Evaluating The Effectiveness Of Knee Pads In The Sport Of Wrestling

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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

- 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.

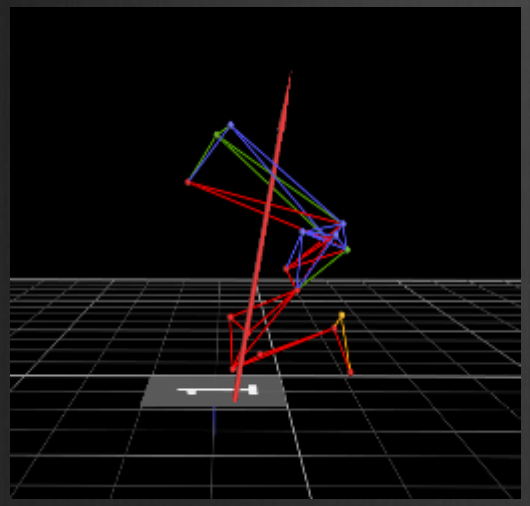
Participants

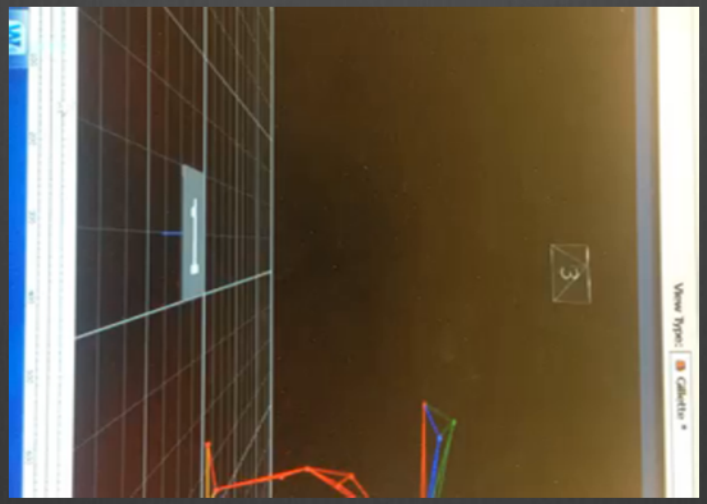
- 10 subjects
- College-aged males with minimum of high school wrestling experience.
- Variety of weights
- No knee injuries
- All were right-leg leads

