Wrestlers with Limb Deficiencies: A Descriptive Study

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Authors & Acknowledgements

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Introduction: Definitions

- Our study uses the terms ‘impaired’ and ‘non-impaired’ in lieu of ‘disabled’ and ‘able-bodied’
  - Consistency with WHO definitions
  - Best descriptors
- Our study uses the term ‘limb-deficient’ for both amputations and congenital limb deficiency
Introduction: Limb Loss in the Military

- According to the Army Office of the Surgeon General, there were 1,286 amputations in Operation Iraqi Freedom, Operation Enduring Freedom and other unaffiliated conflicts\(^1\)

- 935 were considered ‘major’ limb amputations
  - Only 105 continued as active duty, reserves or were Fit for Duty

- 50% were caused by IEDs

- 77% Army, 19% Marines, 2% Air Force, 2% Navy
Limb Loss in the Military: What’s the Burden?

- The Military Extremity Trauma Amputation / Limb Salvage (METALS) Study \(^2\) reported
  - 38.3% had a positive depression screen, 18% had a positive PTSD screen
  - 34% were not working, active duty or enrolled in school
  - 38% involved in rigorous sports / recreation

- Many struggle with emotional health and have difficulty re-initiating their social and vocational roles
Toward a Solution

- In addition to foundational rehabilitation services, sports (competitive or recreational) can help improve functional independence, mental and physical health, and self-efficacy.³,⁴

- Common sports for limb-deficient athletes include track, swimming, sitting volleyball, sled hockey and wheelchair sports.

- Though these are excellent options, each of them requires adaptive equipment and/or competition against similarly impaired peers.

- My personal observations suggested that wrestling presents a unique opportunity for limb-deficient athletes by integrating them into standard competition against non-impaired athletes.
The wrestling community has consistently seen limb-deficient wrestlers compete against non-impaired peers

- No adaptive equipment, accommodations, or disability classifications
- Examples
  - https://www.youtube.com/watch?v=c5W4RZq1NRg
  - https://www.youtube.com/watch?v=Ri8kx2yEPMI
  - https://www.youtube.com/watch?v=4isX2EMMg08

- From our best observations, competitive equality between the wrestlers is preserved

- There are numerous success stories of limb-deficient wrestlers
Dustin Carter (Hillsboro, OH); 40-3 senior year record
Nick Ackerman (Simpson College); DIII NCAA Champion & Hodge Trophy Winner
Rohan Murphy (Penn State)
Kyle Maynard (Collins Hill, GA): High School State Champion
Zach Anglin (Bayfield, WI): State Tournament Qualifier
Anthony Robles (Arizona State): DI NCAA Champion
Despite this success, wrestling has not yet been integrated into common athletic considerations for limb-deficient athletes and participation remains isolated.

- Not found in any text, paper or website for impaired / amputee athletes

- **Wrestling is just not commonly considered for limb-deficient athletes**
  - But maybe it should be
Aims

- Since the rehabilitation, adaptive sports, and amputee communities have limited awareness of wrestling as an option for limb-deficient patients...
- The primary goal of the study was to survey wrestlers with limb deficiencies to determine if wrestling is a safe and positive athletic option for limb-deficient athletes.
- If safe and positive, we hoped to raise awareness of the suitability of wrestling for these athletes.
Study Design

- Questionnaire-based descriptive study using a nationally distributed electronic survey after receiving IRB approval
- Inquired about demographics, limb loss etiology, achievements, quality of life, barriers to entry, residual limb and musculoskeletal (MSK) problems
- Inclusion criteria: 5 years old and up, minimum 1 year wrestling experience, limb deficiency at or proximal to the transradial / transtibial level
- Descriptive statistics used for analysis; Fisher’s exact test used to examine residual limb complication risk factors
## Results: Demographics

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male: 16</td>
</tr>
<tr>
<td>Congenital vs. Acquired</td>
<td>Congenital: 9</td>
</tr>
<tr>
<td></td>
<td>Acquired: 7</td>
</tr>
<tr>
<td>Age at Acquired Amputation (years)</td>
<td>Median: 6</td>
</tr>
<tr>
<td></td>
<td>Range: 1-15</td>
</tr>
<tr>
<td>Acquired Etiology</td>
<td>Traumatic: 4</td>
</tr>
<tr>
<td></td>
<td>Infectious: 3</td>
</tr>
<tr>
<td>Limb Deficiency Level</td>
<td>Below Knee: 9</td>
</tr>
<tr>
<td></td>
<td>Above Knee: 5</td>
</tr>
<tr>
<td></td>
<td>Below Elbow: 3</td>
</tr>
<tr>
<td>Accomplishments</td>
<td></td>
</tr>
<tr>
<td>NCAA Champions</td>
<td>2</td>
</tr>
<tr>
<td>NCAA Tournament Qualifiers</td>
<td>2</td>
</tr>
<tr>
<td>Collegiate Wrestlers</td>
<td>7</td>
</tr>
</tbody>
</table>
Results: Wrestling-related residual limb complications

