Knee Arthroscopy Prior to Total Knee Arthroplasty: Temporal Relationship to Surgical Complications

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Abstract

Mechanical knee symptoms secondary to knee osteoarthritis (OA) may warrant knee arthroscopy (KA). Degenerative changes may progress and require a subsequent total knee arthroplasty (TKA). Recent studies have evaluated the timing of KA prior to TKA, associated a narrow interval with increased post-TKA complications. However, an updated analysis is required. We compared surgical outcomes in recipients of KA prior to TKA as stratified by four, time-dependent cohorts (< 12, 12 to 16, 16 to 20, and 20 to 24 weeks prior to TKA). We specifically compared: 90-day (1) manipulations under anesthesia (MUAs); (2) septic revisions at 90 days, 1 year, and 2 years; as well as (3) how various independent risk factors influenced the manipulations or revisions. We queried a national database for patients undergoing TKA. Patients who underwent KA with the following intervals: < 12 ($n = 1{,}023$), 12 to 16 ($n = 816$), 16 to 20 ($n = 1{,}957$), and 20 to 24 weeks (1,727) prior to TKA were compared with those patients who did not have a history of KA ($n = 5{,}000$). Bivariate analyses were utilized to assess 90 days through 2 years surgical outcomes. Afterwards, multivariate regression models were utilized to assess for independent risk factors. The unadjusted analyses showed an increase in MUA through 2 years among all the KA recipients ($p < 0.001$). Septic revisions and surgical site infections at all time points were not associated with any of the four arthroscopy time intervals ($p > 0.476$). The adjusted analyses showed an increased risk for 90-day MUA among all TKA cohorts ($p < 0.001$). Risk for septic revisions did not reach significance. Delaying TKA by 24 weeks in KA recipients was not associated with a decreased risk in septic revisions. However, there was an apparent risk of MUA at 90 days for all KA cohorts suggesting that waiting after KA before TKA makes no difference in MUA rates. These results update existing literature, may serve as an adjunct to current practice guidelines, and can contribute to shared decision making in the preoperative setting.

Keywords
- arthroscopy
- TKA
- knee
- infection
- revision

Arthroscopic knee surgeries remain the most common ambulatory orthopaedic procedures for patients who have meniscal or ligamentous tears, articular cartilage injuries, or mechanical symptoms secondary to knee osteoarthritis (OA). Current clinical practice guidelines (2021) for non-arthroplasty management of knee OA strongly recommends conservative measures such as exercise, and oral nonsteroidal anti-inflammatory drugs, though many require more aggressive management, such as knee arthroscopy.[1] Among the estimated 14 million patients who have symptomatic

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and advanced knee OA, further degeneration may progress, often warranting a total knee arthroplasty (TKA).[2] As life expectancy continues to rise, more patients are seeking orthopaedic consultation for progression of knee OA. This progression may be accelerated in a population of patients who have had a prior knee arthroscopy, given possible damage to the articular joint space. Furthermore, TKA recipients who have a prior knee arthroscopy may also be at further risk of joint stiffness (arthrofibrosis), prosthetic joint infection (PJI), or revision, as suggested by several recent studies.[3–8] However, the temporal relationship between these poor outcomes following TKA and the timing of a prior total knee arthroscopy continues to be debated.

Multiple studies within the past few years have attempted to identify how long to delay a TKA procedure following a knee arthroscopy.[4,9,10] Using a national database from 2008 to 2011, Werner et al[9] found that infection, stiffness, and thromboses following TKA were elevated in patients who had prior a prior knee arthroscopy within 6 months. In a similar study from 2009 to 2013, Barton et al[4] found lower Oxford knee scores among patients who required a TKA within 6 months of knee arthroscopy. Though these studies suggested delaying TKA by at least 6 months following knee arthroscopy, they may have been limited by patient sample sizes and may not reflect the past decade's rise in the number of TKAs performed.[10] A recent study by Gu et al attempted to further explore this temporal relationship by comparing a more specific time interval within a year from TKA.[7] Using national data from 2006 to 2017, they found an increased rate of PJI if a knee arthroscopy was performed within 35 weeks of TKA. However, this study was restricted to Ninth Edition International Classification Codes (ICD) that lack laterality and outcome-specific details that are available with the post-2015, Tenth Edition.

