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Disclosures

• Anikar Chhabra
  • Consultant: Arthrex, Trice Medical, Zimmer Biomet
  • Education Support: Stryker, Cayenne Medical

• Other Authors
  • No Relevant Disclosures
Introduction

- Over 73,000 athletes participate in NCAA football
- Football has the highest injury rates among all sports
  - 39.9 injuries per 1000 athletic exposures
- Fast-paced, high-energy sport
  - Increased likelihood of injury
- Elbow injuries in football
  - 58% of upper extremity injuries involve the elbow
  - Significant time lost from sport participation
- There is limited data on elbow injuries at collegiate level
- Purpose: To analyze the NCAA- ISP database from the 2009-2010 through 2013-2014 academic years to determine the specific incidence, risk factors, and epidemiology of elbow injuries in NCAA football players.
NCAA Injury Surveillance Program (ISP)

• Voluntarily collect injury & exposure data
• Convenience sampling of NCAA teams
• All reporting is completed by teams’ athletic trainers
  • Details of injury:
    • Activity, mechanism, injury type, competition vs practice, seasonality, position
    • Number of athlete exposures are determined
• Obtained through Datalys Center Inc.
Methods

• NCAA ISP database queried for hip injuries in football players over a 5 year period

• Sport code: *Men’s football*

• Injury Location: *elbow*

• Definitions
  • *Athlete-Exposure:*
    • One athlete participating in one practice or competition
  • *Reportable Injury:*
    • Result of practice or competition
    • Required attention from AT or physician
Data Calculations

• **Injury Rate:**
  
  \[ IR = \frac{\text{Number Injuries}}{\text{Number Athlete-Exposures}} \]

  • Overall & individual rates (event & season type) calculated

• **Injury Rate Ratios:**
  
  \[ IRR = \frac{\left(\sum \text{Number of competition injuries}\right)}{\sum \text{Competition AEs}} \div \frac{\left(\sum \text{Number of practice injuries}\right)}{\sum \text{Practice AEs}} \]

  • Compare injury rates between event & season types
Results

• 184 elbow injuries during the 5 year period
• 25,767,731 athlete-exposures
• Overall injury rate: 0.1892/1000 AEs
• Most common injury: elbow instability (subluxation, dislocation, hyperextension)
• Relative risk of competition vs practice: 8.08 (95% CI, 6.04-10.80)
• 53.16% Turf vs 45.71% Natural Grass
• 98.36% were treated nonoperatively
• 3.7% of injuries were recurrent
• Nearly 90% contact mechanism
## Results

### TABLE 1: ELBOW INJURY RATES: NCAA-ISP, 2009/10-2013/14 ACADEMIC YEARS

<table>
<thead>
<tr>
<th>Condition</th>
<th>Non-Weighted Injuries</th>
<th>Weighted Injuries</th>
<th>Weighted Exposures</th>
<th>Injury Rate/1000 AEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instability</td>
<td>124</td>
<td>3189.53</td>
<td>25767730.90</td>
<td>0.1238</td>
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<tr>
<td>Elbow Impingement</td>
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<td>Elbow Laceration</td>
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<td>Elbow Osteocondritis Dissecans</td>
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<td>Tendonitis</td>
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<tr>
<td>Olecranon Bursitis</td>
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<td>Ulnar Collateral Ligament Strain</td>
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<tr>
<td>Ulnar Nerve Subluxation</td>
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<td>58.47</td>
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<tr>
<td><strong>Total</strong></td>
<td>184</td>
<td>4874.56</td>
<td>25767730.90</td>
<td>0.1892</td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th>TABLE 2: PARTICIPATION RESTRICTION IN ELBOW INJURIES AMONG STUDENT-ATHLETE: NCAA-ISP, 2009/10-2013/14 ACADEMIC YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACADEMIC YEARS</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>INSTABILITY</td>
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<tr>
<td>ELBOW IMPINGEMENT</td>
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<td>ELBOW INFECTION</td>
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<tr>
<td>ELBOW LACERATION</td>
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<td>TENDONITIS</td>
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<td>ULNAR LIGAMENT STRAIN</td>
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<tr>
<td>ULNAR NERVE SUBLUXATION</td>
</tr>
<tr>
<td>TOTAL</td>
</tr>
<tr>
<td>PERCENTAGE TOTALS</td>
</tr>
</tbody>
</table>
Results

Figure 1: Rate Ratios of Elbow Injuries by Season of Play Among Student-Athletes: NCAA-ISp, 2009/10-2013/14 Academic Years

Figure 2: Distribution of Elbow Injuries Among Student-Athletes by Position: NCAA-ISp, 2009/10-2013/14 Academic Years

- Center/Off Guard/Off Tackle: 18%
- Cornerback/Defensive Back/Safety: 10%
- Long Snapper: 1%
- Quarterback: 2%
- Def End: 14%
- Def Tackle/NG: 17%
- Off (tight) End: 6%
- Unknown: 2%
- Linebacker: 12%
- Kicker/Punter: 0%
- Flanker: 8%
- Other/Participant/Special Teams: 5%
Discussion

• Instability
  • 65.43% of all elbow injuries
  • Especially common among linemen
  • Similar to NFL data

• Event Type:
  • More frequent in competition (RR 8.08)
  • More intensity, less predictable

• Time in Season:
  • More frequent in regular season (0.1936/1000 AEs)
  • Postseason had the lowest rate
    • Improved conditioning, awareness of importance

• Time Lost to Participation: 67% <24 hours
Conclusion

• Between the 2009/10-2013/14 NCAA football seasons, elbow injuries occurred at a rate of 0.1892/1000 AEs

• The most common type of elbow injury was elbow instability, predominantly occurring in the regular season, and in defensive and offensive linemen

• Over 8x more likely to have an elbow injury in competition vs practice

• 67% had <24 hours of time lost to play

• An emphasis must be placed on understanding these injury mechanisms to allow for prevention and decrease time lost from participation
References