

# Game-Changer

By Steven Sampson, DO

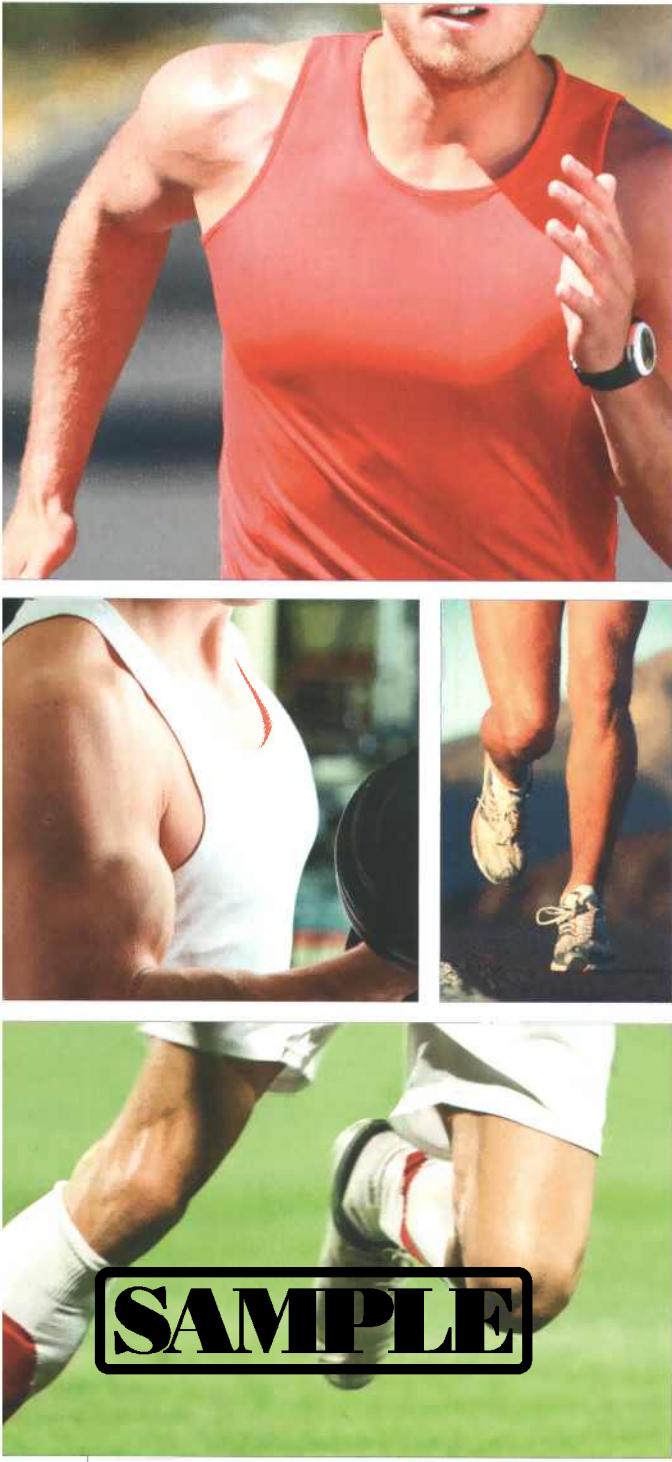
Use of ultrasound at the point of care is growing in sports medicine. In office practice and on the playing field, this versatile technology is now widely used by team physicians in professional sports to provide dynamic real-time evaluation and safe, accurate treatment of players' injuries. Most European soccer clubs, as well as the National Basketball Association, are taking advantage of ultrasound's well-established benefits for improving patient safety and outcomes, at a fraction of the cost of MRI or CT scans.

Not only can ultrasound-guided musculoskeletal procedures, such as joint injections and aspirations, help both professional athletes and weekend warriors get back into the game quickly, but utilization of this cost- and time-efficient technology also can be a game-changer for sports medicine physicians themselves. Over the past 3 years, use of ultrasound visualization to guide all needle procedures performed in our practice has played an integral role in driving the rapid expansion and success of our comprehensive physical medicine and rehabilitation facility in Los Angeles, the Orthohealing Center.

Founded in July 2008, the center started as a solo practice and now has four physicians treating 200 to 240 patients a week in our new 5,000-square-foot facility. Our focus on providing hands-on, personalized care, coupled with use of state-of-the-art ultrasound technology at the point of care to immediately diagnose and treat an array of painful or debilitating musculoskeletal problems—from sports injuries to osteoarthritis—has consistently resulted in an extremely high level of patient satisfaction and word-of-mouth referrals, leading to significant growth in patient volume.

