

COMPARING SMASH PERFORMANCE AND TECHNIQUE BETWEEN ELITE MALE AND FEMALE BADMINTON PLAYERS

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Best university in the world
for sports-related subjects
six years running

QS World University Rankings by Subject 2017-2022



Loughborough
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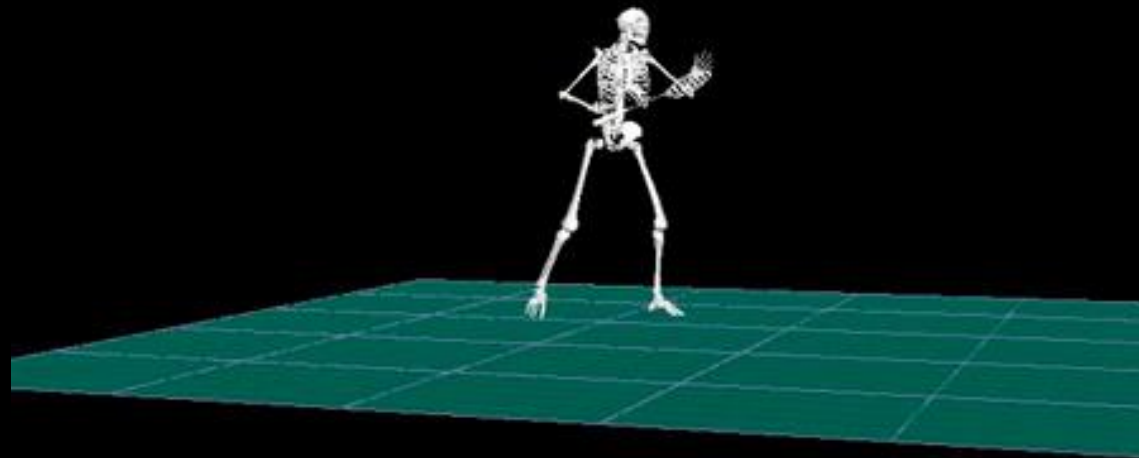
SPORTS BIOMECHANICS

- **mechanical understanding and explanation of movement in sport**
- **identify the factors that are important**
 - **performance**
 - **injuries**

PHILOSOPHY

- **some factors are critical for elite performance**
- **other factors are less important and will be governed by coaching, individual variation etc**

BADMINTON SMASH - BUILD UP OF SPEED



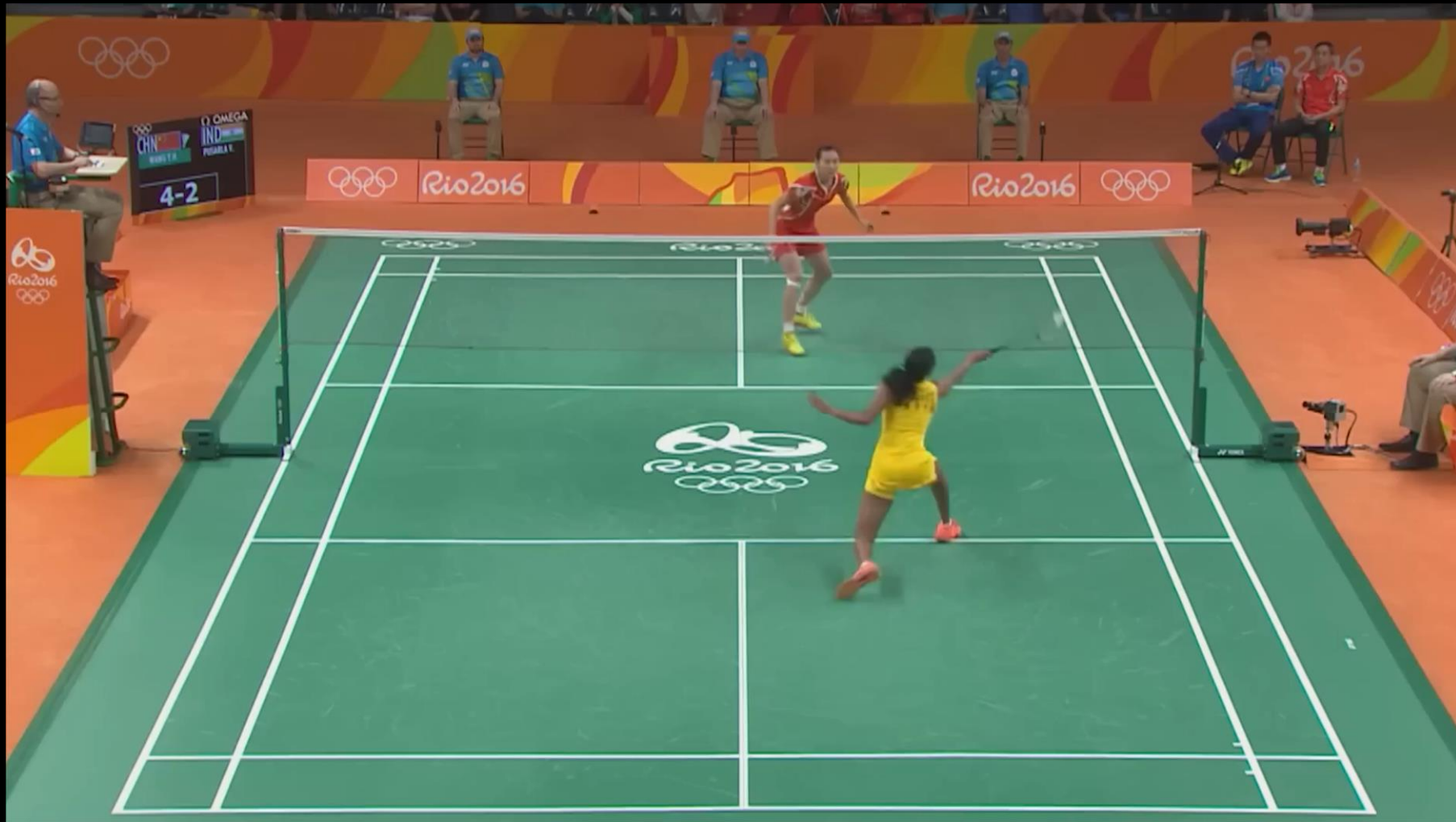
BADMINTON SMASH - BUILD UP OF SPEED



EXAMPLE MALE BADMINTON SMASH



EXAMPLE FEMALE BADMINTON SMASH



PURPOSE

- **how does smash performance and technique compare between elite male and female badminton players?**

