НАУЧНАЯ СЕКЦИЯ «СПОРТИВНАЯ ИНЖЕНЕРИЯ. МЕДИЦИНСКАЯ ТЕХНИКА И ТЕХНОЛОГИИ. ВОССТАНОВЛЕНИЕ И РЕАБИЛИТАЦИЯ»

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UBIQUITOUS ASSESSMENT OF CARDIOVASCULAR STATUS: ESTIMATION OF CENTRAL AORTIC BLOOD PRESSURE AND ARTERIAL STIFFNESS

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Cardiovascular disease (CVD) is the number one causes of death across the world. Hypertension and arterial stiffness are one of the most common cardiovascular diseases. Hypertension represents hemodynamic stress on target organs (e.g. kidney, brain), while arterial stiffness is one of the main causes for hypertension. This abstract briefly reviews the assessment of hypertension and arterial stiffness.

Brachial blood pressure has been used as an indicator for hypertension for a long time. It was commonly suggested that central aortic blood pressure (CAP) may be a potentially more significant indicator for CVDs[1], considering that target organs exposes directly to central aortic blood pressure instead of peripheral (e.g. brachial) blood pressures. Invasive measurement (catheterization) of CAP are considered the 'gold standard'. While catheterization would not be applied until the patient is diagnosed to be with CVD. Thus this technique does not allow for routine screening of large populations. Techniques for noninvasive measurement of CAP has been proposed and embedded in commercial devices (e.g. SphygmoCor SM, AtCor, Australia; HEM-9000AI, Omron, Japan). The proposed methods include: (1) the surrogate of CAP with carotid artery blood pressure [2]; (2) modeling of blood pressures propagating from central to peripheral [3, 4]; (3) prediction of CAP with second diastolic blood pressure of peripheral blood pressure waveforms [5]; (4) applying a moving average filter to peripheral blood pressure waveforms [6]. In general, these techniques do not account for inter-subject or intra-subject variability of cardiovascular status. Adaptive or Individualized methods [7-9] has become the interests of researchers. These methods typically try to (partially) individualize the model of blood pressure propagating from aorta to the periphery. These methods may potentially improve CAP estimation, while there is still a long way to go till applied to clinical practice.

All the above methods are based on the peripheral blood pressure waveforms, which should be calibrated by brachial blood pressure in practice. The calibration error is another main source of error for CAP estimation. None of the above methods do not account for the calibration error. Methods that account for the calibration error are required.

Another limitation for the development of CAP estimation method is the lack of a public dataset. Validation of CAP estimation techniques requires large amount of clinical data. Some of the recently proposed techniques are validated via noninvasive data from human body or invasive data from animals, which largely lowers down the clinical significance of the work. Creating a public dataset should largely help improving the development of this technique.

The 'gold standard' technique for the assessment of arterial stiffness is the measurement of carotid-femoral pulse wave velocity [10]. The simultaneous recording of carotid and femoral pulse waveforms and the measurement of carotid-femoral distance both limit the practical use of this technique. Methods based on the augmentation index of easily-available peripheral (e.g. radial) pulse waveforms were proposed to ease routine screening. While as lack of accuracy [11], this technique only allows for monitoring and detection of sudden changes of cardiovascular status. Techniques with improved accuracy that ease routine screening of arterial stiffness are required.

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УШУ КАК СРЕДСТВО ВОССТАНОВЛЕНИЯ ОРГАНИЗМА

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Abstract. *This article describes the different challenges of modern society, such as the increase in the number of illnesses caused by nervous tension, constant fatigue, etc. there are some recommendations to address those problems and to restore the body through the usage of the traditional approach in wushu.*

Проблема реабилитации или восстановления организма широко распрстранена не только в посттравматической медицине. Проблема восстановления организма широко стоит также и в спортивных дисциплинах, где нагрузки зачастую приводят к травмам, на восстановление которых требуется большое количество времени. Однако данная проблема также является следствием современного образа жизни, связанного с постоянным повышенным эмоциональным фоном, перегрузками нервной системы и, как следствие, нервных срывах.

Это приводит к снижению иммунитета, возможным простудным заболеваниям, различного рода нервным расстройствам. Что, в свою очередь можетнегативно сказаться на различных функциях организма.

На сегодня проблемой также является прогрессирующий рост проблем психологического характера среди молодежи.