JPRAS Open 43 (2025) 506–509

Contents lists available at ScienceDirect

JPRAS Open

journal homepage: www.elsevier.com/locate/jpra

Short Communication

Orthoplastic surgery research: Three decades of growth and future directions

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ARTICLE INFO

Article history:
Received 23 August 2024
Accepted 25 January 2025
Available online 31 January 2025

Keywords:
Lower extremity trauma
Orthoplastic surgery
BOAST
Oncologic reconstruction

ABSTRACT

Six clinical databases were analysed from inception through 2023 to assess the trajectory of orthoplastic surgery research and provide a scoping review of concentrations and gaps in the literature. The literature grew exponentially since 2010, with 66 % of identified studies published between 2020 and 2024. The United Kingdom emerged as the primary contributor, accounting for 47 % of publications following national guideline implementation that demonstrated improved patient outcomes. While meta-analyses support the clinical benefits of orthoplastic management for complex fractures, showing reduced surgical interventions and infection rates, the evidence base relies predominantly on retrospective studies, with no randomized controlled trials identified. Key opportunities to strengthen the field include conducting prospective studies, expanding research beyond lower extremity trauma to areas such as upper extremity reconstruction, oncologic applications, and paediatric care, addressing healthcare access disparities, evaluating cost-effectiveness across different healthcare systems, and developing standardized guidelines beyond the UK.

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https://doi.org/10.1016/j.jpra.2025.01.021

Orthoplastic surgery represents a specialized partnership between plastic and orthopaedic surgeons focused on optimizing limb reconstruction outcomes. Originally developed for trauma cases using microsurgical techniques,[1] the field now encompasses oncologic, congenital, and humanitarian work. We were interested to benchmark the state of orthoplastic surgery research and identify foci and gaps in the literature. We conducted a scoping review of six clinical databases through 2023. The review examined studies with explicit plastic-orthopaedic surgical collaboration and related non-surgical care.

The orthoplastics literature grew exponentially over the past 3 decades, with a notable surge in publications after 2010 (Figure 1). Of the 172 studies meeting inclusion criteria, 114 (66 %) were published between 2020 and 2024, compared to just six before 2010. The United Kingdom contributed 47 % of publications, followed by the United States (25 %), Switzerland (6 %), and Italy (5 %). Retrospective cohort studies predominated (36 %), while review articles (12 %) and case reports (12 %) were common. Three systematic reviews and no randomized controlled trials were identified.

Lower extremity injuries were examined in 83 % of studies. Tibial fractures (28 %) and general lower limb trauma (34 %) were the focus in most of these studies, and traumatic injuries overall accounted for 63 % of publications. Mixed aetiologies (14 %) and tumour resections (2.9 %) were less frequently studied. Upper extremity reconstruction appeared in only several case series or reports, and paediatric outcomes were addressed in just nine articles (5 %).

There were 34 articles describing national guidelines for orthoplastic trauma, of which 31 originated in the United Kingdom. This national distribution correlates with the adoption in 2009 of the British Orthopaedic Association Standards for Trauma (BOAST) guidelines for open fractures. Meta-analyses from the UK demonstrated that direct admission to orthoplastic units reduced the number of required surgeries and improved long-term functionality compared to delayed transfers.[2] Pooled analysis of 1663 orthoplastic-managed and 692 non-orthoplastic-managed patients revealed that orthoplastic management yielded shorter times to bone fixation (standard mean difference: −0.35, 95 % CI: −0.46 to −0.25, $P < 0.0001$) and a lower risk of wound infections and osteomyelitis (relative risk: 0.37, 95 % CI: 0.23 to 0.61, $P < 0.0001$).[3]

