Return to Play after UCL Injury in Gymnasts and Javelin Throwers.

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Disclosures

• Taylor D’Amore, MD
  • I have no financial conflicts to disclose

• Sam Rao, MD
  • I have no financial conflicts to disclose.

• Robert A Jack II, MD
  • I have no financial conflicts to disclose.

• Christopher J. Hadley, BS
  • I have no financial conflicts to disclose.

• Donald P. Willier III, BS
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• Anthony Romeo, MD
  • I am a paid consultant and receive royalties from Arthrex, Inc.

• Christopher C. Dodson, MD
  • I am a paid consultant for Arthrex Inc.

• Steven B. Cohen, MD
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• Michael G. Ciccotti, MD
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Introduction

• UCL injuries common in traditional overhead sports, most notably baseball.

• UCL reconstruction or repair has allowed high level athletes an opportunity to return to play – number of UCLR has more than doubled within the past decade

• Lack of evidence outlining management and RTP outcomes for non-traditional sports including gymnastics and javelin throwers
  • Supraphysiologic load on the elbow joint

❖ Combined projects
  ❖ Return to Play after UCL Injury in Gymnasts
  ❖ Ulnar Collateral Ligament Reconstruction in Javelin Throwers: An Analysis of Return to Sport Rates and Patient Outcomes
Introduction

• **Purpose:** evaluate RTP and PROs in gymnasts and javelin throwers after operative and non-operative treatment of UCL injuries

• **Level IV Retrospective Case Series**

• **Hypotheses:** no differences in RTP or PROs in patients treated operatively or non-operatively
Materials and Methods

• 12 Gymnasts were diagnosed with a UCL injury over an 8-year period (2010-2018)
  • 9 (75%) successfully contacted over the phone at a minimum of 2 years postoperatively and included in this analysis

• Patients were contacted over phone and assessed with 6 patient reported outcome measurements including a custom return to play questionnaire

• Gymnasts were rated based on their level of competition (recreational, elite or Level 1 through 10 as defined by USA gymnastics)
Results – Demographic Characteristics

- The cohort’s mean age was $16.1 \pm 2.6$ (range, 12-20) years and mean follow-up was $4.5 \pm 2.3$ years

- 8 patients reported they acutely injured themselves while performing a gymnastics maneuver
  - Back Handspring (2), Missed bar and landed on arm (2), Front Handspring (1), double back handspring (1), hyperextension from tumbling (1) and vaulting (1)

- MRI classification
  - Partial (4) vs. Complete (5)
  - Proximal (4) vs. Distal (4) vs. Mid-Substance (1)

- Treatment
  - All 5 complete tears were treated operatively (3 reconstructed/2 repaired)
  - All 4 partial tears underwent initial non-surgical treatment with only 1 patient with a partial mid-substance tear undergoing UCLR at an outside institution
Results – Clinical Outcomes/PROs

• Subjective Assessment
  • 3 patients report resolved symptoms
  • 3 reported improvement in symptoms
  • 2 reported no chance
  • 1 worsened symptoms

• Return to Play Data
  • 7/9 (77.8%) gymnasts were able to return to competition at an average of 7.3±3.4 months from their injury
## Results – Clinical Outcomes/PROs

<table>
<thead>
<tr>
<th>Subjective Assessment</th>
<th>Operative (6)</th>
<th>Non-operative (3)</th>
<th>Total (9)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UCLR</td>
<td>Repair</td>
<td>Combined</td>
</tr>
<tr>
<td>Resolved</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Improved</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>No change</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Worsened</td>
<td>1</td>
<td>0</td>
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</tbody>
</table>

### Conway-Jobe Scale

<table>
<thead>
<tr>
<th></th>
<th>Operative (6)</th>
<th>Non-operative (3)</th>
<th>Total (9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Good</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fair</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Poor</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
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</table>

### Return to Play

<table>
<thead>
<tr>
<th></th>
<th>Operative (6)</th>
<th>Non-operative (3)</th>
<th>Total (9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

### Return to Competition (mo)

- Operative (6): 9.0±4.2
- Non-operative (3): 6.0±1.4
- Total (9): 7.5±3.1
- Overall: 7.0±4.4

**Sidney Kimmel Medical College at Thomas Jefferson University**

**Rothman Institute**
Results – Clinical Outcomes/PROs

• At final follow-up: the operative group had significantly superior (p < 0.05) MEPS, qDASH, current pain at rest, and SANE scores.

<table>
<thead>
<tr>
<th></th>
<th>Operative (6)</th>
<th>Non-Operative (3)</th>
<th>P-Value</th>
<th>Total (9)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UCLR (4)</td>
<td>Repair (2)</td>
<td>Combined (6)</td>
<td>-</td>
</tr>
<tr>
<td>KJOCC</td>
<td>68.8±8.2</td>
<td>67.5±9.8</td>
<td>68.4±7.7</td>
<td>67.4±9.0</td>
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<tr>
<td>MEPS</td>
<td>98.8±2.5</td>
<td>95.0±0.0</td>
<td>97.5±2.7</td>
<td>71.7±5.8</td>
</tr>
<tr>
<td>AT</td>
<td>97.5±2.9</td>
<td>77.5±3.5</td>
<td>90.8±10.7</td>
<td>71.7±14.4</td>
</tr>
<tr>
<td>qDASH</td>
<td>0.0±0.0</td>
<td>5.7±1.6</td>
<td>1.9±3.0</td>
<td>11.4±9.9</td>
</tr>
<tr>
<td>Pain at Rest</td>
<td>0.0±0.0</td>
<td>27.5±3.5</td>
<td>9.2±14.3</td>
<td>36.7±15.3</td>
</tr>
<tr>
<td>SANE</td>
<td>95.8±4.3</td>
<td>80.0±14.1</td>
<td>90.5±10.8</td>
<td>63.3±15.3</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>75.0±50.0</td>
<td>90.0±14.1</td>
<td>80.0±40.0</td>
<td>81.7±27.5</td>
</tr>
</tbody>
</table>
Results – Clinical Outcomes/PROs

