

1. PURPOSE

This Standard Operating Procedure (SOP) outlines procedures for routine care and cleaning of head fixation implants and recording chambers, as well as treatment of infected implants and chambers in non-human primates (NHP).

2. RESPONSIBILITY

Principal investigator (PI) and their research staff, veterinarians, veterinary care staff and all qualified personnel who care for cranial implants and recording chambers in non-human primates (NHP) or assisting in the procedures.

3. MATERIALS

- 3.1. Sterile cotton-tipped swabs and gauze sponges
- 3.2. Hydrogen peroxide (H₂O₂)
- 3.3. Sterile 0.9% saline
- 3.4. Chlorhexidine: 2% chlorhexidine scrub (soap), 0.05% solution
- 3.5. Povidone-iodine: scrub (soap), 2% and 10% solutions
- 3.6. 0.5% sodium hypochlorite (Dakin's solution)
- 3.7. Petroleum jelly
- 3.8. Personal protective equipment (PPE):
 - 3.8.1. Fit-tested N95 respirator
 - 3.8.2. Gloves, or sterile gloves
 - 3.8.3. Lab coat or gown
 - 3.8.4. Goggles/face shield
- 3.9. Treats/rewards
- 3.10. Analgesics
- 3.11. Antibiotics

4. CONSIDERATIONS

- 4.1. Wear the adequate PPE at all times for the procedures. The use of sterile gloves may be recommended in some cases by the veterinarian.
- 4.2. Proper maintenance and cleaning of implant margins and chambers helps to prevent infections which jeopardize not only the health of the animal, but also the ability of the animal to continue working in the research protocol, and hence the ability to acquire meaningful data. Once an infection is noted, it must be treated promptly and aggressively, based on culture and sensitivity testing, if possible.
- 4.3. Document all implant care procedures.
- 4.4. To maintain the viability of the acrylic implant and the surrounding tissue, these areas must be frequently cleaned and maintained. The frequency of cleaning is evaluated on a case-by-case basis. The principal investigator is responsible for designating the individual responsible for the regular cleaning of implants and chambers.
- 4.5. Implant margins should be inspected at least once weekly. Chambers should be inspected at least three times weekly. The frequency of inspection of the margin and chambers can be altered as per the veterinarian's recommendation.
- 4.6. Use food rewards as a form of positive reinforcement after each procedure. Reward preference should be predetermined by preference testing but typically can include dried or fresh fruit, nuts, etc.

