The British Student Doctor, 2019;3(3):32-34
doi: 10.18573/bsdj.119
C4ME Supplement

Management beyond the pitch: a literature review of paediatric sports related concussion

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No conflicts of interest to declare

Accepted for publication: 25.09.19

Background

Sports related concussion (SRC) is a growing topic of interest, partly due to media attention and concern for medical negligence towards high-profile athletes. Children and adolescents are at their most vulnerable stage of neurological development and continually at risk of concussive injuries in sporting activities. It is estimated that 1-2 children per team, per season endure a SRC playing rugby in the UK. (1) Despite this, there remains a paucity in the development of clear and objective guidelines for guardians, sports coaches and healthcare professionals to ensure a safer return to sport for the paediatric population.

There is often confusion regarding the precise definition of concussion. The 2017 Concussion in Sport Group define concussion as a direct or transmitted force to the brain which *"results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously."* (2) Concussion *"reflects a functional disturbance rather than a structural injury",* (2) which is echoed in the absence of defect on standard neurological imaging.

This project explores the current practices for managing paediatric SRC in the Emergency Department (ED) by specifically addressing the following questions:

1. *How should we advise families on the rehabilitation of the patient?*
2. *What evidence is there for the value of follow up appointments?*
3. *How should we advise families on the long-term effects on neurocognition?*

Methods

A systematic literature review was conducted using the MEDLINE, Scopus and Web of Science databases. Identification of search terms were formed by breaking down the title into three main themes: paediatrics, sports related concussion and rehabilitation. Possible alternative spellings and synonyms were incorporated.

Initially, 727 records were identified through the database searches and an additional two records through reading other research papers. 135 duplicate abstracts were removed using the citation manager EndNote. The remaining 594 records were screened based on pre-determined inclusion and exclusion criteria.

The resulting articles were critically appraised using verified appraisal tools for risk of bias. 11 papers were included for the final review. Referral to the School of Medicine Research Ethics Committee was not required.

Results

1. How should we advise families on the rehabilitation of the patient?

Comprehensive advice should consist of symptom management including sleep hygiene, nutrition and hydration, graded return-to-play and return-to-school discussions. (3) In the acute phase, a form of exercise before seven days is more beneficial than the complete rest approach. (4) In patients with prolonged symptoms i.e. lasting more than 4 weeks, multiple papers have shown improved outcomes with physiotherapist-supervised exercise. (3, 5) One to two days of cognitive rest followed by a gradual return to activity showed greater symptom resolution versus five or more days of strict cognitive rest. (6) Cognitive behavioural therapy (CBT) programmes in patients with prolonged symptoms showed improvement. (7) Currently, there are no randomised controlled trials using pharmacological therapies for symptom management in paediatric concussion.

2. What evidence is there for the value of follow up appointments?

The paediatric neurorehabilitation service in Wales admits patients who exhibit a change on CT or MRI brain scans, which typically does not include patients with SRC. Therefore, there is a lack of evidence regarding follow-up appointments for patients with prolonged post-concussion symptoms in Wales. However, paediatric concussion clinics are a standard part of long-term care, as seen in Australian and American literature.

3. How should we advise families on the long-term effects on neurocognition?

Early attendance at the ED reduces prolonged symptoms and is therefore advisable. (8) Despite reporting symptom resolution, some patients have continued impairment in neurocognition. (9) Therefore, advice regarding graded return to play should be reinforced.

Research suggests that academic progression favours non-contact sports groups over contact sports groups who have endured an SRC. (10) Therefore, it should be ensured that parents are aware of the seriousness of an SRC and the possibility of suffering long term neurocognitive damage.

Discussion

Evidence suggests taking time to educate both patients and their guardians on recovery and prolonged symptoms is particularly important. Primary and secondary healthcare professionals require further education and training on concussion management, for example through e-learning modules. Potential therapies after discharge from the ED include active rehabilitation with early physiotherapy guided exercises and CBT, which have shown better outcomes than the complete physical rest approach.

Larger randomised controlled trials with prospective monitoring are needed to provide solid evidence on which to base management guidelines. The five to ten-year-old group requires particular focus. There is potential for increasing the use of the 5th Sports Concussion Assessment Tool (SCAT5) proforma in the emergency setting and incorporating it into rehabilitation progression. Pre-season SCAT5 assessments conducted by sports clubs for all amateur players would provide a valuable baseline in the event of an SRC. Safety netting and providing resources for follow-up, including sign-posting sporting body websites, may result in highlighting more patients with prolonged neurocognitive deficits.

