MSK Sonography Review

Musculoskeletal Sonography  A Q&A Review for the ARDMS Specialty Exam

1-2-3 STEP
Ultrasound Education & Test Preparation

Step 1  Review text
Step 2  Mock examination
Step 3  Q&A memory skills flashcard drill

SDMS-Approved  12 CME Credits

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Musculoskeletal Sonography Review
A Q&A REVIEW FOR THE ARDMS
MUSCULOSKELETAL SONOGRAPHER EXAM

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This mock exam is a question/answer/reference review of musculoskeletal sonography for those candidates who plan to take the specialty examination for the Registered Musculoskeletal Sonographer (RMSKS) credential, administered by the American Registry for Diagnostic Medical Sonography (ARDMS). Physicians taking the specialty exam for the Registered in Musculoskeletal (RMSK) sonography credential, sponsored by ARDMS's companion council, the Alliance for Physician Certification and Advancement (APCA), will likewise find that this mock exam offers an invaluable review of the basics, supplementing their preparation for the more interpretive and diagnosis-centered MSK exam. For both groups, this mock exam is also considered a CME activity; an SDMS-approved CME quiz worth 12 credits will be found in Part 8 of this book.

The mock exam is designed as an adjunct to your regular study and as a means of helping you determine your strengths and weaknesses so that you can study more effectively. It covers everything on the current ARDMS MSKS exam content outline, which you will find at the end of this book with cross-references to the questions in this mock exam.

Facts about Musculoskeletal Sonography Review

- This mock exam covers the material on the ARDMS exam content outline in effect as of 2018. Readers are advised to check the ARDMS website, www.ardms.org, for the latest updates. This mock exam itself is continuously updated and revised as necessary, and readers can check Davies' website for the latest Study Alerts and other product updates at http://www.daviespublishing.com/Product-Updates-C220.aspx.

- The Davies mock exam focuses exclusively on the MSKS specialty exam to ensure thorough coverage of even the smallest subtopic on the exam. (For those preparing for the Sonography Principles and Instrumentation exam, see Davies’ Ultrasound Physics Review: SPI Edition, available at www.daviespublishing.com.)

- We use the most current ARDMS content outline as a guideline for coverage. It is, in fact, our table of contents.

- This mock exam contains 571 questions, many of which are accompanied by sonographic and other images, anatomic illustrations, and schematics—more than 200 in all.

- While otherwise in ARDMS exam format, this Davies mock exam makes deliberate and judicious use of multiple-choice items with five, not four, possible choices—thereby increasing both the difficulty of each question and the time needed to
answer it. The point? To give you an educational tool that will exercise those neural pathways in more than one direction. Registry candidates who master these items at an average rate of 1 minute apiece will be exceptionally well prepared for the actual exam.

- The answer key located in Part 7 contains not only the answers but also concise explanations that are abundant, clear, and authoritatively referenced for further study. We recommend that you have a copy of a standard musculoskeletal ultrasound review text at your side when using this mock exam to study for the MSKS exam; you will see several of these referenced in the answer section and the "Suggested Readings" in Part 9.

- This mock examination has been approved by the Society of Diagnostic Medical Sonography (SDMS) as a CME activity. A CME application form, quiz, and full submission instructions are included in Part 8. Passing this quiz will qualify the applicant for 12 CME credits. A modest administrative processing fee applies at the time of submission, and more than one sonographer may submit this activity for CME credit. These credits are accepted by ARDMS, APCA, the American Registry of Radiologic Technologists (ARRT), and other organizations toward meeting their CME requirements. Some credentials carry stipulations regarding specialty areas in which CME credits may be earned. Always check with the organization that governs your credential(s). All the credits in this activity may be applied to maintain the ARDMS RMSKS credential and the APCA RMSK credential.

- A list of "Suggested Readings" including current authoritative publications appears in Part 9.

- The expanded ARDMS exam content outline, complete with all questions that apply to specific clinical tasks, appears in Part 10. Under each task we have indexed the question numbers in this mock exam that are related to that task, for your convenience in targeting your study on specific exam topics. (To ensure that you are studying the most current MSKS examination outline, be sure to visit the ARDMS website at www.ardms.org.)

