FAST BREAK

Publication for team medical personnel

Concussion

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WELCOME to FAST BREAK!

Welcome to Fast Break, the official quarterly news bulletin of the FIBA Medical Commission. Our goal is to introduce our FIBA sports medicine and sports science community to newsworthy research topics and develop a community of practice among physicians and clinicians involved with basketball at every level of play across the globe.

We hope this publication will foster friendly communication and discussions within the world of basketball. We welcome and encourage your questions, comments, suggestions, and contributions to this publication.

MESSAGE FROM THE EDITOR

30 years ago, concussion was an injury that was managed with rigid but arbitrary guidelines stemming mostly from expert opinion. We have come a very long way with respect to concussion recognition, diagnosis, and rehabilitation. Since 2001, the direction of research into concussion injury, and the publications made by the Concussion in Sport Group (https://bjsm.bmj.com/content/bjsports/57/11/695.full.pdf) renders this an easy injury to remain abreast of current and best practice management approaches. However, despite all the advances made in medical science for concussion, this remains an under-appreciated injury.

In this thematic edition of the Fast Break, Drs. Harcort and Shawdon discuss the FIBA medical commissions policy and procedures regarding concussion. In many locations across the globe, concussion has become the 'injury du-jour', and many ancillary health care providers are jumping on the band-wagon, but providing unsubstantiated, unproven and often costly therapies. To help you and your patients become better health-care consumers, our guest editorial from Codi Isaac, physical therapist, outlines what is expected from good concussion rehabilitation versus unproven and unnecessary treatment.

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IN THIS ISSUE

UPCOMING WEBINAR SESSIONS

The FIBA medical commission would like to invite you to join our first webinar session of 2025.

Ear, Nose and Throat, and Maxillo-Facial injuries in Basketball (2nd session)

The session is scheduled on Tuesday, 25 March at 08:00am CET.

Professor Darryl Tong, Maxillofacial surgeon at the University of Otago in Dunedin, NZ. He will deliver a practical session on common MF injuries, and their management and some practical tips

Please find *here* the link to join this session live and *here* another to the new FIBA Corporate website Medical section to find the recording to watch it after the session.

FIBA MEDICAL COMMISSION EDITORIAL

Concussion Management in Basketball

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Introduction

The management of concussion in sport has become an important priority due to the emerging knowledge of potential short-term health risks and the difficulty of diagnosis.

Concussion awareness in basketball is particularly important because of:

- a relatively low incidence resulting in a lack of awareness by participants, officials and commentators
- presentations often being clinically subtle, with a lack of obvious signs such as tonic posturing or loss of consciousness
- a high frequency of competition games impacting participation, especially in international tournaments
- player and coach financial pressures which may influence optimal management in professional competitions

As a result of the above there is a need for competition wide consistency in diagnosis and management of concussion.

The FIBA Concussions Guidelines have been revised to be aligned with those developed by the 6th International Consensus Statement on Concussion in Sport.

National Federations and Professional leagues should develop their own concussion guidelines consistent with the FIBA Concussion Guidelines and the International Consensus.

All team medical staff must be familiar with the FIBA (and their own NF or league) concussion guidelines and how these apply to their players

Players, high performance staff and coaches should be aware of their obligations to ensure appropriate evidence-based diagnosis, management of concussion and player welfare.

Managing concussion

Important aspects of the diagnosis and management of head trauma and concussion in basketball include:

- The head trauma can be missed as basketball is a fast-moving sport and there are generally limited medical staff on the bench

- Obvious neurological signs are not common in basketball cases. As such it will assist if all support staff are looking for head knocks and have a low threshold to report these to the medical personnel. Subtle signs can include a glazed or blank look or a player having trouble with team structure. There is also reliance on players notifying concussion symptoms (e.g. headache, dizziness, etc) to medical personnel.
- A player suspected of concussion must be immediately removed from the game or training and assessed by the appropriate medical personnel. Ideally this is a team doctor but can be a physiotherapist if they have been trained in the assessment and diagnosis of concussion and have the support of a team doctor, The neurological assessment can be quite detailed with subtle findings. Assessments will vary player to player, so a knowledge of that player and their previous baseline assessment is desirable.
- A player cannot compete until they are either cleared of concussion or, if concussion is diagnosed, until an appropriate rehabilitation program has been completed. Before the player returns to competition they require a final clearance by the team doctor.
- If a Player is cleared of concussion following a head knock during a game or training, they must be regularly monitored for the development of symptoms for up to 2 days. Only a doctor can clear a player with of a concussion.
- Players must be honest in reporting their symptoms. Players and coaches must understand that being a multimodal neurological condition, it is inappropriate and not in the interests of player welfare to overrule the clinical decision of a team doctor.
- Because of the subtle nature of the symptoms and signs of concussion, baseline concussion testing is strongly recommended (SCAT 6, Cognigram, ImPACT or equivalent).
- All Players with a diagnosed concussion should follow the FIBA Concussion Guidelines or equivalent which requires 24-48 relative cognitive and physical rest followed by a graduated rehabilitation program that typically takes 5-7 days but may be a few weeks. During the first two stages of the graded return to play the player may experience some symptoms as long as they are mild and short lived. In the final three stages of the graded return to play, the player must remain symptom free, and any return of symptoms should result in a return to stage 2 until fully asymptomatic at rest and with exertion.
- Younger Players typically take longer to recover and return to sport may take up to 3 weeks or longer. The emphasis of their rehabilitation should be on a return to school and education before sport.
- Whilst the diagnosis and management of concussion sits with the Medical team, all members of the team including players, coaches and officials should be updated annually on the guidelines and how they apply, Team culture is critical in ensuring player safety and optimising a safe and timely return to play

