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Effect of diaphragmatic breathing techniques on perceived exertion and cardiovascular variables during resistance exercises performed by tetraplegic rugby athletes

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Background: People with tetraplegia tend to have sedentary lifestyle which prevents optimal participation in work and recreational activities. Thus, the aim of the present study is to determine the effect of the use of diaphragmatic breathing techniques on perceived exertion and cardiovascular variables during resistance exercises performed by tetraplegic rugby athletes who use wheelchairs as their primary mode of mobility.

Methods: Forty tetraplegic rugby athletes with incomplete C5-C8 spinal cord injury were selected randomly to participate in the present study, and were assigned to one of two equal groups: 1) the experimental group that was taught to perform resistance exercises without any breathing instruction followed by sessions including different breathing techniques, and 2) the control group. Perceived exertion, blood pressure and heart rate were measured prior to and following each resistance exercises session.

Results: The collected data indicates that performing resistance exercises without any breathing instruction induced the highest cardiovascular and perceived exertion responses in both groups. Exhalation during the concentric phase of the exercise was associated with elevations in all responses as compared to inhalation during the concentric phase of the exercise which resulted in significant reduction of all responses ($p<0.01$). These results suggest that coupling inhalation or exhalation with the concentric phase of the lift of resistance exercises produces similar blood pressure responses, while the inhalation technique specifically reduces heart rate and perceived exertion. Thus, the inhalation technique is recommended for its sustained effects on all studied variables.

Conclusion: The findings of the current study contradict the generally accepted relationship between the rate of perceived exertion and heart rate during exercises performed by people without disabilities.

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