(majority of research to date has been on male players)

DATA COLLECTION – PARTICIPANTS

variable	male	female
<i>n</i>	26	26
age (y)	25.5 ± 4.6	23.0 ± 2.7
height (m)	1.82 ± 0.06	1.71 ± 0.07
mass (kg)	75.9 ± 4.0	63.6 ± 8.9
world ranking	59 ± 36	54 ± 24

DATA COLLECTION - ALL ENGLAND CHAMPIONSHIPS 2016



DATA COLLECTION - BADMINTON ENGLAND DEC' 2016



DATA COLLECTION - BADMINTON ENGLAND DEC' 2016



DATA COLLECTION - WORLD CHAMPIONSHIPS – GLASGOW



**OPTIMUM
PERFORMANCE
IN THE
BADMINTON
SMASH**

BWF

23RD - 25TH AUGUST

PERSONALIZED PLAYER 3D REPORT INCLUDING:

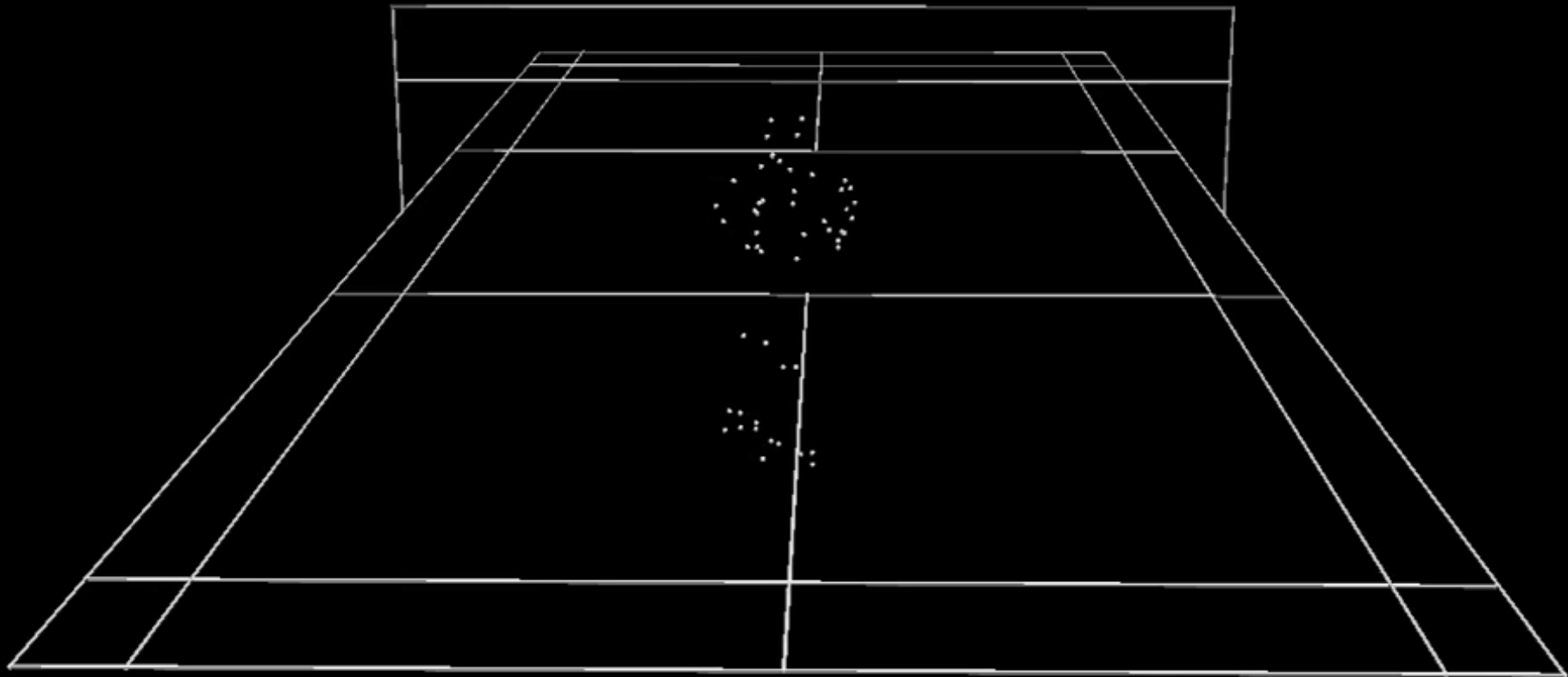
- TECHNIQUE CHARACTERISTICS
- SMASH SPEED
- RACKET IMPACT LOCATIONS

LOCATION:
PRACTICE COURTS
(EMIRATES ARENA)

