Are We Involving Patients in Shared Decision-Making in Young Adult Hip Surgery? A Systematic Review of Patient Engagement Initiatives in Hip Preservation

Aaron Alokozai, BS1, David N Bernstein, MD, MBA, MA2, Linsen T Samuel, MD, MBA3, and Atul F Kamath, MD3

Abstract
There are limited published studies on patient engagement, including shared decision-making, in adolescents and young adults with complex congenital or post-traumatic hip disorders. Despite the limited number of papers, we aim to clearly summarize what is currently available in the literature using a systematic review approach. We hope this serves as a call to action and catalyst for more work in this field. Future research must focus on awareness of what matters most to patients (values), and the development, implementation, and barriers to the use of decision aids and patient engagement optimization specific to hip disease in young adults.

Keywords
shared decision-making, patient engagement, decision aid, hip preservation

Introduction
There is a growing shift from a physician-centered model of medicine toward patient-centered care and understanding patients’ preferences, needs, and values in making shared decisions (1). Shared decision-making (SDM) is a new paradigm that involves patients and providers working collaboratively to reach an informed treatment decision following expert communication of knowledge, risks, benefits, and alignment with the patient’s values, goals, and preferences (2). Studies across multiple specialties, including orthopedic surgery, have shown that SDM may result in a number of benefits such as increased patient satisfaction, improved patient-centered health outcomes, and increased adherence to treatment regimens (3–5). Because of its many advantages, SDM is recommended by organizations such as Centers for Medicare and Medicaid Services.

Despite increasing evidence showing SDM to be beneficial to both patients and clinicians, there is limited evidence that it is routinely incorporated in orthopedic practice (6). Some surgeons may believe they already practice SDM, but studies show there is a mismatch. For example, a survey conducted by the American Academy of Orthopedic Surgeons reported that, while patients value listening as an important quality, only 13.3% thought their physician spent the time to listen, while 71.3% of physicians thought they spent enough time listening (7). While younger patients in orthopedic surgery prefer a higher degree of SDM, there is limited knowledge of its utilization in hip preservation, as many prior applications of these models are primarily based on an elderly patient population with end-stage osteoarthritis (8–10).

The primary purpose of this review is to summarize what is currently available in the literature and act as a call to action for more work related to patient engagement and SDM tools in the management of young adult hip pathology.

1 Tulane University School of Medicine, New Orleans, LA, USA
2 University of Rochester School of Medicine and Dentistry, Rochester, NY, USA
3 Department of Orthopaedic Surgery, Center for Hip Preservation, Cleveland Clinic Foundation, Cleveland, OH, USA

Corresponding Author:
Atul F Kamath, Center for Hip Preservation, Orthopaedic and Rheumatologic Institute, Cleveland Clinic Foundation, 9500 Euclid Avenue, Mailcode A41, Cleveland, OH 44195, USA.
Email: kamatha@ccf.org

Creative Commons Non Commercial CC BY-NC: This article is distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 License (https://creativecommons.org/licenses/by-nc/4.0/) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the SAGE and Open Access pages (https://us.sagepub.com/en-us/nam/open-access-at-sage).
Methods
The Preferred Reporting Items for Systematic Reviews and Meta-Analysis Statement guidelines were utilized throughout the search, analyses, and reporting processes. A comprehensive search was carried out using PubMed/MEDLINE, Embase, and the Cochrane Library databases using the MeSH terms “hip,” “surgery,” “arthroscopy,” “arthroplasty,” “osteotomy,” “patient involvement,” “decision making,” “adolescent,” and “young” in combination with the “AND” or “OR” Boolean operators. Additionally, reference lists of relevant studies were scrutinized.

Data extraction included study date, number of patients, diagnosis, type of engagement, and outcomes.

Inclusion criteria were (1) studies published between 1990 and January 2020, (2) English language publications and complete articles from peer-reviewed journals, (3) orthopedic patients presenting with congenital or post-traumatic hip disorders, and (4) mean patient study population less than 50 years old. Exclusion criteria were (1) studies involved in solely the development of patient engagement initiatives/tools, rather than their evaluation and (2) case studies.

