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1102 – Innovations in oncoplastic surgery and breast reconstruction in breast cancer: a systematic review

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Introduction: Oncoplastic breast surgery has progressed with minimally invasive technologies, especially robotic and microsurgical techniques. These innovations aim to improve precision, preserve anatomy, and enhance aesthetic outcomes without compromising oncologic safety. This review summarizes current evidence on the aesthetic, functional, and oncologic results of these advances in breast cancer surgery.

Objective: To systematically assess aesthetic, functional, and oncologic outcomes of technological innovations in oncoplastic surgery and breast reconstruction, with emphasis on robotic techniques, microsurgery, and immediate reconstruction.

Methodology: A systematic PubMed review was performed using MeSH terms related to breast neoplasms, surgery, oncoplastic procedures, reconstruction, robotics, 3D printing, computer-assisted surgery, recurrence, quality of life, satisfaction, and functional recovery. Studies from the last 10 years were screened without language restriction. Of the 31 studies identified, 5 were excluded for low methodological quality. Only clinical studies with adequate samples and standardized outcomes were included.

Results: Major complication rates were generally comparable between robotic and conventional techniques. However, several studies reported lower nipple-areolar complex and skin necrosis, with lower blood loss, and reduced donor-site morbidity with robotic autologous reconstruction. Seroma, infection, and reintervention also tended to be lower. Operative time was consistently longer, especially during the learning curve, but decreased with growing experience. Short and mid-term oncologic outcomes, including surgical margins, locoregional recurrence, and overall survival, were similar to conventional approaches. Functional and aesthetic outcomes favored robotic surgery, with greater satisfaction, superior body image satisfaction, improved psychosocial well-being, and higher quality of life. Immediate reconstruction through remote incisions with implants or autologous flaps was feasible and reproducible.

Conclusion: Robotic and microsurgical innovations appear promising for minimally invasive breast reconstruction, with lower morbidity, improved aesthetics, and acceptable oncologic safety. Still, longer operative time, high costs, technical heterogeneity, and the scarcity of large-scale studies remain important barriers.

Ethics: Public data – Literature review.

Keywords: breast neoplasms; mammoplasty; robotic surgical procedures; inventions.