FAST BREAK

PUBLICATION FOR TEAM MEDICAL PERSONNEL

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WELCOME TO FAST BREAK!

Welcome to FIBA's quarterly publication. Our goal is to introduce our FIBA Sport Medicine and Sport Science community to newsworthy research topics. We welcome your questions or comments and thank you for your ongoing commitment to basketball players' healthcare.

Jennifer Reed, RKin, PhD

Scientific Editor, FAST BREAK

Scientist, Director

Exercise Physiology and Cardiovascular Health Lab

University of Ottawa Heart Institute

E mail: jreed@ottawaheart.ca

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SELECTED PUBLICATIONS OF INTEREST

Basketball shot types and shot success in different levels of competitive basketball.

Erčulj F, Štrumbelj E.

PLoS One. 2015 Jun 3;10(6):e0128885.

PubMed link: https://www.ncbi.nlm.nih.gov/pubmed/26038836

The purpose of our research was to investigate the relative frequencies of different types of basketball shots (above head, hook shot, layup, dunk, tip-in), some details about their technical execution (one-legged, two-legged, drive, cut, …), and shot success in different levels of basketball competitions. We analysed video footage and categorized 5024 basketball shots from 40 basketball games and 5 different levels of competitive basketball (National Basketball Association (NBA), Euroleague, Slovenian 1st Division, and two Youth basketball competitions). Statistical analysis with hierarchical multinomial logistic regression models reveals that there are substantial differences between competitions. However, most differences decrease or disappear entirely after we adjust for differences in situations that arise in different competitions (shot location, player type, and attacks in transition). Differences after adjustment are mostly between the Senior and Youth competitions: more shots executed jumping or standing on one leg, more uncategorised shot types, and more dribbling or cutting to the basket in the Youth competitions, which can all be attributed to lesser technical and physical ability of developing basketball players. The two discernible differences within the Senior competitions are that, in the NBA, dunks are more frequent and hook shots are less frequent compared to European basketball, which can be attributed to better athleticism of NBA players. The effect situational variables have on shot types and shot success are found to be very similar for all competitions.

The NBA and Youth Basketball: Recommendations for Promoting a Healthy and Positive Experience.

DiFiori JP, Güllich A, Brenner JS, Côté J, Hainline B, Ryan E 3rd, Malina RM.

Sports Med. 2018 Jun 30 [Epub ahead of print].

PubMed link: https://www.ncbi.nlm.nih.gov/pubmed/29961207

Participation in sports offers both short-term and long-term physical and psychosocial benefits for children and adolescents. However, an overemphasis on competitive success in youth sports may limit the benefits of participation, and could increase the risk of injury, burnout, and disengagement from physical activity. The National Basketball Association and USA Basketball recently assembled a group of leading experts to share their applied research and practices to address these issues. This review includes the group's analysis of the existing body of research regarding youth sports participation and the related health, performance, and psychosocial outcomes. Based upon this, age-specific recommendations for basketball participation are provided that aim to promote a healthy and positive experience for youth basketball players.

Prevention of Lower Extremity Injuries in Basketball: A Systematic Review and Meta-Analysis.

Taylor JB, Ford KR, Nguyen AD, Terry LN, Hegedus EJ.

Sports Health. 2015 Sep-Oct;7(5):392-8.

PubMed link: https://www.ncbi.nlm.nih.gov/pubmed/26502412

CONTEXT: Lower extremity injuries are common in basketball, yet it is unclear how prophylactic interventions affect lower extremity injury incidence rates. OBJECTIVE: To analyze the effectiveness of current lower extremity injury prevention programs in basketball athletes, focusing on injury rates of (1) general lower extremity injuries, (2) ankle sprains, and (3) anterior cruciate ligament (ACL) tears. DATA SOURCES: PubMed, MEDLINE, CINAHL, SPORTDiscus, and the Cochrane Register of Controlled Trials were searched in January 2015. STUDY SELECTION: Studies were included if they were randomized controlled or prospective cohort trials, contained a population of competitive basketball athletes, and reported lower extremity injury incidence rates specific to basketball players. In total, 426 individual studies were identified. Of these, 9 met the inclusion criteria. One other study was found during a hand search of the literature, resulting in 10 total studies included in this meta-analysis. STUDY DESIGN: Systematic review and meta-analysis. LEVEL OF EVIDENCE: Level 2. DATA EXTRACTION: Details of the intervention (eg, neuromuscular vs external support), size of control and intervention groups, and number of injuries in each group were extracted from each study. Injury data were classified into 3 groups based on the anatomic diagnosis reported (general lower extremity injury, ankle sprain, ACL rupture). RESULTS: Meta-analyses were performed independently for each injury classification. Results indicate that prophylactic programs significantly reduced the incidence of general lower extremity injuries (odds ratio [OR], 0.69; 95% CI, 0.57-0.85; $P < 0.001$) and ankle sprains (OR, 0.45; 95% CI, 0.29-0.69; $P < 0.001$), yet not ACL ruptures (OR, 1.09; 95% CI, 0.36-3.29; $P = 0.87$) in basketball athletes. CONCLUSION: In basketball players, prophylactic programs may be effective in reducing the risk of general lower extremity injuries and ankle sprains, yet not ACL injuries.