**ARDMS Advanced Item Type (AIT) Questions**

All the ARDMS exams now include Advanced Item Type (AIT) questions that assess practical sonography instrumentation skills. For the MSKS specialty exam, these AIT questions include what ARDMS calls “Hotspot” questions. Hotspot items display an image with the question and ask you to indicate the correct answer by marking directly on the image using your cursor; this type of question is called “advanced” because it involves a higher level of thinking and processing than you perform when answering a conventional multiple-choice question. In Davies’ mock exam, similar questions are identified as “AIT—Hotspot” questions. These items ask you to identify what an arrow in the image is pointing at or to indicate the label on an image that corresponds to the correct answer.
Another type of AIT question, the Semi-Interactive Console (SIC) item, requires the examinee to use a semi-interactive console to correct a problem with the image presented. Currently these items do not appear on the MSKS exam, but as a bonus feature we have identified such items as “AIT—SIC” questions.

Finally, PACSim items—case-based Picture Archive and Communication Simulation questions—are not included in this MSKS mock exam because currently this type of question is specifically designed for and limited to the Ob/Gyn exam and the Physician in Vascular Interpretation (PVI) exam, the latter under the jurisdiction of the Alliance for Physician Certification and Advancement (APCA).

How to Use This Mock Exam

Musculoskeletal Sonography Review effectively simulates the content of the MSKS exam. Current ARDMS standards call for 170 multiple-choice questions to be answered during a three-hour period. That is, you will have an average time of approximately one minute to answer each question. Timing your practice sessions according to the number of questions you need to finish will help you prepare for the pressure experienced by MSKS candidates taking this exam. It also helps to ensure that your practice scores accurately reflect your strengths and weaknesses so that you can study more efficiently in the limited time you are able to devote to preparation.

IMPORTANT NOTE: Although many of our customers remark on similarities between our questions and those of the actual exam, do not be misled into thinking you should memorize these questions and answers. They are here to give you practice, to teach you things you may not know, and to reveal your strengths and weaknesses so that you know where to put your energy as you prepare for the exam. They also provide a means of assessing your progress as you study.

ARDMS test results are reported as a “scaled” score that ranges from a minimum of 300 to a maximum of 700. A scaled score of 555 is the passing score—the “passpoint” or “cutoff score” for all ARDMS examinations. The scaled score is simply a conversion of the number of correct answers that also, in part, takes into account the difficulty of a particular question. You can search on the Internet for the “Angoff scoring method” if you want to learn more about scaled scoring. Suffice it to say that it helps to ensure the fairness of the exams.

We include below and strongly recommend that you read Taking and Passing Your Exam, by Don Ridgway, RVT, who offers useful tips and practical strategies for taking and passing the ARDMS examinations.

Finally, you have not only our best wishes for success but also our admiration for taking this big and important step in your career.

Susan Raatz Stephenson
MS, MA Ed, RDMS, RVT, CIIP

Nirvikar Dahiya
MD, FAIUM, FSRU
Preparing for Your Exam . . .

**Study.** And then study some more. Knowing your stuff is the most important factor in your success. Start early, set a regular study schedule, and stick to it. Make your schedule specific so you know exactly what to study on a particular day. Write it down. Establish realistic goals so that you don’t build a mountain you can’t climb.

**As to what you study, don’t just read aimlessly.** Focus your efforts on what you need to know. Rely on a core group of dependable references, referring to others as necessary to firm up your understanding of specific topics. Let the ARDMS exam outline guide you. And use different but complementary study methods—texts, flashcards, and mock exams—to exercise those neural pathways.

**Ease down on studying the week before.** Wind down, reduce stress, build confidence, and rest up. Don’t cram! And no studying the night before. You had your chance. Watch a movie, relax, go to bed early, and sleep well.

**Organize your things the night before.** Lay out comfortable clothes (including a sweater or sweatshirt in case the testing center is cold), your photo ID, car and house keys, glasses, prescriptions, directions to the test center, and any other personal items you might need. Remember that the only thing you can take into the testing room is you—there will be lockers for your personal items. Read about necessary documentation and examination admission compliance requirements for your exam at www.ardms.org. Be prepared!

The Day of Your Exam . . .

**Eat lightly.** You do not want to fall asleep during the exam. Go easy on the coffee or tea so your bladder doesn’t distract you halfway through the exam.

**Arrive early.** Plan to arrive at the test center early, especially if you haven’t been there before. Take directions, including the telephone number of the testing center in case you have to make contact en route. You don’t need a wrong-offramp adventure.

**Be confident.** As you wait for the exam to begin, smile, lift both hands, wave them toward yourself, and say, “Bring it on.”

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*Don Ridgway is the author of Introduction to Vascular Scanning: A Guide for the Complete Beginner and editor of Vascular Technology Review. He is Professor Emeritus at Grossmont College in El Cajon, California.*
During the Exam . . .

