Using the Finapres to teach cardiovascular physiology to second year science students

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There are many ways of teaching cardiovascular physiology to university science students, but few of these directly demonstrate or measure cardiac output and total peripheral resistance, concepts which are fundamental to an understanding of cardiovascular physiology. The Physiology Department at Monash University has been trialling the use of a finger pressure cuff, the *Finapres* system, in the cardiovascular practical classes. This abstract reports on the initial findings from a study of 220 second year physiology students undertaking a practical class on exercise and cardiovascular physiology using the *Finapres* system.

During the practical class students worked in groups of 5, with one student performing graded levels of exercise on a cycle ergometer. The exercise workload was increased every 3 minutes by increments of 50 watts, until the subject reached 75% of their maximum HR. The *Finapres* finger cuff, together with *Beatscope* software, were used to continuously measure and record blood pressure (BP). Heart rate (HR) and cardiac output (CO) were triggered from the pulse rate and the pulse waveform, respectively. The students were asked to calculate the stroke volume (SV) and the total peripheral resistance (TPR).

To determine if the *Finapres* practical class had improved student learning and understanding of cardiovascular physiology and exercise, pre- and post-tests were given to the students at the beginning and end of the practical class. The questions tested the students understanding of cardiovascular physiology during rest and exercise. Statistical analysis of student performance for the individual questions indicated that there was a significant improvement for two questions following the practical class. The first question required a calculation of the CO. On the pre-test 75.81% of students answered this correctly. This rose to 84.5% on the post-test. A similar increase (78% to 84%) was seen for a multiple choice question about the sympathetic cardiac response to exercise. However, there was no significant difference in the overall pre- and post-test results, suggesting that the *Finapres* practical had a positive, but narrow, effect on learning.

A questionnaire using a five point Likert scale, similar to that used by Rodrigues-Barbero (2008), was used to evaluate the student experience of the *Finapres* system. The findings showed that students: i) appreciated the immediacy of the recording of cardiovascular responses (4.17 ± 0.85, mean ± SD); ii) felt that they gained a better understanding of how to record physiological data (4.06 ± 0.89); iii) enjoyed the practical class (4.17 ± 0.96); and iv) would recommend the *Finapres* to other students (4.12 ± 0.97). Given this positive student feedback, we have subsequently used the *Finapres* system to teach Physiotherapy and third year Physiology (Science) students about circulatory reflex responses to perturbations in the cardiovascular system. The ability of the *Finapres* system to continuously record and calculate BP, HR, CO, SV, and TPR during the experimental protocols provides students with immediate feedback and, we believe, improves their understanding of cardiovascular physiology.

Rodríguez-Barbero, A. & López-Novoa, J.M. (2008) Teaching integrative physiology using the quantitative circulatory physiology model and case discussion method: evaluation of the learning experience. *Advances in Physiology Education*, **32**: 304-311.