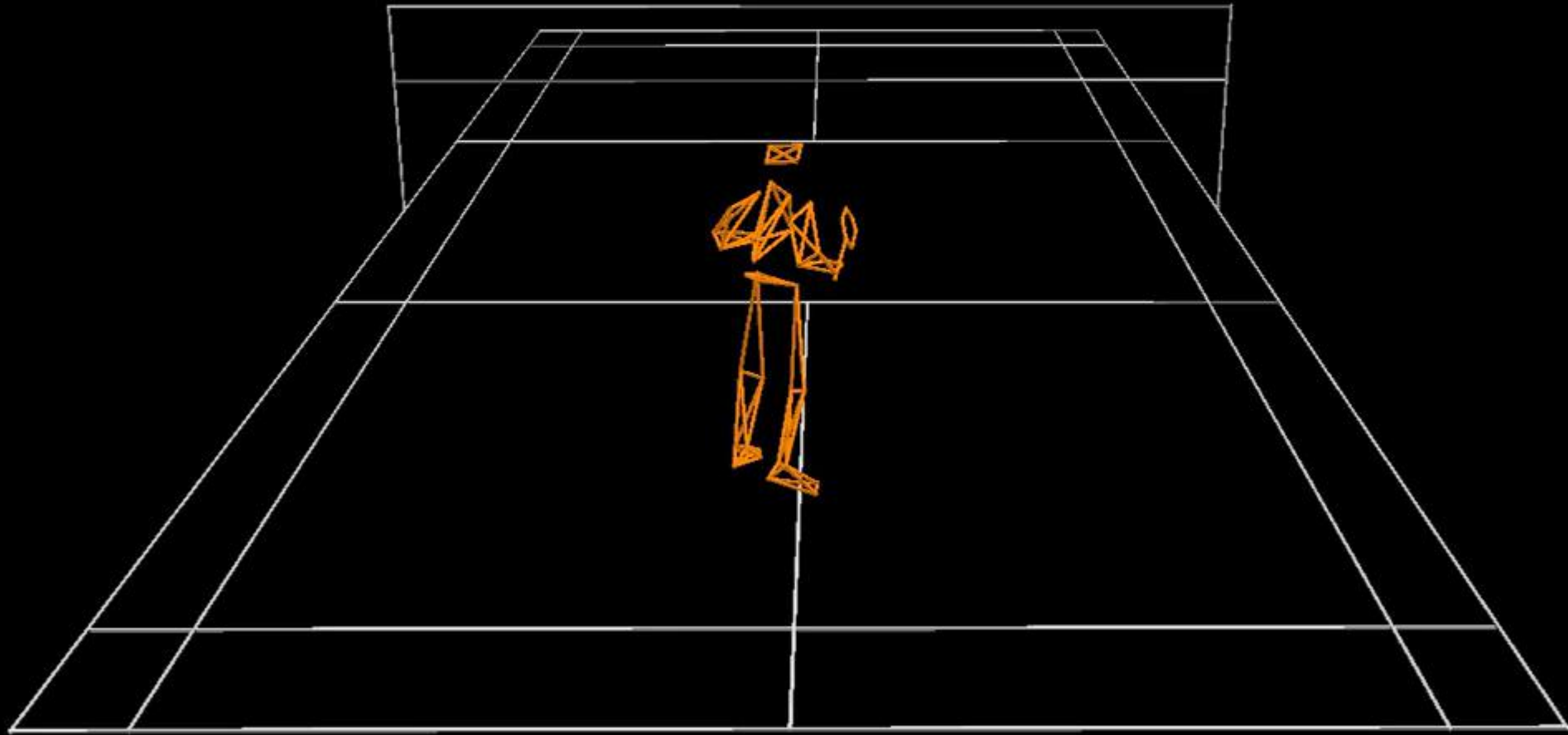
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WORLD
CHAMPIONSHIPS

