**Low Dose Radiotherapy for Osteoarthritis: Analysis of Preliminary Outcomes at Scripps Clinic.**

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**Background:**
Osteoarthritis (OA) is a chronic, degenerative joint disease affecting ~15% of Americans. It causes pain, functional impairment, and reduced quality of life. Many patients find conservative treatments such as NSAIDs, physical therapy, and intra-articular therapy insufficient. Low-dose radiotherapy (LDRT) has been used for decades in Europe to manage OA symptoms but remains underutilized in the United States. Since June 2024, LDRT has been routinely used at the Scripps Clinic Division of Radiation Oncology. To date, only one American study has been published on LDRT for OA. This study represents the largest American clinical series evaluating its safety and effectiveness.

**Objective:**
To assess the effectiveness and safety of LDRT in reducing pain, decreasing analgesic use, and improving quality of life in patients with OA.

**Methods:**
This study was approved by the Scripps Health Institutional Review Board (IRB Protocol No: IRB-25-8578). It involved retrospective collection of de-identified clinical data from patients aged 40–100 treated with LDRT for OA between June 1, 2024, and May 31, 2025, at Scripps Cancer Center and Scripps Clinic Radiation Therapy.

We reviewed 184 joints treated with LDRT. Exclusion criteria included age <40, pregnancy, rheumatoid or autoimmune joint diseases, spinal OA, and incomplete follow-up. Data collected from electronic medical records included demographics, joint location, imaging, prior therapies, radiation dose, and treatment dates. Patients received a total dose of 3 Gy, delivered in 0.5 Gy fractions over approximately 10 days. Standardized OA scoring forms were completed before treatment and at 2-, 6-, and 12-month follow-ups, assessing pain severity (Visual Analog Scale), analgesic use (days/week), and quality of life (1–10 scale). Secondary outcomes included changes in range of motion and side effects such as fatigue or skin reactions.

**Results:**
Preliminary analysis shows significant improvement in pain scores, analgesic use, and quality of life. Among 184 joints, mean scores decreased from $6.31 \pm 2.07$ pre-treatment to $3.38 \pm 2.51$ at end of therapy ($\Delta = -2.93 \pm 2.56$; paired t-test p = 5.70E35, Wilcoxon p = 1.45E24), and to $2.51 \pm 2.80$ at follow-up ($\Delta = -0.88 \pm 2.96$; p = 9.38E5; Wilcoxon p = 5.04E5). Analgesic use ($-0.92 \pm 2.00$; p = 1.20E4), quality of life ($-2.13 \pm 2.20$; p = 7.07E13), and activities of daily living ($-2.05 \pm 2.30$; p = 4.21E11) all improved significantly. At end of treatment, 80.5% of joints showed pain reduction, 9.4% worsened, and 10.2% showed no change. At follow-up, 88% showed sustained pain reduction, 4.9% worsened, and 7.1% remained unchanged.

**Conclusion:**
LDRT significantly reduced joint pain, improved quality of life, and decreased analgesic use. A few patients reported only mild fatigue. Some experienced pain at new sites, potentially inflating follow-up pain scores. This can Missing follow-up data introduces possible selection bias. Prospective studies are needed to confirm long-term benefits. While LDRT can delay the need for surgery and improve symptoms, it is not a substitute for surgical intervention when indicated.

References

Koneru, B. N., Sick, J., Shaikh, H. A., Spengler, H., Small, W., & Shaffer, R. (2025). *Low-dose radiotherapy for osteoarthritis: A retrospective single-institution analysis of 69 patients and 168 joints*. *International Journal of Radiation Oncology, Biology, Physics*. Advance online publication. https://doi.org/10.1016/j.ijrobp.2025.04.040