The Effects of Resistance Training on Chronic Low Back Pain: Walking Interventions vs. RT

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Abstract

A predominant cause of chronic lower back pain (CLBP) is muscle weakness. Addressing this concern from the root by increasing muscular strength should have pragmatic results. Resistance training is a general rehabilitative protocol prescribed to clients to target strength gain with the intention of reversing CLBP and related disability. To determine whether resistance training is as effective as deemed, it was compared to a walking intervention through a meta-analysis. The target population consisted of CLBP clients who were assessed through two variables: subjective pain levels and disability. Resistance training was predicted to be a more efficient form of treatment compared to walking, but the analyzed studies suggested otherwise. No conclusion could be drawn supporting resistance training as the more effective treatment form; a walking intervention was just as advantageous. Resistance training should not be the sole means of rehabilitation for CLBP clients since following a walking protocol decreased pain and improved disability to no lesser degree.

Keywords: chronic pain, resistance training

Introduction

Pain is a concern that should not be taken lightly, yet the number of people experiencing such discomfort is rising day by day. Specifically, chronic lower back pain (CLBP) has been an issue in our societies. Elfien (2019) compares the prevalence of back pain from the year 2000 to 2016, and the percent of surveyed individuals reporting pain during both years was almost identical. More than 1 in 4 Americans were suffering from lower back pain despite there being a 16-year difference between both surveys (Elfien, 2019). Crombez, Vlaeyen, Heuts, and Lysens (1999) concluded that the fear that comes with CLBP is more disabling on individuals than the localized pain. Researchers studied 104 participants and discovered a high correlation between the measure individuals take because of having CLBP and disability levels; those who took more precautions reported higher disability levels (Crombez et al., 1999). This fear hesitates individuals from taking long-term solutions, and many resort to pharmaceuticals with adverse side effects or even dependency.

Treatments such as prolonged rehabilitation are starting to show some positive effects in easing pain levels and should be further explored. Rehabilitation is a non-invasive technique that is performed in the comfort of one’s home with limited equipment necessary. Resistance training, in particular, is a form of rehabilitation that progressively overloads the muscular system to increase muscular strength and endurance. Resistance training can be analyzed over a spectrum from education and going all the way to a wide range of exercise types. To start, Donzelli, Di Domenica, Cova, Galletti, and Giunta (2006) took an education approach and analyzed Pilates CovaTech, a form of resistance training. Pilates CovaTech involves strength training while using body weight as resistance to educating individuals about antalgic, posture, mobilization, and stretching (Donzelli et al., 2006). Simply educating individuals on this form of resistance training was proven as a treatment option for CLBP (Donzelli et al., 2006).

Comparatively, Winett and Carpinelli (2001) early on validated the benefits of progressive resistance training. These benefits include—but are not limited to: reducing risk factors for predominant diseases such as diabetes, prevention of sarcopenia and osteoporosis, and other effects on the musculoskeletal system (Winett & Carpinelli, 2001). Both groups of researchers promoted studying resistance training and this context, prescribing it to individuals with chronic lower back pain.

Though CLBP seems dominant in today’s population, research suggests that one form of therapy might be more effective than another in treating CLBP, and certain types of resistance training may have alternative effects as well. The following studies will explore the impact of resistance training on individuals with chronic lower back pain to determine whether or not it is an effective treatment. Resistance training protocols will be compared to walking protocols to validate that they are more effective in reducing pain and improving disability than walking. The simplicity of walking should not undermine the scientific basis of resistance training: increasing muscular strength and preventing muscular weakness.

Methods

The research follows a meta-analysis design using secondary sources from the BioMed Central and EBSCOHost databases. Journal articles from the National Institutes of Health (NIH) and similar organizations were gathered to reveal to what extent resistance training decreased chronic lower back pain and disability. Keywords such as “chronic LBP” and “resistance training” refined the searches. Trials comparing resistance training and walking interventions were used to quantify degrees of pain and levels of disabilities. The articles were filtered via reliability and date published; they were screened to see if they were peer-reviewed and published recently. A compilation of several peer-reviewed articles that met the criteria solidified this research.
Results

Resistance training is a form of rehabilitation used to treat chronic lower back pain (CLBP). A predominant cause of CLBP is muscle weakness. If muscle weakness is managed via resistance training, can CLBP be eliminated? I hypothesize that resistance training is an effective method to treat CLBP and more effective than walking because it increases muscular strength. While comparing resistance training to walking, resistance training should be more effective in decreasing pain, and improving disability.

