

## A NOVEL CUFFLESS BLOOD PRESSURE MEASUREMENT TECHNOLOGY: CONCEPT AND FEASIBILITY

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**Objective:** A pocket-size cuffless device for self-measurement of blood pressure (BP) has been developed (Freescan, Maisense). The principle of this technology is presented. The feasibility in providing valid self-BP measurement in adults was evaluated.

**Method:** This novel technology is based on its capability to read BP directly from the radial pulse using three electrodes and one force-sensor. The user has to apply the force sensor of the device on the radial artery. The pulse wave is combined with single-lead electrocardiography, providing the device with parameters used for calculating BP (systolic and diastolic) and pulse rate in a few seconds. Anthropometric characteristics (age, gender, height, weight) are recorded on the device, which requires individualized initial calibration based on a reference arm BP measurement performed by using a validated BP monitor, before proceeding to self-measurement. Untreated or treated normotensive and hypertensive adults were included. A demonstration was made to each participant lasting about 5 min aiming to familiarize with the device. The user was then allowed to make up to 5 attempts to self-measure BP, with at least 3 successful attempts considered as "pass".

**Results:** A total of 108 adults were included (57% men, 54% hypertensives, mean age 48.2±11.6 [SD], BMI 28.5±4.9 kg/m<sup>2</sup>, wrist circumference 17.8±1.8 cm). In an initial subgroup of 73 subjects the overall "pass" feasibility rate was 55% (40 subjects). After upgrading the firmware for the pulse detection, 35 additional individuals were recruited, of whom 28 (80%) passed the feasibility. Among the latter 28 subjects, 50% made 3 attempts, 32% made 4 attempts and 18% made 5 attempts to have 3 successful measurements.

**Conclusions:** A novel pocket-size cuffless BP monitor with promising potential for portable self-monitoring of BP by patients with hypertension has been developed. The device requires individualized initial calibration based on a standard arm BP measurement. Self-measurement of BP using this device appears to be feasible in the vast majority of adults. Evaluation of the accuracy of this new technology using an established validation protocol is required.