

Too Late to Matter? Time to Positivity Beyond 5 Days Still Recognizes Clinically Relevant PJI

Sohum Patel MD, Adam Freedhand MD, Ken Mathis MD, Steven Schroder MD, Alisina Shahi MD, PhD

Adult Reconstructive Orthopaedic Surgery
University of Texas Health Science Center (UTHealth) at Houston
Houston, Texas, USA

Background

- Periprosthetic joint infection (PJI) remains one of the most devastating complications in arthroplasty. Accurate diagnosis and targeted antimicrobial therapy rely on organism identification. Standard 5-day incubation protocols may miss slow-growing organisms such as *Cutibacterium acnes*, anaerobes, and coagulase-negative *Staphylococci*, leading to misclassification as culture-negative PJI.
- Extended incubation may improve organism detection and clinical decision-making.

Objectives

- Evaluate the clinical relevance of delayed (>5 days) time-to-positivity in PJI.
- Compare microbiologic profiles and clinical outcomes among:
 - Early-positive (≤ 5 days) cultures
 - Late-positive (>5 days) cultures
 - Culture-negative PJI cases

Methods

- Retrospective cohort study across tertiary academic medical centers.
- All patients met the 2018 PJI definition.
- Standardized collection protocols with incubation extended to 14 days.
- **Hypothesis:** Late-positive cultures represent true infections with outcomes comparable to early-positive PJI and distinctly better than culture-negative PJI.

Cohort Overview (n = 4,127 PJI)

- Culture-positive: 3,125 (75.7%)
- Culture-negative: 1,002 (24.3%)
- Early-positive (≤ 5 days): 1,805 (57.7%)
- Late-positive (>5 days): 1,320 (42.3%)
- Joint distribution: 62% knees, 38% hips

Primary Outcome: Failure at 1 Year

- Failure defined as infection-related reoperation or need for chronic antibiotic suppression.
- **Overall culture-positive: 31.4% failure**
- **Culture-negative: 60.1% failure (p=0.001)**
- **Early-positive: 30.9%, Late-positive: 32.1% (p=0.78)**
- Late-positive cultures demonstrated no difference in failure rates compared to early-positive cultures.

Results:

- **42.3% of PJIs turned positive after 5 days, dominated by slow-growing organisms.**
- **Late-positive cultures represent true infections, not contaminants.**
- **Clinical outcomes were equivalent between early- and late-positive groups.**
- **Supports extended incubation to 14 days to avoid mislabeling infections as culture-negative.**
- **Culture-negative PJI carries 2× higher failure risk**

Limitations

- Retrospective design.
- Potential selection and information bias.
- Inconsistent data on preoperative antibiotics and recurrent organism matching.
- No molecular diagnostics used.

Strengths

- Large sample size.
- Standardized sample collection.
- Uniform 14-day incubation protocol.
- All patients met 2018 PJI criteria.

Conclusion

- **Nearly half of PJIs become positive after 5 days.**
- **Late-positive cultures indicate true infection.**
- **Culture-negative PJI has the highest failure risk.**
- **Extended incubation to 14 days should be standardized.**



UT★ORTHO
A Part of UT Physicians



EBJIS-MSIS 2026 | 17-19 SEPTEMBER · PORTO · PORTUGAL

