



Original Research

Orthopaedic Consultation is Associated With Fewer Patient-Perceived Barriers to Total Joint Arthroplasty

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ABSTRACT

Background: Orthopaedic consultations' influence on perceived barriers to total joint arthroplasty (TJA) remains unclear. This study explores how orthopedic consultations are associated with patient perceptions of barriers to TJA.

Methods: We performed a post-hoc analysis of questionnaire responses based on data from a previous study that used semi-structured interviews with patients with advanced osteoarthritis. This earlier study identified 5 key barriers to TJA—trust in surgeon, cost/insurance, recovery, surgical outcome, and timing of surgery—and highlighted significant racial differences in these barriers. Our analysis focused specifically on the role of orthopaedic consultations. Using multiple logistic regression models, we compared responses from patients who had an orthopaedic consultation to those who did not, while adjusting for race, age, Hip Disability and Osteoarthritis Outcome Score, Joint Replacement/Knee Injury and Osteoarthritis Outcome Score, Joint Replacement, insurance status, education level, and prior discussions about TJA.

Results: Of the 696 participants, 88% were female, 77% White, 11% Black, and 9% Hispanic. Nearly half (49%) had an orthopaedic consultation. Participants who had consulted with an orthopaedist were older, more likely to be college graduates, Medicare beneficiaries, have consulted a primary care physician, attempted conservative management including joint injections, braces, and physical therapy. After adjusting for participant factors, orthopaedic consultation was a predictor of fewer perceived cost/insurance and timing barriers. However, no differences were observed in other barriers.

Conclusions: Orthopaedic consultation is associated with fewer reported cost/insurance and timing barriers to TJA. Addressing barriers of concern to patients in the context of orthopaedic consultations could further improve TJA utilization.

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Introduction

Total joint arthroplasty (TJA) is a highly effective treatment for advanced arthritis, with demand steadily increasing. However, patients often face significant barriers to accessing TJA at different stages of the treatment process. These challenges disproportionately affect Black, Hispanic, and low-income populations, contributing to persistent racial and socioeconomic disparities in TJA

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utilization [1-11]. Additionally, TJA outcomes vary across populations, with minority and underserved patients typically presenting for surgery with more advanced arthritis and worse pain and function [12,13] suggesting this population is experiencing greater obstacles related to access, healthcare infrastructure, knowledge, or financial resources [14].

We previously developed a questionnaire to elicit the self-reported barriers to TJA experienced by Black and Hispanic patients with symptomatic hip or knee arthritis. Our questionnaire identified key themes as the most important concerns regarding TJA, including “trust in the surgeon” (ie, addressing the ability to find a qualified surgeon), “recovery” (including access to social support or physical therapy), “cost/insurance” (such as insurance and co-pays), “surgical outcome” (encompassing concerns about persistent pain or poor function), and “personal suitability/timing” (including whether other health concerns should take precedence) [13]. We gathered demographic and clinical information from the survey participants to better understand their responses, including data relevant to our research question (sex, race, and ethnicity), and prior clinical exposures including whether they had seen an orthopaedist that may have confounded our analysis. Notably, responses differed among racial groups, with Black respondents being twice as likely and Hispanic respondents 4 times as likely to rate “trust in the surgeon” as very/extremely important compared to White respondents [13]. In a secondary analysis, we used geospatial localization to stratify responses by community poverty level, and we found that those from high-poverty regions expressed greater concerns about trusting surgeons and feared poor surgical outcomes [15]. However, little is known about the point in the care pathway where these barriers may arise or be mitigated [16-20].

While our previous research has identified key barriers contributing to racial, ethnic, and socioeconomic disparities in TJA, the specific stages of the care pathway where these disparities arise remain unclear, complicating efforts to identify effective intervention points. The orthopaedic consultation is a formal evaluation by an orthopaedic surgeon to assess a patient’s condition, discuss treatment options for joint-related issues, and provide recommendations regarding the suitability and timing of TJA. This interaction often includes reviewing prior treatments, evaluating imaging studies, and addressing patient concerns about surgery. It may play a pivotal role in overcoming these challenges by allowing surgeons to educate patients, correct misconceptions, and engage in shared decision-making to ease concerns about TJA.

