

Main Outcome Measurements Sex, limb dominance, joint angles and excursions, and muscle excitation amplitudes during the flight phase of the drop-jumps were extracted. These variables were normalized, reduced and submitted to a logistic regression.

Results Twenty-nine variables were reduced to a seven variable logistic regression model that included trunk and pelvis lateral tilt, pelvis internal rotation, hip abduction, trunk and pelvis joint excursion, and biceps femoris muscle excitation. Using these variable the model correctly classified 74% of the landings. The same variables are present for both males and females.

Conclusions Regardless of sex, an athlete who presents the identified movement and control patterns during the flight phase risks a failed landing, potentially increasing the risk of injury. Typical prophylactic interventions focus on landing characteristics. This research indicates for the first time that modifying what occurs prior to landing is critical and must be addressed through training.

053

THE PREVENTIVE EFFECT OF TARGETED ADDUCTOR TRAINING ON GROIN PAIN FROM FOOTBALL PLAYERS

Julia Smakal, Nadja Jamrog, Bartosz Wojanowski. *Privatpraxis Orthopädie, Dortmund, Germany*

10.1136/bjsports-2021-IOC.50

Background Groin pain is a widespread problem in football. Not only in the professional leagues, even the amateur and the youth sector have to handle it. Consistently, there are training and game absenteeism due to existing pain in this area.

Objective The aim was to describe the preventive effect of a separate training of the hip joint adductors on groin pain in order to reduce their prevalence.

Design Randomized prospective intervention study.

Setting Twelve amateur football teams were grouped and supervised during a period of six months (2 preparation, 4 first half of the season).

Patients (or Participants) Twelve amateur football teams participated (6 teams, 121 players, aged 25±8 yrs, in the intervention group, 6 teams, 115 players, aged 26±5 yrs, in the control group)

Interventions (or Assessment of Risk Factors) The intervention group worked on three targeted exercises to strengthen the adductors, performed said exercise three times a week during their preiod and once a week during their season (3x15 reps, 30'). The content included stabilization exercises with their own body weight and a 'Doiserband' as an additive.

Main Outcome Measurements The prevalence of groin pain was recorded weekly over a period of 16 weeks during the competition phase per VAS and a short questionnaire. The weekly activity of each player was also recorded.

Results The average prevalence of groin pain was 12.5% (95% CI. 11,3% to 13,7%) in the intervention group and 20.3% (95% CI. 29,0% bis 21,6%) in the control group. This result is a 41% lower risk for the occurrence of groin pain, if separate exercises for strengthening would be performed additionally.

Conclusions It becomes apparent that a strengthening training of the adductors can reduces the prevalence of groin pain in the observed sample. Therefore, a targeted and regular training program is recommended to strengthen the adductors, and to preventively reduce the risk of training and competition failures.

054

SUPERVISED IMPLEMENTATION OF A NEUROMUSCULAR TRAINING WARM-UP PROGRAMME TO IMPROVE ADHERENCE AND REDUCE INJURIES IN YOUTH BASKETBALL: A CLUSTER RANDOMISED TRIAL

^{1,2,3}Oluwatoyosi Owoeye, ^{2,3,4,7}Kati Pasanen, ²Anu Raisanen, ²Kimberley Befus, ²Tyler J Tait, ²Carlyn Stilling, ²Vineetha Warriyar, ^{2,5}Luz Palacios-Derflinger, ^{2,3,5,6,7,8}Carolyn Emery. ¹Department of Physical Therapy and Athletic Training, Doisy College of Health Sciences, Saint Louis University, Missouri, USA; ²Sport Injury Prevention Research Centre, Faculty of Kinesiology, University of Calgary, Calgary, Canada; ³Alberta Children's Hospital Research Institute, University of Calgary, Calgary, Canada; ⁴Tampere Research Center of Sports Medicine, UKK Institute, Tampere, Finland; ⁵Department of Community Health Sciences, Cumming School of Medicine, University of Calgary, Calgary, Canada; ⁶Department of Pediatrics, Cumming School of Medicine, University of Calgary, Calgary, Canada; ⁷McCaig Institute for Bone and Joint Health, University of Calgary, Calgary, Canada; ⁸O'Brien Institute for Public Health, University of Calgary, Calgary, Canada

10.1136/bjsports-2021-IOC.51

Background The efficacy of neuromuscular training (NMT) programmes has been extensively documented; however, little is known about the best strategies to translate them into practice.