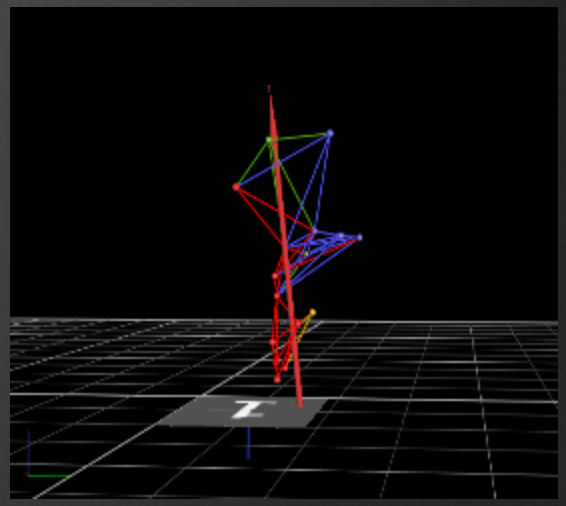
Methods

- 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

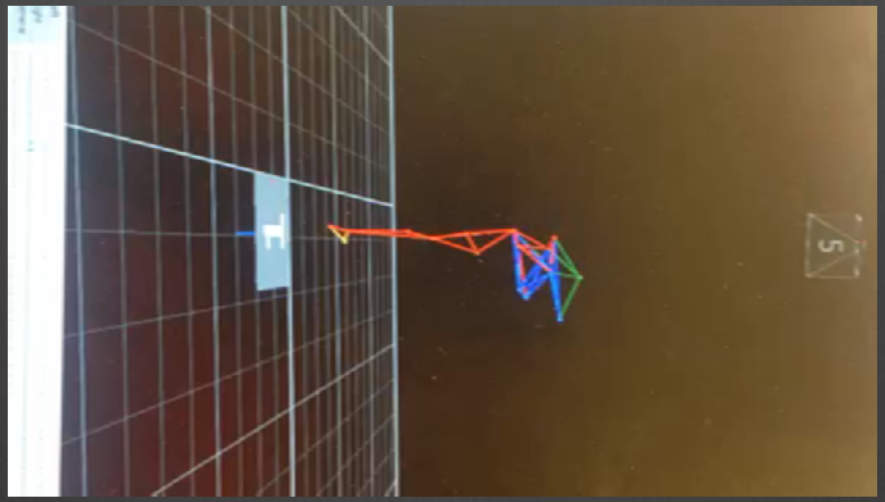
Images

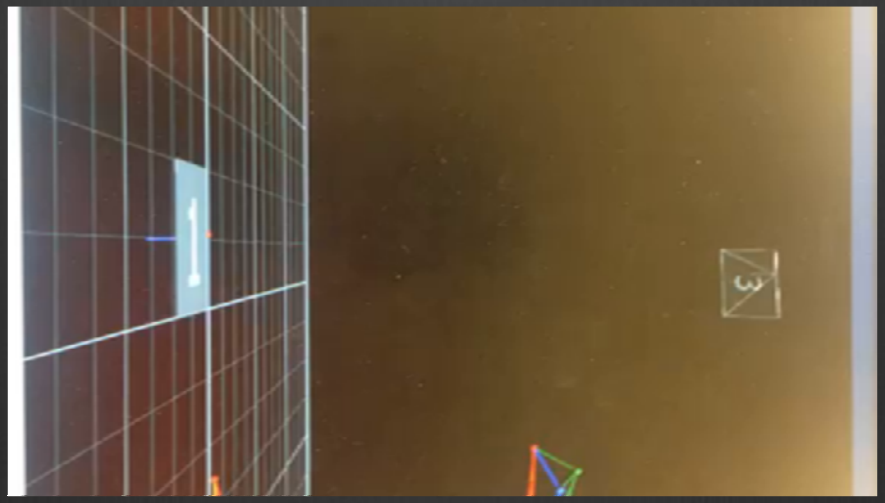




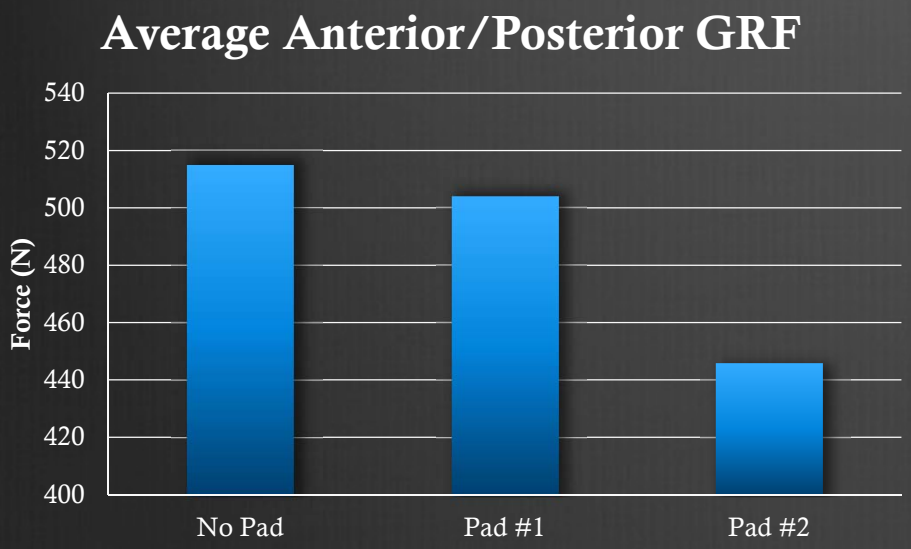


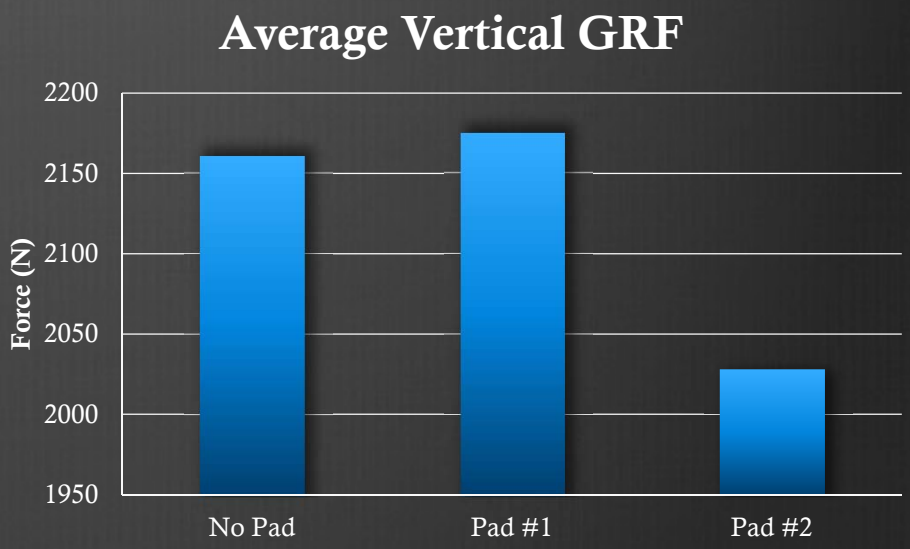
Slow Motion





Results (A/P and Vertical GRF)





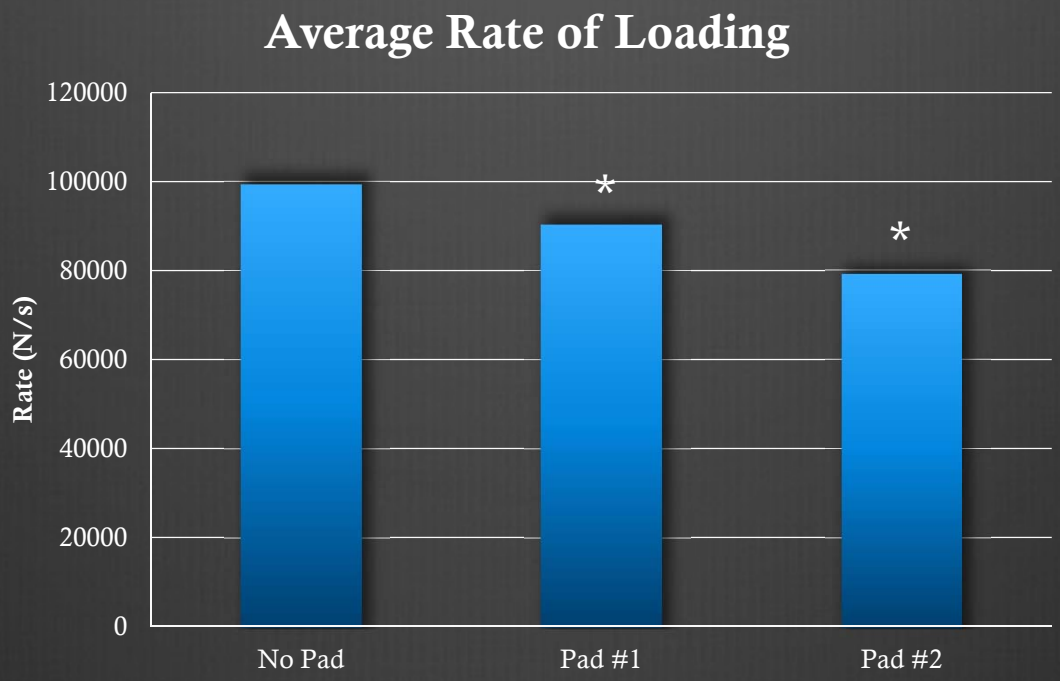
P-Values

AP GRF (1vs2)	**0.778**
AP GRF (1vs3)	**0.183**

P-Values

Vert GRF (1vs2)	**0.853**
Vert GRF (1vs3)	**0.188**

Results (Rate of Loading)



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

1. Pasque, Charles B. and Hewett, Timothy E. "A Prospective Study Of High School Wrestling Injuries." *The American Journal Of Sports Medicine* 28.4 (2000)

2. Wroble, R.R., Mysnyk, M.C., Foster, D.T., and Albright, J.P. "Patterns Of Knee Injuries In Wrestling: A Six Year Study." *The American Journal Of Sports Medicine* 14.1 (1986)