• No RTP Outcomes

  • Level 10 gymnast with distal full thickness tear after elbow hyperextension injury. Retired due to prolonged recovery and inability to return to former level of performance

  • Level 5 gymnast with high-grade mid-substance partial tear who retired due to decreased strength in injured elbow after injury and conservative management followed by UCLR at outside institution

• No major complications in cohort

• Overall general satisfaction with treatment was 80.6% and patients reported that their elbow status was 81.4% relative to prior to their injury
Discussion & Conclusions

- Largest follow up data on cohort of gymnasts who sustained UCL injury
- Surgically treated group significantly higher MEPS and SANE scores in addition to significantly lower qDASH scores and less pain at rest
  - Limited by the small sample size
  - KJOC designed for overhead throwing athletes
- Location of the tear likely matters
  - 1 patient who crossed groups was a partial mid-substance tear
- High chance RTP
  - Complete tear and elect surgery
  - Partial tear and nonoperative treatment
Limitations

- **Retrospective study**
  - Subject to recall bias and selection bias

- **Relatively small sample size**
  - While a large sample size for such a rare condition in a unique population the sample is still too small to draw meaningful conclusions

- **Lacking preoperative data**
  - Study lacked pre-operative scores to effectively evaluate the efficacy and impact of procedure
Next: Javelin Throwers

• 18 Javelin throwers were diagnosed with a UCL injury between 2011-2017 and underwent isolated UCLR

  • 16 (88.9%) were successfully contacted over the phone at a minimum of 2 years postoperatively and included in this analysis

• Patients were contacted over phone and assessed with the Kerlan-Jobe Orthopaedic Clinic Shoulder and Elbow score (KJOC), the Andrew-Timmerman Scale (AT), the Conway-Jobe Score as well as a custom return to play questionnaire
Results – Demographic Characteristics

- The cohort was comprised of 14 (87.5%) males with an average age of 21.2±2.0 (18.6-24.9) years and an average final follow-up of 6.4±2.2 (3.6-9.6) years.

- Surgical Technique
  - Modified Jobe – 12 (75%)
  - Docking – 4 (25%)

- All patients received autografts for their UCLR
  - Palmaris longus - 8 (50%)
  - Gracilis - 7 (43.8%)
  - Plantaris - 1 (6.2%)
Results – Clinical Outcomes/PROs

• Subjective Assessment
  • 12 patients report resolved symptoms
  • 3 reported improvement in symptoms
  • 1 reported no change

• Return to Play Data
  • 10/16 (62.5%) gymnasts were able to return to competition at an average of 12.2±3.6 (6.0-18.0) months from their injury
  • 3 patients to a higher level of competition, 3 to the same level and 4 to a lower level of competition
Results – Clinical Outcomes/PROs

• Patient Reported Outcomes
  • KJOC – 77.3±21.5 (18.7-98.4)
  • AT – 91.5±10.4 (70.0-100.0)
  • Satisfaction – 88.9% (40.0-100.0%)

• There was no significant difference found when comparing KJOC scores and AT scores between those than did and did not return to play (0.368 and 0.093, respectively)

• Conway Scale
  • Excellent – 6; Good – 4; Fair – 6
Results – Clinical Outcomes/PROs

• No RTP Outcomes (6/16)
  • 4 reported that the reason for no RTP was due to expiration of their college eligibility even through they felt that they could still throw competitively
  • 2 reported that they elected not to RTP for personal reason unrelated to their elbows

• No major complications in cohort

• Reinjuries
  • 2 patients who were able to RTP sustained an ipsilateral shoulder injury at an average of 12.5 months postoperatively
Limitations

• Retrospective study
  • Subject to recall bias and selection bias

• Relatively small sample size
  • While a large sample size for such a rare condition in a unique population the sample is still too small to draw meaningful conclusions

• Lacking preoperative data
  • Study lacked pre-operative scores to effectively evaluate the efficacy and impact of procedure
Discussion & Conclusions

• While reported RTP in operatively managed javelin throwers was lower than that of previously published studies, no athlete failed to return to sport because of their elbow
  • Unique opportunity to compete likely limits period of sport participation
  • All 6 not returning to play reported resolved or improved symptoms post-operatively
Summary

• More data is needed on outcomes of UCL injuries for non baseball playing athletes

• Based on our studies, javelin throwers and gymnasts did well overall with surgical treatment

• Non-operative treatment is a practical option but the exact indications for operative versus non-operative treatment are still being worked out

❖ Javelin players did well in terms of likelihood of RTP after surgical intervention for UCL injury

❖ Gymnasts did better with some metrics when treated operatively but the small numbers make sweeping conclusions difficult
References


THANK YOU.