

THE EFFECT OF CONTROLLED SURFACE PROPERTIES ON PLAYER LOADING FOR SOCCER

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Introduction

- Purpose of study:
 - ▣ Investigate the effect of surface hardness and traction on player loading during a stop and turn
 - ▣ Control surface properties throughout tests



Methods (Subjects)

- 16 players of Loughborough University teams
- Average age 20 ± 1 years
- Average experience 13.6 ± 2.1 years
- On artificial turf 6.4 ± 3.7 years

- All players provided with same boots (Adidas Copa Mundial)



Methods (Surfaces)

- All surfaces:
 - Tiger turf Real Soccer 50 MS carpet (50mm)
 - ~10mm sand infill
 - ~20mm SBR infill

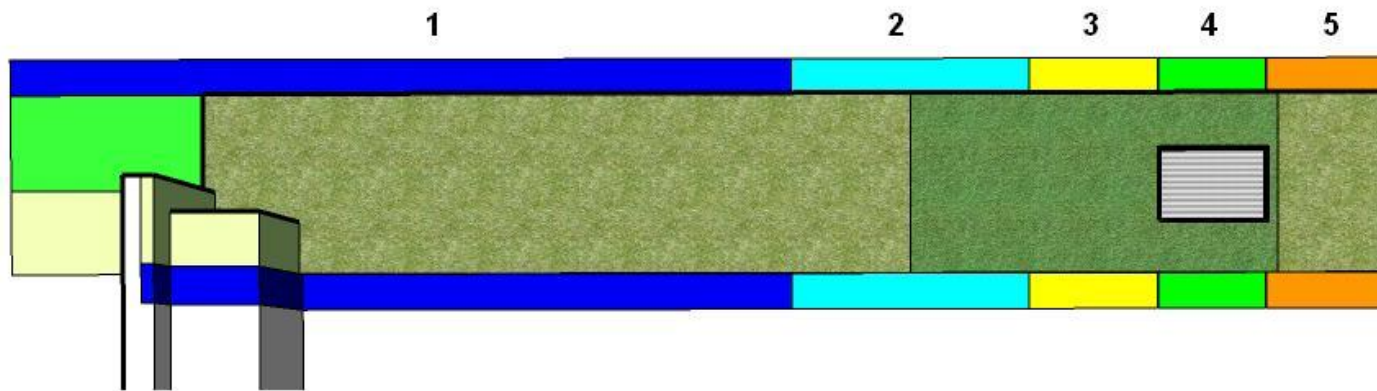
- 2 Hard (FR ~70%) - No shockpad
- 2 Soft (Fr ~50%) - Recticel re-bounce[®] uni F82.1 6 shockpad
- 2 High traction (~40Nm) - 1 – 2.5mm grade rubber
- 2 Low traction (~30Nm) - 2 – 8mm grade rubber

Methods (Surfaces)

- Surfaces were brushed at beginning of each test day
- Surface on top of force plate was rubbed by hand after each subject to make sure surface was even
- Advanced Artificial Athlete (AAA) and Rotational traction measurements were taken at the end of each test day

Methods (Set-up)

- 11.5m x 1.5m runway
- 12 Vicon camera's (500Hz)
- 60x90cm Kistler force plate (1000Hz)
- High speed video
- Plug-in-Gait marker set



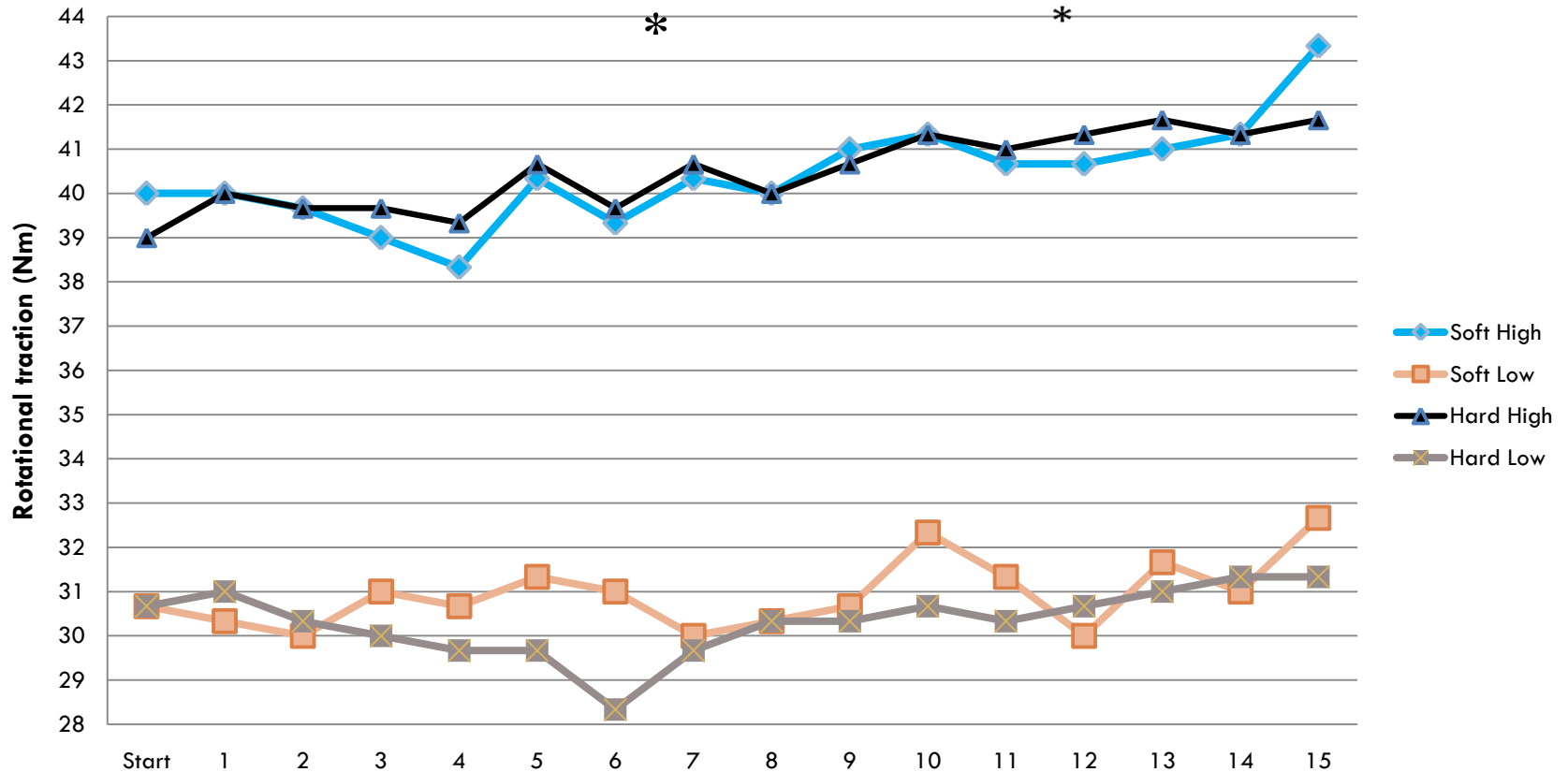
Methods (Protocol)