In this post-hoc analysis, we compare the experiences of participants who have consulted with an orthopaedist to those who have not, with the hypothesis that orthopaedic consultation will be linked to reduced barriers, potentially highlighting an intervention point for addressing concerns and increasing TJA utilization.

Material and methods

Participants and setting

This analysis used survey data from a multi-institutional prospective cohort study conducted between February 2020 and July 2022 [13]. An electronic questionnaire on barriers to TJA was administered to patients at 2 large urban academic institutions (Hospital for Special Surgery Rheumatology Clinic and New York Presbyterian-Brooklyn Methodist Hospital) and 2 national arthritis cohorts (ArthritisPower [21]; CreakyJoints Español). For this post-hoc analysis, we excluded respondents who did not report their

race/ethnicity, visit history with an orthopaedist, barrier ratings, or who identified as Asian or “other” race.

Semi-structured interviews and questionnaire development

The study questionnaire was developed using a mixed-methods approach, with key findings previously published [13]. In brief, we conducted semi-structured interviews with minoritized Black and Hispanic patients who, despite experiencing pain and limited function from hip or knee arthritis, had not undergone arthroplasty. Symptom severity was assessed using short forms of the Hip Disability and Osteoarthritis Outcome Score, Joint Replacement (HOOS, JR) [20] and the Knee Injury and Osteoarthritis Outcome Score, Joint Replacement (KOOS, JR) [21]. Based on the interview data, we developed the questionnaire of barriers to TJA, which was then analyzed using factor analysis and reliability testing (including Cronbach’s alpha).

Questionnaire and distribution

The survey was administered via e-mail and focused on 5 barriers to undergoing TJA (Table 1). In addition, assessing these barriers, we collected demographic data relevant to our research question including age, race, education, insurance status, address, and pain scores using the Visual Analog Scale [22], HOOS, JR [23], and KOOS, JR [24]. The survey included questions identifying potential confounders including past arthritis treatments, and specifically asked participants whether they had received an orthopaedic consultation, with response options indicating “yes” or “no.”

The level of importance of each barrier was assessed using a 5-point Likert scale, ranging from 1 (“Not at all important”) to 5 (“Extremely important”). These responses were then categorized using a “top-2 box” approach, grouping the highest 2 levels of importance (“Very Important” and “Extremely Important”) as “Highly Important”, and the remaining 3 levels (“Not at all important”, “A little important”, and “Somewhat Important”) as “Not as Important”. The survey was translated into Spanish and distributed via e-mail in both English and Spanish to patients identified at the Cornell Internal Medicine Practice, the rheumatology clinic at Hospital for Special Surgery, New York-Presbyterian Brooklyn Methodist Hospital, ArthritisPower [19], and CreakyJoints Español [23], between February 27, 2020 and July 10, 2022. These sites were chosen to represent a diverse population of arthritis patients.

Statistical methods

We evaluated differences in patient characteristics between those who had and those who had not consulted an orthopaedist using *t*-tests and chi-square tests for continuous and categorical variables, respectively. Multiple logistic regression models were used to analyze the adjusted odds ratios (aORs) of orthopaedic consultation on participants’ ratings of barriers to arthroplasty. Models controlled for participant factors, including age, sex, HOOS, JR/KOOS, JR, insurance, education, and prior discussion of TJA with any doctor. Interaction terms between these participant factors and orthopaedic consultation were evaluated.

Study components were approved by the ethics committee of the Weill Cornell Institutional Review Board (Protocol number: 1807019476). All participants provided consent to being in the study by completing the survey and the study was undertaken in accordance with the Declaration of Helsinki.

Table 1
Barriers to arthroplasty survey.

