

American Academy of Physical Medicine and Rehabilitation
Position Statement
Diagnostic Musculoskeletal Ultrasound or Musculoskeletal Ultrasound-Guided
Procedures

American Academy of Physical Medicine and Rehabilitation (AAPM&R) Position:

Physiatrists specialize in the evaluation, diagnosis and treatment of patients of all ages with functional impairments, painful conditions and/or cognitive impairments related to the central and peripheral nervous system, cardiopulmonary and peripheral vascular systems and musculoskeletal systems. Patients diagnosed and treated by physiatrists may have orthopedic, neurologic, rheumatologic, oncologic, vascular, industrial/occupational, cardiovascular, pulmonary or sports-related conditions. With a focus on restoring optimal function and enhancing quality of life, our member physicians' musculoskeletal expertise is complemented by utilizing diagnostic and interventional musculoskeletal (MSK) ultrasound (US) to improve patient care. Thus, it is AAPM&R's position that diagnostic and interventional MSK US is cost effective and integral to the diagnosis and treatment of physiatric patients with certain MSK conditions.

With recent increased scrutiny regarding the value of this procedure, AAPM&R has developed the following key principles to guide policy development and appropriate use:

- (1) Diagnostic MSK US is highly sensitive and specific for the diagnosis of many musculoskeletal conditions.¹
- (2) The dynamic nature of MSK US enables physicians to diagnose conditions that cannot be resolved by static imaging.²
- (3) Diagnostic MSK US is significantly less expensive than other soft tissue imaging modalities (e.g., magnetic resonance imaging (MRI)). Therefore, appropriate utilization of diagnostic MSK US will save healthcare dollars.³
- (4) US-guided procedures enable many conditions that previously required surgery to be treated with minimally invasive interventions that are less expensive, have fewer potential complications, and facilitate earlier recovery than surgery. For example, ultrasound guided needle lavage for calcific rotator cuff tendinopathy is a successful office-based procedure that obviates the need for surgical debridement.⁴
- (5) US-guided procedures are more accurate than palpation-guided procedures.⁵⁻⁴⁵



American Academy of
Physical Medicine and Rehabilitation

Physicians Adding Quality to Life®

9700 W. Bryn Mawr Ave., Suite 200
Rosemont, Illinois 60018
phone 877/AAPMR 99
info@aapmr.org www.aapmr.org

- (6) There is evidence that US-guided arthrocentesis is superior to palpitation guided intra-articular (IA) injections in several respects. US-guided arthrocentesis reduces procedural pain, improves arthrocentesis success rates, leads to greater synovial fluid yield with more complete joint decompression and improves clinical outcomes and costs per patient responder per year.^{6, 31, 46-51}
- (7) Diagnostic MSK US has no known contra-indications and does not expose the patient or physician to harmful radiation.²
- (8) The diagnostic utility and cost-effectiveness of MSK US are enhanced when performed by the same physician who clinically evaluated the patient.
- (9) Interventional neuromuscular US services should include both MSK procedures (e.g., joints, tendons, bursa injections) and peripheral nerve blocks (e.g., carpal tunnel injections).
- (10) Diagnostic and interventional MSK US requires extensive training to develop competence. Training may be acquired through a structured residency or fellowship with a MSK US didactic curriculum, or via other means such as conferences, courses, books, on-line learning, and mentoring programs. Regardless of how the training was acquired, criteria must be established to demonstrate competence.
- (11) Diagnostic MSK US is preferred by patients over MRI due to ease of access, reduced cost and quicker diagnostic interpretation of their problems.⁵²

AAPM&R believes that diagnostic and interventional MSK ultrasound is a fundamental component of physiatric practice and an essential tool in the treatment of people with certain musculoskeletal conditions.

References

1. *Klauser, A., Tagliafico A, Allen Gm, Boutry N, Campbell R, Court-Payen M, Grainger A, Guerini H, McNally E, O'Connor PJ, Ostlere S, Petroons P, Reijnierse M, Sconfienza LM, Silvestri E, Wilsson DJ, Martinoli C, Clinical indications for musculoskeletal ultrasound: A Delphi-based consensus paper of the European society of musculoskeletal radiology. Eur Radiol, 2012. 22: p. 1140-1148.*
2. *Smith, J., Finnoff JT, Diagnostic and interventional musculoskeletal ultrasound: Part 1. Fundamentals. PM&R, 2009. 1(1): p. 64-75.*
3. *Parker, L., Nazarian LN, Carrino JA, Morrison WB, Grimaldi G, Frangos AJ, Levin DC, Rao VM, Musculoskeletal imaging: medicare use, costs, and potential for cost substitution. J Am Coll Radiol, 2008. 5: p. 182-188.*