- Approach speed 12 – 14.5km/h
- 10 trials per surface
- 5 with simulated defender behind force platform to create an in-game scenario

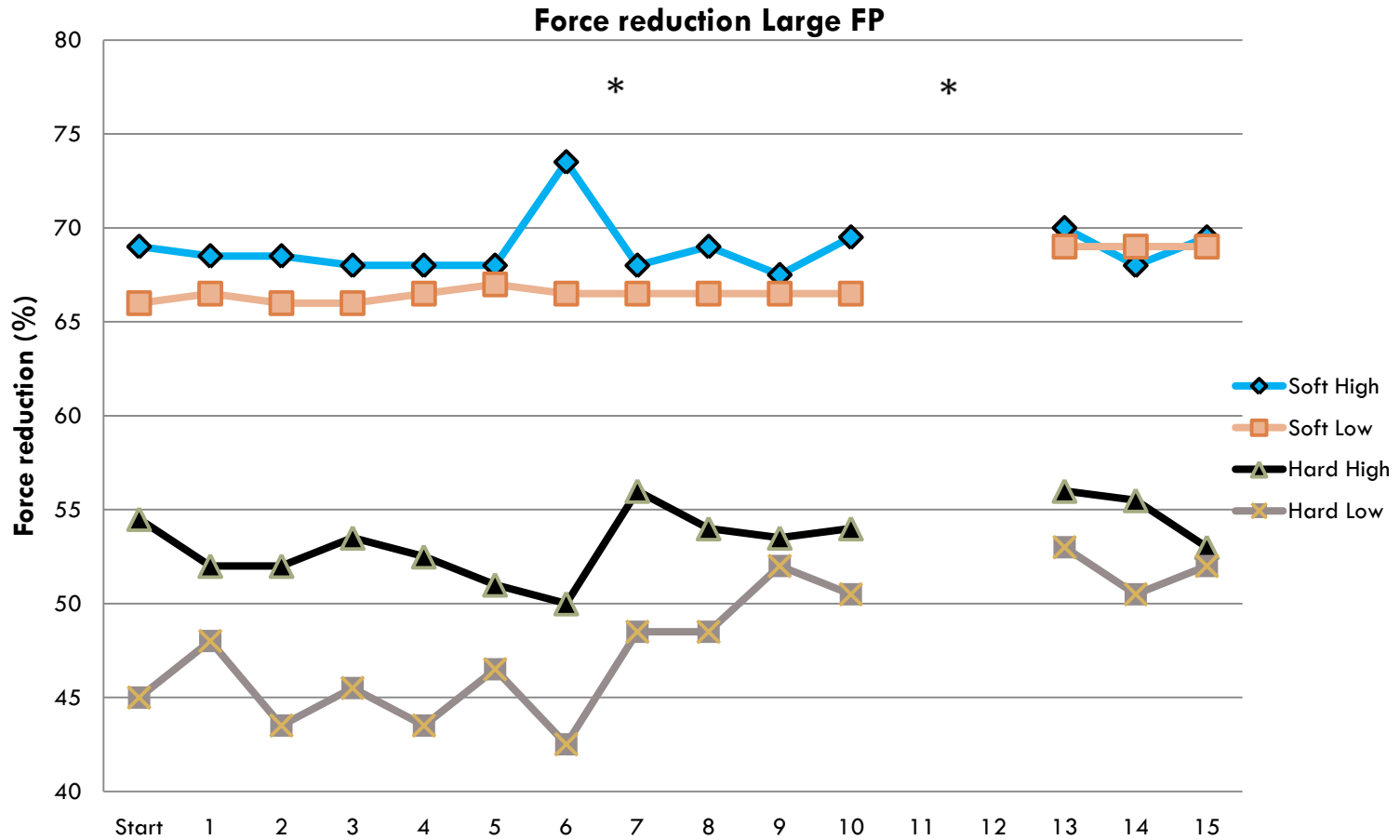
- After each surface condition players rated surfaces on hardness and amount of grip

Surface measurements (Rotational)

