



DECOMPRESSION & UNLOADING EFFECTS OF FITWALL

Jeff Collins, M.S., Welltec Human Performance Lab

July, 2013

1. INTRODUCTION

The CDC reports the prevalence of arthritis and Chronic Joint Symptoms (CJS) is 1 in 3 among U.S. adults.¹ The purpose of this paper is to discuss the mechanisms of CJS, review research that has shown to reduce CJS and explain how Fitwall exercises may be a unique modality for decompression and relief of CJS.

2. OSTEOARTHRITIS OVERVIEW

Of all the many causes of joint pain, the most common is osteoarthritis. Osteoarthritis results from deterioration or loss of the cartilage that acts as a protective cushion between bones, particularly in weight-bearing joints such as the knees and hips. As the cartilage is worn away, the bone forms spurs, areas of abnormal hardening, and fluid-filled pockets in the marrow known as subchondral cysts.

As the disorder progresses, pain results from deformation of the bones and fluid accumulation in the joints. The pain is relieved by rest and made worse by moving the joint or placing weight on it.⁷

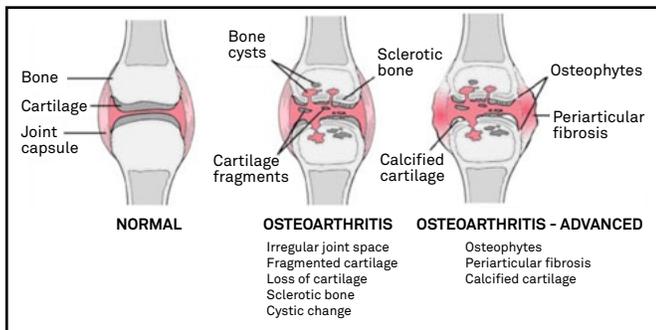


Figure 1: Miller-Keane Encyclopedia and Dictionary of Medicine, Nursing, and Allied Health, Seventh Edition.

3. CLOSED CHAIN VS. OPEN CHAIN

Closed kinetic chain exercises (CKC) are physical exercises performed where the hand (for arm movement) or foot (for leg movement) is fixed in space and cannot move. The extremity remains in constant contact with the immobile surface, usually the ground or the base of a machine.

The opposite of CKC exercises are open kinetic chain exercises (OKC). Closed chain exercises are considered safer and more "functional" compared to open chain exercises.²

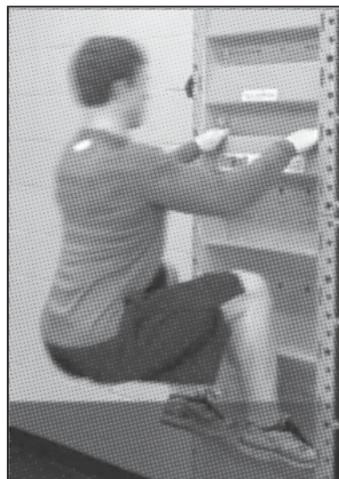


Figure 2: Fitwall Closed Chain Kinetic Movement

Traditionally, closed chain exercises are described using upper or lower body one at a time. As shown in Figure 2, Fitwall uses the upper and lower body at the same time in this CKC exercise.

Table 1 lists the "14 Fundamental" movements that are part of the Fitwall curriculum and rated Poor, Fair, Moderate, Good Excellent in terms of being closed chain and level of unloading or joint decompression.

| Name | Closed Chain, unloading factor |
|-------------------|--------------------------------|
| Perfect Pull Up | Excellent |
| Rear Delt Pull Up | Excellent |
| Standard Row | Excellent |
| Ab Pull | Excellent |
| Cowboy Squat | Excellent |
| Squat | Excellent |
| Let Extension | Excellent |
| Calf Raise | Excellent |
| Kickback | Moderate |
| Hip Rotation | Fair/Excellent |
| Oblique Side Kick | Moderate/Excellent |
| Targeting | Moderate |
| Ab Hop | Moderate |
| In-Out Ab Hop | Moderate |

4. RESEARCH REVIEW

Reviewing the research on joint pain, it has been shown that high impact, sheering forces and open chain kinetic exercises cause the most pain, while unloading, low impact closed chain exercises relieves pain most effectively.