<table>
<thead>
<tr>
<th>Complication Type</th>
<th>Total #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin breakdown</td>
<td>6</td>
</tr>
<tr>
<td>Residual Limb Pain</td>
<td>5</td>
</tr>
<tr>
<td>Swelling</td>
<td>2</td>
</tr>
<tr>
<td>Phantom Pain</td>
<td>2</td>
</tr>
<tr>
<td>Infection</td>
<td>1</td>
</tr>
</tbody>
</table>

Rate: 50%
Results: Musculoskeletal Injuries

- Significant injury defined as any injury that withheld the athlete from competition
- 6 / 16 reported at least 1 significant musculoskeletal (MSK) injury
- MSK Injuries by body region
  - Shoulder: 2
  - Elbow: 1
  - Low back: 3
    - All lower limb deficiencies
  - Knee: 3
- *One respondent accounted for 4 injuries, while the others each had only 1 injury
Results: Training habits

- 9 used a prosthesis for cardiovascular / strength training
- None used a prosthesis for wrestling training or competition
- 1 used modified grips for strength training; otherwise, no adaptive equipment needed
Results

- 100% indicated that wrestling had a ‘very positive’ impact on quality-of-life
- 95% reported a ‘very positive’ impact on physical health
- 87% reported no difficulty finding acceptance with teammates, coaches and competitors
Discussion: Competitive Equality

- Limb-deficient wrestlers can and do succeed against non-impaired peers without the need for accommodations or adaptations.
- No other sport boasts this degree of competitive equality.
- Competitive equality is likely fostered by the weight class system & nature of the sport.
Discussion: Competitive Equality

- Because of the weight class system, whatever mass is absent from the limb is redistributed to the torso and intact limbs.
Competitive Equality or Competitive Advantage?

- Basic concepts can guide our discussion
Competitive Equality or Competitive Advantage?

- Consider the wrestler with a lower limb deficiency
- Upper body likely stronger than opponents: relative, not absolute, advantage
- Missing a lower limb means an entire array of techniques are unavailable to that athlete
  - Basic attacks requiring a powerful push-off, trips and throws
- Mat mobility is challenging
- These wrestlers must cope with and overcome significant challenges to be competitive
Discussion: Injuries

- Residual limb complications seem common
  - Direct end bearing and shear forces
  - Complication rate of 50% warrants educating & monitoring the athlete; meticulous skin care is a priority
Discussion: Injuries

- MSK injury risk
  - For ‘all injuries’, rate was 38% all-time compared to 50% injury rate per season in a large cohort of high-school wrestlers\(^5\)
  - Wrestlers with lower limb deficiencies may be predisposed to low back injuries
    - Altered biomechanics and their kinetic chain
Discussion: Injuries
Discussion

- Wrestling was a markedly positive experience
- Barriers to entry are low, allowing for easier integration
  - No special equipment, financial investment, personnel training or adaptive needs
Limitations

- Selection bias
- Small sample size
- No female participants
This study suggests that wrestling is a safe, positive athletic experience that provides the unique opportunity for competitive equality between limb-deficient and non-impaired athletes.

Wrestling should be integrated into the common athletic considerations for athletes with limb deficiencies.
Future Directions: Research

- Detailed, prospective assessment of injuries
  - Specific etiologies
  - Motion analysis for injury prevention and optimizing training

- Prospective study of mental and physical health outcomes

- Preventive strategies for residual limb complications
Two groups: those with a wrestling background and those without

For those with experience, options include:
- Post-college, join local sanctioned USA Wrestling club, help at local HS
- [http://www.teamusa.org/usa-wrestling/membership/athletes/find-a-club](http://www.teamusa.org/usa-wrestling/membership/athletes/find-a-club)
- If they plan to attend college, contact coach at the school

For those without experience, no clear opportunities exist
- Local clubs may work, but not suited to new adults
- Military programs are for elite level
Future Direction: Participation for Military Amputees

- Start a wrestling reconditioning program specifically geared towards veterans with amputations
  - Need mat space and a coach
  - Contact myself or USA Wrestling: lgutches@usawrestling.org
References


Questions & Discussion
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