REVIEW ARTICLE

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The effectiveness of aerobic exercises compared to other types of treatment on pain and disability in patients with neck pain: A systematic review.

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Background: Neck pain is one of the most common musculoskeletal pains and among the fourth leading causes of years of life lost due to disability, following back pain, depression, and arthralgia. (1) In the course of their lives, about 70% of all people will experience a clinically relevant episode of neck pain, (2) so finding a good therapy to treat it is of high interest. Aerobic exercise is associated with pain reduction in patients with different types of MSK pain. Recent studies have shown a positive impact of aerobic exercises on brain function, memory processing, cognition, and motor function. (3, 4) Therefore, the influence of aerobic exercise on pain modulation seems to be of particular interest for individuals with chronic MSK pain, since brain imaging studies have shown that these patients have structural and functional changes, as well as abnormal brain features in various areas of the brain. The evidence regarding the effectiveness of aerobic exercise for neck pain seems limited and outdated. Thus, a systematic review evaluating the effects of aerobic exercise in patients with neck pain is needed. Therefore, this review aims to investigate the effectiveness of aerobic exercise interventions when compared to other conservative and non-conservative interventions (e.g., localized exercises, medication, acupuncture, physical agents, manual therapy) to decrease pain intensity in people with neck pain.

Materials and methods: Electronic literature searches were conducted in a total of six databases such as Medline, Embase, CINAHL, Cochrane Library, Web of Science, and Scopus. The review considered randomised controlled trials (RCTs) including patients over 18 years having musculoskeletal pain in the neck area. The Neck Pain Task Force's classification of pain severity describes four levels of neck pain, with the first three levels considered in this review. (5)These must be clinically diagnosed by a health care provider according to signs and symptoms or based on standardized criteria specific for each disease. Studies involving subjects with any pre-existing conditions, previous surgery, or pain not clearly related to the musculoskeletal system were excluded. No limits were applied in terms of sex, ethnicity, and living country. Data were extracted using a standardized data extraction form. Methodological quality was determined using the Cochrane Collaboration Risk of Bias Tool (CCRBT) and the strength of the evidence with Grading of Recommendations Assessment, Development, and Evaluation (GRADE). Data were extracted and evaluated by two independent reviewers.

Results: A total of 21585 records were identified and screened independently for eligibility by two reviewers. A total of six unique studies, reported on ten manuscripts met the specified inclusion criteria. Different types of aerobic exercise were used in the studies. Studies included isolated and combined aerobic exercise using interventions such as cycling on an ergometer or walking outdoors at a moderate intensity. Comparison groups were for example strength training or education. The most common outcome was pain assessed with the Visual Analogue Scale (VAS) or the Nordic questionnaire. The included studies had a high risk of bias and the overall quality of the evidence for this systematic review was considered low. There was high heterogeneity in the included studies regarding interventions applied and study results.

When looking at the effect of aerobic exercise versus control group or other intervention groups measured with VAS, it can be observed, that there was a great heterogeneity between studies results (different magnitudes and directions). Although none of the comparisons showed a statistically significant difference between aerobic exercise and control (MD 6.24 mm, 95% CI [-11.21; 23.96]) or active intervention groups (MD -9.52 mm, 95% CI [-18.48; -0.56]) on pain intensity; it seems that aerobic exercise is slightly better than a control group, and equally effective as other active treatments such as strength exercise or education.

In addition, when combined with other therapeutic modalities, aerobic exercise, could potentially help to reduce pain intensity (MD 7.71 mm, 95% CI [1.07; 14.35]). Especially in the long term, the combination of strength and aerobic exercise showed promising results. Statistically significant differences in favour of aerobic exercise for pre vs. three months follow up (MD 11.20 mm, 95% CI [2.85;19.55]) and pre vs. six moths follow up (MD 15.10 mm, 95% CI [6.99; 23.21]) were found.

Conclusions: Although there is currently limited evidence on the effectiveness of aerobic exercise in individuals with chronic neck pain, aerobic exercise was found to not only reduce pain intensity, but also to improve disability as well as physical and emotional functioning. However, as the evidence is limited, low quality, and heterogeneous, further research is needed in this area to obtain more accurate results.

Any Conflict(s) of Interest

None.

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Ethical Permissions

No ethics approval needed

Relevance for patient care

Due to the characteristics of aerobic exercise (easy, less costly, applicable in groups), it could bring many benefits to the patient, especially considering the positive effects of aerobic exercise on general health.

References

1. Vos T, Flaxman A, Naghavi M. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010 (vol 380, pg 2163, 2012). Lancet. 2014;384(9943):582-.
2. Palacios-Cena D, Alonso-Blanco C, Hernández-Barrera V, Carrasco-Garrido P, Jiménez-García R, Fernández-de-las-Peñas C. Prevalence of neck and low back pain in community-dwelling adults in Spain: an updated population-based national study (2009/10–2011/12). European Spine Journal. 2015;24(3):482-92.
3. Hillman CH, Erickson KI, Kramer AF. Be smart, exercise your heart: exercise effects on brain and cognition. Nature reviews neuroscience. 2008;9(1):58-65.
4. Stern Y, MacKay-Brandt A, Lee S, McKinley P, McIntyre K, Razlighi Q, et al. Effect of aerobic exercise on cognition in younger adults: A randomized clinical trial. Neurology. 2019;92(9):e905-e16.
5. Guzman J, Haldeman S, Carroll LJ, Carragee EJ, Hurwitz EL, Peloso P, et al. Clinical practice implications of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders: from concepts and findings to recommendations. Spine (Phila Pa 1976). 2008;33(4 Suppl):S199-213.