2014

Exercise Dosage and Pelvic Floor Muscle Function in Young Women With and Without Urinary Incontinence

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Exercise Dosage and Pelvic Floor Muscle Function in Young Women With and Without Urinary Incontinence

EWU RESEARCH SYMPOSIUM 2014
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PATRICIA NELSON, PT, SCD, OCS, FAAOMPT
WHAT IS URINARY INCONTINENCE (UI)?

Any *involuntary* loss of urine… [Abrams et al., 2002]

Stress Incontinence v. Urge Incontinence

Who?

- Females > Males
- Populations who are obese, pregnant, or elderly
  [Eliasson et al., 2004]
- Young, nulliparous, healthy females…
WHY YOUNG, HEALTHY FEMALES?

38%-50% report UI during daily living & sport activity…
[Eliasson et al., 2004; Bo & Borgen, 2001; Kruger et al., 2007]

Why?

• High intra-abdominal pressure (IAP) during high impact activity
• Poor control of the pelvic floor muscles (PFM), transverse abdominus (TrA), and diaphragm [Sapsford, 2003; Madill & McLean, 2006]
HOW CAN WE MEASURE PFM CONTROL?

Transabdominal Real Time Ultrasound Imaging (RTUS)

Visualization of bladder floor:
- Ascends with PFM contraction
- Descends with Valsalva maneuver
Figure 1. PFM Contraction

Figure 2. Valsalva Maneuver
Can higher levels of physical activity lead to poor pelvic floor muscle control in young, nulliparous, healthy females?
AND WE LOOKED AT…

48 female volunteers from the EWU Riverpoint and Cheney campuses who:

- Were 18-30 years old
- Have never been pregnant
- Had no known congenital pelvic deformities
DATA COLLECTION

Bladder filling protocol
Completion of standardized questionnaires
  • Incontinence Severity Index
  • Urinary Status Questionnaire
  • International Physical Activity Questionnaire
Clinical examination
  • PFM & TrA coordination
  • Pelvic Angle
  • Chest Excursion
RTUS
  • Resting
  • PFM contraction
  • Valsalva Maneuver
THE RESULTS

- 48 subjects met eligibility criteria
- 94% with college degree or some college
- **23%** (n=11) reported UI in the past 4 weeks
  - 8% (n=4) presented with **moderate to severe UI** (ISI Score ≥ 3)

### Subject Demographics and Exam Findings

<table>
<thead>
<tr>
<th></th>
<th>UI +</th>
<th>UI -</th>
<th>t-test</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (Years)</strong></td>
<td>21.3 ±2.6</td>
<td>22.8 ±3.1</td>
<td></td>
<td>.390</td>
</tr>
<tr>
<td><strong>BMI (kg/m²)</strong></td>
<td>22.7 ±3.1</td>
<td>22.7 ±2.92</td>
<td></td>
<td>.980</td>
</tr>
<tr>
<td>Subjects</td>
<td>Mean Total METs (min/wk)</td>
<td>t-test p value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>UI- (ISI &lt; 3)</td>
<td>44</td>
<td>3452.25 ± 2542.9</td>
<td>0.758</td>
<td></td>
</tr>
<tr>
<td>UI+ (ISI ≥ 3)</td>
<td>4</td>
<td>3247.13 ± 810.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total METs by Intensity per Week**

- **Vigorous**:
  - UI-
  - UI+  
  - p=0.911

- **Moderate**:
  - UI-
  - UI+  
  - p=0.777

- **Average** :
  - UI-
  - UI+  
  - p=0.874
PELVIC FLOOR COORDINATION

- **40% (n=19)** unable to perform lifting contraction without viewing US image
- **47% (n=9)** able to correct lifting contraction after viewing the US image

<table>
<thead>
<tr>
<th>Pelvic Floor Movement</th>
<th>Bladder Floor Excursion (cm)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UI-</td>
<td>UI+</td>
</tr>
<tr>
<td>Valsalva</td>
<td>0.767 ± 0.596</td>
<td>0.964 ± 0.752</td>
</tr>
<tr>
<td>PFM Contraction</td>
<td>0.365 ± 0.322</td>
<td>0.001 ± 0.219</td>
</tr>
</tbody>
</table>
IMPORTANCE

• No difference between amount and intensity of exercise between groups

• Significant difference in ability to perform proper PFM lifting contraction in UI+ group

• Motor control v. strength?
CONCLUSIONS

• **Mechanisms of UI** in young, healthy females remain unclear

• **RTUS** is great biofeedback tool for training PFM

• **Further research needed** to determine correlation between high levels of physical activity and UI
FUTURE RESEARCH

- Determine if high levels of physical activity can lead to moderate to severe levels of UI in a young, healthy, female population.
ACKNOWLEDGEMENTS

*Special thanks to: Ashley Wilkens