Efficacy of Whole-Body Vibration Board Training on Strength in Athletes After Anterior Cruciate Ligament Reconstruction: A Randomized Controlled Study.

Costantino C, Bertuletti S, Romiti D.

Clin J Sport Med. 2018 Jul;28(4):339-349.

PubMed link: https://www.ncbi.nlm.nih.gov/pubmed/28657911

OBJECTIVE: To evaluate whether an 8-week whole-body vibration training program may improve recovery of knee flexion/extension muscular strength in athletes after arthroscopic anterior cruciate ligament (ACL) reconstruction. DESIGN: Randomized controlled trial. SETTING: Single outpatient rehabilitation center. PARTICIPANTS: Thirty-eight female volleyball/basketball players (aged between 20 and 30), randomized into 2 treatment groups. INTERVENTIONS: During a standardized six-month rehabilitation program, from week 13 to week 20 after surgery, the whole-body vibration group ($n = 19$) and the control group ($n = 19$) performed additional static knee flexor/extensor exercises on a vibration platform. For the whole-body vibration group, the vibration platform was set to 2.5 mm of amplitude and 26 Hz of frequency. The control group followed the same whole-body vibration board training with no vibrations. MAIN OUTCOME MEASURES: All patients were evaluated using an isokinetic strength test with a Biodex dynamometer at the beginning and at the end of the additional treatment protocol. The parameters tested were the peak torque and the maximum power of knee flexor and extensor muscles performing strength and endurance tests. RESULTS: No vibration-related side effects were observed. Improvements were

noticed in both groups, but increase in knee muscle isokinetic strength values was statistically significant in the whole-body vibration group when compared with the control group (differences in extension: peak torque 11.316/10.263 N·m and maximum power 13.684/11.211 W; flexion: peak torque 9.632/11.105 N·m and maximum power 10.158/9.474 W; P < 0.001). CONCLUSIONS:

When combined with a standardized rehabilitation program, whole-body vibration may increase muscular strength and be an effective additional treatment option in the rehabilitation of athletes after ACL arthroscopic reconstruction.

Prevention of Ankle Sprain Injuries in Youth Soccer and Basketball: Effectiveness of a Neuromuscular Training Program and Examining Risk Factors.

Owoeye OBA, Palacios-Derflingher LM, Emery CA.

Clin J Sport Med. 2018 Jul;28(4):325-331.

PubMed link: https://www.ncbi.nlm.nih.gov/pubmed/29864071

OBJECTIVES: The primary objective of this study was to examine the effectiveness of a neuromuscular training (NMT) warm-up program in reducing the risk of ankle sprain injury (ASI) in youth soccer and basketball. The secondary objective included the evaluation of risk factors for ASI. STUDY DESIGN: Secondary analysis of pooled data from 5 studies. PARTICIPANTS: Male and female youth (11-18 years) soccer and basketball players (n = 2265) in Alberta, Canada. OUTCOME MEASURES: Ankle sprain injury was the primary outcome and was recorded using a validated prospective injury surveillance system consistent in all studies. The primary exposure of interest was NMT warm-up, which included aerobic, strength, agility, and balance components. Multivariable Poisson regression, controlling for clustering by team and offset for exposure hours, was used to estimate incidence rate ratios (IRRs) with 95% confidence intervals (CIs), with considerations for confounding and effect modification and evaluating all covariates as potential risk factors. RESULTS: A total of 188 ASIs were reported in 171 players. Neuromuscular training significantly reduced the risk of ASI [IRR = 0.68 (95% CI; 0.46-0.99)]. Independent risk factors for ASI included previous ASI [IRR = 1.98 (95% CI; 1.38-2.81)] and participation in basketball versus soccer [IRR = 1.83 (95% CI; 1.18-2.85)]. Sex, age, body mass index, and previous lower extremity injury (without previous ASI) did not predict ASI (P > 0.05). CONCLUSIONS: Exposure to an NMT program is significantly protective for ASI in youth soccer and basketball. Risk of ASI in youth basketball is greater than soccer, and players with a history of ASI are at greater risk.

