

A25 The McKern-Stewart Method as a Technique for Analyzing Age-Related Pubic Symphyseal Changes: A Systematic Review and Meta-Analysis

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Learning Overview: The goal of this presentation is to establish the applicability of the McKern-Stewart method for age estimation by analyzing findings corresponding to mean age for the onset and progression of age-related morphological changes obtained across various studies and, also against the original findings of McKern and Stewart.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by establishing the applicability of the aforementioned method for the purpose of age estimation. In the current scenario where a multitude of age estimation methods are explored, it becomes imperative to ascertain the accuracy and relevancy of these different research methods. The findings of component- and scoring-based analysis, in consortium with the observed uniformity in the distribution of mean ages for each score and each component across populations, points toward the reliability of this method in investigations, inclusive of and not limited to cases of forensic significance.

The McKern-Stewart method, devised in 1957, has over the years gradually evolved into one of the prominently used methods for aging skeletal remains. With age estimation studies employing the os pubis constituting a fair share of contemporary research, the McKern-Stewart method continues to be explored for analyzing age-related morphological changes incurred by the pubic symphysis. The method entails breaking down the observed changes into three distinct components, followed by assigning a specific score to the remains based on the observed morphological changes within each component. Subsequently, an age range based on the cumulative score obtained is established. The present systematic review was piloted with the aim of establishing the applicability of the McKern-Stewart method for age estimation by comparing the results obtained across various studies and also against the original findings of McKern and Stewart. The review was targeted toward isolating original research focusing on the use of the McKern-Stewart method for aging skeletal remains via systematic and standardized procedures. Studies pertaining to the use of the aforementioned method for skeletal age estimation were retrieved by appropriately keying in a combination of Medical Subject Headings (MeSH) terms, free terms, and relevant Boolean operators from four different databases—PubMed®, Cochrane Central Register of Controlled Trials (CENTRAL), Google® Scholar, and ScienceDirect®. The articles retrieved were subjected to a preliminary elimination based on the inclusion and exclusion criteria laid down, following which the risk of bias was assessed and quality of evidence was established. Once the final tally of relevant articles was obtained, data specific to mean age pertaining to individualistic and cumulative scores were extracted and subjected to meta-analysis. The Kruskal-Wallis test, along with corresponding boxplots, were used to compare findings indicative of age of the remains. Mean ages across these studies, including the data obtained from McKern-Stewart's original work, yielded a non-significant difference for each of the cumulative scores from 0–15, suggesting that there is a certain uniformity in the occurrence and prevalence of age-related pubic symphyseal changes. Furthermore, component-wise analysis also points toward a certain concordance in the distribution of mean ages corresponding to scores 0–5 individually, for each component, across different populations.

Based on the results of meta-analysis, it can be concluded that the McKern-Stewart method exhibits evidence in favor of its applicability for the purpose of age estimation. The component- and scoring-based analysis, in consortium with the observed uniformity in the distribution of mean ages for each score and each component, across populations, points toward the reliability of the method in investigations inclusive of and not limited to cases of forensic significance.

Age Estimation, Applicability, McKern-Stewart Method