Read each question twice before answering. Guess how easy it is to get one word wrong and misunderstand the whole question!

Try to answer the question before looking at the choices. Formulating an answer before peeking at the possibilities minimizes the distraction of the incorrect answer choices, which in the test-making business are called—guess what?—distractors.

Knock off the easy ones first. First answer the questions you feel good about. Then go back for the more difficult items. Next, attack the really tough ones. Taking notes on long or tricky questions often can jog your memory or put the question in new light. For questions you just cannot answer with certainty, eliminate the obviously wrong answer choices and then guess.

Guessing. Passing the exam depends on the number of correct answers you make. Because unanswered questions are counted as incorrect, it makes sense to guess when all else fails. The ARDMS itself advises that it is to the candidate’s advantage to answer all questions. Guessing alone improves your chances of scoring a point from 0 (for an unanswered question) to 25% (for randomly picking one of four possible answers). Eliminating answer choices you know or suspect are wrong further improves your odds of success. By using your knowledge and skill to eliminate two of the four answer choices before guessing, for example, you increase your odds of scoring a point to 50%.

Pace yourself; watch the time. Work methodically and quickly to answer those you know, and make your best guesses at the gnarly ones. Leave no question unanswered.

Don’t despair 50 minutes into the exam. At some point you may feel that things just aren’t going well. Take 10 seconds to breathe deeply—in for a count of five, out for a count of five. Relax. Recall that you need to get only about three out of four answers correct to pass. If you’ve prepared reasonably well, a passing score is attainable even if you feel sweat running down your back.

Taking the Exam on Computer . . .

Some candidates express concern about taking the registry exam on a computer. Most folks find this to be pretty easy; some find it offputting, at least in prospect. But the computerized exams are quite convenient: You know whether or not you passed before you leave the testing center (compare that to waiting weeks and even months, as used to be the case), and if you happen not to pass the first time, you can usually take it again after a couple months. Another good point: The illustrations are said to be clearer on computer than in the booklets at a Scantron-type exam.

Taking the test by computer is not complicated. The test center even has a tutorial to be sure you know what you need to do. You sit in a carrel with a computer and answer the multiple-choice questions by pointing and clicking with a mouse. There is a clock on the display letting you know how much time is left. Use it to pace yourself. A white board (today’s equivalent of scratch paper) is available upon request, and it’s a good idea to have one at your side for notes.
You can mark questions for answering later. A display shows which questions have not been answered so you can return to them. When you have finished, you click on “DONE,” and you find out immediately whether you passed.

It’s nothing to be afraid of. The principles are the same as those for any exam. Be methodical and keep breathing.

**Summary . . .**

**Preparing for the exam:**
- Study.
- Use flashcards.
- Join a study group.
- Wind down a week before.
- Don’t cram.
- Relax!

**The day of your exam:**
- Eat lightly; avoid too much caffeine.
- Arrive early.
- Take a sweater.
- Be confident!

**During the exam:**
- Read each question twice.
- Answer the question before looking at the answer choices.
- Answer the easy ones first.
- Guess when necessary.
- Pace yourself.
- Don’t despair.

**Taking the exam on computer:**
- Just point and click.
- Take notes.
- Mark and return to the hard questions.
- Use the onscreen clock to pace yourself.
- Be methodical.
- Breathe!
PART 1 Anatomy and Physiology

General anatomy and physiology 2

Abdominal wall 6
- Perform general ultrasound of the muscles and fasciae of the abdominal wall

Ankle and foot 8
- Perform general ultrasound of the bones, bursae, fat pads, and joints of the ankle and foot
- Perform general ultrasound of the fasciae, ligaments, muscles, retinaculum, and tendons of the ankle and foot
- Perform general ultrasound of the neurovascular system of the ankle and foot

Elbow 19
- Perform general ultrasound of the bones, bursae, fat pad, joints, and ligaments of the elbow
- Perform general ultrasound of the muscles and tendons of the elbow
- Perform general ultrasound of the neurovascular system of the elbow

Hand and wrist 25
- Perform general ultrasound of the bones and joints of the hand and wrist
- Perform general ultrasound of the fasciae, muscles, tendons, retinaculum, pulleys, and ligaments of the hand and wrist
- Perform general ultrasound of the neurovascular system of the hand and wrist
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Perform general ultrasound of the bones, bursae, cartilage, tendons, and joints of the hip, groin, and pelvis
Perform general ultrasound of the muscles of the hip, groin, and pelvis
Perform general ultrasound of the lymphatic and neurovascular system of the hip, groin, and pelvis
Perform general ultrasound of the infant hip

