



Hip and Knee Replacements: An Examination of Malpractice Claims From the Ambulatory and Inpatient Settings

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Introduction

Hip and knee replacements are two of the most common surgeries in orthopedics, with over one million total hip and knee replacements completed annually in the United States. By 2030, the [total number of knee replacements](#) per year is expected to increase by 85 percent (compared to 2014 levels) to 1.26 million procedures, and hip replacements are expected to rise by 71 percent to 635,000 procedures. This projection is based on the prevalence of osteoarthritis in adults, the aging of the American population, changes in reimbursement from Medicare for ambulatory surgery, and the rising obesity rate among Americans. With the advancement in minimally invasive technologies, such as robotics and navigational surgeries, hip arthroplasties have seen growth in the ambulatory setting, with knee and hip replacements now both being completed more routinely as ambulatory procedures. It is anticipated by 2026 that [more than 50 percent of primary joint replacements](#) will occur in the ambulatory setting.

As these trends continue, understanding the most cost-effective and safe means to perform these joint replacements is essential. [Systematic reviews](#) exploring postoperative complications occurring after inpatient vs. ambulatory hip arthroplasties have found comparable rates of post-op complications in the two settings. Another recent study followed [two groups of hip replacement patients](#) (inpatient and ambulatory) for two years and found no differences in postoperative short-term complications, two-year revision rates, or unplanned office visits/readmissions. However, the literature related to malpractice claims comparing inpatient and ambulatory knee and hip replacements has so far been limited.

Therefore, the purpose of this study was to examine medical malpractice claims involving improper performance of surgery or improper management of the patient following a knee or hip replacement, either in the inpatient or the ambulatory setting, and then to explore potential differences between the two settings.

The Doctors Company is the nation's largest physician-owned medical malpractice insurer, with over 84,000 members. Its mission is to advance, protect, and reward the practice of good medicine. To achieve this, The Doctors Company studies malpractice claims to better appreciate what motivates patients and their families to pursue claims and to gain a broader overview of system failures and processes that result in patient harm. From these studies The Doctors Company can design risk mitigation strategies to improve patient safety and reduce malpractice risk.

Our research questions were:

1. Over the loss years of 2009 to 2019 for malpractice claims, were there trends in the type of intraoperative injuries occurring during hip and knee replacements?
2. In malpractice claims with loss years of 2009 to 2019 related to hip and knee replacements, were there differences in injury severity, gender, or contributing factors between those procedures completed or managed in the inpatient vs. the ambulatory setting?

Method

The sample included all closed, coded malpractice claims in The Doctors Company database during the loss years between 2009 and 2019 where an orthopedic surgeon was the primary responsible service and the claim involved hip or knee replacement. The sample was also limited to cases that concerned either improper performance of surgery or the improper management of the patient. Major injury, gender and age of the patient, final diagnosis, location of injury, and contributing factors were included.