American Academy of
Physical Medicine and Rehabilitation

Physicians Adding Quality to Life®

9700 W. Bryn Mawr Ave., Suite 200
Rosemont, Illinois 60018
phone 877/AAPMR 99
info@aapmr.org www.aapmr.org

4. de Witte PB, S.J., Navas A, Nagels J, Visser CPJ, Nelissen RGHH, Reijnen M, Calcific tendonitis of the rotator cuff: a randomized controlled trial of ultrasound-guided needling and lavage versus subacromial corticosteroids. *Am J Sports Med*, 2013. **41**: p. 1665-1673.
5. Balint, P., Kane D, Hunter J, McInnes IB, Field M, Sturrock RD, Ultrasound-guided versus conventional joint and soft tissue fluid aspiration in rheumatology practice: a pilot study. *J Rheumatol*, 2002. **29**(10): p. 220-2213.
6. Cunnington, J., Marshall N, Hide G, Bracewell C, Isaacs J, Platt P, Kane D, A randomized, double-blind, controlled study of ultrasound-guided corticosteroid injection into the joint of patients with inflammatory arthritis. *Arthritis Rheum*, 2010. **62**(7): p. 1862-1869.
7. Curtiss, H., 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. *PMR*, 2011. **3**(6): p. 507-515.
8. Daley, E., Bajaj S, Bisson LJ, Cole BJ, Improving injection accuracy of the elbow, knee, and shoulder: does injection site and imaging make a difference? A systematic review. *Am J Sports Med*, 2011. **39**(3): p. 656-662.
9. Dobson, M., A further anatomical check on the accuracy of intra-articular hip injections in relation to the therapy of coxarthrosis. *Ann Rheum Dis*, 1950. **9**: p. 237-240.
10. Eichenberger, U., Greher M, Kirchmair L, Curatolo M, Moriggl, Ultrasound-guided blocks of the ilioinguinal and iliohypogastric nerve: accuracy of a selective new technique confirmed by anatomic dissection. *Br J Anaesth*, 2006. **97**(2): p. 238-243.
11. Eustace, J.A., et al., Comparison of the accuracy of steroid placement with clinical outcome in patients with shoulder symptoms. *Annals of the Rheumatic Diseases*, 1997. **56**(1): p. 59-63.
12. Finnoff, J., Nutz DJ, Henning PT, Hollman JH, Smith J, Accuracy of ultrasound-guided versus unguided pes anserinus bursa injections. *PMR*, 2010. **2**: p. 732-739.
13. Finnoff, J.T., M.F. Hurdle, and J. Smith, Accuracy of ultrasound-guided versus fluoroscopically guided contrast-controlled piriformis injections: a cadaveric study. *Journal of Ultrasound in Medicine*, 2008. **27**(8): p. 1157-63.
14. Hanchard, N., Shanahan D, Howe T, Thompson J, Goodchild L, Accuracy and dispersal of subacromial and glenohumeral injections in cadavers. *J Rheumatol*, 2006. **33**: p. 1143-1146.
15. Hashiuchi, T., Sakurai G, Morimoto M, Komei T, Takakura Y, Tanaka Y, Accuracy of biceps tendon sheath injection: ultrasound-guided or unguided injection? A randomized controlled trial. *J Shoulder Elbow Surg*, 2011. **20**: p. 1069-1073.
16. Henkus, H.E., et al., The accuracy of subacromial injections: a prospective randomized magnetic resonance imaging study.[see comment]. *Arthroscopy*, 2006. **22**(3): p. 277-82.
17. Im, S., Lee SC, Park YB, Cho SR, Kim JC, Feasibility of sonography for intra-articular injections in the knee through a medial patellar portal. *J Ultrasound Med*, 2009. **28**: p. 1465-1470.
18. Jackson, D.W., N.A. Evans, and B.M. Thomas, Accuracy of needle placement into the intra-articular space of the knee.[see comment]. *Journal of Bone & Joint Surgery - American Volume*, 2002. **84-A**(9): p. 1522-7.
19. Kang, M.N., et al., The accuracy of subacromial corticosteroid injections: a comparison of multiple methods. *Journal of Shoulder & Elbow Surgery*, 2008. **17**(1 Suppl): p. 61S-66S.
20. Leopold, S., Battista V, Oliverio JA, Safety and efficacy of intraarticular hip injection using anatomic landmarks. *Clin Orthop Relat Res*, 2001. **391**: p. 192-197.
21. Mathews, P.V. and R.E. Glousman, Accuracy of subacromial injection: anterolateral versus posterior approach. *Journal of Shoulder & Elbow Surgery*, 2005. **14**(2): p. 145-8.
22. Muir, J., Curtiss HM, Hollman J, Smith J, Finnoff JT, The accuracy of ultrasound-guided and palpation-guided peroneal tendon sheath injections. *Am J Phys Med Rehabil*, 2011. **90**: p. 564-571.
23. Park, Y., Lee SC, Nam HE, Lee J, Nam SH, Comparison of sonographically guided intra-articular injections at 3 different sites of the knee. *J Ultrasound Med*, 2011. **30**: p. 1669-1676.
24. Park, Y., Choi WA, Kim YK, Lee SC, Lee JH, Accuracy of blind versus ultrasound-guided suprapatellar bursal injection. *J Clin Ultrasound*, 2012. **40**(1): p. 20-25.

