

Conservative Management of the Patient with Osteoarthritis (OA)

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$CP = \frac{CF}{CA}$ Interventions should be targeted to mitigate contact pressure (CP). Smaller contact force (CF) and larger contact area (CA) will reduce CP.

Normalize the condition to reduce fear avoidance behaviors.

To Decrease CF → Decrease Body Mass; Decrease Velocity of Movement; Increase Shock Absorption

Lose weight;^{4,5} decrease running velocity, avoid running downhill; consider activity on softer surface, shoes with more cushion, stronger muscles, AD use, stretch tight soft tissues

To Increase CA → Correct Malalignments

Consider foot orthoses, wedges, shoe wear,¹⁻³ use of assistive device (AD)

Decrease Abrasive (Shear) Wear

Educate regarding post-traumatic OA if ligamentous injury,⁶ activity modification, and potentially bracing can help protect the joint⁷

Strength is the Goal

2-6 repetitions for 4-6 sets or 8-12 repetitions for 3-5 sets,⁸ fewer repetitions → INCREASE amount of resistance (i.e., load), perform a minimum of 4x/week^{9,10}

Exercises that target fluid film lubrication can decrease abrasive wear and contact pressures. Utilize open-kinetic chain exercises (i.e., non-weight bearing), or exercises where the distal segment is free to move in space.

Spine OA Evidence

4x/week or greater for exercise,¹⁴ pre-surgical rehabilitation,^{15,16} avoid high-impact activities

Hip and Knee OA Evidence

Quadriceps and proximal hip girdle strengthening,^{11,13} aerobic exercise,^{12,13} balance/motor control activities,^{12,13} cognitive behavioral therapy/mindfulness training^{5,13}

References

1. Arazpour M, Bani MA, Maleki M, Ghomshe FT, Kashani RV, Hutchins SW. Comparison of the efficacy of laterally wedged insoles and bespoke unloader knee orthoses in treating medial compartment knee osteoarthritis. *Prosthet. Orthot. Int.* 2013;37(1):50-57. doi:10.1177/0309364612447094.
2. Kerrigan DC, Johansson JL, Bryant MG, Boxer JA, Della Croce U, Riley PO. Moderate-heeled shoes and knee joint torques relevant to the development and progression of knee osteoarthritis. *Arch. Phys. Med. Rehabil.* 2005;86(5):871-875. doi:10.1016/j.apmr.2004.09.018.
3. Shakoor N, Sengupta M, Foucher KC, Wimmer MA, Fogg LF, Block JA. Effects of common footwear on joint loading in osteoarthritis of the knee. *Arthritis Care Res. (Hoboken)* 2010;62(7):917-923. doi:10.1002/acr.20165.
4. Messier SP, Mihalko SL, Legault C, et al. Effects of intensive diet and exercise on knee joint loads, inflammation, and clinical outcomes among overweight and obese adults with knee osteoarthritis: the IDEA randomized clinical trial. *JAMA* 2013;310(12):1263-1273. doi:10.1001/jama.2013.277669.
5. Allen K, Choong P, Davis A, et al. Osteoarthritis: Models for appropriate care across the disease continuum. *Best Pract Res Clin Rheumatol* 2016;(30):503-535.
6. MacFarlane LA, Yang H, Collins JE, et al. Association of Changes in Effusion-Synovitis With Progression of Cartilage Damage Over Eighteen Months in Patients With Osteoarthritis and Meniscal Tear. *Arthritis Rheumatol.* 2019;71(1):73-81. doi:10.1002/art.40660.
7. American Academy of Orthopaedic Surgeons. TREATMENT OF OSTEOARTHRITIS OF THE KNEE: EVIDENCE-BASED GUIDELINE, 2ND EDITION. 2013.
8. Sands W, Wurth J, Hewit J. BASICS OF STRENGTH AND CONDITIONING MANUAL. NSCA 2012.
9. Fransen M, McConnell S, Harmer AR, Van der Esch M, Simic M, Bennell KL. Exercise for osteoarthritis of the knee: a Cochrane systematic review. *Br. J. Sports Med.* 2015;49(24):1554-1557. doi:10.1136/bjsports-2015-095424.
10. Skelly AC, Chou R, Dettori JR, et al. *Noninvasive Nonpharmacological Treatment for Chronic Pain: A Systematic Review*. Rockville (MD): Agency for Healthcare Research and Quality (US); 2018. doi:10.23970/AHRQEPCCER209.
11. Fernandes L, Hagen KB, Bijlsma JWJ, et al. EULAR recommendations for the non-pharmacological core management of hip and knee osteoarthritis. *Ann. Rheum. Dis.* 2013;72(7):1125-1135. doi:10.1136/annrheumdis-2012-202745.
12. American Academy of Orthopaedic Surgeons. MANAGEMENT OF OSTEOARTHRITIS OF THE HIP EVIDENCE-BASED CLINICAL PRACTICE GUIDELINE. 2017.
13. Kolasinski SL, Neogi T, Hochberg MC, et al. 2019 american college of rheumatology/arthritis foundation guideline for the management of osteoarthritis of the hand, hip, and knee. *Arthritis Rheumatol.* 2020;72(2):220-233. doi:10.1002/art.41142.
14. Chen H, Onishi K. Effect of home exercise program performance in patients with osteoarthritis of the knee or the spine on the visual analog scale after discharge from physical therapy. *Int. J. Rehabil. Res.* 2012;35(3):275-277. doi:10.1097/MRR.0b013e328355a1bd.
15. Fors M, Enthoven P, Abbott A, Öberg B. Effects of pre-surgery physiotherapy on walking ability and lower extremity strength in patients with degenerative lumbar spine disorder: Secondary outcomes of the PREPARE randomised controlled trial. *BMC Musculoskelet. Disord.* 2019;20(1):468. doi:10.1186/s12891-019-2850-3.
16. Lindbäck Y, Tropp H, Enthoven P, Abbott A, Öberg B. PREPARE: presurgery physiotherapy for patients with degenerative lumbar spine disorder: a randomized controlled trial. *Spine J.* 2018;18(8):1347-1355. doi:10.1016/j.spinee.2017.12.009.