

# Common blood pressure medications linked to lower risk of total knee replacement

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Among patients with knee pain, those who take a widely used class of blood pressure-lowering medications called beta-blockers appear to have a lower risk of total knee arthroplasty (TKA) for the treatment of

advanced osteoarthritis (OA), suggests a study in [\*The Journal of Bone & Joint Surgery\*](#).

"Our results indicate that the use of  $\beta$ -blockers, especially nonselective blockers, was associated with a lower likelihood of TKA," according to the case-control study by Iskandar Tamimi, MD, Ph.D., of Universitario de Malaga, Spain, and colleagues. Beta-blockers may slow the progression of OA by reducing [inflammatory mediators](#) involved in cartilage degeneration—which may provide clues to the development of new treatment approaches for OA.

## **Non-selective beta-blockers linked to 54% reduction in TKA risk**

Using a Spanish hospital database, the researchers identified 300 patients who were evaluated for knee pain between 2010 and 2019 and who underwent TKA between 2018 and 2019. These case patients were matched for age, sex, calendar year, and grade of arthritis to 300 controls who were evaluated for knee pain but did not undergo TKA.

Beta-blocker treatment was evaluated for possible effects on the risk of undergoing TKA. The analysis included the duration of [beta-blocker](#) treatment, and as a measure of treatment adherence, the percentage of days with a filled prescription. A validated artificial intelligence tool was used to minimize bias in adjusting for other factors potentially related to TKA risk.

In the adjusted analysis, patients with any use of beta-blockers were about half as likely to undergo TKA. The association was specific to non-selective beta-blockers, which target both beta-1 and beta-2 adrenergic receptors. For patients with knee pain taking these medications, the risk of undergoing TKA was reduced by 54%. In contrast, patients taking

selective beta-blockers—which target beta-1 receptors located mainly in the heart—had no significant reduction in TKA risk.

## **Findings may point to new treatments to 'delay the progression of OA'**

The protective effect was even stronger with prolonged use of beta-blockers: Patients taking beta-blockers for five years or longer had a 64% reduction in TKA risk. The association was also stronger for patients with greater adherence, with a filled prescription on at least 75% of days.

Previous studies have suggested that beta-blockers downregulate various inflammatory mediators involved in OA. Several of these mediators are regulated by the adrenergic pathways responsible for the blood pressure-lowering effects of beta-blockers.

"Thus, downregulation of the adrenergic signal could potentially decrease cartilage degradation and delay the progression of OA," the researchers write. They note that their study cannot draw any conclusions regarding the "true causal link" between beta-blocker treatment and the risk of undergoing TKA.

"[W]e believe that the role of  $\beta$ -blockers in the management of OA could go beyond an analgesic treatment and that these drugs potentially could interfere with the degenerative processes in the cartilage," Dr. Tamimi and co-authors conclude. While further research is needed, the study "provides a hypothesis for the development of future therapeutic lines targeting the adrenergic system in the treatment of OA."

**More information:** Iskandar Tamimi et al, The Use of  $\beta$ -Blockers and the Risk of Undergoing a Knee Arthroplasty, *Journal of Bone and Joint*

*Surgery* (2023). [DOI: 10.2106/JBJS.22.01189](https://doi.org/10.2106/JBJS.22.01189)

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