

LETTER

Wearable, yes, but able...?: it is time for evidence-based marketing claims!

With great interest, we¹ have been following the growing popularity of non-invasive wearable sensor technology as a way to increase physical performance, assist recovery or monitor health. These sensors, integrated into clothing worn on the body, are often referred to as 'wearables' or 'wearable technology'.

The popularity of the wearables is mainly due to three recent advances: (1) miniature sensor technology,¹ (2) telemetric transfer and (web-based) storage of personal data and (3) extension of battery life. According to a worldwide survey of fitness trends, wearable technology appears set to be the number 1 trend in 2017,² with expected sales for some wearables in the range of 1.5–2.6 billion US\$.²

We believe that this type of technology will be a central tool in the fitness and health industry, provided some fundamental issues are dealt with. More specifically, prototype evaluation and market launching of new products must be supported through scientific validation and some ethical issues must be considered.

In this context, numerous studies aiming to assess the validity and reliability of wearable sensors have been conducted, especially after market launch. They show that many non-invasive wearable sensor technologies have questionable validity and reliability when used in various sport settings and populations.^{1,3}

We believe the overly hasty launch of non-evaluated wearable products is problematic. One of the world's largest sport medicine communities, the American College of Sports Medicine, claims that 'Exercise is Medicine'. If we assume that wearable technology could assist in the health-enhancing process of exercise, for example, to control body weight (by estimating energy expenditure), or monitor cardiac and metabolic function (eg, by measuring variables of heart rate precisely), we cannot understand why wearable devices employing biological data for health purposes are not required to undergo rigorous evaluation prior to being launched on the market. It is, after all, obligatory for the

pharmaceutical industries to test their products. Manufacturers undoubtedly invest a great portion of their budget into prototype development; however, validation and reliability studies are often performed inhouse by the company itself, without external evaluation (at least until the products enter the market).

Aggressive and exaggerated marketing claims are another critical concern. In our opinion, developers' marketing claims concerning non-invasive wearable technology should be backed by scientific evidence and verified independently before the devices are launched on the sports, fitness and health market. In the past, companies making dubious marketing claims of fitness products without scientific back-up have been punished with severe fines⁴ and similar lawsuits are currently pending.⁵

We strongly recommend that all parties involved in consumer health and fitness care (ie, companies, governing bodies, customer care, technical and medical inspection agencies) to perform and demand prototype validation and to control and monitor the launching of sensor-based technology for health and fitness purposes. Wearable technology provides an opportunity to collect a huge amount of personal data and also open a possibility for (big data) analysis to improve health and performance. But does it make sense—and is it ethically defensible—to collect and analyse data of questionable accuracy? Wearable technology truly has merit as it may stimulate a broad population to pursue life-long health-enhancing exercise and improve individual performance. Do they pose a threat to personal integrity? These questions have been posed quite often since companies began pushing new technology onto the fitness and health market backed by strong and often unsubstantiated marketing claims.

Inspired by the discussion of evidence-based medicine,⁶ we believe it is time to demand 'evidence-based marketing claims' (1) to ensure the safe use of wearable technology and (2) to use the technology's full potential to maintain and improve health and performance.

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REFERENCES

- Düking P, Hotho A, Holmberg HC, *et al.* Comparison of non-invasive individual monitoring of the training and health of athletes with commercially available wearable technologies. *Front Physiol* 2016;7:71.
- Thompson WR. Worldwide survey of fitness trends for 2017. *ACSMs Health Fit J* 2016;20:8–17.
- Wallen MP, Gomersall SR, Keating SE, *et al.* Accuracy of heart rate watches: implications for weight management. *PLoS ONE* 2016;11:e0154420.
- Commission FT. Reebok to Pay \$25 Million in Customer Refunds To Settle FTC Charges of Deceptive Advertising of EasyTone and RunTone Shoes. 2011. <https://www.ftc.gov/news-events/press-releases/2011/09/reebok-pay-25-million-customer-refunds-settle-ftc-charges>
- CNN. Fitbit accuracy questioned in lawsuit. 2016. <http://edition.cnn.com/2016/05/20/health/fitbit-accuracy-questioned/>
- Sackett DL, Rosenberg WM, Gray JA, *et al.* Evidence based medicine: what it is and what it isn't. *BMJ* 1996;312:71–2.