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Effects of High-Intensity Exercise on the ROM Training Device On Muscular Strength and Body Composition

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The importance of exercise and physical activity for the maintenance and improvement of health and physical fitness is beyond discussion. However, most people do not allow themselves the time to engage in conventional, time consuming exercise programs.

Time efficient training schedules could offer them a solution. High-intensity – low volume exercise on the so called ROM training device has shown to increase VO₂max and endurance capacity in healthy, untrained subjects.

Purpose: To investigate whether high intensity training on the ROM training device also has a positive effect on whole body strength, body weight and fat percentage.

Methods: 16 healthy, untrained subjects (12 men, 4 women, age 36 ±10 years) exercised for 8 weeks, 3 times a week. Net exercise time per session was 8 minutes. In every session, first the upper body was exercised for 4 minutes and then, after a short break, the lower body was exercised for the same length of time. The upper body exercise is more or less similar to rowing, with resistance in both movement directions. The lower body exercise can be described as deep stepping. Subjects were encouraged to train at their maximal intensity. Total net exercise time over 8 weeks was 3 hours and 12 minutes. Before and after the training period maximal isometric strength of 6 muscle groups (left and right arm flexors, arm extensors, trunk flexors, trunk extensors, leg extensors), body weight and fat percentage (Durnin & Wormersley skin fold method) were measured.

Results: The average increase of isometric strength for the 6 muscle groups was 5.2% (p<0.01). Fat percentage decreased significantly from 25.5 ± 5.5 to 24.6 ± 5.2% (p=0.04). Body weight (kg) did not change (pre-test 81.8 ± 13.0, post-test 82.2 ± 13.0, p=0.13).

Conclusion: High intensity exercise on the ROM training device has a small, but significant positive effect on whole body strength and body composition in healthy, untrained adults.



Effects of high-intensity exercise on the ROM training device on muscular strength and body composition

INTRODUCTION

The importance of exercise and physical activity for the maintenance and improvement of health and physical fitness is beyond discussion. However, most people do not allow themselves the time to engage in conventional, time consuming exercise programs. Time efficient training schedules could offer them a solution. High intensity - low volume exercise on the so called ROM training device has shown to increase VO_{2max} and endurance capacity in healthy, untrained subjects (Van Es & van der Loo, 2007). We investigated whether this type of training also has a positive effect on whole body strength, body weight and fat percentage.



METHODS

16 healthy, untrained subjects (12 men, 4 women, mean age 36 ± 10 years) exercised on the ROM device for 8 weeks, 3 times a week. In every session, firstly the upper body exercise, which is more or less similar to rowing with resistance in both movement directions (see picture in lower left corner), was performed for 4 minutes. Secondly, after a short break, the lower body exercise, that can be described as deep stepping (see picture in lower right corner) was exercised for the same length of time. Subjects were encouraged to train at their maximal intensity. External resistance progressively increased over the weeks. Total net exercise time over 8 weeks was 3 hours and 12 minutes.

RESULTS

Before and after the training period maximal isometric strength of 6 muscle groups (left and right arm flexors, arm extensors, trunk flexors, trunk extensors, leg extensors), body weight and percentage of body fat (Durnin & Womersley skinfold method) were measured. The average increase of isometric strength for the 6 muscle groups was 5.2% ($p < 0.01$; see table below). Fat percentage decreased significantly from 25.5 ± 5.5 to $24.6 \pm 5.2\%$ ($p = 0.04$). Body weight (kg) did not change (pre-test 81.8 ± 13.0 , post-test 82.2 ± 13.0 , $p = 0.13$).

Isometric test exercise	Pre-test (N)		Post-test (N)		Relative Change (%)	p-value
	Avg	sd	Avg	sd		
Right arm flexion	240	63	246	67	+2.5%	0.10
Left arm flexion	232	58	242	66	+4.0%	0.10
Leg press	3959	1193	4225	1027	+6.7%	0.09
Trunk flexion	677	113	727	123	+7.5%	0.00*
Trunk extension	843	151	881	149	+4.5%	0.08
Arm extension	1193	218	1231	211	+3.1%	0.29
Average					+5.2%	0.00*

DISCUSSION

Although users of the ROM device experience the external resistance that has to be overcome as substantial, it is evidently not high enough to induce substantial muscle hypertrophy and/or maximal strength gain. This is concluded with slight reservation, because training was dynamic and testing was isometric. However, per 4 minutes of exercise about 48 (upper body) to 60 (lower body) continuous movement cycles are made. Within one cycle, most muscles are loaded for about half the time. Such a combination of a high number of reps and (inevitably) moderate resistance is more likely to improve (local) strength endurance (Kraemer, 2002). This is in line with the significant increases from pre- to post-test in maximal external power at the end of an incremental cycling test (+ 10%, 248 vs. 272 Watt) and endurance time during cycling at 80% VO_{2max} (+ 72%, 14:51 vs 25:31), as reported by Van Es & Van der Loo (2007).

CONCLUSION

High intensity - low volume exercise on the ROM training device has a small, but significant positive effect on whole body strength and body composition in healthy, untrained adults.

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References:
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