Though many authors have attempted to critically assess the timing of TKA in patients who have prior knee arthroscopy, they continue to have limitations that may not reflect an accurate and current representation. Furthermore, there is a consensus that as the timing between TKA from prior knee arthroscopy decreases, patients are at greater risk for poor outcomes. However, a more granular examination of this shortened timeframe is lacking. Therefore, we compared surgical outcomes in recipients of knee arthroscopy prior to TKA as stratified by four, time-dependent cohorts ($<$ 12, 12 to 16, 16 to 20, and 20 to 24 weeks prior to TKA). We specifically compared: 90-day (1) manipulations under anesthesia (MUAs); (2) septic revisions at 90 days, 1 year, and 2 years; as well as (3) how various independent risk factors influenced the manipulations or revisions.

Materials and Methods

Database

We queried the "MKnee" data set within a national, all-payer database (PearlDiver Inc., Colorado Springs, CO). This database is a composite of over 120 million Health Insurance Portability and Accountability Act compliant patient records spanning commercial, Medicare, Medicaid, government, and cash payers in all 50 states of the United States. All patient populations, outcomes, and complications were identified using the International Classification of Disease, Tenth Edition, procedures, and diagnoses codes. Additionally, Current Practice Terminology codes characterized procedures.

Patients

We identified all patients who underwent a primary TKA between January 1, 2015 and October 31, 2020. Patients who had a prior ipsilateral knee arthroscopy were then characterized. To accomplish this, patients who had a left knee arthroscopy and a subsequent left TKA were identified, this was repeated for the right limb, and then the two laterality-specific populations were combined ($n = 19{,}258$). Only patients who had knee OA were included (ICD-10-D-M1711, ICD-10-D-M1731, ICD-10-D-M93261, ICD-10-D-M1712, ICD-10-D-M1732, ICD-10-D-M93262). We then stratified these patients into four, mutually exclusive cohorts of knee arthroscopy recipients (total = 5,523) prior to TKA: 0 to 12 weeks ($n = 1{,}023$), $>$ 12 to 16 weeks ($n = 816$), $>$ 16 to 20 weeks ($n = 1{,}957$), and $>$ 20 to 24 weeks ($n = 1{,}727$). A control cohort was then created, comprised of a limited randomized population of TKA recipients who did not have prior knee arthroscopy ($n = 5{,}000$). A limited population was used to mitigate risks of type I error.

Outcomes of Interest

The primary outcomes assessed by this study were 90-day to 2-year incidences and odds of revisions (septic, revision due to PJI), as well as MUAs. In addition to deep infections, 90-day to 2-year surgical site infections were also investigated. Additionally, we aimed to identify independent risk factors for septic and aseptic revision, as well as MUAs within all the studied TKA populations. All outcomes and complications were identified using ICD codes. The index primary TKA was the reference date when determining timings. Demographic data and health metrics were also collected to compare baseline characteristics between all cohorts. These included: age, sex, alcohol abuse, Charlson Comorbidity Index,[11,12] diabetes mellitus (DM), obesity, rheumatoid arthritis (RA), and tobacco use.

Demographics and Baseline Characteristics

All knee arthroscopy cohorts were relatively younger than the nonarthroscopy cohort, with mean ages ranging from 61 to 62 years versus 66 years (►**Table 1**). All cohorts were predominantly women (range, 62–64%). Knee arthroscopy cohorts also had higher baseline rates of obesity (range, 56–59%), tobacco use (range, 45–49%), and alcohol abuse (range, 6–7%).

Statistical Analyses

Continuous variable such as ages, were assessed using Student's *t*-tests. Categorical variables such as baseline comorbidities, infections, and revisions were assessed using bivariate chi-square analyses with resultant odds ratios (ORs) and 95% confidence intervals, with the nonarthroscopy cohort as the referent. Afterwards, multivariate regressions

