The OmegaWave Sport Technology System

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September 15, 2005

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The OmegaWave Sport Technology System®

Background

Recently, the Evidence-Based Practice Group (EBPG) received a request for product endorsement of the OmegaWave Sport Technology System®, to be used at the Board.

The OmegaWave Sport Technology System claims to evaluate a number of the human body's systems, including the autonomic nervous system, "energy" system, cardiopulmonary system, detoxification system and hormonal system.[1] This ability is performed through the analysis of data collected from heart rate variation and 3 lead ECG and EEG (omega wave detection).[1,2] The producer of the OmegaWave Sport Technology System claims that it is a revolutionary product used to enhance athletic performance and physical fitness quickly, non-stressfully, and non-invasively.[2] In his e-mail to the EBPG,[3] the company representative claims that the ability of the 'Tension Index', a feature available in this system, correlates with progression and regression of disease. The system also provides quantifiable measures of cumulative stress.[3] Further, the system is also marketed as a diagnostic test for stress of various origins and possibly for coronary disease.[4] Hence, the OmegaWave System has been marketed somewhat as a 'diagnostic' tool.

Objectives

The purpose of this review is to investigate the efficacy or effectiveness of the OmegaWave Sport Technology System in assisting diagnosis of various conditions, including stress of various origins, coronary disease, and development of various disease conditions.

Methods

The Evidence-Based Practice Group (EBPG) conducted a systematic review on the OmegaWave system.

Primary literature searches were undertaken on commercial medical literature databases available in the OVID® system. These databases include the Cochrane Database of Systematic Reviews, ACP Journal Club, DARE, Cochrane Clinical Trial Registry, BIOSIS Previews, CINAHL, EMBASE, Ovid MEDLINE® In-Process, Other Non-Indexed Citations and Ovid MEDLINE®. Searches were also conducted on websites of members of the International Network of Agencies for Health Technologies Assessment (including Canada, the US(including the Department of Veterans Affairs and Blue Cross Blue Shields TEC Assessment), Great Britain, New Zealand, Australia, Sweden and Denmark).

The search was done in order to identify any published peer-reviewed research on the OmegaWave system. This search was done by employing the keywords:

omegawave OR omegawave sport technology system OR
omegawave system.

The search was done from the inception of the respective databases up to September 14, 2005. Publications were selected for critical review if they involved human subjects and were published (at least the abstract) in the English language. No other restrictions, including the year of publication, were put in place.

The primary search was able to identify six published articles. However, none of these was related to the OmegaWave Sport Technology System.

A secondary search was undertaken on the web by employing Google search engine. Similar keywords were employed. This search was able to identify three primary research papers published as abstracts only (two as conference proceedings and one as a Masters dissertation abstract). The EBPG cannot identify the peer reviewed full publications of these articles. Thus, these three abstracts are appraised below.

Appendix 1 provides the interpretation of levels of evidence as adopted by the EBPG at WorkSafeBC.

Results

1. Zwolle HJ[1] presented his abstract, 'The Bridge between Science and Athletes', at the May 2003 European Congress of Sports Medicine in Belgium. The author compared the VO_2Max reading of 40 rowers on an ergometer with Oxycon® measurements and the OmegaWave system. The author found a correlation coefficient of 0.76 between Oxycon® and the OmegaWave system. The author mentioned that the OmegaWave system manufacturer claimed to get a higher (0.90) correlation coefficient (instead of 0.76 as the author found). Further, the author claimed that experience with other athletes on different fields including swimming and field hockey showed findings were all positive. *In this abstract, the author did not provide any information on the methodology or data on the outcome of this study, particularly, those among other athletes. Further, this lengthy abstract was written in what appeared to be a promotional manner. Based on our critical appraisal, the EBPG categorized this primary study as low quality level 5 evidence (case series)*.

2. As part of her Masters thesis in Kinesiology, Ramirez R[5] compared the estimated VO_2Max values obtained from the OmegaWave system to those from direct measurement during maximal exercise testing (GXT) in 26 healthy young competitive or recreational athletes. She concluded that the OmegaWave system overestimated VO_2Max in young athletes compared to GXT measurements. Further, the author concluded that the OmegaWave system was a relatively poor predictor of VO_2Max in this study population. *In this short abstract, the author provided a reasonable amount of information in order to assess the quality of her research. Based on our critical appraisal the EBPG categorized this primary study as high quality level 5 evidence (case series).*

3. van de Velde D[6] also presented an abstract at the May 2003 European Congress of Sports Medicine in Belgium, entitled 'Monitoring the cardial function and the athlete's potential with a heart rate variability test'. The author conducted heart rate variability testing by monitoring the heart rate of over 400 athletes at rest and recorded the change of length (in seconds) between each cardiac contraction over a 130 second period. The author claimed that the heart rate variability test gave very accurate and fast information about cardiac function and training capacity of the athlete *(no comparison data were provided to support this claim)*. *Again, in this abstract, the author did not provide any information on the methodology or data on the outcome of this study. This abstract was written more with promotional*

overtones. Based on our critical appraisal, the EBPG categorized this primary study as low quality level 5 evidence (case series).

Conclusions

To date, there is no evidence on the efficacy or effectiveness of the OmegaWave Sport Technology System in assisting with the diagnosis of various conditions, including stress of various origins, coronary disease and development of variously reported disease conditions. No data is available to assess the sensitivity, specificity, false positive, false negative, positive or negative predictive values and the likelihood ratio of a positive or a negative test in order to assess the system's potential role as a diagnostic test.

There is limited evidence that the OmegaWave Sport Technology System does not provide accurate measurement of VO_2Max in young athletes.

References

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3. Kendal Yonemoto (OmegaWave representative). E-mail sent to Dr. Craig Martin on September 13, 2005.

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Appendix 1

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Levels of Evidence (adapted from 1,2,3,4)

1	Evidence from at least 1 properly randomized controlled trial (RCT) or systematic review of RCTs.
2	Evidence from well-designed controlled trials without randomization or systematic reviews of observational studies.
3	Evidence from well-designed cohort or case-control analytic studies, preferably from more than 1 centre or research group.
4	Evidence from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled
5	Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees.

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4. Canadian Task Force on Preventive Health Care. New grades for recommendations from the Canadian Task Force on Preventive Health Care. CMAJ. Aug 5, 2003;169(3):207-208.