

First clinical use worldwide of electric fields for the treatment of prosthetic knee infection



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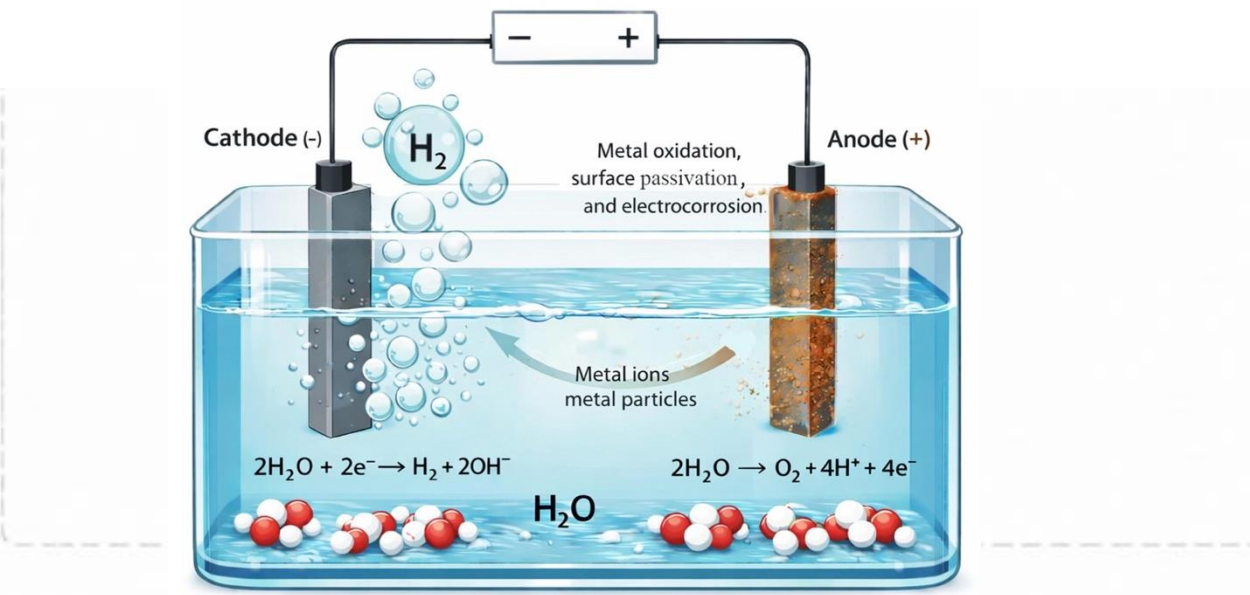