5. MAINTENANCE PROCEDURES FOR RECENTLY IMPLANTED ANIMALS

- 5.1. Be vigilant about potential pain associated with routine cleaning. If there is any sign of discomfort, consult the veterinarian to determine the cause and discuss proper treatment. When cleaning implants and chambers, avoid contamination of the chamber by first working on the chamber, then cleaning the implant edge.
- 5.2. Avoid the use of hydrogen peroxide for at least 2-3 weeks following implantation of head fixation device surgery; hydrogen peroxide can be irritating to the skin margins.
- 5.3. Chamber cleaning may begin one week after surgery.
- 5.4. Animals should not be head fixed for 6-8 weeks following placement of the head post..
- 5.5. Clean the exterior surface of the acrylic implant, recording chamber, and cap.
 - 5.5.1. Prior to opening the chamber, clean the exterior surface of the chamber, its cover, and the surrounding acrylic with povidone-iodine or 2% chlorhexidine scrub (soap) and a gauze sponge or cotton-tipped swabs.
 - 5.5.2. The minimum contact time is 3 minutes, after which the surface should be rinsed with saline. Residual blood may be removed with 0.75% to 3% hydrogen peroxide (H₂O₂). Care must be taken to avoid contact between H₂O₂ and viable soft tissues that are in the process of re-epithelialization.
- 5.6. Cleaning of the recording chamber.
 - 5.6.1. Chambers should be cleaned at least 3 times weekly.
 - 5.6.2. Use aseptic technique when opening a recording cylinder. Sterile instruments (e.g., aspirator/suction tips, forceps) and supplies (e.g., gauze, drapes, gloves) should be used while working inside the recording cylinder. If there are multiple cylinders, they should each be thoroughly cleaned sequentially rather than simultaneously. No materials (e.g., forceps, suction tips, etc.) should be shared between cylinders during multiple cylinder care. Uninfected cylinders should always be cleaned before suspect or known infected cylinders.
 - 5.6.3. Open or remove the chamber's cap.
 - 5.6.4. Thoroughly clean the cap by scrubbing it with 10% povidone-iodine solution and hydrogen peroxide and soak the cap in 10% povidone-iodine solution for the duration of the cleaning procedure.
 - 5.6.5. Flush the chamber 5 times with copious amounts of sterile saline. Carefully examine the dura for the presence of focal infection, necrosis, cuts, or tears before any cleaning agents are applied. Alternate between the two options below every 7-10 days to prevent microbial resistance:
 - 5.6.5.1. Rinse several times with a 3% H₂O₂ solution or a 1:1 mixture of H₂O₂ and povidone-iodine.
 - 5.6.5.2. Rinse several times with a dilute povidone-iodine solution at 1-2%.
 - 5.6.6. A sterile gauze pad should be placed into the chamber. A few drops of 2% povidone-iodine solution may be placed on the gauze to reduce bacterial growth. Do not overfill with gauze as this may cause increased cranial pressure. Alternatively, the chamber may be filled with sterile saline or a dilute sterile saline/povidone-iodine solution.
 - 5.6.7. The cap is removed from the povidone-iodine soak, rinsed with sterile saline or alcohol, dried with a clean, sterile gauze sponge, and replaced on the chamber.
- 5.7. Cleaning the wound margin/implant edge.
 - 5.7.1. The tissue surrounding an implant must be allowed to heal for at least 2-3 weeks. Cleaning or rough handling of the tissue can promote swelling and infection and delay healing. Gentle flushing is all that is required during this critical healing period.
 - 5.7.2. If cleaning is needed, the exterior surface of the chamber, its cap, and the surrounding acrylic should be first cleaned with povidone-iodine or chlorhexidine 2% scrub (soap) and a gauze sponge. The minimum contact time is 3 minutes, after which the surface should be rinsed with sterile saline. Residual blood may be removed with 0.75% to 3% hydrogen peroxide (H₂O₂). Care must be taken to avoid contact between H₂O₂ and viable soft tissues that are in the process of re-epithelialization.
- 5.8. Any abnormal appearance of the wound edge (swelling, discharge, bleeding) or chamber (discharge, foul odor) should be reported to Veterinary Services.

6. MAINTENANCE PROCEDURES FOR CHRONICALLY IMPLANTED ANIMALS

- 6.1. Cleaning of the exterior surface of the acrylic implant, recording chamber, and cap.
 - 6.1.1. Refer to section 5.5.
- 6.2. Cleaning the recording chamber.
 - 6.2.1. Refer to section 5.6.
- 6.3. Cleaning the wound margin/implant edge.
 - 6.3.1. Prior to cleaning the wound margin, the exterior surface of the chamber, its cap, and the surrounding acrylic should be first cleaned with povidone-iodine or chlorhexidine 2% scrub (soap) and a gauze sponge. The minimum contact time is 3 minutes, after which the surface should be rinsed with sterile saline. Residual blood may be removed with 0.75% to 3% hydrogen peroxide (H₂O₂). Care must be taken to avoid contact between H₂O₂ and viable soft tissues that are in the process of re-epithelialization.
 - 6.3.2. The tissue surrounding the implant must be handled in a gentle manner to prevent trauma, swelling, and secondary infections.
 - 6.3.3. Re-growing hair should be carefully removed on an as-needed basis to facilitate cleaning. Remove hair from the wound margin with small scissors (depilatory cream and clippers are not recommended). Care must be taken when removing hair around eye coil wires, at the rostral margin of the wound edge.
 - 6.3.4. Cleaning of the skin/implant interface involves gentle removal of loose crusts and rinsing of wound margins. The following solutions should be considered for cleansing: sterile saline, chlorhexidine 0.05% or povidone-iodine 1-2%. Dakin's solution (0.5% sodium hypochlorite) can be used particularly in the presence of necrotic tissue or 1.5 - 3% hydrogen peroxide (to remove dried up blood and other secretions followed by copious saline irrigation). None of the above compounds is effective indefinitely or against all pathogens and a 7 to 10 day rotation of different disinfectants should be employed. Following cleaning, a small amount of Petroleum jelly should be applied to problem areas at the wound edge.
- 6.4. Any abnormal appearance of the wound edge (swelling, discharge, bleeding) or chamber (discharge, foul odor) should be reported to Veterinary Services.