Table 1 Demographics and baseline characteristics

	No arthroscopy prior to TKA $n = 5{,}000$ (%)	Arthroscopy 0–12 weeks prior to TKA $n = 1{,}023$ (%)	Arthroscopy 12–16 weeks prior to TKA $n = 816$ (%)	Arthroscopy 16–20 weeks prior to TKA $n = 1{,}957$ (%)	Arthroscopy 20–24 weeks prior to TKA $n = 1{,}727$ (%)	*p*-Value
Age (SD)	66 (8.68)	61 (9.67)	62 (10.19)	61 (9.64)	62 (9.88)	< 0.001
Sex						
Women	3,164 (63.28)	637 (62.27)	518 (63.48)	1224 (62.54)	1,104 (63.93)	< 0.001
Men	1,836 (36.72)	386 (37.73)	298 (36.52)	733 (37.46)	623 (36.07)	
Alcohol abuse	245 (4.90)	75 (7.33)	51 (6.25)	134 (6.85)	116 (6.72)	0.001
CCI > 3	606 (12.12)	151 (14.76)	135 (13.20)	302 (15.43)	295 (17.08)	< 0.001
DM	2,361 (47.22)	395 (38.61)	340 (41.67)	769 (39.29)	718 (41.57)	< 0.001
Obesity	2,567 (51.34)	574 (56.11)	470 (57.60)	1,107 (56.57)	1,019 (59.00)	< 0.001
RA	351 (7.02)	55 (5.38)	48 (5.88)	111 (5.67)	95 (5.50)	0.053
Tobacco use	1,785 (35.70)	461 (45.06)	396 (48.53)	880 (44.97)	811 (46.96)	< 0.001

Abbreviations: BMI, body mass index; CCI, Charlson Comorbidity Index; DM, diabetes mellitus; RA, rheumatoid arthritis; SD, standard deviation; TKA, total knee arthroplasty.

were conducted to identify independent risk factors for the following complications: MUAs and septic revisions. Dependent variables included: male sex, age < 60 years, alcohol abuse, DM, RA, tobacco use, and all arthroscopy cohorts (range, 0–24 weeks prior to primary TKA). All analyses were conducted using the R Project (Statistics Department of the University of Auckland, North Island, New Zealand) functions within the database. Statistical significance was defined as $p < 0.05$.

Results

Manipulations Under Anesthesia

All knee arthroscopy cohorts had higher incidences and odds of MUAs as compared with the nonarthroscopy group (►**Tables 2** and **3**). At 90 days, MUAs among the arthroscopy cohorts ranged from 4.9 to 5.6%, while the incidence among the nonarthroscopy group was 2.6% (all $p < 0.001$). Similarly, ORs among the arthroscopy cohorts ranged from 1.94 to 2.21, with the control as the referent group.

Septic Revisions

Septic revisions, whereby a patient had a revision due to PJI, were nominally higher among the arthroscopy cohorts, though these did not reach statistical significance (►**Tables 2** and **3**). At 90 days, septic revisions among the arthroscopy cohorts ranged from 1.3 to 1.0%, as compared with the 1.0% among the nonarthroscopy group ($p = 0.804$). Similarly, ORs were not significantly different at 90 days among the arthroscopy cohorts (OR range, 1.09–1.41). These similarities continued through 2 years, whereby the incidences and odds of septic revisions among the arthroscopy cohorts did not differ significantly from the nonarthroscopy group (OR range, 1.13–1.21, $p = 0.673$).

Independent Risk Factors

When using the nonarthroscopy cohort as a reference, all arthroscopy cohorts were identified as independent risk factors for 90-day MUAs when controlling for the 10 risk factors (►**Table 4**). ORs ranged from 1.52 to 1.61 (all $p < 0.001$). When assessing 90-day through 2-year septic revisions, none of the four arthroscopy cohorts were found to be independent risk factors ($p > 0.05$) (►**Table 5**). However, alcohol abuse, tobacco use, and obesity were found to be independent risk factors for further increasing septic revision risk from 90 days through 2 years ($p < 0.001$).

Discussion

Mechanical symptoms secondary to knee OA may warrant a knee arthroscopy. Within the past several years, authors have attempted to identify the ideal delay interval between knee arthroscopy and subsequent TKA, if indicated, with many specifying within 6 months as an inflection point, whereby the rates of poor outcomes develop.[4,7,9] However, literature to date is not reflective of the current rates of knee arthroscopies and TKAs.[10] We sought to compare four, time-based cohorts of patients who received a TKA within 24 weeks of an ipsilateral knee arthroscopy, as compared with a control of patients who did not have prior history of knee arthroscopies. Among all arthroscopy cohorts, 90-day MUAs were found to be significantly increased compared with the nonarthroscopy group (all $p < 0.001$). However, these cohorts were not at increased risk for septic revision at 90 days, 1 year, and 2 years.

