Evaluating The Effectiveness Of Knee Pads In The Sport Of Wrestling

Logan Gushiken
Wrestling

- Multi-Dimensional
- Physically demanding (intense training)
- High incidence of injury
  - Most common in shoulder and knee
  - Limited options for protective equipment
Injuries

- Study on over 450 high school wrestlers (Pasque, Charles, and Hewett; 2000)
  - Majority of injuries in practice, although higher rate during competition (Pasque, Charles B. and Hewett, Timothy E. 2000)
  - 52% of high school wrestlers get injured in a season
  - Higher risk in older and more experienced
  - Takedown is particularly dangerous position

- 6 year study of Iowa wrestlers (Wroble, Mysnyk, Foster, and Albright; 1986)
  - Knee most common (pre-patellar bursitis, sprains, meniscal tears)
  - Lead leg is most commonly damaged
Take Down Position

- [Link](https://www.youtube.com/watch?v=wxNAEByjOoA)
- Impact on knee of lead leg
- Unstable position
- Very common (high repetitions in practice)
- Realistically there’s added weight and resistance of opponent
  - No attempt to duplicate in this experiment
- Change in directions
Introduction

Purpose: Explore knee pads as an effective method for prevention of knee injury in the sport of wrestling.

Independent variables: no knee pad, thin knee pad, thick knee pad

Dependent variables: anterior/posterior ground reaction force (GRF), vertical GRF, rate loading

Hypotheses: Anterior/posterior and vertical GRF, and rate loading will decrease as thickness of pad increases.
Participants

- 10 subjects
- College-aged males with minimum of high school wrestling experience.
- Variety of weights
- No knee injuries
- All were right-leg leads
Methods

- Subjects took a penetration shot with knee of lead leg striking a cushioned mat over a force platform
- Reflective markers recorded by 8-camera motion capture system
- Three shots per condition
- Data recorded on Vicon Nexus 1.8.5 software
- Averaged results from each trial for each condition
Slow Motion
Results (A/P and Vertical GRF)

**Average Anterior/Posterior GRF**

- No Pad: 400 N
- Pad #1: 420 N
- Pad #2: 440 N

**Average Vertical GRF**

- No Pad: 1950 N
- Pad #1: 2000 N
- Pad #2: 2050 N

**P-Values**

- AP GRF (1vs2): 0.778
- AP GRF (1vs3): 0.183
- Vert GRF (1vs2): 0.853
- Vert GRF (1vs3): 0.188
Results (Rate of Loading)

Average Rate of Loading

No Pad | Pad #1 | Pad #2
---|---|---
* 100,000 | 110,000 | *

P-Values

| Load Rate (1vs2) | 0.040 |
| Load Rate (1vs3) | 0.023 |
Conclusions

- Trends of decreased braking and vertical GRF with thick knee pad (not statistically significant)
- Significant decreases in loading rate with increasing thickness of knee pads
- High levels of variation
- Rudimentary evidence for effectiveness of knee pads
- Future studies should be done
Future Studies

- Use wrestling mat
- Normalize for weight
- Larger sample size
- Use participants with more recent experience
- Take more data on participants (ex: age, weight, height, etc.)
Works Cited