25. Partington, P.F. and G.H. Broome, Diagnostic injection around the shoulder: hit and miss? A cadaveric study of injection accuracy. *Journal of Shoulder & Elbow Surgery*, 1998. 7(2): p. 147-50.
26. Patel, D., Nayyar S, Hasan S, Khatib O, Sidash S, Jazrawi LM, Comparison of ultrasound-guided versus blind glenohumeral injections: a cadaveric study. *J Shoulder Elbow Surg*, 2012. 21(12): p. 1664-1668.
27. Peck, E., Lai JK, Pawlina W, Smith J, Accuracy of ultrasound-guided versus palpation-guided acromioclavicular joint injections: a cadaveric study. *PMR*, 2010. 2: p. 817-821.
28. Pourbagher, M.A., M. Ozalay, and A. Pourbagher, Accuracy and outcome of sonographically guided intra-articular sodium hyaluronate injections in patients with osteoarthritis of the hip. *Journal of Ultrasound in Medicine*, 2005. 24(10): p. 1391-5.
29. Raza, K., et al., Ultrasound guidance allows accurate needle placement and aspiration from small joints in patients with early inflammatory arthritis. *Rheumatology*, 2003. 42(8): p. 976-9.
30. Reach, J., Easley ME, Chuckpaiwong B, Nunley JA, Accuracy of ultrasound guided injections in the foot and ankle. *Foot Ankle International*, 2009. 30(3): p. 239-242.
31. Rutten, M., Collins JMP, Maresch BJ, Janssen CMM, Kiemeny LALM, Jager GJ, Glenohumeral joint injection: a comparative study of ultrasound and fluoroscopically guided techniques before MR arthrography. *Eur Radiol*, 2009. 19: p. 722-730.
32. Smith, J., Hurdle MF, Locketz AJ, Wisniewski SJ, Ultrasound-guided piriformis injection: technique description and verification. *Arch Phys Med Rehabil*, 2006. 87(12): p. 1664-1667.
33. Smith, J., Hurdle MF, Office-based ultrasound-guided intra-articular hip injection: technique for physiatric practice. *Arch Phys Med Rehabil*, 2006. 87(2): p. 296-298.
34. Smith, J., Hurdle MF, Weingarten TN, Accuracy of sonographically guided intra-articular injections in the native adult hip. *J Ultrasound Med*, 2009. 28: p. 329-335.
35. Smith, J., Finnoff JT, Henning PT, Turner NS, Accuracy of sonographically guided posterior subtalar joint injections: Comparison of 3 techniques. *J Ultrasound Med*, 2009. 28(1549-1557).
36. Smith, J., Finnoff JT, Santaella-Sante B, Henning T, Levy BA, Lai JK, Sonographically guided popliteus tendon sheath injection: techniques and accuracy. *J Ultrasound Med*, 2010. 29: p. 775-782.
37. Smith, J., Brault JS, Rizzo M, Sayeed YA, Finnoff JT, Accuracy of sonographically guided and palpation guided scaphotrapezotrapezoid joint injections. *J Ultrasound Med*, 2011. 30: p. 1509-1515.
38. Smith, J., Rizzo M, Sayeed YA, Finnoff JT, Sonographically guided distal radioulnar joint injection: Technique and validation in a cadaveric model. *J Ultrasound Med*, 2011. 30: p. 1587-1592.
39. Smith, J., Wisniewski SJ, Wempe MK, Landry BW, Sellon JL, Sonographically guided obturator internus injections: Techniques and validation. *J Ultrasound Med*, 2012. 31: p. 1597-1608.
40. Toda, Y. and N. Tsukimura, A comparison of intra-articular hyaluronan injection accuracy rates between three approaches based on radiographic severity of knee osteoarthritis. *Osteoarthritis & Cartilage*, 2008. 16(9): p. 980-5.
41. Umphrey, G., Brault JS, Hurdle MF, Smith J, Ultrasound-guided intra-articular injection of the trapeziometacarpal joint: description of technique. *Arch Phys Med Rehabil*, 2008. 89(1): p. 153-156.
42. Wasserman, B., Petrone S, Jazrawi LM, Zuckerman JD, Rokito AS, Accuracy of acromioclavicular joint injections. *Am J Sports Med*, 2013. 41(1): p. 149-152.
43. Weinberg, A., Pichler W, Grechenig S, Tesch N, Heidari N, Grechenig W, Frequency of successful intra-articular puncture of sternoclavicular joint: a cadaveric study. *Scand J Rheumatol*, 2009. 38(5): p. 396-398.
44. Wisniewski, S., Smith J, Patterson DG, Carmichael SW, Pawlina W, Ultrasound-guided versus nonguided tibiotalar joint and sinus tarsi injections: a cadaveric study. *PMR*, 2010. 2: p. 277-281.
45. Yamakado, K., The targeting accuracy of subacromial injection to the shoulder: an arthrographic evaluation. *Arthroscopy*, 2002. 18(8): p. 887-91.
46. Chavez-Chiang, N., Delea S, Sibbitt WL, Bankhurst AD, Norton H, Outcomes and cost-effectiveness of carpal tunnel injections using sonographic needle guidance. *Arthritis Rheum*, 2010. 62(Suppl 10): p. 1626.
47. Jones, A., Regan M, Ledingham J, Pattrick M, Manhire A, Doherty M, Importance of placement of intra-articular steroid injections. *Br Med J*, 1993. 307: p. 1329-1330.