GUEST EDITORIAL

Codi Isaac, PT, RISPT, MScPT, BCom, is an international sport and vestibular physical therapist. Her practice focus' on concussion rehabilitation. She is a member of the concussion committee for Sport Physiotherapy Canada and team-lead for the concussion management toolkit for the Physical Therapy Association and College. Her work and research on concussion rehabilitation has been presented at the 6th International Conference on Concussion in Sport.

Stick to the Evidence

There are so many concussion "treatments" available. How do you sort through them, always desiring the best for your athletes? It's not about team or clinic budget. It's not about expensive technologies or equipment. It's not about a prescribed cookie cutter "program". It's not about a membership or ongoing subscription that provides a "certification" of recovery. It is about the use of effective strategies that provide consistent results in a complex injury with many brain and body system interactions.

To produce the consensus statement, the Concussion in Sport Group reviewed an enormous amount literature and determined that approximately 70% of concussion- injured athletes will achieve recovery in 4 weeks. Recovery is defined as full return to cognitive and physical activity, and a return to sport. How many other athletic injuries exist where this is possible? In some ways this injury is relatively easy to manage, relying on "spontaneous" or natural recovery. In other ways it can be extraordinarily difficult with recovery affected by complex bio-psycho-social factors for the few that make up the remaining 30%. Physical therapists can work toward the best recovery possible by keeping up with consensus on concussion in sport publications, the most recent in 2023.

Current evidence states in the initial (2-10 days post-concussion) phase treatment goals are cognitive and physical symptom resolution through active recovery. Physical therapy treatment providers can be influential in ensuring spontaneous (or natural) recovery simply by following return to learn and return to sport guidelines and using exertion as the primary treatment. The 2023 consensus statement outlines, "strong evidence exists regarding the benefits of physical activity and aerobic exercise treatment as early interventions."

Guiding athletes through exertional exercise takes skill to recognize the capacity to increase while respecting the sub-symptom threshold concept. Knowing whether to ask your athlete to refrain from progressing activity or gently encourage more is part of the art of physiotherapy. The science of exercise testing informs the art. Exercise intensity can be guided by symptom exacerbation or through relatively simple exercise testing using a bike or a treadmill. There are tests easily accessed on-line such as the Buffalo Concussion Treadmill Test (BCTT) and Buffalo Concussion Bike Test (BCBT). With these tests, we can determine a level of activity below symptom exacerbation. Over the ensuing few days to week, the expectation is for overall symptom burden decreases as capacity for both cognitive and physical activity increases. During this phase of recovery, it can be quite helpful to reassure the athlete that maximal effort is not required and not as effective as "sub-symptom threshold". The sport physical therapist's role is in educating, guiding activity and documenting progress. There are many ways to be creative in designing exertional programs, relating them to the sporting needs, environment and utilizing available, low-tech equipment.

The next phase of treatment is about 10-14 days after injury, for those who have not yet achieved symptom resolution, or been able to progress through the return to play steps.
Cervico-vestibular rehabilitation is indicated for athletes with neck pain, headaches, dizziness and/or balance problems. A thorough physical assessment of both cervical and vestibular

systems is required. Documenting impairment/dysfunction along with symptom provocation is required to engage in targeted interventions for neck pain, headache and dizziness. Caution is required if symptom provocation is the only assessment finding, as there are many other confounding factors that correlate to neck pain, headache and dizziness symptoms.

Targeted interventions in the systematic review are cervical (neuromotor and sensorimotor exercise), and vestibular rehabilitation (canalith repositioning maneuvers, gaze stabilization, and/or balance exercise). Active, exercise-based therapies, are preferred over many forms of passive therapies such as manual techniques, needling or electrophysical modalities. By focusing on targeted interventions, treatment becomes a unique mix of elements for each athlete based on their unique concussion.

Sub-symptom threshold application of treatments is a good guide to choosing interventions. If the athlete is consistently reporting an increase in headache, neck pain/stiffness or short-lived relief with prescribed exercise or manual technique, it is very easy to blame the injury, the athlete or a lack of practitioner skill. Instead, question the exercise or technique. An example is vision therapy or 'eye exercises'. There is considerable controversy with vision therapy. Dr. Christina Master and her research group have stated, "although vision therapy has been widely promoted for the treatment of concussion, a thorough assessment of this practice does not provide sufficient evidence for the efficacy of such therapy." Applying techniques that lack of effectiveness or have little evidence of efficacy has the potential to create less-than-optimal recovery from concussion and may be one of the pathways for persistent symptoms.