Strength Exercise and Walking Effects on Lumbar Function

Lee and Kang (2016) sought to understand the effects of strength training and walking on overweight, non-active adults. These adults had not participated in any exercise six months before the study. The participants were diagnosed by a physician after reviewing x-rays of the lower back (Lee & Kang, 2016). Participants were randomly assigned to three groups: a control group (CG), a strength exercise group (SEG), and a combined exercise group (CEG). The CG had six participants with a mean age of 43.3 ± 9.9, the SEG’s mean age was 42.7 ± 13.1, and the CEG had a mean age of 46.7 ± 8.1. Both exercise groups consisted of 15 participants each, whereas the control group had six (Lee & Kang, 2016). The exercise groups completed 12 weeks of training under a professional trainer twice a week for 50 minutes; the participants exercised at a moderate to a hard intensity at an RPE of 11-16 (Lee & Kang, 2016). Lower back disability was measured using the Roland-Morris Disability Questionnaire (RMDQ), and lower back pain was measured using theVAS scale.

The SEG performed only strength training exercises. This group had a baseline RMDQ score of 3.8 ± 3.7 and a final score of 1.1 ± 0.9 (Lee & Kang, 2016). The CEG performed strength training along with a walking protocol using a step-box. This group had a baseline RMDQ value of 6.3 ± 4.8 which then decreased to 1.8 ± 2.1, and the control group had a baseline value of 0.8 ± 1.2 which then changed to 1.7 ± 1.6 after 12 weeks (Lee & Kang, 2016). Despite both exercise groups lowering disability levels, only the combined exercise group had a statistically significant decrease.

The pre-training VAS scores for the SEG were 32.3 ± 14.9; this value significantly decreased to 22.0 ± 11.3 (Lee & Kang, 2016). Similarly, the pre-training VAS scores for the CEG were 45.3 ± 14.8 which drastically lowered to 33.1 ± 20.0. Both exercise groups had a statistically significant decrease at p<0.05 (Lee & Kang, 2016). It is evident that strength training, with or without walking, decreases the degree of lower back pain. The control group participated in no exercise and had a baseline VAS score of 24.2 ± 9.2; this significantly increased to 35.8 ± 17.2 (Lee & Kang, 2016). Authors Lee and Kang (2016) were able to support that inactive individuals with CLBP will find relief through a lifestyle modification of adding exercise to their daily regimen.

A Synergy of Rehabilitation Program and Treadmill Exercise

Cho and the authors (2015) compared the effects of walking and a traditional rehabilitation program that targeted strengthening in twenty men aged from 22 to 36 years. Individuals with other health conditions categorized under musculoskeletal, neurological, heart disease, and spine deformation were excluded. Two groups were randomly assigned ten men who performed normal rehabilitation training for thirty minutes three times a week for eight weeks. The experimental group was prescribed an additional thirty minutes of treadmill walking each week, and the non-walking group was labeled as the control group (Cho et al., 2015).

The average age of the control group was 27.7 ± 4.2, and the mean age of the experimental group was 29.1 ± 4.8 (Cho et al., 2015). The average weight for both groups was categorized as normal weight. The control group’s VAS score altered from an average of 36.6 ±17.4 to 20.5 ± 13.1 post-training. The experimental group’s VAS score reduced from an average of 31.3 ± 17.9 to 16.9 ± 9.3 after eight weeks (Cho et al., 2015). Both groups experienced pain to a much lower degree than before the training. While comparing the two, neither could be supported as more efficient than the other.

A lower back disability was measured using the Oswestry Disability Index (ODI). The control group started with a baseline disability average of 16.5 ± 3.5, and after the study, the ODI was 14.4 ± 5.0 (Cho et al., 2015). The experimental group started with an average score of 14.9 ± 3.0, which then decreased to 11.7 ± 1.7 (Cho et al., 2015). Both groups had a better quality of life after the training sessions were complete because their degree of disability was lowered.

A Walking Program vs. Muscular Strength Training

Authors Shnayderman and Katz-Leurer (2012) compared a walking program to a muscular strengthening program in 52 sedentary individuals. They aimed to determine whether walking was just as effective as strength training in reducing pain. The Low Back Pain Functional Scale (LBPS) was used to measure pain, and the Oswestry Low Back Pain Disability Questionnaire (ODQ) was used to analyze the degree of disability. The participants were divided into two groups: a walking group and an exercise group. The average age of the walking group was 47.0 ± 10.0, and the average age of the exercise group was 43.6 ± 13.5 (Shnayderman & Katz-Leurer, 2012).

