Preoperative chronic opiate use associated with a worse joint-specific function and quality of life before and after total hip and knee arthroplasty

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Aims

The aim of this study was to assess whether chronic pre-arthroplasty use of strong opiates impacted the pre- and postoperative joint-specific function, quality of life (QoL), pain scores, and satisfaction in those undergoing total hip arthroplasty (THA) or total knee arthroplasty (TKA).

Methods

This prospective study assessed 1,487 patients (THA n = 729; TKA n = 758). Preoperative opiate use of more than a month was used to define the opioid group. Patient demographics, comorbidities, Oxford Hip Score (OHS), Oxford Knee Score (OKS), and EuroQol five-dimension questionnaire (EQ-5D) scores were collected preoperatively and at six months postoperatively. Patient satisfaction with their joint was assessed at six months.

Results

The opioid groups consisted of 95 patients in both the THA (13.0%) and TKA (12.5%) cohorts. Pre- and postoperative OHS, OKS, and EQ-5D were clinically (greater than the minimal clinically important difference) and statistically ($p < 0.001$) significantly worse for the opioid groups undergoing THA and TKA. The opioid group was independently associated with a significantly worse improvement in OHS (−3.0, 95% CI −4.8 to −1.2; $p = 0.001$) and EQ-5D (−0.089, 95% CI −0.132 to −0.041; $p < 0.001$) for those undergoing THA, but no significant (OKS, $p = 0.650$ and EQ-5D, $p = 0.485$) association was demonstrated in the TKA cohort. There was no difference in satisfaction with their arthroplasty between opioid and opiate-naive groups undergoing THA ($p = 0.133$) or TKA ($p = 0.797$).

Conclusion

Preoperative opiate use was associated with clinically significantly worse pre- and postoperative joint-specific function and QoL. Those undergoing THA had a clinically worse improvement in their joint-specific function, but this was not observed in those undergoing TKA. However, patients were equally satisfied with outcomes.

Take home message

- Preoperative opiate use for analgesia purposes in patients with osteoarthritis was found to be associated with worse joint-specific scores and quality of life preoperatively.
- It also seems that opioid use negatively influences the clinical benefit of total hip arthroplasty. The reasons why this independent effect was not observed in those undergoing total knee arthroplasty is not clear.

Introduction

Osteoarthritis (OA) is a degenerative disease of joints most commonly the knees and hips, causing progressive damage to joints,[1] and is deemed the most common joint disease in older adults,[2] with approximately 10 million people in the UK living with osteoarthritis.[3] Musculoskeletal conditions are considered

the leading cause of disability in the UK,[4] with 35.0% of patients awaiting total hip arthroplasty (THA) and 22.3% of patients awaiting total knee arthroplasty (TKA) in a health state worse than death (WTD).[5] National Institute for Health and Care Excellence (NICE) guidelines for OA management in the UK advises non-pharmacological management with exercise, weight management, and pharmacological treatments.[6] Guidance discourages use of weak opioids and advises avoidance of strong opioids for individuals suffering osteoarthritic pain.[6]

Previous authors have questioned the benefits of opioids and have highlighted their reduced efficacy when used chronically in non-terminal illnesses including OA.[7,8] This questionable efficacy,[7,8] risks of adverse side effects,[2] and potentially worse functional outcomes[9] supports opioid avoidance in individuals awaiting arthroplasty surgery. The COVID-19 pandemic has had wide-ranging impacts upon delivery of healthcare, including elective orthopaedic treatment.[10] As of November 2022, more than 780,000 patients (or 1,400 per 100,000 population) were awaiting orthopaedic surgery in England.[11] A further 42,000 are on orthopaedic waiting lists in Scotland,[12] and in Northern Ireland, orthopaedic waiting lists are at record levels.[13] Increasing arthroplasty waiting lists are associated with negative effects on recovery, outcomes, reduced quality of life (QoL), and increasing use of analgesic medications,[10,14] and antidepressant medication,[13] with significant effects on musculoskeletal morbidity.[10] The proportion of individuals awaiting arthroplasty reported to be in a subjective health state WTD is nearly double that reported prior to the pandemic.[5] As waiting lists for patients with hip and knee OA increase, preoperative opiate prescribing is exacerbated as patients with end-stage OA are manged in primary care while they wait.[13]

The primary aim of this study was to assess whether improvement in joint-specific function was influenced by preoperative use of opioid analgesia prior to THA or TKA. The null hypothesis was that preoperative opioid use was associated with a worse improvement in joint-specific function when compared with those patients not using opioid analgesics. Secondary aims were to assess whether opioid use was deleterious to health-related QoL, pain relief, and patient satisfaction.

