

**Spraino® reduces the risk of lateral ankle sprain injury among indoor sport athletes**

*a pilot randomized controlled trial with 510 participants*

Lysdal, Filip Gertz; Bandholm, Thomas; Tolstrup, Janne Schurmann; Clausen, Mikkel Bek; Mann, Stephanie; Petersen, Pelle Baggesgaard; Grønlykke, Thor Buch; Kersting, Uwe Gustav; Delahunt, Eamonn; Thorborg, Kristian

*Published in:*

British Journal of Sports Medicine

*DOI (link to publication from Publisher):*

[10.1136/bjsports-2021-IOC.17](https://doi.org/10.1136/bjsports-2021-IOC.17)

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*Publication date:*

2021

*Document Version*

Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

*Citation for published version (APA):*

Lysdal, F. G., Bandholm, T., Tolstrup, J. S., Clausen, M. B., Mann, S., Petersen, P. B., Grønlykke, T. B., Kersting, U. G., Delahunt, E., & Thorborg, K. (2021). Spraino® reduces the risk of lateral ankle sprain injury among indoor sport athletes: a pilot randomized controlled trial with 510 participants. *British Journal of Sports Medicine*, 55(Suppl 1), A7-A8. Article 18. <https://doi.org/10.1136/bjsports-2021-IOC.17>

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**Background** Understanding the risk of concussion and how this injury occurs in rugby union match play can inform future injury reduction strategies. This has been investigated in professional rugby but not in the UK elite level pathway.

**Objective** Describe the incidence of concussion and characteristics of tackles resulting in concussion in British University rugby union.

**Design** A one-season prospective cohort study; team medical staff reported match play concussions. Matches were filmed and tackle-related concussions were analysed alongside 796 non-injurious 'control' tackles.

**Setting** British University and Colleges (BUCS) 'Super' rugby union: season 2018/19.

**Participants** Eight teams (341 players).

**Independent variables** Match exposure.

**Main Outcome Measurements** Injury incidence and characteristics of tackles associated with concussion.

**Results** There were 43 concussions in 154 team games; incidence was 14.0 per 1000 player match hours (95% CI: 10.1–18.8) and mean absence was 23 days (95% CI: 16.1–29.9). Thirty-four (79%) concussions occurred in the tackle; 22 by the tackler and 12 by the ball carrier. Twenty-five tackles resulting in concussion could be conclusively identified on video (tackler: 16; ball carrier: 9). For control tackles, 5% resulted in initial impact to the head/neck and 18% to the shoulders of the ball carrier compared with tackles resulting in concussions to the ball carrier [head/neck, 3 (33%); shoulder, 2 (22%)] or tackler [head/neck, 2 (13%); shoulder, 3 (19%)]. For tackler concussions, 3 (19%) involved head-to-head contact (2% of control tackles) and 4 (25%) involved head-to-shoulder contacts (6% of control). The ball carrier was travelling at high speed for 67% of ball carrier concussions, compared with 29% for control tackles.

**Conclusions** Concussion incidence in high-level university rugby union is slightly lower than professional rugby with most concussions occurring in the tackle. Lowering tackle height may help reduce concussion for the ball carrier and the tackler should prioritise head positioning away from the ball carrier's head and shoulders.

017

#### DOES THE OSLO SPORTS TRAUMA RESEARCH CENTER SHOULDER INJURY PREVENTION PROGRAM AFFECT THE RISK FACTORS EXTERNAL ROTATION STRENGTH AND INTERNAL ROTATION RANGE OF MOTION? A RANDOMIZED CONTROLLED STUDY AMONG ADOLESCENT HANDBALL PLAYERS

<sup>1</sup>Hilde Fredriksen, <sup>2</sup>Ann Cools, <sup>1</sup>Roald Bahr, <sup>1</sup>Grethe Myklebust. <sup>1</sup>Oslo Sports Trauma Research Center, Norwegian School of Sport Sciences, Oslo, Norway; <sup>2</sup>Ghent University, Rehabilitation Sciences and Physiotherapy, Ghent, Belgium

10.1136/bjsports-2021-IOC.16

**Background** Shoulder problems are common in handball, but preventable. However, player compliance remains a challenge, as the existing prevention program is time consuming.

**Objective** To assess the effect of the Oslo Sports Trauma Research Center shoulder injury prevention program on external rotation (ER) strength and internal rotation (IR) range of motion (ROM), believed to represent key risk factors for injury.

**Design** Randomised controlled trial, single blinded

**Setting** Youth handball players (16–18 yrs)

**Participants** Four youth handball teams (three female, one male, 57 players, mean age 17.1 yrs) were randomly selected from eligible teams in the Oslo region, and randomized to an intervention group (28 players) or control group (29 players).

**Interventions** The Oslo Sports Trauma Research Center shoulder injury prevention program was implemented during regular handball warm-up three times a week for 18 weeks in the intervention group.

**Main Outcome Measurements** The main outcome variable was the between-group difference in ER strength and IR ROM change from baseline to post intervention. Isometric ER strength was measured with a handheld dynamometer and IR ROM with a digital goniometer.