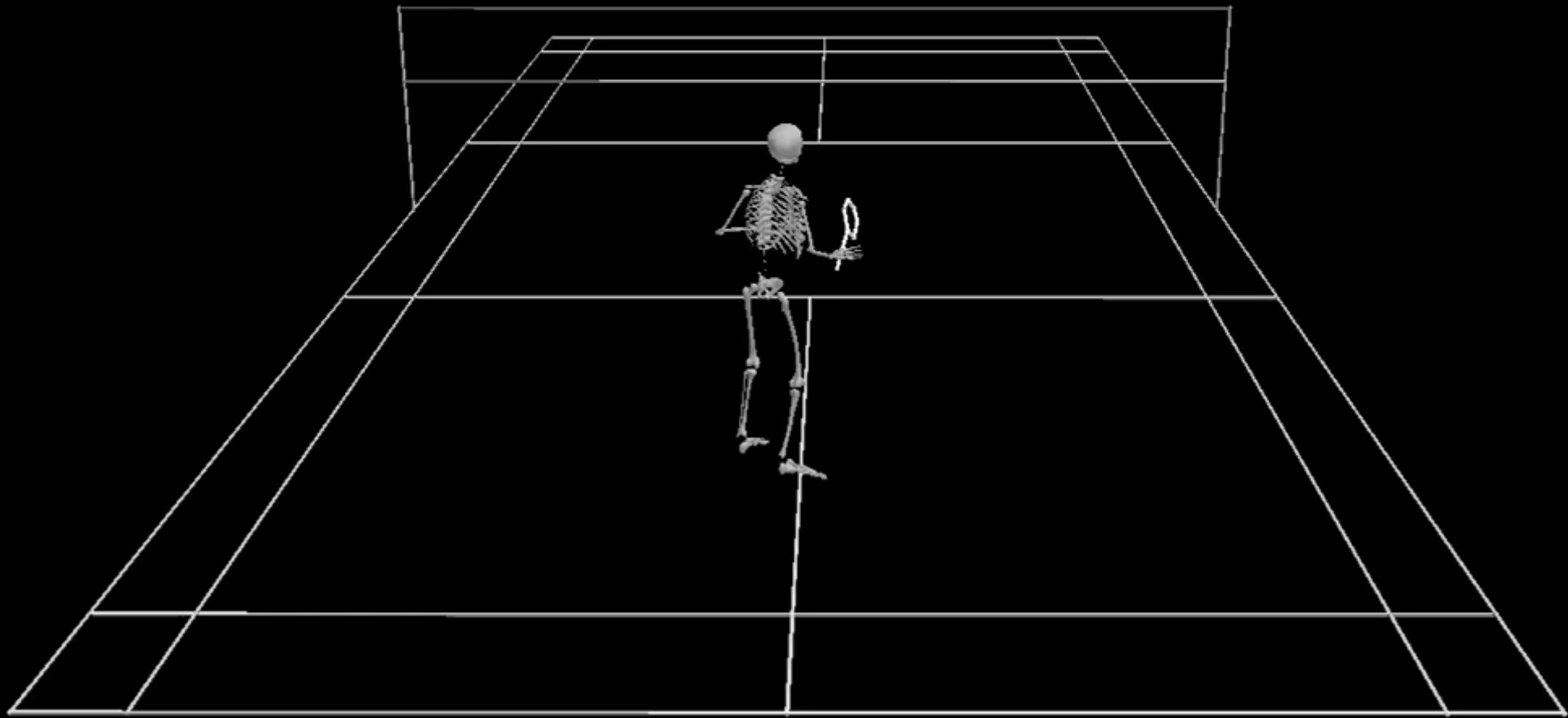
RAW DATA



LABELLED



SKELETON

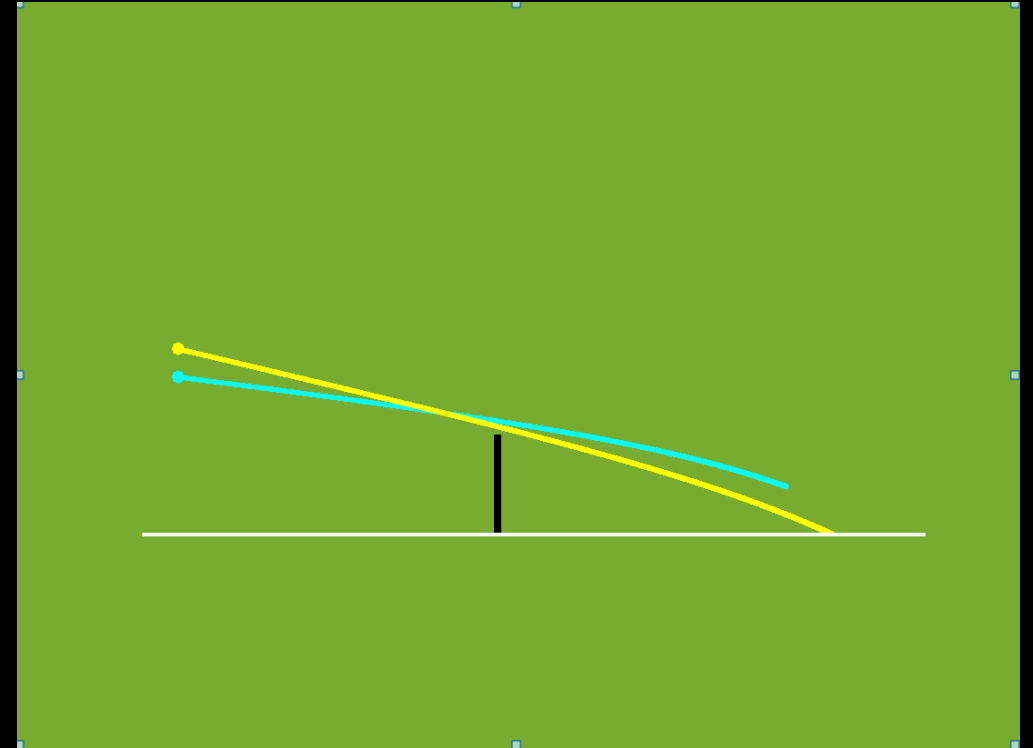
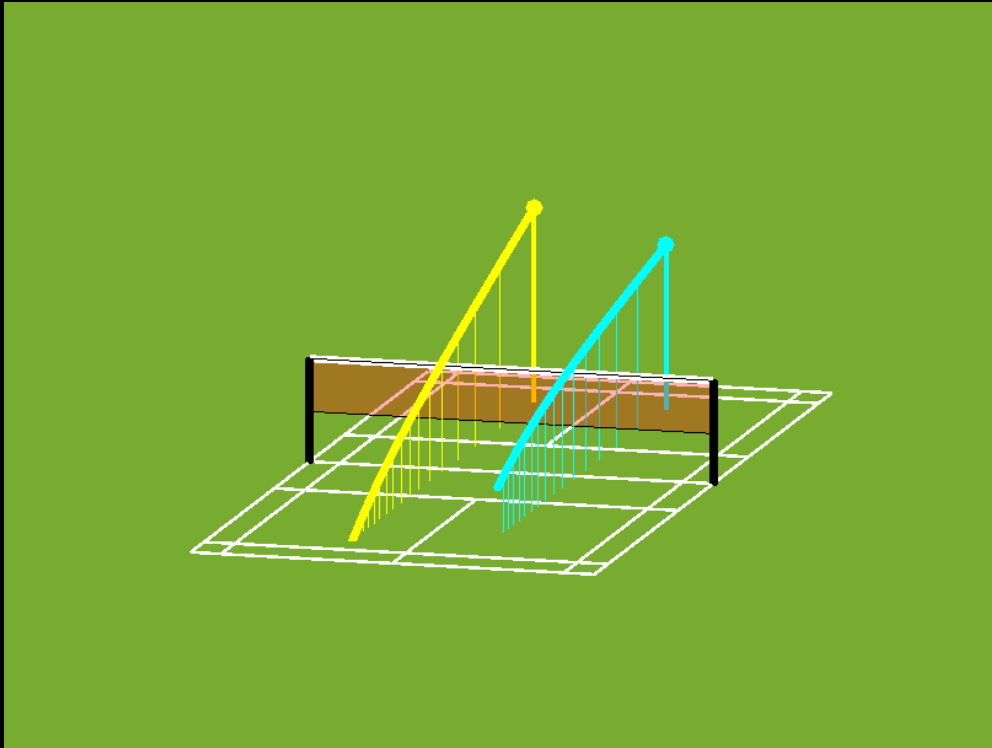


