

Intramedullary nailing of tibial shaft fractures: a scoping review

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Introduction

Intramedullary (IM) nailing is the typical fixation method for adult tibial shaft fractures, the most common long bone fracture [1]. Studies seeking the optimal IM nailing techniques show conflicting results. The absence of a validated, cohort-specific outcome measure has led to a wide range of outcome measures reported, making comparisons difficult. The true extent and prevalence of outcome measures in use is currently not known.

Aims

- Summarise the outcome tools reported in the assessment of tibial shaft fractures treated with IM nailing.
- Provide insight into the extent, range, and nature of the publications.

Methods

PubMed and Embase databases were searched in November 2021. Covidence™ was used for article screening and data extraction. All study designs and populations were included. Studies reporting on open or intra-articular fractures only, or other fracture fixation were excluded. The methodology followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) extension for scoping reviews [2] and Arksey & O'Malley frameworks [3].

Results

- 433 articles were identified yielding 165 papers for data extraction.
- 137 *in vivo* studies, 26 cadaveric studies, two studies included both study types.

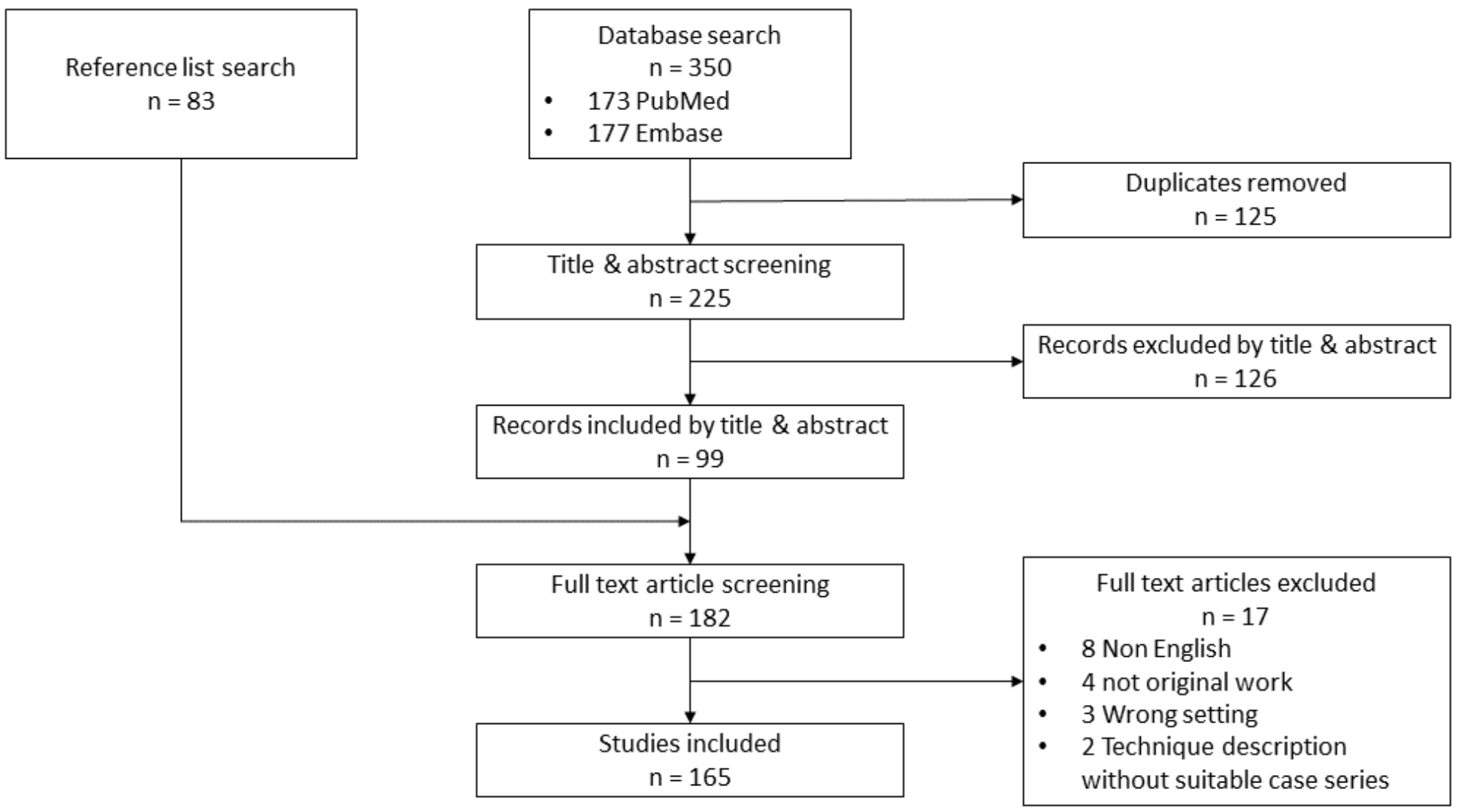


Figure 1: PRISMA flowchart.