Methods

This prospective mixed-method study obtained ethical approval (Scotland A Research Ethics Committee 16/SS/0026). Between January 2017 and December 2018, pre- and postoperative data were collected from patients undergoing THA and TKA at the study centre. Data were collected for 824 patients undergoing unilateral primary THA and 819 undergoing primary TKA for OA with 729 THAs and 758 TKAs meeting the inclusion criteria. Exclusion criteria were partial knee or revision arthroplasty; bilateral arthroplasty; avascular necrosis; or rheumatoid arthritis; and patients who had not completed preoperative questionnaires in relation to analgesic medication questions.

THA was performed using an anterolateral or posterior approach. A cemented Exeter femoral component was paired with either a Contemporary Flanged acetabular component (Stryker, USA), Low Profile (Stryker), Trident (Stryker), or Restoration ADM (Stryker) socket. For those undergoing a TKA, a cemented Triathlon (Stryker) was used in all cases with a tourniquet. A routine postoperative patient care protocol was employed for all patients. Venous thromboembolism prophylaxis was left at the surgeon's discretion; however, during this period, aspirin was commonly employed.

Patient-reported outcome measures (PROMs) were assessed via a hip or knee arthroplasty questionnaire preoperatively and at six months postoperatively. Details of preoperative analgesia were included in questionnaires in addition to joint-specific function (Oxford Hip Score (OHS),[15] Oxford Knee Score (OKS)),[15] health-related QoL (EuroQol five-dimension questionnaire (EQ-5D), and EuroQol-visual analogue scale (EQ-VAS)); and level of pain (pain visual analogue scale (pain-VAS)). Forgotten Joint Score (FJS)[16] and patient satisfaction with their arthroplasty was assessed at six months postoperatively. Patient demographic data (including age, sex, weight, height, and BMI), and comorbidities were collected and recorded. Patients self-reporting more than one month of opiate use prior to arthroplasty were investigated further using their electronic patient notes to identify the specific analgesia prescribed within preoperative documentation, including the emergency care summary. Once confirmed, those patients taking opioid analgesia for one month or more were defined as the opioid group, and those not taking opioid for one month or more as the opiate-naive group. With the definition of long-term opiate use varying much within practice and the literature, it is shown that the first month of opiate use is key and has association with continued use at one year.[17,18]

The OHS and OKS are joint-specific assessments consisting of 12 questions assessed on a Likert scale from 0 to 4 to give a total score, ranging from 0 (worst) to 48 (best).[19] The EQ-5D evaluates five domains: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression.[20] The three-level (3L) version (EQ-5D-3L) of the questionnaire was used, with responses to the five domains recorded at three levels of severity (no/slight problems; moderate/severe; or unable/extreme problems).[20] This index is on a scale of −0.594 to 1, where 1 represents perfect health and 0 represents death. Patients scoring < 0 for the EQ-5D score were defined to be in a state WTD.[15] The EQ-VAS questionnaire has a vertical scale from 0 (worst) to 100 (best) to assess how good or bad the person's health is that day. The FJS is a patient-reported outcome scale to assess joint awareness of the hip during various activities of daily living. It uses a five-point Likert response format, consisting of 12 questions with the raw score transformed to 0 to 100 points. High scores indicate a good outcome, i.e. a high degree of being able to forget about the affected joint in daily life. The FJS has a low ceiling effect and especially discriminates between good, very good, and excellent outcome after THA and TKA. Pain was assessed using a VAS from 0 (worst) to 100 (best) to assess the severity of pain that day (pain-VAS). Patient satisfaction with their hip/knee was assessed using a Likert scale of: very satisfied, satisfied, neither, dissatisfied, or very dissatisfied. Patients who were very satisfied or satisfied were combined into a group that were satisfied with their healthcare.

The minimal clinically important difference (MCID), a difference in the PROM that is clinically meaningful to the patients, was defined as: three points for the Oxford

Table I. Preoperative self-reported analgesic use prior to total hip and knee arthroplasty.

