Effect of Patella Alta on the Native Anatomometricity of the Medial Patellofemoral Complex: A Cadaveric Study

ADAM YANKE MD, PHD / HAILEY HUDDLESTON, BS / KEVIN CAMPBELL, MD / MICHAEL L. REDONDO, MA, BS
ALEJANDRO ESPINOZA-ORIAS, PHD / JORGE CHAHLA MD, PHD / BRIAN J. COLE, MD, MBA / JACK FARR, MD

References

1. Waterman BR, Belmont PJ Jr, Owens BD. Patellar dislocation in the United States: role of sex, age, race, and athletic participation. *J Knee Surg.* 2012;25(1):51-57.

2. Weber AE, Nathani A, Dines JS, et al. An algorithmic approach to the management of recurrent lateral patellar dislocation. *J Bone Joint Surg Am.* 2016;98(5):417-427.

3. Lewallen L, McIntosh A, Dahm D. First-time patellofemoral dislocation: risk factors for recurrent instability. *J Knee Surg.* 2015;28(4):303-309.

4. Fitzpatrick CK, Steensen RN, Tumuluri A, Trinh T, Bentley J, Rullkoetter PJ. Computational analysis of factors contributing to patellar dislocation. *J Orthop Res.* 2016;34(3):444-453.

5. Ellera Gomes JL. Medial patellofemoral ligament reconstruction for recurrent dislocation of the patella: a preliminary report. *Arthroscopy.* 1992;8(3):335-340.

6. Hiemstra LA, Kerslake S, Loewen M, Lafave M. Effect of trochlear dysplasia on outcomes after isolated soft tissue stabilization for patellar instability. *Am J Sports Med.* 2016;44(6):1515-1523.

7. Amis AA, Firer P, Mountney J, Senavongse W, Thomas NP. Anatomy and biomechanics of the medial patellofemoral ligament. *Knee.* 2003;10(3):215-220.

8. Tanaka MJ, Chahla J, Farr J II, Recognition of evolving medial patellofemoral anatomy provides insight for reconstruction. *Knee Surg Sports Traumatol Arthrosc.* 2019;27(8):2537-2550. doi:10.1007/s00167-018-5266-y

9. Askenberger M, Arendt EA, Ekström W, Voss U, Finnbogason T, Janarv PM. Medial patellofemoral ligament injuries in children with first-time lateral patellar dislocations. *Am J Sports Med.* 2016;44(1):152-158.

10. Steensen RN, Bentley JC, Trinh TQ, Backes JR, Wiltfong RE. The prevalence and combined prevalences of anatomic factors associated with recurrent patellar dislocation. *Am J Sports Med.* 2015;43(4):921-927.

11. Jaquith BP, Parikh SN. Predictors of recurrent patellar instability in children and adolescents after first-time dislocation. *J Pediatr Orthop.* 2017;37(7):484-490.

12. Charles MD, Haloman S, Chen L, Ward SR, Fithian D, Afra R. Magnetic resonance imaging–based topographical differences between control and recurrent patellofemoral instability patients. *Am J Sports Med.* 2013;41(2):374-384.

13. Askenberger M, Janarv PM, Finnbogason T, Arendt EA. Morphology and anatomic patellar instability risk factors in first-time traumatic lateral patellar dislocations: a prospective magnetic resonance imaging study in skeletally immature children. *Am J Sports Med.* 2017;45(1):50-58.

14. Berard JB, Magnussen RA, Bonjean G, et al. Femoral tunnel enlargement after medial patellofemoral ligament reconstruction: prevalence, risk factors, and clinical effect. *Am J Sports Med.* 2014;42(2):297-301.

15. Kruckeberg BM, Chahla J, Moatshe G, et al. Quantitative and qualitative analysis of the medial patellar ligaments: an anatomic and radiographic study. *Am J Sports Med.* 2018;46(1):153-162.

16. Krackow KA, Thomas SC, Jones LC. A new stitch for ligament-tendon fixation: brief note. *J Bone Joint Surg Am.* 1986;68(5):764-766.

