

## Musculoskeletal Ultrasound

While most physicians are aware of the medical imaging uses of ultrasound, its implementation has not advanced far beyond radiology, ob-gyn, and cardiology. Applications in such non-traditional specialties as anesthesiology, emergency medicine, and critical care are raising the exposure to how point-of-care ultrasound in the office and hospital setting can improve patient care. Because ultrasound has been most prominently used in Europe and Australia, where MR and CT imaging are not as widely available as in the United States, physicians practicing overseas have contributed greatly to advancing the state-of-the-art applications of ultrasound, including its use in diagnosing and treating musculoskeletal (MSK) conditions. Utilization of MSK ultrasound continues to show signs of continued growth with the introduction of high-quality, affordable, hand-carried ultrasound systems.

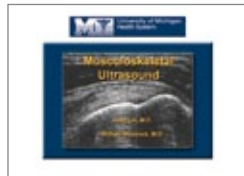
Physicians learning to use ultrasound can refer to a variety of informational sources to help them become proficient as quickly as possible. The following is a compilation of resources and references providing additional information about the use of ultrasound for MSK applications: ultrasound websites, reference texts, and video instruction.

## MSK Ultrasound Websites

### University of Michigan Health System

<http://www.med.umich.edu/rad/muscskel/mskus/index.html>

An interactive computer-based teaching tool, this website reviews the general principles and techniques of musculoskeletal sonography. It is organized by anatomic location, with images showing patient positioning, transducer placement, normal anatomy, and images of common conditions. The dynamic imaging capability of ultrasound is illustrated by video clips. For instance, the shoulder section contains:



- Patient positioning and transducer placement
- Images of the normal shoulder (biceps tendon, supraspinatus, infraspinatus, labrum)
- Images of shoulder cases include full thickness supraspinatus tear with retraction, without retraction, with calcifications, with bursal fluid; partial thickness articular surface supraspinatus tear; partial thickness bursal surface supraspinatus tear; supraspinatus tendinopathy; supraspinatus calcific tendonitis; biceps tendon dislocation; biceps tendon loose bodies; subscapularis tendon tear; subscapularis pump; labral tear with ganglion cyst; greater tuberosity fracture; Hill-Sachs injury; and subacromial/subdeltoid bursitis.

### MSK-USS.org

<http://www.msk-uss.org>

MSK-USS.org is an organization formed by rheumatologists interested in musculoskeletal ultrasound. Its aim is to promote collegiality among national and international rheumatologists practicing musculoskeletal ultrasound. Lists of useful websites, books, courses, and articles are offered on this site. Enter the "Members Only" section of the website to join a discussion forum with topics ranging from image acquisition, image review, research discussions and "Members Only" surveys.



### European League Against Rheumatism (EULAR)

<http://www.doctor33.it/eular/ultrasound/index.htm>

EULAR's Working Group for Musculoskeletal Ultrasound created and maintains the "Guidelines for Musculoskeletal Ultrasound in Rheumatology" website. While specifically targeted toward the needs of rheumatologists, the applications are largely common to other specialties utilizing musculoskeletal ultrasound. Major topics include: technical equipment, teaching and training, and standardization of musculoskeletal ultrasound. A summary explaining patient position is followed by examples of ultrasound images of normal anatomy and a variety of conditions.



### European Society of Musculoskeletal Radiology

<http://www.essr.org>

The ESSR Subcommittee for Ultrasound in Musculoskeletal Radiology promotes ultrasound practice among European musculoskeletal radiologists and develops standards for musculoskeletal ultrasound scanning technique. The website enables downloads of the ESSR protocols for MSK ultrasound. Included are illustrated, step-by-step instructions for performing comprehensive ultrasound exams of the knee, shoulder, hip, wrist, ankle and elbow; patient positioning; transducer placement; and images of normal anatomy.



## Reference Texts

All texts available through [www.amazon.com](http://www.amazon.com) unless otherwise indicated.

### Guidelines and Gamuts in Musculoskeletal Ultrasound

*Rethy K. Chhem and Etienne Cardinal*

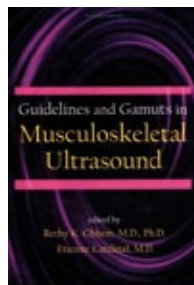
This practical guidebook provides an overview of the capability of musculoskeletal ultrasonography to assess disorders of the shoulder, elbow, wrist, hands, hip, knee, ankle, and foot. Each chapter provides a concise overview of anatomical structure, clinical indications, scanning techniques, and possible normal and abnormal findings. *Guidelines and Gamuts in Musculoskeletal Ultrasound* features a highly visual and easily accessible format that makes great use of tables, schematic diagrams, gamuts, and representative images. Individual chapters address such topics as: rotator and non-rotator cuff shoulder disorders; disorders of the elbow, wrist, adult hip, knee, and ankle; muscle and fascia; bone; soft tissue masses: an algorithmic approach; and soft tissue masses in pediatrics.