This study is not without its limitations, mainly stemming from the use of a large database. This national, all-payer database is a composite of deidentified institutional data from across the country. Thus, medical and billing errors may

Table 2 Bivariate analysis of postoperative outcomes

	No arthroscopy Prior to TKA $n = 5{,}000$ (%)	Arthroscopy 0–12 weeks prior to TKA $n = 1{,}023$ (%)	Arthroscopy 12–16 weeks prior to TKA $n = 816$ (%)	Arthroscopy 16–20 weeks prior to TKA $n = 1{,}957$ (%)	Arthroscopy 20–24 weeks prior to TKA $n = 1{,}727$ (%)	*p*-Value
90-day complications						
Aseptic revision	15 (0.30)	[a]	[a]	11 (0.56)	*	0.340
MUA	130 (2.60)	57 (5.57)	43 (5.27)	108 (5.52)	85 (4.92)	< 0.001
PJI	48 (0.96)	13 (1.27)	11 (1.35)	22 (1.12)	18 (1.04)	0.804
SSI	64 (1.28)	[a]	12 (1.47)	17 (0.87)	24 (1.39)	0.476
1-year complications						
Aseptic revision	58 (1.16)	20 (1.96)	14 (1.72)	34 (1.74)	28 (1.62)	0.160
MUA	170 (3.40)	70 (6.84)	54 (6.62)	129 (6.59)	107 (6.20)	< 0.001
PJI	66 (1.32)	18 (1.76)	15 (1.84)	31 (1.58)	29 (1.68)	0.620
SSI	78 (1.56)	16 (1.56)	15 (1.84)	24 (1.23)	31 (1.80)	0.653
2-year complications						
Aseptic revision	85 (1.70)	41 (4.01)	28 (3.43)	58 (2.96)	51 (2.95)	< 0.001
MUA	173 (3.46)	74 (7.23)	54 (6.62)	133 (6.80)	108 (6.25)	< 0.001
PJI	77 (1.54)	19 (1.86)	17 (2.08)	34 (1.74)	34 (1.97)	0.673
SSI	98 (1.96)	20 (1.96)	16 (1.96)	33 (1.69)	33 (1.91)	0.962

Abbreviations: MUA, manipulation under anesthesia; PJI, prosthetic joint infection; SSI, surgical site infections; TKA, Total knee arthroplasty.
[a]Censored in accordance with the database confidentiality agreement.

Table 3 Odds ratios of complications

	Arthroscopy 0–12 weeks prior to TKA $n = 1{,}023$ (%)		Arthroscopy 12–16 weeks prior to TKA $n = 816$ (%)		Arthroscopy 16–20 weeks prior to TKA $n = 1{,}957$ (%)		Arthroscopy 20–24 weeks prior to TKA $n = 1{,}727$ (%)	
	OR[a]	95% CI	OR[a]	95% CI	OR[a]	95% CI	OR[a]	95% CI
90-day complications								
Aseptic revision	2.29	0.93–5.63	1.23	0.35–4.25	1.88	0.86–4.10	1.35	0.55–3.32
MUA	2.21	1.61–3.04	2.08	1.46–2.97	2.19	1.69–2.84	1.94	1.47–2.56
PJI	1.33	0.72–2.46	1.41	0.73–2.73	1.17	0.71–1.95	1.09	0.63–1.87
SSI	0.76	0.39–1.49	1.15	0.62–2.14	0.68	0.39–1.16	1.09	0.68–1.74
1-year complications								
Aseptic revision	1.70	1.02–2.84	1.49	0.83–2.68	1.51	0.98–2.32	1.40	0.89–2.21
MUA	2.09	1.57–2.78	2.01	1.47–2.76	2.00	1.58–2.54	1.88	1.46–2.41
PJI	1.34	0.79–2.26	1.40	0.80–2.46	1.20	0.78–1.85	1.28	0.82–1.98
SSI	1.00	0.58–1.72	1.18	0.68–2.06	0.78	0.49–1.24	1.15	0.76–1.76
2-year complications								
Aseptic revision	2.41	1.65–3.53	2.05	1.33–3.17	1.77	1.26–2.48	1.76	1.24–2.50
MUA	2.18	1.64–2.88	1.98	1.44–2.71	2.03	1.61–2.57	1.86	1.45–2.38
PJI	1.21	0.73–2.01	1.36	0.80–2.31	1.13	0.75–1.70	1.28	0.85–1.93
SSI	1.00	0.61–1.62	1.00	0.59–1.71	0.86	0.58–1.28	0.97	0.65–1.45

Abbreviations: 95% CI, 95% confidence interval; MUA, manipulation under anesthesia; OR, odds ratio; PJI, prosthetic joint infection; SSI, surgical site infection; TKA, Total knee arthroplasty.
[a]Reference group: no arthroscopy prior to TKA.

