

Effect of a Short-term Corrective Exercise Program on Chronic Knee and Hip Pain

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Abstract

The objective of this study was to determine the acute effect following one corrective exercise treatment and the short-term effect of a home-based two-week corrective exercise program on chronic knee and hip pain. Forty

the use of expensive equipment, this type of therapy may be a viable approach for people suffering from chronic knee and/or hip pain.

This study sought to determine the acute response following one corrective exercise treatment and the short-term response of a home-based two-week corrective exercise program on chronic knee and hip pain. We hypothesized that: 1) knee and hip pain would not decrease pain rating scores following one corrective exercise treatment, and 2) knee and hip pain would be lower following a two-week corrective exercise program.

Materials and Methods

This study was a simple randomization design. Participants were a convenience sample who were randomly assigned to either the exercise treatment group, which performed corrective exercises for two weeks,

Sitting femur rotations	http://www.egoscue.com/WebMenus/QTVideo/18.html	10 repetitions x 4 sets
Static back abdominal contractions	http://www.egoscue.com/WebMenus/QTVideo/349.html	20 repetitions x 3 sets
Hooklying gluteal contractions	http://www.egoscue.com/WebMenus/ECiseHTML/28.html	20 repetitions x 3 sets
Hooklying knee squeezes	http://www.egoscue.com/WebMenus/QTVideo/26.html	20 repetitions x 3 sets
Airbench	http://www.egoscue.com/WebMenus/ECiseHTML/27.html	1-minute hold
Supine groin stretch (modified)	http://www.egoscue.com/WebMenus/ECiseHTML/31.html	5-minute hold
Supine foot circles-point/flexes	http://www.egoscue.com/WebMenus/ECiseHTML/3.html	10 repetitions x 8 sets
*Total time of E-cise routine=about 45 minutes; with minimal rest between sets (0-30 seconds)		

($p=0.04$). However, non-prescription pain medication use was not a $g[b]$ Wbh covariate in any of the statistical analyses. Additionally, there were no $g[b]$ Wbh changes in non-prescription pain medication use from baseline and U Yf weeks 1 and 2 in either group ($p=0.29$). VAS pain scores in the exercise treatment group did not $g[b]$ Wbh change U Yf a single corrective exercise routine, U Yf controlling for location of pain, past surgery, and age, at rest ($p=0.49$, for group x time interaction) or pain during movement ($p=0.69$, for group x time interaction).

Resting VAS pain scores decreased by 1.40 ± 0.34 cm in the exercise group and 0.48 ± 0.32 cm in the control group, although the X Yf W between groups did not reach statistical $g[b]$ WbW ($p=0.03$). U Yf controlling for initial pain level, location of pain, past surgery, and arthritis, there was no $g[b]$ Wbh decrease over time for pain at rest as measured by daily resting VAS pain scores ($p=0.52$).

On the other hand, movement VAS pain scores (Figure 1) decreased on average by 0.11 ± 0.03 cm/d in the exercise group ($p=0.002$), while there was a bc $g[b]$ Wbh decrease of 0.02 ± 0.03 cm/d in VAS pain scores in the control group ($p=0.47$). Y X Yf W between the groups was statistically $g[b]$ Wbh ($p=0.02$) U Yf controlling for $g[b]$ Wbh covariates (initial pain level, location of pain, past surgery, arthritis). Compared to baseline, pain during movement at the end of the second week decreased by 3.77 ± 0.49 cm in the exercise group and 1.34 ± 0.46 cm in the control group ($p=0.001$ for group x time interaction).

showed a 60%, 67%, and 51% relative decrease in total WOMAC, function, and pain subscores, respectively at the end of week 2

		Week 1	Week 2
WOMAC total	Treatment Group	-10.19 ± 3.92 ($p=0.11$)	-16.15 ± 3.92* ($p=0.001$)
	Control Group	-0.83 ± 3.92 ($p=1.00$)	0.11 ± 3.92 ($p=1.00$)
WOMAC function	Treatment Group	-7.10 ± 2.65 ($p=0.09$)	-10.35 ± 2.65* ($p=0.002$)
	Control Group	0.10 ± 2.65 ($p=1.00$)	-0.10 ± 2.65 ($p=1.00$)
WOMAC pain	Treatment Group	-1.65 ± 0.95 ($p=0.54$)	-3.35 ± 0.95* ($p=0.01$)
	Control Group	0.50 ± 0.95 ($p=1.00$)	0.20 ± 0.95 ($p=1.00$)

Results are described as mean ± standard error. *Significant at the 0.05 level after controlling for age, gender, BMI, past surgery, arthritis, and location of pain.

