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(G*) (POS-37) Influence of Arterial Occlusion at Various Cuff Pressures on Skin Colour Measured by rPPG

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Background: Arterial occlusion is a ubiquitous medical procedure, which is used in many clinical scenarios. However, there is no standard protocol for the selection of the applied pressure. As various pressures may trigger different physiological responses, it is important to understand these peculiarities. Aim: The current work aims to investigate if there is any difference in skin tone with occlusion at various applied pressures and how that potential difference relates to tissue physiology. Materials and Methods: We used remote photoplethysmography to record arterial occlusion events remotely with an iPhone camera. The hands of healthy volunteers (10 volunteers) were occluded at the wrist by inflating the blood cuff to either 150 or 200 mmHg. The experimental setup includes the subject sitting with their hands placed side by side on a raised platform palms facing down with the iPhone positioned directly above. A white circle is also placed in the frame for normalization during processing. In each iteration of data collection, one hand is designated as the experimental hand, occluded throughout the data collection, and the other acts as a control. A 7-minute continuous video was captured, consisting of three segments with different effects applied to the experimental hand: rest, arterial occlusion (150 or 200 mmHg), and pressure release. This process is repeated with the right and left hands acting as the experimental hands (on the left experimental hand 150 mmHg of pressure is applied and on the right 200 mmHg). The recorded video footage is divided into three regions of interest (ROI), one on the experimental hand, one on the control hand and one around the white circle. For each ROI the signal is averaged for each channel (R, G and B) in each frame for each segment creating a time series. Each channel of each ROI for the hands was then normalized using the white circle time series. To generate colour data from the RGB time series, the RGB series is converted to the CIE XYZ colour space and then further normalized to generate chromaticity coordinates across time for each segment for each ROI (control and experimental). Results: The preliminary results provide a good visualization of the colour changes that occur throughout the different levels of arterial occlusion (150 mmHg vs 200 mmHg). Conclusions: These preliminary results could allow for the interpretation of proper arterial occlusion based on remotely recorded and interpreted colour data.

Keyword-1

Photoplethysmography

Keyword-2

Arterial Occlusion

Keyword-3

Microcirculation

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