## Less Pain, Improved Outcomes

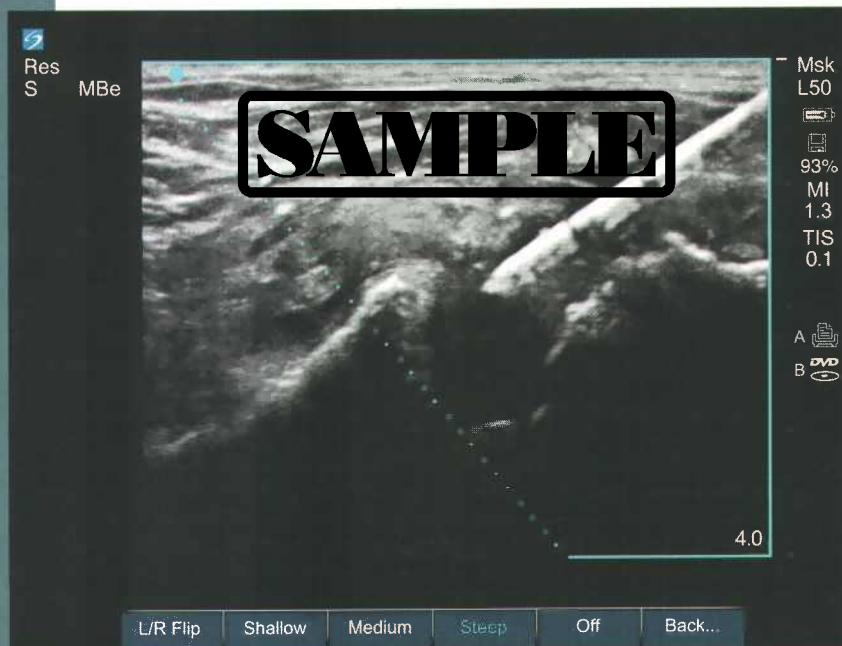
We frequently have new patients request ultrasound guidance, after hearing from a friend that we utilize this technology for needle procedures. Often, patients from other cities—even as far away as San Diego, a 3-hour drive—will travel to our Los Angeles center for treatment because there is a buzz in the community that our joint injections and aspirations are



Ultrasound-guided needle procedures offer accurate, cost-effective, and often less painful treatment of musculoskeletal disorders

**SAMPLE**

**Use of ultrasound in our sports medicine practice has had a variety of positive effects on patient satisfaction, starting with immediate diagnosis at the point of care that is painless and interactive.**



*This image of a posterior shoulder joint injection using Advanced Needle Visualization technology shows a bright, hyperechoic needle that can otherwise be lost during steep angled approaches to deep targets.*

less painful, thanks to ultrasound guidance. It is common in sports medicine for physicians to see needle-phobic patients, since many people with musculoskeletal disorders or injuries have previously undergone needle procedures performed blindly, which can be significantly more painful than those performed under ultrasound guidance.

During residency, for example, we were taught to perform hip bursa injections with a landmark technique: taking a 3.5-inch spine needle and pushing it in until we hit the greater trochanter. Then we were told to pull the needle back slightly to arrive at the bursa. However, the problem is that when the needle hits bone, the periosteal nerves cause considerable pain. So we were inflicting additional suffering on patients who already had a great deal of hip pain, initially making patients feel worse and causing them anxiety. Under ultrasound guidance, the ability to look inside the body allows us to navigate the needle precisely to the target without touching painful structures, offering a huge benefit for apprehensive patients.

Use of ultrasound in our sports medicine practice has had a variety of positive effects on patient satisfaction, starting with immediate diagnosis at the point of care that is painless and interactive. We can point out the locations of the various tendon structures or the rotator cuff on the ultrasound screen, educate patients about their injury, and show them exactly where the injection will be placed. Seeing that physicians have a cutting edge technology to visually guide treatment helps build trust and rapport, so that previously apprehensive patients feel comfortable about having a needle stuck into their shoulder or knee. Often patients will say, "You did the injection already? I can hardly believe it's over," because there was so little pain.