Average rotational traction 3 test locations

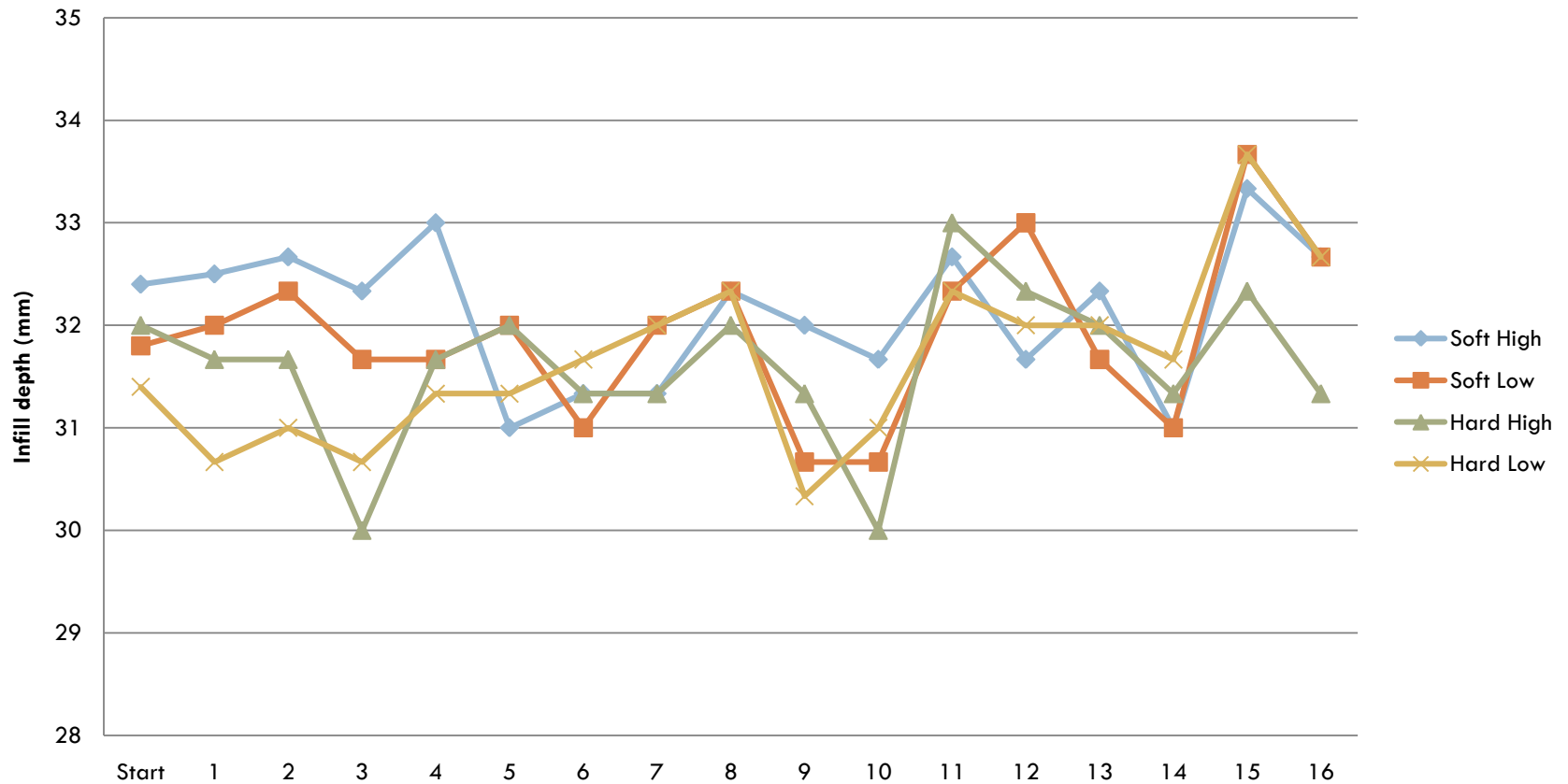


Surface measurements (AAA)



Surface measurements (Infill depth)