Table 4 Multivariate logistic regression for MUA

90-day MUAs	OR[a]	95% CI	*p*-Value
Age < 60 y	0.47	0.40–0.55	< 0.001
Alcohol abuse	0.73	0.52–0.99	0.05
Diabetes mellitus	0.97	0.84–1.13	0.73
Obesity	1.06	0.92–1.23	0.41
Rheumatoid arthritis	0.86	0.63–1.16	0.35
tobacco use	0.94	0.81–1.09	0.40
Arthroscopy 0–12 wk prior to TKA	1.61	1.34–1.94	< 0.001
Arthroscopy 12–16 wk prior to TKA	1.52	1.24–1.87	< 0.001
Arthroscopy 16–20 wk prior to TKA	1.58	1.23–2.01	< 0.001
Arthroscopy 20–24 wk prior to TKA	1.54	1.20–1.97	< 0.001

Abbreviations: 95% CI, 95% confidence interval; MUA, manipulation under anesthesia; OR, odds ratio; TKA, Total knee arthroplasty.
[a]Reference group: no arthroscopy prior to TKA.

Table 5 Multivariate logistic regression for septic revision

90-day septic revision	OR[a]	95% CI	*p*-Value
Age < 60 y	0.91	0.66–1.28	0.592
Alcohol abuse	1.68	1.11–2.45	0.011
Diabetes mellitus	2.03	1.57–2.66	< 0.001
Obesity	1.79	1.35–2.39	< 0.001
Rheumatoid arthritis	0.93	0.54–1.49	0.777
Tobacco use	1.79	1.38–2.32	< 0.001
Arthroscopy 0–12 wk prior to TKA	0.91	0.65–1.26	0.571
Arthroscopy 12–16 wk prior to TKA	0.90	0.62–1.27	0.561
Arthroscopy 16–20 wk prior to TKA	0.74	0.43–1.18	0.234
Arthroscopy 20–24 wk prior to TKA	0.47	0.25–0.82	0.014
1-year septic revision			
Age < 60 years	0.70	0.54–0.91	0.007
Alcohol abuse	1.50	1.05–2.08	0.021
Diabetes mellitus	1.73	1.40–2.15	< 0.001
Obesity	1.71	1.36–2.18	< 0.001
Rheumatoid arthritis	0.98	0.63–1.46	0.939
Tobacco use	1.74	1.40–2.16	< 0.001
Arthroscopy 0–12 wk prior to TKA	0.85	0.64–1.13	0.273
Arthroscopy 12–16 wk prior to TKA	0.99	0.73–1.31	0.920
Arthroscopy 16–20 wk prior to TKA	0.78	0.51–1.15	0.235
Arthroscopy 20–24 wk prior to TKA	0.73	0.47–1.08	0.134
2-year septic revision			
Male sex	1.11	0.91–1.35	0.313
Age < 60 y	0.68	0.54–0.87	0.002
Alcohol abuse	1.50	1.08–2.04	0.013
Diabetes mellitus	1.47	1.21–1.80	< 0.001
Obesity	1.73	1.40–2.16	< 0.001
Rheumatoid arthritis	0.86	0.56–1.27	0.482
Tobacco use	1.59	1.30–1.94	< 0.001
Arthroscopy 0–12 wk prior to TKA	0.76	0.58–1.00	0.050
Arthroscopy 12–16 wk prior to TKA	0.87	0.65–1.15	0.334
Arthroscopy 16–20 wk prior to TKA	0.76	0.51–1.09	0.155
Arthroscopy 20–24 wk prior to TKA	0.74	0.50–1.06	0.116

Abbreviations: 95% CI, 95% confidence interval; OR, odds ratio; TKA, Total knee arthroplasty.
[a]Reference group: no arthroscopy prior to TKA.

exist from the institutional level. However, an independent party audits all claims within the database. Additionally, the U.S. Department of Health and Human Services report a low (1%) miscoding rate, likely similar to the current data set.[13] This study is also limited by its ability to assess functional related outcomes that are often excellent markers for surgical success, such as ranges of motion and patient-reported outcome scores. However, we specifically identified common complications following knee procedures that can be used as a proxy for the overall procedure success: namely, MUAs and revisions. Another limitation is our use of data from 2015 and not the beginning of the entire data set (2010). Although some of our sample sizes may be sacrificed, we only elected to identify patients who had an ICD-10 procedural code with the aim of achieving a laterality-specific patient population. These limitations should not disqualify the strengths of this study. Specifically, we assessed a relatively large population that was laterality-specific and had mutually exclusive time intervals between procedures, in contrast to existing reports.

