Wrestling: Biomechanics and Related Injuries

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The official health care provider of Sporting Kansas City

UMKC School of Medicine

BEST CHILDREN'S HOSPITALS U.S.News & WORLD REPORT RANKED IN 10 SPECIALTIES 2017-18

NO DISCLOSURES

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Objectives

- Brief history, popularity, terminology and relevant rules
- Evaluate wrestling specific movements via motion analysis as they relate to common injuries
- Applying general concepts to treatment plans

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Wrestling Basics

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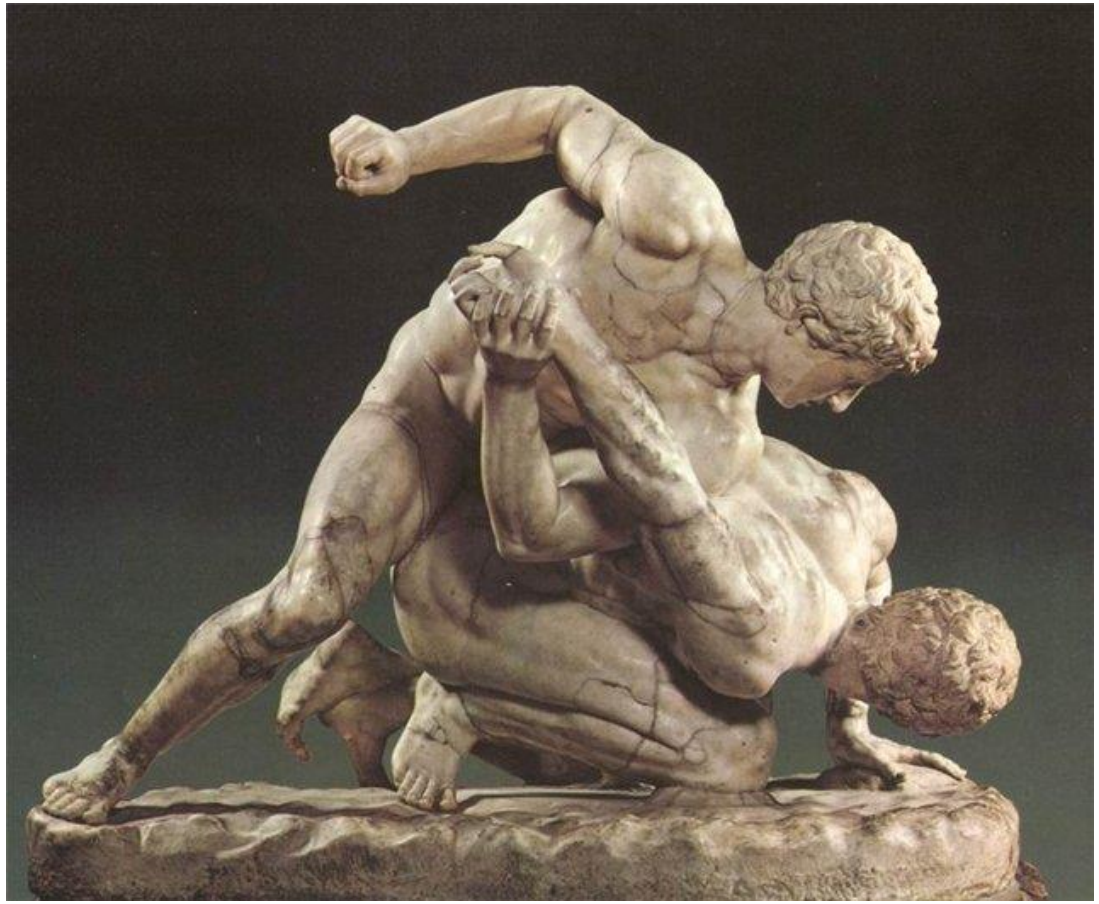
Wrestling Basics: Brief History

- Considered the oldest sport
- Can be traced to artwork from Babylonia and Egypt in 3000 BCE
- Most popular from ancient Greeks; part of the first Olympic games in 776 BCE



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Wrestling Basics: Popularity

- 2017-2018 USA stats:
  - Boys 245,564 (+0.5%)
    - 7th most popular
  - Girls 16,562 (+13.5%)
    - 8th most popular

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Wrestling Basics: Terminology

- Positions:
  - Neutral
  - Referee's position
    - Top
    - Bottom

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Wrestling Basics: Terminology

- Styles:
  - Greco-Roman: upper body only; Olympic, international
  - Freestyle: collegiate, Olympic, international
  - **Folkstyle**: high school and youth

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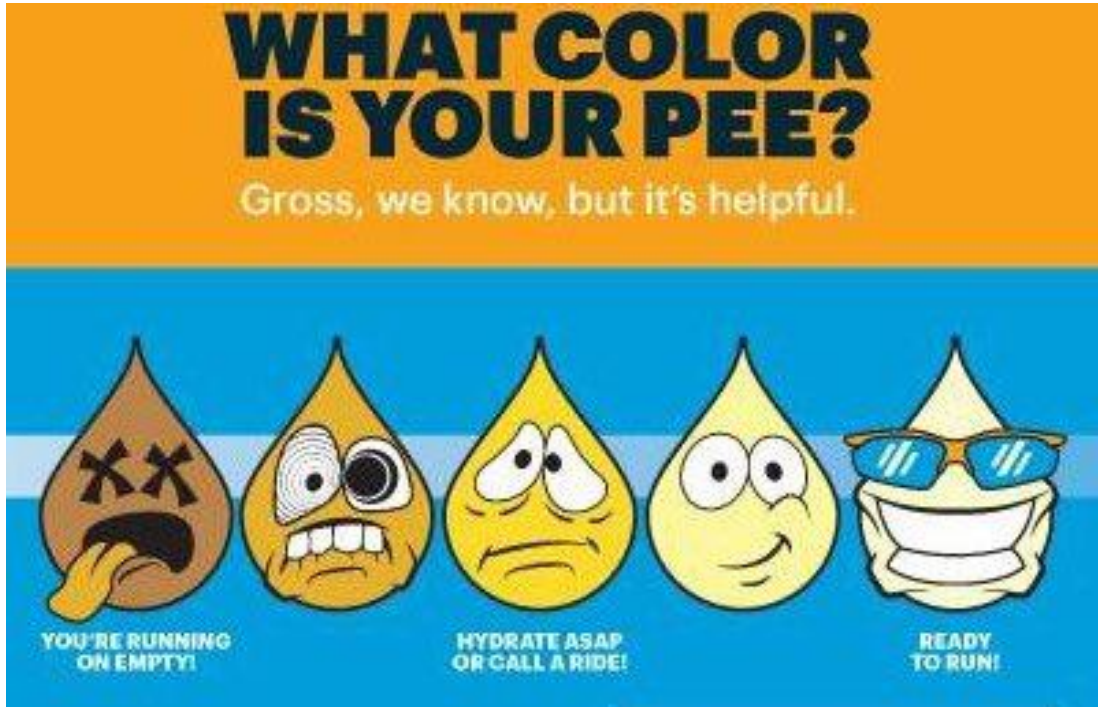
Wrestling Basics: Relevant Rules

