Heading for trouble: is dementia a game changer for football?

A Rutherford,1 William Stewart,2 Davide Bruno3

INTRODUCTION

After fevered media coverage of a possible link between football (soccer) heading and long-term damage to the brain, 2016 saw the Professional Footballers’ Association call for a review of the game to decide whether to follow the lead of the United States Soccer and ban heading for younger players. Given these concerns, and the fact the relevant Rules of Football were conceived over 100 years ago, is it time for major rule changes? Is there evidence that football increases risk of neurodegenerative disease (eg, dementia) and heading is to blame?

(NO) DATA ON DEMENTIA RISK IN FOOTBALL

Remarkably, despite phenomenal football participation rates globally and over a century of participation, there is little evidence regarding football’s impact on brain health, and dementia in particular. Football is a contact sport and concussive head injuries do occur, but multiple reviews of the available research literature have drawn the same conclusions: football concussion outcomes are consistent with the general concussion literature, applying the recommended control for the confounding effects of a greater number of head injuries sustained by those who head more frequently.2 Intriguingly, an inverse correlation between heading frequency and neurocognitive test performance is reported in a majority of studies, while the remainder report only minor and sometimes questionable influence of heading,1 2 with surprisingly few studies applying the recommended control for the confounding effects of a greater number of head injuries sustained by those who head more frequently.3 4 Regarding late consequences of heading, data are mixed and limited. No correlation between heading frequency and neurocognitive test performance is reported in a majority of studies, while the remainder report only minor and sometimes questionable influence of heading,1 2 with surprisingly few studies applying the recommended control for the confounding effects of a greater number of head injuries sustained by those who head more frequently.3 Intriguingly, an inverse correlation between heading exposure and MRI measures of cortical thickness in former professional footballers has been reported and associated with cognitive performance,5 but again data are mixed across the few imaging studies to date, with no direct correlation reported in others.3

DO FOOTBALLERS’ BRAINS LOOK LIKE BOXERS’?

There is increased recognition of chronic traumatic encephalopathy (CTE) in non-boxer athletes in a growing list of sports,1 including small numbers of cases in former footballers.3 While these reports capture headlines, as observational studies on serendipitous brain donations (ie, without appropriate sampling of sport population), they provide no insight into the risk of CTE in a sport, let alone into the risk of CTE in a sport, let alone into the risk of CTE in a sport.

(Confounding) Data on the Consequences of Football Heading

Research on the immediate effects of football heading alone is sparse, with one recent study reporting evidence of short-lived impairment in cognitive and electrophysiological assessments after a single session of 20 headers by young footballers.3 However, no controls were included and effects normalised within 24 hours. So, while intriguing, the data provide no insight into any long-term consequences of heading.

Work to Do Before Rule Change Is Informed

Current evidence suggests the concerns and anxieties expressed in many quarters of the media about football participation, specifically the act of heading the ball increasing dementia risk, are unsubstantiated. Nevertheless, growing public anxiety around the consequences of exposure to brain injury in sport, partly fuelled by increasing recognition of CTE in former athletes, must be acknowledged.

However, in reality there are remarkably few robust and enlightening studies on the long-term neuropsychological health of former footballers, or on the lasting consequences of football heading. Not only is most research to date beset by methodological deficiencies,1 2 those studies exhibiting methodological deficiencies are most likely to identify neuropsychological impairment.5

While current evidence does not demand rule change, neither does it provide football with a clean bill of health. Instead, to inform discussions and assuage anxieties, there is a pressing need for appropriately designed and powered research studies to address questions over dementia risk in former footballers and any long-term consequences of heading. Until then, recommendations on heading in association football will be driven by opinion, not by scientific evidence. Therefore, the recent EUFA and Football Association calls for research to fill these knowledge gaps are welcomed and demonstrate a commitment to address these serious issues.

Contributors AR with assistance from DB wrote the first draft of the manuscript. WS substantially revised this first draft for publication as an editorial. This was tweaked by AR, who then submitted the manuscript’s final draft. The revisions requested were addressed by AR’s discussion with WS and DB.

Competing interests None declared.

Provenance and peer review Not commissioned; externally peer reviewed.

Open Access

This is an Open Access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits...
others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: http://creativecommons.org/licenses/by-nc/4.0/

© Article author(s) (or their employer(s) unless otherwise stated in the text of the article) 2017. All rights reserved. No commercial use is permitted unless otherwise expressly granted.

To cite Rutherford A, Stewart W, Bruno D. Br J Sports Med Published Online First: [please include Day Month Year]. doi:10.1136/bjsports-2017-097627

Accepted 5 July 2017
doi:10.1136/bjsports-2017-097627

REFERENCES