17. Stephen JM, Lumpaopong P, Deehan DJ, Kader D, Amis AA. The medial patellofemoral ligament: location of femoral attachment and length change patterns resulting from anatomic and nonanatomic attachments. *Am J Sports Med.* 2012;40(8):1871-1879.

18. Matsushita T, Araki D, Hoshino Y, et al. Analysis of graft length change patterns in medial patellofemoral ligament reconstruction via a fluoroscopic guidance method. *Am J Sports Med.* 2018;46(5):1150-1157.

19. Tateishi T, Tsuchiya M, Motosugi N, et al. Graft length change and radiographic assessment of femoral drill hole position for medial patellofemoral ligament reconstruction. *Knee Surg Sports Traumatol Arthrosc.* 2011;19(3):400-407.

No sources of support in the forms of grants, equipment, or other items were received for this study. The authors report no conflict of interest. The authors' personal disclosure information can be accessed through the AAOS Orthopedic Disclosure Program at www.aaos.org.

Impact of Local Steroid Application in a Minimally Invasive Transforaminal Lumbar Interbody Fusion

BRITTANY E. HAWS, MD / BENJAMIN KHECHEN, BA / JOON S. YOO, BA / DANIEL D. BOHL, MD, MPH / BENJAMIN C. MAYO, MD
DUSTIN H. MASSEL, MD / JORDAN A. GUNTIN, BS / KAITLYN L. CARDINAL, BS / KERN SINGH, MD

References

1. Elboghdady IM, Naqvi A, Jorgenson AY, Marquez-Lara A, Singh K. Minimally invasive transforaminal lumbar interbody fusion for lumbar spondylolisthesis. *Ann Transl Med*. 2014;2(10):99.

2. Ge DH, Stekas ND, Varlotta CG, et al. Comparative analysis of two transforaminal lumbar interbody fusion techniques: open TLIF versus Wiltse MIS TLIF. *Spine (Phila Pa 1976)*. 2019;44(9):E555-E560.

3. Singh K, Nandyala SV, Marquez-Lara A, et al. A perioperative cost analysis comparing single-level minimally invasive and open transforaminal lumbar interbody fusion. *Spine J*. 2014;14(8):1694-1701.

4. Parker SL, Mendenhall SK, Shau DN, et al. Minimally invasive versus open transforaminal lumbar interbody fusion for degenerative spondylolisthesis: comparative effectiveness and cost-utility analysis. *World Neurosurg*. 2014;82(1-2):230-238.

5. Ranguis SC, Li D, Webster AC. Perioperative epidural steroids for lumbar spine surgery in degenerative spinal disease: a review. *J Neurosurg Spine*. 2010;13(6):745-757.

6. Wilson-Smith A, Chang N, Lu VM, et al. Epidural steroids at closure after microdiscectomy/laminectomy for reduction of postoperative analgesia: systematic review and meta-analysis. *World Neurosurg*. 2018;110:e212-e221.

7. Gan TJ. Poorly controlled postoperative pain: prevalence, consequences, and prevention. *J Pain Res*. 2017;10:2287-2298.

8. Bajwa SJ, Haldar R. Pain management following spinal surgeries: an appraisal of the available options. *J Craniovertebr Junction Spine*. 2015;6(3):105-110.

9. Kurd MF, Kreitz T, Schroeder G, Vaccaro AR. The role of multimodal analgesia in spine surgery. *J Am Acad Orthop Surg*. 2017;25(4):260-268.

10. Jamjoom BA, Jamjoom AB. Efficacy of intraoperative epidural steroids in lumbar discectomy: a systematic review. *BMC Musculoskelet Disord*. 2014;15:146.

11. Diaz RJ, Myles ST, Hurlbert RJ. Evaluation of epidural analgesic paste components in lumbar decompressive surgery: a randomized double-blind controlled trial. *Neurosurgery*. 2012;70(2):414-423, discussion 423-424.

12. Debi R, Halperin N, Mirovsky Y. Local application of steroids following lumbar discectomy. *J Spinal Disord Tech*. 2002;15(4):273-276.