Infill depth large FP during ST

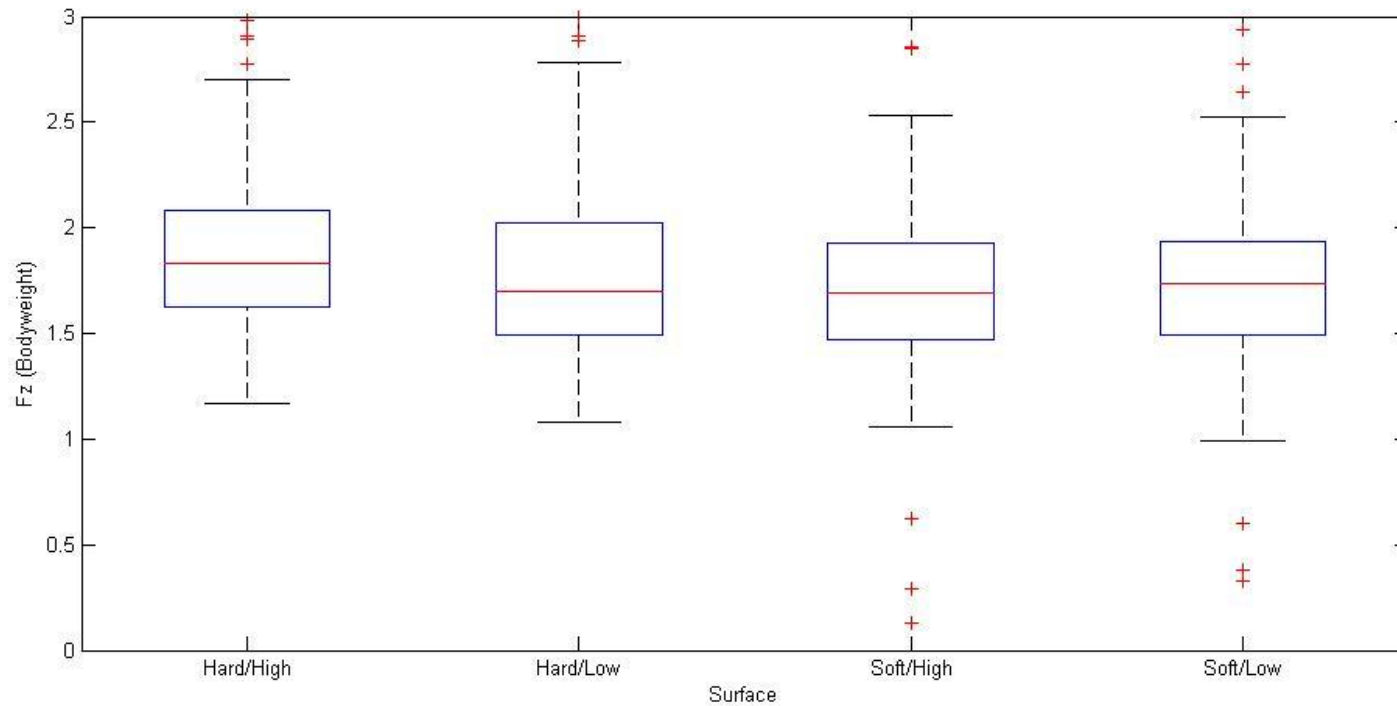


High speed video



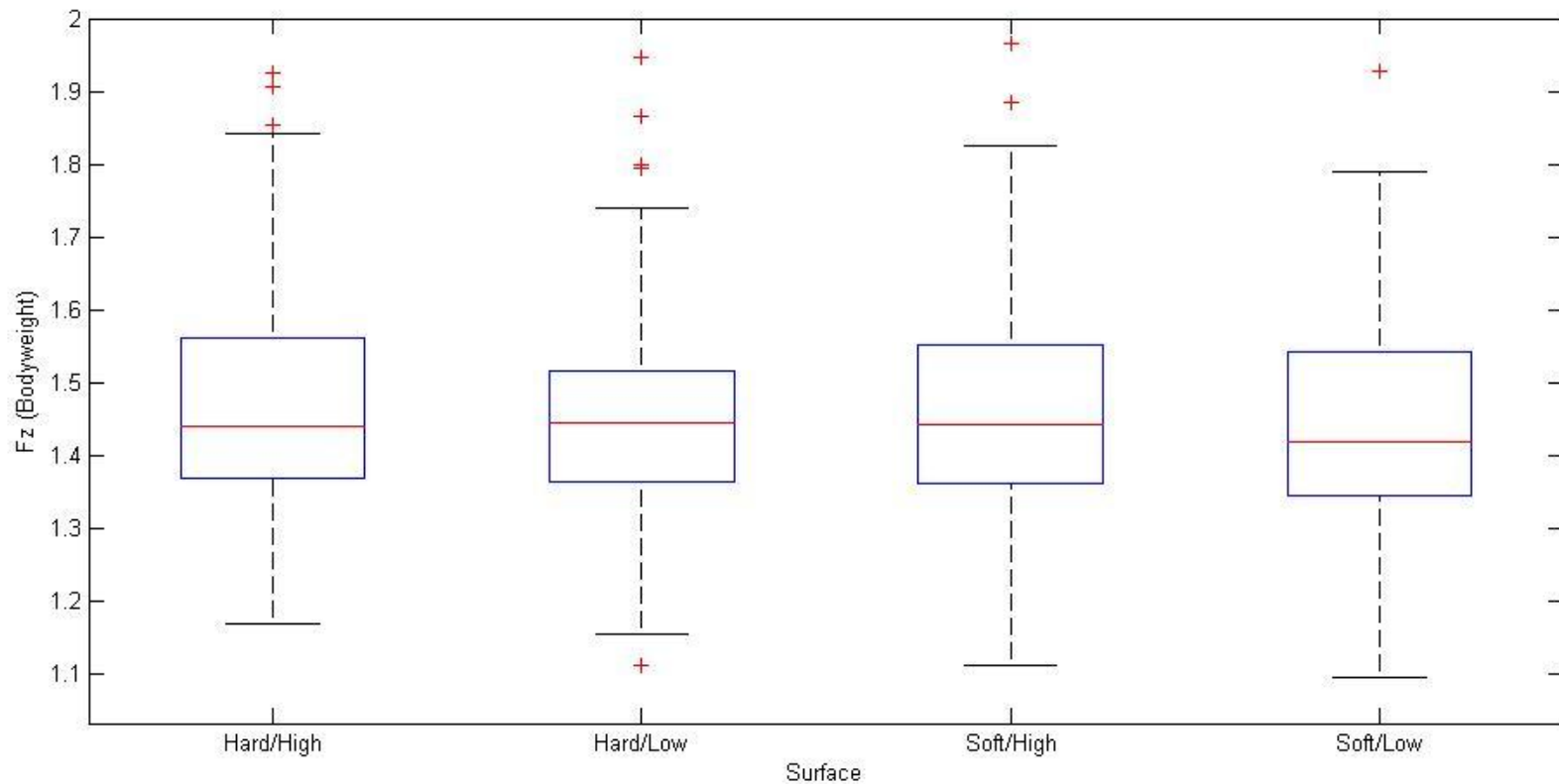
