Continuous Local Antibiotic Perfusion-Assisted Implant Retention for Periprosthetic Joint Infection with Stable Implants, Including Chronic Cases

Y. Yamamoto, A. Maruo, A. Ohara, K. Kudo, H. Muratsu
Department of Orthopaedic Surgery, Hyogo Prefectural Harima Himeji General Medical Center, Himeji, Japan

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Background and Aim

- **Periprosthetic joint infection (PJI)** remains a challenging condition and often leads to implant loosening and revision surgery.
- **Debridement, antibiotics, and implant retention (DAIR)** is commonly performed for acute-phase cases without implant loosening; however, its success rate remains limited [1].
- **Continuous local antibiotic perfusion (CLAP)** enables sustained delivery of high local antibiotic concentrations and has recently emerged as a promising adjunctive treatment for implant-retaining strategies in fracture-related infection and PJI (Figure 1) [2,3].

Aim

To evaluate the effectiveness of CLAP-assisted DAIR for PJI with stable implants (no radiographic loosening), including chronic-phase infections.

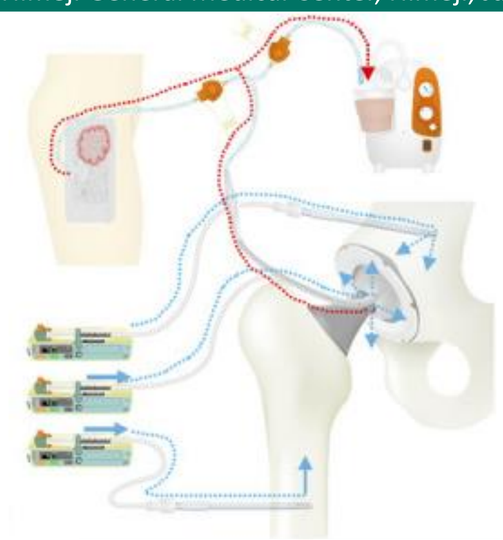


Figure 1

Schematic illustration of the CLAP system in PJI cases. They are inserted intra-articularly and into the central portion of other infected sites. This configuration enables both continuous drainage of the infectious focus and negative-pressure–assisted guidance of antibiotics, thereby ensuring adequate drug distribution throughout the lesion.

The blue dashed arrow indicates the route of antibiotic infusion, while the red dashed arrow represents the route of suction for hematoma and debris [2].

Methods

- Retrospective review of 38 patients (40 joints) with PJI treated with CLAP between September 2010 and September 2025.
- After consolidating recurrent episodes by joint side and excluding cases with implant loosening, 26 patients (28 joints) treated with CLAP-assisted DAIR were included.
- Minimum follow-up: 6 months.
- Clinical variables: infection phase, sinus tract, implant type, and duration of CLAP therapy.
- Primary outcome: final implant retention at final follow-up.

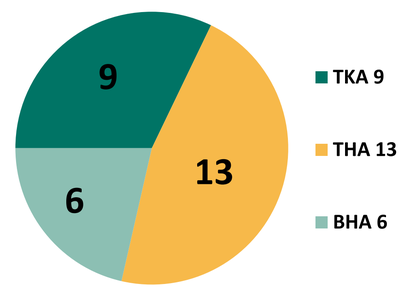
Definitions:

- ***Initial infection control*** = resolution of clinical signs without additional surgery before recurrence/final follow-up.
- ***Recurrence*** = reappearance after initial control.
- ***Complete eradication*** = no clinical signs, normal CRP, and no antibiotics.
- ***Clinical suppression*** = implant retention without local infection despite elevated CRP and/or oral antibiotics.