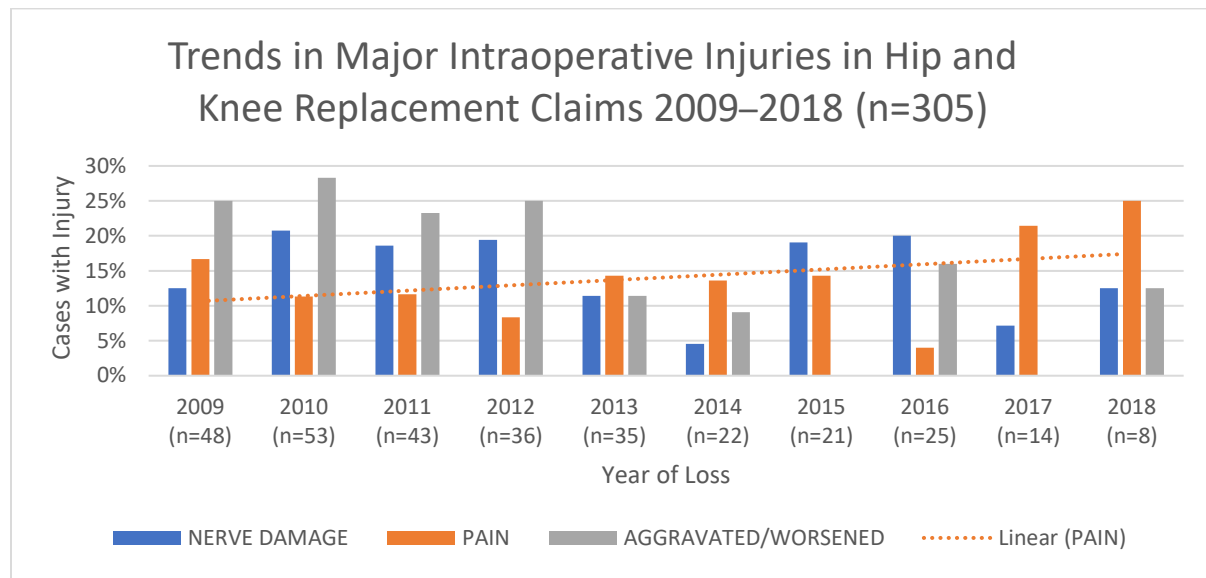
Data Set

The sample consisted of 453 claims, including 377 inpatient and 76 ambulatory claims. Among patients, there were 256 females and 197 males. The most common major injuries for all claims were aspects of aggravated or worsened preoperative condition, such as pain or mobility (14 percent; n=63), pain (12 percent; n=54), nerve damage (12 percent; n=53), and infection (11 percent; n=50).

Research Question One: Over the loss years of 2009 to 2019 for malpractice claims, were there trends in the type of intraoperative injuries occurring during hip and knee replacements?

Intraoperative Injuries

Over the loss dates of 2009 to 2019, there were 307 claims involving intraoperative injuries, including 293 inpatient claims and 14 claims in the ambulatory surgery setting. The top three major intraoperative injuries were related to an aggravated or worsened preoperative condition, like pain or mobility (19 percent; n=57), nerve damage (16 percent; n=49) and postoperative pain (13 percent; n=39).



Examining trends over the years in the top three major injury categories involving intraoperative injuries, we found only two relevant claims among our loss data for 2019. These likely reflect the immature nature of claims data (given time lags for reporting and claims investigation, followed by post-claim coding). After removing the two claims from 2019, when examining the loss years of 2009 to 2018, we saw that only the intraoperative injury of pain showed an upward trend. However, in the context of the small number of claims (n=307) included in this study, care should be taken in this appraisal.

Of note, three wrong-site procedures with hip and knee replacements were found among our data from this period. Two wrong-site procedures involved hip replacements, and one was a knee replacement. All wrong-site procedures happened in the inpatient setting.

Research Question Two: In malpractice claims with loss years of 2009 to 2019 related to hip and knee replacements, were there differences in injury severity, gender, or contributing factors between those procedures completed or managed in the inpatient vs. ambulatory setting?

Gender	Ambulatory (n=76)	Inpatient (n=377)
Female	49%	58%
Male	51%	42%
Age Group		
	Ambulatory (n=76)	Inpatient (n=377)
0–9 years old	0	<1%
10–19 years old	0	0%
20–29 years old	0	<1%
30–39 years old	<1%	1%
40–49 years old	4%	13%
50–59 years old	32%	31%
60–69 years old	46%	32%
70–79 years old	12%	15%
80–89 years old	<1%	4%
90–99 years old	0	<1%
Unknown age	4%	2%
Severity		
	Ambulatory (n=76)	Inpatient (n=377)
Low	1%	2%
Medium	83%	89%
High	16%	9%

Among the 76 ambulatory procedure claims, 71 percent (n=54) involved knee replacements, whereas the inpatient procedure claims (n=377) were relatively evenly distributed between hip replacements at 49.6 percent (n=187) and knee replacements at 50.4 percent (n=190).

