

# Invasive Dental Procedures in Existing Total Knee Arthroplasty Implants: Is Antibiotic Prophylaxis Necessary?

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## INTRODUCTION:

Approximately 40% of all revision total knee arthroplasties (TKA) are performed for prosthetic joint infection (PJI). History of PJI is associated with a multitude of other complications such as re-operation, infection recurrence, and extended hospital stays, all with financial implications. In fact, estimates of annual costs for PJI in TKA are projected to reach over one billion dollars by 2030. Early-onset PJI occurs within three months and is suggestive of intra-operative contamination of virulent microorganisms. Delayed or late-onset PJI occurs after three months, often implicated by hematogenous spread from another joint. Common procedures like invasive dental procedures (IDP) may predispose patients to PJI; however, antibiotic prophylaxis in patients with existing knee implants has yet to reach consensus. We sought to examine antibiotic prophylaxis prior to invasive dental procedures in patients who had undergone a total knee arthroplasty (TKA) prior. We specifically assessed: 90-day to 1-year (1) periprosthetic joint infection (PJIs) and (2) revisions.

## METHODS:

We queried a national, all-payer database for patients undergoing primary TKA between 2010 and 2020 (n=1,952,917). We identified IDP, as defined by any procedure that involves gingival manipulation, and stratified according to antibiotic prophylaxis prior. A control cohort of TKA recipients without subsequent IDP was then established. All three cohorts were matched according to demographic and health-metrics (n=496). *Chi-square* testing generated odds ratios (OR) with 95% confidence intervals (CI) for post-operative PJIs and revisions.

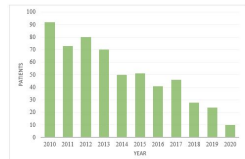
## RESULTS:

PJI and revision odds at all time points were statistically similar between antibiotic prophylaxis and no antibiotic prophylaxis (PJI: all ORs 0.62, 95% CI ranges 0.11 to 4.00,  $p \geq 0.479$ ; revisions: ORs  $\geq 0.33$ , 95% CI range 0.03 to 4.00,  $p \geq 0.248$ ). Additionally, both IDP cohorts and the control cohort had similar rates of post-operative PJIs ( $\geq 0.367$ ) and revisions ( $\geq 0.173$ ) at all time-points.

## DISCUSSION AND CONCLUSION:

Antibiotic prophylaxis prior to invasive dental procedures in TKA recipients did not decrease risk of PJI or revision up to 1-year following index procedure. These results support the trend by dentists and orthopaedic surgeons to refrain from antibiotic prophylaxis. However, they likely have utility in patients at high-risk, as suggested by current guidelines.

Figure 1. Antibiotic Prophylaxis Prior to Invasive Dental Procedures in Patients with Existing TKA Implants



\*2020 data listed as "10" though exact value is hidden due to database user agreement patient confidentiality

	Antibiotics before IDP n=496 (%)	No Antibiotics before IDP n=496 (%)	TKA without IDP n=496 (%)	p value
Age (SD)	63 (7.9)	63 (7.9)	63 (8.0)	0.999
Sex				0.999
Female	311 (62.7)	311 (62.7)	311 (62.7)	
Male	185 (37.3)	185 (37.3)	185 (37.3)	
CCI <sup>a</sup> $\geq 3$	24 (4.84)	24 (4.84)	24 (4.84)	0.999
Alcohol Abuse	*	*	*	0.999
DM <sup>b</sup>	235 (47.38)	235 (47.38)	235 (47.38)	0.999
Tobacco Use	175 (35.28)	175 (35.28)	175 (35.28)	0.999
Obesity <sup>c</sup>	283 (57.06)	283 (57.06)	283 (57.06)	0.999

SD: standard deviation, CCI: Charlson comorbidity index, DM: diabetes mellitus, IDP: invasive dental procedures

	Antibiotics before IDP	No Antibiotics before IDP	p value
90 Day Complications	OR <sup>a</sup>	95% CI	
	Prosthetic Joint Infections	*	0.479
Revisions	*	0.248	
6 Month Complications	OR <sup>a</sup>	95% CI	
	Prosthetic Joint Infections	0.67	0.11-3.99
Revisions	0.33	0.03-3.20	
9 Month Complications	OR <sup>a</sup>	95% CI	
	Prosthetic Joint Infections	0.67	0.11-4.00
Revisions	0.50	0.09-2.73	
1 Year Complications	OR <sup>a</sup>	95% CI	
	Prosthetic Joint Infections	0.67	0.11-4.00
Revisions	0.43	0.11-1.65	

\* Referent cohort: non-antibiotic prior to colonoscopy following TKA. OR: odds ratio, CI: confidence intervals, IDP: invasive dental procedures CCI: Charlson comorbidity index.

	Antibiotics before IDP	No Antibiotics before IDP	p value
90 Day Complications	OR <sup>a</sup>	95% CI	
	Prosthetic Joint Infections	*	0.99
Revisions	*	3.01	
6 Month Complications	OR <sup>a</sup>	95% CI	
	Prosthetic Joint Infections	0.67	0.11-4.00
Revisions	0.50	0.05-5.52	
9 Month Complications	OR <sup>a</sup>	95% CI	
	Prosthetic Joint Infections	0.67	0.11-3.99
Revisions	0.99	0.04-13.3	
1 Year Complications	OR <sup>a</sup>	95% CI	
	Prosthetic Joint Infections	0.67	0.11-4.00
Revisions	0.75	0.17-3.36	

\* Referent cohort: total knee arthroplasty recipients without IDP IDP: invasive dental procedure, OR: odds ratio, CI: confidence interval