- Kansas rules:
  - Alpha Weigh In: establishes initial weight prior to start of season
  - Hydration assessment: at Alpha weigh in, must submit urine sample proving adequate hydration



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Wrestling Basics: Relevant Rules

- 8 Percent Rule:
  - May not lose more than 8% of the Alpha Weight, unless cleared by physician
  - Must still pass hydration assessment
- Growth allowance: 2lbs above certified weight after Jan. 1st

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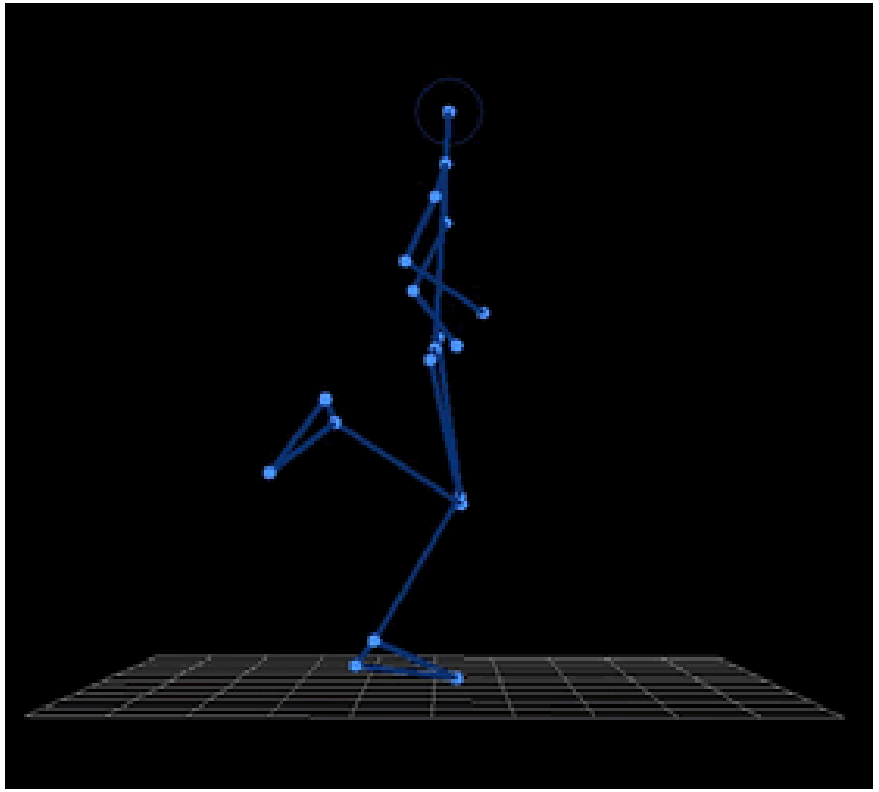
Wrestling Biomechanics



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Wrestling Biomechanics: Disclaimer

- 3D motion analysis is limited due to data collection process
- Lack of opponent effects accuracy of joint measurements

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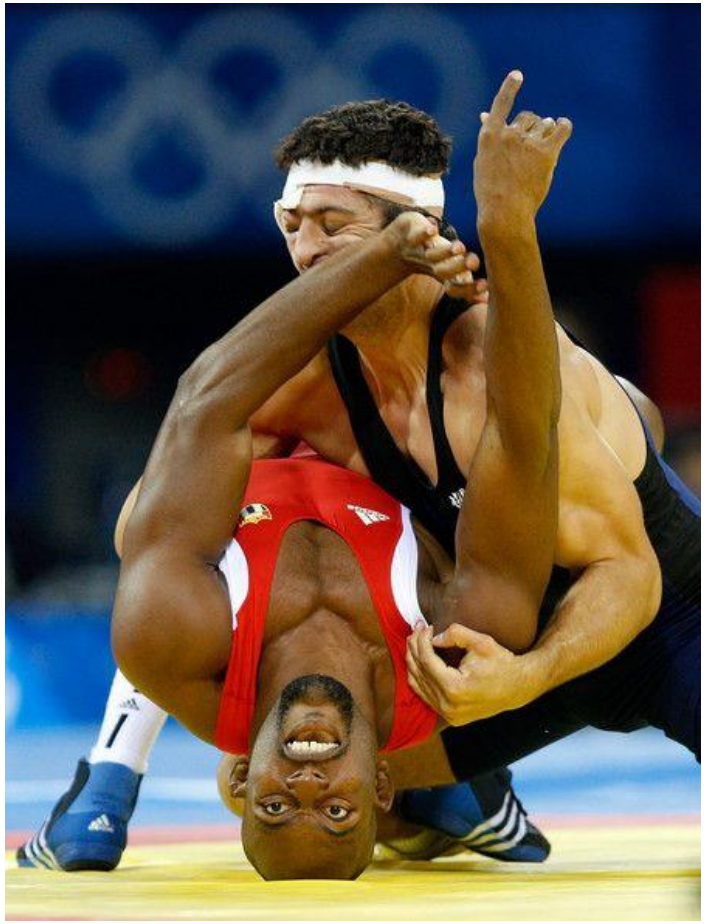
Wrestling Biomechanics: Disclaimer

- Cervical biomechanics not discussed but are a very important aspect in wrestling
- Zuckerman et al. (2015) found wrestling to have highest concussion rate



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Wrestling Biomechanics: Elbow

Move:

2 on 1

Joint of interest:

Elbow (defense)

