A NOVEL THERMOCHROMIC LIQUID CRYSTAL FABRIC DESIGN FOR THE EARLY DETECTION OF HIGH-RISK FOOT COMPLICATIONS: A PROOF-OF-CONCEPT STUDY (83 pp.)

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INTRODUCTION: The researcher developed a prototype of a novel thermochromic liquid crystal (TLC)-coated fabric with an extended temperature range and enhanced sensitivity. Employing both color and pattern recognition into the fabric, rapid determination of the underlying pedal temperature is facilitated. PURPOSE: The purpose of this study was to evaluate the accuracy of the fabric as a potential diagnostic aid for identifying complications in the high-risk foot. METHODS: The hands of one hundred subjects were used to compare the average maximum temperatures indicated by the fabric versus standard thermal camera images. Findings were statistically analyzed using a paired t-test with significance defined as \( p < 0.05 \). RESULTS: With the exception of the tip of the thumb and regions in the palm, there were no significant differences between average maximum temperatures measured with the thermal camera and those detected with the TLC fabric. CONCLUSION: Using direct visual analysis, the researcher demonstrated that a novel TLC fabric was able to accurately map temperatures in the palmar surface of the hand. The findings support the continued development of a temperature-sensitive sock that can be used in home to monitor for temperature changes that may indicate the onset of high-risk foot complications.