

Infected peri-prosthetic fractures: a scoping review on the current diagnostic principles, treatment and outcome

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Background:

Infected periprosthetic fractures (iPPFs) are among the most complex challenges in orthopaedic infection surgery.

Management must reconcile two conflicting priorities:

- eradication of infection - often requiring implant removal
- restoration of mechanical stability for fracture healing

Standard diagnostic tests are unreliable and hampered by trauma-induced inflammation

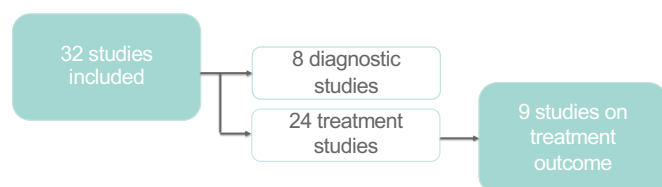
Evidence-based guidelines remain lacking despite clinical burden

Aim:

Mapping the current evidence on diagnostic strategies, treatment approaches, and outcomes in iPPFs.

Methods:

- scoping review conducted according to PRISMA-ScR guidelines
- 8713 records identified through 5 major databases (PubMed, Embase, Web of Science, Scopus, CENTRAL)
- 4299 records screened, 41 assessed for eligibility
- Eligibility: Studies on diagnostic and/or treatment strategies for hip and knee iPPFs
- Data extracted: study design, diagnostic work-up, surgical management, infection outcomes, and fracture healing



Results: Diagnostics

- Serum inflammatory markers demonstrated limited diagnostic reliability.
- Synovial fluid analysis emerged as the most informative modality, although optimal thresholds remain unclear.

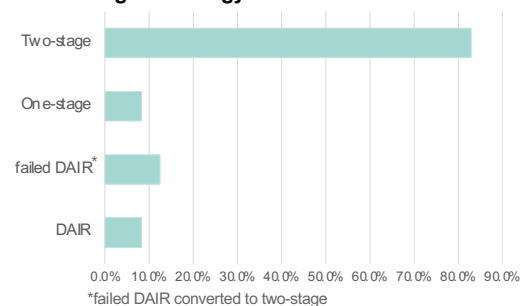
Infection scenarios:

- **F-I:** PPF treated with fracture fixation or revision arthroplasty, followed by an infection.
- **I-F:** PPF in the setting of an already infected prosthesis, including: fractures as a result of implant loosening in iPPF revision surgery (**scenario I-F-A**) or fractures during PJI treatment (during explantation, re-implantation, exchange or between stages)(**scenario I-F-B**).

Results: Treatment overall (24 studies)

- 58.3% reported on additional unplanned surgical procedures needed to cure infection (14/24)
- Infection scenarios: 50% F-I (12/24), 41.7% I-F (10/24), 4.1% not clear (1/24) and 4.1% mixed (1/24)
- Localizations: 54.2% hip (13/24), 20.8% knee (5/24), and 25% hip and knee (6/24)

Fig. 1: Main surgical strategy



Results: Treatment outcome (9 studies)

- Infection eradication ranged from 58.3% to 91.7%, with recurrence rates up to 29.2%.
- Inconsistent reporting of fracture healing ranging from 62.5% to 100% (4 out of 9 studies with 53/58 fractures, mean 91.4%)

Conclusion: IPPFs represent a hybrid pathology with substantial morbidity appearing to yield inferior infection outcomes compared to isolated prosthetic joint or fracture-related infections. Current evidence is sparse and heterogeneous, highlighting an urgent need for standardized diagnostic criteria and prospective multicentre studies. Future strategies must better balance infection control with mechanical stability to improve patient outcomes.