Knee  46
Perform general ultrasound of the bones, bursae, cartilage, and joints of the knee
Perform general ultrasound of the muscles, tendons, retinaculum, and ligaments of the knee
Perform general ultrasound of the neurovascular system of the knee

Shoulder  60
Perform general ultrasound of the bones, bursae, cartilage, joints, and ligaments of the shoulder
Perform general ultrasound of the muscles and tendons of the shoulder
Perform general ultrasound of the neurovascular system of the shoulder

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Evaluate muscle pathology and tears
Evaluate joint effusions
Evaluate ligament pathology and tears
Evaluate for foreign body
Evaluate subcutaneous abnormalities
Evaluate infections
Evaluate synovitis and tenosynovitis
Evaluate synovial proliferation
Evaluate neuromas
Evaluate nerve pathology and entrapment
Evaluate for gas within the soft tissue
Evaluate bone pathology and erosion
Evaluate fractures
Evaluate crystal deposits
Evaluate joint laxity/altered function

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Report impression of the exam

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Communicate with the patient
Communicate ultrasound findings
Generate an initial plan for the examination

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104. Identify the structures located within Guyon’s canal.
   A. Radial artery, vein, and nerve
   B. Musculoskeletal nerve, axillary artery, and vein
   C. Cephalic vein and extensor wrist tendons
   D. Ulnar artery, vein, and nerve
   E. Radial artery, median nerve, and flexor digitorum tendons

105. This transverse image was taken on the volar side of the wrist at the distal crease. Identify the structure(s) indicated by the arrows.

   A. Hamate, capitate, and trapezoid bones
   B. Tendons of the digitorum superficialis
   C. Tendons of the digitorum profundus
   D. Radial and ulnar vessels
   E. Flexor retinaculum

**AIT—Hotspot**

106. This image was obtained in the transverse plane on the volar side of the wrist at the level of the carpal tunnel. What structure lies in the circle?
A. Flexor tendon sheath
B. Flexor retinaculum
C. Guyon’s canal
D. Median nerve
E. Pisiform bone

**AIT—Hotspot**

107. The median nerve may have a bifid appearance in the transverse image of the wrist. What percentage of people have this nerve variation?
   A. 2%–3%
   B. 10%–15%
   C. 45%–50%
   D. 50%–60%
   E. About 75%

108. This transverse image was taken at the level of the carpal tunnel. Identify the structure indicated by the arrows.

A. Persistent median artery
B. Complex ganglion
C. Retinaculum partial tear
D. Bifid median nerve
E. Thenar muscle group

**AIT—Hotspot**
**Hip, Groin, and Pelvis**

*Perform general ultrasound of the bones, bursae, cartilage, tendons, and joints of the hip, groin, and pelvis*

*Perform general ultrasound of the muscles of the hip, groin, and pelvis*

*Perform general ultrasound of the lymphatic and neurovascular system of the hip, groin, and pelvis*

*Perform general ultrasound of the infant hip*

109. When imaging the normal anterior hip in the transverse plane, where will you see the iliopsoas tendon located in relation to the femoral head?
   A. Lateral
   B. Anterior
   C. Posterior
   D. Superior
   E. Cephalad

110. Imaging of the lateral hip relies on bony landmarks to confirm the correct location and anatomic structures. In the transverse plane, what is the key landmark for visualizing the gluteus medius and minimus insertions?
   A. Trochanteric posterior facet
   B. Trochanteric fossa at the neck
   C. Echogenic articular capsule
   D. Apex of the greater trochanter
   E. Acetabular fibrocartilaginous margin

111. Tendons and ligaments have a characteristic sonographic appearance. Which of the following describes the normal echogenicity of the iliopsoas tendon at its distal insertion?
   A. Isoechoic
   B. Anechoic
   C. Hypoechoic
   D. Heterogeneous
   E. Echogenic
112. The two major bursae of the hip are the greater trochanteric bursa and the iliopsoas bursa. Where is the iliopsoas bursa located?
A. Posterior to the greater trochanter of the femur
B. Medial to the ischial tuberosity of the pelvis
C. Inferior to the ischiogluteal and gluteus medius bursae
D. Between the femoral head and the iliopsoas muscle/tendon
E. Central to the vastus lateralis muscle

113. Scanning approach is important when imaging the hip tendons. Identify the correct transducer placement for imaging the gluteus medius and gluteus minimus distal attachments on the trochanter.
A. Anterior
B. Posterior
C. Superior
D. Lateral
E. Caudal

114. What structure is indicated by the arrow in this schematic?


A. Iliotibial tract
B. Tensor fasciae latae origin
C. Iliopsoas tendon insertion
D. Adductor longus aponeurosis
E. Pectineus insertion
115. This diagram mimics a coronal view when you are imaging the hip while the patient is on his side. Identify the structure labeled A.