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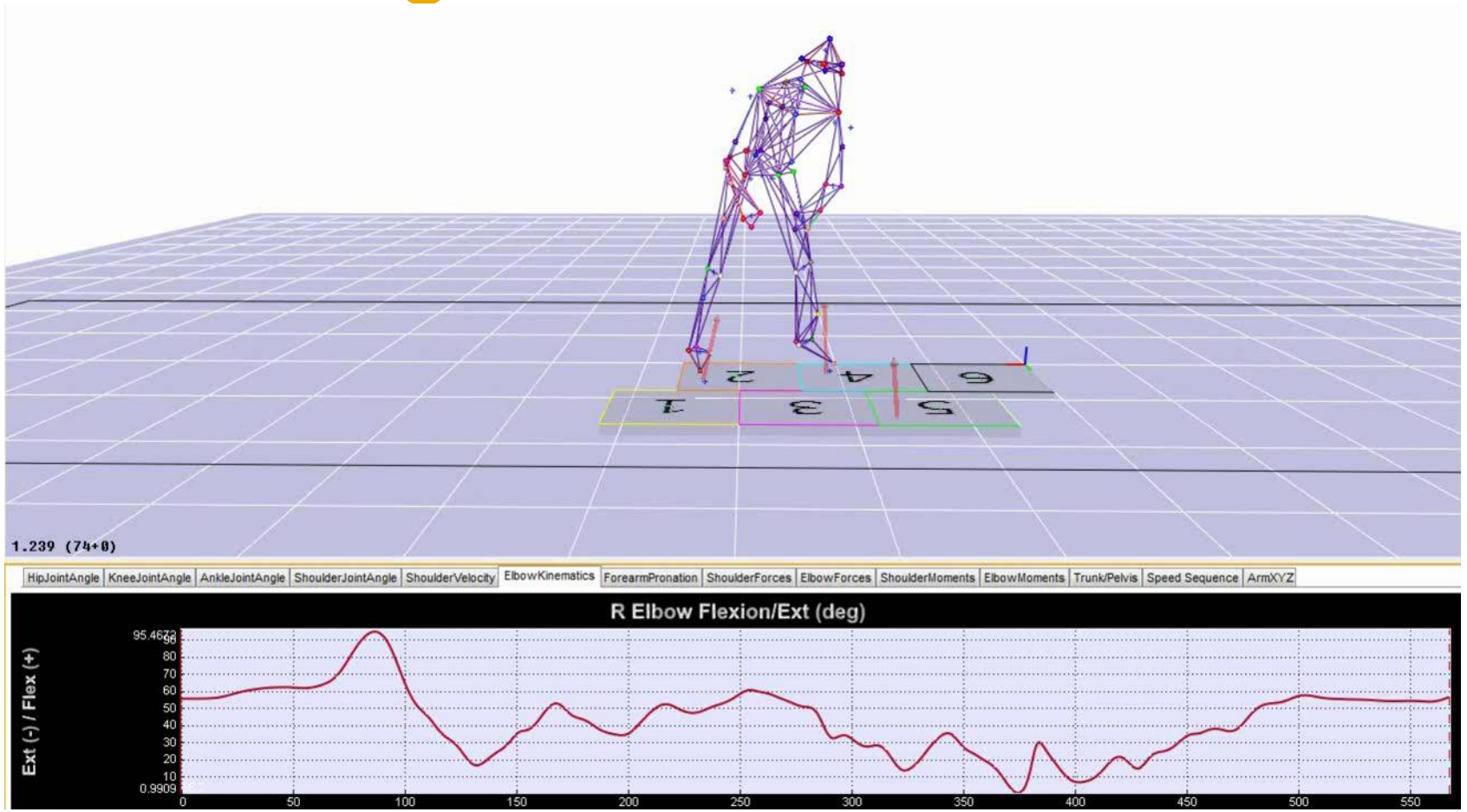
Wrestling Biomechanics: Elbow



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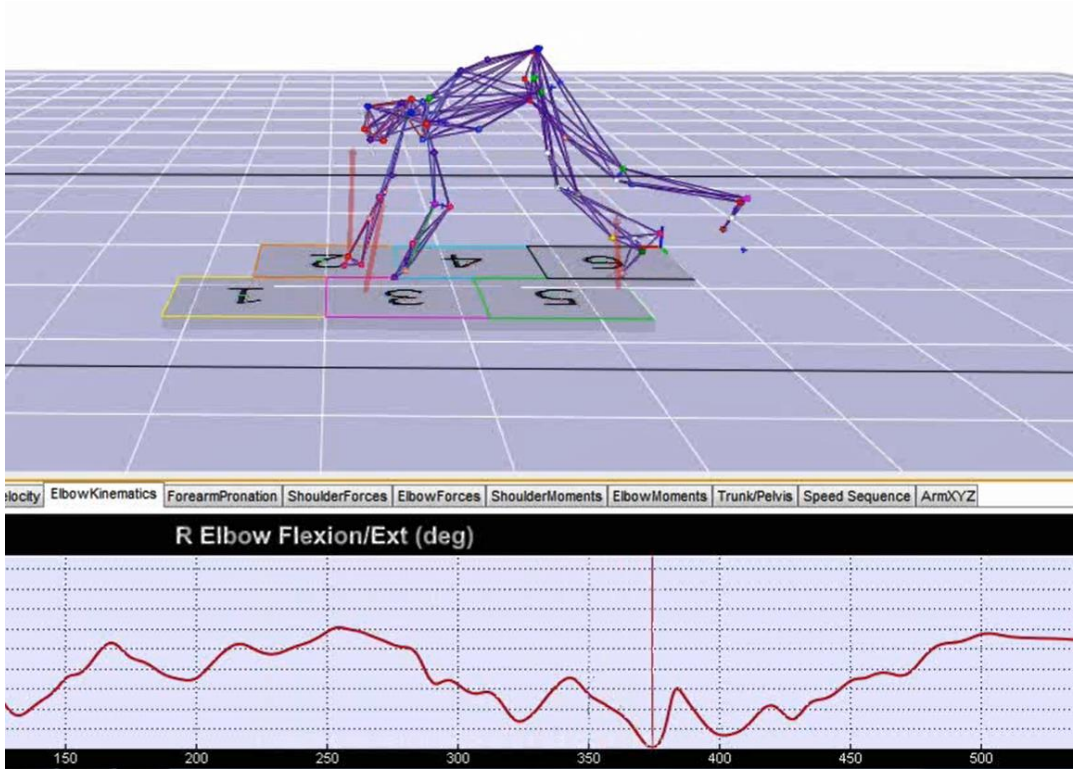
Wrestling Biomechanics: Elbow

- Thomas et al. (2018) found the UE injury rate to be 24-31%
- Elbow injuries tend to be less common but more severe
  - 8% of all injuries
  - Most common: UCL sprain



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Wrestling Biomechanics: Hip and Trunk

Move:

Sprawl

Joint of interest:

Hip and trunk

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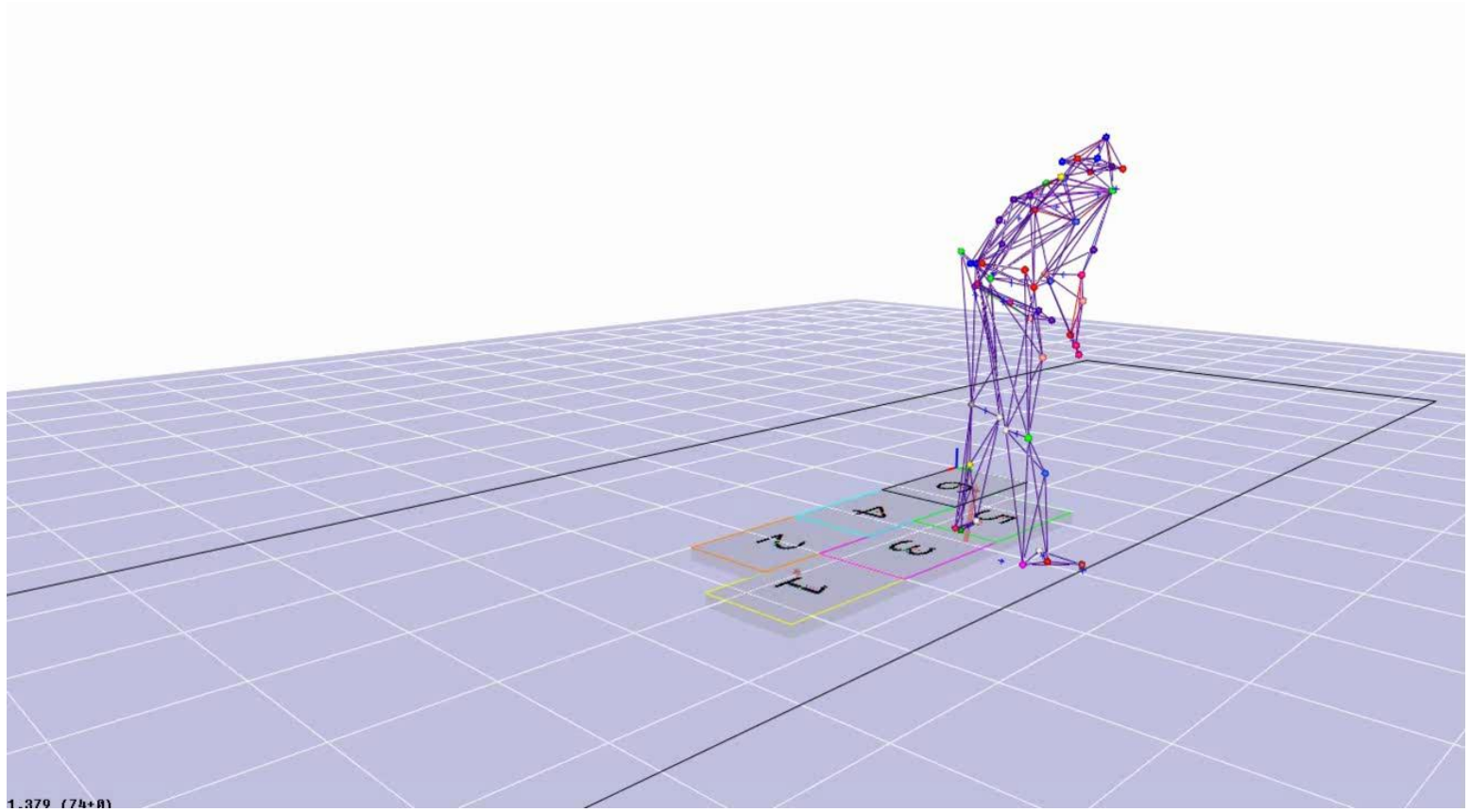
Wrestling Biomechanics: Hip and Trunk



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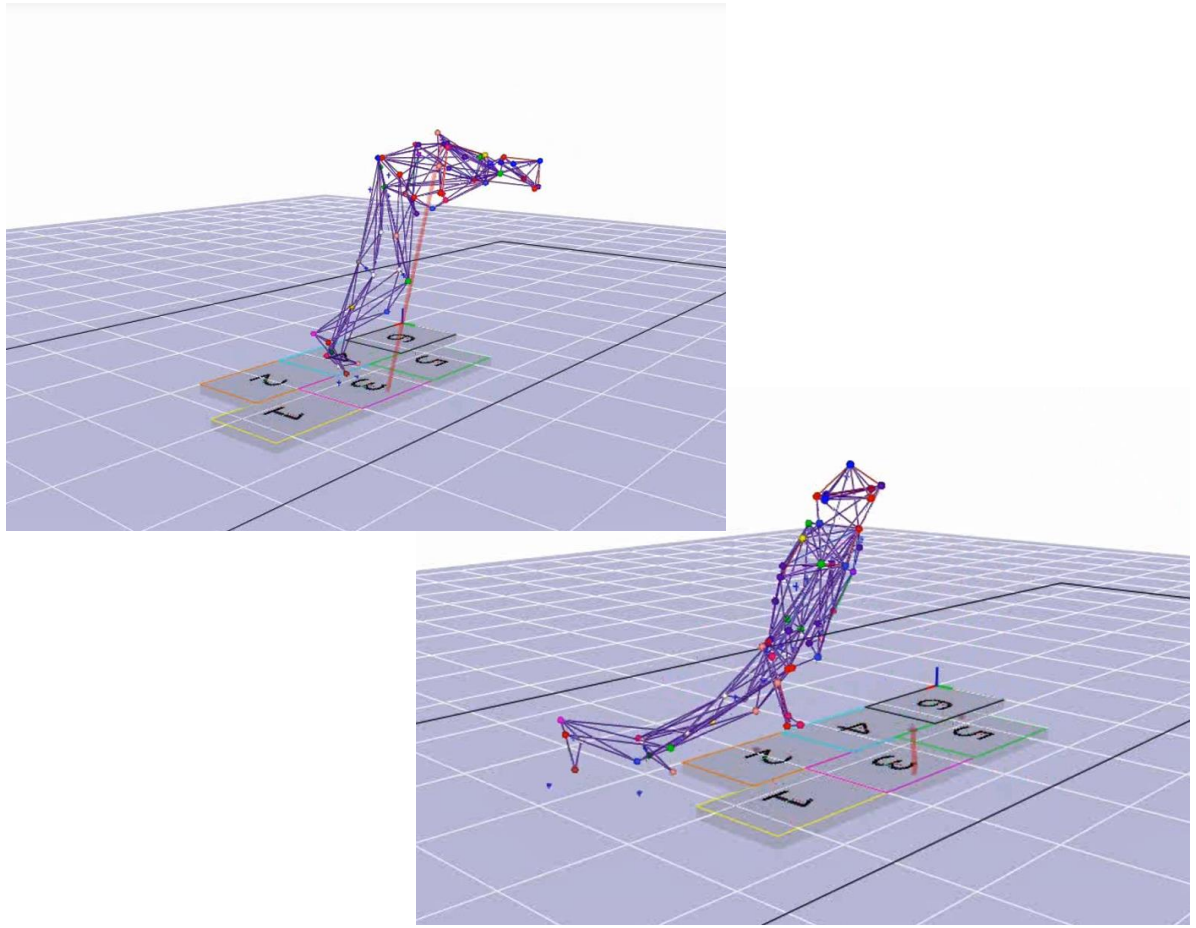
Wrestling Biomechanics: Hip and Trunk