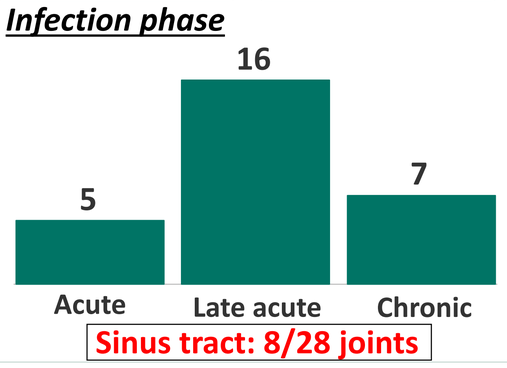
Study cohort and treated joints

26 patients (28 joints) | **70.5** mean age (20–96 years) | **23.1** follow-up (6–84 months) | **14.4** CLAP duration (7–20 days)

Implant type (joints)



Infection phase



Sinus tract: 8/28 joints

Results

96.4%	32.1%	100%	57.1%	39.3%	92.6%
Initial infection control	Recurrence	Final implant retention	Complete eradication	Clinical suppression	Ambulation preserved
27/28 joints	9/28 joints	28/28 joints	16/28 joints	11/28 joints	25/26 evaluable joints

- The cohort included 28 joints (mean age 70.5 years; range, 20–96), with a mean follow-up of 23.1 months (range, 6–84).
- Implant types included total knee arthroplasty (n=9), total hip arthroplasty (n=13), and bipolar hemiarthroplasty (n=6).
- Infection phases were acute (n=5), late acute (n=16), and chronic (n=7), and sinus tracts were present in 8 joints.
- The mean duration of CLAP therapy was 14.4 days (range, 7–20).
- **Initial infection control was achieved in 27/28 joints (96.4%), while recurrence occurred in 9/28 joints (32.1%).** **All recurrent joints were salvaged with repeated CLAP-assisted DAIR.**
- **Final implant retention was achieved in all 28 joints (100%).**
- Complete eradication was achieved in 16/28 joints (57.1%), while clinical suppression was achieved in 11/28 joints (39.3%). Thus, complete eradication or clinical suppression was achieved in 27/28 joints (96.4%). Ambulatory function was preserved in 25/26 evaluable joints (92.6%) during follow-up.

Final clinical status (28 joints)

Clinical pathway in this cohort

CLAP-treated PJI (38 patients / 40 joints) → **Stable implants** (Exclude loosening) → **CLAP-assisted DAIR** (26 patients / 28 joints) → **Initial control** (27/28 joints) → **Repeat DAIR for recurrence** (9 recurrent joints salvaged) → **Final implant retention** (28/28 joints)

Interpretation

- In stable implants, CLAP-assisted implant-preserving treatment maintained the implant in all joints at final follow-up, despite recurrence in approximately one third and inclusion of chronic-phase cases.

Discussion/Conclusion

- Conventional DAIR has failure rates of 34–39% in acute PJI and up to 74% in chronic PJI, which is generally considered a contraindication to curative DAIR [1,4].
- Recurrence did not necessarily represent failure of the implant-preserving strategy: all recurrent joints were salvaged by repeat CLAP-assisted DAIR, resulting in 100% final implant retention.
- Although complete eradication was achieved in 57.1%, most remaining joints were clinically suppressed with preserved function, suggesting that CLAP may expand the potential for implant-preserving treatment beyond conventional DAIR indications [3,5].

CLAP may support implant retention even when conventional DAIR indications are limited, provided the implant is radiographically stable.

Contact / Disclosure

Yuya Yamamoto, M.D., Ph.D.
Department of Orthopaedic Surgery
Hyogo Prefectural Harima Himeji General Medical Center
3-264 Kamiya-cho, Himeji, 670-8560, Japan
Email: m06101yy@gmail.com

Conflict of interest statement: The authors declare no conflict of interest.

References

[1] Sigmund IK, et al. J Bone Jt Infect. 2025;10:101–138.
[2] Choe H, et al. JBJS Open Access. 2026;11:e25.00212.
[3] Miyake Y, Takagi T. J Orthop Sci. 2024;29:1469–1476.
[4] Abbaszadeh A, et al. J Arthroplasty. 2026;41:19–38.
[5] Hieda Y, et al. Sci Rep. 2025;15:26017.