13. Shin SH, Hwang BW, Keum HJ, Lee SJ, Park SJ, Lee SH. Epidural steroids after a percutaneous endoscopic lumbar discectomy. *Spine (Phila Pa 1976)*. 2015;40(15):E859-E865.

14. Zhang Y, Yang XJ, Zeng TH, Qiu YY, Wang YT, Liang FG. A retrospective study of epidural and intravenous steroids after percutaneous endoscopic lumbar discectomy for large lumbar disc herniation. *Chin J Traumatol*. 2017;20(1):34-38.

15. Modi H, Chung KJ, Yoon HS, Yoo HS, Yoo JH. Local application of low-dose Depo-Medrol is effective in reducing immediate postoperative back pain. *Int Orthop*. 2009;33(3):737-743.

16. Mobbs RJ, Phan K, Malham G, Seex K, Rao PJ. Lumbar interbody fusion: techniques, indications and comparison of interbody fusion options including PLIF, TLIF, MI-TLIF, OLIF/ATP, LLIF and ALIF. *J Spine Surg*. 2015;1(1):2-18.

17. Copay AG, Glassman SD, Subach BR, Berven S, Schuler TC, Carreon LY. Minimum clinically important difference in lumbar spine surgery patients: a choice of methods using the Oswestry Disability Index, Medical Outcomes Study questionnaire Short Form 36, and pain scales. *Spine J*. 2008;8(6):968-974.

18. Akinduro OO, Miller BA, Haussen DC, Pradilla G, Ahmad FU. Complications of intraoperative epidural steroid use in lumbar discectomy: a systematic review and meta-analysis. *Neurosurg Focus*. 2015;39(4):E12.

19. Jirarattanaphochai K, Jung S, Thienthong S, Krisanaprakornkit W, Sumananont C. Peridural methylprednisolone and wound infiltration with bupivacaine for postoperative pain control after posterior lumbar spine surgery: a randomized double-blinded placebo-controlled trial. *Spine (Phila Pa 1976)*. 2007;32(6):609-616, discussion 617.

20. Bijur PE, Silver W, Gallagher EJ. Reliability of the visual analog scale for measurement of acute pain. *Acad Emerg Med*. 2001;8(12):1153-1157.

21. Boonstra AM, Schiphorst Preuper HR, Reneman MF, Stewart RE. Reliability and validity of the visual analogue scale for disability in patients with chronic musculoskeletal pain. *Int J Rehabil Res*. 2008;31(2):165-169.

22. Folstein MF, Luria R. Reliability, validity, and clinical application of the Visual Analogue Mood Scale. *Psychol Med*. 1973;(4)3:479-486.

No sources of support in the forms of grants, equipment, or other items were received for this study. The authors report no conflict of interest. The authors' personal disclosure information can be accessed through the AAOS Orthopedic Disclosure Program at www.aaos.org.

Reduced Blood Loss With Use of Canady Hybrid Plasma Scalpel Compared With Bovie Electrocautery in the Resection of Soft-Tissue Sarcomas

CONNOR J. WAKEFIELD, BS / CHRIS CULVERN, MS / MATTHEW COLMAN, MD
JEROME CANADY, MD / STEVEN GITELIS, MD / ALAN T. BLANK, MD, MS

References

1. Clark MA, Fisher C, Judson I, Thomas JM. Soft-tissue sarcomas in adults. *N Engl J Med*. 2005;(353):701-711. doi:10.1056/NEJMra041866

2. Fletcher CDM, Bridge JA, Hogendoorn P, Mertens F. *WHO Classification of Tumours of Soft Tissue and Bone*. Lyon, France: International Agency for Research on Cancer; 2013.