- Trunk/hip flexion goes through near 110 degrees of total ROM
  - Starting approx. 90deg of flexion finishing at approx. 20deg of extension
- Low back pain: typically chronic in nature due to flexed posture and repeated movement patterns



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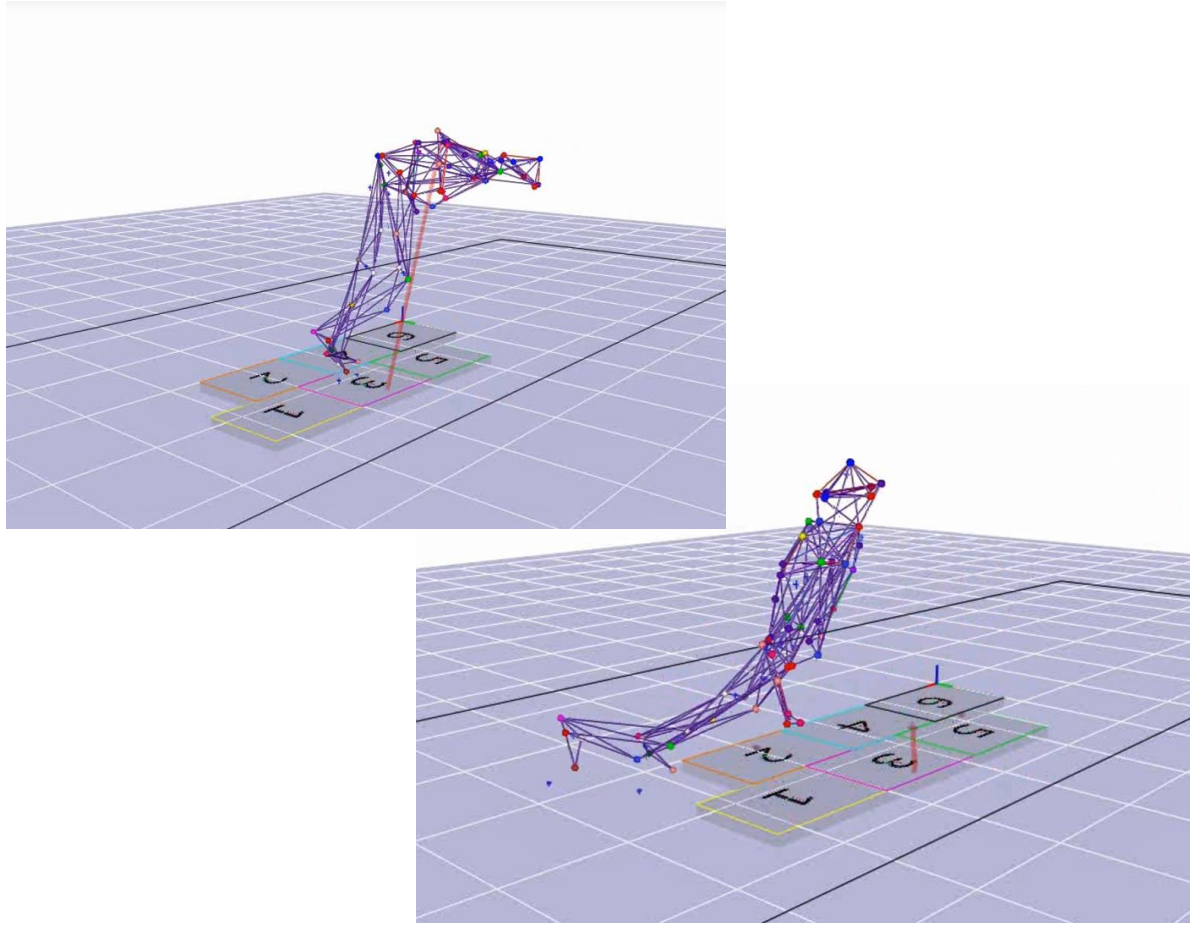
Wrestling Biomechanics: Hip and Trunk

- Limited research on lumbar/hip injuries of wrestlers
- Estwanik et al. (1980) found that 25% of wrestlers with reported LBP had spondy
- Rossi & Dragoni (1990) found 29.8% with reported LBP had spondy



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Wrestling Biomechanics: Knee and Ankle

Move:

Double leg takedown

Joint of interest:

Ankle and knee

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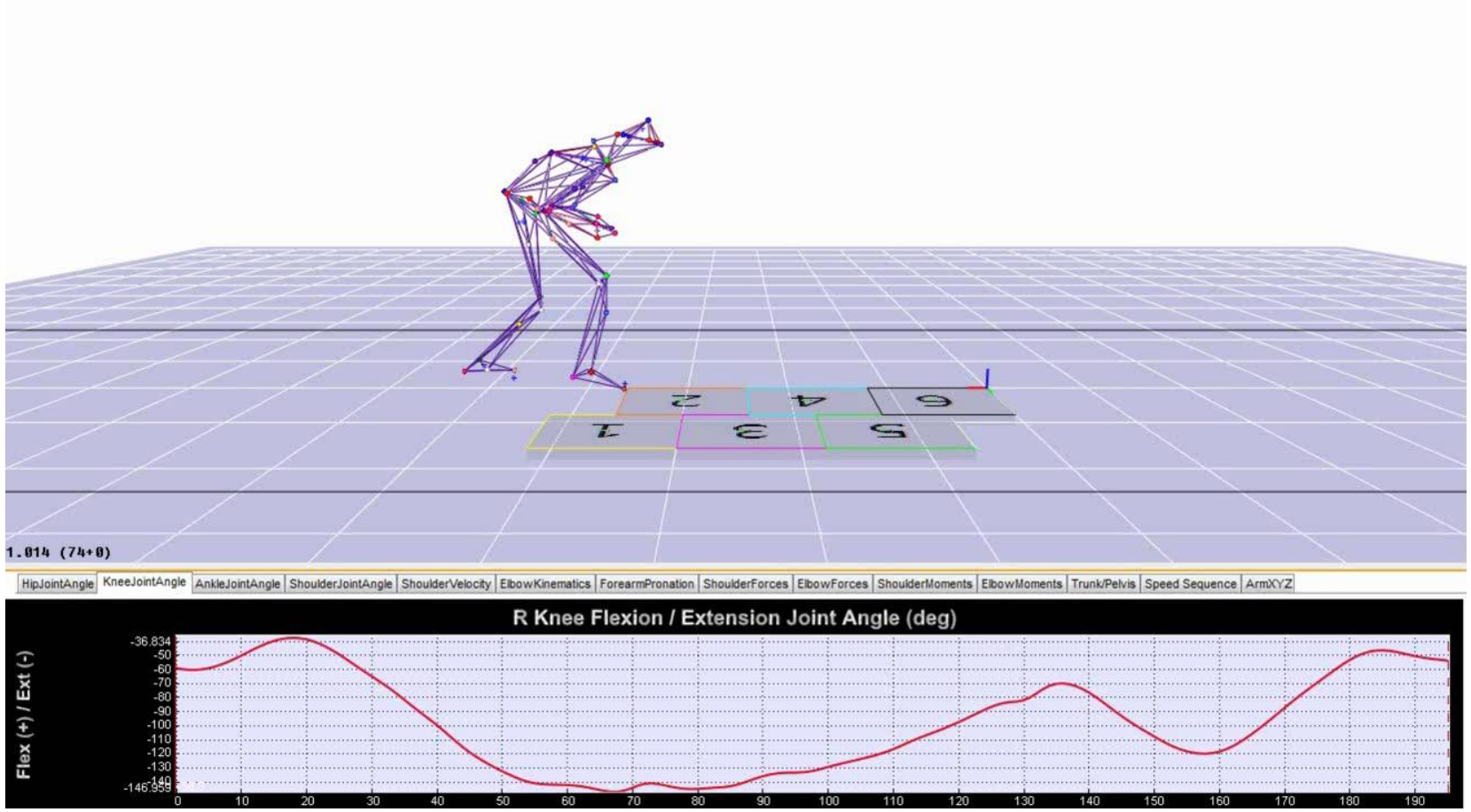
Double Leg Takedown: Knee and Ankle



