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Risk of Periprosthetic Joint Infection after IA Injection

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Introduction

- Intra-articular injections are widely used for osteoarthritis (OA) and chronic joint pain.
- Growing numbers of patients with prosthetic joints received IA treatments.
- Clinical question: Do intra-articular injections increase the risk of PJI?





Periprosthetic Joint Infection (PJI)

The colonization of the implant or surrounding tissues by microorganisms, leading to inflammation, pain, and implant failure.

- 1-2 % after Primary Arthroplasty
- 4 % after revision procedures

Devastating impact

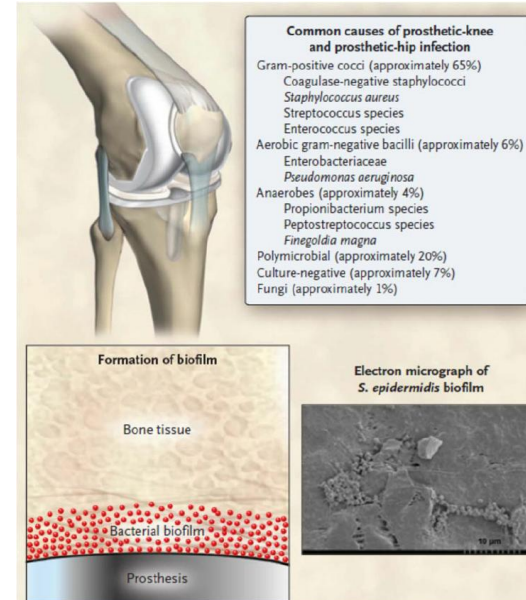
Revisions, AB treatments, hospitalization, functional decline, costs





Pathogenesis and the Role of Biofilm

- **Direct inoculation:** bacteria introduced during injection.
- **Hematogenous spread**
- **Local immunosuppression**
- **Patient factors:** diabetes, obesity, immunosuppressive therapy



Evidence Overview

> [Front Surg.](#) 2021 Sep 7;8:737529. doi: 10.3389/fsurg.2021.737529. eCollection 2021.

Impact of Prior Intra-articular Injections on the Risk of Prosthetic Joint Infection Following Total Joint Arthroplasty: A Systematic Review and Meta-Analysis

Fei Nie ¹,
Affiliations
PMID: 345

Review > [Healthcare \(Basel\)](#). 2024 May 23;12(11):1060. doi: 10.3390/healthcare12111060.

Risk of Periprosthetic Joint Infection after Intra-Articular Injection: Any Difference among Shoulder, Knee and Hip?

Giovanni Vicenti ¹, Federica Albano ¹, Claudio Buono ¹, Anna Claudia Passarelli ¹, Elisa Pesare ¹,
Giulia Colasuonno ¹, Teresa Ladogana ¹, Biagio Moretti ¹, Giuseppe Solarino ¹

Affiliations + expand

PMID: 38891135 PMCID: [PMC11171832](#) DOI: [10.3390/healthcare12111060](#)

Meta-Analysis > [J Orthop Surg Res.](#) 2023 Feb 28;18(1):148.

doi: 10.1186/s13018-023-03637-4.

Preoperative intra-articular steroid injections within 3 months increase the risk of periprosthetic joint infection in total knee arthroplasty: a systematic review and meta-analysis

Young Mo Kim ¹, Yong Bum Joo ¹, Ju-Ho Song ²

Affiliations + expand

PMID: 36855146 PMCID: [PMC9972619](#) DOI: [10.1186/s13018-023-03637-4](#)

ection of the Ankle With Corticosteroids Increase the Risk of Subsequent Periprosthetic Joint Infection
kle Arthroplasty (TAA)? If So, How Long After a Prior Intra-articular Injection Can TAA Be Safely



Nie F. et AL. 2021 – Systematic Review and Metanalysis

- 19 studies (2005–2021)
- 127.163 pz IA injection vs 394.104 controls
- **Overall risk:** a significant increase in the risk of PJI in patients with prior intra-articular injections → **OR 1.24 (95% CI 1.11–1.38, p=0.002)**.
- **Within 12 months before surgery:** increased risk → **OR 1.18 (95% CI 1.10–1.27)**.
- **Within 6 months / 3 months / 1 month:** a trend toward higher risk was observed, but it was **not statistically significant** (likely due to insufficient statistical power).



Kim et AL. 2023 – Meta Analysis

- 14 studies included
- Including IA Knee Injection with HA and CCS
- 113,032 pz IA injection vs 256,987 controls
- **Injections <3 months:** OR 1.26 (95% CI 1.06–1.50, $p < 0.01$) → **significantly increased risk (26%)**
- HA IA injection → not significantly increase





Vicenti et AL. 2024 – Systematic Review



- **Hip:** Corticosteroid injections ↑ infection risk, especially if <3 months pre-op; risk is dose-dependent (multiple > single).
- **Knee:** Conflicting evidence; some studies show ↑ PJI after CSIs, especially if ≤2–4 weeks before TKA. HA may also carry risk if ≤3 months pre-op.
- **Shoulder:** Fewer studies; timing critical—CSIs <1 month before arthroplasty significantly ↑ infection risk.
- Overall, **time interval <3 months consistently associated with higher PJI risk.**



Risk by Injection Type

Injection Type	Risk of PJI	Evidence Level
Corticosteroids	↑ Increased risk (OR ~1.2–1.3), especially if <3 months before arthroplasty	High (multiple meta-analyses: Nie 2021, Kim 2023, Vicenti 2024)
Hyaluronic Acid	Possible ↑ risk if <3 months before arthroplasty; no significant risk beyond 3–6 months	Moderate (Richardson 2019, Yang 2022, Vicenti 2024)
Biologics	No clear evidence of increased risk; data very limited	Low (few small studies or case series, no meta-analysis)



Risk by Timing

Timing of IA Injection	Infection Risk
< 3 months	↑↑ Significant risk
3–6 months	↑ Possible risk (variable)
> 6 months	≈ No significant difference



Future Perspectives?

- Investigate regenerative and biologic therapy safety.
- Explore IA antibiotic prophylaxis strategies.

Conclusions: Guidelines and Clinical Recommendations

- **Avoid IA injections within 3 months** before planned arthroplasty.
- **Delay elective arthroplasty** if an injection has been administered recently.
- Use **strict aseptic technique** and consider ultrasound guidance to minimize soft-tissue trauma.
- Carefully **stratify patients by risk factors** (e.g., diabetes, immunosuppression).
- Consider **alternative conservative therapies** when arthroplasty is imminent.

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Thank you for your attention