3. López-Pousa A, Broto JM, Trufero JM, et al. SEOM clinical guideline of management of soft-tissue sarcoma (2016). *Clin Transl Oncol*. 2016;18(12):1213-1220. doi:10.1007/s12094-016-1574-1

4. Gronchi A, Colombo C, Raut CP. Surgical management of localized soft tissue tumors. *Cancer*. 2014;120(17):2638-2648. doi:10.1002/cncr.28715

5. O'Sullivan B, Davis AM, Turcotte R, et al. Preoperative versus postoperative radiotherapy in soft-tissue sarcoma of the limbs: a randomised trial. *Lancet*. 2002;359(9325):2235-2241. doi:10.1016/s0140-6736(02)09292-9

6. Moore J, Isler M, Barry J, Mottard S. Major wound complication risk factors following soft tissue sarcoma resection. *Eur J Surg Oncol*. 2014;40(12):1671-1676. doi:10.1016/j.ejso.2014.10.045

7. Geller DS, Hornicek FJ, Mankin HJ, Raskin KA. Soft tissue sarcoma resection volume associated with wound-healing complications. *Clin Orthop Relat Res*. 2007;459:182-185. doi:10.1097/blo.0b013e3180514c50

8. Kawai A, Kadota H, Yamaguchi U, Morimoto Y, Ozaki T, Beppu Y. Blood loss and transfusion associated with musculoskeletal tumor surgery. *J Surg Oncol*. 2005;92(1):52-58. doi:10.1002/jso.20375

9. Guild GN, Runner RP, Castilleja GM, Smith MJ, Vu CL. Efficacy of hybrid plasma scalpel in reducing blood loss and transfusions in direct anterior total hip arthroplasty. *J Arthroplasty*. 2017;32(2):458-462. doi:10.1016/j.arth.2016.07.038

10. Loh SA, Carlson GA, Huang E, Duncan KL, Gurtner GC. Comparative healing of surgical incisions created by a standard bovie, PEAK electrosurgical cutting tool, and standard scalpel blade. *J Am Coll Surg*. 2007;205(3)(suppl):S54.

11. Keidar M, Shashurin A, Volotskova O, et al. Cold atmospheric plasma in cancer therapy. *Phys Plasmas*. 2013;20(5):057101. doi:10.1063/1.4801516

12. Keidar M, Walk R, Shashurin A, et al. Cold plasma selectivity and the possibility of a paradigm shift in cancer therapy. *Br J Cancer*. 2011;105(9):1295-1301. doi:10.1038/bjc.2011.386

13. Volotskova O, Stepp MA, Keidar M. Integrin activation by a cold atmospheric plasma jet. *New J Phys*. 2012;14(5):053019. doi:10.1088/1367-2630/14/5/053019

14. Jemal A, Tiwari RC, Murray T, et al. Cancer statistics, 2004. *CA Cancer J Clin*. 2004;54(1):8-29.

15. Kolovich GG, Wooldridge AN, Christy JM, Crist MK, Mayerson JL, Scharschmidt TJ. A retrospective statistical analysis of high-grade soft tissue sarcomas. *Med Oncol*. 2011;29(2):1335-1344. doi:10.1007/s12032-011-9970-4

16. Tsuda Y, Yasunaga H, Horiguchi H, Fushimi K, Kawano H, Tanaka S. Complications and postoperative mortality rate after surgery for pathological femur fracture related to bone metastasis: analysis of a nationwide database. *Ann Surg Oncol*. 2016;23(3):801-810. doi:10.1245/s10434-015-4881-9

17. Karmaniolou I, Makris A, Lamprou K, Staikou C. Perioperative management of patients with bone and soft tissue tumors: a narrative review. *Acta Anaesth Belg*. 2017;68(1):1-12.

18. Nathanson SD, Tilley BC, Schultz L, Smith RF. Perioperative allogeneic blood transfusions: survival in patients with resected carcinomas of the colon and rectum. *Arch Surg*. 1985;120(6):734-738. doi:10.1001/archsurg.1985.01390300076013

19. Gümbel D, Bekeschus S, Gelbrich N, et al. Cold atmospheric plasma in the treatment of osteosarcoma. *Int J Mol Sci*. 2017;18(9):2004. doi:10.3390/ijms18092004

20. Virard F, Cousty S, Cambus JP, Valentin A, Kémoun P, Clément F. Cold atmospheric plasma induces a predominantly necrotic cell death via the microenvironment. *PLoS One*. 2015;10(8). doi:10.1371/journal.pone.0133120

21. Fang J, Seki T, Maeda H. Therapeutic strategies by modulating oxygen stress in cancer and inflammation. *Adv Drug Deliv Rev*. 2009;61(4):290-302. doi:10.1016/j.addr.2009.02.005

No sources of support in the forms of grants, equipment, or other items were received for this study. The authors report no conflict of interest. The authors' personal disclosure information can be accessed through the AAOS Orthopedic Disclosure Program at www.aaos.org.