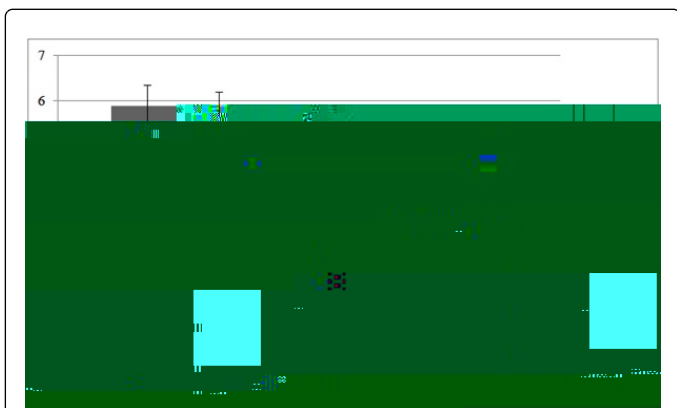


Figure 1: VAS pain (cm) during movement, by group. Data are presented as means ± standard error bars (y-axis = VAS pain rating scores from 0-7). *Statistically $g[b]$ Wbh X Yf W from baseline ($p=0.001$) U Yf controlling for age, past surgery, and location of pain. **Statistically $g[b]$ Wbh X Yf W between groups ($p=0.02$) U Yf controlling for age, gender, BMI, past surgery, arthritis, and location of pain.

Total WOMAC scores decreased $g[b]$ Wbh in the exercise treatment group over time, while total WOMAC scores in the control group did not change $g[b]$ Wbh (Table 3 Figure 2). Although, there were bc $g[b]$ Wbh decreases in total WOMAC ($p=0.11$), function ($p=0.09$), and pain subscores ($p=0.54$) in the exercise treatment group U Yf the fghweek, by the end of week 2, decreases in total WOMAC ($p=0.001$), function ($p=0.002$), and pain ($p=0.008$) subscores were statistically $g[b]$ Wbh (Table 3). Total WOMAC, function, and pain subscores were $g[b]$ Wbh lower ($p=0.02$, $p=0.03$, $p=0.01$, respectively) in the exercise treatment group compared to the control group at the end of week 2. Compared to baseline, the exercise group

Discussion

This study evaluated the effect of a corrective exercise program on pain and function in participants with chronic knee and/or hip pain. The study was conducted over a period of two weeks, with participants receiving the program at one week and two weeks of performing exercises. The resulting data showed a significant decrease in pain over the two weeks, as well as a significant improvement in functional

Future studies that involve long-term follow-up should be employed to determine whether or not the changes are sustained over time. In addition, it is important that future EM corrective exercise research measure changes in postural alignment, more accurately document and statistically control various lifestyle variables, and directly supervise EM corrective exercise routines to ensure full participation.