Persisting symptoms is currently the preferred terminology for those not recovered from concussion symptoms by 4 weeks after injury. The physical therapist's role in this phase of treatment is to provide a referral to an expert clinician group (sport medicine, neurology, physiatry, physiotherapists, psychologists and neuropsychologists) with advanced experience and knowledge in concussion management. This may seem too early to seek a referral in comparison to treating other musculoskeletal injuries. However, as hinted in phase 2, there are many factors that may confound the athlete's recovery that do not fall into the physiotherapy scope of practice. It can be challenging to find or assemble this expert-provider group but it is key because a broader understanding of individual bio-psycho-social factors - both pre-existing and post-injury - is required to achieve the desired recovery outcome. The best possible recoveries are possible by engaging thoughtfully, utilizing consensus group knowledge and a willingness to refer when progress is slow or stalled.

References:

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6. Barton JJS, Ranalli PJ. Vision Therapy: Ocular Motor Training in Mild Traumatic Brain Injury. Annals of Neurology. 2020;88(3):453-461. doi:10.1002/ana.25820
7. Subramanian PS, Barton JJS, Ranalli P, Smith C, Francis CE, Frishberg B. Consensus
8. Statement on Visual Rehabilitation in Mild Traumatic Brain Injury. Neurology: Clinical Practice. 2022;12(6):422-428. doi:10.1212/CPJ.0000000000200071

SELECTED PUBLICATIONS OF INTEREST

Consensus statement on concussion in sport: the 6th International Conference on Concussion in Sport– Amsterdam, October 2022

Patricios JS, Schneider KJ , Dvorak J , Ahmed OH , Blauwet C , Cantu RC, Davis GA , Echemendia RJ, Makdissi M, McNamee M, Broglio S , Emery CA , Feddermann-Demont N, Fuller GW, Giza CC, Guskiewicz KM, Hainline B , Iverson GL , Kutcher JS, Leddy JJ, Maddocks D, Manley G, McCrea M , Purcell LK, Putukian M, Sato H, Tuominen MP, Turner M, Yeates KO, Herring SA, Meeuwisse W.

https://doi.org/10.1136/bjsports-2023-106898

Abstract: For over two decades, the Concussion in Sport Group has held meetings and developed five international statements on concussion in sport. This 6th statement summarises the processes and outcomes of the 6th International Conference on Concussion in Sport held in Amsterdam on 27–30 October 2022 and should be read in conjunction with the (1) methodology paper that outlines the consensus process in detail and (2) 10 systematic reviews that informed the conference outcomes. Over 3½ years, author groups conducted systematic reviews of predetermined priority topics relevant to concussion in sport. The format of the conference, expert panel meetings and workshops to revise or develop new clinical assessment tools, as described in the methodology paper, evolved from previous consensus meetings with several new components. Apart from this consensus statement, the conference process yielded revised tools including the Concussion Recognition Tool-6 (CRT6) and Sport Concussion Assessment Tool-6 (SCAT6, Child SCAT6), as well as a new tool, the Sport Concussion Office Assessment Tool-6 (SCOAT6, Child SCOAT6). This consensus process also integrated new features including a focus on the para athlete, the athlete's perspective, concussion-specific medical ethics and matters related to both athlete retirement and the potential long-term effects of SRC, including neurodegenerative disease. This statement summarises evidence-informed principles of concussion prevention, assessment and management, and emphasises those areas requiring more research.

Links

Sport Concussion Assessment Tool (SCAT) 6

Child Sport Concussion Assessment Tool (Child SCAT) 6

Sport Concussion Office Assessment Tool (SCOAT) 6

Child Sport Concussion Office Assessment Tool (Child SCOAT) 6

Vision Therapy: Ocular Motor Training in Mild Traumatic Brain Injury

Barton JS, Ranalli PJ. Annals of Neurology; 88(3): 453-461, 2020. DOI: 10.1002/ana.25820

Abstract: Vision therapy in the form of ocular motor training is increasingly used to treat visual complaints, particularly in the setting of persistent symptoms after mild traumatic brain injury (mTBI). In this review, we discuss the rationale behind this intervention and the evidence for its utility. Although the efficacy of exercises for primary convergence insufficiency is plausible and supported by data, there is not yet strong evidence of benefit for the post-traumatic variant. It is not established that abnormalities in fixation, pursuit, and saccades in mTBI are the cause of

post-concussive symptoms, or that these abnormalities arise from ocular motor damage rather than being secondary effects of cognitive problems with attention or executive control. The few studies to date have significant methodological weaknesses. More substantial evidence is required before vision therapy can be accepted as a useful tool in the rehabilitation of patients with brain trauma.

Consensus Statement on Visual Rehabilitation in Mild Traumatic Brain Injury

Subramanian PS, Barton JS, Ranalli P, Smith C, Francis CE, Frishberg B. Neurol Clin Pract, 12(6): 422-428, 2022.

