

# Ultrasound-Guided Hip Procedures



Jeffrey M. Payne, MD\*

## KEYWORDS

- Ultrasound • Injection • Hip joint • Iliopsoas bursa • Trochanteric bursa
- Ischial bursa • Piriformis muscle

## KEY POINTS

- The differential diagnosis for hip pain is extensive and includes intra-articular and extra-articular pathologic conditions, and referred pain from the lumbar spine and pelvis.
- Ultrasound (US) is commonly used to evaluate hip region pathologic conditions and to guide interventions in the hip region for diagnostic and therapeutic purposes.
- US confers many advantages compared with other commonly used imaging modalities, including real-time visualization of muscles, tendons, bursae, neurovascular structures, and the needle during an intervention.
- US-guided injection techniques have been described for many commonly performed procedures in the hip region, and many studies have been performed demonstrating the safety and accuracy of these techniques.



Video content accompanies this article at <http://www.pmr.theclinics.com>.

## INTRODUCTION

The differential diagnosis for hip pain is extensive and includes intra-articular and extra-articular pathologic conditions, and referred pain from the lumbar spine and pelvis.<sup>1</sup> Ultrasound (US) is commonly used to evaluate pathologic conditions and to guide interventions in the hip region for diagnostic and therapeutic purposes.<sup>2-15</sup> Indications for performing interventions with image guidance include the proximity of neurovascular structures, lack of palpable anatomic landmarks, large body habitus, deep location of target, and the heightened need for accuracy when performing a diagnostic injection. In comparison with computed tomography (CT) and fluoroscopy, US does not produce ionizing radiation, has no absolute contraindications, does not require contrast agents, and is able to be performed with less expensive and more portable

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Physical Medicine and Rehabilitation, Mayo Clinic Health System, 300 State Avenue, Faribault, MN 55021, USA

\* 200 First Street SW, Rochester, Minnesota 55905, USA

E-mail address: [payne.jeffrey@mayo.edu](mailto:payne.jeffrey@mayo.edu)

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equipment.<sup>9</sup> US can identify bony acoustic landmarks and provides high-resolution soft tissue imaging, allowing for real-time visualization of muscles, tendons, and fascial planes.<sup>7,8</sup> US also allows for visualization of important neurovascular structures to assist in the prevention of injection-related complications.<sup>7,8</sup> This article describes the techniques for performing US-guided procedures in the hip region, including intra-articular hip injection, iliopsoas bursa injection, greater trochanter bursa injection, ischial bursa injection, and piriformis muscle injection. In addition, the common indications, pitfalls, accuracy, and efficacy of these procedures are addressed.

## ULTRASOUND-GUIDED HIP JOINT INJECTION

### *Diagnostic Criteria*

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Intra-articular causes of hip pain include osteoarthritis, acetabular labral tears, femoroacetabular impingement, loose bodies, and ligamentum teres tears.<sup>1</sup> Hip osteoarthritis is most often symptomatic with weight-bearing activities but may also cause pain at night. Management options include activity modification, weight loss, analgesics, physical therapy, intra-articular steroids, viscosupplementation, and total hip arthroplasty.<sup>16</sup>

Patients with intra-articular pathologic conditions may not have signs and symptoms clearly localized to the hip joint. Often, patients will have concomitant knee or spine conditions, making a definite diagnosis difficult. In these patients, an intra-articular injection of local anesthetic can be useful in confirming hip pathologic conditions and has been associated with predicting a good surgical outcome.<sup>14,15</sup> Hip joint corticosteroid injections have been shown to decrease pain, stiffness, and disability in patients with hip osteoarthritis.<sup>17</sup> Intra-articular hip injections with hyaluronic acid products have also been performed in patients with hip osteoarthritis.<sup>18,19</sup>

Intra-articular hip injections have been performed with palpation guidance using anatomic landmarks, as well as with image guidance using fluoroscopy, CT, and US.<sup>20-28</sup> Hip joint injections are technically challenging to perform because of the deep location of the joint, variable body habitus, and the adjacent femoral neurovascular bundle. Therefore, image guidance has been recommended to ensure safety and accurate needle placement.<sup>20</sup> Sonography can identify the femoral neurovascular bundle, reveal intra-articular fluid collections, and visualize needle passage into the hip joint.<sup>26</sup> Byrd and colleagues<sup>23</sup> reported that patients found in-office US-guided hip injections more convenient and less painful than the same procedure under fluoroscopy. US-guided hip joint injections have been shown to have an excellent safety profile. Sofka and colleagues<sup>28</sup> reported no major complications with 358 US-guided hip joint aspirations or injections, including no inadvertent vascular or femoral nerve puncture. Also, Migliore and colleagues<sup>19</sup> performed 4002 intra-articular hip injections with hyaluronan products and reported no major complications.

Several studies have been performed confirming the accuracy of US-guided hip joint injections.<sup>10,18,26,29</sup> A recent meta-analysis revealed that US-guided hip joint injections are significantly more accurate than landmark-guided intra-articular hip injections.<sup>30</sup> In addition, a systematic literature review for a position statement by the American Medical Society for Sports Medicine found four level 1 studies of US-guided hip injections with a mean accuracy of 99%.<sup>31</sup> Two level 2 studies were identified for landmark-guided hip injections with a mean accuracy of 73%.<sup>31</sup>

Several studies have evaluated the efficacy of US-guided hip joint injections.<sup>18,27,32,33</sup> Micu and colleagues<sup>27</sup> found that US-guided hip intra-articular corticosteroid injections are efficacious in achieving pain control in patients with hip osteoarthritis. Furtado and colleagues<sup>33</sup> compared the short-term effectiveness of

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