The initial query yielded 1850 articles after duplicates were removed (Figure 1). Records were screened by title (1779 excluded), and 71 full-text articles were subsequently assessed for eligibility. Applying inclusion and exclusion criteria resulted in 3 manuscripts included for analysis. Review of each study’s reference lists was performed but did not result in any additional articles being considered for our investigation.

Results
The search identified 2 applications of patient engagement (1 preoperative and 1 perioperative) on an already prescribed treatment, and 1 study exploring factors influencing treatment decisions to enhance SDM (Table 1). We found no research applying SDM initiatives and patients’ preferences prior to making a treatment decision. Further, our search yielded no randomized trials of decision aids and their application in hip preservation.
Bockhorn et al assessed the utility of a visual patient engagement tool on an already prescribed treatment. The authors used 3-dimensional (3D)-printed hip models in the evaluation and management of the hip. Inclusion criteria were young adults with hip pain undergoing hip preservation. Sixteen patients with hip pathology were selected. Of these 16 patients, 12 patients went on to get hip arthroscopy (11). Average age at the time of surgery was 37. Outcomes assessed were patient understanding of hip pathology, comfort with surgical procedure, and willingness to pay. The study found patients “strongly agree” that the 3D visual models helped understand their pathology, and patients “agree or strongly agree” that the models made them more comfortable with surgery. Half of the patients were willing to pay for the model if necessary.

Richard et al evaluated outcomes after perioperative patient engagement through interdisciplinary education, counseling, and psychological intervention in 67 adolescents treated with hip preservation surgery (12). Average age at the time of hip preservation surgery was 15.3. Orthopedic diagnoses included femoracetabular impingement (FAI), acetabular dysplasia (23), Legg-Calve-Perthes disease (13), slipped capital femoral epiphysis (8), and other hip conditions (3). Patients completed patient-reported measures preoperatively and approximately 12 months postoperatively. Compared to baseline scores, perioperative patient engagement lead to statistically significant (P < .05) improved physical function, return to activity, psychological function, and resiliency.

Stake et al examined factors influencing treatment decisions to enhance SDM for 71 young patients considering hip arthroplasty. Inclusion criteria was patients younger than 50 years with symptomatic osteoarthritis considering hip arthroplasty (13). Patients with traumatic injuries or those who were not able to read because of language or cognition were excluded from the study. Enrollment occurred at both an academic medical center and private clinic. Average age was not reported, but age range was 26 to 50 years. Pain, Western Ontario and McMaster Universities Osteoarthritis Index score, and activity restrictions were statistically significant (P < .05) variables correlated with treatment decision-making.

Discussion

Treatment of hip preservation among young adults can be preference sensitive, where both operative and nonoperative strategies are reasonable options depending on the clinical scenario (ie, potential for clinical equipoise). A shared-decision approach respects patient autonomy, incorporates them as an integral part of the care team, and increases knowledge of the treatment options. This allows the patient and physician to collaboratively reach a decision that is aligned with patient’s preferences and goals (eg, impact on employment, pain relief, quality of life restoration, minimizing surgical risk). While there are a number of ways surgeons can communicate information, engage patients, and facilitate SDM (ie, decision aids, visual tools, and verbal techniques such as goal elicitation), we found minimal research in the medical literature in the setting of hip preservation.

Orthopedic surgery, like other fields in medicine, is undergoing a transformation from volume of care (fee-for-service) to value-based models. Applying surgery to an appropriate clinical setting remains important. For example, prior study has found total knee arthroplasty surgeries that were deemed inappropriate (14). This may lead to increased health care costs, and patient dissatisfaction may occur when expectations are not met or aligned. Appropriate transfer of information is critical in the management of young hip disease, such as choosing between a periacetabular osteotomy and a total joint replacement in the prearthritic hip of a 30-year-old patient. This discussion engages patients to think about their health and decide the value they place on different attributes of care such as pain relief, increased function, impact on employment, native joint preservation, and risk of subsequent revisions if early arthroplasty is performed. Patients who take an interest in managing their health are more capable of contending with their risk factors and experience better patient-reported outcomes (15). Shared-decision tools do not diminish the enthusiasm for surgery, but may more appropriately guide care delivery teams by

Table 1. Overview of All Studies Included in Systematic Review.