RESULTS

parameter	male	female
shuttlecock speed (m/s)	98.7 ± 3.6	78.5 ± 8.2
racket head speed (m/s)	63.3 ± 2.9	51.0 ± 4.7
swing duration (ms)	183 ± 15	211 ± 33
shuttle vertical angle↓ (°)	13.3 ± 2.2	7.3 ± 2.6
contact height (m)	2.90 ± 0.13	2.46 ± 0.15
jump height (cm)	53.6 ± 9.4	14.5 ± 11.0

SHUTTLE OUTCOME COMPARISON

male female



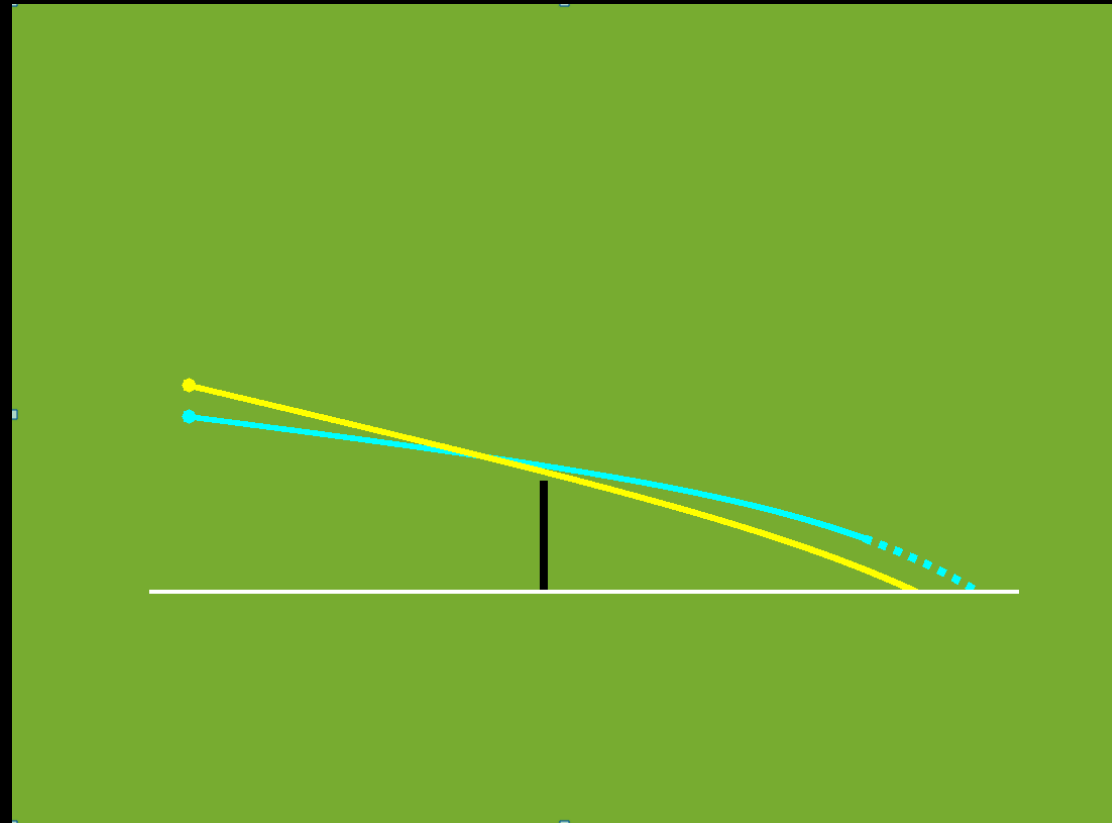
0 - 0.41 s

(male shuttle has landed)

based on average velocities, vertical angle and height of contact

SHUTTLE OUTCOME COMPARISON

male female



extra 0.08 s to reach equivalent position (to the right) of males (+20%)

extra 0.2 s to land compared to males (+49%)