**Results** Mean dominant shoulder isometric ER strength increased significantly both in the intervention (10%) and the control group (6%) during the intervention, but there was no significant group by time interaction (group difference: 0.06 N/kg (95% CI: -0.04 to 0.17). IR ROM did not change in either group during the intervention.

**Conclusions** The Oslo Sports Trauma Research Center shoulder injury prevention program did not affect the risk factors ER strength and IR ROM. The preventive effect of the program must therefore be due to other factors.

018

#### SPRAIN<sup>®</sup> REDUCES THE RISK OF LATERAL ANKLE SPRAIN INJURY AMONG INDOOR SPORT ATHLETES: A PILOT RANDOMIZED CONTROLLED TRIAL WITH 510 PARTICIPANTS

<sup>1,2</sup>Filip Gertz Lysdal, <sup>3</sup>Thomas Bandholm, <sup>4</sup>Janne Tolstrup, <sup>5,6</sup>Mikkel Clausen, <sup>3</sup>Stephanie Mann, <sup>7</sup>Pelle Petersen, <sup>2</sup>Thor Grønlykke, <sup>1,8</sup>Uwe Kersting, <sup>9,10</sup>Eamonn Delahunt, <sup>3,6</sup>Kristian Thorborg. <sup>1</sup>Sport Sciences, Department of Health Science and Technology, Aalborg University, Aalborg, Denmark; <sup>2</sup>Spraino ApS, Copenhagen, Denmark; <sup>3</sup>Physical Medicine and Rehabilitation Research—Copenhagen (PMR-C), Department of Physical and Occupational Therapy, Clinical Research Centre, and Department of Orthopedic Surgery, Amager-Hvidovre Hospital, Copenhagen University, Hvidovre, Denmark; <sup>4</sup>National Institute of Public Health, University of Southern Denmark, Copenhagen, Denmark; <sup>5</sup>School of Physiotherapy, Faculty of Health and Technology, University College Copenhagen, Copenhagen, Denmark; <sup>6</sup>Department of Orthopedic Surgery, Sports Orthopedic Research Center—Copenhagen (SORC-C), Amager-Hvidovre Hospital, Copenhagen University, Hvidovre, Denmark; <sup>7</sup>Section for Surgical Pathophysiology 7621, Rigshospitalet, University of Copenhagen, Copenhagen, Denmark; <sup>8</sup>Institute of Biomechanics and Orthopaedics, German Sport University Cologne, Cologne, Germany; <sup>9</sup>School of Public Health, Physiotherapy and Sports Science, University College Dublin, Dublin, Ireland; <sup>10</sup>Institute for Sport and Health, University College Dublin, Dublin, Ireland

10.1136/bjsports-2021-IOC.17

**Background** High shoe-surface friction is a proposed risk factor for 'non-contact' lateral ankle sprain (LAS) injuries. Spraino<sup>®</sup> is a novel product that minimizes friction at the lateral edge of the shoe, thereby potentially mitigating the risk.

**Objective** To determine preliminary effect and safety of Spraino<sup>®</sup> when used to prevent LAS injury among indoor sport athletes.

**Design** A double-blinded, prospective, two-arm pilot randomised controlled trial (RCT). Participants were allocated (1:1) to Spraino<sup>®</sup> or to a 'do-as-usual' control group. The random allocation was concealed for investigators and participants. Group allocations were outcome-assessor-blinded.

**Setting** Indoor sports clubs competing at divisional- or league level in handball, badminton and basketball in Denmark.

**Participants** 510 elite- and sub-elite indoor sport athletes with at least one previous LAS injury within the preceding 24 months were enrolled; 480 completed the trial.

**Intervention** Spraino<sup>®</sup>; a low-friction patch applied to the lateral side of the shoe.

**Main Outcome Measurements** The trial was explorative with evenly-valued outcome measures related to incidence and severity of self-reported LAS injuries, pain in the ankle, fear of injury and intervention-related adverse events.

**Results** A total of 151 LAS injuries were reported within the trial period, of which 96 were categorized as non-contact injuries. A total of 50 injuries were severe. All metrics favoured Spraino<sup>®</sup> with computed incidence rate ratios of 0.87 (95% CI, 0.62–1.23) for any LAS injury, 0.64 (95% CI, 0.42–0.97) for non-contact LAS injuries, and 0.41 (95% CI, 0.19–0.89) for severe non-contact LAS injuries. The relative time-loss for the total number of injuries was 0.65 (95% CI, 0.45–0.93). Fear-of-injury and ankle pain was also lower in the Spraino<sup>®</sup> group. Six participants reported minor harms due to slipping on the floor because of Spraino<sup>®</sup>.

**Conclusions** Spraino<sup>®</sup> was found to be effective and safe when used to prevent LAS injuries in indoor sports. Findings should be replicated in a confirmatory RCT.

