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[Intervention Review]

Whole body vibration exercise training for fibromyalgia

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ABSTRACT

Background

Exercise training is commonly recommended for adults with fibromyalgia. We defined whole body vibration (WBV) exercise as use of a vertical or rotary oscillating platform as an exercise stimulus while the individual engages in sustained static positioning or dynamic movements. The individual stands on the platform, and oscillations result in vibrations transmitted to the subject through the legs. This review is one of a series of reviews that replaces the first review published in 2002.

Objectives

To evaluate benefits and harms of WBV exercise training in adults with fibromyalgia.

Search methods

We searched the Cochrane Library, MEDLINE, Embase, CINAHL, PEDro, Thesis and Dissertation Abstracts, AMED, WHO ICTRP, and ClinicalTrials.gov up to December 2016, unrestricted by language, to identify potentially relevant trials.

Selection criteria

We included randomized controlled trials (RCTs) in adults with the diagnosis of fibromyalgia based on published criteria including a WBV intervention versus control or another intervention. Major outcomes were health-related quality of life (HRQL), pain intensity, stiffness, fatigue, physical function, withdrawals, and adverse events.

Data collection and analysis

Two review authors independently selected trials for inclusion, extracted data, performed risk of bias assessments, and assessed the quality of evidence for major outcomes using the GRADE approach. We used a 15% threshold for calculation of clinically relevant differences.

Main results

We included four studies involving 150 middle-aged female participants from one country. Two studies had two treatment arms (71 participants) that compared WBV plus mixed exercise plus relaxation versus mixed exercise plus relaxation and placebo WBV versus control, and WBV plus mixed exercise versus mixed exercise and control; two studies had three treatment arms (79 participants) that compared WBV plus mixed exercise versus control and mixed relaxation placebo WBV. We judged the overall risk of bias as low for selection (random sequence generation), detection (objectively measured outcomes), attrition, and other biases; as unclear for selection bias (allocation concealment); and as high for performance, detection (self-report outcomes), and selective reporting biases.

The WBV versus control comparison reported on three major outcomes assessed at 12 weeks post intervention based on the Fibromyalgia Impact Questionnaire (FIQ) (0 to 100 scale, lower score is better). Results for HRQL in the control group at end of treatment (59.13) showed a mean difference (MD) of -3.73 (95% confidence interval [CI] -10.81 to 3.35) for absolute HRQL, or improvement of 4% (11% better to 3% worse) and relative improvement of 6.7% (19.6% better to 6.1% worse). Results for withdrawals indicate that 14 per 100 and 10 per 100 in the intervention and control groups, respectively, withdrew from the intervention (RR 1.43, 95% CI 0.27 to 7.67; absolute change 4%, 95% CI 16% fewer to 24% more; relative change 43% more, 95% CI 73% fewer to 667% more). The only adverse event reported was acute pain in the legs, for which one participant dropped out of the program. We judged the quality of evidence for all outcomes as very low. This study did not measure pain intensity, fatigue, stiffness, or physical function. No outcomes in this comparison met the 15% threshold for clinical relevance.

The WBV plus mixed exercise (aerobic, strength, flexibility, and relaxation) versus control study (N = 21) evaluated symptoms at six weeks post intervention using the FIQ. Results for HRQL at end of treatment (59.64) showed an MD of -16.02 (95% CI -31.57 to -0.47) for absolute HRQL, with improvement of 16% (0.5% to 32%) and relative change in HRQL of 24% (0.7% to 47%). Data showed a pain intensity MD of -28.22 (95% CI -43.26 to -13.18) for an absolute difference of 28% (13% to 43%) and a relative change of 39% improvement (18% to 60%); as well as a fatigue MD of -33 (95% CI -49 to -16) for an absolute difference of 33% (16% to 49%) and relative difference of 47% (95% CI 23% to 60%); and a stiffness MD of -26.27 (95% CI -42.96 to -9.58) for an absolute difference of 26% (10% to 43%) and a relative difference of 36.5% (23% to 60%). All-cause withdrawals occurred in 8 per 100 and 33 per 100 withdrawals in the intervention and control groups, respectively (two studies, N = 46; RR 0.25, 95% CI 0.06 to 1.12) for an absolute risk difference of 24% (3% to 51%). One participant exhibited a mild anxiety attack at the first session of WBV. No studies in this comparison reported on physical function. Several outcomes (based on the findings of one study) in this comparison met the 15% threshold for clinical relevance: HRQL, pain intensity, fatigue, and stiffness, which improved by 16%, 39%, 46%, and 36%, respectively. We found evidence of very low quality for all outcomes.