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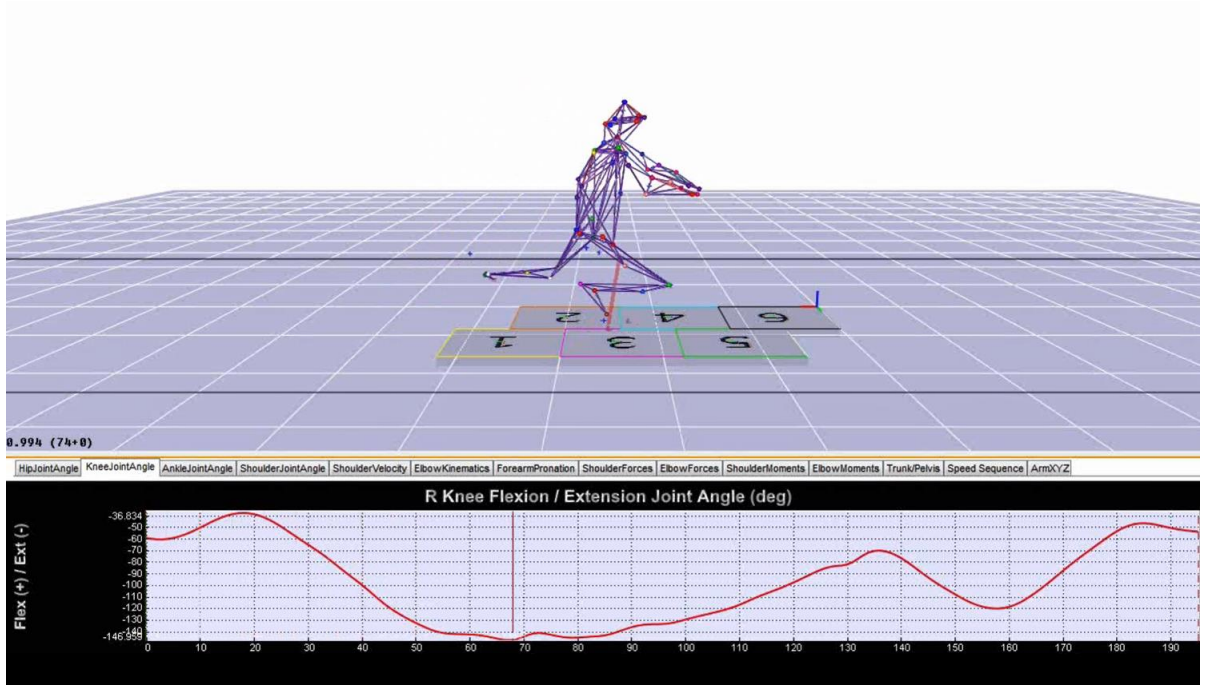
Wrestling Biomechanics: Knee and Ankle

- Max knee flexion 147 degrees
- Thomas et al. (2018) states the most frequent injuries are to the lateral meniscus and medial collateral ligament.



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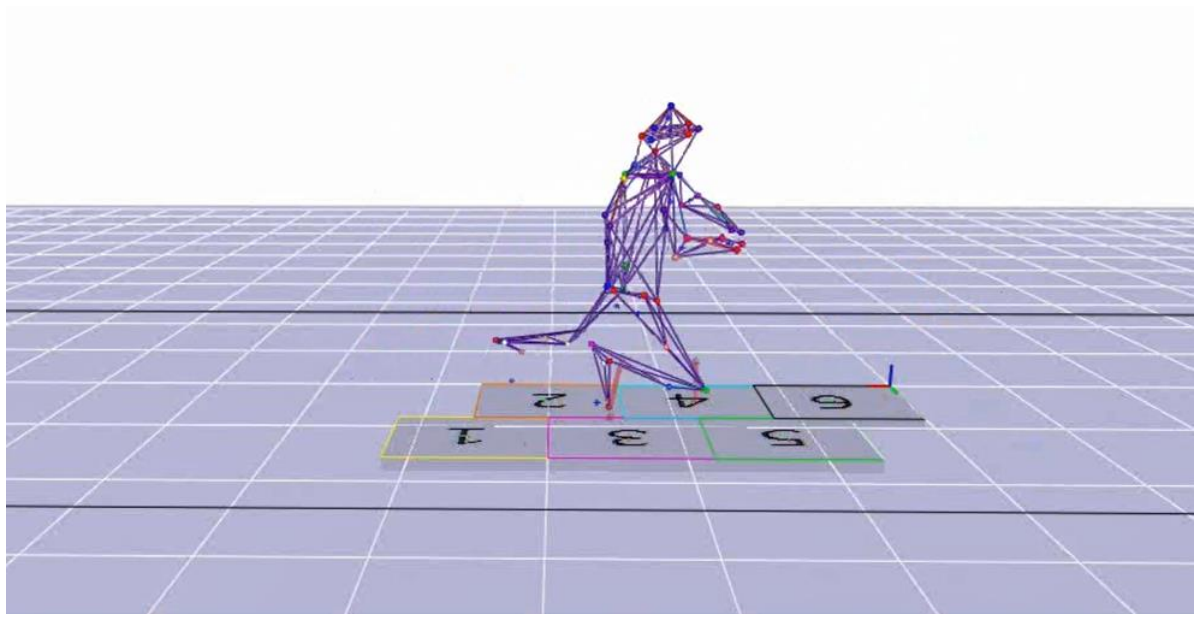
Wrestling Biomechanics: Knee and Ankle