DOI: 10.1212/CPJ.0000000000200071

Abstract: Optometric visual rehabilitation therapy has been used for a variety of visual disorders. Descriptively named entities such as posttrauma visual syndrome, visual midline shift syndrome, and vertical heterophoria syndrome are frequently diagnosed by neuro-optometrists and/or behavioral optometrists in patients after stroke or head injury or in the setting of dizziness and/or headache. The scientific underpinnings of these diagnoses and treatments are weak, and published clinical studies comprise case reports and case series without comparison to control populations. Neuro-ophthalmologists are frequently questioned by patients about the utility of such treatment strategies. Many ophthalmologists and neurologists also are involved in the care of patients who carry these diagnoses and undergo these visual therapies. Involved physicians may benefit from guidance about the rationale, evidence, and level of evidence for the efficacy of these therapeutic approaches.

Does Neuromuscular Training Reduce the Risk of Lower-Extremity Musculoskeletal Injury in High School Female Athletes With a History of Sport-Related Concussion?

McPherson AL, Zuleger TM, Barber Foss KD, Warren SM, Hogg JA, Diekfuss JA, Myer GD. Journal of Sport Rehabilitation. 33(7):506-514, 2024 Sep 01.

Context: There is a well-established increased risk of lower-extremity (LE) musculoskeletal (MSK) injury following a sport-related concussion (SRC). Neuromuscular training programs improve biomechanics associated with LE MSK injury and reduce LE MSK injury incidence, but their relative effectiveness in athletes with history of SRC is unknown. The purpose of this study was to evaluate LE MSK injury incidence in female adolescent athletes with history of SRC following a neuromuscular training intervention. **Design**: Prospective case-control. **Methods:** Seventy-seven adolescent female athletes aged 12-18 years who participated in soccer, volleyball, or basketball were recruited from a single institutional sports medicine research and performance center to complete a 6-week neuromuscular training program prior to competitive athletic season. Group (Control, History of SRC) comparisons of athlete exposure and relative LE MSK injury risk and rates during the competitive athletic season were assessed. **Results**: Ten injuries were recorded by 9 athletes. Female athletes who reported history of SRC had increased injury risk (Risk Ratio 3.9, 95% CI, 1.1-13.8, P = .01) and increased injury rate (rate ratio 4.1, 95% CI, 1.1-15.8, P = .03) compared with female athletes without history of SRC.

Conclusions: Female adolescent athletes with history of SRC showed a greater risk of LE MSK injury compared with athletes with no history of SRC. Future work is still needed to understand the underlying mechanisms associated with future LE MSK injury following SRC and interventions that ameliorate elevated injury risk.

Concussion Symptomatology by Symptom Resolution Time in US High School Athletes: Findings From the National Athletic Treatment, Injury and Outcomes Network High School Surveillance Program (NATION-SP).

Didner N, Boltz AJ, Robison HJ, Chandran A, Quinsey C

Journal of Athletic Training. 59(7):745-750, 2024 Jul 01.

Context: Concussions incurred during high school athletics are a significant health concern, and studies examining concussions with a symptom resolution time (SRT) of 15 to 28 days have been limited. **Objective:** To compare concussions that had an SRT of 15 to 28 days with concussions that had an SRT of greater than 28 days among US high school athletes. **Design:** Descriptive epidemiology study. **Setting:** Secondary school athletic training clinics. **Patients or other participants:** Secondary school athletes. **Main outcome measure(s):** Concussion frequency, symptom number, and symptom prevalence. **Results:** Among all 917 reported concussions (of which 50.8% had missing SRT), 88 had an SRT recorded as 15 to 28 days, and 29 had an SRT recorded as greater than 28 days. Greater frequencies of concussions with an SRT of 15 days or more were reported in boys' sports (n = 78) than girls' sports (n = 39). Boys' football (51.7%) and girls' basketball (11.5%) accounted for the largest proportions of all reported concussions with an SRT of 15 to 28 days; boys' football (58.6%) accounted for the greatest proportion of concussions reported with an SRT greater than 28 days. The average number of symptoms was 6.3 +/- 3.4 for concussions with an SRT of 15 to 28 days and 7.2 +/- 3.8 for those with an SRT greater than 28 days. The most frequently reported symptoms in concussions with both SRT of 15 to 28 days and greater than 28 days were headache, dizziness, sensitivity to light, and difficulty concentrating. The prevalence of irritability was higher in concussions with an SRT of 15 to 28 days as compared with concussions with an SRT greater than 28 days (26.1% versus 13.8%); visual problems (48.3% versus 35.2%) and hyperexcitability (24.1% versus 15.9%) were more prevalent in concussions with an SRT greater than 28 days, although differences were not statistically significant. **Conclusions:** Symptom prevalence and total count were comparable between concussions with an SRT of 15 to 28 days and those with an SRT of greater than 28 days with no statistically significant difference, suggesting that symptom burdens within these groups are more similar than they are different.

Avenues for prevention using the epidemiology of sport-related concussion from a large high school surveillance study.

Bretzin AC, Pollard-McGrandy AM, Davis ER, Wiebe DJ, Covassin T Neurosurgical Focus. 57(1):E3, 2024 07.