Ground Reaction forces (Fz)

□ Initial peak



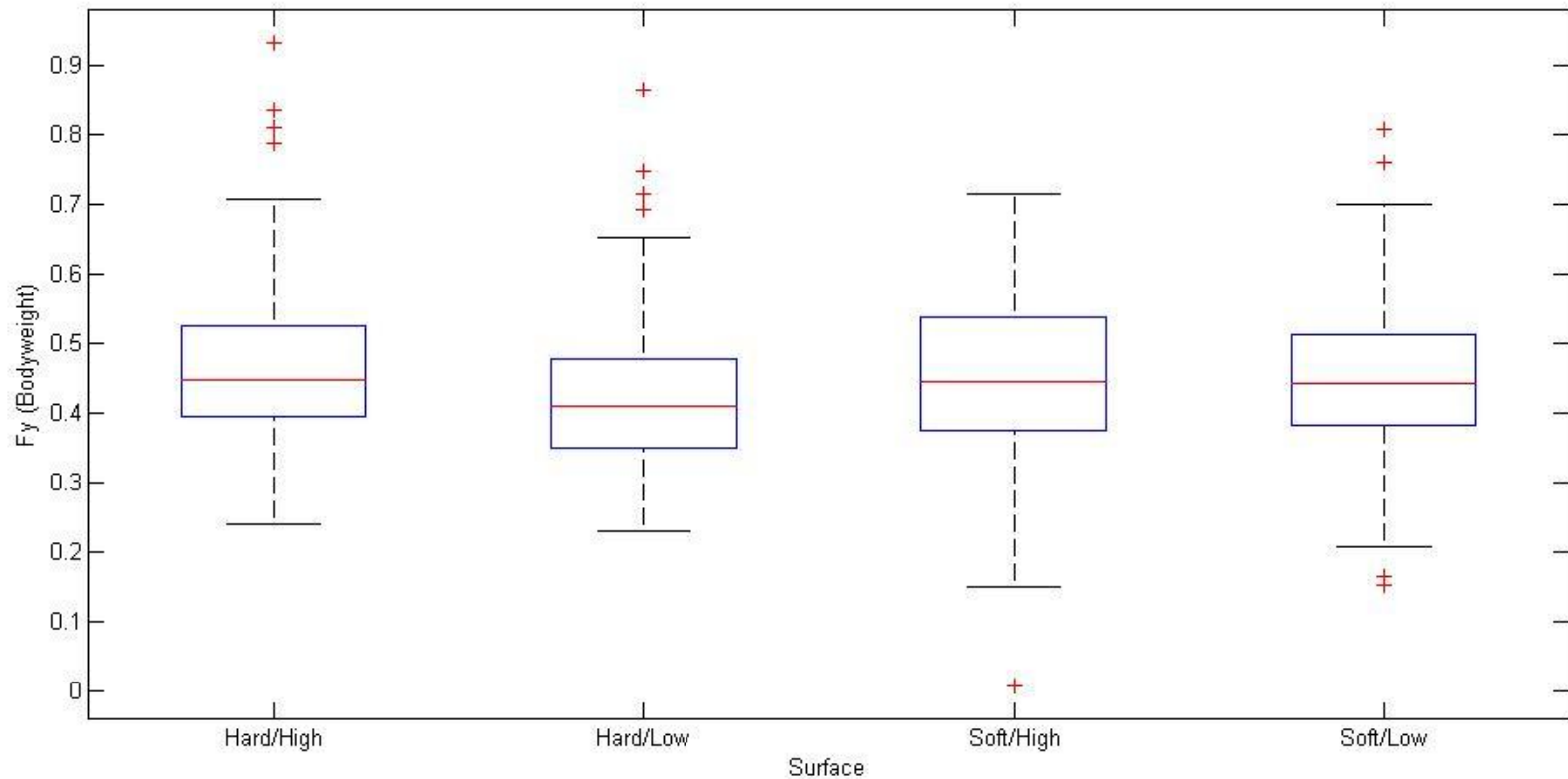
Ground Reaction forces (Fz)