Head coaches' attitudes towards injury prevention and use of related methods in professional basketball: A survey.

Wilke J, Niederer D, Vogt L, Banzer W.

Phys Ther Sport. 2018 Jul;32:133-139.

PubMed link: https://www.ncbi.nlm.nih.gov/pubmed/29793121

OBJECTIVES: To investigate the practices and attitudes of professional basketball head coaches towards injury prevention. DESIGN: Survey. SETTING: Elite-level basketball. PARTICIPANTS: Head coaches of all 366 German professional teams. MAIN OUTCOME MEASURES: Use of injury risk screening methods, rated importance of different musculoskeletal injuries and rated effectiveness of preventive interventions. RESULTS: Eighty-three of

366 invited coaches (23%) responded to the survey. No non-response bias was detected. Only one of three teams conducts systematic injury screenings. The most commonly used test was the functional movement screen (73.1% of users), while balance and strength testing (both 38.5%) were least prevalent. Top-rated preventive interventions included balance and strength training, training of functional movement patterns, and stretching. In contrast, passive interventions, e.g. the use of orthoses, were not considered effective. The involvement of a health professional (e.g. physiotherapist) was associated with the performance of injury screening, but not with the choice of specific tests or preventive strategies. CONCLUSIONS: The methods applied to conduct injury screening and prevent musculoskeletal disorders in German professional basketball teams seem only partially backed by scientific evidence. Although not correlated with the tests and interventions used, the involvement of health-related stakeholders might help to identify players at increased injury risk.

Recovery practices in Division 1 collegiate athletes in North America.

Murray A, Fullagar H, Turner AP, Sproule J.

Phys Ther Sport. 2018 Jul;32:67-73.

PubMed link: https://www.ncbi.nlm.nih.gov/pubmed/29758507

OBJECTIVES: Establish current practice and attitudes towards recovery in a group of Division-1 Collegiate athletes from North America. DESIGN: A 16-item questionnaire was administered via custom software in an electronic format. PARTICIPANTS: 152 student athletes from a Division-1 Collegiate school across 3 sports (Basketball, American Football, Soccer). MAIN OUTCOME MEASURES: The approaches and attitudes to recovery in both training and competition. RESULTS: Sleep, cold water immersion (CWI) and nutrition were perceived to be the most effective modalities (88, 84 and 80% of the sample believed them to have a benefit respectively). Over half the sample did not believe in using compression for recovery. With regard to actual usage, CWI was the most used recovery modality and matched by athletes believing in, and using, the approach (65%). Only 24% of student athletes believed in, and used, sleep as a recovery modality despite it being rated and perceived as the most effective. CONCLUSIONS: Collectively, there is a discrepancy between perception and use of recovery modalities in Collegiate athletes.

Hop Stabilization Training Improves Neuromuscular Control in Collegiate Basketball Players with Chronic Ankle Instability: A Randomized Controlled Trial.

Minoonejad H, Karimizadeh Ardakani M, Rajabi R, Wikstrom EA, Sharifnezhad A.

J Sport Rehabil. 2018 Jun 28:1-25.

PubMed link: https://www.ncbi.nlm.nih.gov/pubmed/29952698

CONTEXT: Neuromuscular control deficit has been reported in people with chronic ankle instability (CAI) and hopping exercises have been recommended as a functional training tool to prevent lower limb injury, but its effects on lower extremity neuromuscular control in those with CAI are unclear. OBJECTIVE: To investigate the effect of hop stabilization training on neuromuscular control and self-reported function in collegiate basketball players with CAI. STUDY DESIGN: A randomized controlled trial. SETTING: Research Laboratory. Patients (or Other Participants): Twenty-eight college basketball players with CAI were randomly assigned to the experimental hop stabilization group (age 22.78± 3.09 years, weight 82.59± 9.51 kg, height 187.96± 7.93 cm) or the control group (age

22.57± 2.76 years, weight 78.35± 7.02 kg, height 185.69± 7.28 cm). INTERVENTION: Participants in the experimental group performed supervised hop stabilization exercises 3 times per week for 6 weeks. The control group received no intervention. MAIN OUTCOME MEASURES: Preparatory and reactive muscle activation levels and muscle onset time were assessed from eight lower extremity muscles during a jump landing task before and after the 6-week training program. RESULTS: Significant improvements in preparatory muscle activation, reactive muscle activation, and muscle onset time were noted across the lower extremity in the experimental group relative to the control group ($p < 0.05$). Self-reported function also improved in the experimental group relative to the control group ($p < 0.05$). CONCLUSIONS: These findings demonstrate that 6-weeks of hop stabilization training is effective in improving neuromuscular control and self-reported function in collegiate basketball players with CAI. Hop stabilization exercises can be incorporated into rehabilitation program for CAI.