The July Effect in Hand Surgery

NITIN GOYAL, MD / DANIEL D. BOHL, MD, MPH / ROBERT W. WYSOCKI, MD

References

1. Jena AB, Sun EC, Romley JA. Mortality among high-risk patients with acute myocardial infarction admitted to U.S. teaching-intensive hospitals in July: a retrospective observational study. *Circulation*. 2013;128(25):2754-2763.

2. Phillips DP, Barker GE. A July spike in fatal medication errors: a possible effect of new medical residents. *J Gen Intern Med*. 2010;25(8):774-779.

3. Young JQ, Ranji SR, Wachter RM, Lee CM, Niehaus B, Auerbach AD. "July effect": impact of the academic year-end changeover on patient outcomes: a systematic review. *Ann Intern Med*. 2011;155(5):309-315.

4. Rich EC, Hillson SD, Dowd B, Morris N. Specialty differences in the 'July Phenomenon' for Twin Cities teaching hospitals. *Med Care*. 1993;31(1):73-83.

5. Barry WA, Rosenthal GE. Is there a July phenomenon? the effect of July admission on intensive care mortality and length of stay in teaching hospitals. *J Gen Intern Med*. 2003;18(8):639-645.

6. Bruckner TA, Carlo WA, Ambalavanan N, Gould JB. Neonatal mortality among low birth weight infants during the initial months of the academic year. *J Perinatol*. 2008;28(10):691-695.

7. Anderson KL, Koval KJ, Spratt KF. Hip fracture outcome: is there a "July effect"? *Am J Orthop (Belle Mead NJ)*. 2009;38(12):606-611.

8. Nandyala SV, Marquez-Lara A, Fineberg SJ, Singh K. Perioperative characteristics and outcomes of patients undergoing anterior cervical fusion in July: analysis of the "July effect". *Spine (Phila Pa 1976)*. 2014;39(7):612-617.

9. Englesbe MJ, Fan Z, Baser O, Birkmeyer JD. Mortality in Medicare patients undergoing surgery in July in teaching hospitals. *Ann Surg*. 2009;249(6):871-876.

10. Bohl DD, Fu MC, Gruskay JA, Basques BA, Golinvaux NS, Grauer JN. "July effect" in elective spine surgery: analysis of the American College of Surgeons National Surgical Quality Improvement Program database. *Spine (Phila Pa 1976)*. 2014;39(7):603-611.

11. Hoashi JS, Samdani AF, Betz RR, Bastrom TP, Cahill PJ. Is there a "July effect" in surgery for adolescent idiopathic scoliosis? *J Bone Joint Surg Am*. 2014;96(7):e55.

12. Rao AJ, Bohl DD, Frank RM, Cvetanovich GL, Nicholson GP, Romeo AA. The "July effect" in total shoulder arthroplasty. *J Shoulder Elbow Surg*. 2017;26(3):e59-e64.

13. Bohl DD, Fu MC, Golinvaux NS, Basques BA, Gruskay JA, Grauer JN. The "July effect" in primary total hip and knee arthroplasty: analysis of 21,434 cases from the ACS-NSQIP database. *J Arthroplasty*. 2014;29(7):1332-1338.

14. Smith ER, Butler WE, Barker FG II. Is there a "July phenomenon" in pediatric neurosurgery at teaching hospitals? *J Neurosurg*. 2006;105(3)(suppl):169-176.

15. Bohl DD, Singh K, Grauer JN. Nationwide databases in orthopaedic surgery research. *J Am Acad Orthop Surg*. 2016;24(10):673-682.

16. Lipira AB, Sood RF, Tatman PD, Davis JI, Morrison SD, Ko JH. Complications within 30 days of hand surgery: an analysis of 10,646 patients. *J Hand Surg Am*. 2015;40(9):1852-1859.e3.