VISUAL TECHNIQUE COMPARISON

male

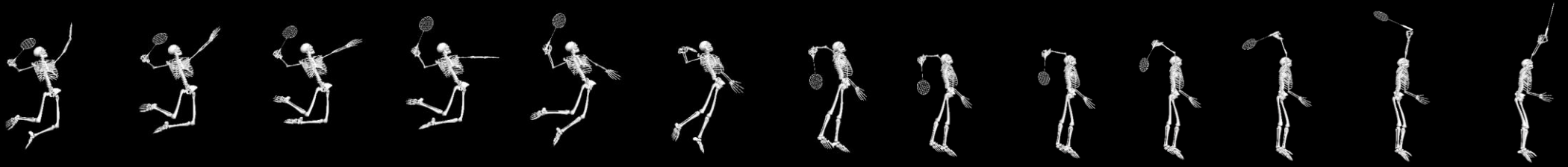


female

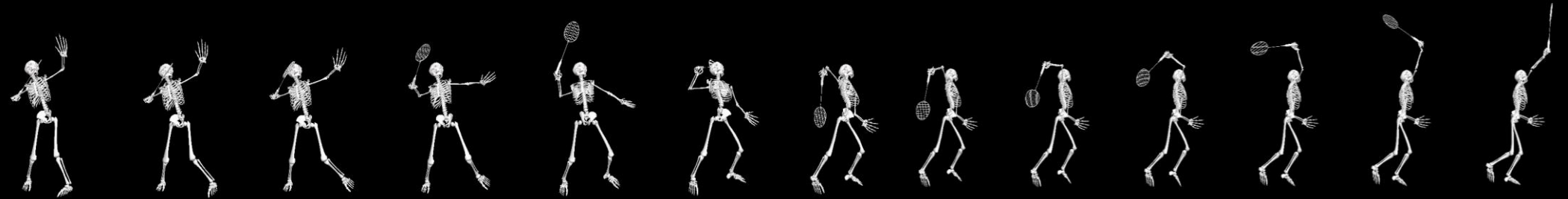


VISUAL TECHNIQUE COMPARISON

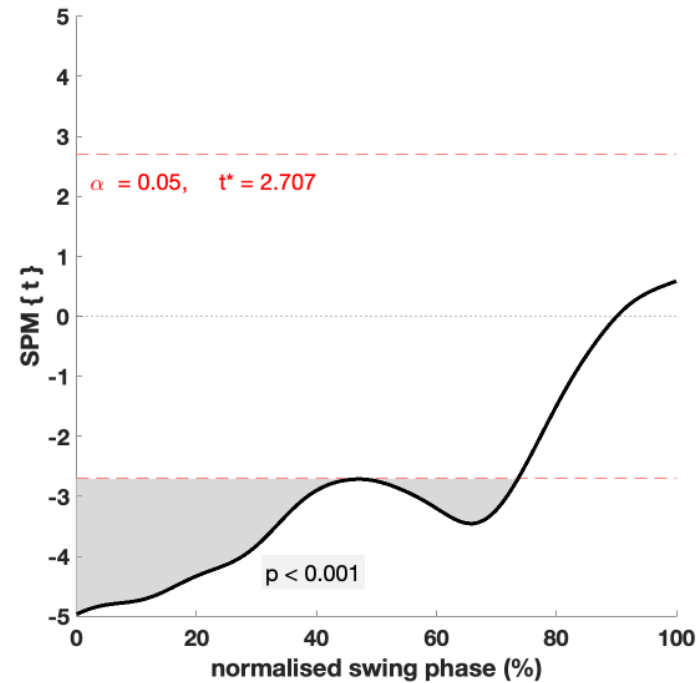
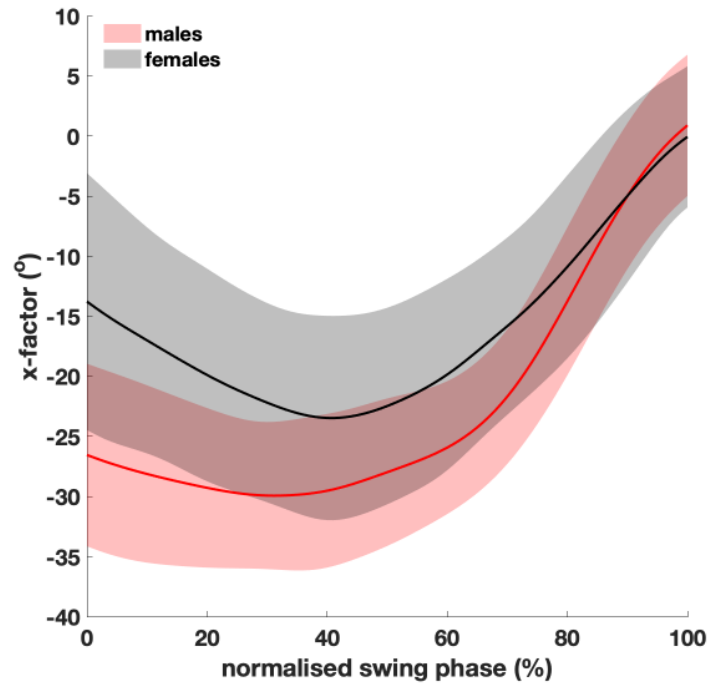
male



female

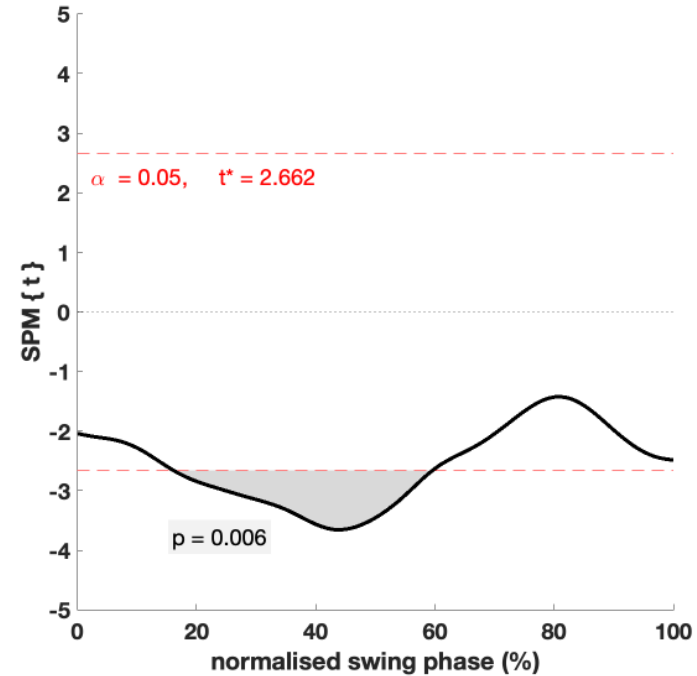
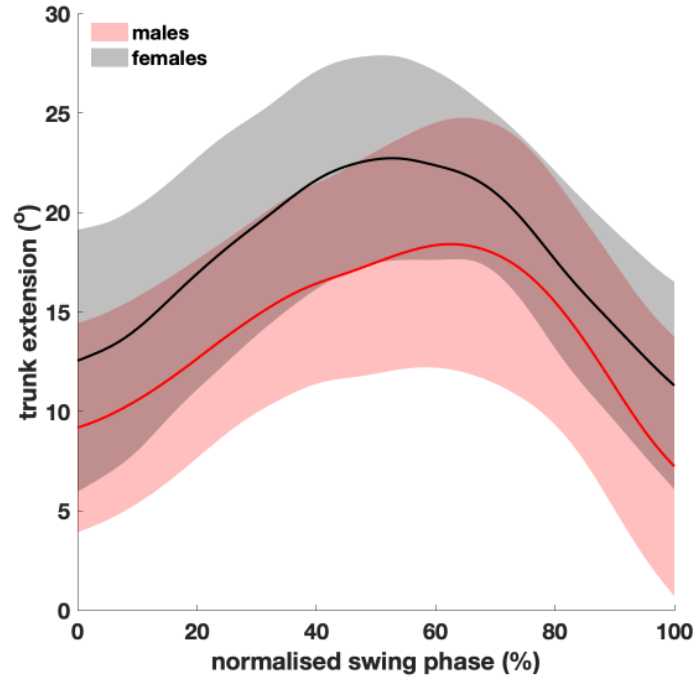