Objective: Epidemiology provides fundamental opportunities to protect student-athlete health. The goal of this study was to describe the epidemiology of sport-related concussion (SRC) across 8 years (2015/2016-2022/2023) and compare boys' and girls' sports for SRC incidence and SRC mechanisms. **Methods:** This was a retrospective cohort study performed using a statewide high school head injury surveillance system of high school student-athletes (n = 2,182,128; boys, n = 1,267,389; girls, n = 914,739). Exposures of interest included study year and boys and girls in comparable sports. Clinical incidence was calculated by dividing SRC counts in each sport by the number of participants per 100 player-seasons and presented with 95% CIs. The 2019/2020 and 2020/2021 data were included in the analysis, however caution is warranted due to the COVID-19 pandemic. Clinical incidence ratios (CIRs) were estimated for sex-comparable sports, and significance was determined if 95% CIs excluded 1.00. The authors compared mechanism

of injury in boys' and girls' comparable sports with chi-square analyses ($p < 0.05$). **Results:** Among 25,482 total SRCs, the overall clinical incidence of SRC for all boys and girls was 1.17 (95% CI 1.15-1.18) per 100 player-seasons across all years. Across all years, the overall clinical incidence in boys' sports was 1.34 (95% CI 1.32-1.36) per 100 player-seasons, and 0.93 (95% CI 0.91-0.95) per 100 player-seasons in girls' sports. Boys' sports with the highest clinical incidence included football, ice hockey, and wrestling. Girls' sports with the highest clinical incidence included basketball, soccer, lacrosse, competitive cheer, and gymnastics. Girls consistently had higher SRC rates relative to boys for baseball/softball, basketball, and soccer (CIR range 1.65 [95% CI 1.41-1.93] to 3.32 [95% CI 2.67-4.16]). Girls had lower SRC in lacrosse in 2015/2016 (CIR 0.63, 95% CI 0.40-0.97); no difference in 2016/2017-2020/2021, but had higher clinical incidence in 2021/2022 (CIR 1.69, 95% CI 1.18-2.44) relative to boys. In boys the most common mechanism of SRC occurred from person-to-person contact (n = 8752, 62.8%), whereas girls commonly sustained SRC from person-to-object contact (n = 2369, 33.4%) and from person-to-person contact (n = 2368, 33.4%). There were significant associations between boys' versus girls' sports and mechanism of injury within baseball/softball ($chi2 = 12.71$, $p = 0.005$); basketball ($chi2 = 36.47$, $p < 0.001$); lacrosse ($chi2 = 185.15$, $p < 0.001$); and soccer ($chi2 = 122.70$, $p < 0.001$). **Conclusions:** These findings can help understand the potential impact of interventions aimed at preventing or reducing SRC. Including girls' sports within this study extends research for a largely underrepresented group.

The effect of repeated concussions on clinical and neurocognitive symptom severity in different contact sports.

Glaser J, Jaeckle S, Beblo T, Mueller G, Eidenmueller AM, Schulz P, Schmehl I, Rogge W, Hollander K, Toepper M, Gonschorek AS Scandinavian Journal of Medicine & Science in Sports. 34(4):e14626, 2024 Apr.

Introduction: The potential consequences of repeated concussions in sport are well documented. However, it remains unclear whether the cumulative impact of sports-related concussions differs between different contact sports. Therefore, the aim of the current study was to investigate the cumulative effects of sports-related concussions on clinical and neurocognitive health in different contact sports. **Materials and methods:** In a prospective multicenter study, we examined 507 (74 females) active professional athletes between 18 and 40 years of age from five different contact sports (soccer, handball, American football, basketball, and ice hockey). Data collection involved concussion history, clinical symptom evaluation, neurocognitive assessment, and the collection of other sports-related information. Composite scores were built for clinical symptoms (such as neck pain and balance disturbances) and for neurocognitive symptoms (such as memory and attention impairments). **Results:** Athletes having suffered 3+ concussions in the past showed disproportionally higher clinical symptom severity than athletes with less than three concussions across all sports. The level of clinical symptom burden in athletes with 3+ concussions indicated mild impairment. The number of past concussions did not affect neurocognitive performance. **Discussion:** Repeated sports-related concussions appear to have a cumulative impact on clinical-but not cognitive-symptom severity. Although clinical symptom burden in athletes with 3+ concussions in the past was not alarmingly high yet in our sample, increased caution should be advised at this point. Despite few exceptions, results are similar for different contact sports, suggesting a similar multidisciplinary concussion management across all types of sport.

Early Targeted Heart Rate Aerobic Exercise Reduces Proportion of Subacute Musculoskeletal Injuries After Recovery From Sport-Related Concussion.

Leddy JJ, Witte M, Chizuk HM, Willer BS, Miecznikowski JC, Master CL, Mannix RC, Meehan WP, Haider MN Clinical Journal of Sport Medicine. 34(6):509-516, 2024 Nov 01.