17. Zou G. A modified Poisson regression approach to prospective studies with binary data. *Am J Epidemiol*. 2004;159(7):702-706.

No sources of support in the forms of grants, equipment, or other items were received for this study. The authors report no conflict of interest. The authors' personal disclosure information can be accessed through the AAOS Orthopedic Disclosure Program at www.aaos.org.

When Do Patients Perceive Clinical Benefits After Knee and Shoulder Sports Surgery?

ALEXANDER BELETSKY, BA / BRANDON J. MANDERLE, MS / YINING LU, BA / EDMUND NAAMI, BA / BENEDICT U. NWACHUKWU, MD, MBA
JORGE CHAHLA, MD, PHD / KELECHI R. OKOROHA, MD / BRIAN FORSYTHE, MD / BRIAN J. COLE, MD, MBA / NIKHIL N. VERMA, MD

References

1. Pugely AJ, Bozic KJ. Editorial commentary: rising interest in "big data" in arthroscopy: is the juice worth the squeeze? *Arthroscopy.* 2017;33(1):232-233.

2. Pugely AJ, Martin CT, Harwood J, Ong KL, Bozic KJ, Callaghan JJ. Database and registry research in orthopaedic surgery, part I: claims-based data. *J Bone Joint Surg Am.* 2015;97(15):1278-1287.

3. Pugely AJ, Martin CT, Harwood J, Ong KL, Bozic KJ, Callaghan JJ. Database and registry research in orthopaedic surgery, part 2: clinical registry data. *J Bone Joint Surg Am.* 2015;97(21):1799-1808.

4. Hamid KS, Nwachukwu BU, Bozic KJ. Decisions and incisions: a value-driven practice framework for academic surgeons. *J Bone Joint Surg Am.* 2017;99(10):e50.

5. Porter ME. A strategy for health care reform—toward a value-based system. *N Engl J Med.* 2009;361(2):109-112.

6. Wright RW, Baumgarten KM. Shoulder outcomes measures. *J Am Acad Orthop Surg.* 2010;18(7):436-444.

7. Watson ST, Robbins CB, Bedi A, Carpenter JE, Gagnier JJ, Miller BS. Comparison of outcomes 1 year after rotator cuff repair with and without concomitant biceps surgery. *Arthroscopy.* 2017;33(11):1928-1936.

8. Liechti DJ, Mitchell JJ, Menge TJ, Hackett TR. Immediate physical therapy without postoperative restrictions following open subpectoral biceps tenodesis: low failure rates and improved outcomes at a minimum 2-year follow-up. *J Shoulder Elbow Surg.* 2018;27(10):1891-1897.

9. Cook CE. Clinimetrics corner: the minimal clinically important change score (MCID): a necessary pretense. *J Man Manip Ther.* 2008;16(4):E82-E83.

10. Paulsen A, Roos EM, Pedersen AB, Overgaard S. Minimal clinically important improvement (MCII) and patient-acceptable symptom state (PASS) in total hip arthroplasty (THA) patients 1 year postoperatively. *Acta Orthop.* 2014;85(1):39-48.

11. Harris JD, Brand JC, Cote MP, Faucett SC, Dhawan A. Research pearls: the significance of statistics and perils of pooling, part 1: clinical versus statistical significance. *Arthroscopy.* 2017;33(6):1102-1112.

12. McGlothlin AE, Lewis RJ. Minimal clinically important difference: defining what really matters to patients. *JAMA.* 2014;312(13):1342-1343.

13. Michener LA, Snyder Valier AR, McClure PW. Defining substantial clinical benefit for patient-rated outcome tools for shoulder impingement syndrome. *Arch Phys Med Rehabil.* 2013;94(4):725-730.

14. Larson CM. Editorial commentary: patient-related outcome measures, minimal clinically important differences, and substantial clinical benefits for adolescent hip arthroscopy: making progress with outcome measures or unquestionably spinning out of control? *Arthroscopy.* 2017;33(10):1819-1820.

15. Kvien TK, Heiberg T, Hagen KB. Minimal clinically important improvement/difference (MCII/MCID) and patient acceptable symptom state (PASS): what do these concepts mean? *Ann Rheum Dis.* 2007;66(suppl 3):iii40-iii41.