7. PROCEDURES FOR PROBLEM IMPLANTS AND CHAMBERS

- 7.1. Promptly report implant margins showing significant granulation tissue, crusting, bleeding, or discharge to Veterinary Care staff.
- 7.2. Clean problem chambers 5-7 times a week for a minimum period of 14 days, or as prescribed by the veterinarian.
- 7.3. Clean chamber as described in section 5.6.5, using both options.
 - 7.3.1. Include a daily flush with hydrogen peroxide to remove any build-up of proteinaceous material.
 - 7.3.2. The chamber is then flushed copiously with sterile saline/2% povidone-iodine solution.
 - 7.3.3. After flushing, the chamber should be filled with sterile saline/2% povidone-iodine solution prior to capping.
- 7.4. If the technique described in 7.3 successfully clears the problem, return to cleaning the chamber 3 times weekly using the routine technique described above in section 5.6.
- 7.5. If the technique described above in 7.3 fails to clear the problem, the chamber should be cleaned daily for a maximum of 14 additional days as follows:
 - 7.5.1. Clean the chamber as in 7.3.1 and 7.3.2.
 - 7.5.2. Finally, fill the chamber with 0.5% sodium hypochlorite prior to replacing the cap.
- 7.6. After the 14-day treatment as described in 7.5, return to cleaning the chamber 3 times weekly as described in section 5.6, filling the chamber with sterile saline/2% povidone-iodine solution after each cleaning.
- 7.7. If the condition returns or persists, contact the Veterinarian. Any abnormal appearance of the wound edge (swelling, discharge, bleeding) or chamber (discharge, foul odor) should be reported to Veterinary Care staff.
- 7.8. The decision to use topical or systemic (oral or injectable) antibiotics must be made in consultation with the Clinical Veterinarian based on culture and sensitivity testing whenever possible.

8. REFERENCES

- 8.1. Association of Primate Veterinarians Cranial Implant Care for Nonhuman Primates in Biomedical Research. (2021). Journal of the American Association for Laboratory Animal Science : JAALAS, 60(5), 496–501.
<https://doi.org/10.30802/JAALAS-JAALAS-21-000108>
- 8.2. Assessing Laboratory Macaque Food Preferences in Positive Reinforcement Training. Animal Welfare Institute, Winter 2018.