The WBV plus mixed exercise versus other exercise provided very low quality evidence for all outcomes. Investigators evaluated outcomes on a 0 to 100 scale (lower score is better) for pain intensity (one study, N = 23; MD -16.36, 95% CI -29.49 to -3.23), HRQL (two studies, N = 49; MD -6.67, 95% CI -14.65 to 1.31), fatigue (one study, N = 23; MD -14.41, 95% CI -29.47 to 0.65), stiffness (one study, N = 23; MD -12.72, 95% CI -26.90 to 1.46), and all-cause withdrawal (three studies, N = 77; RR 0.72, 95% CI -0.17 to 3.11). Adverse events reported for the three studies included one anxiety attack at the first session of WBV and one dropout from the comparison group ("other exercise group") due to an injury that was not related to the program. No studies reported on physical function.

Authors' conclusions

Whether WBV or WBV in addition to mixed exercise is superior to control or another intervention for women with fibromyalgia remains uncertain. The quality of evidence is very low owing to imprecision (few study participants and wide confidence intervals) and issues related to risk of bias. These trials did not measure major outcomes such as pain intensity, stiffness, fatigue, and physical function. Overall, studies were few and were very small, which prevented meaningful estimates of harms and definitive conclusions about WBV safety.

PLAIN LANGUAGE SUMMARY

Whole body vibration training for adults with fibromyalgia

Review question

What are the effects of whole body vibration (WBV) training on health-related quality of life (HRQL), pain intensity, fatigue (feeling tired), stiffness, physical function, study participant dropout, and adverse events among adults (18 years of age and older) with fibromyalgia?

Background

People with fibromyalgia have chronic widespread body pain, often with increased fatigue, stiffness, depression, and problems sleeping. Vibration training is a new type of exercise that might reduce fibromyalgia symptoms. Vibration training usually consists of a person standing on a vibrating platform with the ability to change body position on the platform to squatting or standing on one leg. The vibration tricks the body into thinking it is falling, forcing the muscles to contract and relax dozens of times each second. These contractions are responsible for most of the benefits attributed to vibration training, including improvements in circulation, muscle strength, balance, and flexibility.

Study characteristics

We searched until December 2016 and found four studies with a total of 150 middle-aged female participants from the same country (Spain). One study (41 participants) compared WBV against control (standard care); two studies (79 participants) compared WBV plus other exercises (strengthening, flexibility, etc.) against other exercises alone or against control (WBV + MX vs MX); and another study (30 participants) compared WBV plus mixed exercise against mixed exercise alone.

Results

HRQL (0 to 100 Fibromyalgia Impact Questionnaire (FIQ) scale, 0 is best)

WBV vs control

Vibration training was 4% better than control (or 4 points, ranging from 11 improved to 3 worse).

• People who had training rated their quality of life at 55 points.

• People who had no training rated their quality of life at 59 points.

WBV + MX vs MX

Vibration training plus exercise was 16% better than control (or 16 points, ranging from 32 to 0.5).

• People who had training rated their quality of life at 43 points.

• People who had no training rated their quality of life at 59 points.

Pain intensity, fatigue, stiffness, and physical function were not measured for WBV vs control; physical function was not measured for WBV + MX vs MX.

Pain

Vibration training plus exercise was 28% better than control (or 28 points, ranging from 13 to 43).

• People who had training rated their pain at 41 points.

• People who had no training rated their pain at 69 points.

Fatigue

Vibration training plus exercise was 33% better than control (or 33 points, ranging from 16 to 49).

• People who had training rated their fatigue at 42 points.

• People who had no training rated their fatigue at 75 points.

Stiffness

Vibration training plus exercise was 26% better than control (or 26 points, ranging from 10 to 43).

• People who had training rated their fatigue at 42 points.

• People who had no training rated their fatigue at 69 points.

Dropouts from treatment (number)

Four more people dropped out of vibration training (4% more, 16% fewer to 24% more) for any reason than dropped out of the control group.

• 14 out of 100 people dropped out of vibration training.

• 10 out of 100 people dropped out of the control group.

A total of 8 per 100 people dropped out of the vibration plus exercise group for any reason compared with 33 per 100 from the control group (24% risk difference).

Adverse events (narrative)

WBV vs control

One person dropped out because of acute pain in the legs. We are uncertain whether vibration training combined with other exercise provides additional benefits over control or vibration training alone, as evidence was of very low quality because of study design flaws and small numbers of participants.

WBV + MX vs MX

Study authors stated that this program did not make symptoms worse and did not result in injury; one patient exhibited a mild anxiety attack at the first session.

Quality of the evidence

One study that reported on this comparison provided very low-quality evidence because of study design flaws and small numbers of participants.