Preoperative medication	THA (n = 729), frequency (%)	TKA (n = 758), frequency (%)
Total	729 (100.0)	758 (100.0)
Paracetamol	509 (69.82)	542 (71.50)
Paracetamol > one month	469 (64.33)	481 (63.46)
NSAIDs	213 (29.22)	211 (27.84)
NSAIDs > one month	207 (28.40)	173 (22.82)
Strong opiates	100 (13.72)	115 (15.17)
Strong opiates > one month	95 (13.03)	95 (12.53)
Anti-neuropathic agents	101 (13.85)	67 (8.84)
Anti-neuropathic agents > one month	92 (12.62)	51 (6.73)

NSAIDs, non-steroidal anti-inflammatory drugs; THA, total hip arthroplasty; TKA, total knee arthroplasty.

Table II. Preoperative strong opioid prescriptions as obtained from TrakCare analysis for total hip and knee arthroplasty patients.

Opioid use	THA, frequency (%)	TKA, frequency (%)
Total, n	95	95
Fentanyl	2 (2.1)	2 (2.1)
Methadone	0 (0.0)	1 (1.1)
Morphine	9 (9.5)	4 (4.2)
Oxycodone	4 (4.2)	1 (1.1)
Tapentadol	1 (1.1)	0 (0.0)
Tramadol	44 (46.3)	59 (62.1)
Multiple opioid prescriptions	8 (8.4)	8 (8.4)
Undetermined	26 (27.4)	20 (21.1)

THA, total hip arthroplasty; TKA, total knee arthroplasty.

scores,[15] 8.1 points for the FJS following THA,[21] and 16.6 points following TKA,[22] and 0.085 for the EQ-5D.[23]

A higher MCID has been defined for the Oxford scores of five points following TKA;[24] however, the authors felt the three-point change suggested by the Oxford scores was lower and therefore potentially represented the 'minimum' clinical difference.[19]

The primary endpoint was improvement in the Oxford score at one year. The MCID in this score is three points and with α of 0.05 and assumed SD of nine using a two-tailed analysis and an estimate of 14% prevalence of opioid analgesic use (1:6 ratio) it was determined that 574 (82 in opioid group versus 492 in opioid-naive group) participants were required in each cohort (THA and TKA) to detect a minimal important difference of approximately three points in Oxford scores at six months with 80% power.

Statistical analysis

Statistical analysis was performed using Statistical Package for Social Sciences v. 17.0 (SPSS, USA). Independent-samples *t*-tests were used to compare parametric scalar variables (age, BMI, PROMs) between groups. Dichotomous variables (sex, comorbidities) were assessed using a chi-squared test. Multivariate linear regression was used to assess the independent association of opioid use and change in the OKS and EQ-5D following THA/TKA when adjusting for confounding variables (age, sex, comorbidity, Oxford score, EQ-5D, EQ-VAS, and pain-VAS). A p-value < 0.05 was defined as significant.

Results

Hips

Of the 729 patients undergoing THA, 95 (13.0%) self-reported taking opiates for more than one month prior to THA (Table I). Within this group, tramadol accounted for 46.3% of the opiate prescriptions (Table II). There were no differences in age (p = 0.214) or sex (p = 0.400) between the groups, but the opioid group had a higher BMI (p = 0.007) and were more likely to suffer associated comorbidities; myocardial infarction (p = 0.023), connective tissue disease (p = 0.014), kidney disease (p = 0.041), hemiplegia (stroke) (p = 0.009), back pain (p <0.001), and pain from other joints (p = 0.001) (Tables III and IV).

The opioid group had clinically and statistically significantly worse EQ-5D (p < 0.001), OHS (p < 0.001), pain-VAS (p < 0.001), and EQ-VAS (p 0.001) scores when compared with the opiate-naive group (Table V). Similarly, the opioid group had a clinically and statistically significantly worse absolute postoperative EQ-5D (p < 0.001), OHS (p < 0.001), pain-VAS (p < 0.001), EQ-VAS (p < 0.001), and FJS (p < 0.001) compared with the opiate-naive group (Table V). However, there was no significant difference in improvement of these PROMs between the two groups from baseline to six months following surgery (Table VI). When adjusting for confounding factors between the groups, the opioid group had a statistically worse OHS (p = 0.001), FJS (p = 0.001), EQ-5D (p < 0.001), and EQ-VAS (p = 0.001) compared with the opioid-naive group, but only EQ-5D was clinically significantly worse (Table VII). There was no difference (odds ratio (OR) 0.63, 95% CI 0.34 to 1.16; p = 0.133, chi-squared test) in the rate of satisfaction between the opioid (n = 80/95; 84.2%) compared with the opioid-naive (n = 567/634; 89.4%) group.