Analysis of Training Plans in Basketball: Gender and Formation Stage Differences.

Cañadas M, Gómez MÁ, García-Rubio J, Ibáñez SJ.

J Hum Kinet. 2018 Jun 13;62:123-134.

PubMed link: https://www.ncbi.nlm.nih.gov/pubmed/29922384

Scientific literature has stated the presence of various stages in athletes sportive development, with different objectives in each one of them. This should lead coaches to different training plans according to the athlete's formation stage. The aim of this study was to analyse training plans and identify differences in basketball objectives according to formative stages (U'12 and U'14) in boys and girls. A total of 1,976 training tasks were collected and analysed, for a total of four teams (girls and boys of U'12 and U'14 categories) during an entire season. Pedagogical variables, game phases, game situations, training means and content were studied. The results showed significant differences between genders. Girls' teams performed more tasks on offense and technical skills. By contrast, boys' teams performed more defensive tasks and tactical contents. The 1-on-0 and 1-on-1 were the most repeated game situations in all teams. Coaches used different training tasks according to gender and age. In male U'12 teams, drills predominated, whereas in the other categories, games predominated. For boys' teams, the contents were tactical oriented, and for girls' teams, the contents were oriented toward skill acquisition. Studying the pedagogical variables of the training process allowed for identification of the utility of training, assessment, and modification of this process.

Incidence and risk factors for back pain in young floorball and basketball players: A Prospective study.

Rossi MK, Pasanen K, Heinonen A, Myklebust G, Kannus P, Kujala UM, Tokola K, Parkkari J.

Scand J Med Sci Sports. 2018 Jun 8 [Epub ahead of print].

PubMed link: https://www.ncbi.nlm.nih.gov/pubmed/29883001

The aim of this study was to investigate the incidence of back pain in young basketball and floorball players under 21 years of age. The secondary aim was to examine risk factors especially for low back pain (LBP). Nine basketball and nine floorball teams (n = 396) participated in this prospective follow-up study (2011-2014). Young athletes (mean age 15.8 ± 1.9) performed physical tests and completed a questionnaire at baseline. The follow-up lasted 1-3 years per player. During the follow-up, back pain reported by the players was registered on a weekly basis and verified by a study physician. The exposure time (AE) on team practices and games was recorded by the coach.

Altogether back pain was reported 61 times by 51 players. The incidence of back pain was 87 per 1000 athlete-years and 0.4 per 1000 hours of AE. Hamstrings, quadriceps and iliopsoas extensibility and general joint hypermobility were not associated with LBP. Furthermore, no association between LBP and leg extension strength or isometric hip abduction strength asymmetry was found in these young basketball and floorball players. In conclusion, back pain can lead to a considerable time-loss from training and competition among young basketball and floorball players and the pain tends to reoccur. Lower extremity muscle extensibility, general joint hypermobility or investigated lower extremity strength measures were not associated with the risk of LBP.

Choking or Delivering Under Pressure? The Case of Elimination Games in NBA Playoffs.

Morgulev E, Galily Y.

Front Psychol. 2018 Jun 12;9:979.

PubMed link: https://www.ncbi.nlm.nih.gov/pubmed/29946290

Neoclassical economic theories foretell that individuals exert the most effort, and consequently produce their best performances, when the net returns to effort are highest. We scanned through 33 NBA seasons and analyzed 1930 playoffs games in order to test this prediction. Analysis of win probabilities in games where one of the two teams faces elimination from the playoffs, demonstrated that the threat of severe losses didn't lead to elevated level of performance. While previous studies analyzed mainly single-level performance in a stable environment, our results shed light on collective performance in a dynamic setting. These findings can be applicable to other realms as we suggest that managers should refrain from deliberate building of high-pressure environments with hopes of achieving performance enhancement effect among their groups.

FIBA - International Basketball Federation
5 Route Suisse, PO Box 29
1295 Mies, Switzerland
Tel: +41 22 545 00 00
fiba.basketball