THE INFLUENCE OF SPRAINO ON PERFORMANCE AND SAFETY IN BADMINTON
Disclosures & Sponsors

- Copenhagen HealthTech Cluster
- Spraino
- MITIC
- Cachet
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The influence of Spraino...
Lateral ankle sprains

- Ankle sprains are extremely common!
  - Most common site of injury¹,²,³,⁴,⁵,⁶
  - 86.5% of a lateral nature¹,²,³,⁴,⁵
  - Lateral ligament complex most frequently injured structure³,⁴,⁵
  - Accounts for 1/6 of all injury lay-off²,⁵

- May result in long term problems
  - Up to 40-50% may suffer from chronic ankle instability¹,⁵,⁶

¹Verhagen & Bay, 2010; ²Wright et al., 2000; ³Garrick, 1977
⁴Fong et al., 2007; ⁵Gribble et al., 2016; ⁶Vuurberg et al., 2018
Lateral ankle sprains

- **Indoor sports** responsible for the highest incidences of lateral ankle sprains\(^1,4,5\)
  - Typically *Non-contact* injury\(^1,4,5\)
  - Especially predominant in:
    - Handball\(^1,4\)
    - Basketball\(^1,4\)
    - Badminton\(^1,4,5\)

- 24.3% of ALL lower extremity injuries\(^6\)

- “*Shoe-wear and playing court surface are important factors for further analysis*” (Fahlström 1998)

\(^1\)Gribble et al., 2016; \(^2\)Fahlström et al., 1998
\(^3\)Doherty et al., 2013; \(^4\)Fong et al., 2007; \(^5\)Kaldau, 2018; \(^6\)Shariff et al., 2009
Lateral ankle sprains

- May result in long term problems
- Up to 50% will suffer from *chronic ankle instability, recurrent issues etc.*
- Viktor Axelsen having problems 1 year after *initial* ankle sprain...
“Based on current evidence, a combination of an external prophylactic measure (tape or brace) with neuromuscular training will achieve the best preventive outcomes with minimal burden for the athlete”

(Verhagen & Bay, 2010)
Usual practice

• A national survey among 504 sub-elite indoor sports athletes revealed a poor to none-existing use of currently available preventive strategies...

• Despite all of them having regular ankle problems and recurring incidences!

• Especially the case among badminton players!

• Limitation to performance and comfort

(Lysdal et al., (unpublished))
Spraino – Next practice?

- The idea of minimizing friction on the lateral edge of a shoe
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Spraino – Next practice?

○ = Initial ground contact

\[\text{(Lysdal et al., 2018)}\]
Minimizing friction on the lateral edge of a shoe can prevent non-contact lateral ankle sprains

(Lysdal et al., 2018)
Effect on Badminton Performance

• Friction fundamental to performance?
  • Yes, (but) only until a friction coefficient of 0.82\(^1\)

• *Can Spraino be used without reducing performance of simulated badminton matchplay?*

(Luo & Stefanyshyn, 2011)
Twenty-one international badminton players participated in the study:
- Thirteen males (age: 22.3 ± 4 y height: 1.79 ± 0.07 m, mass: 72.1 ± 7 kg)
- Eight females (age: 21.6 ± 3 y height: 1.65 ± 0.07 m, mass: 58.7 ± 7 kg)

Performed the Møller Speed Test (BST)\(^1\) two times in two different conditions in a randomized crossover design
- With and without minimized lateral shoe-surface friction

\(^1\)Madsen et al., 2015
Effect on Badminton Performance

- Kinematic data
  - 66 markers
  - 240Hz
  - 16 highspeed infrared cameras (Oqus 700+, Qualisys AB, Gothenburg, Sweden)

- Lower extremity joint kinematics were analyzed using Visual3D (C-Motion Inc., Maryland, USA)
Effect on Badminton Performance

Time [s]

- Spraino
- Control
Effect on Badminton Performance

![Bar chart showing the effect of Spraino and Control on time.]

- Spraino: Time [s] = 31
- Control: Time [s] = 32

Statistical significance: $P = 0.08$
Effect on Badminton Performance

• Biomechanics of the badminton **forward lunge**
  • *Test if Spraino affects performance*

• Essential part of badminton\(^1\)

• Produces high shoe-floor shear stresses (friction)\(^1\)

• **Backhand forward lunge** (*Backhand lob*)
  • Highest degree of initial ankle inversion (initial lateral contact)

(Smith and Lees, 1994)
Effect on Badminton Performance
Effect on Badminton Performance

![Shoe floor flexion](image1)

- Shoe floor flexion
- Stance phase [%]
- Angle [°]

![Shoe floor eversion/inversion velocity](image2)

- Shoe floor eversion/inversion velocity
- Stance phase [%]
- Angle [°]

Legend:
- Control
- Sprain
Effect on Badminton Performance
Effect on Badminton Performance

![Graphs showing shoe floor flexion and eversion/inversion velocity](image)
Effect on Badminton Performance
Effect on Badminton Performance
Conclusions

• **Spraino does not have a negative effect on badminton performance**
  • Tendency towards a faster completion time

• **No reduction in traction**
  • Spraino does not reduce friction during backhand forward lunging (backhand lob)
    • despite initial ankle inversion

• **No adverse effects observed**
The trend towards a faster completion time highlights, that Spraino may be effective when used to prevent ankle sprains in badminton, without affecting performance and safety.
Thank you for your attention!