A recent study reported that for patients with inflammatory arthritis, ultrasound-guided triamcinolone acetonide joint injection resulted in 81% decrease in procedural pain,

compared to palpation-guided injection. While this dramatic reduction in discomfort was already a huge benefit for the patients, the ultrasound group also had superior clinical outcomes, with a 35% decrease in pain scores at outcome (2 weeks and 6 months) and 32% increase in therapeutic duration. Moreover, there was a 33% reduction in cost per respondent per year, showing that use of ultrasound guidance can improve cost-effectiveness.<sup>1</sup>

Ultrasound-guided shoulder injections also have been demonstrated to deliver greater pain relief than blind injections: A randomized comparative study of 41 consecutive patients treated for painful shoulder found that sonographic-guided local corticosteroid injections led to significantly higher improvements in both the shoulder function assessment scale and visual analog scale for pain upon follow-up assessment 6 weeks after the injection, compared to patients treated with blind injections.<sup>2</sup>

### **Accurate and Cost-Effective**

Ultrasound guidance improves the accuracy of injections and aspirations, as compared to blind or palpation guidance. One study found that for synovial fluid aspiration, the needle was successfully placed within the joint 96% of the time with ultrasound guidance, versus a 59% success rate for palpation guidance.<sup>3</sup> Another study reported a 100% success rate for ultrasound-guided injections of the knee, even when performed by an inexperienced clinician.<sup>4</sup> In a randomized clinical trial of 184 arthritis patients with an inflamed joint, 33% of palpation-guided injections were inaccurate, versus 17% of ultrasound-guided injections. Accurate positioning of the needle resulted in greater improvements in pain, function, and stiffness at 6 weeks.<sup>5</sup>

Accurate corticosteroid injections are also crucial for successful treatment of shoulder pain from subacromial impingement syndrome, since failure to attain accurate injection

# SAMPLE

**A recent study reported that for patients with inflammatory arthritis, ultrasound-guided triamcinolone acetone joint injection resulted in 81% decrease in procedural pain, compared to palpation-guided injection.**



*Steven  
Sampson,  
DO*

placement was associated with a return to pretreatment pain scores at 2 weeks in one study, while significant improvement continued when the injection was delivered accurately to the target site.<sup>6</sup> Another study using radiographic contrast material to check the accuracy of local corticosteroid injection to the shoulder found that only 37% of attempted injections performed with traditional methods were properly placed.<sup>7</sup>

Viscosupplementation with hyaluronic acid has become a frequently performed procedure to relieve pain in patients suffering from osteoarthritis of the knee, an increasingly common disorder as the United States population ages. A recent review reported that use of ultrasound guidance for hyaluronic injections is “faster and cheaper than X-ray...used

in fluoroscopy and CT” and may aid in avoiding the possible side effects of blind injections into difficult joints. Additionally, the review noted that direct visual evidence of successful placement of the therapeutic fluid inside the joint space helps “guarantee the efficacy and safety of the treatment.”<sup>8</sup> Unlike CT or fluoroscopy, ultrasound spares patients and physicians from radiation exposure, which has become a growing public health concern.

## Sharpening Needle Visibility at Steep Angles

Sports medicine procedures are typically performed with a “free hand” technique to afford direct visualization of the needle tip in real time as it is advanced toward its target. In ultrasound-guided approaches to deep targets, such as the shoulder or hip, as the angle becomes steeper, the distal portion of the needle becomes increasingly hazy and indistinct, as if it were shrouded in fog.

Some companies market special needles designed to be highly echogenic under ultrasound, but due to the relatively high cost of these disposable products, they haven’t been widely implemented in clinical practice.

Special software called Advanced Needle Visualization offers a cost-effective solution, through proprietary algorithms that make both large and small needles extremely bright and hyperechoic, including during steep-angled approaches to deep targets. This enhancement is offered as a software upgrade to SonoSite M Turbo and S series equipment and works with standard needles. At our center, we find that this tool reduces injection time for steep and deep targets by at least 50%, since we previously would move these patients into alternate positions or tried different transducer probes to see which one worked best to visualize their injury. The software also has been particularly helpful with obese patients, who commonly present with osteoarthritis, and also those with extensive muscle mass.

Recently, an extremely muscular patient presented with severe right shoulder osteoarthritis and biceps bursitis. We were able to inject the biceps without difficulty, but when we began to inject his shoulder, the distal needle tip was obscured due to the depth of the target. Turning on the enhancement was like shining a spotlight at the target site, and we were able to proceed confidently with the injection. Had we not been able to accurately introduce the cortisone into the joint space of the severely arthritic joint in this challenging case, the patient would not have achieved the same excellent clinical response to his treatment.