In vivo studies

- 12,589 fractures reported,
- 33% of fractures did not describe the nailing approach,
- 126 unique patient outcomes,
 - A binary (yes/no) assessment of knee pain was most common (29%).
- 69 unique clinical outcomes.
 - fracture union was most common (51%).

Table 1: Nailing approach counts

generalApproach	n_in.vivo	per_in.vivo	n_cadaveric	per_cad	totals	per_tot
IPN	6147	48.8	199	54.5	6346	49.0
Semi-extended	432	3.4	•	0	432	3.3
SPN	1869	14.8	110	30.1	1979	15.3
ND	4141	32.9	56	15.3	4197	32.4
Totals	12589	100.0	365	100	12954	100.0

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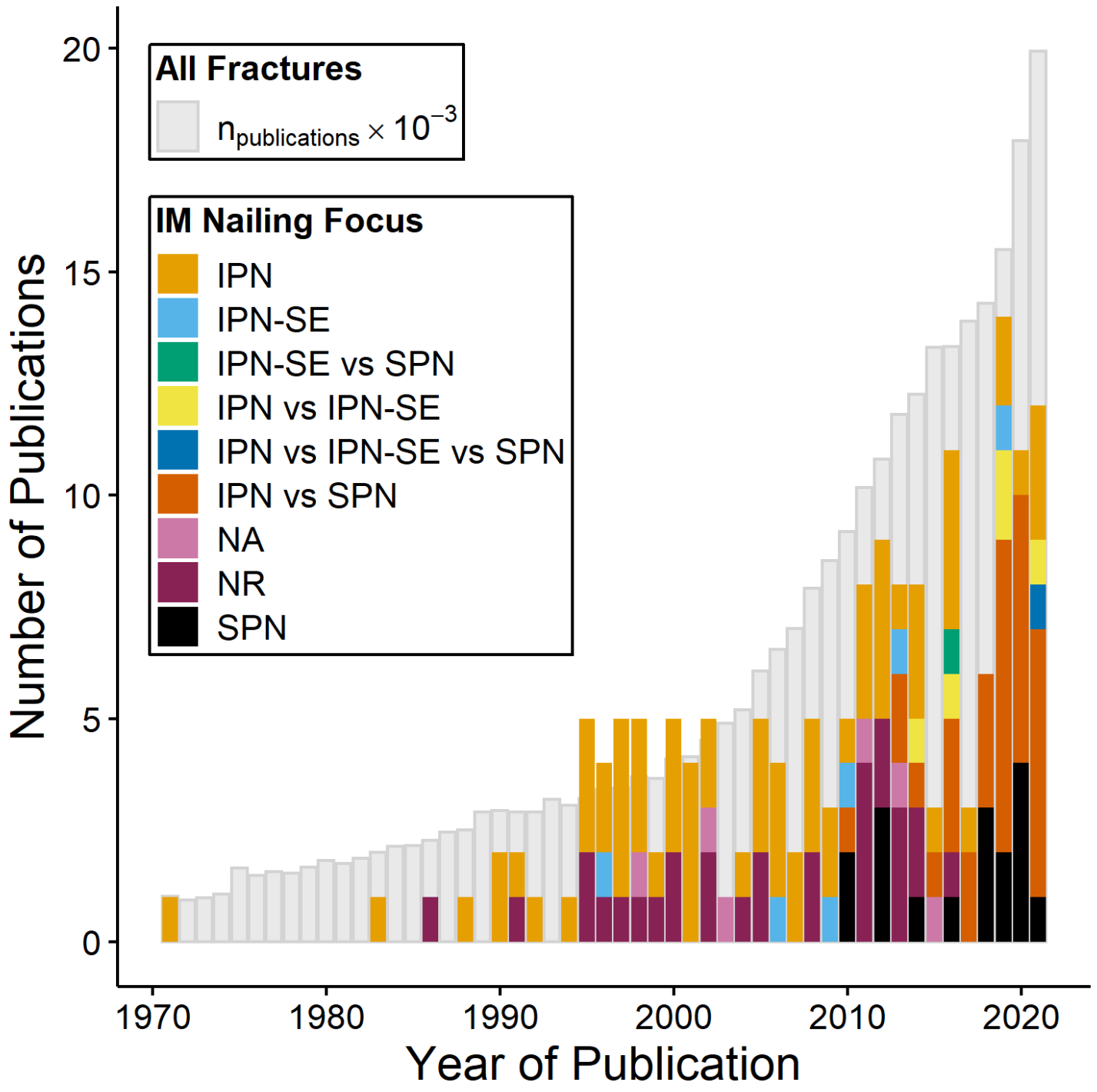


