or Call 800-965-3002 (USA) or 301-649-9300 (Outside USA)

3 - Guide to the Medical Literature

Introduction

This section of your *MediFocus Guidebook* is a comprehensive bibliography of important recent medical literature published about the condition from authoritative, trustworthy medical journals. This is the same information that is used by physicians and researchers to keep up with the latest advances in clinical medicine and biomedical research. A broad spectrum of articles is included in each *MediFocus Guidebook* to provide information about standard treatments, treatment options, new developments, and advances in research.

To facilitate your review and analysis of this information, the articles in this *MediFocus Guidebook* are grouped in the following categories:

- Review Articles - 35 Articles
- General Interest Articles - 54 Articles
- Drug Therapy Articles - 17 Articles
- Clinical Trials Articles - 48 Articles

The following information is provided for each of the articles referenced in this section of your *MediFocus Guidebook*:

- Title of the article
- Name of the authors
- Institution where the study was done
- Journal reference (Volume, page numbers, year of publication)
- Link to Abstract (brief summary of the actual article)

Linking to Abstracts: Most of the medical journal articles referenced in this section of your *MediFocus Guidebook* include an abstract (brief summary of the actual article) that can be accessed online via the National Library of Medicine's PubMed® database. You can easily access the individual abstracts online via PubMed® from the "electronic" format of your *MediFocus Guidebook* by clicking on the URI that is provided for each cited article. If you purchased a printed copy of the *MediFocus Guidebook*, you can still access the abstracts online by entering the individual URI for a particular abstract into your computer's web browser.

Recent Literature: What Your Doctor Reads

Database: PubMed <July 2007 to March 2010>

Review Articles

1.

Effect of tumor necrosis factor alpha inhibition on bone density and turnover markers in patients with rheumatoid arthritis and spondyloarthropathy.

Authors: Barnabe C; Hanley DA
Institution: Division of Rheumatology, Department of Medicine, University of Calgary, Calgary, Alberta, Canada. ccbarbab@ucalgary.ca
Journal: Semin Arthritis Rheum. 2009 Oct;39(2):116-22. Epub 2008 Jun 30.
Abstract Link: <http://www.medifocus.com/abstracts.php?gid=RH001&ID=18585759>

2.

Treatment of ankylosing spondylitis and other spondyloarthritides.

Authors: Braun J; Baraliakos X
Institution: Rheumazentrum Ruhrgebiet, Herne, Germany. X.Baraliakos@googlemail.com
Journal: Curr Opin Rheumatol. 2009 Jul;21(4):324-34.
Abstract Link: <http://www.medifocus.com/abstracts.php?gid=RH001&ID=19461519>

3.

Inflammatory arthritis: an overview for primary care physicians.

Author: Brent LH
Institution: Albert Einstein Medical Center, Einstein Arthritis Center, Philadelphia, PA 19141, USA. brentlh@hotmail.com
Journal: Postgrad Med. 2009 Mar;121(2):148-62.
Abstract Link: <http://www.medifocus.com/abstracts.php?gid=RH001&ID=19332973>

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- Review Articles - 35 Articles
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4 - Centers of Research

This section of your *MediFocus Guidebook* is a unique directory of doctors, researchers, medical centers, and research institutions with specialized research interest, and in many cases, clinical expertise in the management of this specific medical condition. The *Centers of Research* directory is a valuable resource for quickly identifying and locating leading medical authorities and medical institutions within the United States and other countries that are considered to be at the forefront in clinical research and treatment of this disorder.

Use the *Centers of Research* directory to contact, consult, or network with leading experts in the field and to locate a hospital or medical center that can help you.

The following information is provided in the *Centers of Research* directory:

- **Geographic Location**

- United States: the information is divided by individual states listed in alphabetical order. Not all states may be included.
- Other Countries: information is presented for select countries worldwide listed in alphabetical order. Not all countries may be included.

- **Names of Authors**

- Select names of individual authors (doctors, researchers, or other health-care professionals) with specialized research interest, and in many cases, clinical expertise in the management of this specific medical condition, who have recently published articles in leading medical journals about the condition.
- E-mail addresses for individual authors, if listed on their specific publications, is also provided.

- **Institutional Affiliations**

- Next to each individual author's name is their **institutional affiliation** (hospital, medical center, or research institution) where the study was conducted as listed in their publication(s).
- In many cases, information about the specific **department** within the medical institution where the individual author was located at the time the study was conducted is also provided.

Centers of Research

United States

CA - California

<u>Name of Author</u>	<u>Institutional Affiliation</u>
Davis JC Jr	University of California San Francisco, 533 Parnassus Avenue Box 0633 Room U383, San Francisco, CA 94143-0633, USA.
Gensler LS	University of California San Francisco, 533 Parnassus Avenue Box 0633 Room U383, San Francisco, CA 94143-0633, USA.
Lee W	Cedars-Sinai Medical Center, Los Angeles, California, USA.
Luo MP	University of California, San Francisco, CA 94143, USA. jdavis@medicine.ucsf.edu
Tsuji WH	University of California, San Francisco, 533 Parnassus Avenue, Box 0633, Room U 386, San Francisco, CA 94143-0633 USA. jdavis@medicine.ucsf.edu
Weisman MH	Cedars-Sinai Medical Center, Los Angeles, California, USA.