TECHNIQUE COMPARISON



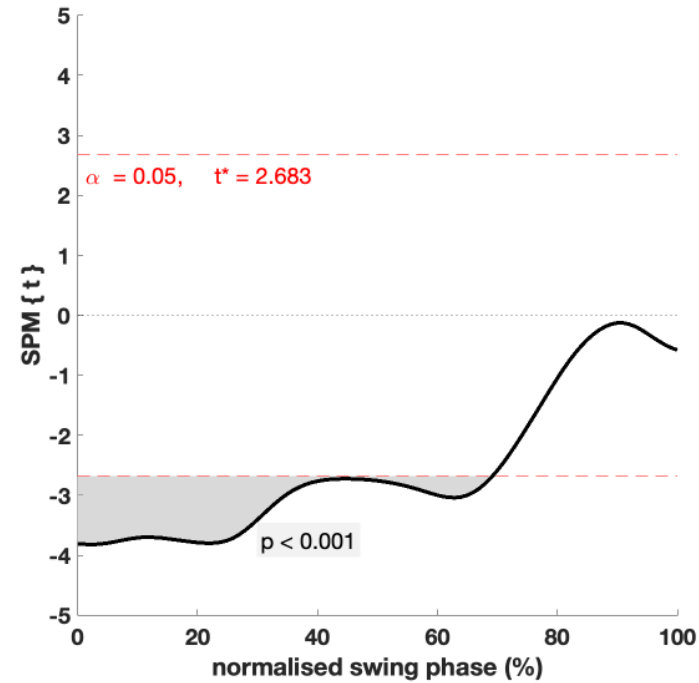
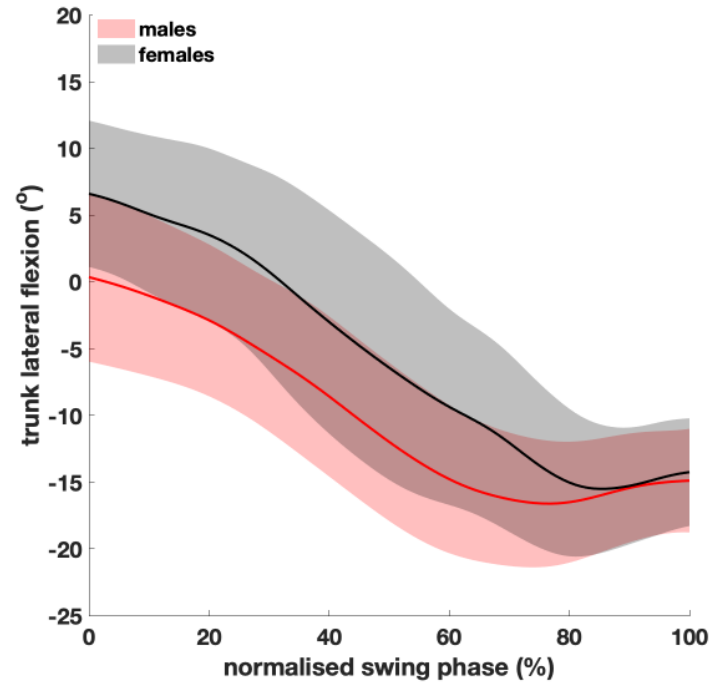
- male players had **more counter-rotated trunks** (x-factor) during the backswing phase