□ Push off peak



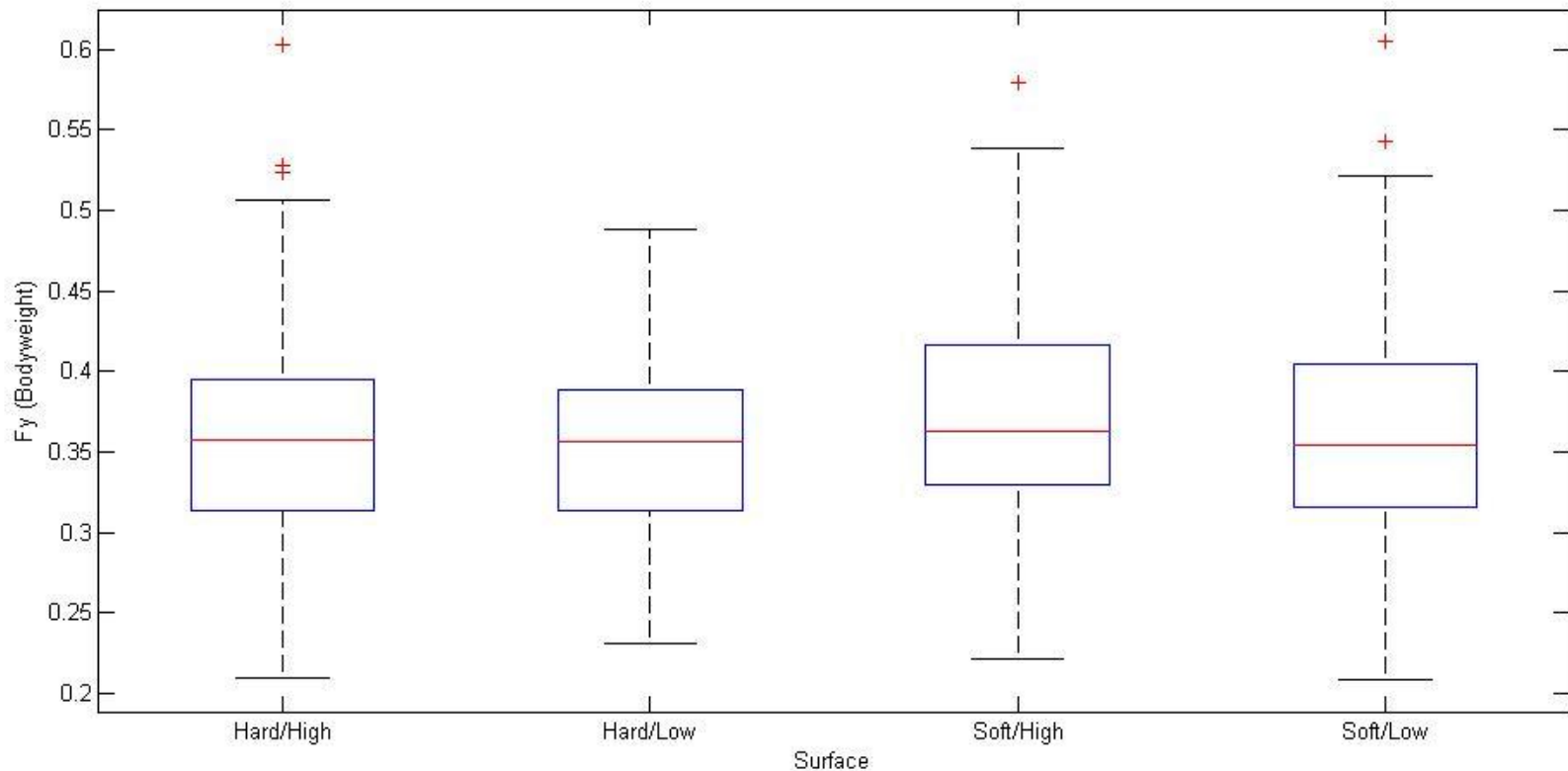
Ground Reaction Forces (Fy)

□ Initial peak



Ground Reaction Forces (Fy)

□ Push off peak



Ground Reaction Forces (Fz)