CT - Connecticut

<u>Name of Author</u>	<u>Institutional Affiliation</u>
Vaccaro AR	Department of Orthopaedics and Rehabilitation, Yale University School of Medicine, New Haven, CT 06520-8170, USA. peter.wang@yale.edu
Wang PG	Department of Orthopaedics and Rehabilitation, Yale University School of Medicine, New Haven, CT 06520-8170, USA. peter.wang@yale.edu

MA - Massachusetts

<u>Name of Author</u>	<u>Institutional Affiliation</u>
Donohue JP	Beth Israel Deaconess Medical Center, 330 Brookline Avenue, Boston, MA 02215, USA. franton444@yahoo.com
Nghiem FT	Beth Israel Deaconess Medical Center, 330 Brookline Avenue, Boston, MA 02215, USA. franton444@yahoo.com

The **Centers of Research** in the complete **Medifocus Guidebook on Ankylosing Spondylitis** includes the following sections:

- Centers of Research for relevant states in the United States
- Centers of Research listed for relevant countries outside the United States

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5 - Tips on Finding and Choosing a Doctor

Introduction

One of the most important decisions confronting patients who have been diagnosed with a serious medical condition is finding and choosing a qualified physician who will deliver a high level and quality of medical care in accordance with currently accepted guidelines and standards of care. Finding the "best" doctor to manage your condition, however, can be a frustrating and time-consuming experience unless you know what you are looking for and how to go about finding it.

The process of finding and choosing a physician to manage your specific illness or condition is, in some respects, analogous to the process of making a decision about whether or not to invest in a particular stock or mutual fund. After all, you wouldn't invest your hard earned money in a stock or mutual fund without first doing exhaustive research about the stock or fund's past performance, current financial status, and projected future earnings. More than likely you would spend a considerable amount of time and energy doing your own research and consulting with your stock broker before making an informed decision about investing. The same general principle applies to the process of finding and choosing a physician. Although the process requires a considerable investment in terms of both time and energy, the potential payoff can be well worth it--after all, what can be more important than your health and well-being?

This section of your Guidebook offers important tips for how to find physicians as well as suggestions for how to make informed choices about choosing a doctor who is right for you.

Tips for Finding Physicians

Finding a highly qualified, competent, and compassionate physician to manage your specific illness or condition takes a lot of hard work and energy but is an investment that is well-worth the effort. It is important to keep in mind that you are not looking for just any general physician but rather for a physician who has expertise in the treatment and management of your specific illness or condition. Here are some suggestions for where you can turn to identify and locate physicians who specialize in managing your disorder:

- **Your Doctor** - Your family physician (family medicine or internal medicine specialist) is a good starting point for finding a physician who specializes in your illness. Chances are that your doctor already knows several specialists in your geographic area who specialize in your illness and can recommend several names to you. Your doctor can also provide you with information about their qualifications, training, and hospital affiliations.

The **Tips on Finding and Choosing a Doctor** in the complete **Medifocus Guidebook on Ankylosing Spondylitis** includes additional information that will assist you in locating a highly qualified and competent physician to manage your specific illness.

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6 - Directory of Organizations

American Academy of Physical Medicine and Rehabilitation

330 N. Wabash Avenue; Suite 2500; Chicago, IL 60611

312.464.9700; 312.464.0227 (fax)

info@aapmr.org

www.aapmr.org

American College of Rheumatology

1800 Century Place; Suite 250; Atlanta, GA 30345

404.633.3777; 404.633.1870 (fax)

acr@rheumatology.org

www.rheumatology.org

Ankylosing Spondylitis International Federation

www.asif.rheumanet.org

Arthritis Foundation Information Line; American Juvenile Arthritis Organization

POB 7669; Atlanta, GA 30309

404.872.7100; 800-283-7800

help@arthritis.org

www.arthritis.org

Arthritis National Research Foundation

200 Oceangate; Suite 830; Long Beach, CA 90802

800.588.2873; 562.983.1410 (fax)

anrf@ix.netcom.com

www.curearthritis.org

National Ankylosing Spondylitis Society

Unit 0.2, One Victoria Villas, Richmond, Surrey, TW9 2GW UK

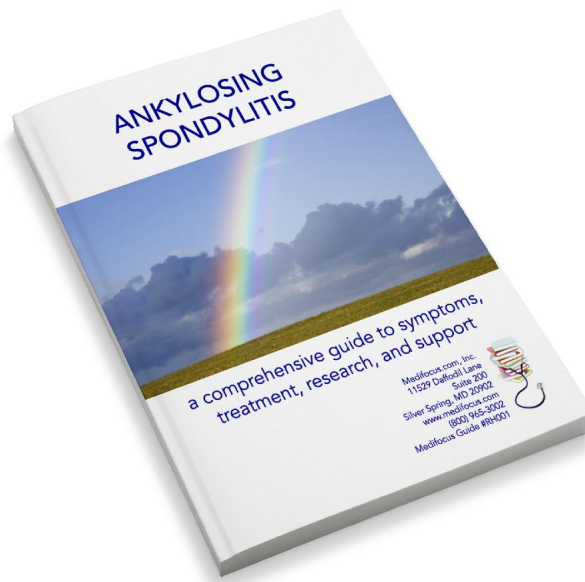
020 8948 9117

nass@nass.co.uk

www.nass.co.uk

The **Directory of Organizations** in the complete **Medifocus Guidebook on Ankylosing Spondylitis** includes a list of selected disease organizations and support groups that are helping people diagnosed with Ankylosing Spondylitis.

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This document is only a SHORT PREVIEW of the **Medifocus Guidebook on Ankylosing Spondylitis**. It is intended primarily to give you a general overview of the **format and structure** of the Guidebook as well as select pages from each major Guidebook section listed in the Table of Contents.

To purchase the COMPLETE Medifocus Guidebook on Ankylosing Spondylitis (130 pages; Updated March 25, 2010), please:

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