TECHNIQUE COMPARISON



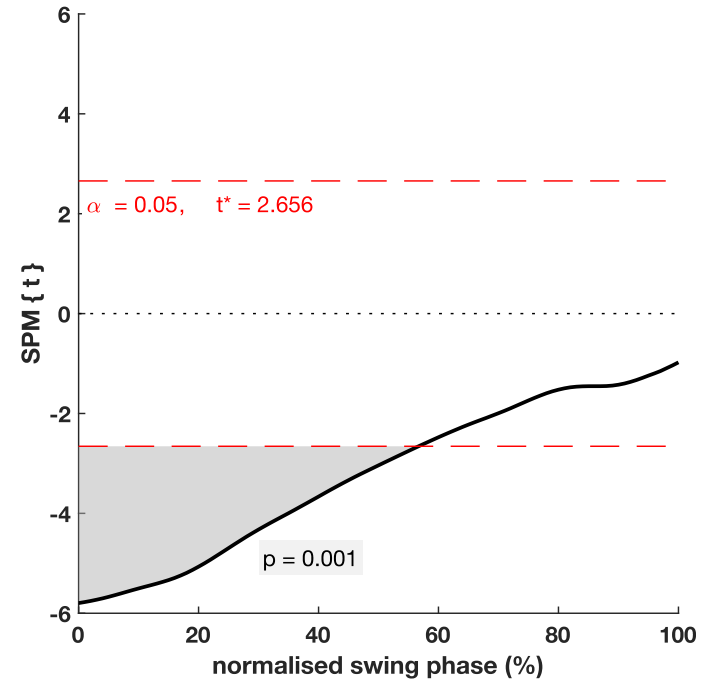
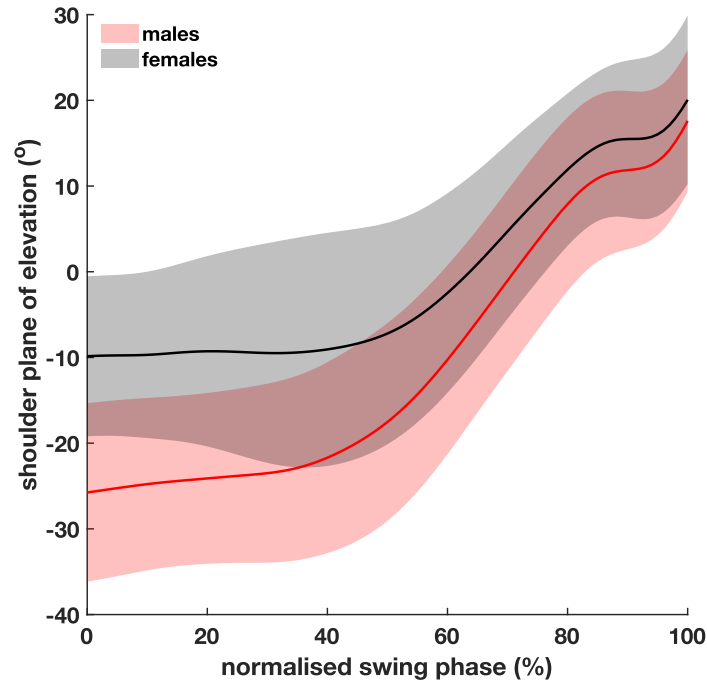
- male players have **more flexed trunk positions** during the backswing phase

TECHNIQUE COMPARISON



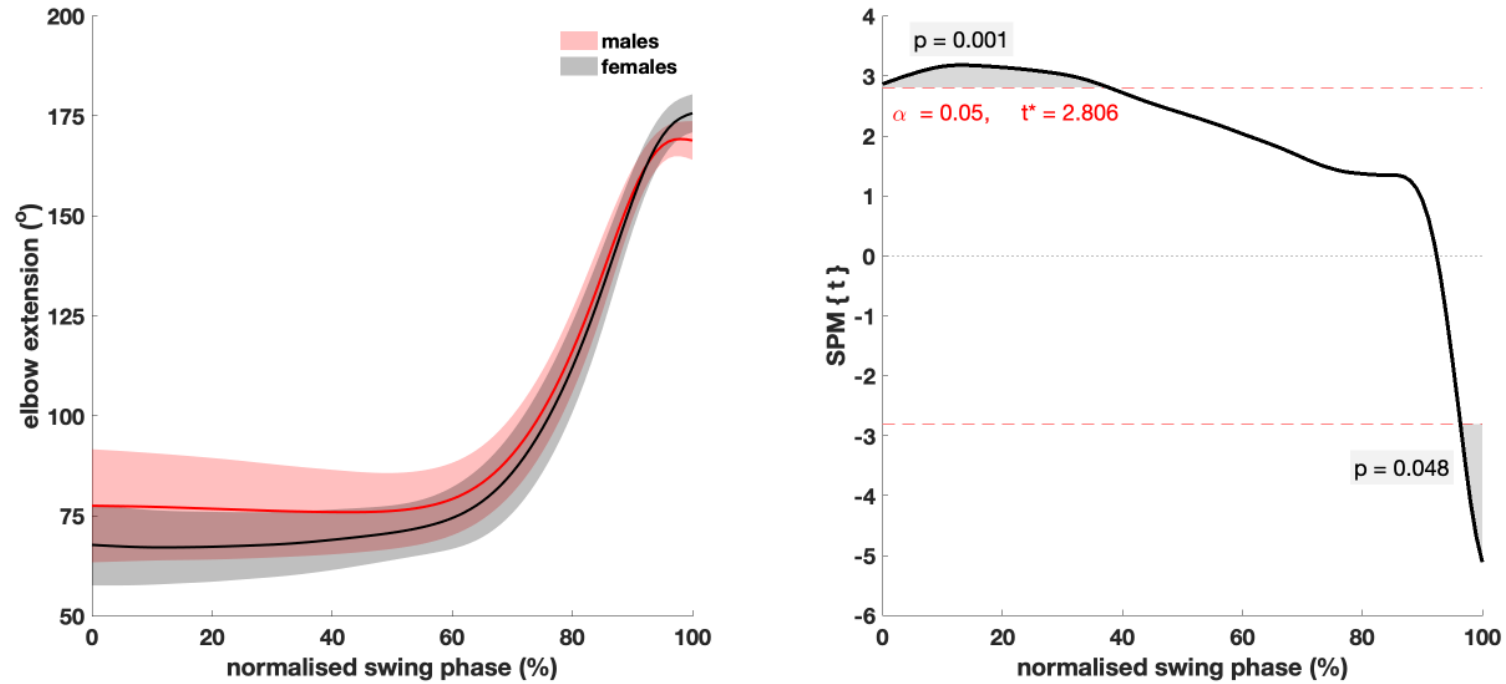
- male players had **more laterally flexed trunk positions** (to the left if right-handed) during the backswing phase

TECHNIQUE COMPARISON



- male players **held their arm further behind the body** (shoulder plane of elevation) during the backswing phase.

TECHNIQUE COMPARISON



- male players **used a smaller elbow flexion/extension range of motion**

SUMMARY

- **25% quicker smash, \approx 40 cm higher jump height, steeper smash, shorter swing time**
- **clear differences mainly during backswing phase**
- **similar position at impact**

ACKNOWLEDGEMENTS

- **Badminton England**
- **Badminton World Federation**

- **All students and staff at Loughborough**

THANK YOU

VISUAL TECHNIQUE COMPARISON

male



female