4.1 LOW BACK, SACROILLIAC JOINT

Practicing active exercise in low positions significantly improves the movement range and body posture and it reduces pain in the lower segments of the spine. Moreover, the patient's functional abilities are improved while performing everyday activities.³

Sacroiliac (SI) joint pain had electromyographic-documented hyperactivity of the ipsilateral gluteus muscles and contralateral latissimus muscle compared with 15 asymptomatic control patients. After a 2-1/2 month exercise program, all 5 patients achieved a significant reduction in pain.² Figure 4 shows a Fitwall movement focusing on the ipsilateral gluteus and contralateral latissimus muscles shown in Figure 3.



DECOMPRESSION & UNLOADING EFFECTS OF FITWALL

Jeff Collins, M.S., Welltec Human Performance Lab

July, 2013

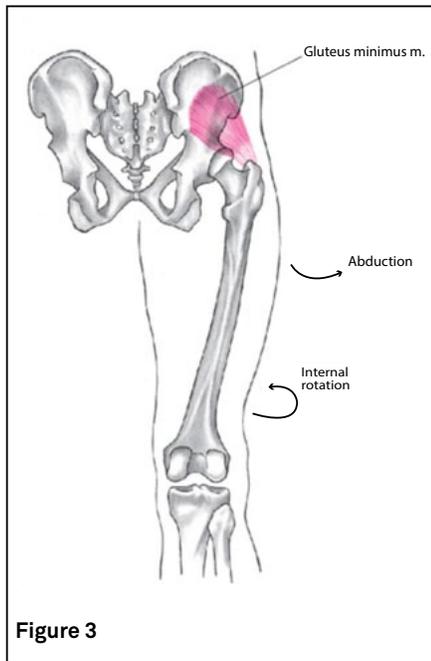


Figure 3



Figure 4

4.2 KNEE

A study looking at gravity and a broad range of weight bearing loads during exercise and measuring tibial tray force measurements (knee joint), showed significantly higher tibial tray loads during open chain movements.⁶

Relaxed and closed chain conditions demonstrated improved congruence as compared with the open chain condition at 0, 10, and 20 degrees of knee flexion ($p < .0001$).³

Many Fitwall exercises reduce tibial loads and sheering forces as well as using closed chain movements as discussed in section 4.1.

5. CONCLUSION

Of the many causes of joint pain, the most common is osteoarthritis. Compressive or high impact exercise has been shown to aggravate or worsen the symptoms of osteoarthritis.

The low impact, unloading and decompressive exercises as seen in Fitwall movements can reduce frequency and intensity of chronic joint symptoms. There is also strong evidence range of motion and flexibility are improved with the reduction in pain.

Closed Chain Kinetic Exercises (CKC) have been recommended for rehabilitation and joint health. Traditionally, CKC are described using upper or lower body one at a time. Many Fitwall movements use upper and lower body at the same time in CKC exercise.

In conclusion, it was found that Fitwall exercises contain movements that have been shown to reduce knee, low back, elbow, shoulder and ankle pain because of the low impact nature and CKC movements.^{2,3,4,5}

6. REFERENCES

1. Center for Disease Control. Prevalence of Self-Reported Arthritis or Chronic Joint Symptoms Among Adults, United States, 2001.
2. Cohen, SP. Anesthesia & Analgesia, 2005 - IARS
3. Doucett SA, Child DD. The effect of open and closed chain exercise and knee joint position on patellar tracking in lateral patellar compression syndrome. Journal of Orthopaedic Sports Physical Therapy. 1996
4. Dzierzanowski M., Adv Clin Exp Med. 2013 May-Jun;22(3):421-430. The Influence of Active Exercise in Low Positions on the Functional Condition of the Lumbar-Sacral Segment in Patients with Discopathy.
5. Litchfield R. Clin J Sport Med. 2013 Jan;23(1):86-
6. Progressive strengthening exercises for subacromial impingement syndrome.
7. Macias, BR. Et. Al. J Appl Physiol. 2012 Jul;113(1):31-8.
8. Mosby's Medical Dictionary, 8th edition. © 2009, Elsevier.