Please check the box that shows how important these items would be if you were thinking about getting a joint replacement					
	Not at all	A little	Somewhat	Very	Extremely
Cost and insurance					
Cost of a joint replacement					
Cost of the co-pay for a joint replacement					
Cost of a co-pay for physical therapy after joint replacement					
Insurance status					
Recovery					
Availability of someone to help me recover from a joint replacement					
Availability to take care of my family/friends while I undergo joint replacement					
Concern of being healthy enough to undergo joint replacement surgery					
Accessing transportation to get to physical therapy appointments					
Finding good physical therapy centers in my community					
Concerns about how hard the recovery after a joint replacement will be					
Trust in the surgeon					
Finding a surgeon I trust					
Figuring out how to find a qualified and experienced surgeon					
Finding a surgeon who understands what I need					
Surgical outcome					
Fear that I will need another joint replacement after the first one because I am young					
Fear that a joint replacement will not help me walk and function better					
Fear that the joint replacement will not improve my pain					
Timing					
Having a joint replacement is the last resort, and I think I should wait longer					
Having many medical problems and having a joint replacement is not a priority now					
Not doing everything I can do (like lose weight) to avoid having a joint replacement					
Not having bad enough joint pain to have a joint replacement					
Not having enough information to decide about having a joint replacement					

Results

Participants

There were 696 participants who completed the survey between February 27, 2020 and July 10, 2022 and were included in the analysis (94% of respondents). Most participants were women (88%), with an average age of 59.3 years. The cohort was predominantly White (77%), with Black participants comprising 11% and Hispanic participants 9%. The 4% who identified as Asian or other races were excluded from the analysis due to small sample size and heterogeneity. Nearly half (49%) of participants reported having had an orthopaedic consultation.

There were significant differences in demographic characteristics between participants who had orthopaedic consultation vs those who had not. Participants who had consulted with an orthopaedist were older (60 vs 58 years, $P < .05$), more likely to be college graduates (61% vs 48%, $P < .01$), Medicare beneficiaries (52% vs 42%, $P < .05$), have previously consulted with a primary care physician (58% vs 41%, $P < .01$) but not a rheumatologist (48% vs 68%, $P < .01$), and have attempted conservative arthritis treatments, such as joint injections (74% vs 47%, $P < .01$), braces (35% vs 15%, $P < .01$), and physical therapy (77% vs 48%, $P < .01$) (Table 2).

Barriers to arthroplasty

Of the 5 barriers to arthroplasty surveyed, participants who had consulted with an orthopaedic surgeon were significantly less likely to rate cost/insurance (33% vs 49%, $P < .001$) and timing (14% vs 25%, $P < .001$) as highly important (Fig. 1). Participants with orthopaedic consultation were less likely to rate specific cost/insurance questions such as “Cost of a joint replacement,” “Cost of the co-pay for a joint replacement,” and “Cost of a co-pay for physical therapy after a joint replacement” as highly important (all $P < .01$)

(Table 3). Similarly, participants with orthopaedic consultation were less likely to rate specific timing questions such as “Having a joint replacement is the last resort, and I think I should wait longer,” “Having many medical problems and having joint replacement is not a priority now,” “Not having enough information to decide about having a joint replacement” (all $P < .05$), and “Not having bad enough joint pain to have a joint replacement” ($P < .01$) as highly important (Table 3). While not statistically significant, participants' likelihood of rating *trust in surgeon* and *outcome* as highly important were slightly lower among participants who had received an orthopaedic consultation compared to those who had not.

After adjusting for age, race, HOOS, JR/KOOS, JR, insurance, treatment history, education, and prior discussion of TJA with any doctor, orthopaedic consultation was a significant predictor of lower barriers relating to *cost/insurance* (aOR [95% confidence interval]: 0.52 [0.36, 0.76]) and *timing of surgery* (aOR [95% confidence interval]: 0.49 [0.31, 0.79]) (Table 4). Participant factors, including age, HOOS, JR/KOOS, JR, insurance, and education did not have significant interaction with orthopaedic consultation ($P > .05$ for all).