Figure 2: Number of publications per year grouped by IM nailing focus.

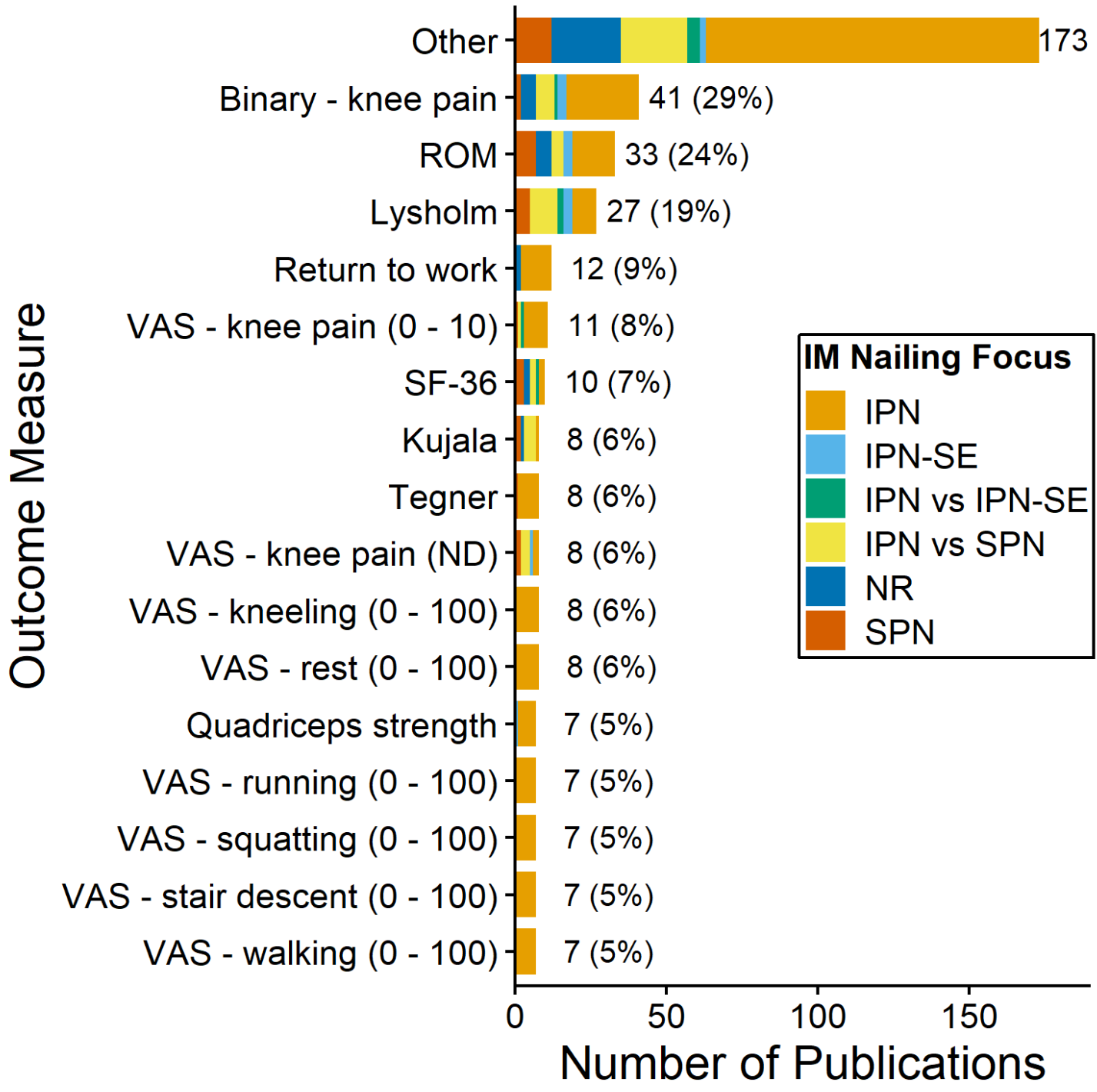


Figure 3: Patient outcomes for in vivo studies.