Introduction & Aims

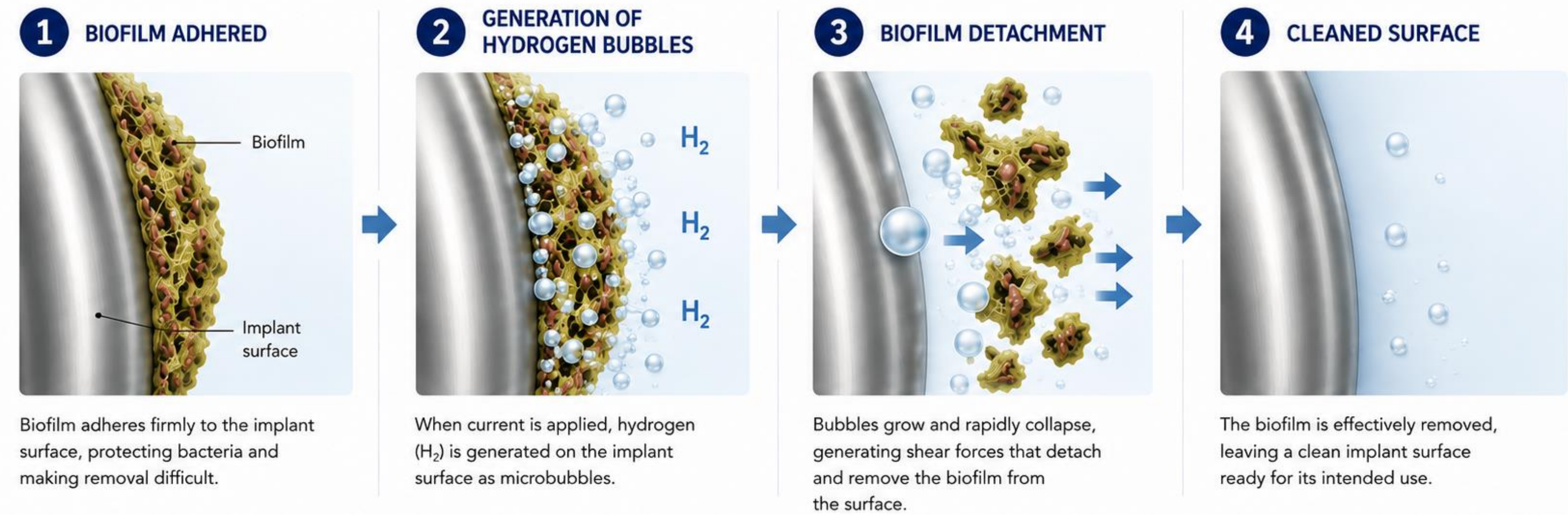
Development of a Technology based on electric fields to enable electrolytic cleaning of metallic implants.

WHAT IS THE ELECTROLYTIC CLEANING?

It is based on the electrolysis of water. When an electric current is applied in a saline solution, hydrogen (H₂) is generated at the negative pole (cathode) on the implant surface in the form of microbubbles.



HOW HYDROGEN BUBBLES REMOVE BIOFILM



HOW DO WE APPLY THIS TECHNOLOGY TO IMPLANTS?

The technology is applied directly to the implant during surgery

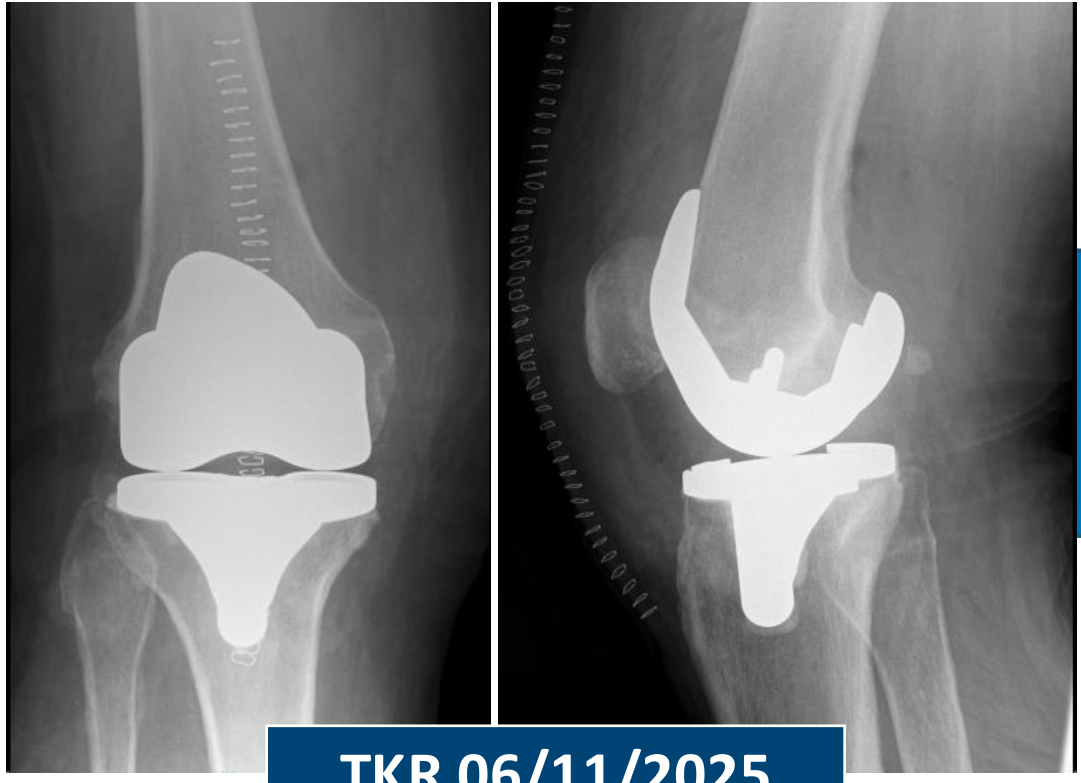
- SINGLE-USE DEVICE**
The system is sterile and single-use, eliminating the risk of cross-contamination and simplifying workflow.
- APPLIED DURING SURGERY BY THE SURGEON**
The device is used like a surgical instrument, seamlessly integrated into the standard surgical procedure.
- PERFORMED WITH PHYSIOLOGICAL SALINE**
The process is carried out using 0.9% NaCl solution, compatible with surgical practice.
- DIRECT CONTROL OF THE TREATED AREA**
Visible hydrogen bubbles indicate real-time activation and coverage of the implant surface.