Multi-disciplinary neurorehabilitation teams require more funding to expand their outreach. Influence must be taken from other global clinical sources and research continued for progress to be maintained.

Lessons Learnt

On receiving my dissertation title, I was wary of having never undertaken a literature analysis project before and I found the sheer quantity of papers on concussion daunting. However, meeting with the healthcare librarian, who advised me how to use literature databases and how to narrow my search field by using key words, was a valuable experience. The skill of using focused searches to further my background knowledge can be applied to both my further research and to keeping up to date with developments in my future specialty.

The time-consuming nature of critical analysis proved challenging; utilising deadlines for each of the constituent parts helped break the project down into smaller and more surmountable tasks. Critical appraisal frameworks enabled me to evaluate the literature systematically and encouraged me to think more deeply about the provenance and significance of the evidence presented in journal studies.

References

1. Haseler CM, Carmont MR, England M. The epidemiology of injuries in English youth community rugby union. British Journal of Sports Medicine. 2010;44(15):1093-9.

https://doi.org/10.1136/bjsm.2010.074021
PMid:20961921

2. McCrory P, Meeuwisse W, Dvorak J, Aubry M, Bailes J, Broglio S, et al. Consensus statement on concussion in sport—the 5th international conference on concussion in sport held in Berlin, October 2016. British Journal of Sports Medicine. 2017;51:838-847.

3. Dobney DM, Grilli L, Kocilowicz H, Beaulieu C, Straub M, Friedman D, et al. Evaluation of an active rehabilitation program for concussion management in children and adolescents. Brain Injury. 2017;31(13-14):1753-9.

https://doi.org/10.1080/02699052.2017.1346294
PMid:29058559

4. Guthrie R. Physical activity following acute concussion and persistent post concussive symptoms in children and adolescents. Physician and Sports Medicine. 2018;46(4):416-9.

https://doi.org/10.1080/00913847.2018.1516479
PMid:30142294

5. Chan C, Iverson GL, Purtzki J, Wong K, Kwan V, Gagnon I, et al. Safety of Active Rehabilitation for Persistent Symptoms After Pediatric Sport-Related Concussion: A Randomized Controlled Trial. Archives of Physical Medicine and Rehabilitation. 2018;99(2):242-9.

https://doi.org/10.1016/j.apmr.2017.09.108
PMid:28989074

6. Thomas DG, Apps JN, Hoffmann RG, McCrea M, Hammeke T. Benefits of strict rest after acute concussion: a randomized controlled trial. Pediatrics. 2015;135(2):213-23.

https://doi.org/10.1542/peds.2014-0966
PMid:25560444

7. McNally KA, Patrick KE, LaFleur JE, Dykstra JB, Monahan K, Hoskinson KR. Brief cognitive behavioral intervention for children and adolescents with persistent post-concussive symptoms: A pilot study. Child Neuropsychology. 2018;24(3):396-412.

https://doi.org/10.1080/09297049.2017.1280143
PMid:28125932

8. Bock S, Grim R, Barron TF, Wagenheim A, Hu YE, Hendell M, et al. Factors associated with delayed recovery in athletes with concussion treated at a pediatric neurology concussion clinic. Child's Nervous System. 2015;31(11):2111-6.

https://doi.org/10.1007/s00381-015-2846-8
PMid:26243160

9. Kriz PK, Mannix R, Taylor AM, Ruggieri D, Meehan WP. Neurocognitive Deficits of Concussed Adolescent Athletes at Self-reported Symptom Resolution in the Zurich Guidelines Era. Orthopaedic Journal of Sports Medicine. 2017;5(11).

https://doi.org/10.1177/2325967117737307
PMid:29164163 PMCid:PMC5676493

10. Alexander DG, Shuttleworth-Edwards AB, Kidd M, Malcolm CM. Mild traumatic brain injuries in early adolescent rugby players: Long-term neurocognitive and academic outcomes. Brain Injury. 2015;29(9):1113-25.

https://doi.org/10.3109/02699052.2015.1031699
PMid:26004752

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Journal DOI
10.18573/issn.2514-3174

Issue DOI
10.18573/bsdj.v3i3

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