- Hewett et al. (2005) found ankle injuries range from 3.2-9.7% of all injuries
- Max knee ankle dorsiflexion is approximately 31 degrees
- If a wrestler is lacking proper ankle mobility, high likelihood of increased stress to knee/foot



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Wrestling Biomechanics: Shoulder

Move:

Fireman's carry – straight line

Joint of interest:

Shoulder

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Wrestling Biomechanics: Shoulder

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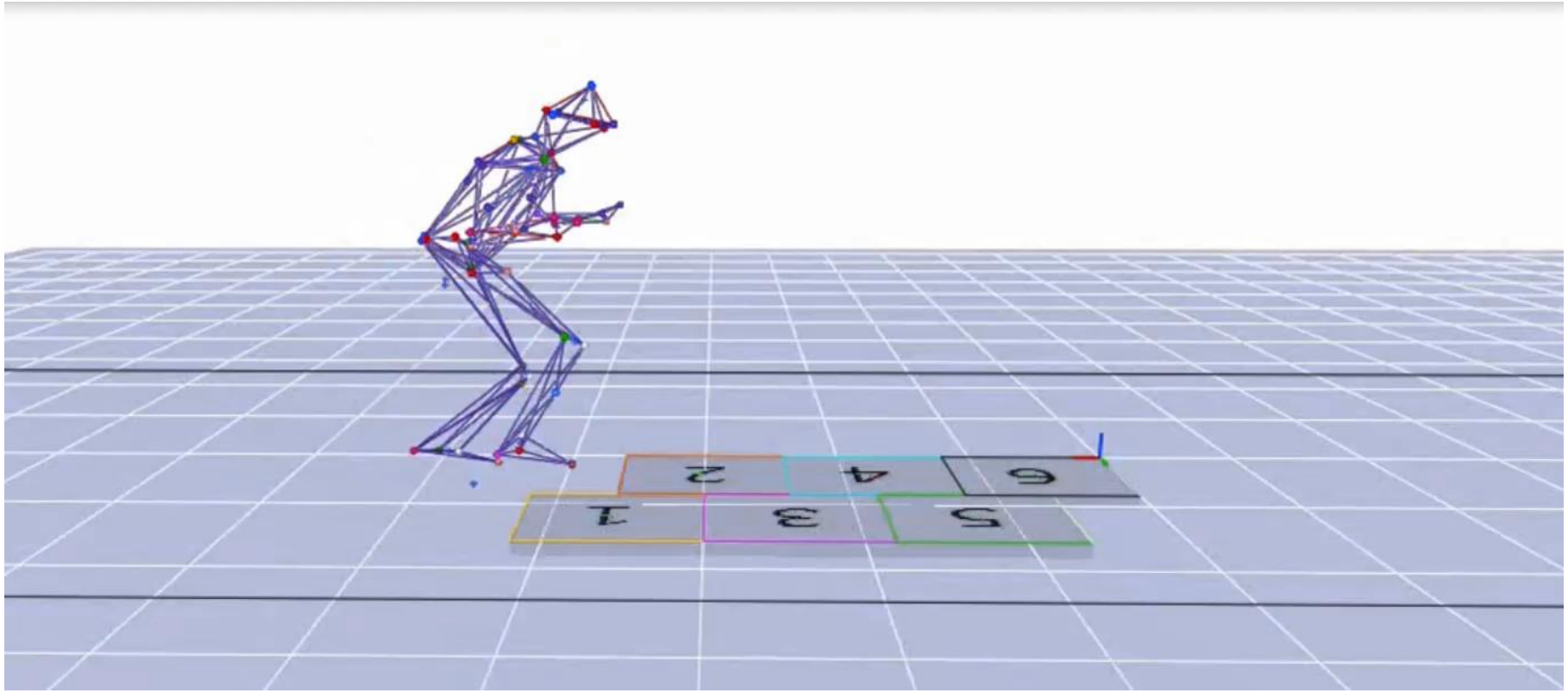
Wrestling Biomechanics: Shoulder



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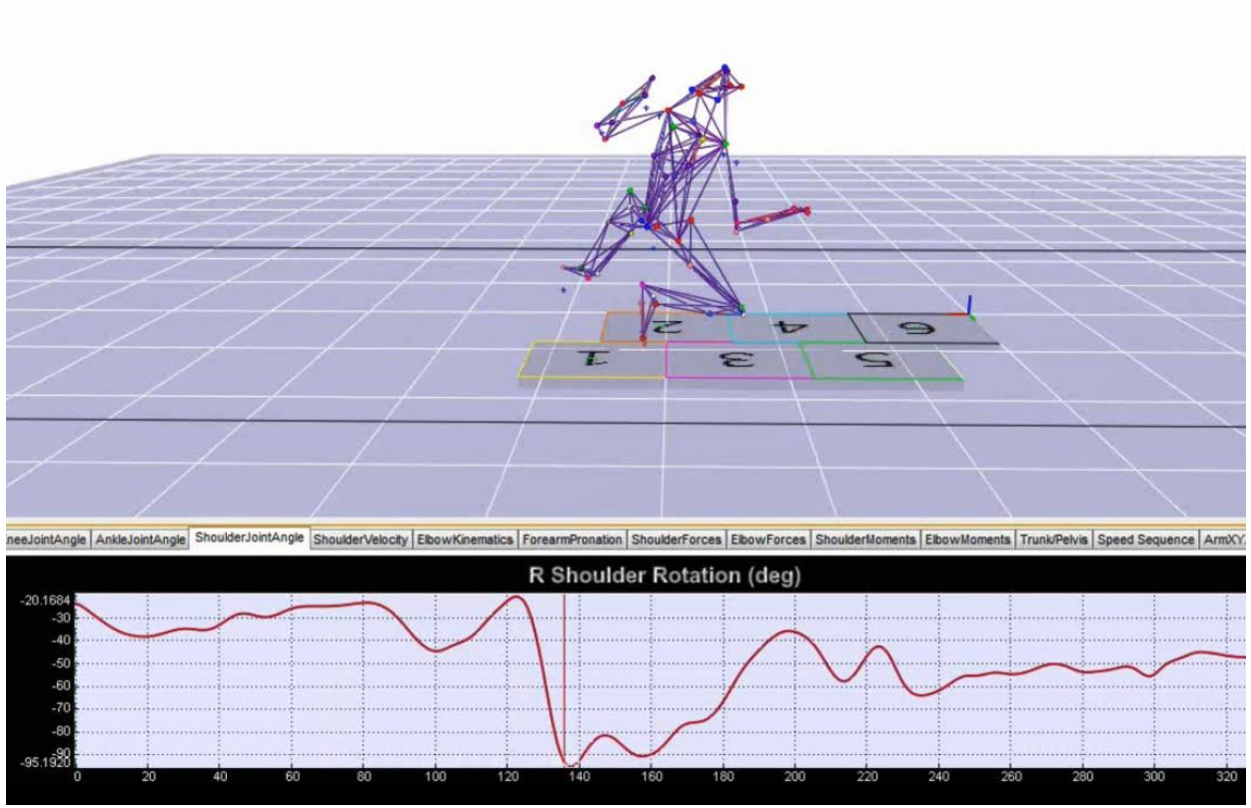
Wrestling Biomechanics: Shoulder

