

Should smoking cessation be implemented for patients undergoing elective knee or hip arthroplasty?

Atthakorn Jarusriwanna, Plamen Kinov, Simon Kovac, Satish Kutty, Richard Kyte, Arjun Lamichhane, Minjae Lee

Response/Recommendation: The literature reveals that active smokers are at an increased risk of both medical and surgical complications. Smoking cessation, especially for heavy smokers, should be implemented prior to elective knee or hip arthroplasty.

Level of evidence: Strong

Rationale: The World Health Organization (WHO) considers smoking, including cigarettes and other forms of tobacco, as one of the significant risk factors that can adversely affect surgical outcomes [1]. Several articles have published findings on the correlation and effects of smoking on postoperative outcomes in patients undergoing elective knee and hip arthroplasty.

A comprehensive search was conducted on PubMed, Scopus, and the CINAHL database, resulting in 1,093 abstracts. After screening, forty manuscripts were included in the final review, with the two largest studies involving 317,230 and 272,640 patients [2, 3]. Current smokers increased the odds of overall mortality compared to patients who were former smokers and quit smoking before surgery (OR 2.34; 95%CI 1.98-2.77), and increased the odds of readmission compared to patients who never smoked (OR 1.46; 95%CI 1.34-1.59). For medical complications, current smokers increased the odds of respiratory adverse events, including respiratory insufficiency and pneumonia when compared to nonsmokers and former smokers (OR 2.27; 95%CI 2.09-2.47 for nonsmokers and OR 1.47; 95%CI 1.23-1.77 for former smokers). Similarly, smoking patients had an increased odds of cardiovascular events, including myocardial infarction (OR 2.85; 95%CI 2.49-3.26) and venous thromboembolism (VTE) (OR 2.82; 95%CI 2.45-3.23). For surgical complications, the odds of overall surgical failure and needed revision surgery was 1.31 (95%CI 1.23-1.40) in current smokers. Smoking patients were associated with an increased odds of 1.65 (95%CI 1.55-1.76) in surgical site infections, including deep wound infections and periprosthetic joint infections (PJIs). These patients also increased the risks of aseptic loosening (OR 1.20; 95%CI 1.03-1.40) and periprosthetic fracture (OR 3.20; 95%CI 2.56-4.00). Additionally, functional outcomes were found to be poorer in current smoking patients. Halawi et al. [4] demonstrated that smokers achieved significantly lower improvements in the Western Ontario and McMaster

Universities Osteoarthritis Index (WOMAC) and the Short Form-12 Physical Composite Summary (SF-12 PCS) compared to nonsmokers at 6 and 12 months postoperatively. For each unit increase in packs per day smoked, WOMAC scores increased (clinical worsened) by 7.7 points and SF-12 PCS decreased by 4.8 points. Patients who received a smoking cessation program with counseling and nicotine replacement therapy for 6-8 weeks before surgery significantly reduced wound-related complications, cardiovascular complications, and the need for revision surgery [5]. Not only did smoking negatively affect outcomes after total knee and hip arthroplasty, but patients who didn't smoke but were exposed to smoking in the family or workplace were also impacted. These passive smokers experienced more postoperative pain, lower functional outcomes, aggravated depression and anxiety, and a deteriorated quality of life [6].

References

1. Yoong SL, Tursan d'Espaignet E, Wiggers J, St Claire S, Mellin-Olsen J, Grady A, et al. Tobacco and postsurgical outcomes: WHO tobacco knowledge summaries. Geneva: World Health Organization; 2020.
2. Debbi EM, Rajae SS, Spitzer AI, Paiement GD. Smoking and Total Hip Arthroplasty: Increased Inpatient Complications, Costs, and Length of Stay. *J Arthroplasty*. 2019;34(8):1736-9.
3. Bongers J, Belt M, Spekenbrink-Spooren A, Smulders K, Schreurs BW, Koeter S. Smoking is associated with higher short-term risk of revision and mortality following primary hip or knee arthroplasty: a cohort study of 272,640 patients from the Dutch Arthroplasty Registry. *Acta Orthop*. 2024;95:114-20.
4. Halawi MJ, Gronbeck C, Metersky ML, Wang Y, Eckenrode S, Mathew J, et al. Time Trends in Patient Characteristics and In-Hospital Adverse Events for Primary Total Knee Arthroplasty in the United States: 2010-2017. *Arthroplast Today*. 2021;11:157-62.
5. Møller AM, Villebro N, Pedersen T, Tønnesen H. Effect of preoperative smoking intervention on postoperative complications: a randomised clinical trial. *Lancet*. 2002;359(9301):114-7.
6. An X, Wang J, Shi W, Ma R, Li Z, Lei M, et al. The Effect of Passive Smoking on Early Clinical Outcomes After Total Knee Arthroplasty Among Female Patients. *Risk Manag Healthc Policy*. 2021;14:2407-19.