Knees

Of the 758 patients who underwent TKA, 95 (13%) self-reported more than one month of opiate use prior to their arthroplasty (Table I); 62.1% (n = 59) of these had tramadol prescriptions (Table II). Preoperative opiate users had a mean age of 66.11 years (SD 8.70), 63.16% (n = 60) were female, with a mean BMI of 31.85 kg/m^2 (SD 5.80) (Table III). Opiate users were significantly younger (p = < 0.001), had a higher BMI (p = 0.019), and were more likely to suffer associated comorbidities, cerebrovascular disease (p = 0.032), connective tissue disease (p = 0.044), malignant lymphoma (p = 0.005), AIDS (p = 0.015), back pain (p <0.001), and pain from other joints (p = 0.021) (Tables III and IV).

The opioid group had clinically and statistically significantly worse preoperative EQ-5D (p < 0.001), OKS (p < 0.001), and EQ-VAS (p = 0.001) scores when compared with the opiate-naive group (Table VIII). Similarly, the opioid group

Table III. Demographic analysis of total hip and knee arthroplasty cohorts comparing chronic preoperative opiate users to opiate-naive patients.

Variable	THA (n = 729), opioid > one month use				TKA (n = 758), opioid > one month use			
	Yes	No	p-value*	Mean difference (95% CI)	Yes	No	p-value*	Mean difference (95% CI)
Total, n	95	634			95	663		
Mean age, yrs (SD)	67.03 (12.02)	68.58 (11.42)	0.214	1.58 (-0.91 to 4.06)	66.11 (8.70)	70.40 (9.05)	< 0.001	4.29 (2.35 to 6.23)
Sex, n								
Male	32	244	0.400	N/A	35	302	0.110	N/A
Female	63	393		N/A	60	361		N/A
Mean BMI, kg/m²	29.41 (6.11)	27.88 (5.14)	0.007*	−1.56 (−2.70 to −0.42)	31.85 (5.80)	30.40 (5.59)	0.019	−1.45 (−2.66 to −0.24)

*Independent-samples *t*-test for parametric scalar variables (age, BMI) and chi-squared test for dichotomous variables (sex).
N/A, not available; THA, total hip arthroplasty; TKA, total knee arthroplasty.

Table IV. Analysis of comorbidities associated with preoperative chronic opiate use in total hip and knee arthroplasty cohorts.

Comorbidity	THA (n = 729), opioid > one month use					TKA (n = 758), opioid > one month use				
	Yes (n = 95)		No (n = 634)			Yes (n = 95)		No (n = 663)		
	No, I do not have that problem	Yes, I do have that problem	No, I do not have that problem	Yes, I do have that problem	p-value*	No, I do not have that problem	Yes, I do have that problem	No, I do not have that problem	Yes, I do have that problem	p-value*
Myocardial infarction	79	7	563	18	0.023	81	7	573	22	0.054
Congestive heart failure	84	1	567	6	0.918	83	1	580	7	0.998
Peripheral vascular disease	77	3	546	10	0.274	82	2	559	14	0.997
Cerebrovascular disease	81	0	557	7	0.305	81	3	569	5	0.032
Dementia	83	0	555	12	0.177	85	2	579	5	0.198
COPD	76	7	551	23	0.085	78	8	549	30	0.104
Connective tissue disease	63	16	491	56	0.014	65	21	464	94	0.044
Peptic ulcer	83	2	563	8	0.506	82	2	577	7	0.377
Diabetes	76	11	537	43	0.093	76	12	544	58	0.221
Kidney disease	79	5	566	12	0.041	84	3	572	18	0.806
Hemiplegia (stroke)	78	6	568	12	0.009	83	4	572	13	0.166
Leukaemia	84	0	571	5	0.386	86	1	588	1	0.109
Malignant lymphoma	84	1	570	3	0.473	83	2	591	1	0.005
Solid tumour	81	3	571	6	0.067	85	2	587	4	0.122
Liver disease	83	2	564	8	0.506	85	2	580	5	0.198
AIDS	83	0	552	8	0.272	82	3	570	4	0.015
Back pain	24	65	285	289	< 0.001	41	49	371	219	< 0.001
Pain from other joints	13	80	156	433	0.001	16	74	168	438	0.021
Hypertension	54	22	419	143	0.877	57	23	391	181	0.525

