

Aug 14, 2025

Maintenance of the Recording Chamber in Non-Human Primates (Cleaning and Dura Scraping)

 In 1 collection

DOI

<https://dx.doi.org/10.17504/protocols.io.kxygx496ol8j/v1>

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Protocol Citation: Jack Kettering, Moya Carrier, Machiko Ohbayashi 2025. Maintenance of the Recording Chamber in Non-Human Primates (Cleaning and Dura Scraping). protocols.io <https://dx.doi.org/10.17504/protocols.io.kxygx496ol8j/v1>

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Protocol status: Working

We use this protocol and it's working

Created: August 13, 2025

Last Modified: August 14, 2025

Protocol Integer ID: 224580

Keywords: Non-human primate, Chamber cleaning, Electrophysiology, craniotomy, recording chamber, dura scraping, procedure, maintenance, maintenance of the recording chamber, routine chamber cleaning, implanted recording chamber, using sterile technique, sterile technique, craniotomy, regular cleaning, occasional dura scraping, cleaning, recording chamber, dura scraping, infection, procedure, human primate, maintenance

Funders Acknowledgements:

NIH

Grant ID: R01NS129551

NIH

Grant ID: R21NS101499

The Brain Sciences Project of the CNSI & NINS

Grant ID: BS291006

Abstract

Following a craniotomy with an implanted recording chamber, regular cleaning (1-3 times per week) using sterile technique is essential to prevent infection. This protocol describes two procedures for maintaining the chamber in a healthy condition: (1) routine chamber cleaning and (2) occasional dura scraping.

Materials

Chamber cleaning kit:

All items (1-8) should be wrapped in the sterilization wrap (9) and sterilized in the EO gas.

	Item	Specification	Vendor	Reference number	Quantity
	Beaker	150 mL	Fisher Scientific	FB100150	1
	Beaker	100 mL	Fisher Scientific	FB100100	1
	Q Tip	Pointed	McKesson	207841	5
	Q Tip	Rounded	McKesson	508716	5
	Gauze	2×2 inch	McKesson	446034	3
	Forceps	Straight	World Precision Instruments	15914	1
	Forceps	Curved	World Precision Instruments	504478	1
	Syringe for Suction	1 mL			2
	Sterilization Wrap		McKesson	11156117	1

Consumable items:

	Item	Specification	Vendor	Reference number
	Vacuum Canister	800 ml	McKesson	544102
	Fluid Solidifier	1500 cc	McKesson	1152097
	Suction Tubing		McKesson	649126
	Sodium Chloride Irrigation Solution	0.9%	McKesson	733255
	Dakin's Wound Cleanser Solution	16 oz, Full Strength	McKesson	479746



	Item	Specification	Vendor	Reference number
	Betadine Prep Pads		McKesson	632679
	Alcohol Prep Pads		McKesson	191089

Devices:

	Item	Vendor	Model
	EO Gas Sterilizer	Anderson	
	Vacuum Pump	McKesson	Suction Pump DeVilbiss

Tools for dura scraping kit:

	Item	Specifications	Vendor	Reference number
	König Woodson Neurosurgical Elevators		Medline	MDG1134118
	Excavator Spoon	#1 and #153-154	Nordent Instruments	
	Adson-Brown Forceps		Fine Science Tools	11627-12
	Dumont Forceps	#7	Fine Science Tools	11252-20
	Vannas Tubingen Scissors	3"	World Precision Instruments	504499

Items for skin margin cleaning:

	Item	Vendor	Reference Number
	Chlorhexidine	Patterson	11584915
	Betadine	McKesson	911740
	Gauze	McKesson	446034

Before start

This protocol requires prior approval from the users' Institutional Animal Care and Use Committee (IACUC) or an equivalent ethics committee.

Routine Maintenance of the Implanted Chamber

- 1 Prepare the workplace: Disinfect the work surface using disposable disinfecting wipes. Prepare the following items: alcohol pads, Betadine pads, sterile saline, Dakin's or Betadine solution, and a sterile pack containing gauze, pointed and rounded Q-tips, two suction syringes, 100 mL beaker, 150 mL beaker, straight and curved forceps.
- 2 Chair the animal: Securing the animal in the chair, ensuring the arms and head are properly stabilized.
- 3 Set up sterile field: Open the chamber cleaning kit, handling the outside of the sterilization wrap. Once laid flat, the top side of the wrap serves as the sterile field. Non-sterile gloves may be used to handle the outside of beakers and forceps, but all other sterile items must be picked up with sterile forceps.
- 4 Prepare solutions: Pour sterile saline and either Dakin's solution or diluted Betadine into sterile beakers.
- 5 Clean the surface of the implant: Wipe the surface of the implanted chamber and the head cap first with Betadine wipes, followed by alcohol pads.
- 6 Remove the chamber cap: Carefully release internal pressure by removing the screw from the small hole at the center of the cap before opening it.
- 7 Remove fluids: Suction out any existing fluid from inside of the chamber, then rinse thoroughly with saline.
- 8 Clean inside of the chamber: Wipe inside of the chamber with Q-tips or sterile gauze and gently remove the granulation tissue if there is any.
- 9 Apply antiseptic solution: Fill the chamber with Dakin's solution or diluted Betadine. Do not overfill to avoid overflow.
- 10 Clean inner walls: Use Q-tips soaked in Dakin's solution or dilute betadine to wipe areas, especially in areas not reached by the liquid.
- 11 Disinfect outer surface: While the Dakin's solution or dilute betadine sits (~ 5 min), clean the external surface of the chamber using alcohol pads and pointed Q-tips.
- 12 Rinse chamber: Suction out the solution and rinse the chamber with saline more than twice to ensure Dakin's/betadine solution is removed.

- 13 Replace chamber cap: Place a sterile chamber cap on the chamber. Place by tightening the side screws first, followed by the top screw at the center of the cap.
- 14 Clean the skin margin as needed: Clean the margin of the skin with the aseptic solution such as Clohexidine or betadine and treat the area using Triple antibiotic ointment as needed.

Occasional Maintenance of the Implanted Chamber (Dura scraping)

- 15 Light sedation: Lightly sedate the animal as needed.
- 16 Standard cleaning: Perform the routine chamber cleaning steps outlined above.
- 17 Prepare dura scraping tools: Open the dura scraping instruments using sterile technique.
- 18 Scrape dura under microscope: Under the microscope, carefully remove fibrous tissue from the dura surface using an excavator, taking care not to damage the dura.
- 19 Rinse chamber: Thoroughly rinse inside of the chamber with sterile saline to remove debris and flush away minor bleeding.
- 20 Close the chamber: Replace the cap as described above.
- 21 Post-procedure care: Administer appropriate pain management medication to the animal (e.g., ketofen, IM).