High Speed Cameras in Performance and Injury

Franky Mulloy
Aims of Today

• Introduce the Louth Hub

• Highlight common issues with high speed camera use

• Demonstrate how high speed cameras can be used in performance

• Identify injury prevention and the relationship with performance
The Louth Hub

- Two high speed IDT cameras (up to 18,000 fps)
- GoPro cameras (2 x Hero II, 1 x Hero4)
- Sense 3D Scanner
- Adidas MiCoach Smartball
- Neptune Bone Conduction MP3
- And much more…
- Biomechanical consultancy
Sports Biomechanics

“Concerned with the analysis of the mechanics of human movement...

...In other words, the science of explaining how and why the human body moves in the way that it does.”

www.BASES.org.uk
High Speed Camera Considerations

- Camera placement (90°)

- Frame rate

- Shutter speed
  - 300Hz
  - 600Hz
  - 1200Hz

- Trigger setting (pre- / post-)
High Speed Camera Considerations
Improving Performance
Small Bore Rifle Performance

- Prone shooting position
- Controlled, with limited movement
- Reloading causes an issue
- Elbow placement
Small Bore Rifle Performance
Rifle Phase Breakdown

1. Trigger Pull
2. Cartridge Pick Up
3. Reload
4. Take Aim
Rifle Elbow Placement

1. Trigger Pull
2. Cartridge Pick Up
3. Reload
4. Take Aim
Rugby Place Kicking

Good

Bad foot strike
Ball Release

Good

Bad foot strike
Torso Lean

Good

Bad foot strike
Ball Contact

Good

Bad foot strike
Injury Prevention
Netball ACL Injury Occurrence

- Connects femur (thigh) to tibia (shin)
- Females 3 x more likely to rupture ACL
- 16.5% of female Netball injuries ACL (5 year period)
- 6-12 months return to sport... some more
Netball Jump Landing Tasks

Forward Jump Tasks

Single Leg Hop Tasks

Rotational Jump Tasks
Knee Flexion

Prior Knee Flexion

Loading Knee Flexion

Single Leg Foot Flexion

Rate of Loading
Knee Valgus
Performance and Injury Balance
Performance and Injury Balance
Liz McTernan: Hand-bike Analysis
Liz McTernan: Hand-bike Analysis

- Seat position
- Lumber Support
- Shoulder movement
Liz McTernan: Hand-bike Analysis
Making a Mould
Recreating Liz
Seat Scan
Franky Mulloy
Biomechanics Research Assistant
PhD Research Student
BIOFeedback Research Group
University of Lincoln

Email: FMulloy@lincoln.ac.uk
Tel: 01522 886680