| Study                        | Number of patients | Mean patient age, years | Results                                                                 |
|------------------------------|--------------------|-------------------------|-------------------------------------------------------------------------|
| Bockhorn et al (11)          | 16                 | 37                      | Patients “strongly agree” that the 3D visual models helped understand their pathology, and patients “agree or strongly agree” that the models made them more comfortable with surgery. Half of the patients were willing to pay for the model if necessary |
| Richard et al (12)           | 67                 | 15.3                    | Perioperative patient engagement lead to statistically significant (P < .05) improved physical function, return to activity, psychological function, and resiliency |
| Stake et al (13)             | 71                 | *                       | Pain, WOMAC score, and activity restrictions were statistically significant (P < .05) variables correlated with treatment decision-making |

Abbreviations: 3D, 3-dimensional; WOMAC, Western Ontario and McMaster Universities Osteoarthritis Index.

*Mean patient age was not reported; age range was 26 to 50 years.
shifting appropriate surgical candidates to surgery, and candidates who will not gain meaningful improvement to non-operative management; this would clearly benefit all significant stakeholders.

**Limitations**

Our study was not without limitations. We are limited to the commonly used MeSH search terms. Heterogeneity of the outcome measures, and limited number of published studies on this topic, made it difficult to evaluate and compare papers. Although we found no research applying SDM initiatives in hip preservation decisions, papers examining hip pathologies in an elderly patient population were present. Future studies may explore how those prior tools translate to a younger hip preservation cohort. Despite these limitations, this review is the first to explore patient engagement and SDM initiatives in hip preservation.

**Conclusions**

Despite a growing understanding of the importance of SDM—where patients are at the center of the health care team—and increase in research on the topic, our review found little evidence that patient preferences and engagement were incorporated in studies involving treatment decisions in hip preservation. While there are a limited number of published studies, we hope this article helps to clearly summarize what is currently available in the literature and acts as a call to action and catalyst for more work in this field. In a patient-centered model, a patient’s preferences, long-term goals, and ability to cope should drive treatment decisions. Future research must focus on awareness of what matters most to patients (ie, their values). Further, it is crucial that research guides the development and implementation of decision aids and patient engagement tools specific to young hip disease. The influence of other factors, such as underlying pathology (eg, dysplasia vs FAI), age, and specific surgical interventions, should be incorporated into any prospective study of SDM.

**Authors’ Note**

This study was performed at the Cleveland Clinic Foundation, Cleveland, OH, USA. Institutional Review Board approval was not required. Informed consent was not obtained as no individual participants were included in the study. All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008 (5).

**Declaration of Conflicting Interests**

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: Dr David Bernstein reports grants from AOFAS and AOA. Dr Atul Kamath reports paid consultancy, paid presenter or speaker, and stock or stock options from Zimmer Biomet; paid consultancy, paid presenter or speaker from DePuy Synthes, and stock or stock options from Johnson & Johnson and Procter & Gamble; research support from Signature Orthopaedics; IP royalties from Innomed, board or committee member for AAOS, AAHKS, and Anterior Hip Foundation.

**Funding**

The author(s) received no financial support for the research, authorship, and/or publication of this article.

**ORCID ID**

Aaron Alokozai, BS  https://orcid.org/0000-0002-9068-9600
Atul F Kamath, MD  https://orcid.org/0000-0002-9214-2756

