Biometric Devices for the Consumer

Biometric devices have numerous applications across many sectors including the consumer fitness domain. Heart rate variability (HRV) devices such as the ithlete™ show promise, but conclusive studies outlining HRV and its validity and applicability over multi-sport/multi-activities are lacking (Flatt & Esco, 2013; Morales et al., 2014).

Recovery is also an important factor of performance. Sleep is a critical component of recovery. Inadequate sleep impacts memory, cognition, mentation, pain perception, immunity, inflammation, carbohydrate metabolism, endocrine function, protein synthesis, appetite regulating, glucose tolerance, insulin sensitivity, cardiovascular disease, food choices (fatty food preferences and lower fruit/vegetable intake), feeding behavior (higher calories, skipping breakfast, increased snacking), lower physical activity, risk of obesity, and decreased athletic performance (Grandner et al., 2014; Halson, 2008).

My interest in biometric devices is more for monitoring recovery/sleep. In the past, I have used the BodyBugg because several years ago, it was the most advanced device--more than just a 3D accelerometer, measured moisture, temperature. Currently, I use the Basis watch which has been shown to have fairly accurate advanced sleep monitoring functions (Patel, Ahmed, Ruoff, & Unadkat, 2014). Again, Basis was the most advanced unit with multi-metrics. Basis was also much easier to wear--significantly less bulk and skin irritation.

Actigraphy has been very useful in assessing sleep. Actigraphy has been shown to be accurate, valid, and reliable by the American Sleep Disorders Association (Sadeh, 2011). Most actigraphs are small wrist-watch styled devices (or bracelet)--far more convenient and comfortable than electrodes and wires (Sadeh, 2011). For best results, it has been recommended that users consistently wear the device for at least 5 days in order to reduce chances of errors in monitor sleep-wake cycles (Sadeh, 2011). Other limitations include special populations and individuals on certain medications as consumer actigraphy rely on "generalized" algorithms/estimations (Sadeh, 2011).

However, any device is only as good as its software algorithms (designed for the masses). Most consumer devices are just fancy accelerometers which are not worth the time and money--"you pay for what you get" applies. The worst usage is to use a consumer device to "count calories expended" as that is as wildly inaccurate as food nutrition labels' supposed correlation to how food might affect an individual's metabolism (Berardi & Andrews, 2012). In my opinion, the consumer-level biometric devices may be "interesting" to have and may serve as psychological motivation. However, for specific purposes other than recreation, one is likely to require a more professional-grade device which will be much more costly.

Chung 10.14.2015

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