![Diagram](image)


A. Tensor fasciae latae  
B. Subgluteus maximus bursa  
C. Gluteus minimus tendon  
D. Subgluteus medius bursa  
E. Subgluteus minimus bursa  
F. Gluteus medius tendon

**AIT—Hotspot**

116. Refer to the image in question 115. Identify the structure labeled B.

A. Tensor fasciae latae  
B. Subgluteus maximus bursa  
C. Gluteus minimus tendon  
D. Subgluteus medius bursa  
E. Subgluteus minimus bursa  
F. Gluteus medius tendon

**AIT—Hotspot**

117. Refer to the image in question 115. Identify the structure labeled C.

A. Tensor fasciae latae  
B. Subgluteus maximus bursa  
C. Gluteus minimus tendon  
D. Subgluteus medius bursa  
E. Subgluteus minimus bursa  
F. Gluteus medius tendon

**AIT—Hotspot**
118. Refer to the image in question 115. Identify the structure labeled D.
A. Tensor fasciae latae
B. Subgluteus maximus bursa
C. Gluteus minimus tendon
D. Subgluteus medius bursa
E. Subgluteus minimus bursa
F. Gluteus medius tendon

**AIT—Hotspot**

119. Refer to the image in question 115. Identify the structure labeled E.
A. Tensor fasciae latae
B. Subgluteus maximus bursa
C. Gluteus minimus tendon
D. Subgluteus medius bursa
E. Subgluteus minimus bursa
F. Gluteus medius tendon

**AIT—Hotspot**

120. Refer to the image in question 115. Identify the structure labeled F.
A. Tensor fasciae latae
B. Subgluteus maximus bursa
C. Gluteus minimus tendon
D. Subgluteus medius bursa
E. Subgluteus minimus bursa
F. Gluteus medius tendon

**AIT—Hotspot**

121. During the sonographic examination it is important to image attachment sites for muscles and tendons. The gluteus minimus and medius muscles begin (originate) at the external iliac fossa. Where do these muscles terminate (insert)?
A. Posterior sacrococcygeal line
B. Greater trochanter of the femur
C. Ischial tuberosity
D. Medial surface of the tibia
E. Linea aspera
Answers, Explanations, and References

Anatomy and physiology

General sonographic pathology

Integration of data

Protocols

Treatment

Physical principles and instrumentation
103. E. Relatively immobile structure hypoechoic to muscle.

*The relatively immobile, cordlike, tubular median nerve is hypoechoic to the tendon and muscle when imaged in the longitudinal plane. The transverse appearance is a hypoechoic structure with internal fibers and a fascicular pattern.*


104. D. Ulnar artery, vein, and nerve.

*The ulnar artery, vein, and nerve are contained within Guyon’s canal, located on the lateral portion of the wrist. The radial artery, vein, and nerve are located on the thumb side of the wrist superficial to the cephalic vein and the first extensor wrist compartment tendons. The carpal tunnel contains the median nerve, radial artery, flexor carpi radialis, and palmaris longus and flexor digitorum tendons.*


105. E. Flexor retinaculum.

*The flexor retinaculum (arrows) provides the anterior border of the carpal tunnel. Within the carpal tunnel are the rounded finger flexor tendons (digitorum superficialis and profundus) and median nerve. Posterior to the carpal tunnel are the carpal bones, which image as echogenic structures. Lateral to the carpal tunnel are the radial and ulnar vessels.*


106. D. Median nerve.

The median nerve (circled) images as fascicular structure and is surrounded by the flexor carpi radialis and flexor pollicis longus muscles. The pisiform and lunate wrist bones lie posterior to the nerve. Guyon’s canal, which contains the ulnar nerve and vessels, lies on the medial side of the wrist.


