Individualized exercises on trunk strength and mobility and cardiorespiratory fitness, lead to significant better outcome in axial spondyloarthritis

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Summary

Exercise is considered as a pilar of treatment for axial spondyloarthritis, a chronic inflammatory condition primarily affecting the sacroiliac joints and spine impacting trunk strength and mobility but also cardiorespiratory fitness. There is, however, paucity of research examining the effect of a patient-tailored exercise program incorporating training for trunk strength/mobility in combination with cardiorespiratory fitness. This study aims to assess the potential benefits for axSpA patients of a combined cardiorespiratory and trunk strength/mobility exercise program, based on individual baseline physical test results.

Introduction

Axial spondyloarthritis (AxSpA) is a chronic inflammatory condition primarily affecting the sacroiliac joints and spine impacting trunk strength and mobility but also cardiorespiratory fitness.[1] Although exercise is considered as a pilar of treatment [2], there is paucity of research examining the effect of an exercise program incorporating training for targeted trunk strength/mobility in combination with cardiorespiratory fitness.
The aim of this prospective interventional study was to assess the potential benefits for axSpA patients of a combined cardiorespiratory and trunk strength/mobility exercise program, based on individual baseline physical test results.

Methods

AxSpA patients performed a baseline maximal Cardiopulmonary Exercise Test (CPET) and trunk strength/mobility tests on the David Back Concept (DBC) devices. For strength and mobility deficits were calculated as (Reference value – Patient value) x100 / Reference value).
Subsequently, patients participated in an eight-week exercise program, with two sessions per week. Each session entailed two intervals of ten minutes of cardiorespiratory training at a set heartrate (HR), followed by exercises on the DBC devices. Training thresholds were determined based on their individual test results. The intensity for the cardiorespiratory training was monitored by HR, based on their first ventilatory threshold (VT1), using a Polar device. The three sets of repetitions of exercises on the four DBC devices focused on mobility and resistance training for the trunk and were tailored to progressively enhance strength and endurance throughout the intervention period. The program was individualized based on the 'one repetition maximum' and the maximal range of motion at baseline. During all training sessions, supervision and assistance was provided to make sure participants performed the exercises correctly, while ensuring safety and effectiveness.
Finally, after the intervention period participants performed again a maximal CPET and trunk mobility and strength tests on the DBC devices. Linear mixed models were used to examine the effect over time.

Results and Discussion

30 axSpA patients (14 M/16 F, 42±11,2 years) participated. Two patients were lost to follow-up and did not attend the posttest (1: flare, 2: personal reasons).
Significant improvement was observed for both strength and mobility (Fig.1). A significant effect was observed for time ($p<0.001$) on strength with a mean decrease in deficit of 14.1% after the training program. For mobility, the interaction between time and direction and the main effects of time and direction were all significant (all $p<0.001$) with a mean decrease in mobility deficit of 14.9%.

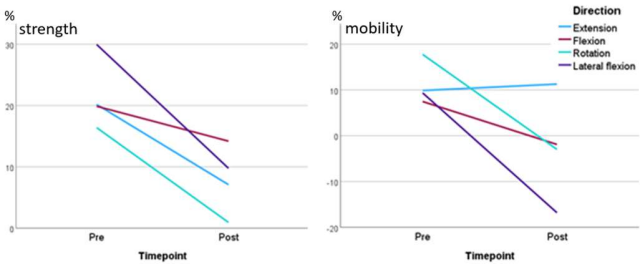

Figure 1: Improvement in mean deficit for strength and mobility

Regarding cardiorespiratory parameters, a significant effect of time was shown for oxygen pulse ($p=0.004$), ventilatory efficiency ($p<0.001$), anaerobic threshold ($p=0.002$) and mechanical efficiency ($p=0.021$). No effect of time could be determined for mechanical efficiency slope ($p=0.888$).

Conclusions

A standardized yet individually adjusted protocol, based on baseline test results, to train trunk strength/mobility and cardiorespiratory endurance, significantly improved these parameters. These findings underline the importance of individualized, patient-tailored exercise interventions in axSpA management to improve patient's outcomes and reduce functional limitations.

References

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[2] Ramiro S, et al. (2023) *Ann Rheum Dis*. **82(1)**:19-34