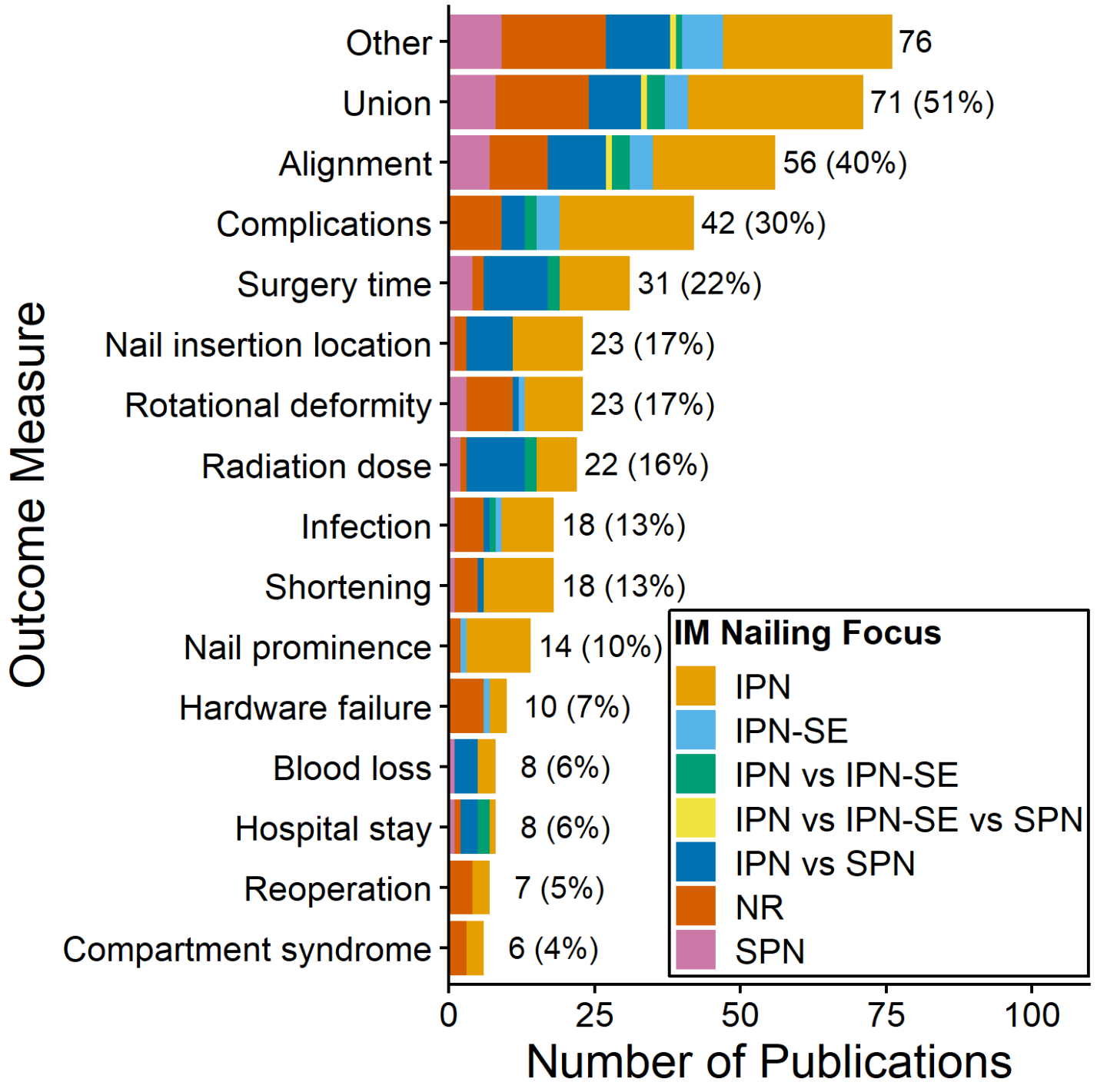


Figure 4: Here is a caption for the figure.