**Trial registration** ClinicalTrials.gov: NCT03311490

**Funding** Innovation Fund Denmark (7038–00087A)

019

#### FLOORBALL PARTICIPATION, INJURY PREVENTION EXPECTATIONS, INJURY RISK PERCEPTIONS AND HEALTH PROBLEMS IN SWEDISH YOUTH PLAYERS AT THE START OF A SEASON

<sup>1,2,3,4</sup>Nirmala Perera, <sup>1</sup>Ida Åkerlund, <sup>1</sup>Martin Hägglund. <sup>1</sup>*Sport Without Injury Programme (SWIPE), Division of Physiotherapy, Department of Medical and Health Sciences, Linköping University, Linköping, Sweden;* <sup>2</sup>*Nuffield Department of Orthopaedics, Rheumatology, and Musculoskeletal Sciences, University of Oxford, Oxford, UK;* <sup>3</sup>*Centre for Sport, Exercise and Osteoarthritis Research Versus Arthritis, Oxford, UK;* <sup>4</sup>*School of Allied Health, College of Science, Health and Engineering, Latrobe University, Bundoora, Australia*

10.1136/bjsports-2021-IOC.18

**Background** Floorball is a popular sport among Scandinavian youth. However, insufficient data hinders the development of focused injury prevention strategies in floorball.

**Objective** Describe the motivations for floorball participation as well as injury prevention expectations, injury risk perceptions and the prevalence of health problems in youth players at the beginning of the floorball season.

**Design** Cross-sectional survey at baseline (2017–2018 season).

**Setting** Swedish youth floorball.

**Patients (or Participants)** 471 (140 female, 331 male) players.

**Main Outcome Measurements** Floorball participation, injury prevention/risk perceptions, health problems

**Results** Female and male players were on average 13.7 (±1.5) and 13.3 (±1.0) years old, and had played floorball for 4.9 (±2.3) years. Most (51% female vs 55% male) players trained/played floorball 3 times/week; a majority (69% female vs 76% of male) thought their training volume was high. Fractures (84% female, 90% male) and eye injuries (90% female, 83% male) were perceived to be most severe. 93% believed sports injuries could be prevented, however, 74% thought they would not get injured. 85% (88% male

vs 78% female) of the players always used protective eyewear.

Females felt more stress (median=4, IQR 2–6) than males (median=2, IQR 0–4,  $P=0.000$ ), but reported better well-being (female median=3, IQR 1–5) vs (male median=2, IQR 0–3,  $P=0.000$ ). No difference in sleep between females (median=3, IQR 1–5) and males, (median=3, IQR 0–3, n.s.) was observed. 33% (38% female vs 30% male) youth players were unable to fully participate in floorball due to health problems at the start of the season, and 65% of these were injuries. 28% (32% female vs 26% male) reported pain.

**Conclusions** This study provides insight into youth players' health status leading into the season; one in three reported a health problem and if these are untreated, there is a potential for more severe and long-term adverse health consequences. Safe sports programmes should be a priority.

020

#### WE HAVE THE INJURY PREVENTION PROGRAMME, BUT HOW WELL DO YOUTH USE IT?

<sup>1,2,3,4</sup>Nirmala Perera, <sup>1</sup>Martin Hägglund. <sup>1</sup>*Sport Without Injury Programme (SWIPE), Division of Physiotherapy, Department of Medical and Health Sciences, Linköping University, Linköping, Sweden;* <sup>2</sup>*Nuffield Department of Orthopaedics, Rheumatology, and Musculoskeletal Sciences, University of Oxford, Oxford, UK;* <sup>3</sup>*Centre for Sport, Exercise and Osteoarthritis Research Versus Arthritis, Oxford, UK;* <sup>4</sup>*School of Allied Health, College of Science, Health and Engineering, Latrobe University, Bundoora, Australia*

10.1136/bjsports-2021-IOC.19

**Background** Over the past two decades, sports medicine research has developed innovative and proven interventions for injury prevention in athletes. Intervention effectiveness of any injury prevention exercise programme (IPEP) is influenced by both utilisation and exercise fidelity, but this has rarely been evaluated in previous randomised controlled trials (RCT).

**Objective** To describe the exercise fidelity and utilisation fidelity of the Knee Control IPEP in youth floorball alongside an intervention RCT.

**Design** Observation study, 26-week season.

**Setting** Swedish youth floorball.

**Patients (or Participants)** 20 teams (8 female, 12 males) aged 12–17 years.

**Interventions (or Assessment of Risk Factors)** Knee Control IPEP.

**Main Outcome Measurements** Exercise fidelity and program utilisation fidelity.

**Results** Of the 535 individual Knee Control exercises observed, 76% were performed by males; and 58% exercises were performed correctly. Exercise fidelity was greater in females (71% vs 54%,  $P=0.001$ ). No difference in exercise fidelity during the first (57%) and second (59%) half of the season. The full Knee Control IPEP (7 exercises x 3 sets) was completed as prescribed in only four out of 31 team training sessions observed. Utilisation fidelity did not differ between sexes and the average number of completed exercises performed was 11(±5). Males performed more exercises with a higher level of difficulty ( $n=247$ , 93 and 59 for levels A, B and C+D, respectively) compared to females ( $n=88$ , 26, and 7,  $P=0.021$ ). 33% of the coaches perceived that they had good knowledge about injury prevention, only 33% believed regular IPEP use could decrease injury risk.