Objective: There is greater risk of musculoskeletal (MSK) injury after clinical recovery from sport-related concussion (SRC). We determined whether aerobic exercise treatment within 10 days of SRC reduced the proportion of MSK injury in recovered adolescent athletes at 4 months since injury. **Design:** Planned secondary analysis of a randomized trial of aerobic exercise versus stretching exercise in adolescents after SRC. **Setting:** Outpatient and hospital-based sports medicine centers. **Participants:** Aerobic exercise (n = 38, 58% male, 15.6 years) and stretching exercise (n = 25, 64% male, 15.9 years) participants completed a questionnaire at 3.5 and 3.3 months since recovery, respectively. **Interventions:** Individualized subthreshold aerobic exercise versus placebo-like stretching. **Main outcome measures:** Proportion of MSK injury, subsequent concussion, and return to exercise training, school, and sport determined 3 months after clinical recovery from SRC. **Results:** Overall, 24% of participants randomized to stretching experienced an MSK injury versus 5.3% of participants randomized to aerobic exercise. There was no difference in time to return to school, sport, or incidence of subsequent concussion. Stretching participants were 6.4 times (95% confidence interval 1.135-36.053) more likely to sustain MSK injury than aerobic exercise participants when controlling for the duration of exposure to sport and return to preinjury sport participation. All injuries were in male participants. **Conclusion:** Adolescent male athletes prescribed aerobic exercise within 10 days of SRC had a significantly lower proportion of individuals injured in the 3 months following clinical recovery when compared with stretching. This may be due to a habituation/rehabilitation effect of aerobic activities to improve autonomic, vestibular, and/or oculomotor function after SRC.

Efficacy of exercise interventions on prevention of sport-related concussion and related outcomes: a systematic review and meta-analysis.

Ivanic B, Cronstrom A, Johansson K, Ageberg E British Journal of Sports Medicine. 58(23):1441-1451, 2024 Dec 02.

Objective: To review the efficacy of exercise interventions on sport-related concussion (SRC) incidence, as well as on linear and rotational head accelerations, and isometric neck strength and to assess reporting completeness of exercise interventions using the Consensus on Exercise Reporting Template (CERT). **Design:** Systematic review and meta-analysis, according to the Prisma in Exercise, Rehabilitation, Sport medicine and SporTs science guidelines. **Data sources:** Six databases (MEDLINE, Embase, CINAHL, Scopus, Web of Science CC and SPORTDiscus) were searched up to 26 June 2023. **Eligibility criteria for selecting studies:** Randomised controlled trials (RCTs), cluster RCTs or quasi-experimental studies, evaluating exercise interventions on SRC incidence, linear and rotational head accelerations, and/or isometric neck strength in male and/or female athletes of any age, and/or in a healthy general population. **Results:** A total of 26 articles were included. A large effect size was observed for resistance training (RT) on isometric neck strength (standardised mean difference (SMD) 0.85; 95% CI 0.57 to 1.13; high-quality evidence). Non-significant effect sizes were observed for neuromuscular warm-up programmes on SRC incidence (risk ratio 0.69; 95% CI 0.39 to 1.23; low-quality evidence), or for RT on linear head acceleration (SMD -0.43; 95% CI -1.26 to 0.40; very low-quality evidence) or rotational head acceleration (SMD 0.08; 95% CI -0.61 to 0.77; low-quality evidence). No studies assessed the impact of RT on SRC incidence. CERT scores ranged from

4 to 16 (out of 19) with median score of 11.5 (IQR 9-13). **Conclusion:** RT increases isometric neck strength, but the effect on SRC incidence is unknown. More adequately powered and rigorous trials are needed to evaluate the effect of exercise interventions on SRC incidence, and on linear and rotational head accelerations. Future studies should follow CERT guidelines, as the included interventions were generally not reported in sufficient detail for accurate replication.

Adolescents With a High Burden of New-Onset Mood Symptoms After Sport-Related Concussion Benefit From Prescribed Aerobic Exercise, a Secondary Analysis of 2 Randomized Controlled Trials.

Castellana MC, Burnett GJ, Gasper A, Nazir MSZ, Leddy JJ, Master CL, Mannix RC, Meehan WP 3rd, Willer BS, Haider MN Clinical Journal of Sport Medicine. 35(1):29-36, 2025 Jan 01.

Objective: Approximately 20% of students with sport-related concussion (SRC) report new symptoms of anxiety and depression which may be associated with delayed recovery and increased risk for developing a mood disorder. Early prescribed aerobic exercise facilitates recovery in athletes with concussion-related exercise intolerance. We studied the effect of aerobic exercise treatment on new mood symptoms early after SRC. **Design:** Exploratory secondary analysis of 2 randomized controlled trials (RCT). **Setting:** Sports medicine clinics associated with UB (Buffalo, NY), CHOP (Philadelphia, PA), and Boston Children's Hospital (Boston, MA). **Participants:** Male and female adolescents (aged 13-18 years) diagnosed with SRC (2-10 days since injury). **Interventions:** Participants were randomized to individualized targeted heart rate aerobic exercise (n = 102) or to a placebo intervention designed to mimic relative rest (n = 96). **Main outcome measures:** Incidence of Persisting Post-Concussive Symptoms (PPCS, symptoms >=28 days). **Results:** First RCT recruited from 2016 to 2018 and the second from 2018 to 2020. Of 198 adolescents, 156 (79%) reported a low burden (mean 1.2 +/- 1.65/24) while 42 (21%) reported a high burden (mean 9.74 +/- 3.70/24) of emotional symptoms before randomization. Intervention hazard ratio for developing PPCS for low burden was 0.767 (95% CI, 0.546-1.079; P = 0.128; beta = 0.085) and for high burden was 0.290 (95% CI, 0.123-0.683; P = 0.005; beta = 0.732). **Conclusions:** High burden of mood symptoms early after injury increases risk for PPCS, but the sports medicine model of providing early targeted aerobic exercise treatment reduces it. Non-sports medicine clinicians who treat patients with a high burden of new mood symptoms after concussion should consider prescribing aerobic exercise treatment to reduce the risk of PPCS and a mood disorder.