Hardcover: 408 pages

Publisher: Wiley-Liss; 1 edition (Oct 1998)

ISBN-10: 0471197556

ISBN-13: 9780471197553



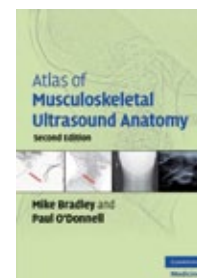
### Atlas of Musculoskeletal Ultrasound Anatomy

*Mike Bradley, Paul O'Donnell*

*Atlas of Musculoskeletal Ultrasound Anatomy* provides an essential grounding in normal ultrasound anatomy, enabling the reader to assess whether anatomy is disrupted through injury or disease. The book is structured systematically, with all commonly imaged areas illustrated by high quality ultrasound scans with accompanying concise descriptive text. Features of the second edition:

- Over 100 individual anatomical descriptions
- Numerous new images from the latest generation ultrasound machines
- Improved surface anatomy diagrams indicating limb and probe optimal positions for each area of anatomy
- Numerous radiographic anatomical diagrams showing ultrasound probe overlying the anatomical structure for improved visual understanding

*Atlas of Musculoskeletal Ultrasound Anatomy* appeals to a wide range of practitioners who need to visualize the musculoskeletal system to diagnose injuries or locate blood vessels or nerves while undertaking clinical procedures. Radiologists, sonographers, anaesthetists, physiotherapists, rheumatologists, and orthopaedic surgeons will find this an invaluable practical reference.



Paperback: 234 pages

Publisher: Cambridge University Press; 2 edition (Jan 2010)

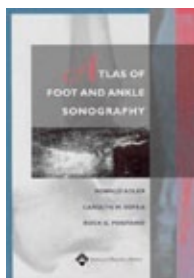
ISBN-10: 0521728096

ISBN-13: 9780521728096

### Atlas of Foot and Ankle Sonography

*Ronald Adler, Carolyn M. Sofka, Rock G. Positano*

Prepared by two leading experts in musculoskeletal ultrasound and a well-known podiatrist, this atlas is a complete guide to the use of ultrasound in the diagnosis of foot and ankle disorders. More than 160 illustrations display both normal ultrasound anatomy and a variety of common (and some uncommon) pathologic states. For each region of the foot and ankle, the atlas shows normal ultrasound anatomy and appearances of specific disorders. The authors compare the utility of ultrasound and MRI, particularly in detecting soft tissue injuries and foreign bodies. A chapter on ultrasound-guided therapeutic injections and diagnostic aspirations is also included.



Hardcover: 123 pages

Publisher: Lippincott Williams & Wilkins (June 2004)

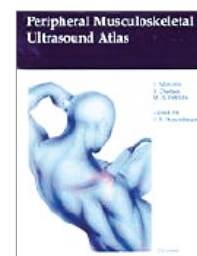
ISBN-10: 0781747694

ISBN-13: 9780781747691

### Peripheral Musculoskeletal Ultrasound Atlas

*S. Marcelis, B. Daenen, M.A. Ferrara*

This book is an authoritative review of high-definition ultrasound (US) in diagnosing musculoskeletal (MSK) pathology of the extremities. It gives an overview of the most common applications of MSK US. The authors illustrate a systematic approach to examining the different joints of the upper and lower limbs. Representative ultrasound scans of the intra-articular regions complement the anatomical line drawings. Examination techniques, tips, tricks, and traps are explained and demonstrated. The reader will appreciate the images of regional and basic pathology.



Hardcover: 203 pages

Publisher: Thieme; 1 edition (Jan 1996)

ISBN-10: 0865775923

ISBN-13: 9780865775923



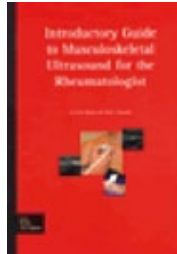
# References and Resources

## Introductory Guide to Musculoskeletal Ultrasound for the Rheumatologist

G. A. W. Bruyn, W.A. Schmidt

This book provides a comprehensive compilation of standard ultrasound scans in rheumatology. Normal and pathologic sonography findings of various structures and disorders have been systematically incorporated. The format of this book is to present standard scans that cover a whole range of anatomic sites: shoulder, elbow, wrist, fingers, hip, knee, ankle, forefoot, and toes. Each scan is accompanied by a picture of the position of the probe, an anatomic drawing, an ultrasound image, and an explanation of the ultrasound scan.

(Not yet available in the U.S.)



Paperback: 152 pages

Publisher: Bohn Stafleu van Loghum b.v. (May 2006)

ISBN-10: 9031347671

ISBN-13: 9789031347674

## Musculoskeletal Ultrasound

Marnix van Holsbeeck, Joseph H. Introcaso

The Second Edition updates and expands this groundbreaking, comprehensive reference and practical guide on the technology and application of ultrasound to the musculoskeletal system.

*Musculoskeletal Ultrasound* is organized into three parts: by tissue type, by areas of special interest, and by site. This edition emphasizes the use of color Doppler and power color Doppler imaging. New insights in the mechanisms of disease have been included, as well as interventional musculoskeletal ultrasound.



