Replicating Cranial Trauma Analysis: Correlating Soweto Assault Weapon Morphology with Blunt Force Injury Patterns in a Cape Verdean Context

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Abstract

Blunt force cranial trauma is a frequent concern in forensic medicine, with injury patterns influenced by weapon characteristics. Foundational research from Soweto, South Africa, established links between specific cranial fractures and traditional weapons such as the knobkerrie and sjambok. Whether these correlations hold in other populations using analogous weapons, like in Cape Verde, is unknown. This replication study aimed to apply the Soweto methodology to a Cape Verdean context. Its objective was to determine if the correlations between weapon morphology (shape, composition) and cranial injury patterns remain consistent where similar traditional weapons are used in assaults. A retrospective, observational study was performed using post-mortem computed tomography (PMCT) scans and forensic pathology reports from documented assault cases. Cranial trauma patterns were analysed and categorised. These patterns were then compared against weapon descriptions from police case reports to assess for correlations identified in the original study. The analysis broadly supported the original correlations. Linear fractures were predominantly linked to elongated weapons like the sjambok, while depressed and comminuted fractures were strongly associated with club-like weapons such as the knobkerrie. A key divergence was noted: the incidence of combined fracture patterns (e.g., linear fractures radiating from a depressed focus) was approximately 15%

higher in the Cape Verdean cohort. The core findings of the original study were largely corroborated, confirming the significant influence of weapon morphology on cranial trauma patterns. The increased prevalence of complex fractures, however, suggests potential contextual differences in assault dynamics or weapon construction. Forensic practitioners in regions with similar traditional weapons should consider these morphological correlations during trauma analysis. Future research should prospectively record detailed weapon specifications and assault mechanics to clarify the causes of variation in complex injury patterns. forensic pathology, blunt force trauma, cranial fractures, weapon morphology, replication study, Cape Verde This study provides a direct replication of a key forensic methodology in a new geographical context, testing the generalisability of established trauma pattern correlations and identifying an area of variation for further investigation.