107. B. 10%–15%.

In roughly 10%–15% of the population, a bifid median nerve coexists with a persistent median artery as it courses through the carpal tunnel. In the patient with both the bifid nerve and a persistent vessel, the artery courses between the nerve branches. If a persistent median artery is suspected, the presence of flow visible with color Doppler will rule out an accessory muscle or thrombosis. In the presence of a bifid median nerve and/or a persistent median artery, care must be taken to rule out other abnormalities, such as neuromas, Schwannomas, lipofibromas, hamartomas, infectious processes, and ganglion cysts.


108. D. Bifid median nerve.

The bifid median nerve is a high division of the nerve proximal to the carpal tunnel that images as two fascicular structures at the level of the pisiform. This transverse view of the wrist proximal to the carpal tunnel shows a bifid median nerve (arrows) with the persistent median artery of the forearm in the center (arrowhead). The median nerve courses through the carpal tunnel at the wrist, which is covered by the flexor retinaculum. When the median nerve enlarges, the flexor retinaculum bows anteriorly. Power Doppler can visualize a persistent median artery between the two branches of the bifid median nerve.


Hip, Groin, and Pelvis

109. B. Anterior.

The iliopsoas tendon inserts at the lesser trochanter of the femur and is formed by the psoas major and iliacus muscles, where they unite at the level of the inguinal ligament. Responsible for our ability to flex the hip, the iliopsoas muscle is best imaged from the anterior approach at the inguinal crease. The normal iliopsoas tendon images as a rounded, slightly hyperechoic structure anterior to the femoral head.


110. D. Apex of the greater trochanter.

Between the anterior and lateral facets of the greater trochanter, the trochanter images as a peaked echogenic structure on the transverse image of the lateral hip. The anterior facet of the greater trochanter is the insertion site for the gluteus minimus; the gluteus medius attaches to the lateral facet. The gluteus maximus passes over the posterior facet.


111. E. Echogenic.

The iliopsoas tendon lies anterior to the anterior-superior labrum at the level of the hip joint. At its insertion point this tendon images as an echogenic structure when a high-frequency (5–12 MHz) transducer is used. The normal iliopsoas tendon has the hyperechoic fibrillar echotexture seen with tendons elsewhere in the body.

112. D. Between the femoral head and the iliopsoas muscle/tendon.

The iliopsoas bursa is the largest bursa in the body and lies in the anterior portion of the hip. The hip capsule is located posterior to the bursa, while the iliacus and psoas major muscles/tendons are anterior. The boundary is formed laterally by the iliofemoral ligament and medially by the acetabular ligament.


113. D. Lateral.

Imaging the lateral portion of the hip allows for investigation of structures close to the greater trochanter of the femur. Composed of the anterior, lateral, posterior, and superoposterior facets, the greater trochanter provides the insertion site for the gluteus minimus and gluteus medius.


114. C. Iliopsoas tendon insertion.

The iliopsoas muscle tendon inserts onto the lesser trochanter, located on the medial side of the femur. The tensor fasciae latae courses over the greater trochanter, connecting to the iliotibial tract. (See Color Plate 11 on page xxii.)


115. B. Subgluteus maximus bursa.

116. A. Tensor fasciae latae.

117. F. Gluteus medius tendon.

118. C. Gluteus minimus tendon.

119. E. Subgluteus minimus bursa.

120. D. Subgluteus medius bursa.


The gluteal attachments are most easily imaged in the coronal plane with the patient rolled into a decubitus position onto the contralateral hip. In the longitudinal plane, from superficial to deep, the hip structures imaged are the echogenic tensor fasciae latae, subgluteus maximus bursa, gluteus medius tendon, subgluteus medius bursa, gluteus minimus tendon, subgluteus minimus bursa, and periosteum of the greater trochanter of the femur.

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About the authors . . .

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Dr. Nirvikar (Nirvi) Dahiyia, MD, is chair of the division of ultrasound at Mayo Clinic Arizona. He has worked exclusively with ultrasound over the past 22 years, completing his fellowship at Mallinckrodt Institute of Radiology at Washington University as a key member of the musculoskeletal ultrasound subspecialty. Winner of the Larry Mack award for research from the Society of Radiologists in Ultrasound and the Teacher of the Year award from the Mayo Clinic, he is an internationally known lecturer and educator, and his commitment to ultrasound is evidenced by his involvement in subcommittees with ABR, AIUM, ACR, and SRU. He has over 40 print publications, including journal articles, book chapters, and a textbook. Dr. Dahiyia’s love of wildlife photography and pursuit of the “perfect shot” have taken him and his wife on many world travels and have spurred an interest in conservation and wildlife protection, particularly in Africa.

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