The Effects of Dynamic Versus Movement Prep Warm-up on Female High School Players

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Introduction

- A dynamic warm-up routine performed prior to exercise is a common practice among athletes.
- Comprehensive neuromuscular (NM) training programs can produce improvement in athletic performance, biomechanical patterns, and reduce the risk of ACL injuries.1,2
- A warm-up that includes aspects of both a dynamic warm-up and NM training would be most beneficial and time efficient for both athletes and coaches.

- Movement prep, named and used by Athletes Performance, combines aspects of a dynamic warm up and NM program.3
- The goal of movement prep is to prepare an athlete’s body for movement while addressing mobility, stability, and movement patterns.3

Purpose

- To determine if a movement prep warm-up improves jump landing mechanics and agility compared to a dynamic warm-up in 12 female high school basketball players.
- We hypothesized that a movement prep warm up will improve jump landing mechanics and decrease agility times compared to a dynamic warm up.

Materials and Methods

- Athletes completed an initial testing session, 13 practices performing a dynamic warm-up, a second testing session, 13 practices performing movement prep, and third testing session.
- During each of the three testing sessions, athletes completed a drop box vertical jump off a 30 cm box and a t-shuttle agility test.
- The drop box vertical jumps were videotaped and landings were scored using the Landing Error Scoring System (LESS).
- The dynamic warm-up consisted of jogging, sport specific movements, and stretching (quad stretch, side lunges, high knees, etc.).
- The movement prep routine consisted of activation exercises (movements performed with a resistance band), dynamic stretches, movement integration (marching and skipping patterns), and neural activation (quick feet drills).
- Movement prep is an extension of a dynamic warm up, therefore it was performed during the second set of 13 practices.

Results

- One-way ANOVA revealed no significant difference in t-shuttle agility times between baseline, after dynamic warm-up, and after movement prep: [(F (2, 35) =1.385, p = .264).
- One-way ANOVA revealed no significant difference in LESS scores between baseline, after dynamic warm-up, and after movement prep for the left leg [(F (2, 35) =.192, p = .826)] and right leg [(F (2, 35) = .373, p = .691)].

<table>
<thead>
<tr>
<th>Baseline</th>
<th>Dynamic</th>
<th>Movement Prep</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.93 s</td>
<td>8.80 s</td>
<td>8.50 s</td>
</tr>
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Table 1: Average t-shuttle agility times across two warm-up treatments

<table>
<thead>
<tr>
<th>Baseline</th>
<th>Dynamic</th>
<th>Movement Prep</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.67</td>
<td>5.92</td>
<td>6.00</td>
</tr>
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</table>

Table 2: Average LESS Scores- Left foot across two warm-up treatments

<table>
<thead>
<tr>
<th>Baseline</th>
<th>Dynamic</th>
<th>Movement Prep</th>
</tr>
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<tbody>
<tr>
<td>6.00</td>
<td>6.25</td>
<td>6.00</td>
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Table 3: Average LESS Scores- Right foot across two warm-up treatments

*For Tables 2 &3 an excellent jump = < 4, good = > 4 to < 5, moderate = > 5 to < 6, and poor = > 6.

Figure 1. Frontal view at initial contact

Figure 2. Frontal view at max knee valgus

Discussion

- Recent research on dynamic warm-ups have focused primarily on the effects on performance. Little research has examined the effects on jump landing mechanics and injury risk. The research on NM training is the opposite.1, 2, 4
- Agility times did decrease but not significantly after a dynamic warm-up and movement prep. These findings are consistent with previous research, but might have been due to improvement in training over the season as well.4
- LESS scores did not change after 13 practices incorporating a dynamic warm-up or 13 practices incorporating a movement prep warm-up.

- Plyometric exercises are included in NM training programs, but were not included in the two treatments used for this study. Plyometric exercises have been shown to improve jump land technique.1,2,5
- Full NM training programs generally take 60-90 minutes to complete and last 6 weeks compared to the brief movement prep warm up period used here.1,3
- Limitations of this study include a small sample size and the lack of a counterbalanced cross over design.

- Future research should include plyometric exercises in the movement prep warm-up to examine the effect on jump landing technique and agility.

Conclusions

- Neither the dynamic warm-up nor the movement prep warm-up was effective in improving agility or improving jump landing technique.
- Performing movement prep did not produce the same results reported in studies using a full length NM training program.

Literature Cited