

382 | 8 | 5  
Views | CrossRef citations to date | Altmetric

Articles

# Invalid Baseline Testing with ImPACT: Does Sandbagging Occur with High School Athletes?

William T. Tsushima ✉, Marcus H. Yamamoto, Hyeong Jun Ahn, Andrea M. Siu, So Yung Choi & Nathan M. Murata

Pages 209-218 | Published online: 13 Aug 2019

🗨️ Cite this article   🔗 <https://doi.org/10.1080/21622965.2019.1642202>



Sample our Behavioral Sciences Journals  
>> [Sign in here](#) to start your access to the latest two volumes for 14 days

📄 Full Article   🖼️ Figures & data   📖 References   🗨️ Citations   📊 Metrics

📄 Reprints & Permissions

Read this article

🔗 Share

## Abstract

The aim of this large-scale research was to determine the frequency of valid, invalid, and sandbagging results in ImPACT baseline testing of high school athletes. This retrospective study identified valid, invalid (identified by five embedded Invalidity Indicators), and sandbagging (identified by three “red flags”) results in the ImPACT baseline test scores of 6,346 high school athletes. In addition, the ImPACT postconcussion scores of 266 athletes who sustained a concussion during the school year were evaluated to compare the baseline-to-postconcussion changes of valid versus a combined group of invalid and sandbagging scorers. There were 3,299 (51.99%) athletes who had valid baseline scores, 269 (4.24%) had invalid scores, and

3,009 (47.42%) had sandbagging scores. (There were 231 who obtained both invalidity and sandbagging scores.) The overall difference in baseline-to-postconcussion changes between the valid scorers and the combined group of invalid and sandbagging scorers was statistically significant. The high rate of athletes who had invalid and sandbagging scores raised concern that the underperformance of baseline testing occurs more commonly than is probably realized by those who utilize computerized neuropsychological testing with high school athletes. Accordingly, efforts are needed to improve test administration procedures so that maximal attention and effort can be maintained among the test takers. In the meantime, increased caution is called for in employing the baseline-to-postconcussion paradigm when return-to-play decisions are made.

Keywords:

[Invalid baseline](#) [ImPACT](#) [sandbagging](#)

---

---

## Acknowledgments

The authors wish to acknowledge the support of the Hawaii Concussion Awareness and Management Program who provided the data for this study, and the assistance of the Hawaii State Department of Education.

---

## Disclosure statement

Marcus Yamamoto participated in the Hawaii Pacific Health Summer Student Research Program while he assisted in this research project. The content of this paper is solely the responsibility of the authors and does not necessarily represent the official view of the National Institute of Health. No competing financial interests exist for any of the six authors.

---

## Additional information

### Funding

Hyeong Jun Ahn and So Yung Choi were partially supported by grants [U54MD007584, U54MD00760131, and 2U54GM104944-06] from the National Institute of Health.



## Related research

People also read

Recommended articles

Cited by  
8

## Information for

[Authors](#)

[R&D professionals](#)

[Editors](#)

[Librarians](#)

[Societies](#)

## Opportunities

[Reprints and e-prints](#)

[Advertising solutions](#)

[Accelerated publication](#)

[Corporate access solutions](#)

## Open access

[Overview](#)

[Open journals](#)

[Open Select](#)

[Dove Medical Press](#)

[F1000Research](#)

## Help and information

[Help and contact](#)

[Newsroom](#)

[All journals](#)

[Books](#)

## Keep up to date

Register to receive personalised research and resources by email



Sign me up



Copyright © 2026 Informa UK Limited [Privacy policy](#)

[Cookies](#) [Terms & conditions](#) [Accessibility](#)

Registered in England & Wales No. 01072954  
5 Howick Place | London | SW1P 1WG

 Taylor and Francis  
Group