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Heart Rate Recovery after Submaximal Exercise in Four Different Recovery Protocols in Male Athletes and Non-Athletes

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Received: 16-12-2010 -- Accepted: 22-03-2011 -- Published (online): 01-06-2011

ABSTRACT

The effects of different recovery protocols on heart rate recovery (HRR) trend through fitted heart rate (HR) decay curves were assessed. Twenty one trained male athletes and 19 sedentary male students performed a submaximal cycle exercise test on four occasions followed by 5 min: 1) inactive recovery in the upright seated position, 2) active (cycling) recovery in the upright seated position, 3) supine position, and 4) supine position with elevated legs. The HRR was assessed as the difference between the peak exercise HR and the HR recorded following 60 seconds of recovery (HRR₆₀). Additionally the time constant decay was obtained by fitting the 5 minute post-exercise HRR into a first-order exponential curve. Within- subject differences of HRR₆₀ for all recovery protocols in both groups were significant ($p < 0.001$) except for the two supine positions ($p > 0.05$). Values of HRR₆₀ were larger in the group of athletes for all conditions ($p < 0.001$). The time constant of HR decay showed within-subject differences for all recovery conditions in both groups ($p < 0.01$) except for the two supine positions ($p > 0.05$). Between group difference was found for active recovery in the seated position and the supine position with elevated legs ($p < 0.05$). We conclude that the supine position with or without elevated legs accelerated HRR compared with the two seated positions. Active recovery in the seated upright position was associated with slower HRR compared with inactive recovery in the same position. The HRR in athletes was accelerated in the supine position with elevated legs and with active recovery in the seated position compared with non-athletes.

Key words: Heart rate recovery, autonomic activity, active recovery, physical activity

Key Points

- In order to return to a pre-exercise value following exercise, heart rate (HR) is mediated by changes in the autonomic nervous system but the underlying mechanisms governing these changes are not well understood.

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 (2011) Heart Rate Recovery after Submaximal Exercise in Four Different Recovery Protocols in Male Athletes and Non-Athletes.
Journal of Sports Science and Medicine (10), 369 - 375.

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