Perseveration of Tool Marks on Bone Using Antimicrobial Solutions [1]

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The purpose of this study is to identify an effective antimicrobial solution for the storage of bone sections with tool marks because saws and edged weapons can leave marks on bone in some dismemberment cases. Samples collected at autopsy are typically fixed and preserved in a 10% buffered formalin solution to fix and preserve proteins; however, this is not necessary for the preservation of tool marks on bone. Dry storage of bone causes shrinkage that may distort tool mark striations; therefore, a less hazardous chemical than formalin would be preferable for the storage of bone samples. In this study, tool marks on bone were produced with a hack saw and photographed before storing in antimicrobial solutions. The antimicrobial solutions tested included: a buffered 10% formalin solution; a 10% buffered formalin solution for 12 days which was then transferred to ethyl alcohol; 6% sodium hypochlorite; 5% acetic acid; 70% isopropyl alcohol; 93% ethyl alcohol; 10 % sodium chloride solution; and 20% sodium chloride solution.

After a storage period of 6 months in the antimicrobial solutions, the tool marks on bone were photographed for comparison purposes. In conclusion, tool marks on bone were preserved in all solutions; however, there was microbial growth in the two saline solutions and crystalline growth on the bone sample in the acidic acid solution. Filamentous fungi and bacteria were present after 3 months in the 10% and 20% sodium chloride solution.

The identity of these contaminants was explored using light microscopic, and DNA cloning and DNA sequencing methods under the supposition that the addition of antifungals and antimicrobials may be effective remedies for preserving bone in non-formalin-containing solutions.

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