Our study found an association between a knee arthroscopy within 24 weeks of a primary TKA and increased rates of post-TKA 90-day MUAs, regardless of arthroscopy cohort. The development of arthrofibrosis and eventual MUA is a well-documented complication following knee arthroscopies with post-TKA rates estimated between 1.3 and 10%.[14–17] Prior knee arthroscopy before a TKA may accelerate the development of knee stiffness given the intra-articular nature of knee arthroscopies.[6,7,18] A 2015 report assessing the timing between knee arthroscopy and TKA found that patients who had a knee arthroscopy within 6 months of a TKA had nearly two times increased risk of developing postoperative stiffness, as compared with other time intervals. A recent report by Gu et al[7] also found worse

post-TKA outcomes in patients who had a prior knee arthroscopy within 6 months. Specifically, they found a significantly higher MUA rate among knee arthroscopy recipients within 43 weeks of TKA, as compared with the control ($p < 0.003$). In a recent study of 1,689 revision TKA recipients, Oganesyan et al[3] similarly found that patients who had a prior knee arthroscopy had a two times increased risk of requiring re-revision for stiffness, as compared with patients who did not have prior knee arthroscopy. Although the development of postoperative stiffness and requirement of MUA is multifactorial, our results corroborate previous literature associating prior arthroscopy as a risk factor for stiffness.

The rates of septic revisions, defined as patients who required revision surgery due to infection, demonstrated no association with any of the arthroscopy cohorts in this study, from 90 days to 2 years. This also remained insignificant in the multivariate regression assessing independent risk factors for septic revision ($p > 0.05$). Peri-PJIs continue to pose a substantial morbidity and mortality risk, as well as financial burden to patients and providers.[19,20] Thus, orthopaedic surgeons remain wary of any potential risk factors for PJIs. Recent reports argue about the increased risk of PJI following an intra-articular injection.[21–23] A similar discussion has also led to multiple reports questioning the association of prior arthroscopy to TKA and PJI risk. According to the 2020 report using a national database from 2006 to 2017, TKA recipients who had prior knee arthroscopy has an adjusted increased risk for revision rates (OR 1.392, $p = 0.003$) and PJIs (OR 1.326, $p < 0.001$).[6] The same group also identified TKA recipients who had knee arthroscopy within 35 weeks were at increased risk for PJI.[7] These recent studies contrast with the current findings, where all knee arthroscopy cohorts who had a knee arthroscopy within 24 weeks of TKA demonstrated no differences in post-TKA PJI risk from 90 days through 2 years in the adjusted analyses. Of note, the present study specifically identified ICD-10 codes to ensure a laterality-specific cohort and is inclusive of a more recent patient population (2015–2020). The differences between the present study and similar reports regarding septic revision risk is likely multifactorial, but partly contributed to the coding differences mentioned. Despite these efforts, further study is warranted to clarify the specific temporal influences of knee arthroscopy and TKA.

Conclusion

Knee arthroscopy within 24 weeks of primary TKA was associated with an increased risk for 90-day post-TKA MUAs, in unadjusted and adjusted analyses. However, the risk for aseptic and septic revisions in the same cohorts was not at increased risk, as compared with TKA recipients who did not have prior knee arthroscopies. These results corroborate the associations between intra-articular disruption as well as stiffness development and outlines patient expectations after receiving arthroscopy with an eventual TKA in the short term.

Conflict of Interest
None declared.

