

## The Impact of Direct and Indirect Pressure Measuring Systems on the Pressure Mapping for the Medical Compression Garments

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**Abstract :** While graduated compression is the foundation of treatment and management of many medical complications such as leg ulcer, varicose veins, and lymphedema, monitoring the interface pressure has been conducted using different sensors that operate based on diverse approaches. The variations existed from the pressure readings collected using different interface pressure measurement systems would cause difficulties in taking a decision regarding the compression therapy. It is crucial to acknowledge the differences existing between direct and indirect pressure measurement systems while considering the commercially available systems such as AMI, Picopress and OPM which are under direct measurements systems, and HATRA (BSI), HOSY (RAL-GZ) and FlexiForce which comes under the indirect measurement system. Furthermore, Piezo-resistive sensors (Flexiforce) can measure the changes in resistance corresponding to the applied force on the sensing area. Direct pressure measuring systems are capable of measuring interface pressure on the three-dimensional states, while the indirect pressure measuring systems stretch the fabric in the two-dimensional direction and extrapolate pressure from surface tension measured on the device and neglect the vital factor which is the radius of curvature. In this study, a leg mannequin of known dimensions is selected with a knitted class 3 compression stocking. It has been decided to evaluate the data collected from different available systems (AMI, PicoPress, FlexiForce, and HATRA) and compare the results. The results showed a discrepancy between Hatra, AMI, Picopress, and Flexiforce against the pressure standard used to generate class 3 compression stocking. As predicted a higher pressure value with direct interface measuring systems were monitored against HATRA due to the effect of the radius of curvature.

**Keywords :** AMI, FlexiForce, graduated compression, HATRA, interface pressure, PicoPress

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