*Chi-squared test.
COPD, chronic obstructive pulmonary disease; THA, total hip arthroplasty; TKA, total knee arthroplasty.

had a statistically significantly worse absolute postoperative EQ-5D ($p < 0.001$), OKS ($p < 0.001$), pain-VAS ($p = 0.009$), EQ-VAS ($p = 0.001$), and FJS ($p = 0.005$) compared with the opiate-naive group (Table VIII), being clinically significant for the EQ-5D. However, the opioid group had a clinically and statistically significantly better EQ-5D score compared with the opiate-naive group but there was no significant difference in the OKS, EQ-VAS, or pain-VAS between the two groups from baseline to six months following surgery (Table VI). When adjusting for confounding factors between groups, there were

Table V. Comparison of pre- and postoperative patient-reported outcomes between chronic opiate users and opiate-naive total hip arthroplasty patients.

Outcome	Preoperative, mean (SD)				Postoperative (six months), mean (SD)			
	Opioid use > one month	No opioid use > one month	p-value*	Mean difference (95% CI)	Preoperative opioid use > one month	Preoperative no opioid use > one month	p-value*	Mean difference (95% CI)
EQ-5D	0.17 (0.29)	0.41 (0.31)	< 0.001	0.24 (0.17 to 0.31)	0.66 (0.32)	0.84 (0.21)	< 0.001	0.17 (0.13 to 0.22)
OHS	14.67 (7.28)	21.16 (8.35)	< 0.001	6.49 (4.70 to 8.28)	34.47 (11.96)	40.93 (8.18)	< 0.001	6.46 (4.56 to 8.35)
Pain-VAS	42.73 (22.80)	50.70 (21.96)	0.001	7.97 (3.15 to 12.79)	69.31 (28.06)	80.50 (25.45)	< 0.001	11.19 (5.48 to 16.90)
EQ-VAS	59.26 (21.77)	68.23 (20.16)	< 0.001	8.97 (4.54 to 13.40)	70.00 (24.53)	81.80 (17.12)	< 0.001	11.81 (7.80 to 15.82)
FJS	N/A	N/A	N/A	N/A	47.35 (32.50)	64.17 (29.47)	< 0.001	16.82 (10.21 to 23.43)

*Multivariate linear regression.
EQ-5D, EuroQol five-dimension questionnaire; EQ-VAS, EuroQol-visual analogue scale; FJS, Forgotten Joint Score; N/A, not available; OHS, Oxford Hip Score; VAS, visual analogue scale.

Table VI. Change in patient-reported outcomes between groups for total hip and knee arthroplasty cohorts.

	THA, mean SD				TKA, mean (SD)			
Outcome	Opioid	No opioid	p-value*	Mean difference (95% CI)	Opioid	No opioid	p-value*	Mean difference (95% CI)
EQ-5D	0.494 (0.357)	0.432 (0.311)	0.076	0.062 (-0.007 to 0.131)	0.410 (0.347)	0.326 (0.317)	0.017	0.084 (0.015 to 0.154)
Oxford Score	19.7 (12.5)	19.9 (9.7)	0.888	-0.2 (-2.4 to 2.0)	15.8 (9.8)	14.7 (9.3)	0.298	1.1 (-0.9 to 3.1)
EQ-VAS	10.9 (29.4)	13.5 (21.9)	0.320	-2.6 (-7.6 to 2.5)	7.4 (27.0)	6.7 (20.0)	0.772	0.7 (-4.0 to 5.4)
Pain-VAS	27.2 (38.0)	29.9 (32.7)	0.482	-2.7 (-10.2 to 4.8)	15.8 (37.4)	21.0 (33.2)	0.174	-5.2 (-12.6 to 2.3)

*Independent-samples *t*-test.
EQ-5D, EuroQol five-dimension questionnaire; EQ-VAS, EuroQol-visual analogue scale; THA, total hip arthroplasty; TKA, total knee arthroplasty; VAS, visual analogue scale.

no significant differences in the improvement in the PROMs between the groups (Table VII). There was no difference (OR 1.08, 95% CI 0.60 to 1.95; p = 0.797, chi-squared test) in the rate of satisfaction between the opioid (n = 80/95; 84.2%) group compared with the opioid-naive group (n = 543/653; 83.2%).