In another typical case, an obese patient presented with a swollen knee. Under ultrasound, we could see suprapatellar recess effusion, but after we injected anesthetic and lidocaine to numb the area, we lost ultrasound resolution of the needle tip. By turning on the headlights, so to speak, with the software enhancement, we located the tip and proceeded with the aspiration. The patient was amazed to watch the fluid in her knee disappear from a big black oval on the ultrasound screen to nothing, and then to see her knee reinjected with viscosupplementation to lubricate the joint—while experiencing very little pain during the two procedures.

Our ability to help patients bend their joints again, resume physical therapy, or do regular exercise to improve their healing after an injury, through precisely placed, often less painful ultrasound-guided therapeutic injections, has frequently prompted our patients to ask, "Why don't all doctors do procedures this way?" **IE**

*Steven Sampson, DO, is the founder of the Orthohealing Center and the Orthobiologic Institute in Los Angeles. He is a Clinical Instructor of Medicine at the David Geffen School of Medicine at UCLA and Clinical Assistant Professor for Western University of Health Sciences. Board-certified in Physical Medicine and Rehabilitation, Sampson lectures internationally and treats professional athletes from around the globe.*

#### REFERENCES

- Sibbitt WL, Band PA, Chavez-Chiang NR, Delea SL, Norton HE, Bankhurst AD. A randomized controlled trial of the cost-effectiveness of ultrasound-guided intraarticular injection of inflammatory arthritis. *J Rheumatol.* 2011;38:252-63.
- Naredo E, Cabero F, Beneyto P, et al. A randomized comparative study of short term response to blind injection versus sonographic-guided injection of local corticosteroids in patients with painful shoulder. *J Rheumatol.* 2004;31:308-14.
- Raza K, Lee CY, Pilling D, et al. Ultrasound guidance allows accurate needle placement and aspiration from small joints in patients with early inflammatory arthritis. *Rheumatology.* 2003;42:976-979.
- Curtiss HM, Finnoff JT, Peck E, Hollman J, Muir J, Smith J. Accuracy of ultrasound-guided and palpation-guided knee injections by an experienced and less-experienced injector using a superolateral approach: a cadaveric study. *PM R.* 2011;3:507-515.
- Cunnington J, Marshall N, Hide G, et al. A randomized, double-blind, controlled study of ultrasound-guided corticosteroid injection into the joint of patients with inflammatory arthritis. *Arthritis Rheum.* 2010;62:1862-1869.
- Esenyel C, Esenyel M, Yesiltepe R, et al. The correlation between the accuracy of steroid injections and subsequent shoulder pain and function in subacromial impingement syndrome. *Acta Orthop Traumatol Turc.* 2003;37(1):41-45.
- Eustace JA, Brophy DP, Gibney RP, Bresnihan B, FitzGerald O. Comparison of the accuracy of steroid placement with clinical outcome in patients with shoulder symptoms. *Ann Rheum Dis.* 1997;56:59-63.
- Migliore A, Giovannangeli F, Granata M, Lagana B, Hylan G-F 20: Review of its safety and efficacy in the management of joint pain in osteoarthritis. *Clin Med Insights Arthritis Musculoskelet Disord.* 2010;3:55-68.

## VIVID IMAGING

THE LARGEST INDEPENDENT SERVICE PROVIDER FOR CONTRAST INJECTORS AND MRI COILS

We have been providing service support to the most recognized names in diagnostic imaging manufacturing, distribution, multi-vendor service, and healthcare since 1994. Our service delivery model is based on that of quality and total customer satisfaction. We invite you to experience the VIVID ADVANTAGE™

- Flat Rate Preventive Maintenance
- Service - No Additional After-hours or Weekend Fees
- ISO 9001:2000 Certified
- Providing Service Support Since 1994
- Live Webcam Technical and Operational Support
- Field & Depot Repair Services
- Parts - OEM, OPM & Refurbished

# SAMPLE



888.535.7094 • INFO@VIVIDIMAGING.COM • WWW.VIVIDIMAGING.COM



Receive your own **FREE** subscription to *Imaging Economics* magazine.

Subscribe now or renew online at [www.submag.com/sub/de?pk=hse](http://www.submag.com/sub/de?pk=hse)

*Imaging Economics*, the publication radiologists, radiology administrators, and C-level executives rely on to deliver market intelligence.