Discussion

Our work suggests that orthopaedic surgeons may play a role in addressing certain perceived barriers to undergoing TJA. The orthopaedic consultation likely helps educate patients about insurance coverage and the appropriateness of surgical timing for their situation [25,26]. Prior research indicates the doctor-patient relationship significantly influences shared decision-making about TJA for osteoarthritis patients [17,27-29]. While studies show mixed results, shared decision-making interventions aim to address patient barriers to pursuing surgery. Their effectiveness may vary depending on individual and contextual factors such as housing instability, caregiving responsibilities, job insecurity, and financial

Table 2
Characteristics of cohort stratified by consultation with an orthopaedist.

Parameter	No orthopaedic consultation (N = 358)	Orthopaedic consultation (N = 338)	P value*
Age (y) (mean, SD)	58.3 (10.54)	60.3 (10.7)	<.05
Female (n, %)	310 (86.6%)	303 (90.2%)	
Race and ethnicity (n, %)			<.05
White	284 (79.3%)	272 (80.5%)	
Black	33 (9.2%)	43 (12.7%)	
Hispanic	41 (11.5%)	23 (6.8%)	
Arthritis characteristics			
VAS pain score (0-100) (mean, SD)	58.3 (10.5)	60.3 (10.7)	<.05
HOOS/KOOS score (100-0) (mean, SD)	66.2 (21.4)	67.1 (23.2)	
Provider history (n, %)			
Primary care physician	148 (41%)	197 (58%)	<.01
Rheumatologist	243 (68%)	161 (48%)	<.01
No one	33 (9%)	1 (0%)	<.01
Other	33 (9%)	24 (7%)	
Discussed TJA	112 (31%)	249 (74%)	<.01
Education (n, %)			
College graduation or above	172 (48%)	205 (61%)	<.01
Some college	148 (41%)	109 (32%)	
Some HS	37 (10%)	24 (7%)	
Insurance (n, %)			
Medicare	151 (42%)	175 (52%)	<.05
Medicaid	73 (20%)	54 (16%)	
Private	183 (51%)	168 (50%)	
Uninsured	18 (5%)	14 (4%)	
Treatment history (n, %)			
Over the counter drugs	291 (81%)	285 (84%)	
Physical therapy	173 (48%)	261 (77%)	<.01
Acupuncture	47 (13%)	57 (17%)	
Braces	54 (15%)	119 (35%)	<.01
Joint injections	170 (47%)	250 (74%)	<.01
Topical salves/creams	226 (63%)	234 (69%)	
Prescription drugs	265 (74%)	266 (79%)	
None	15 (4%)	4 (1%)	<.05

HOOS, hip disability and osteoarthritis outcome score; KOOS, knee injury and osteoarthritis outcome score; SD, standard deviation; TJA, total joint arthroplasty; VAS, visual analog scale; HS, High School.

* P value represents the statistical significance of the differences observed in values between groups.

strain [26-33]. In our main mixed-methods study, patients highlighted social barriers, emphasizing how they shaped their decision-making and limited access to care, particularly among

minoritized individuals [12]. These factors likely account for a significant portion of why patients do not move forward with surgery.

We anticipated that differences in participants' characteristics—such as age, insurance status, and prior arthritis treatments—might also contribute to the observed variations in cost/insurance and timing barriers between groups, independent of the orthopaedic consultation. Specifically, participants who had an orthopaedic consultation tended to be older, which could have provided them with better access to insurance, such as Medicare, and more experience with healthcare decisions, potentially reducing the impact of these barriers. The higher proportion of Medicare beneficiaries in the orthopaedic consultation group may explain the lower cost/insurance barriers observed, as Medicare covers a substantial portion of TJA costs, reducing out-of-pocket expenses. Moreover, Medicare beneficiaries likely had improved access to resources like postoperative care and rehabilitation, which could help mitigate timing barriers [30,31]. Despite accounting for these patient-level factors, the orthopaedic consultation group still showed significant differences in cost/insurance and timing barriers, with no significant interactions observed.