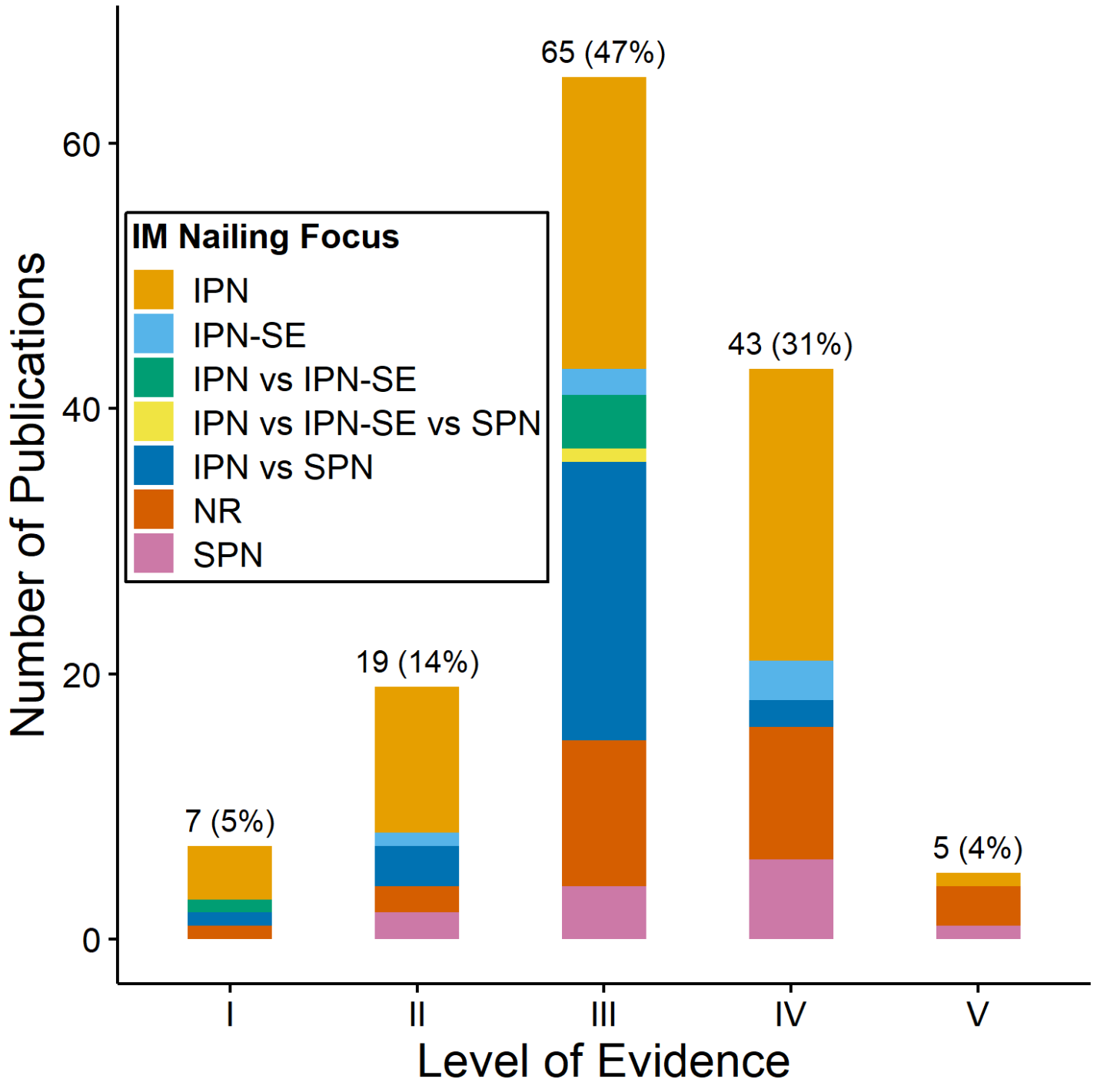


Figure 5: Here is a caption for the figure.