Case presentation

First Clinical use worldwide for the treatment (compassionate-use approach) of a chronic prosthetic joint infection.

♂ Male of 62 years old – ASA III
Primary Osteoarthritis of the right knee
Grade III obesity / Hypertension / DM II
History of spondylodiscitis with psoas abscess
Sensory-Motor axonal neuropathy (absence of pain)
Charcot arthropathy with multiple surgical interventions
Right ankle arthrodesis (chronic osteomyelitis)
Gouty arthritis



07/08/2025
Arthrocentesis
+ S. aureus

DAIR 06/27/2025
M.O. cultures +
for S. aureus



Rapid soft-tissue deterioration and skin necrosis

07/14/2025

07/25/2025

08/18/2025

Due to poor soft-tissue condition, local debridement was performed prior to definitive surgery

Patient decline the risk of arthrodesis during revision surgery so DAIR with Bacticleaner is offered as a last-resort alternative



01/08/2026
Arthrocentesis
+ S. aureus



Favorable clinical response to Dalbavancin

12/19/2025

Failure of suppressive therapy
STOP Levo and START Dalbavancin



11/17/2025

11/16/2025
Arthrocentesis
+ S. aureus

09/15/2025
Suppressive treatment with Levofloxacin



09/15/2025
After NPWT removal

Negative pressure wound therapy



09/08/2025
Local debridement + NPWT



Preoperative
02/02/2026

02/02/2026
DAIR + Bacticleaner

Samples during DAIR + Bacticleaner			
Sampling Timepoint	Sample Type	Number of Samples	Microbiological Result
Before debridement	Synovial fluid	1	Staphylococcus aureus positive
Before debridement	Periprosthetic tissue	3	Staphylococcus aureus positive
Before debridement	Polyethylene insert (biofilm)	1	Staphylococcus aureus positive
After electrolytic cleaning and electrical pulse application	Joint fluid	1	Negative
Immediately before arthrotomy closure	Joint fluid and PT	3	Negative



Soft-tissue status in the immediate postoperative period

02/25/2026
Arthrocentesis
NEGATIVE



03/19/2026



04/16/2026

Results

- No clinical or laboratory signs of infection recurrence after 6 months of follow-up
- Full range of motion
- Pain-free, with normal function and no walking aids



Conclusions

- Favorable outcome in this first case of chronic PJI, despite being outside the primary target indication of the technology: acute PJI treated with DAIR and implant retention.
- A prospective clinical study in a larger cohort of last-resort patients will start in October 2026.

Bibliography



Contact / Questions

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