While it is encouraging that some barriers appear to be addressed during orthopaedic consultations, surprisingly, there were no significant differences in the levels of importance of trust in the surgeon, recovery, or surgical outcome concerns between participants who had consulted with an orthopaedist and those who had not. This suggests that cost/insurance and timing barriers may primarily emerge early in the decision-making process, when patients are first considering surgery, whereas factors like trust, surgical outcomes, and recovery concerns might develop earlier, before the consultation. The lack of association between orthopaedic consultation and lower-rated barriers could be partly explained by limitations in the consultation itself, such as insufficient information about treatment options [32-34]. Patients may feel disempowered when their desire for TJA conflicts with their orthopaedist's recommendation [28,29]. Additionally, orthopaedic consultations might encourage more conservative treatment options, particularly when the best approach is unclear [35]. Concerns about surgery may also be influenced more by personal factors, such as past experiences, health anxieties, and provider rapport, than by the consultation itself.

Our study's limitations also include its cross-sectional design, which precludes a causal determination of orthopaedic consultations' impact on participants' perceived barriers to TJA nor

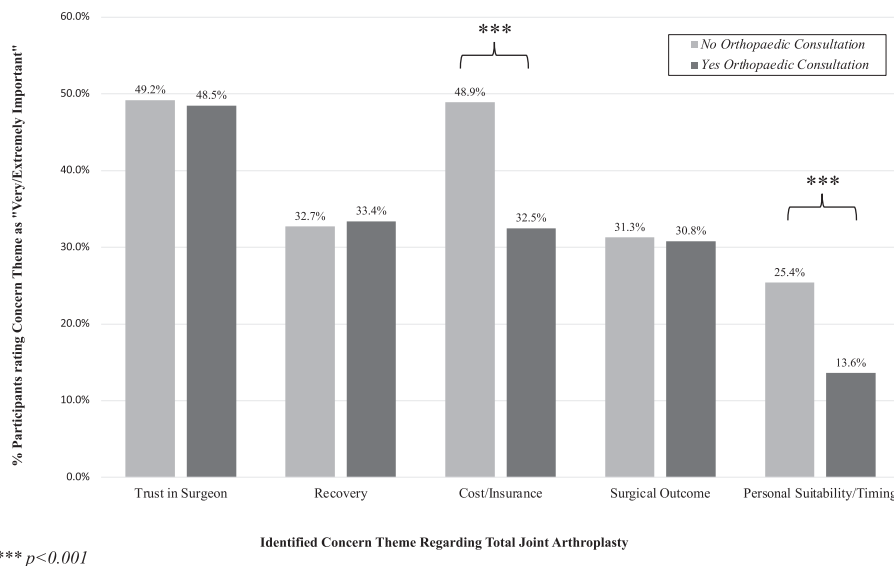


Figure 1. Proportion of participants rating each barrier to TJA as highly important stratified by orthopaedic consultation. ***P < .001. TJA, total joint arthroplasty.

Table 3

Individual survey questions that had significant statistical difference between those who had an orthopaedic consultation and those who did not.

Theme	Survey question	No orthopaedic consultation	Orthopaedic consultation	P value
Cost/ insurance	Cost of a joint replacement	177 (46%)	107 (30%)	<.01
	Cost of the co-pay for a joint replacement	189 (49%)	128 (36%)	<.01
	Cost of a co-pay for physical therapy after joint replacement	183 (47%)	119 (34%)	<.01
Timing	Having a joint replacement is the last resort, and I think I should wait longer	190 (49%)	144 (41%)	<.05
	Having many medical problems and having a joint replacement is not a priority now	120 (31%)	77 (22%)	<.05
	Not having had enough joint pain to have a joint replacement	121 (31%)	74 (21%)	<.01
	Not having enough information to decide about having a joint replacement	99 (26%)	62 (18%)	<.05

