

Extracorporeal Shockwave Therapy (ESWT) in the Treatment of Mild-Moderate Knee Osteoarthritis—A Hypothetical Case Study



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Knee Osteoarthritis

- Prevalent degenerative disease that generates pain and decreases function
- Less-invasive treatments include physical therapy, weight-loss, and oral NSAIDs
- Moderate-invasive treatment includes corticosteroid injection and Hyaluronic Acid injection
- Highly-invasive treatment involves performing partial or total knee arthroplasty
- Each intervention contains inherent risks and benefits that must be considered in performing a patient-centered approach



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Case Report

A 77 year old male with a past medical history significant for CAD s/p CABG and EF of approximately 35%, Diabetes Mellitus Type-2 insulin-dependent, returns to clinic 6 weeks following corticosteroid injection (CSI) of the left knee due to longstanding osteoarthritis (OA). Previously, he has been able to obtain at least 3 months of relief following CSI. He has completed a series of hyaluronic acid injections without relief and has completed an 8-week course of physical therapy with only minor improvement. Recent left knee X-rays confirm tricompartmental OA of mild-moderate degree.

Physical examination of the left knee is repeated and demonstrates the following:

- *Tenderness to palpation along the medial joint-line; crepitus elicited with passive knee flexion and extension; positive patellar grind test. Lachman's and Posterior Drawer testing are both negative.*

The patient underwent CABG 15 years prior and has since remained active. Hemoglobin A1c is controlled at 7.2. Previously, patient was walking approximately 2-3 miles per day; however, over the past 6 months, pain has prevented this as well as other activities he previously enjoyed. He does not have access to a pool. You are hesitant to refer for surgical evaluation given his cardiac history, current EF, and advanced age.

Based on the protocol performed Kim *et al.*, the patient is scheduled to return to clinic for administration of extracorporeal shockwave therapy (ESWT). The patient is placed in supine with the knee flexed to 90° and a total of 1000 shockwaves with an energy flux density of 0.093 mJ/mm² were administered to the medial joint space. The patient undergoes a total of 3 treatment sessions.

He then returns to clinic one and three months following ESWT, each time confirming pain relief along with improvement of activities of daily living.

Discussion

The objective of this hypothetical case is to highlight the potential use and application of ESWT for knee osteoarthritis. Currently, there are multiple interventions available; however, each presents inherent benefits and risks along with different utility based on the degree of arthritis and its associated pain and functional impact. Once many of these interventions fail, the remaining option typically involves surgical referral for possible total or partial joint replacement. There are many patients who fall within this category but may be deemed poor surgical candidates due to advanced age or associated comorbidities. Meta-analysis studies utilizing moderate-high energy ESWT demonstrate both pain relief and increased function at 3, 6, and 12 month follow-up (Ying-Chun *et al.* 2020). The exact mechanism is not fully understood, but studies have demonstrated chondroprotective effects (Wang *et al.* 2012) as well as increased cytokine and growth factors which are beneficial to joint health (Waugh *et al.* 2015). Based on these findings, this emerging technology warrants further consideration and utilization for patients with knee OA who are deemed poor surgical candidates.

Conclusions

In the treatment of knee osteoarthritis, ESWT demonstrated both short and long-term pain relief as well as increased function (Ying-Chun *et al.* 2020). Pain, stiffness, and decreased function are the most common symptoms attributed with knee OA (Woolf *et Pflieger* 2003). OA manifestation at the knee is particularly disabling given the joint's weight-bearing activities and contribution to general mobility, thus proper management is fundamental for mitigating symptoms and maintaining quality of life. It is a frequent condition encountered in the outpatient PM&R practice, and ESWT offers an additional solution for patients in modulating pain and restoring function.

References

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