Review of: "Ready for Impact? A validity and feasibility study of instrumented mouthguards (iMGs)"

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Ready for Impact? A validity and feasibility study of instrumented mouthguards (iMGs)
Review

This study sought to compare four mouthguard devices for measuring head accelerative events in the laboratory and on the rugby pitch. The basic testing approach for evaluating these devices is standard, with bench testing and in-vivo testing verified by video. Assessment of fit and feasibility are included. However, there are also significant limitations in the data collected as the authors note. As a non-biomechanist, it would be inappropriate to comment on the specific measurement properties identified, although some of the predictive values are concerning.

Given the limitations noted, the analyses were complete if not overly so. This is challenging research and the study team attempted to control as much as they probably could.

In regards to the unguided analysis: measuring accelerative forces in shoulder tackles is interesting, but the data did not present a clear picture of the outcomes, nor why this action was studied. Laboratory tests using head forms focus on direct head impacts and this is typically the focus of in vivo studies as well. One would not expect the same level of HAE as a head to body or head to head impact. However, if accumulated exposures are the real culprit all measured force experienced by the head (nee brain) could be relevant; however, it was counterintuitive and the purpose not clearly explained.

P7 Line 157 the sentence is incomplete
“One professional rugby video analyst tracked each player wearing an iMG during matches and labelled their one-on-one shoulder tackles when a tackler.[11]”

The concern for this reviewer has to do with the conclusions. The authors seem to be making the case that these devices are ready for clinical use, when this is not necessarily a plausible inference given the limitations of the analyses and the findings. And while some of these devices appear to accurately reflect impact exposure, it is not yet clear what to make of the values. Notably, the International Sports Concussion Group has consistently recommended research-only usage of these devices until clinical usefulness has been determined empirically.

The limitations the authors report support those recommendations and should therefore be highlighted with references for clinical use removed from the paper. Reinforcing the need for more research before clinical implementation would be welcome. The title is not very appropriate in that regard.