“Comparison of the Effects of Three Hangboard Training Programs on Maximal Finger Strength in Rock Climbers”

Eva López-Rivera, Club Vertical Toledo, Spain
J.J. González-Badillo, Seville University, Spain

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Grip strength greater in Climbers vs non climbers
Elite climbers vs lower level
(Grant y col., 1996, 2001; Vigouroux & Quaine, 2006, Philippe y col., 2012)

Significant positive correlation with climbing ability
(Macleod et col., 2007; Philippe et col., 2012)

Grip strength is a performance factor
(Bourne et al. 2011; MacLeod et al., 2007; Philippe et al., 2012)
Program variables can be manipulated...

Low volume
High load (>90%)
Long rest periods (>3')

¿combined?

Moderate volume
Moderate-high Load (70-85%)
Short rest periods (<2')

A higher relative load could be superior to a lighter relative load for developing strength
(Shoenfeld, 2014)

Dead hangs is a specific exercise in climbing
(Watts 2004; Vigouroux & Quaine, 2006)

Max hangs
Repeaters

López-Rivera & González-Badillo (2012)

Photo courtesy of Shauna Coxey
López-Rivera & González-Badillo (2012) combined the benefits of RT with one of the main characteristics of climbing...

Purpose

Compare the effects on strength development of three dead-hang training programs, comprised of two 4-week phases each.

**Group 1**
- Max Weighted Hangs - Max Unweighted Hangs

**Group 2**
- Repeaters

**Group 3**
- Max Weighted Hangs - Repeaters
### Introduction

Methods

Results & Discussion

Conclusion

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<table>
<thead>
<tr>
<th>Group</th>
<th>Age (years)</th>
<th>Height (cm)</th>
<th>Weight (kg)</th>
<th>Years climbing</th>
<th>Climbing ability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (n = 11)</td>
<td>33.91 ± 7.00</td>
<td>171.3 ± 7.41</td>
<td>67.04 ± 8.90</td>
<td>14.27 ± 6.34</td>
<td>8a</td>
</tr>
<tr>
<td>Group 2 (n = 7)</td>
<td>31.11 ± 5.30</td>
<td>172.6 ± 9.31</td>
<td>63.30 ± 9.93</td>
<td>10.44 ± 5.75</td>
<td>8a</td>
</tr>
<tr>
<td>Group 3 (n = 8)</td>
<td>30.13 ± 5.77</td>
<td>171.0 ± 5.57</td>
<td>66.51 ± 6.90</td>
<td>11.19 ± 6.14</td>
<td>7c</td>
</tr>
</tbody>
</table>

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**Hangboard apparatus** (López-Rivera & González-Badillo, 2012)

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Adjustable depth edge
**Test** (López-Rivera & González-Badillo, 2012)

I.C.C. = 0.96 (95%CI, 0.87/0.99)
CV = 7.8%

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**Testing and Training Schedule**

<table>
<thead>
<tr>
<th>tests</th>
<th>Random.</th>
<th>Training phase 1</th>
<th>tests</th>
<th>Training phase 2</th>
<th>tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 0</td>
<td>G_1</td>
<td>ST1</td>
<td>Week 1-4</td>
<td>G_2</td>
<td>ST2</td>
</tr>
<tr>
<td></td>
<td>G_3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 5</td>
<td>G_1</td>
<td></td>
<td>Week 5-8</td>
<td>G_2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ST3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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## Training Methods

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Training phase 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3x10&quot;.3'</td>
<td>3x4x10&quot;.5&quot;/1'</td>
<td>3x10&quot;.3'</td>
</tr>
<tr>
<td>4x10&quot;.3'</td>
<td>4x4x10&quot;.5&quot;/1'</td>
<td>4x10&quot;.3'</td>
</tr>
<tr>
<td>5x10&quot;.3'</td>
<td>5x4x10&quot;.5&quot;/1'</td>
<td>5x10&quot;.3'</td>
</tr>
<tr>
<td>5x10&quot;.3'</td>
<td>5x4x10&quot;.5&quot;/1'</td>
<td>5x10&quot;.3'</td>
</tr>
</tbody>
</table>

| **Training phase 2** |               |               |
| 3x10".3'      | 3x5x10".5"/1' | 3x10".3'      |
| 4x10".3'      | 4x5x10".5"/1' | 4x10".3'      |
| 5x10".3'      | 5x5x10".5"/1' | 5x10".3'      |
| 5x10".3'      | 5x5x10".5"/1' | 5x10".3'      |

## % Change in Strength

### ST1-ST2

- **Max Hangs**
  - ES: 0.4
  - 15%

- **Repeaters**
  - ES: 0.5
  - 21%

### ST1-ST3

- **Max Hangs**
  - ES: 0.7
  - 28%

- **Repeaters**
  - ES: 0.3
  - 14%
Changes in Strength after 4 weeks of training

- **Group 1** and **group 3** improved the most
  - Neural effects
    (Hakkinen & Komi, 1985; Hakkinen et al., 1998; Sale et al., 1998)
  - In line with López-Rivera & González-Badillo (2012) and similar
    isometric training works (Ikai & Fukunaga, 1970; Can; Canon & Cafarelli,
    1987; Davies et col., 1988)

- Training repeaters provided smaller gains to **group 2**:
  - Lower intensity and added weight
    (Fry, 2004; Hakkinen, 1994; Schoenfeld et al. 2014; Tan, 1999)

Changes in Strength after 8 weeks training

Greater progress by **group 1** *(28% compared to 13,4% and 13,9% by groups 3 and 2)*

- **Group 3** experienced loss in phase 2: heightened fatigue
- **Group 2** obtained its best increase in phase 2: hypertrophy
  Ratamess et col., 2007)
1- The most effective Program for strength development is

2- The repeaters group displayed a higher rate of improvement after 8 weeks, probably as an effect of hypertrophy
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Eva López-Rivera, Club Vertical Toledo, Spain
evalopriv@gmail.com
twitter.com/evalopezcoach
facebook.com/evalopezcoach
www.en-eva-lopez.blogspot.com

Practical Applications

Suggested Hangboard Periodizations

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