Menstrual Function Not Related to Clinical Outcomes in Females After Acute Spondylolysis: An Observational Analysis.

Mary Kathryn Vicary PT, DPT
& Mitchell Selhorst PT, DPT, OCS

This research was conducted at Nationwide Children's Hospital Sports and Orthopedic Physical Therapy

What is a Spondylolysis?¹⁴
Why Females? 

Menstrual Dysfunction

- Primary Amenorrhea
  - No onset of menses by age 15

- Secondary Amenorrhea
  - Cessation of menstrual cycles for ≥ 3 consecutive months in the past year

- Oligomenorrhea
  - >35 days between menstrual cycles

I’m Not Irregular. Period.
The Female Athlete Triad\textsuperscript{7-9}

Bone Stress Injuries\textsuperscript{6}

The purpose of this study is to determine if there is a link between menstrual dysfunction and long-term clinical outcomes following acute spondylolysis.
Hypothesis

Acute Spondylolysis

Menstrual Dysfunction

Clinical Outcomes

Methods

Long Term Follow-Up Data:

- Recurrence Rate of Low Back Pain
- Patient’s Perceived Outcome
- Pain
- Functional Ability on the Micheli Functional Scale
- Current Menstrual Function

Participants

Eligible if treated from January 2010 through December 2015

Inclusion Criteria

- 10-18 year old female
- Confirmed acute spondylolysis

Exclusion Criteria

- Diagnosis made by radiograph, computed tomography, or suspicion only
- The injury was chronic
- Another injury or illness that altered the plan of care
- Referred to an external clinic for care
Menstrual Function Questionnaire

- Last Menstrual Period
- Reliability: Exact or Approximate

- Currently Pregnant: Yes or No
- Having menstrual periods: Yes or No

- Number of menses in past 12 months
- Do you go more than 35 days between periods: Yes or No

- Do you take hormonal contraceptives: Yes or No
Data Analysis

1. Descriptive statistics were calculated for all retrospective and long-term follow-up variables.
2. The study’s objective was assessed using logistic regression analysis.
   ▶ Controlled for number of levels injured and adverse events
   ▶ Variables that were not considered significant were removed one by one, starting with the least significant variable

Baseline and Menstrual History

<table>
<thead>
<tr>
<th></th>
<th>All Patients (n=100)</th>
<th>Responders (n=70)</th>
<th>Non-Responders (n=30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>13.8 ± 2.1</td>
<td>13.5 ± 2.1</td>
<td>14 ± 1.3</td>
</tr>
<tr>
<td>Bilateral stress injury</td>
<td>44 (44%)</td>
<td>40 (57%)</td>
<td>4 (13%)</td>
</tr>
<tr>
<td>Multi-level injury</td>
<td>4 (4%)</td>
<td>6 (8%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Participates in organised sport</td>
<td>100 (100%)</td>
<td>50 (100%)</td>
<td>50 (100%)</td>
</tr>
<tr>
<td>Previous history LBP</td>
<td>24 (24%)</td>
<td>21 (30%)</td>
<td>3 (10%)</td>
</tr>
<tr>
<td>Hormonal contraceptive</td>
<td>5 (5%)</td>
<td>4 (6%)</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Signs of menstrual dysfunction</td>
<td>8 (8%)</td>
<td>5 (7%)</td>
<td>3 (10%)</td>
</tr>
<tr>
<td>Premenarchal</td>
<td>22 (22%)</td>
<td>22 (31%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

Long-Term Clinical Outcomes

Time Since Treatment (35.2 ± 12 months)
n=70

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Excellent 31 (44%)</th>
<th>Good 27 (39%)</th>
<th>Fair 11 (16%)</th>
<th>Poor 7 (13%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrence of LBP</td>
<td>30 (38%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required medical treatment</td>
<td>22 (32%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function (MFS)</td>
<td>12.5 ± 15.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>1.2 ± 1.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same or higher level of sport</td>
<td>37 (53%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower level of sport</td>
<td>10 (14%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had to retire due to low back</td>
<td>9 (13%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retired but low back not a factor</td>
<td>14 (20%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Poor Outcome 50% (n=35)
Results

<table>
<thead>
<tr>
<th></th>
<th>Point estimate of odds ratio</th>
<th>95% Confidence Interval</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Menstrual Dysfunction</td>
<td>0.9</td>
<td>(0.3, 2.4)</td>
<td>0.46</td>
</tr>
</tbody>
</table>

Discussion

- A large percentage of females had a poor long term outcome following an acute spondylolysis.
- Contrary to other bone stress injuries, menstrual dysfunction was not correlated with poor long term outcomes following acute spondylolysis.

In Summary

- Menstrual Dysfunction
- Low Bone Mineral Density
  - Decreased Energy Availability
- Bone Stress Injuries
- Poor Long Term Outcomes
- Female Athlete Triad
References