Discussion

This study has shown that strong opioid use for one month or more preoperatively was associated with clinically significantly worse joint-specific function and QoL both preoperatively and at six months following THA and TKA. There were demographic differences between groups, with the opioid group having higher BMIs and more comorbidities. When adjusting for these factors, opioid use was independently associated with a clinically significant worse improvement in joint-specific function (OHS) and QoL (EQ-5D) in patients undergoing THA, but this was not observed in those undergoing TKA. Despite these differences, there was no difference in the rate of satisfaction with THA or TKA according to opioid use.

This study has identified that prior to the COVID-19 pandemic, 13.0% and 12.5% of individuals awaiting THA and TKA, respectively, reported use of strong opiates for greater than one month prior to surgery. The significance of this four-week timeframe is evaluated within a Cochrane review detailing that following more than one month of opiate use there are increasing reductions in osteoarthritic pain relief.[2] Review of specific prescriptions via the electronic patient records showed tramadol was the most prescribed opiate in the opiate user cohort, seen in 46.3% of THA patients and 62.1% of TKA patients. A 2019 study assessing effects of tramadol following TKA identified preoperative tramadol use was associated with significantly lower improvement in PROMs within the short-term postoperative period.[9]

Preoperative opioid use was associated with significantly worse preoperative EQ-5D scores for both THA and TKA individuals, aligning with evidence that 35% and 22.3% of patients awaiting hip and knee arthroplasty, respectively, are in a state WTD.[5] These significantly lower EQ-5D scores support literature stating that preoperative opiate use is associated with poor preoperative pain relief.[2] Preoperative opiate use has additionally been associated with worse postoperative outcomes and increased risk of complications both in the short postoperative window and the longer term.[2,25] The current study demonstrated that individuals reporting opiate use prior to their total joint replacement had statistically worse joint-specific scores (OHS and OKS) compared with opiate-naive patients. As well as statistical significance, these scores are clinically significant, as defined by Murray et al[15] detailing that a difference of approximately

Table VII. Multivariable linear regression analysis was used to identify preoperative independent predictors associated with postoperative OHS, FJS, and EQ-5D following total hip arthroplasty.

Joint and PROM	R^2	Group	Mean difference	95% CI	p-value*
THA					
		Control	Reference		
OHS	0.296	Opioid	−3.0	−4.8 to −1.2	0.001
		Control	Reference		
FJS	0.141	Opioid	−7.6	−4.3 to −0.8	0.001
		Control	Reference		
EQ-5D	0.267	Opioid	−0.089	−0.132 to −0.041	< 0.001
EQ-VAS	0.223	Control	Reference		
		Opioid	−6.6	−10.6 to −2.6	0.001
Pain-VAS	0.131	Control	Reference		
		Opioid	−5.5	−11.5 to 0.5	0.074
TKA					
OKS	0.269	Control	Reference		
		Opioid	−0.4	−2.4 to 1.4	0.650
FJS	0.182	Control	Reference		
		Opioid	−1.7	−8.0 to 4.7	0.613
EQ-5D	0.215	Control	Reference		
		Opioid	−0.017	−0.067 to 0.032	0.485
EQ-VAS	0.409	Control	Reference		
		Opioid	−1.9	−5.8 to 2.0	0.338
Pain-VAS	0.402	Control	Reference		
		Opioid	−3.5	−9.8 to 2.7	0.265

Variables included in the models were sex, age, BMI, all comorbidities, and preoperative OHS, EQ-5D, EQ-VAS, and pain-VAS, in addition to the study group.
*Multivariable linear regression analysis.
EQ-5D, EuroQol five-dimension questionnaire; EQ-VAS, EuroQol-visual analogue scale; FJS, Forgotten Joint Score; OHS, Oxford Hip Score; OKS, Oxford Knee Score; PROM, patient-reported outcome measure; THA, total hip arthroplasty; TKA, total knee arthroplasty; VAS, visual analogue scale.

Table VIII. Comparison of pre- and postoperative patient-reported outcomes between preoperative chronic opiate users and opiate-naive total knee arthroplasty patients.