Objective To compare the effects of a supervised vs. unsupervised implementation of an NMT warm-up programme on team adherence and injury risk in youth basketball players.

Design A pragmatic cluster randomised controlled trial.

Setting High school basketball teams in Alberta, Canada.

Participants 31 teams (18 female teams) comprising 307 players (age range: 14–18 years).

Interventions A structured pre-season coach workshop with (intervention) or without (control) weekly research staff supervision of a 10-minute NMT warm-up programme, comprising 13 exercises was administered. Teams were asked to perform the NMT warm-up programme before every practice and game through the 2017/2018 basketball season.

Main Outcome Measurements Team adherence, evaluated as cumulative utilisation (proportion of total NMT sessions possible), utilisation fidelity (average number of exercises completed per NMT session) and utilisation frequency (average number of NMT sessions completed per week), was tracked daily by team designates. All-complaint injuries were collected weekly. Wilcoxon sign rank tests or Poisson regressions were used for the analyses, with Bonferroni corrections.

Results No significant differences were found in the median (range) cumulative utilisation [80% (32%–100%) vs. 75% (16%–100%)], utilisation fidelity [12.1 (5.5–13.0) vs. 11.4 (5.1–13.0)] and utilisation frequency [2.2 (0.9–4.1) vs. 2.2 (0.5–4.7)] between intervention and control groups, respectively (all $p > 0.017$). Injury incidence rates, adjusted for cluster by team, sex and age did not differ by groups for all injuries [incidence rate ratios (IRR) = 1.21 (97.5%CI: 0.73–1.99)] and lower extremity injuries [IRR = 1.10 (97.5%CI: 0.73–1.66)].

Conclusions No additional benefits were found in adherence or injury risk reduction following a supervised implementation

of an NMT programme in youth basketball. This implementation strategy should not be considered for broad-scale translation of NMT programmes in this context.

055

IDENTIFYING THE CHALLENGES TO IMPLEMENTING A NETBALL NEUROMUSCULAR WARM-UP USING CONCEPT MAPPING

^{1,2}Erin Smyth, ¹Renee Appaneal, ^{1,3}Michael Drew, ⁴Alanna Antcliff, ^{1,2}Gordon Waddington, ⁴Juanita Weissensteiner, ²Phillip Newman, ^{3,6}Alex Donaldson. ¹Australian Institute of Sport, Canberra, Australia; ²University of Canberra, Canberra, Australia; ³Australian Collaboration for Research into Injury in Sport and its Prevention (ACRISP), Perth, Australia; ⁴Netball Australia, Melbourne, Australia; ⁵New South Wales Office of Sport, Sydney, Australia; ⁶La Trobe University, Melbourne, Australia

10.1136/bjsports-2021-IOC.52

Background Netball Australia is Australia's governing netball body, and introduced the 'Knee injury prevention for Netballers and Enhance performance and Extend play' (KNEE) program in 2015. Ankle sprains and ACL rupture are the most frequent and costly injuries in 17U & 19U athletes competing at the Australian Netball Championships (ANC). Thirty-eight percent of teams competing at the 2019 ANC's were not completing the KNEE program as frequently as recommended.

Objective To identify the challenges for implementing the KNEE program.

Design A mixed-methods approach for qualitative data collection and quantitative data analysis.

Setting Participants own environment.

Patients (or Participants) Thirty-nine netball coaches (n=17), strength & conditioning coaches (n=5) and physiotherapists (n=16) working with 17U & 19U teams attending the 2019 ANC's.

Interventions (or Assessment of Risk Factors) The process of Concept Mapping was followed to capture challenges to implementing the KNEE program with State 17U & 19U teams.

Main Outcome Measurements Statements were consolidated to clusters (concepts). The importance and difficulty to overcome each challenge was rated by all participants.