The exercise group had an LBPS score of 52.8 ± 9.7 before the intervention, and after performing strength training twice a week for six weeks, this score increased to 60.9 ± 11.6. The walking group started with an average score of 49.5 ± 8.4, and their score increased to 59.6 ± 13.5 (Shnayderman & Katz-Leurer, 2012). Noting that a higher score indicates less pain and better function, it was
concluded that both groups felt less pain after the interventions.

The ODQ of the exercise group at baseline was 27.5 ± 15.3, but after strength training, this decreased to 19.1 ± 12.8. The walking group started with a pre-training ODQ score of 34.4 ± 17.0 that then decreased to 22.6 ± 14.4 after the walking intervention (Shnayderman & Katz-Leurer, 2012). Both groups were effective in decreasing pain and disability, but neither could be described as being more effective than the other; walking was just as effective as strength training.

**Lumbar Stabilization Exercises vs. Walking Exercises**

Suh and the authors (2019) evaluated a walking protocol against a lumbar stabilization protocol. The participants were divided amongst four groups, but only three groups will be analyzed in this review. The stabilization exercise group (SE) had a mean age of 57.40 ± 15.88, the walking exercise group (WE) had a mean age of 54.15 ± 13.89, and the third group, the stabilization and walking group (SWE), had a mean age of 54.75 ± 14.98 (Suh et al., 2019). The SE group performed an individualized graded lumbar stabilization exercise (IGLSE) protocol. The IGLSE protocol consisted of five minutes of stretching followed by twenty-five minutes of moderate, progressive stabilization exercises. The WE group followed a protocol of abdominal bracing and speed walking; the SWE group performed both protocols (Suh et al., 2019).

After six weeks of training, disability levels were measured using the ODI. All three groups had statistically significant decreases in ODI; the WE group had a baseline of 28.1 ± 12.8 that then decreased to 22.5 ± 7.4. The SE group also had a significant reduction from 31.4 ± 13.2 to 25.3 ± 9.9, and the SWE group’s score reduced from 30.4 ± 12.9 to 24.9 ± 12.3 (Suh et al., 2019). There was no difference in the groups indicating that one was more effective than the other.

After twelve weeks of training, the pain levels were measured using the VAS scale during rest and physical activity. During rest, the WE group’s score changed from 30.58 ± 20.92 to 20.00 ± 17.58, and the SE group’s score improved from 37.50 ± 21.78 to 22.50 ± 23.72. The SWE group decreased from 30.00 ± 30.38 to 20.83 ± 26.44 during rest (Suh et al., 2019). During physical activity, all groups also experienced pain to a lower degree. The WE group’s VAS score decreased from 69.00 ± 14.49 to 26.00 ± 23.07, and the SWE group’s score dropped from 59.58 ± 22.61 to 39.55 ± 25.44 (Suh et al., 2019). Though all groups had experienced less pain, while looking at the six-week mark, only the SE group had statistically significant decreases at p<0.05. Regardless, during physical activity at the twelve-week evaluation, all groups felt better.

All the four studies had the same conclusions: walking and resistance training are equally beneficial in bettering the quality of life of individuals with CLBP.

**Discussion**

The hypothesis that resistance training is more effective than walking for decreasing chronic lower back pain cannot be confirmed. Though it is proven to be very effective in the literature above, resistance training does not lower pain levels and improve disability any more than walking. All trials that included walking interventions concluded that individuals felt less pain, and these values were statistically significant. There was no statistically significant difference between the independent groups. Furthermore, additional research should be conducted to observe the long-term effects of both interventions and to ultimately discover a more supported conclusion. Then, that should be implemented into treatment plans made by physical therapists and be incorporated into daily living activities to decrease unhealthy or addicting forms of treatment.

A strength of this analysis is various aspects of resistance training and walking. For example, a combination of the two training methods was compared to each sole method. Resistance training was the core idea of this review, and many modes of it were discussed to validate it; only then was the comparison made. A limitation of this study was that there were no long-term trials. All trials ended at 12 weeks or earlier. Further research would help define and answer the question of whether both interventions are equally effective in decreasing chronic lower back pain and improving disability in the long run.

These results were quite surprising. The power of walking is drastically underestimated, and the general population is unaware of the easy benefits they can receive by this minor lifestyle modification of adding walking into their daily regimen.

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References


