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The Emerging Role of Musculoskeletal Ultrasound in Occupational Medicine

To the Editor:

Musculoskeletal (MSK) injuries are commonly seen by occupational medicine clinicians. Making evaluation and treatment more efficient is an important area for improvement in occupational medicine clinical care. Musculoskeletal injuries such as sprains, strains, and tears have the highest annual incidence rates in terms of work-related injury at 43 injuries per 10,000 full-time workers. The median days away from work being diagnosed with an MSK disorder was 12.¹ Musculoskeletal disorders account for nearly 70 million physician office visits in the United States annually, and an estimated 130 million total health care encounters, including outpatient, hospital, and emergency department visits. According to Liberty Mutual, overexertion injuries—lifting, pushing, pulling, holding, carrying, or throwing an object—cost employers \$13.4 billion every year.²

While MRI is often used as the primary mode of assessing MSK injuries, clinical based ultrasound (US) may be a more effective and less-expensive modality. MSK US can be used diagnostically to evaluate muscle, tendon, nerve, joint, bursopathy, and even some osseous diseases, like calcific tendinitis. MSK MRI has increased 353.6% reported from 1996 to 2005 by Parker et al.³ He also estimates that the substitution with MSK US, when appropriate, would lead to a saving of \$6.9 billion.

In addition to being less expensive, MSK US is more patient-friendly. The claustrophobic patient who requires sedation will not be an issue when scanning with MSK US. MSK US is useful when there are contraindications to MRI such as metal implants. MSK US provides the clinician with the ability to focus on the relevant patient complaint or symptomology. Also, MSK US poses a unique advantage to MRI, diagnosis can be made very early after an injury.

If used clinically, definitive visual diagnosis can be made in the first clinical visit. In addition, intervention can be performed during clinical evaluation under US guidance. For greater efficacy, US can be used to diagnose joint effusion and can also be used to provide real-time imaging for aspiration.

MSK US can incorporate both static and real-time scanning through a tendon or joints normal range of motion. Clinicians can visualize when and where the patient experiences symptoms: snapping tendons, catches in joints, or impingement can be assessed across the range of motion. This information can be clinically valuable to help direct treatment. Ultrasound also has the advantage of mobility. Many US machines today are small, the size of a computer laptop case, and portable. Many institutions have US devices available in a variety of settings and some medical schools have incorporated US into the curriculum. They can be easily moved to a clinic or an employer's worksite.

The main barrier to MSK US is that it is sonographer dependent and there is a learning curve. Diagnostic usefulness depends on technique, details, and thorough knowledge of appropriate MSK anatomy, neuromuscular anatomy, and the circulatory system. Once proficiency is obtained, clinical reimbursement may help offset the cost for the purchase of the device. Use of US in clinic may be time intensive but can provide valuable information for triaging injury at initial patient contact. As the sonographer becomes more proficient, this time may be reduced with experience.

Ultrasound is currently being taught as part of residency training programs for emergency medicine, OB/GYN, and PM&R. It is suspected that training in MSK US for occupational medicine residents and experienced physicians would be clinically useful.⁴ To our knowledge, no occupational medicine residency programs teach MSK US to their residents. We believe that MSK US can become common practice in most occupational medicine clinical settings. Residency training programs that teach MSK US can help train future clinicians as is common in other specialties to deal with a high volume of MSK disorders. In addition, per the ACOEM practice guidelines, there are recommendations for the use of MSK US for acute and sub-acute MSK injuries.⁵ In conclusion, we believe that MSK US can be extremely valuable to the occupational medicine physician in terms of diagnosis and intervention, allowing for more efficient treatment

of patients, which should improve positive outcomes including return to work and reduce the cost of care. This could be a promising area of research over the coming years.

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Disclosures: None declared.

No institutional funding or other funding required.
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DOI: 10.1097/JOM.0000000000000332