16. Puzzitiello RN, Gowd AK, Liu JN, Agarwalla A, Verma NN, Forsythe B. Establishing minimal clinically important difference, substantial clinical benefit, and patient acceptable symptomatic state after biceps tenodesis. *J Shoulder Elbow Surg.* 2019;28(4):639-647.

17. Cvetanovich GL, Gowd AK, Liu JN, et al. Establishing clinically significant outcome after arthroscopic rotator cuff repair. *J Shoulder Elbow Surg.* 2019;28(5):939-948.

18. Gowd AK LS, Liu JN, Agarwalla A, et al. Factors associated with clinically significant patient-reported outcomes after primary arthroscopic partial meniscectomy. *Arthroscopy.* 2019;35(5):1567-1575.e3.

19. Nwachukwu BU, Chang B, Adjei J, et al. Time required to achieve minimal clinically important difference and substantial clinical benefit after arthroscopic treatment of femoroacetabular impingement. *Am J Sports Med.* 2018;46(11):2601-2606.

20. Flores SE, Sheridan JR, Borak KR, Zhang AL. When do patients improve after hip arthroscopy for femoroacetabular impingement? a prospective cohort analysis. *Am J Sports Med.* 2018;46(13):3111-3118.

21. Copay AG, Subach BR, Glassman SD, Polly DW Jr, Schuler TC. Understanding the minimum clinically important difference: a review of concepts and methods. *Spine J.* 2007;7(5):541-546.

22. Nwachukwu BU, Chang B, Fields K, et al. Defining the "substantial clinical benefit" after arthroscopic treatment of femoroacetabular impingement. *Am J Sports Med.* 2017;45(6):1297-1303.

23. Nwachukwu BU, Chang B, Kahlenberg CA, et al. Arthroscopic treatment of femoroacetabular impingement in adolescents provides clinically significant outcome improvement. *Arthroscopy.* 2017;33(10):1812-1818.

24. Mai HT, Chun DS, Schneider AD, et al. Performance-based outcomes after anterior cruciate ligament reconstruction in professional athletes differ between sports. *Am J Sports Med.* 2017;45(10):2226-2232.

25. Dunn WR, Spindler KP, Amendola A, et al. Which preoperative factors, including bone bruise, are associated with knee pain/symptoms at index anterior cruciate ligament reconstruction (ACLR)? a Multicenter Orthopaedic Outcomes Network (MOON) ACLR cohort study. *Am J Sports Med*. 2010;38(9):1778-1787.

26. Villa FD, Ricci M, Perdisa F, et al. Anterior cruciate ligament reconstruction and rehabilitation: predictors of functional outcome. *Joints*. 2016;3(4):179-185.

27. Monk P, Garfjeld Roberts P, Palmer AJ, et al. The urgent need for evidence in arthroscopic meniscal surgery. *Am J Sports Med*. 2017;45(4):965-973.

28. Williamson PR, Altman DG, Blazeby JM, et al. Developing core outcome sets for clinical trials: issues to consider. *Trials*. 2012;13:132.

29. Wu IT, Hevesi M, Desai VS, et al. Comparative outcomes of radial and bucket-handle meniscal tear repair: a propensity-matched analysis. *Am J Sports Med*. 2018;46(11):2653-2660.

30. Thorlund JB, Englund M, Christensen R, et al. Patient reported outcomes in patients undergoing arthroscopic partial meniscectomy for traumatic or degenerative meniscal tears: comparative prospective cohort study. *BMJ*. 2017;356:j356.

31. Abram SGF, Middleton R, Beard DJ, Price AJ, Hopewell S. Patient-reported outcome measures for patients with meniscal tears: a systematic review of measurement properties and evaluation with the COSMIN checklist. *BMJ Open*. 2017;7(10):e017247.

32. Albrecht-Olsen P, Kristensen G, Burgaard P, Joergensen U, Toerholm C. The arrow versus horizontal suture in arthroscopic meniscus repair: a prospective randomized study with arthroscopic evaluation. *Knee Surg Sports Traumatol Arthrosc*. 1999;7(5):268-273.