Outcome	Preoperative, mean (SD)				Postoperative (six months), mean (SD)			
	Opioid use > one month	No opioid use > one month	p-value*	Mean difference (95% CI)	Preoperative opioid use > one month	Preoperative no opioid use > one month	p-value*	Mean difference (95% CI)
EQ-5D	0.27 (0.31)	0.44 (0.30)	< 0.001	0.17 (0.11 to 0.24)	0.68 (0.25)	0.77 (0.23)	< 0.001	0.089 (0.04 to 0.14)
Oxford Knee Score	16.37 (6.72)	21.35 (7.30)	< 0.001	4.99 (3.43 to 6.55)	32.13 (10.37)	36.01 (9.22)	< 0.001	3.89 (1.87 to 5.91)
Pain-VAS	50.93 (23.16)	53.36 (21.00)	0.303	2.43 (−2.20 to 7.07)	66.30 (28.92)	74.22 (26.98)	0.009	7.91 (1.97 to 13.85)
EQ-VAS	64.71 (19.71)	71.49 (18.31)	0.001	6.78 (2.77 to 10.79)	71.94 (22.71)	78.23 (16.93)	0.001	6.37 (2.48 to 10.26)
Forgotten Joint Score	N/A	N/A	N/A	N/A	38.68 (31.75)	47.93 (29.44)	0.005	9.29 (2.88 to 15.70)

*Independent-samples *t*-test.
EQ-5D, EuroQol five-dimension questionnaire; N/A, not available; VAS, visual analogue scale.

three points indicates clinical relevance between Oxford joint scores.

In addition to EQ-5D scoring, pain experience is quantified through pain-VAS. Preoperatively, THA patients

reported significantly worse pain-VAS, and TKA patients reported a pain-VAS score that, while not statistically significant, is still worse than opiate-naive patients. In both, opioid users did not report any better or improved pain PROMs compared with opiate-naive patients. Despite opiates not being recommended in NICE guidance for the management of osteoarthritic pain in the UK,[6] individuals with chronic osteoarthritic pain are sometimes prescribed them. This study supports evidence that demonstrate that opiates do not have significant long-term efficacy for osteoarthritic pain.[8,26] The current study suggests that the preoperative pain burden remains high despite strong opiates; however, opiates appear not to be improving pain when used beyond one month. While it is advised to avoid opiates in the osteoarthritic community, the British Orthopaedic Association has identified that severe end-stage OA patients often are suffering significant pain and analgesia is realistically an aspect of their prearthroplasty treatment.[27]

Following total joint replacement, both cohorts (opioid users and opioid-naive patients) reported significant improvements in EQ-5D and joint-specific scores (OHS/OKS). Despite these improvements, preoperative opioid users achieved significantly lower postoperative PROMs than the opioid-naive patients. This discrepancy is a continuation of the trend seen preoperatively between the cohorts. Whether opiate prescription simply reflects worse symptom burden or whether stopping opiates prior to surgery reverses this effect remains to be seen. THA preoperative opioid use was independently associated with significantly worse improvement in both OHS and EQ-5D. In THA patients especially, preoperative opioid analgesics should be avoided to try and optimize the clinical benefit.

Postoperative satisfaction scores did not differ between opiate users and opiate-naive patients for either THA or TKA. Despite chronic opiate users having both worse preoperative and postoperative PROMs, they were nonetheless equally satisfied with their total joint replacement.

This study has limitations. First, data collection and analysis were performed prior to the COVID-19 pandemic; in the context of increasing waitlists for total joint replacement, opiate-prescribing practices may have changed. Second, radiological assessment of arthritis severity was not undertaken. This may have allowed assessment of disease severity with opioid use; however, there is evidence that symptom burden and PROMs are not correlated with radiological severity of OA.[28–30] Assessment of other comorbidities was simply recorded as a 'yes' and 'no', but grading of the severity may have demonstrated those with opioid use having higher disability due to their comorbidity, which may explain their worse PROMs pre- and postoperatively.[31] While the study identifies the association between long-term joint function, the retrospective nature of the review means that further assessment of this mechanism is not within the scope of this study. Due to the nature of this study, we did not collect data on patients' postoperative analgesic and opioid use; this could have allowed for correlation of PROMs and satisfaction with ongoing opiate use.

In conclusion, preoperative opiate use for analgesia purposes in patients with OA was found to be associated with worse joint-specific scores and QoL preoperatively, and would therefore seem not to be of benefit. It would also seem that opioid use negatively influences the clinical benefit of THA and should, therefore, be avoided. The reasons why this independent effect was not observed in those undergoing TKA are not clear. Further work is required to assess alternative means of pain relief, such as the ESCAPE pain programme,[32] for the increasing number of patients awaiting THA or TKA.

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Data sharing

The data that support the findings for this study are available to other researchers from the corresponding author upon reasonable request.

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