

TOPIC INFO

TOPIC:	THE ROLE OF MUSCULOSKELETAL ULTRASOUND FOR DIAGNOSIS AND TREATMENT IN SPORTS MEDICINE
SPEAKER:	ATUL K. GUPTA, MD
TITLE:	PHYSICAL MEDICINE AND REHABILITATION
AFFILIATION	VIRGINIA MASON MEDICAL CENTER
TIME:	30 minutes

PRACTICE GAP ANALYSIS:

Describe the problems or gaps in practice this activity will address:

What are you trying to change?	<p>describe below the current state.</p> <p>Sports injuries are common in younger adults and children. More than 3.5 million children and teens are injured as part of an organized sports or physical activity each year, estimates Stanford Children’s Health. One-third of all injuries in children are related to sports, too. The most common sports injuries in children are sprains and strains. Contact sports, like football and basketball, account for more injuries than noncontact sports, like swimming and running.</p> <p>A 2016 study Trusted Source found that 8.6 million people, ages 5 to 24, have a sports injury every year in the United States. Researchers note males ages 5 to 24 make up more than half of all sports injury episodes.</p> <p>The lower body is most likely to be injured (42 percent). The upper extremities make up 30.3 percent of injuries. Head and neck injuries combine for 16.4 percent of sports injuries.</p> <p>Ultrasonography is a rapidly developing area of sports medicine that has many different applications, which can be used in the clinic, training room, and even on the sidelines. It can be used for diagnostic as well as treatment purposes..</p>
What is the problem?	<p>Describe the desired state.</p> <p>Sport and exercise medicine (SEM) physicians are increasingly using musculoskeletal ultrasound (MSK US) in their clinical practice. In sports medicine, ultrasound is useful for diagnostic purposes, as it facilitates evaluation of various musculoskeletal structures. For example, a doctor may use ultrasound to look at the Achilles tendon or calf muscle to assess for tears. Ultrasound can be used to look for fluid around or within a structure as an indication of inflammation, tendonitis, or bursitis. This concept can be applied to most muscles, tendons, and bursa throughout the body. A sports medicine physician may also be able to look at a structure as it progresses through a range of motion. Additionally, some physicians have proposed the use of ultrasound to evaluate for fractures and stress fractures of various bones.</p> <p>In addition to its diagnostic uses, ultrasound can be used during procedures to allow for direct visualization of the target structure being injected. When used in this way, the needle can be visualized as it is directed into the target during the procedure. This can be extremely helpful to make sure that a medicine or injectable is placed directly into the area that is causing pain.</p> <p>Ultrasound has the advantages of being quickly accessible, relatively inexpensive, and highly accurate in experienced hands. Additionally, there is no risk of radiation and no need for injected contrast material, as in some other imaging studies. A sports medicine physician may use the device in a variety of ways, and the examples mentioned here highlight just a few of the potential applications of ultrasound technology</p>
How did you assess and/or measure these issues?	<p>How was the educational need/practice gap for this activity identified? Place an X by each source utilized to identify the need for this activity.</p> <p>Attach copies of documentation for each source indicated (REQUIRED)</p> <p>* please make sure when selecting your needs assessment data and references that you highlight applicable components.</p>
Method	Example of required document
Previous participant evaluation data	Copy of tool and summary data

	Research/literature review	Abstract(s) or articles
X	Expert Opinion	Summary
	Target audience survey	Copy of tool and summary data
	Regulatory body requirements	Requirements summary
	Data from public health sources	Abstract, articles, references
	Other (describe)	

Describe the needs of learners underlying the gaps in practice:

What are the causes of the gaps in practice? Check all that apply

X	Lack of awareness of the problem,	Poor self-efficacy,
X	Lack of familiarity with the guideline,	Inability to overcome the inertia of previous practice, and
	Non-agreement with the recommendations,	Presence of external barriers to perform recommendations
	Other	

Why does the gap exist? Check all that apply

X	Lack of Knowledge competence	Lack of time to assess or counsel patients
X	Performance-based.	Cost / Insurance/reimbursement issues
	Lack of consensus on professional guidelines	Patient Compliance Issues
	Other:	

What do learners need to be able to know or do to be able to address the gaps in practice?

Explain your CME Objectives here

A better understanding of use of ultrasound in sports medicine can be achieved by understanding

- the place for ultrasonography within the spectrum of care for musculoskeletal pathologies.
- when to consider regenerative medicine therapies for musculoskeletal pathologies.
- when to order an MRI versus an ultrasound for musculoskeletal pathologies.

CME OBJECTIVES

State at least three or more things that participants should be able to do after they participate in this CME activity. Please note these objectives should be measurable, specific, actionable and timely.

Upon completion of this activity, attendees should be able to:

- 1 Define the place for ultrasonography within the spectrum of care for musculoskeletal pathologies.
- 2 Discuss when to consider regenerative medicine therapies for musculoskeletal pathologies.
- 3 Describe when to order an MRI versus an ultrasound for musculoskeletal pathologies.

The ACCME does not want you to use the words - think, understand, know, appreciate, learn, comprehend, be aware of, be familiar with, etc. as they are not measurable.