utilization. The Likert scale may inadequately capture participants' perspectives, and unmeasured confounders such as comorbidities or surgeon–patient racial concordance might affect the results [36,37]. The study sample, consisting of survey respondents only, might not accurately reflect the broader arthritis patient population. Despite our efforts to recruit a racially diverse study cohort, we acknowledge that our electronic survey still yielded a somewhat low response rate from Black and Hispanic patients and may not fully capture the heterogeneity of the population. The survey was distributed via e-mail, which may have excluded lower-income patients or those with limited access to technology. Moreover, the 50% of participants who reported having consulted with an orthopaedist may have already overcome barriers to TJA and presented to an orthopaedic office ready for surgery. The timing of the orthopaedic consultation relative to survey completion was not captured, nor did the survey distinguish whether the consultation was focused on the arthritic joint in question or another orthopaedic issue. The study did not verify TJA suitability, confirm receipt of TJA, or assess alternative surgeries. Instead, it aimed to examine how orthopaedic consultation might alleviate other barriers to TJA, with the goal of determining whether promoting orthopaedic referrals could help improve TJA utilization. Longitudinal studies are needed to establish causality between orthopaedic consultation and perceived TJA barriers. The significant baseline differences between the groups in this study may impact the validity of comparisons despite controlling for several confounders, warranting cautious interpretation of the associations. Moreover, while a power analysis was conducted prior to data collection in the initial study [13], the smaller sample sizes for Hispanic and Black participants may limit the statistical power to draw definitive conclusions for these subgroups. Understanding which patient groups benefit most from orthopaedic consultations in reducing TJA concerns will require larger, controlled studies.

Table 4Odds ratios with 95% confidence intervals of orthopaedic consultation on likelihood of rated importance of barriers to TJA.^a

Barrier to arthroplasty	Orthopaedic consultation odds ratio (OR)	
	Crude OR (95% CI)	Adjusted OR (95% CI) ^{b,d}
1. Trust in surgeon	0.97 (0.72, 1.31)	1.08 (0.77, 1.51)
2. Recovery	1.03 (0.75, 1.42)	1.17 (0.78, 1.75)
3. Cost and insurance	0.50 (0.37, 0.69) ^c	0.51 (0.36, 0.76) ^c
4. Outcome of surgery	0.98 (0.71, 1.35)	1.12 (0.78, 1.59)
5. Timing of surgery	0.46 (0.31, 0.68) ^c	0.49 (0.31, 0.79) ^c

CI, confidence interval; OR, odds ratio; TJA, total joint arthroplasty.

^a Statistical significance markers. $P < .10$.^b $P < .05$.^c $P < .001$.^d Models adjusted for sex, age, education, HOOS/KOOS score, insurance, and discussion of TJA with doctor.

Conclusions

This study highlights that orthopaedic consultations are associated with reduced perceptions of cost-related and timing-related barriers to TJA, although other significant concerns, such as trust in the surgeon and surgical outcomes, remain unchanged. Our work identifies the orthopaedist consultation as a potential strategy to reduce barriers to care yet underscores the need to elucidate additional interventions to improve disparities in TJA utilization.

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Conflicts of interest

Henry Tischler is a paid consultant and paid presenter or speaker for Zimmer. Linda Russell is a board or committee member of the Arthritis Foundation. Michael L. Parks received other financial or material support from Joint Effort Administrative Services Organization, Type: other business ownership; HSS ASC Development Network, LLC, Type: other business ownership; and HS2, LLC, Type: other business ownership. Bella Mehta is a paid consultant for Janssen and Novartis. Susan M. Goodman is a paid consultant for UCB; received research support from Novartis as a Principal Investigator; and is a board or committee member of the American College of Rheumatology. Mark Figgie received IP royalties from Wishbone; is a paid consultant for Bone Solutions Inc. and Enovis; and holds stock or stock options in Wishbone, HS2, Icarus, Joint Effort ASO, Mekanika, and Sylke. Anne Bass is a board or committee member of the American College of Rheumatology. All other authors declare no potential conflicts of interest.

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