Injury and Severity

A higher percentage of claims related to high-severity (disabling) injuries derived from ambulatory settings (16 percent; n=12) than from inpatient settings (9 percent; n=35). Among high-severity injury

claims, postoperative infection/sepsis was the most prevalent (50 percent; n=6), followed by claims involving pulmonary emboli (17 percent; n=2). In comparison, the high-severity injury cases that occurred in the inpatient setting represented 14 percent (n=5) of high-severity injury cases studied. These cases were based on two different injuries: nerve damage and pulmonary emboli.

The overall top injuries were aggravated injuries from prior to surgery, and mostly involved knee pain. This injury was followed in prevalence by infections (including nosocomial), which were more common in the ambulatory setting (33 percent; n=25) ambulatory compared to 11 percent (n=44) inpatient. Pain was also a top major injury, with knee pain being more common than hip pain (74 percent [n=40] of the pain complaints were knee pain, compared to 26 percent [n=14] hip pain).

The average number of comorbidities was similar between ambulatory and inpatient settings. Ambulatory patients had 1.32 comorbidities per claim, and inpatients had a slightly higher incidence of comorbidities, with 1.36 comorbidities per claim. In both settings, obesity was the top comorbidity, followed by diabetes.

Gender and Age

In this analysis, among inpatient procedures, a greater proportion were performed upon female patients than male patients. In ambulatory settings, the genders were fairly evenly distributed. Among all the malpractice claims in this study, individuals from 60 to 69 years old were more often found in the ambulatory claim group (46 percent; n=35) than in the inpatient claim group (32 percent; n=121). Similarly, among patients 50 to 59 years old, the ambulatory claim group (32 percent; n=24) was slightly larger than the inpatient claim group (31 percent; n=117). These findings would be expected, since ambulatory surgery should be the setting of choice for those patients who are younger, have fewer comorbidities, and are having knee replacements. Patients who were 40 to 49 years old were more likely found in the inpatient setting, but also more likely to have hip replacement procedures.

Contributing Factors

Contributing Factor Subcategory	Inpatient Claims	%	Ambulatory Claims	%
Patient assessment issues*	64	17%	31	41%
Communication between patient and providers**	42	11%	18	24%

*Significant at < .001 using chi-square.

Some differences emerged when reviewing the prevalence of contributing factors in the two settings. Three major areas of difference were prominent: Communication between the patient and the provider, patient assessment issues, and patient factors. Communication between the patient and provider was a factor in claims at a significantly higher rate in the ambulatory setting than in the inpatient setting. Claims where communication between the patient and provider was a contributing factor typically included issues such as poorly managed expectations and poor rapport. Patient assessment issues related to ordering a diagnostic test (a delay or a failure) appeared more frequently in the ambulatory setting (17 percent of all claims; n=13) than in the inpatient setting (5 percent of all claims; n=19). The

most common diagnostic tests mentioned with an allegation of delay or failure to order a diagnostic test were cultures (31 percent; n=24) in the ambulatory setting and 28 percent (n=106) in the inpatient setting) and x-rays (15 percent; n=11) in the ambulatory setting and 22 percent (n=83) in the inpatient setting). Patient factors were more prominent among claims from the ambulatory setting; however, this subcategory failed to reach statistical significance. Some clinical significance may be present when considering the influence of patient adherence on outcomes.

Discussion

In answering research question one, we observed an upward rise in reports of pain as an intraoperative injury, but a downward trend in other major injuries. (Most intraoperative injuries that resulted in malpractice claims in this study were found among procedures performed in the inpatient setting.) However, in reviewing the injuries related to postoperative management of hip and knee replacement claims, a slight upward trend in infections, including sepsis, was noted.

Nationally, the annual incidence of [surgical-site infection](#) for total hip replacement is estimated to be 0.4 to 2.5 percent, while [surgical-site infection](#) for total knee replacement is estimated to be 1 to 2 percent. This study examined only malpractice claims, vs. all procedures that resulted in an infection. The ambulatory setting was implicated in a larger percentage of the infection-related claims in our data set than the inpatient setting. The same was true of more high-injury severity claims.

One potential reason for a higher infection rate in the ambulatory setting may be related to a need for higher compliance to the inpatient Surgical Care Improvement Project (SCIP) protocol for antibiotic dosing in the prevention of surgical site infections (SSIs). Individuals having ambulatory procedures often must comply with an additional dose of antibiotic at home. Poor adherence could be a possible explanation for the higher rate of infection following ambulatory procedures.