The Adolescent Patient Perspective on Activity Limitations After Sport-Related Concussion.

Valovich McLeod TC, Williams RM, Snyder Valier AR Journal of Athletic Training. 59(10):984-990, 2024 Oct 01.

Context: Assessment of sport-related concussion (SRC) has begun to include patient-reported outcome measures. However, understanding of which health limitations are most meaningful to adolescents after SRC is limited.

Objective: To explore patient-perceived activity limitations after SRC and throughout recovery to return to play and mapped according to the International Classification of Functioning, Disability, and Health (ICF) model. **Design:** Longitudinal study. **Setting:** Secondary school athletic training facilities. **Patients or other participants:** Fifty patients (41 males, 5 females, 4 sex not reported, age = 14.9 +/- 3.5 years, grade = 10.2 +/- 0.93 level) with a medically diagnosed SRC. **Intervention(s):** The Patient Specific-Functional Scale (PSFS) was used to assess

changes in the patient's condition and the effect the injury posed on their ability to perform activities. The PSFS is a self-reported assessment of health used to identify activity limitations and rate the difficulty of performing those tasks. The PSFS was administered to patients on days 3 (D3) and 10 (D10) after SRC and at return to play. **Main outcome measure(s):** Activities affected by injury were coded into common categories and themes by a 3-person research team for subsequent analysis. The coded themes were also mapped to the ICF domains, chapters, and categories. The dependent variables were the PSFS themes, number of activities endorsed, PSFS scores, ICF domains, chapters, and categories. Descriptive analyses and frequencies were reported for the dependent variables. **Results:** A total of 157 different activities were identified at D3 and coded into 28 categories that fit into 6 themes: activities of daily living, cognitive and school (COG), sports and physical activity (SPA), screen time, sleep, and social. On D3, all patients (50/50) identified at least 1 activity limitation. Most related to SPA (37.6%) and COG (31.2%). Sixty percent of patients endorsed activity limitations at D10, primarily in COG (38.6%) and SPA (36.6%). All (100%) response categories were mapped to the ICF, with most (75%) fitting the activities and participation domain. **Conclusions:** Our primary findings suggest that SRC influences many facets of the lives of adolescent athletes. Specifically, adolescent athletes identified activity restrictions primarily related to physical activity and sports participation.

Individual and Combined Effects of Sport-Related Concussion and Anterior Cruciate Ligament Injury on Neurocognitive and Neuromechanical Reaction Time.

Moran RN, Grooms DR Journal of Athletic Training. 60(1):3-10, 2025 Jan 01.

Context: Recent epidemiological data have indicated a potential connection between sport-related concussion (SRC) and elevated anterior cruciate ligament (ACL) injury risk. Limited research exists in which authors have quantified cognitive and motor outcome measures between SRC and ACL injury history. **Objective:** To examine the individual and combined effects of a history of SRC and ACL injury and reconstruction (ACLR) on neurocognitive and neuromechanical function. **Design:** Cross-sectional study. **Setting:** Research laboratory. **Patients or other participants:** Forty-seven recreationally active college individuals with either an injury history of SRC (n = 12), ACLR (n = 12), combination of SRC + ACLR (n = 11), or uninjured controls (n = 12). **Main outcome measure(s):** Participants completed a neurological battery using the C3 Logix application and TRAZER system for neuromechanical reaction time (RT). C3 Logix subtests consisted of the Trail Making Test (TMT) A, B, and B - A; simple and choice RT; and processing speed. TRAZER subtests consisted of simple, Flanker-task, and Stroop-task RT. Participants were categorized into 3 group comparisons of either (i) SRC, ACLR, SRC + ACLR, and controls, (ii) any or no SRC overall, or (iii) any or no ACLR overall. **Results:** No differences were demonstrated between SRC, ACLR, SRC + ACLR, and controls on TMT (P = .07-.14), neurocognitive (P = .14-.93), or neuromechanical (P = .64-.99) performance. Those with any SRC had slower TMT B - A times (P = .03), while those with any ACLR had slower TMT A (P = .02) times than those with no ACLR. No differences were noted for the TRAZER simple, Flanker, or Stroop RT for any or no SRC and ACLR groups. **Conclusions:** College students with a combined effect of SRC and ACLR did not differ from other groups on neurocognition and neuromechanical RT. Individuals with a history of SRC or ACLR had a worse TMT, leading to inquiry about potential long-term neurological deficits, despite no differences in those with a combined history.

Sport-Related Concussion in Para Athletes: A Scoping Review of Concussion Incidence, Assessment, and Management.

Smetana RM, Kaplan DT, Magill RT, Denton AH, Ahmed OH, Broshek DK American Journal of Physical Medicine & Rehabilitation. 103(9):858-865, 2024 09 01.