48. *Sibbitt, S., Band PA, Kettwich LG, Chavez-Chiang NR, DeLea SL, Bankhurst AD, A randomized controlled trial evaluating the cost effectiveness of sonographic guidance for intra-articular injection of the osteoarthritic knee. J Clin Rheumatol, 2011. 17: p. 409-415.*
49. *Sibbitt, W., Peisajovich A, Michael AA, Park KS, Sibbitt RR, Band PA, Bankhurst AD, Does sonographic needle guidance affect the clinical outcome of intraarticular injections? J Rheumatol, 2009. 36: p. 1892-1902.*
50. *Sibbitt, W., 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: p. 252-263.*
51. *Sibbitt, W., Kettwich LG, Band PA, Chavez-Chiang NR, DeLea SL, Haseler LJ, Bankhurst AD, Does ultrasound guidance improve the outcomes of arthrocentesis and corticosteroid injection of the knee. Scand J Rheumatol, 2012. 41(1): p. 66-72.*
52. *Middleton, W., Payne WT, Teefey SA, Hildebolt CF, Rubin DA, Yamaguchi K, Sonography and MRI of the shoulder: comparison of patient satisfaction. AJR, 2004. 183: p. 1449-1452.*

About AAPM&R

The AAPM&R is the national medical society representing more than 9,000 physiatrists, physicians who are specialists in the field of physical medicine and rehabilitation. Physiatrists treat adults and children with acute and chronic pain, persons who have experienced catastrophic events resulting in paraplegia, quadriplegia, traumatic brain injury, spinal cord injury, limb amputations, rheumatologic conditions, musculoskeletal injuries, and individuals with neurologic disorders or any other disease process that results in impairment and/or disability. With appropriate rehabilitation, many patients can regain significant function, live independently, and live fulfilling lives.

Disclaimer

This AAPM&R Position Statement is intended to provide general information to physiatrists and is designed to complement advocacy efforts on diagnostic or guided ultrasound procedures in discussions with payers and policymakers at the federal, state and regional levels. The statement should never be relied on as a substitute for proper assessment with respect to the specific circumstances of each case a physiatrist encounters and the needs of each patient. This AAPM&R statement has been prepared with regard to the information available at the time of its publication. Each physiatrist must have access to timely relevant information, research or other material which may have been published or become available subsequently.

*Approved by AAPM&R Board of Governors
March 2014*



American Academy of
Physical Medicine and Rehabilitation

Physicians Adding Quality to Life®

9700 W. Bryn Mawr Ave., Suite 200
Rosemont, Illinois 60018
phone 877/AAPMR 99
info@aapmr.org www.aapmr.org