Better Dynamic Postural Stability While Wearing Minimalist Footwear in Physically-Active Male Adults

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ABSTRACT

Minimalist footwear (MF) has gained significant popularity over the last decade. The majority of existing research has examined running-related injuries and kinematics, but MF may provide a therapeutic benefit when integrated with strength and conditioning programs. To establish if MF is therapeutic, acute differences in dynamic postural stability were assessed in athletic shoes (AS), MF, and military boots (MB). Postural stability has been shown to be a risk factor for ankle injuries, a common ailment in armed forces. If certain footwear might otherwise be muted by AS, experience strengthening benefits, and provide understanding on the role of footwear on dynamic postural stability.

STUDY DESIGN

Within-subject, repeated measures design

SUBJECTS

31 healthy, physically-active males (23.5 ± 4.9 yrs [mean ± SD], 76.3 ± 7.5 kg, 175.7 ± 6.3 cm) with no experience wearing minimalist footwear

PROCEDURES

Dynamic Postural Stability Index (DPSI) Jump-Landing Task

Anterior/posterior (A/P) jumps over 12-inch hurdle from distance equal to 40% of the subject’s height; 5 collected trials (Figure 1)

Medial/lateral (M/L) jumps over 6-inch hurdle from distance equal to 33% of the subject’s height; 5 collected trials (Figure 1)

Jumps performed in each footwear condition; 30 total collected trials

A/P DPSI in athletic shoes (AS) as first condition

MF and military boots (MB), as well as direction, randomized thereafter

Five-minute warm-up on treadmill in each condition prior to jump-landing task

RESULTS

A/P DPSI trials sig. different (F = 17.052, df = 2, p < .001) across footwear conditions

DPSI sig. lowest in MF (p < .001)

M/L DPSI trials sig. different (F = 8.459, df = 2, p < .001) across footwear conditions

DPSI sig. lower in MF than AS (p = .002)

Footwear

<table>
<thead>
<tr>
<th>Footwear Type</th>
<th>ASPI</th>
<th>MLSI</th>
<th>VSI</th>
<th>DPSI</th>
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<tbody>
<tr>
<td>Athletic Shoes (AS)</td>
<td>.42*</td>
<td>.01*</td>
<td>.23*</td>
<td>.376 ± .026</td>
</tr>
<tr>
<td>Minimalist Footwear (MF)</td>
<td>.13*</td>
<td>.02*</td>
<td>.29*</td>
<td>.359 ± .026</td>
</tr>
<tr>
<td>Military Boots (MB)</td>
<td>.13*</td>
<td>.02*</td>
<td>.29*</td>
<td>.362 ± .027</td>
</tr>
<tr>
<td>p-value</td>
<td>p &lt; .001</td>
<td>p &lt; .001</td>
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<tr>
<td>Significant Pairwise Comparisons</td>
<td>AS &gt; MF</td>
<td>AS &gt; MF</td>
<td>AS &gt; MF</td>
<td>AS &gt; MF</td>
</tr>
<tr>
<td></td>
<td>(p &lt; .001)</td>
<td>(p &lt; .001)</td>
<td>(p &lt; .001)</td>
<td>(p &lt; .001)</td>
</tr>
<tr>
<td></td>
<td>AS &gt; MB</td>
<td>AS &gt; MB</td>
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<td></td>
<td>(p &lt; .001)</td>
<td>(p &lt; .002)</td>
<td>(p &lt; .002)</td>
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<tr>
<td></td>
<td>MPSI sig. lowest in MF (p &lt; .001)</td>
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</tbody>
</table>

EXPERIMENTAL DESIGN AND METHODS

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SUMMARY AND CONCLUSIONS

- MF scores indicate better dynamic postural stability compared to AS acutely
- Better DPSI in MB than AS possibly due to the differences in footwear design
- Future studies should account for a potential learning effect with DPSI task

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