References

- Hootman JM, Helmick CG, Barbour KE, Yigit KA, Boring MA (2016) Updated projected prevalence of self-reported doctor-diagnosed arthritis and arthritis-attributable activity limitation among US adults, 2015-2040. *Arthritis Rheumatol* 68: 1582-1587.
- Blyth FM, Briggs AM, Schneider CH, Hoy DG, March LM (2019) The global burden of musculoskeletal pain-where to from here? *Am J Public Health* 109: 35-40.
- Husky MM, Ferdous Farin F, Compagnone P, Fermanian C, Kovess-Masfety V (2018) Chronic back pain and its association with quality of life in a large French population survey. *Health Qual Life Outcomes* 16: 195.
- Peat G, McCarney R, Raftery P (2001) Knee pain and osteoarthritis in older adults: a review of community burden and current use of primary health care. *Ann Rheum Dis* 60: 91-97.
- Gosvig KK, Jacobsen S, Sonne-Holm S, Palm H, Troelsen A (2010) Prevalence of malformations of the hip joint and their relationship to sex, groin pain, and risk of osteoarthritis: a population-based survey. *J Bone Joint Surg Am* 92: 1162-1169.
- Losina E, Weinstein AM, Reichmann WM, Burbine SA, Solomon DH, et al. (2013) Lifetime risk and age at diagnosis of symptomatic knee osteoarthritis in the US. *Arthritis Care Res* 65: 703-711.
- Egoscue P (1993) *The Egoscue Method of health through motion: revolutionary program that lets you rediscover the body's power to rejuvenate it.* HarperCollins Publisher, New York City, NY.
- Smith AJ, O'Sullivan PB, Campbell A, Straker L (2010) The relationship between back muscle endurance and physical, lifestyle, and psychological factors in adolescents. *J Orthop Sports Phys Ther* 40: 517-523.
- Twomey LT (1992) A rationale for the treatment of back pain and joint pain by manual therapy. *Phys Ther* 72: 885-892.
- Kendall FP, McCreary EK, Provance PG (1993) *Muscles: Testing and function*, Fourth edition. Lippincott Williams & Wilkins, Philadelphia, PA.
- Griegel-Morris P, Larson K, Mueller-Klaus K, Oatis CA (1992) Incidence of common postural abnormalities in the cervical, shoulder, and thoracic regions and their association with pain in two age groups of healthy subjects. *Phys Ther* 72: 425-431.
- Guimond S, Massieh W (2012) Intricate Correlation between Body Posture, Personality Trait and Incidence of Body Pain: A Cross-Referential Study Report. *PLoS One* 7: 8.
- Lynch SS, Lynch CA, Mihalik JP, Prentice WE, Parnianpour M, et al. (2010) The effect of an exercise intervention on forward head and rounded shoulder postures in elite swimmers. *Br J Sports Med* 44: 376-381.
- Kluemper M, Uhl T, Hazelrigg H (2006) The effect of stretching and strengthening shoulder muscles on forward shoulder posture in competitive swimmers. *J Sport Rehabil* 15: 58.
- Kuo YL, Tully EA, Galea MP (2009) Sagittal spinal posture: Upright Pilates-based exercise in healthy older adults. *Spine* 34: 1046-1051.
- Scannell JP, McGill SM (2003) Lumbar posture - Should it, and can it, be a 'neutral' position? A study of passive tissue length and lumbar position during activities of daily living. *Phys Ther* 83: 907-917.
- Moustafa IM, Diab AA, Hegazy F, Harrison DE (2018) Does improvement towards a normal cervical sagittal curvature aid in the management of cervical myofascial pain syndrome: a 1-year randomized controlled trial. *BMC Musculoskelet Disord* 19: 396.
- Diab AA, Moustafa IM (2012) The effect of forward head correction on nerve root function and pain in cervical spondylotic radiculopathy: a randomized trial. *Clin Rehabil* 26: 351-361.
- Hernandez-Molina G, Reichenbach S, Zhang B, Lavalley M, Felson DT (2008) The effect of therapeutic exercise for hip osteoarthritis pain: results of a meta-analysis. *Arthritis Rheum* 50: 1221-1228.
- Fransen M, McConnell S (2008) Exercise for osteoarthritis of the knee. *Cochrane Database Syst Rev* 4: 125.
- Egoscue P (2013) A revolutionary method for stopping chronic pain.
- Wallis JA, Taylor NF (2011) Pre-operative interventions (non-surgical and non-pharmacological) for patients with hip or knee osteoarthritis awaiting joint replacement surgery-a systematic review and meta-analysis. *Osteoarthritis Cartilage* 19: 1381-1395.
- Gill SD, McBurney H (2013) Does exercise reduce pain and improve physical function before hip or knee replacement surgery? A systematic review and meta-analysis of randomized controlled trials. *Arch Phys Med Rehabil* 94: 164-176.
- Hasegawa M, Yamazaki S, Kimura M, Nakano K, Yasumura S (2013) Community-based exercise program reduces chronic knee pain in elderly Japanese women at high risk of requiring long-term care: A non-randomized controlled trial. *Geriatr Gerontol Int* 13: 167-174.
- Hurley MV, Walsh NE, Mitchell H, Nicholas J, Patel A (2012) Long-term outcomes and costs of an integrated rehabilitation program for chronic knee pain: A pragmatic, cluster randomized, controlled trial. *Arthritis Care Res* 64: 238-247.
- Deyle GD, Henderson NE, Matekel RL, Ryder MG, Garber MB, et al. (2000) The effect of manual physical therapy and exercise in osteoarthritis of the knee: A randomized, controlled trial. *Ann Intern Med* 132: 173-181.
- Tubach F, Ravaud P, Baron G, Falissard B, Logeart I, et al. (2005) Evaluation of clinically relevant changes in patient health-related quality of life in randomized controlled trials. *Stat Med* 24: 1093-1107.