

B53 The Influence of Ceramic Tiles' Surface Characteristics on the Analysis of Bloodstain Patterns

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After attending this presentation, attendees will be more aware of the many differences existing in the surface characteristics of traditional as well as modern ceramic tiles, currently employed worldwide both for floor and wall covering applications, and the consequent implications on the analysis of bloodstain pattern characteristics associated with a bloody criminal event. Although recent research on Bloodstain Pattern Analysis (BPA) was also necessarily directed toward the study of the effect of surface characteristics of different types of substrates, similar studies on ceramic tiles are completely missing in the scientific literature.¹⁻³ Indeed, a wide range of ceramic tiles is available on the market with different technical characteristics, such as porosity and surface roughness, which will inevitably affect the morphology of the patterns arising from blood impact on that specific tile. Moreover, in the last decade, digital decoration of ceramic tiles by inkjet printing technologies began replacing conventional decoration techniques, smoothing the way toward many new possibilities, including the decoration of structured surfaces with ever-more-complex textural characteristics, for example, those reproducing natural wood and stone.^{4,5}

This presentation will impact the forensic science community by, for the first time, presenting and discussing results of BPA experiments performed on traditional as well as innovative and digitally decorated ceramic tiles. The importance of this study also relies on its global character, as Italy and particularly the ceramic district of Sassuolo (Province of Modena, Emilia Romagna region) covers approximately 38% of the international trade of ceramic tiles.⁶

Therefore, in this study, ceramic tiles with different surface finishing and textures (from the ceramic district of Sassuolo) were considered as the substrates for simple BPA experiments; for example, drop patterns reproduction. In particular, ceramic tiles with structured, smooth, matte, and glossy surfaces were selected and accurately characterized in terms of surface roughness, mineralogical (X-ray diffraction), and microstructural analysis (Scanning Electron Microscopy (SEM)) in order to correlate the surface properties with the morphological characteristics of the obtained bloodstains.

Blood from healthy swine was utilized according to the studies by Christman, and the experiments were performed according to Laber and Epstein.^{7,8} The resulting bloodstain patterns were recorded by means of a Nikon® D5100 reflex digital camera.

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BPA, Ceramic Tiles, Digital Decoration