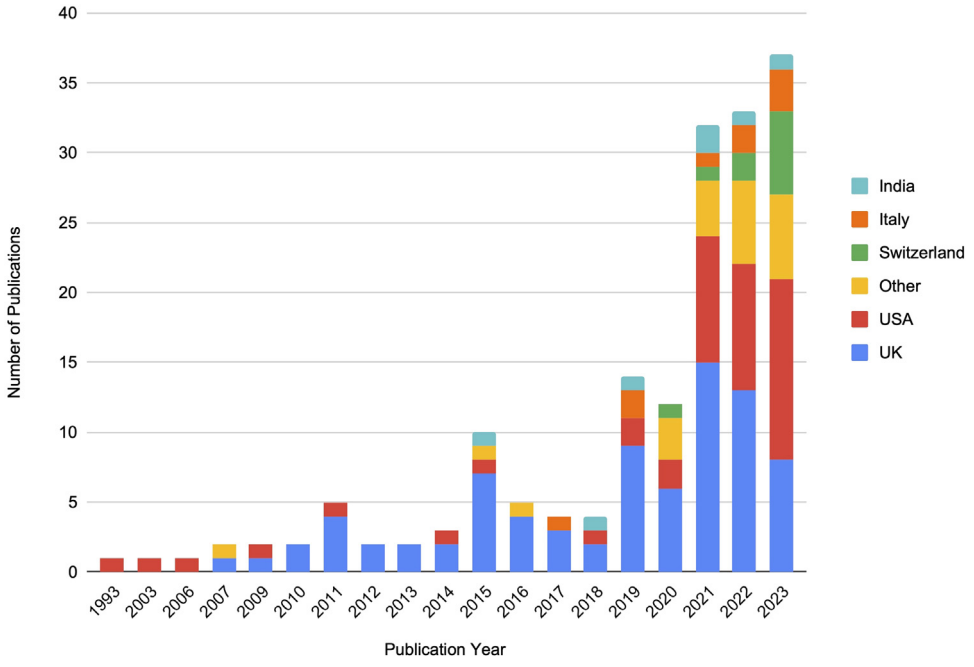

Figure 1. Publications in the orthoplastic surgery literature by country of origin and year.

Findings from our scoping review demonstrate substantial growth in orthoplastic surgery research, with notable concentration in the United Kingdom following the implementation of BOAST guidelines in 2009. Meta-analyses confirmed the clinical benefits of orthoplastic management, showing reduced surgical interventions, faster bone fixation, and lower infection rates compared to traditional approaches, particularly for lower extremity trauma. However, the evidence base remains predominantly retrospective, with no randomized controlled trials identified. The urgent nature of trauma cases, combined with heterogeneous injury patterns and reconstruction methods, creates substantial barriers to conducting randomized controlled trials. Given this challenge, healthcare systems should capitalize on pragmatic studies, national registries, and observational data from orthoplatic units to refine protocols and expand adoption.

The United Kingdom's experience demonstrates the transformative potential of standardized orthoplastic protocols. The limited adoption of similar guidelines internationally, including in the United States,[4] represents a critical opportunity for advancing care delivery standards.

Several topical gaps in the literature require attention. Lower extremity trauma predominates, while upper extremity reconstruction, oncologic applications, and paediatric care remain understudied. The disparity is likely attributable to relative frequencies and complexities. Longitudinal studies evaluating functional outcomes of upper limb reconstructions, investigations into the role of orthoplastic interventions for oncologic defects, and age-specific analyses for paediatric patients are needed. Apart from clinical topics, only one study identified barriers to orthoplastic care in underserved communities in the United Kingdom;[5]the field would benefit from broader investigation into access disparities and quality and cost-effectiveness analyses.

Looking forward, we suggest a proactive implementation strategy to prioritize the translation of evidence-based orthoplastic principles into practice. This step includes establishing and recognizing regional orthoplastic units with protocol adoption based on UK experiences; further assessment and refinement of best practices according to local contexts; and prospective studies to further determine comparative outcomes, needs and opportunities. The remarkable growth in orthoplastic surgery research over the past decade provides a strong foundation for improving patient care and expanding collaboration between plastic and orthopaedic surgeons. We conclude from our scoping review that it is important now to widen the evidentiary base across clinical scopes and settings and expand protocol implementation where appropriate.

Conflict of interest

None.

Funding

None.

Ethical approval

Not required.

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