33. Ayeni O, Peterson D, Chan K, Javidan A, Gandhi R. Suture repair versus arrow repair for symptomatic meniscus tears of the knee: a systematic review. *J Knee Surg*. 2012;25(5):397-402.

34. Barber-Westin SD, Noyes FR. Clinical healing rates of meniscus repairs of tears in the central-third (red-white) zone. *Arthroscopy*. 2014;30(1):134-146.

35. Bryant D, Dill J, Litchfield R, et al. Effectiveness of bioabsorbable arrows compared with inside-out suturing for vertical, reparable meniscal lesions: a randomized clinical trial. *Am J Sports Med*. 2007;35(6):889-896.

36. Grant JA, Wilde J, Miller BS, Bedi A. Comparison of inside-out and all-inside techniques for the repair of isolated meniscal tears: a systematic review. *Am J Sports Med*. 2012;40(2):459-468.

37. Hede A, Larsen E, Sandberg H. The long term outcome of open total and partial meniscectomy related to the quantity and site of the meniscus removed. *Int Orthop*. 1992;16(2):122-125.

38. Herrlin SV, Wange PO, Lapidus G, Hallander M, Werner S, Weidenhielm L. Is arthroscopic surgery beneficial in treating non-traumatic, degenerative medial meniscal tears? a five year follow-up. *Knee Surg Sports Traumatol Arthrosc*. 2013;21(2):358-364.

39. Katz JN, Brophy RH, Chaisson CE, et al. Surgery versus physical therapy for a meniscal tear and osteoarthritis. *N Engl J Med*. 2013;368(18):1675-1684.

40. Khan M, Evaniew N, Bedi A, Ayeni OR, Bhandari M. Arthroscopic surgery for degenerative tears of the meniscus: a systematic review and meta-analysis. *CMAJ*. 2014;186(14):1057-1064.

41. Kurzweil PR, Lynch NM, Coleman S, Kearney B. Repair of horizontal meniscus tears: a systematic review. *Arthroscopy*. 2014;30(11):1513-1519.

42. Moseley JB, O'Malley K, Petersen NJ, et al. A controlled trial of arthroscopic surgery for osteoarthritis of the knee. *N Engl J Med*. 2002;347(2):81-88.

43. Noyes FR, Barber-Westin SD. A systematic review of the incidence and clinical significance of postoperative meniscus transplant extrusion. *Knee Surg Sports Traumatol Arthrosc*. 2015;23(1):290-302.

44. Smith NA, MacKay N, Costa M, Spalding T. Meniscal allograft transplantation in a symptomatic meniscal deficient knee: a systematic review. *Knee Surg Sports Traumatol Arthrosc*. 2015;23(1):270-279.

45. Vermesan D, Prejbeanu R, Laitin S, et al. Arthroscopic debridement compared to intra-articular steroids in treating degenerative medial meniscal tears. *Eur Rev Med Pharmacol Sci*. 2013;17(23):3192-3196.

46. Xu C, Zhao J. A meta-analysis comparing meniscal repair with meniscectomy in the treatment of meniscal tears: the more meniscus, the better outcome? *Knee Surg Sports Traumatol Arthrosc*. 2015;23(1):164-170.

47. Yim JH, Seon JK, Song EK, et al. A comparative study of meniscectomy and nonoperative treatment for degenerative horizontal tears of the medial meniscus. *Am J Sports Med*. 2013;41(7):1565-1570.

48. Sihvonen R, Paavola M, Malmivaara A, et al. Arthroscopic partial meniscectomy versus sham surgery for a degenerative meniscal tear. *N Engl J Med*. 2013;369(26):2515-2524.

49. Agarwalla A, Puzzitiello RN, Liu JN, et al. Timeline for maximal subjective outcome improvement after anterior cruciate ligament reconstruction. *Am J Sports Med*. 2019;47(10):2501-2509.

No sources of support in the forms of grants, equipment, or other items were received for this study. The authors report no conflict of interest. The authors' personal disclosure information can be accessed through the AAOS Orthopedic Disclosure Program at www.aaos.org.