References

1 American Academy of Orthopaedic Surgeons Management of Osteoarthritis of the Knee (Non-Arthroplasty) Evidence-Based Clinical Practice Guideline. 3rd ed. Rosemont, IL: American Academy of Orthopaedic Surgeons; 2021
2 Deshpande BR, Katz JN, Solomon DH, et al. Number of persons with symptomatic knee osteoarthritis in the US: impact of race and ethnicity, age, sex, and obesity. Arthritis Care Res (Hoboken) 2016;68(12):1743–1750
3 Oganesyan R, Klemt C, Esposito J, Tirumala V, Xiong L, Kwon YM. Knee arthroscopy prior to revision TKA is associated with increased re-revision for stiffness. J Knee Surg 2022;35(11): 1223–1228
4 Barton SB, McLauchlan GJ, Canty SJ. The incidence and impact of arthroscopy in the year prior to total knee arthroplasty. Knee 2017;24(02):396–401
5 Viste A, Abdel MP, Ollivier M, Mara KC, Krych AJ, Berry DJ. Prior knee arthroscopy does not influence long-term total knee arthroplasty outcomes and survivorship. J Arthroplasty 2017;32(12): 3626–3631
6 Gu A, Malahias MA, Cohen JS, et al. Prior knee arthroscopy is associated with increased risk of revision after total knee arthroplasty. J Arthroplasty 2020;35(01):100–104
7 Gu A, Fassihi SC, Wessel LE, et al. Comparison of revision risk based on timing of knee arthroscopy prior to total knee arthroplasty. J Bone Joint Surg Am 2021;103(08):660–667
8 Churchill JL, Sodhi N, Khlopas A, et al. Total knee arthroplasty fibrosis following arthroscopic intervention. Ann Transl Med 2017;5(Suppl 3):S28
9 Werner BC, Burrus MT, Novicoff WM, Browne JA. Total knee arthroplasty within six months after knee arthroscopy is associated with increased postoperative complications. J Arthroplasty 2015;30(08):1313–1316
10 Sloan M, Premkumar A, Sheth NP. Projected volume of primary total joint arthroplasty in the U.S., 2014 to 2030. J Bone Joint Surg Am 2018;100(17):1455–1460
11 Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. J Chronic Dis 1987;40(05): 373–383
12 Charlson M, Szatrowski TP, Peterson J, Gold J. Validation of a combined comorbidity index. J Clin Epidemiol 1994;47(11): 1245–1251
13 U.S. Department of Health & Human Services. Medicare Fee-for-Service Supplemental Improper Payment Data 2019;2019:1–80
14 Kim J, Nelson CL, Lotke PA. Stiffness after total knee arthroplasty. Prevalence of the complication and outcomes of revision. J Bone Joint Surg Am 2004;86(07):1479–1484
15 Freeman TA, Parvizi J, Dela Valle CJ, Steinbeck MJ. Mast cells and hypoxia drive tissue metaplasia and heterotopic ossification in idiopathic arthrofibrosis after total knee arthroplasty. Fibrogenesis Tissue Repair 2010;3:17
16 Gollwitzer H, Burgkart R, Diehl P, Gradinger R, Bühren V. Therapie der arthrofibrose nach kniegelenkendoprothetik. Orthopade 2006;35:143–152
17 Kalson NS, Borthwick LA, Mann DA, et al. International consensus on the definition and classification of fibrosis of the knee joint. Bone Joint J 2016;98-B(11):1479–1488
18 Piedade SR, Pinaroli A, Servien E, Neyret P. Is previous knee arthroscopy related to worse results in primary total knee arthroplasty? Knee Surg Sports Traumatol Arthrosc 2009;17 (04):328–333

19 Kurtz SM, Lau E, Watson H, Schmier JK, Parvizi J. Economic burden of periprosthetic joint infection in the United States. J Arthroplasty 2012;27(8, Suppl):61–5.e1
20 Shohat N, Goswami K, Tan TL, et al. Frank Stinchfield Award: identifying who will fail following irrigation and debridement for prosthetic joint infection: a machine learning-based validated tool. Bone Joint J. 2020;102-B(7_Supple_B):11–19
21 Kurtz SM, Mont MA, Chen AF, et al. Intra-articular corticosteroid or hyaluronic acid injections are not associated with periprosthetic joint infection risk following total knee arthroplasty. J Knee Surg 2022;35(09):983–996
22 Khan IA, Small I, Sutton RM, et al. Cumulative intraarticular injections are not a risk factor for periprosthetic joint infection following total knee arthroplasty. J Arthroplasty 2022;37(06):1059–1063.e1
23 Richardson SS, Schairer WW, Sculco TP, Sculco PK. Comparison of infection risk with corticosteroid or hyaluronic acid injection prior to total knee arthroplasty. J Bone Joint Surg Am 2019;101(02):112–118