Hardcover: 648 pages

Publisher: Mosby; 2 edition (Jan 2001)

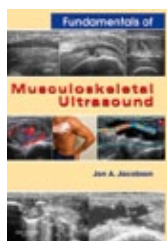
ISBN-10: 0323000185

ISBN-13: 9780323000185

## Fundamentals of Musculoskeletal Ultrasound

Jon A. Jacobson

*Fundamentals of Musculoskeletal Ultrasound* packs a big punch for such a compact book. It teaches the resident, clinician and even medical student, how to perform and read musculoskeletal ultrasounds, while highlighting the basic anatomy needed to perform and interpret ultrasounds and the salient points needed to make diagnosis. Key anatomy, concepts, diseases and even controversies are highlighted, rather than presenting a lengthy tome covering the A to Z's of musculoskeletal ultrasound.



Paperback: 384 pages

Publisher: Elsevier Health Sciences (Aug 2007)

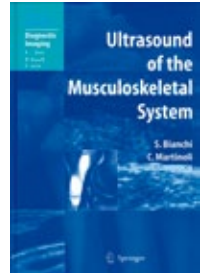
ISBN-10: 1416035931

ISBN-13: 9781416035930

## Ultrasound of the Musculoskeletal System

Stefano Bianchi, Carlo Martinoli

This book is a comprehensive reference and practical guide on the technology and application of ultrasound to the musculoskeletal system. It is organized into two main sections. The first is devoted to general aspects, while the second provides a systematic overview of the applications of musculoskeletal ultrasound in different areas of the body. Each chapter of the second section provides an introduction on clinical anatomy and the essentials of clinical history and physical examination. Thereafter, performance of the ultrasound study is explained and the normal and pathological anatomy is reviewed. To assist in understanding, the ultrasound scans are correlated with drawings, photographs, images obtained using other modalities, and anatomic specimens.



Hardcover: 976 pages

Publisher: Springer-Verlag New York (Mar 2007)

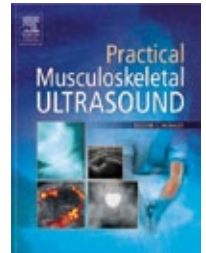
ISBN-10: 3540422676

ISBN-13: 9783540422679

## Practical Musculoskeletal Ultrasound

Eugene G. McNally

*Practical Musculoskeletal Ultrasound* is a resource for clinicians involved in the diagnosis and management of patients with musculoskeletal disorders. This book provides a guide for those wishing to obtain an understanding of ultrasound techniques, their major applications and their role in patient diagnosis and management. The authors provide essential guidance on how best to conduct an ultrasound examination, to obtain optimal images, and to interpret the information gained. Throughout the book the authors display an awareness of what does and what doesn't work, what is or isn't useful, and an appreciation of the role of ultrasound in relation to other imaging techniques.



Hardcover: 350 pages

Publisher: Churchill Livingstone (Dec 2004)

ISBN-10: 0443073503

ISBN-13: 9780443073502



## Video Instruction

### Musculoskeletal Ultrasound Imaging – Upper Extremities: Shoulder, Elbow, Wrist, and Hand

*Randy E. Moore, DC, RDMS*

After viewing this presentation, the participant will be able to describe techniques and protocols for performing shoulder, elbow, wrist, and hand ultrasound examinations; identify normal anatomy during musculoskeletal ultrasound imaging; and explain the capabilities and limitations of musculoskeletal ultrasound imaging. Program chapters include shoulder exam, elbow exams, and wrist and hand exam. An enclosed CME Quiz (\$25.00 processing fee) can be submitted to Gulfcoast Ultrasound Institute for 2.0 AMA Cat. 1 CME credits, if needed. The Gulfcoast Ultrasound Institute is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians. The Gulfcoast Ultrasound Institute designates this educational activity for a maximum of 2.0 AMA PRA Category 1 Credit(s)™. Physicians should only claim credit commensurate with the extent of their participation in the activity. This product also meets CME/CEU requirements for ARDMS.



**Format:** DVD (55 minutes)

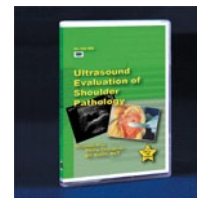
**Publisher:** Gulfcoast Ultrasound Institute (Apr 2007)

**ISBN-10:** 1932680748

### Ultrasound Evaluation of Shoulder Pathology

*Phillip Thompson, BS, RDMS, RVT*

After viewing this DVD, the participant should be able to: State the common indications for performing shoulder sonography; describe sonographic characteristics associated with rotator cuff tears, rotator cuff tendinopathy, effusions, and synovitis; list primary and secondary signs of rotator cuff tears; explain sonographic pitfalls associated with evaluation of the shoulder. Requires extra \$25.00 CME processing fee at time of quiz submission. The Gulfcoast Ultrasound Institute is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians. The Gulfcoast Ultrasound Institute designates this educational activity for a maximum of 2.0 AMA PRA Category 1 Credit(s)™. Physicians should only claim credit commensurate with the extent of their participation in the activity. This product also meets CME/CEU requirements for ARDMS.



**Format:** DVD (40 minutes)

**Publisher:** Gulfcoast Ultrasound Institute (July 2005)

**ISBN-10:** 1932680489