Results Forty-six challenges were generated and organised into eight clusters. Statement 3 (*'Making sure athletes are committed to executing the KNEE program with correct technique'*) received the highest mean importance rating (4.43 out of 5). Statement 43 (*'Education is presented to coaches and S&C regarding the KNEE program but physio is only covered 2 hours/week to cover both 17s and 19s training. Never get to see whether it's implemented or how well'*) received the highest mean difficulty rating (3.11). Nineteen challenges were identified as being the most important and difficult to overcome.

Conclusions This CM process has identified 19 important and difficult challenges to overcome when implementing the Netball Australia KNEE program in 17U and 19U State teams. It is recommended that an advisory group consisting of athletes, coaches, support staff, administrators and implementation specialists is formed to address some of these KNEE implementation challenges.

056

THE EFFECTIVENESS OF NEUROMUSCULAR TRAINING WARM-UP PROGRAMME TO REDUCE KNEE AND ANKLE INJURIES IN YOUTH BASKETBALL: A HISTORICAL COHORT STUDY

^{1,2,3}Oluwatoyosi Owwoeye, ^{2,3,4,7}Kati Pasanen, ²Kimberley Befus, ²Carlyn Stilling, ²Brianna Ghali, ²Tyler J Tait, ^{5,6}Tate HubkaRao, ^{2,5}Luz Palacios-Derflinger, ²Vineetha Warriyar, ^{2,3,5,6,7,8}Carolyn Emery. ¹Department of Physical Therapy and Athletic Training, Doisy College of Health Sciences, Saint Louis University, Missouri, USA; ²Sport Injury Prevention Research Centre, Faculty of Kinesiology, University of Calgary, Calgary, Canada; ³Alberta Children's Hospital Research Institute, University of Calgary, Calgary, Canada; ⁴Tampere Research Center of Sports Medicine, UKK Institute, Tampere, Finland; ⁵Department of Community Health Sciences, Cumming School of Medicine, University of Calgary, Calgary, Canada; ⁶Department of Pediatrics, Cumming School of Medicine, University of Calgary, Calgary, Canada; ⁷McCraig Institute for Bone and Joint Health, University of Calgary, Calgary, Canada; ⁸O'Brien Institute for Public Health, University of Calgary, Calgary, Canada

10.1136/bjsports-2021-IOC.53

Background Studies evaluating the effectiveness of neuromuscular training (NMT) warm-up programmes in reducing knee and ankle injuries in youth basketball are sparse and specifically, the effect of NMT warm-up programmes on patellar and Achilles tendinopathy is unknown.

Objective To evaluate the effectiveness of NMT warm-up programme in reducing the risk of knee and ankle injuries, including patellar and Achilles tendinopathy in youth basketball.

Design A two-season historical cohort comparison of players exposed (season 2) and unexposed (season 1) to an NMT intervention.

Setting Youth basketball teams (Alberta, Canada).

Participants Ninety-four teams, comprising 825 male and female players (age range: 11–18 years; season 1, n=518; season 2, n=307).

Interventions A coach-delivered 10-minute SHRed Basketball Injuries NMT warm-up programme, administered in season 2, comprised 13 exercises including aerobic, agility, strength and balance components. The control teams used their standard of practice warm-up in season 1.

Main Outcome Measurements All-complaint knee and ankle injuries, including patellar and Achilles tendinopathy were recorded weekly throughout two basketball seasons using validated injury surveillance methods. Poisson regression (with offset using exposure hours and adjusted for team cluster, sex, two-season participation) was used to estimate incidence rate ratios (IRRs; 98.8% CIs Bonferroni) for all-complaint injuries between seasons. Logistic regression (adjusted for team cluster, sex, exposure hours, two-season participation), was used to estimate odds ratios (ORs; 98.8% CIs) for players reporting at least one tendinopathy.

Results The NMT warm-up programme was protective for knee [IRR=0.51 (98.8%CI: 0.35–0.75)] and ankle injuries [IRR=0.68 (98.8%CI: 0.52–0.91)] but not for patellar [OR=0.88 (98.8%CI: 0.44–1.73)] and Achilles tendinopathy [OR=0.63 (98.8%CI: 0.18–2.18)] specifically.

Conclusions The SHRed Basketball Injuries NMT warm-up programme is effective in reducing all-complaint knee and ankle injury rates but ineffective for mitigating patellar and Achilles tendinopathy risk in youth basketball players. Further research evaluating load modification may be a target for prevention of tendinopathies.