

# Image-Guided Hyaluronic Acid Injection and Knee Bracing Significantly Improve Clinical Outcomes for High-Grade Osteoarthritis

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Sports Med Open. 2015 Dec; 1: 31.

Published online 2015 Sep 15. doi: 10.1186/s40798-015-0029-5

## Abstract

**Background:** Intra-articular hyaluronic acid (HA) injection is an intermediate option between analgesics and knee joint replacement in patients with osteoarthritis (OA). Our objective was to test whether image-guided HA injections may improve knee OA outcomes after 6 months of treatment independent of potential covariates.

**Methods:** This is a retrospective case series with multivariate outcome-based analysis of 207 consecutive adult patients with mild to severe knee OA treated at a single out-patient clinic employing fluoroscopy-guided HA injections. We employed a customized pain (scored 0–10) and function (scored 0–120) questionnaire based on the Likert scale to compare baseline scores with 6-month outcomes. Linear and logistic (based on >9-point score improvement) regression analysis was used to adjust for potential covariates, including grade of disease, patient age, gender, body mass index, smoking history, medical history (e.g., diabetes or heart disease), use of daily pain medications, fish oil supplementation, knee bracing, and physical therapy.

**Results:** Significant covariates included OA grade, knee bracing, and analgesic use. Most of the study subjects were women (124/207, 60 %) and obese (113/207, 55 %). Clinically significant improvements in index scores (>9 points) at 6 months were observed in more than 50 % of cases post-image-guided HA injection. Regression analysis revealed a complimentary affect with knee bracing, especially in severe grade 4 disease (odds ratio 5.5 [1.14–27.0],  $P < 0.05$ ). Daily analgesic use reflected a poor clinical response to treatment.

**Conclusions:** Our data suggest image-guided HA injections coupled with knee bracing may benefit patients with moderate to severe knee osteoarthritis.

## Key Quotes

“Knee bracing is a significant covariate for clinical improvement in severe grade 4 disease.”

“Regression analysis revealed that knee bracing provided a positive complimentary effect to HA injection in severe OA cases to improve outcomes....”