**References**

1. Barry MJ, Edgman-Levitan S. Shared decision making - the pinnacle of patient-centered care. N Engl J Med. 2012;366:780-81. doi:10.1056/NEJMp1109283
2. Elwyn G, Frosch D, Thomson R, Joseph-Williams N, Amy L, Paul K, et al. Shared decision making: a model for clinical practice. J Gen Intern Med. 2012;27:1361-67. doi:10.1007/s11606-012-2077-6
3. Klifto K, Klifto C, Slover J. Current concepts of shared decision making in orthopedic surgery. Curr Rev Musculoskelet Med. 2017;10:253-57. doi:10.1007/s12178-017-9409-4
4. Hughes TM, Merath K, Chen Q, Steven S, Elizabeth P, Jay Idrees J, et al. Association of shared decision-making on patient-reported health outcomes and healthcare utilization. Am J Surg. 2018;216:7-12. doi:10.1016/j.amjsurg.2018.01.011
5. Aubree Shay L, Lafata JE. Where is the evidence? A systematic review of shared decision making and patient outcomes. Med Decis Making. 2015;35:114-31. doi:10.1177/0272989X14551638
6. Martinez-Siekavizza SN, Winter SC, Barchi F. Pilot survey of shared decision-making between orthopaedic surgeons and their patients in Guatemala. J Bone Joint Surg Am. 2019;101:e35. doi:10.2106/JBJS.18.00650
7. Frymoyer JW, Frymoyer NP. Physician-patient communication: a lost art? J Am Acad Orthop Surg. 2002;10:95-105. doi:10.5435/00124635-20020300-00005
8. Lindsay SE, Alokozai A, Eppler SL, Fox P, Curtin C, Gardner M, et al. Patient preferences for shared decision making. J Am Acad Orthop Surg. 2020;28:419-26.
9. Sepucha K, Bedair H, Yu L, Dorrwaughter JM, Dwyer M, Talmo CT, et al. Decision support strategies for hip and knee osteoarthritis: less is more: a randomized comparative effectiveness trial (DECIDE-OA study). J Bone Joint Surg Am. 2019;101:1645-53. doi:10.2106/JBJS.19.00004
10. Bozic KJ, Belkora J, Chan V, Youm J, Zhou T, Dupaix J, et al. Shared decision making in patients with osteoarthritis of the hip and knee results of a randomized controlled trial. J Bone J Surg Ser A. 2013;95:1633-39. doi:10.2106/JBJS.M.00004
11. Bockhorn L, Gardner SS, Dong D, Karmonik C, Elias S, Winston Gwathmey F, et al. Application of three-dimensional printing for pre-operative planning in hip preservation surgery. J Hip Preserv Surg. 2019;6:164-9. doi:10.1093/jhps/hnz023
12. Richard HM, Nguyen DC, Podeszwa DA, De La Rocha A, Daniel JS. Perioperative interdisciplinary intervention contributes to improved outcomes of adolescents treated with hip...
preservation surgery. J Pediatr Ortho. 2018;38:254-59. doi:10.1097/BPO.0000000000000816

13. Stake CE, Talbert PY, Hopkinson WJ, Robert JD, Kris JA, Benjamin GD. Hip arthroplasty or medical management: a challenging treatment decision for younger patients. J Arthroplasty. 2015;30:950-54. doi:10.1016/j.arth.2015.01.032

14. Riddle DL, Jiranek WA, Hayes CW. Use of a validated algorithm to judge the appropriateness of total knee arthroplasty in the United States: a multicenter longitudinal cohort study. Arthritis Rheumatol. 2014;66:2134-43. doi:10.1002/art.38685

15. Alokozai A, Jayakumar P, Bozic KJ. Value-based healthcare: improving outcomes through patient activation and risk factor modification. Clin Orthop Relat Res. 2019;477:2418-20.

Author Biographies

Aaron Alokozai is medical student at Tulane University School of Medicine. He was previously awarded the Dell Medical School Value-Based Care Delivery Summer Fellowship, where he investigated topics relevant to designing, implementing, and disseminating value-based care delivery models in orthopaedic surgery. His research interests include healthcare transformation, value-based healthcare, and patient-centered experience (shared decision-making, decision tools, patient engagement).

David N Bernstein is an orthopaedic surgery resident at the Harvard Combined Orthopaedic Residency Program (HCORP) in Boston, Massachusetts. He is a former Senior Researcher in Value-Based Health Care at Professor Michael Porter’s Institute For Strategy And Competitiveness at Harvard Business School.

Linsen T Samuel is a clinical research fellow in the Department of Orthopaedic Surgery at the Cleveland Clinic Foundation. His research interests include the investigation of reimbursement models in adult reconstruction, as well as analysis of differing approaches to total hip arthroplasty.

Atul F Kamath is a professor of Orthopaedic Surgery at the Cleveland Clinic Lerner College of Medicine and Case Western Reserve University School of Medicine. He also serves as the Director of the Center for Hip Preservation at the Cleveland Clinic Foundation, where he also serves as the Director for Adult Reconstruction Research in the Department of Orthopaedic Surgery. His focus of research is on young hip preservation modalities and on the anterior approach to total hip arthroplasty.