EFFECTS OF TWO DIFFERENT RESISTANCE TRAINING INTENSITIES ON SHORT-TERM STRENGTH ADAPTATIONS IN YOUNG ADULTS

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ABSTRACT

The study aimed to compare the initial changes in muscular strength between traditional resistance (TR) and minimal resistance (MR) training in young adults novice to resistance training. METHODS: Twenty-nine untrained young adults (age 17-25) were randomized to TR or MR groups. For both groups, the intervention consisted of 4-week training sessions with pre-test and seven follow-up tests. RESULTS: Significant strength improvements were observed in both groups for both exercises from pre- to the last follow-up test (p<0.0011). For the Bench Press no significant group by time interaction was observed (p=0.0809) as the strength improvement patterns were similar between the MR and TR groups. For the Triceps Pressdown a significant group by time interaction was observed (p=0.0227) as the TR group showed greater and more rapid strength gains than the MR group. CONCLUSION: Initial strength improvements may be elicited in untrained subjects by the mere practice of the training movement using minimal training load, particularly in complex multi-joint movements. Higher training load is necessary to achieve further strength improvements after the first few weeks of training. For single-joint movements, the use of higher training loads may be necessary early on to elicit strength improvements.

INTRODUCTION

- Resistance training induced rapid initial strength gains observed in untrained subjects are mainly due to neuromuscular factors.
- It is theorized that muscular strength improvements may be elicited by simply practicing the resistance training movement with minimal resistance and initial gains may be comparable to gains achieved through using an overload.

PURPOSE

- To compare the initial changes in muscular strength between traditional resistance (TR) and minimal resistance (MR) training in young adults novice to resistance training.

METHODS

- Four-week training intervention with pre-test and seven follow-up tests.
- Untrained young adults were randomly assigned to TR & MR groups.
- Two exercises were performed: Bench Press representing a multi-joint and Triceps Pressdown representing a single-joint movement.
- Subjects in TR group used resistance of approximately 75% of 1RM.
- Subjects in MR group used very low (i.e., < 10% 1RM) resistance.

RESULTS

- Three sets of ten repetitions were performed for each exercise twice per week for 4 weeks.
- Strength was measured using the 1RM testing procedure for both exercises for all tests.
- Data were analyzed using a general linear mixed model.
- Alpha level was set at p<0.05.

Table 1. Descriptive characteristics of the subjects

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Age (years)±SD</th>
<th>Height (cm)±SD</th>
<th>Weight (kg)±SD</th>
<th>BMI(kg/m²)±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>TR</td>
<td>14</td>
<td>23.19±4.60</td>
<td>167.68±9.50</td>
<td>81.29±22.44</td>
<td>28.57±5.89</td>
</tr>
<tr>
<td>MR</td>
<td>15</td>
<td>24.22±4.50</td>
<td>166.74±8.35</td>
<td>71.19±17.65</td>
<td>25.46±5.49</td>
</tr>
</tbody>
</table>

Figure 1. Bench Press Strength Group Means by Time

- Significant strength improvements were observed in both groups for both exercises from pre- to the last follow-up test (p<0.0011).
- For the Bench Press no significant group by time interaction was observed (p=0.0809) as the strength improvement patterns were similar between the MR and TR groups.
- For the Triceps Pressdown a significant group by time interaction was observed (p=0.0227) as the TR group showed greater and more rapid strength gains than the MR group.

CONCLUSION

- Initial strength improvements may be elicited in untrained subjects by the mere practice of the training movement using minimal training load, particularly in complex multi-joint movements.
- Higher training load is necessary to achieve further strength improvements after the first few weeks of training.
- For single-joint movements, the use of higher training loads may be necessary early on to elicit strength improvements.

PRACTICAL APPLICATIONS

- During the initial program period practicing proper exercise technique – particularly for multi-joint movements – with minimal or no resistance overloads may provide a safe and effective method of achieving initial strength adaptations in untrained individuals.

Figure 5. A subject demonstrates the bench press using minimal resistance (<10% 1RM) and traditional resistance (75% 1RM).

ACKNOWLEDGEMENT

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