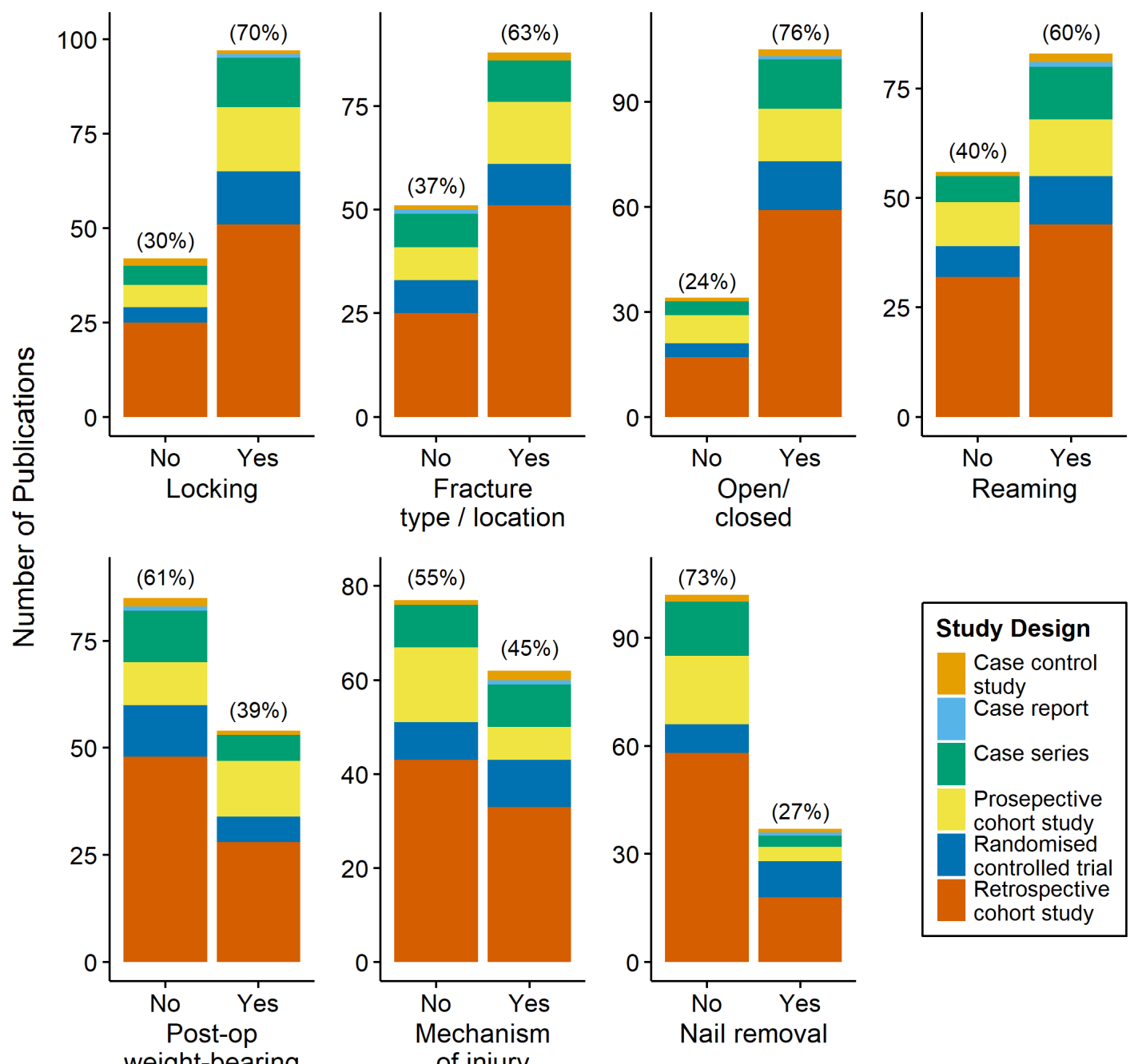


Figure 6: Here is a caption for the figure.

Discussion & Conclusion

To our knowledge, this is the first study to review and chart the clinical and patient outcomes used in the assessment of tibial shaft fractures treated with IM nailing. Notably, a number of the scores routinely used are designed for other pathologies and do not contain a kneeling component, shown to cause the most severe pain within this cohort [4], and the most frequent modality is simply asking whether any knee pain exists. Currently, no conclusive evidence exists to inform surgical decision making on whether an optimal IM nailing technique exists. This work highlights the need for a validated outcome measure designed specifically for this cohort.

References

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