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## The effect of pressure on DNA deposition by touch

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### Abstract

Casework exhibits are routinely examined for DNA that might have been deposited by touch, although the success of downstream profiling can vary. Many variables affect DNA deposition by touch, such as 'shedder status', surface type, and nature of contact. This may include pressure, which has been shown to increase the transfer of DNA between two surfaces, although whether pressure can impact DNA deposition directly from skin has yet to be examined. Therefore, this study uses a novel method to investigate whether pressure can affect the amount and quality of DNA directly deposited by touch. With the fingertips of one hand, volunteers exerted pressure for one minute onto a DNA-free polycarbonate board placed on top of a balance; all five fingermarks were then swabbed and combined as one sample for DNA extraction, quantification and profiling. For each hand, the area of the combined fingertips was used to determine the weight value to which to push the balance to give pressures of 4, 21 or 37 kPa. Volunteers used both their right and left hands at each pressure in a randomised order on each day of three non-consecutive days. Increasing the pressure between skin and surface significantly increased the amount of DNA deposited, which resulted in the detection of more alleles, from both the donor and unknown sources. No significant differences were observed in the amounts of DNA deposited between hands and among different days for each volunteer. DNA amounts significantly varied between individuals at 21 and 37 kPa, but not at 4 kPa. These findings provide insights into the impact of pressure on touch DNA deposition, and suggest that pressure is a key variable for crime scene investigators and forensic examiners to consider when prioritising items/surfaces that are likely to produce successful touch DNA results during a criminal investigation.

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