Does pitching experience during elementary and junior high school increase the risk of shoulder and elbow injuries?

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I have no financial conflicts to disclose.
Introduction

• Childhood shoulder and elbow injuries due to excessive baseball pitching have been reported, and limiting the number of pitches has been recommended, particularly in children whose primary position is pitcher.

• While the risks of pitching are indisputable, we have experienced a large number of patients with osteochondritis dissecans (OCD) of the elbow who were fielders rather than pitchers, and who required surgery.
Purpose

• To examine the association between shoulder and elbow injuries and pitching experience, based on examinations of the shoulders and elbows of new members of high school baseball teams.
Materials and Methods

From 2012 to 2017, the orthopaedic surgeons and physical therapists examined the shoulders and elbows of 358 new members of several high school baseball teams. Students were assigned to either the pitching group or non-pitching group to determine whether experience as a pitcher and the years of pitching experience were associated with shoulder and elbow injuries.

- **Pitching group:** 195 students had experience as a pitcher.
- **Non-pitching group:** 163 students had no experience as a pitcher.
Diagnosis and Statistical Analysis

• **Shoulders** were diagnosed as either normal or injured (exhibiting inflammation, for instance) based on pain history and physical examination.

• **Elbows** were diagnosed as normal or having a medial elbow injury or OCD based on pain history, physical examination, and echography.

• For **statistical analysis**, the **Mann-Whitney U test** was used for shoulders and the **Kruskal-Wallis test** was used for elbows. For the relationship between prevalence and pitching experience, the **chi-square test** was used. Statistical significance was defined as $P < 0.05$. 
## Results

The prevalence of **shoulder injury** in two groups

<table>
<thead>
<tr>
<th></th>
<th>Without shoulder injury</th>
<th>Shoulder injury</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pitching</strong></td>
<td>168 (86.2%)</td>
<td>27 (13.8%)</td>
</tr>
<tr>
<td>(n=195)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Non-pitching</strong></td>
<td>146 (89.6%)</td>
<td>17 (10.4%)</td>
</tr>
<tr>
<td>(n=163)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No significant difference (using chi-square test). \( P=0.327 \)
The prevalence of **elbow injuries** in two groups

No significant difference (using chi-square test). $P=0.225$
### The average years of pitching experience

<table>
<thead>
<tr>
<th>Shoulder</th>
<th>Without shoulder injury (n=314)</th>
<th>Shoulder injury (n=44)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pitching experience (years)</strong></td>
<td>1.74</td>
<td>1.96</td>
</tr>
</tbody>
</table>

No significant difference (using **Mann-Whitney U test**). \( P=0.386 \)

<table>
<thead>
<tr>
<th>Elbow</th>
<th>Without elbow injury (n=269)</th>
<th>Elbow OCD (n=14)</th>
<th>Medial elbow pain (n=72)</th>
<th>Medial elbow pain+OCD (n=3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pitching experience (years)</strong></td>
<td>1.64</td>
<td>1.71</td>
<td>2.17</td>
<td>3.67</td>
</tr>
</tbody>
</table>

No significant difference (using **Kruskal-Wallis test**). \( P=0.106 \)
Discussion (1)

In this study, no obvious association was found between the prevalence of shoulder and elbow injuries at the time of high school entry and students’ pitching experience during elementary and junior high school. The presence or absence of pitching experience and the years of pitching experience in the OCD group were comparable to the group without injury, suggesting that pitching experience was not associated with the development of OCD.

- **Age of 6-12**: •Shoulder and elbow pain: associated with pitcher and catcher, not associated with periods of experience. (Matsuura T, Phys Sportsmed. 2017.)
  •Medial elbow injuries: associated with pitcher, number of throws per day. (Sakata J, Am J sports Med. 2017.)
  •Elbow injuries: associated with pitcher, days of training. (Harada M, Takahara M, J Shoulder Elbow Surg. 2010.)
• Therefore, it may be difficult to decrease children’s baseball-related shoulder and elbow injuries by conducting physical examinations of pitchers only, and examination of all child baseball players seems to be preferable.

• Limitation

  The number of throws was not examined.
Conclusions

• Based on physical examination of new members of high school baseball teams, no obvious association was found between the prevalence of shoulder and elbow injuries at the time of high school entry and students’ pitching experience during elementary and junior high school.
References