You can use words such as Analyze, Categorize, Classify, Compare, Conclude, Construct, Critique, Define, Demonstrate, Describe, Discuss, Evaluate, Identify, List, Name, Outline, Show

COMPETENCIES:

What ACGME or IOM related competency is associated with this activity? (check all that apply)

X	Patient Care	Practice-Based Learning and Improvement	Medical/Clinical Knowledge
	Procedural Skills	Interdisciplinary Teams	Teams and Teamwork

	Communication Skills	Professionalism	Systems-based Practice
	Quality Improvement	Utilization of Informatics	Evidence-based Practice

What is the activity designed to change

- X Competence** - (knowing how to do something)
 Selecting this option requires the CME activity being planned provide participants with an opportunity to:
 - hear information related to advances or best practice
 - hear examples of application in practice of information presented
- Performance**- (actually doing something)
 Selecting this option requires the CME activity being planned provide participants with an opportunity to:
 - practice what they have learned during the CME activity
 - receive feedback about doing what they have learned during the CME activity
- Patient Outcomes**- (actually measure change in patients)
 Selecting this option requires the CME activity track change in patient outcomes:
 - provide tangible improvements and data to support overall change to patient outcomes

What potential barriers do you anticipate attendees may encounter when incorporating new objectives into their practice?

- | | | |
|----------|--|-------------------|
| X | Lack of time to assess or counsel patients | Other – describe: |
| | Cost | |
| | No perceived barriers | |
| | Lack of administrative support/resources | |
| | reimbursement issues | |
| | Insurance/ | |

Describe how will this educational activity address these potential barriers and the strategies used?

RESULTS:

please describe the results expected (outcomes) for this activity in terms of specific improvements in patient care and/or other work related to the practice of medicine.

- | | |
|----------|--|
| | Your description |
| X | Improvements in patient care based on evidence-based treatment |
| | Reduce Health care costs |
| | Streamline care of patients |

MEASURING YOUR SUCCESS:

Will use pre-and post CME activity questionnaire to measure success.
 Please provide 3 questions and answers that will asked to the audience before and after your talk. The answer to these questions should be in your presentation. Please highlight the correct answer and limit your possible answers to a maximum of 4 with only one correct answer. The others can be partially correct or wrong

Question 1. Which imaging characteristic is unique to ultrasound over other imaging modalities?

- | Answers | |
|----------|--|
| 1 | Ability to differentiate cystic versus solid structures? |
| 2 | Ability to visualize a structure dynamically? |
| 3 | Ability to grade a muscle tear? |
| 4 | Ability to detect fatty atrophy? |

Feedback:

1. Ability to differentiate cystic versus solid structures: **Partially Correct**

Cystic masses can show up bright under T2 signal on MRI. With ultrasound imaging, the cystic mass can be further characterized as complex or simple based on its appearance.

2. Ability to visualize a structure dynamically: **Correct Answer.**
Musculoskeletal ultrasound is the only imaging modality which is able to detect dynamic changes in a structure. Examples of such motion include peroneal tendon subluxation, ligamentous laxity anywhere in the body, and biceps tendon subluxation¹.
3. Ability to grade a muscle tear. : **Wrong Answer**
Muscle tears can be characterized by both ultrasound and MRI.
4. Ability to detect fatty atrophy. : **Wrong Answer**
Fatty Atrophy can be identified by both ultrasound and MRI.

Question 2: Which injectable therapy for knee osteoarthritis has the most level 1 evidence to supports its use?

Answers

- 1 Viscusupplementation
- 2 Corticosteroid
- 3 Mesenchymal stem cells
- 4 Platelet Rich Plasma

Feedback:

1. Viscusupplementation: **Wrong Answer.**
Viscusupplementation have been shown to not be superior to saline injections for knee osteoarthritis².
2. Corticosteroid **Wrong Answer.**
Corticosteroid have been shown to have a good short-term effect on pain with a high drop off rate within three months. There have also been studies showing cartilage deterioration and lack of superiority to saline injections³.
3. Mesenchymal stem cells **Wrong Answer.**
Mesenchymal Stem Cells have shown promise in both in vitro and smaller studies. There have also been studies which have shown no superiority to a saline control⁴.
4. Platelet Rich Plasma **Correct Answer.**
Currently platelet rich plasma has the largest amount of data to support its use in cases of mild to moderate knee osteoarthritis

Question 3: Which of the following is not one of the advantages of musculoskeletal ultrasound?

Answers

- 1 Higher spatial resolution than MRI?
- 2 Ability to image around surgical hardware without artifact?
- 3 Ability to grade osteoarthritis within a joint?
- 4 Ability to perform a simple side to side comparison of pathology?

Feedback:

1. Higher spatial resolution than MRI?: **Wrong Answer.**
On average, a 10 MHz ultrasound probe has a spatial resolution of 150 microns. In comparison, a 1.5 tesla MRI scanner has a spatial resolution of 450-500 microns.
2. Ability to image around surgical hardware without artifact? **Wrong Answer.**
Ultrasound has the advantage of not being affected by metal artifact. Even with metal artifact reducing sequences, MRI still has the unfortunate limitation in evaluating soft tissue pathology around prosthetic hardware.
3. Ability to grade osteoarthritis within a joint? **Correct Answer.**
Explanation: X-ray and MRI do a better job of objectively classifying the level of arthritic change within a joint. Ultrasound can clearly identify osteophyte formation and joint effusions. They can to a lesser extent characterize the amount of chondral layer loss within a joint.
4. Ability to perform a simple side to side comparison of pathology? **Wrong Answer.**
Ultrasound imaging capabilities include the ability to scan the contralateral side of the body as a reference.