Recommendation: Preoperative patient optimization is essential in decreasing postoperative complications. Checklists are one tool, but the patient optimization process entails much more, including a focus on modifiable risk factors, setting expectations with the patient and family, arranging the patient's home prior to surgery, and the importance of preoperative rehabilitation.

The ambulatory setting's contributing factors revealed more issues with communication between the patient/family and the providers, as well as with patient behaviors. This is unfortunate because in the ambulatory setting, especially, the patient's initial expectations may not have been realistic. Patients may [expect less risk with an ambulatory procedure](#) than an inpatient procedure. They may also [expect a swift and complete recovery](#), with no pain-imposed limits on their abilities. To complicate patient expectations further, the procedure may not have been explained by the provider in terms the patient could understand.

Recommendation: [Shared decision making](#) can address gaps between the patient's expectations and realistic outcomes for the procedure, as well as preventing a variety of other communication-related issues that can contribute to claims. Shared decision making includes discussing the risks and benefits of various treatments, allowing the patient to convey treatment preferences, and reaching agreement on treatment. To effectively communicate during shared decision making, providers need to be [aware of the patient's health literacy level](#).

The potential for poor rapport can often be traced to insufficient communication, leading to the patient going to another provider and breaking the continuity of care. This form of patient nonadherence was more frequent for patients in the ambulatory setting. These factors can interplay into postoperative complications being missed or worsened, further contributing to the likelihood of a claim.

Recommendation: During the first few days following a joint replacement with an ambulatory patient, consider adding in a telemedicine visit. A simple phone call is also an option. Patients and physicians can openly discuss how the patient is feeling. The physician can review expectations, and the patient will likely have a better understanding of their postoperative care.

In this study, the top two comorbidities were obesity and diabetes in both inpatient and ambulatory settings. In other studies, obese orthopedic patients have been twice as [likely to have surgical-site infections](#), with obese total hip replacement patients having 4.2 times higher risk of postoperative infection and obese total knee replacement patients having a 6.7 times higher risk of postoperative infection. Patients with diabetes also have shown a [higher risk for developing a postoperative infection](#) (odds ratio 1.26), and even higher risk if their diabetes is unmanaged (odds ratio 2.8).

Recommendation: The use of [preoperative screening methods and open patient-provider communication](#) can help to decrease the risks of surgical-site and periprosthetic joint infections postoperatively. Patients need to understand the risks and take part in the surgical plan.

[More women than men have hip and knee replacements](#) annually in the United States. Therefore, we would expect more claims to be filed by women, as well. Among the inpatient group of claims, female patients did represent a higher percentage of claimants (males 42 percent [n=195]; females 58 percent [n=275]). The ambulatory setting, however, included a roughly even split of claims from male and female patients (males 51 percent [n=45]; females 49 percent [n=42]), indicating a possible gender difference in patients' likelihood of filing for malpractice, with male patients likelier to file. However, this finding would require more study.

Limitations

This data was retrospective and used closed malpractice claims from one large national malpractice carrier. Claims data from ambulatory settings did not distinguish between freestanding ambulatory surgery centers and hospital-based outpatient care. This study did not represent complications that arose in situations in which patients did not file a claim or patients who did not experience complications from their procedures.

Patient selection for the choice of ambulatory setting was essential, but one confounding factor we could not access in detail in this analysis that has been evaluated in other studies was body mass index (BMI). While our analysis included obesity as an overarching comorbidity, we lacked the ability to track differences in outcomes based on patients' specific BMIs and complications.

In addition, in this study we were unable to evaluate preoperative and postoperative education done by the individual physicians, and physicians' criteria for patient selection were not universal across the cohort. Physician-specific information such as fellowship training was also not available.

Acknowledgements

We would like to extend our sincere appreciation to our expert reviewer for his insight into this study:

Dr. Jason A. Brustein (Resurgens Orthopaedics, Atlanta, GA)