- Hewett et al. (2005) states 24% of all injuries
- Approx. 95 degrees of shoulder external rotation – unopposed!
- Internal reaction forces from opponent



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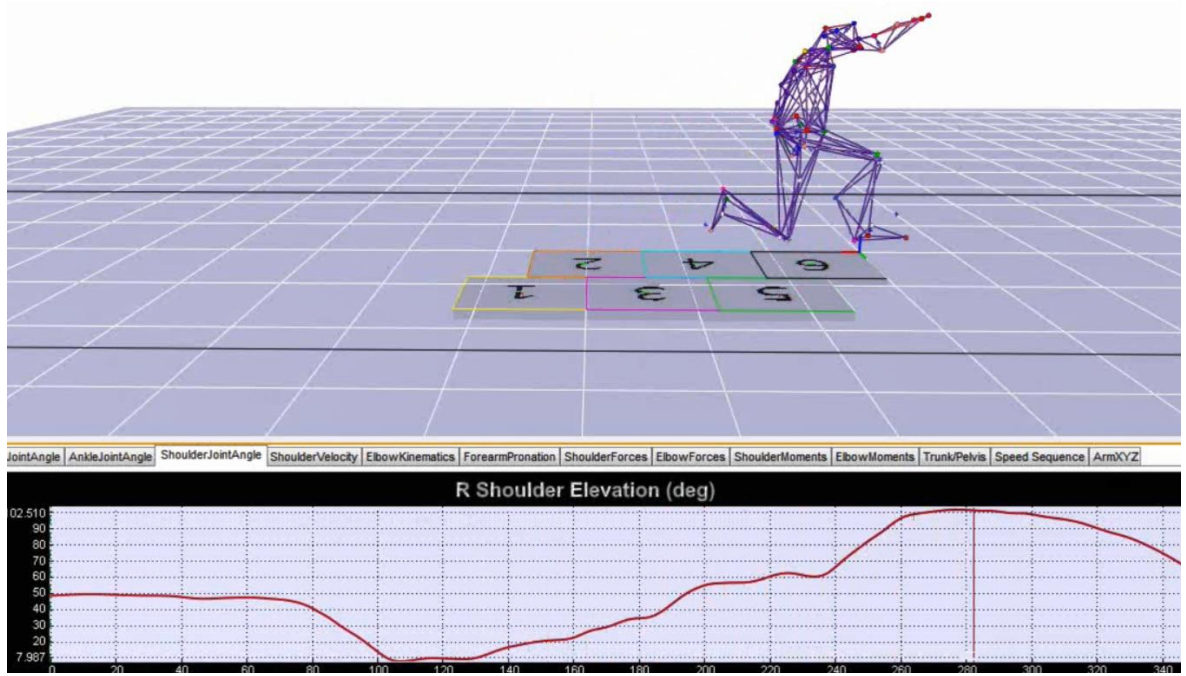
Wrestling Biomechanics: Shoulder

- While in 95 degrees of external rotation transitions into combined 90/90
- Again this is UNOPPOSED



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Clinical Applications

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Clinical Applications

- Unique postures and positions require specific treatment programs
- Understanding the physical demands wrestlers endure helps to guide treatment

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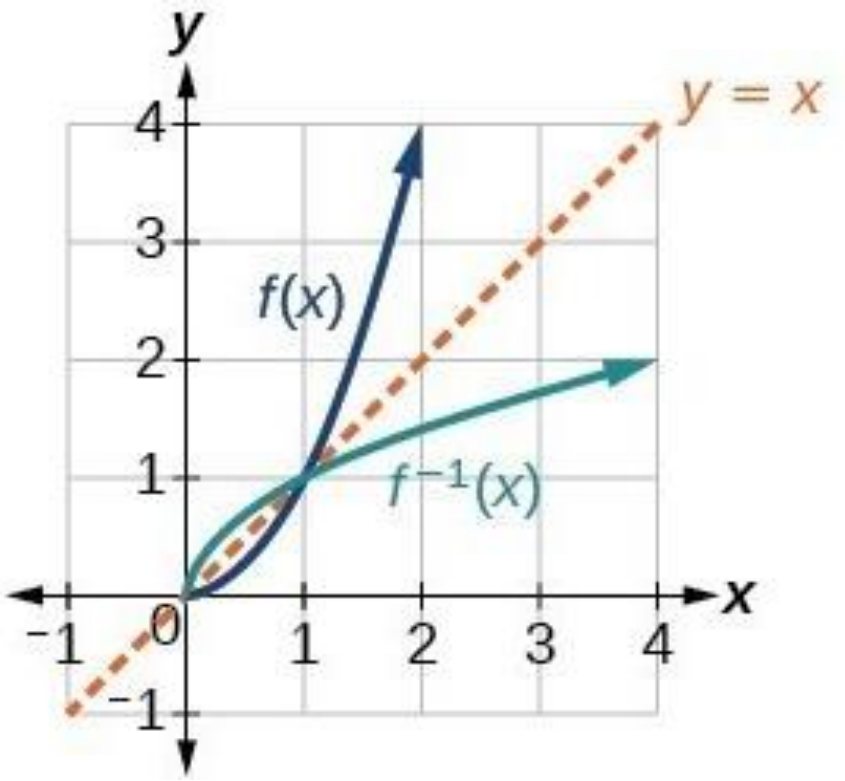
Clinical Applications

- Inverse relationship of injury risk and experience
- Pasque & Hewett (2000) found that injured wrestlers had 32% more experience



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Clinical Applications

- A passion sport
- Because so much invested, injuries can seem more devastating

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THANK YOU

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