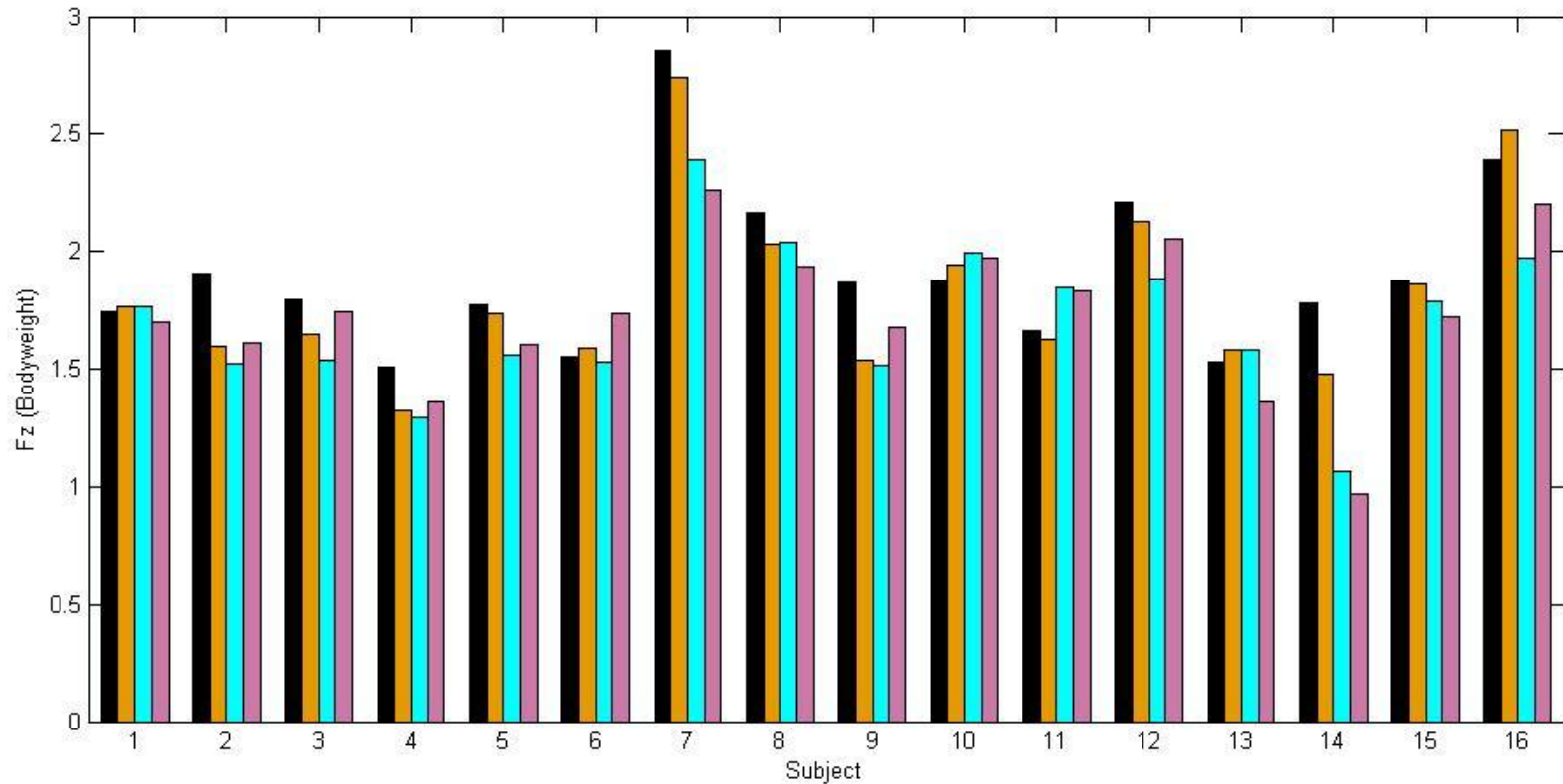
□ Initial peak

Hard/High

Hard/Low

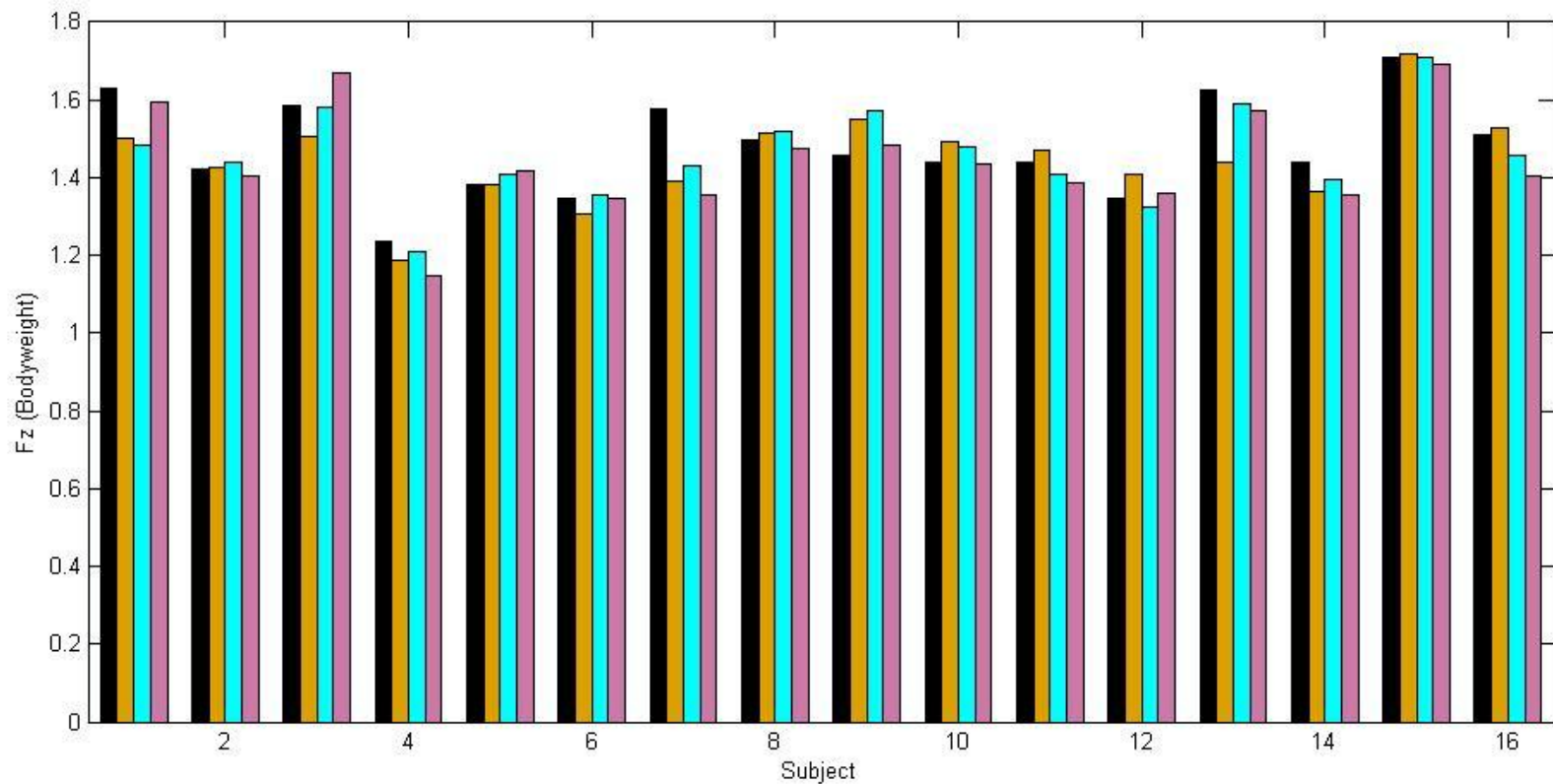
Soft/High

Soft/Low



Ground Reaction Forces (Fz)

□ Push off peak Hard/High Hard/Low Soft/High Soft/Low



Ground Reaction Forces (Fy)