Abstract: Although research on sport-related concussion has grown substantially in the last decade, research on concussion in para sports remains limited. The aim of this scoping review is to synthesize and describe the current literature on the incidence, assessment, and management of sport-related concussion in para-athletes. The literature search was conducted in CINAHL, Google Scholar, MEDLINE, SPORTDiscus, and Web of Science databases and identified 22 studies that addressed one of our research questions. A majority of studies addressed concussion in elite athletes; youth and collegiate para-athletes were largely underrepresented. Fewer studies addressed concussion assessment and management, in part due to limitations in accessibility of current assessment tools for athletes with varying disabilities. Moving forward, there is a need to capture a larger range of incidence data, create modified assessment tools with para-specific normative data, and develop risk prevention strategies for para-athletes.

FROM THE HISTORY BOOK

‘’*The first clear separate recognition of concussion was made by the Persian physician, Rhazes, in the 10th century. Lanfrancus subsequently expanded this concept as brain "commotion" in the 13th century.”*

(from Concussion: the history of clinical and pathophysiological concepts and misconceptions; McCrory PR, Berkovic SF. Neurology, 2001 Dec 26;57(12):2283-9.)

Photo: Picture available online

SHARE YOUR PHOTOS

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Email: medical@FIBA.basketball

Leonie Fiebich's shoulder inadvertently knocked Nyara Sabally while taking her pick during the Germany – Belgium game of the Paris 2024 Olymic Games. The rotation of the head can be seen on this picture, Nyara Sabally showed symptoms of concussion following the action and put under concussion protocol.

NEWS AND NOTABLE FROM THE FIBA MEDICAL COMMISSION

The FIBA MC will continue to develop educational webinar sessions on a variety of content relevant to basketball. Stay tuned for the 2025 slate of presentations, and please let us know if there is a specific topic that you would like to see covered.

THE STUDENT'S CORNER

This space is intended for sport science and medical students, residents, and fellows to contribute to our knowledge and conversation.

Please encourage your students to contribute to the Fast Break on a topic of their choosing related to basketball injury, rehabilitation or sport science. The work published here is reviewed and approved for submission by the student's preceptor.

Unfortunately, there were no student submissions to this edition of the Fast Break.

BASKETBALL CME OPPORTUNITIES

A listing of varied sport medicine and basketball meetings and conferences you may be interested in attending:

Sports Medicine Australia conference events can be found here: **https://sma.org.au/about-sma/honour-board/sma-national-conferences/**

Sports Medicine New Zealand conference events can be found here: **https://sportsmedicine.co.nz/**

The Australasian College of Sport and Exercise Physicians events can be found here: **https://www.acsep.org.au/page/events**

The Asian Federation of Sport Medicine conference events can be found here: **https://afsm2024.com/index.php**

The South African Sports Medicine Association hosts several events throughout the year:

https://www.sasma.org.za/events/

The South African Sports Medicine Association hosts several events throughout the year:

https://www.sasma.org.za/events/

The British Association of Sport and Exercise Medicine conference events can be found here: **https://basem.co.uk/learning/**

The FIMS (International Sport Medicine Federation) list of events can be found here: **https://www.fims.org/news-events/events/**

The National Basketball Strength and Conditioning Association hosts a performance conference. Check here for the latest updates regarding the date of their next conference: **https://thenbsca.com.**

The Euroleague Strength and Conditioning Coaches Association list of upcoming events can be found here: **https://escca.net/events/.**

The High-Performance Basketball Symposium dates are coming soon: **https://www.highperformancebasketball.com/index.cfm.**

A listing of all the American Medical Society for Sports Medicine conferences can be found here:

https://www.amssm.org/Conferences.php

The Society for Sport Exercise and Performance Psychology website lists a number of mental performance educational opportunities:

https://www.apadivisions.org/division-47/about/resources/conferences

Conference Locate.com allows you to search globally for conferences on an extensive array of medical topics:

https://www.clocate.com

A listing of exercise physiology conferences across the world can be found here: **https://conferenceindex.org/conferences/exercise-physiology**

And for something a little different:

https://unconventional.com.au/conferences/south-america/medical-conferences/2024/

If you prefer self-study to earn CME credits while you are on vacation, have a look at these options:
https://www.americanseminar.com/?gad_source=1&gclid=Cj0KCQjw5cOwBhCiARIsAJ5njuavUXdPzpk4LULqCfKx1tp5tulliGrFPaki0M-Hjk6RjD6Vb4EGtGQaAtMTEALw_wcB

Date	Location	Event website
March 26-28, 2025	Online	Harvard Sport Medicine 2025
March 29, 2025	Sydney (Australia)	International Conference on Sport Medicine and Exercise Science
Apr 22-27, 2025	Kansas City (USA)	American Medical Society for Sport Medicine annual symposium
May 7-10, 2025	Charlottetown, Prince Edward Island (Canada)	Canadian Academy of Sport and Exercise Medicine Annual Symposium
May 27-31, 2025	Atlanta (USA)	American College of Sport Medicine Annual symposium
July 2-4, 2025	Melbourne (Australia)	15th International Conference on Sport and Society
May 26-30, 2026	Salt Lake City (USA)	American College of Sport Medicine Annual symposium
Jun 1-4, 2027	Indianapolis (USA)	American College of Sport Medicine Annual symposium