INTRODUCTION

- Rotator cuff tears are common shoulder injuries in baseball players. In severe tears, conservative treatment does not work well, and surgical treatment is sometimes chosen in an effort to ensure return to play.
- However, in overhead throwing athletes, partial-thickness rotator cuff tear does not always cause shoulder pain.
- The objective of this study was to assess whether partial thickness rotator cuff tears cause shoulder pain and muscle weakness in baseball players.

Material & Methods

- We studied 87 university baseball players.
- Average age was 19.5 years old.
- Baseball career was 11.5 years.
- All players completed questionnaires regarding their current position, baseball career, and shoulder pain.
- Both dominant and non-dominant shoulder muscle strength was evaluated with digital handheld dynamometer (MicroFET2 (HOGGAN)).
- % muscle strength was calculated.

(\% \text{ muscle strength} = \text{dominant} / \text{non-dominant} \times 100)

- The ultrasonography was used to examine both shoulders to diagnose rotator cuff tears by a single experienced orthopedic surgeon.
- The tear depth was measured using long-axis of the ultrasonographic image.
- All players were divided into 4 groups; (1) no tear, (2) supraspinatus tendon tear, (3) infraspinatus tendon tear, (4) both tendons tear.

Results

Rate of rotator cuff tear
- Forty-one (47\%) players were diagnosed with articular-sided partial-thickness rotator cuff tears using ultrasonography.
- Nineteen (22\%) tears were in the supraspinatus tendon, 13 (15\%) tears in the infraspinatus tendon, and 9 (10\%) tears in both tendons.

Tear depth
- SSP tear: 4.6 \pm 2.3 \text{ mm} (2.3 \text{ – } 6.9 \text{ mm})
- ISP tear: 6.2 \pm 3.6 \text{ mm} (2.7 \text{ – } 9.8 \text{ mm})

Rate of shoulder pain
- In 41 players with rotator cuff tear, 7 (17\%) players had shoulder pain.
- In 46 players without rotator cuff tears, 9 (20\%) players had shoulder pain.
- Rate of shoulder pain was not significant different between rotator cuff tears and intact rotator cuff.

Comparison of the % muscle strength

Abduction

<table>
<thead>
<tr>
<th>No tear</th>
<th>SSP tear</th>
<th>ISP tear</th>
<th>SSP + ISP tear</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>79</td>
<td>92</td>
<td>91</td>
</tr>
</tbody>
</table>

External rotation

<table>
<thead>
<tr>
<th>No tear</th>
<th>SSP tear</th>
<th>ISP tear</th>
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</thead>
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- The % shoulder muscle strength was not significant different among 4 groups.

Discussion

- These results suggest that articular-sided partial thickness rotator cuff tear itself does not cause shoulder pain and muscle weakness in baseball players.
- The average widths of the capsular attachment on the greater tuberosity were 4.4 to 5.6 mm under the supraspinatus tendon and 5.4 to 9.1 mm under the infraspinatus tendon. (Nimura A, JSES 2011)
- This study showed the average tear depth of the articular-sided partial thickness rotator cuff tears was 4.6 mm in the supraspinatus tendon and 6.2 mm in the infraspinatus tendon.
- Therefore, in university baseball players, most so-called articular-sided partial thickness rotator cuff tears were capsular tear on the greater tuberosity.

Conclusion

- Articular-sided partial-thickness rotator cuff tears did not cause shoulder pain and muscle weakness in university baseball players.
- Most so-called articular-sided partial-thickness rotator cuff tears are tears of the superior capsule but not the rotator cuff tendon, and may not be pathological tendon tear.