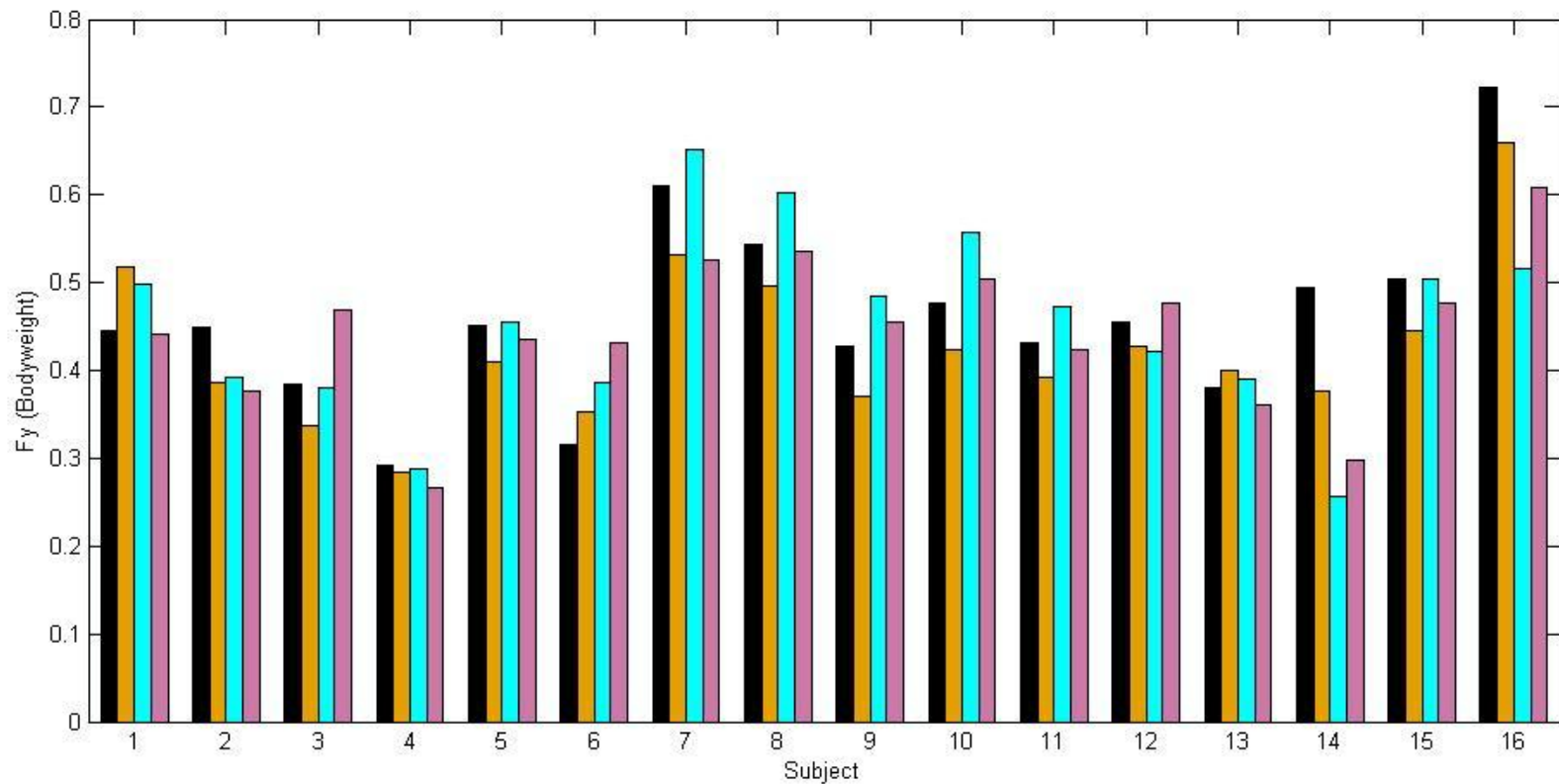
□ Initial peak

Hard/High

Hard/Low

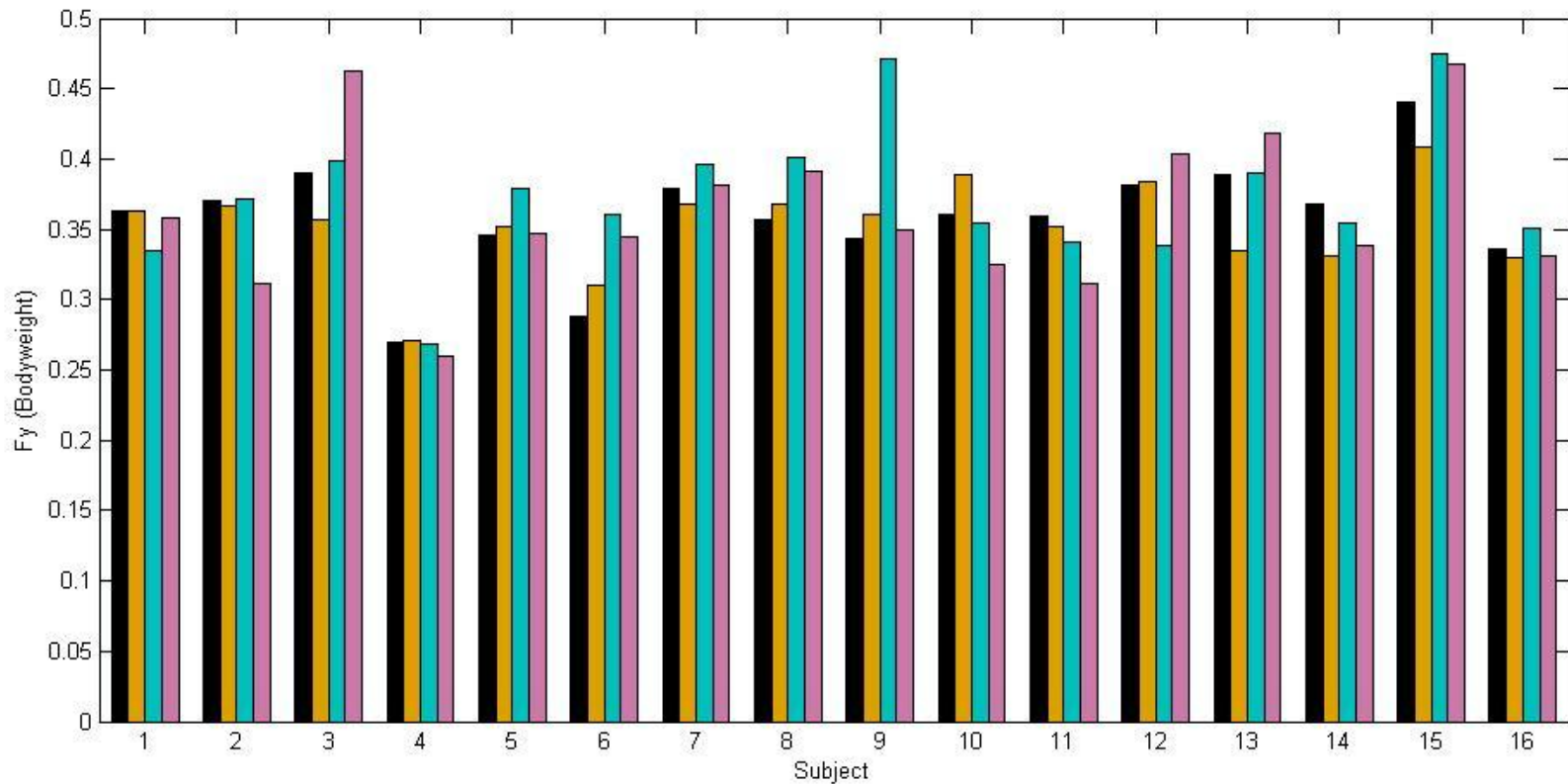
Soft/High

Soft/Low



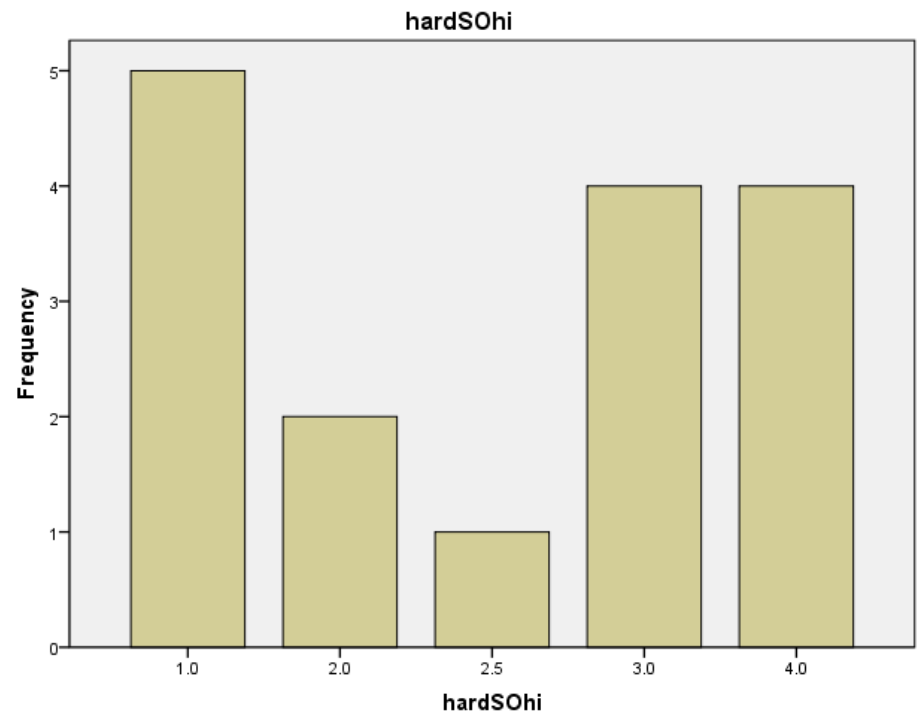
Ground Reaction Forces (F_y)

□ Push off peak Hard/High Hard/Low Soft/High Soft/Low



Discussion

- No apparent difference of ground reaction forces on group level
- Some differences between surfaces on individual level
- Player perception?
- Movement strategy?





Questions?

Suggestions?

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