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1045 – Artificial intelligence for mammographic positioning – impact on diagnostic accuracy and clinical applicability: a prisma-based systematic review (2021–2026)

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Introduction: Mammography is the primary method for breast cancer screening and early diagnosis, contributing to reduced mortality. However, the quality of the examination depends on mammographic positioning, which can lead to diagnostic failure. The omission of breast tissue, especially in the posterior and axillary regions, compromises lesion detection. Variability among professionals and the lack of standardization pose significant challenges. In this context, artificial intelligence (AI) emerges as a promising tool for objective evaluation, reducing variability, and improving diagnostic accuracy.

Methods: The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed, and a meta-analysis was performed. The databases searched included IEEE Xplore, PubMed, and ScienceDirect, with searches conducted between January and March 2026, covering studies from 2021 to 2026. Search terms related to mammographic positioning and AI were used. A total of 1,122 studies were identified, of which 74 were selected after screening based on inclusion criteria (women aged ≥ 40 years and open-access peer-reviewed articles) and exclusion criteria (studies that did not address mammographic positioning or were published in language other than English). Data were extracted on AI methods, datasets, performance metrics, and clinical implications. A large language model was applied for data extraction from the studies.

Results: AI models demonstrated high performance in evaluating positioning. Convolutional neural networks achieved accuracies of 96.5% in craniocaudal views and 93.3% in mediolateral oblique views. Automated systems showed higher reproducibility than human evaluation in criteria such as pectoral muscle visualization and tissue coverage, while humans were superior in detecting subtle artifacts. Positioning was the primary cause of errors in 78.4% of cases. Variations affected lesion detectability and the need for additional views.

Conclusion: Mammographic positioning contributes to diagnostic accuracy, and AI supports standardization and objective evaluation; however, the clinical applicability of AI is limited by methodological heterogeneity. Moreover, AI has made significant advances in the past two years, highlighting the need for new research using more recent techniques.

Ethics: Public data – Literature review.

Keywords: mammography; artificial intelligence; diagnosis; breast neoplasms.