SOP REVISION HISTORY

DATE	REVISIONS
2019.01.30	<p>3.4. Chlorhexidine 2%: 2% chlorhexidine scrub (soap), 0.05% solution</p> <p>3.5 Triple antibiotic ointment</p> <p>3.6 Povidone-iodine ointment</p> <p>3.7 3.5 Povidone-iodine: scrub (soap), 2% and 10% solutions</p> <p>3.8 3.6 0.5% bleach solution sodium hypochlorite (Dakin's solution)</p> <p>3.10. Analgesics: EMLA cream, lidocaine jelly, lidocaine or bupivacaine local block, systemic NSAIDs or opioids</p>
2019.01.30	<p>5.1 Be vigilant about potential pain associated with routine cleaning. If there is any sign of discomfort, consult the veterinarian for determining the cause and proper treatment. One or a combination of the following analgesic agents is recommended: EMLA cream, lidocaine jelly, lidocaine or bupivacaine local block, or systemic NSAIDs or opioids. When cleaning implants and chambers, avoid contamination of the chamber by first working on the chamber, then cleaning the implant edge.</p>
2019.01.30	<p>5.5.1. Prior to opening the chamber, clean the exterior surface of the chamber, its cover, and the surrounding acrylic with 0.05% chlorhexidine solution (for external use only) or 10% povidone-iodine solution povidone-iodine or 2% chlorhexidine scrub (soap) and a gauze sponge or animal-specific toothbrush.</p>
2019.01.30	<p>5.5.2 The minimum contact time is 3 minutes, after which the surface should be wiped clean using a new dry gauze sponge rinsed with saline. Residual blood may be removed with 0.75% to 3% hydrogen peroxide (H2O2). Care must be taken to avoid contact between H2O2 and viable soft tissues that are in the process of re-epithelialization.</p>
2019.01.30	<p>5.6.2. Use aseptic technique when opening a recording cylinder. Sterile instruments (e.g., aspirator/suction tips, forceps) and supplies (e.g., gauze, drapes, gloves) should be used while working inside the recording cylinder. If there are multiple cylinders, they should each be thoroughly cleaned sequentially rather than simultaneously. No materials (e.g., forceps, suction tips, etc.) should be shared between cylinders during multiple cylinder care. Uninfected cylinders should always be cleaned before suspect or known infected cylinders.</p>
2019.01.30	<p>5.6.3. Thoroughly clean the cap by scrubbing it with 10% povidone-iodine solution and hydrogen peroxide. Then soak the cap in 10% povidone-iodine solution.</p> <p>5.6.4. Remove bone wax and use sterile gauze to remove accumulated liquid inside the chamber.</p> <p>5.6.4. It is preferable to replace the old cap with a new sterilized (i.e., autoclaved, or cold-sterilized with glutaraldehyde) cap each time; or thoroughly clean the cap by scrubbing it with 10% povidone-iodine solution and hydrogen peroxide, and soak the cap in 10% povidone-iodine solution.</p>
2019.01.30	<p>5.6.5 Flush and suction the chamber 5 times with copious amounts of sterile saline/2% povidone-iodine solution. Carefully examine the dura for the presence of focal infection, necrosis, cuts or tears before any cleaning agents are applied. Alternating between the two options below every 7-10 days to prevent microbial resistance:</p> <p>5.6.5.1. Rinse and suction several times with a 3% H₂O₂ solution or a 1:1 mixture of H2O2 and povidone-iodine.</p> <p>5.6.5.2. Rinse and suction several times with a dilute povidone-iodine solution at 1-2%.</p>
2019.01.30	<p>5.6.7. A new sterile cap is used The or the same cap is removed from the povidone-iodine soak, rinsed with alcohol, dried with a clean sterile gauze sponge, and replaced on the chamber.</p>
2019.01.30	<p>5.7.1. Prior to cleaning the wound margin, the exterior surface of the chamber, its cap, and the surrounding acrylic should be wiped with alcohol to remove any material remaining from the chamber cleaning. Avoid getting alcohol on the wound margin of a newly implanted animal.</p> <p>5.7.1. An uninfected surgical wound that is healing well is best left alone for a period of 7-14 days post-operatively. Cleaning or rough handling of the tissue can promote swelling and infection and delay healing.</p> <p>5.7.2. If cleaning is needed, the exterior surface of the chamber, its cap, and the surrounding acrylic should be first cleaned with povidone-iodine or chlorhexidine 2% scrub (soap) and a gauze sponge. The minimum contact time is 3 minutes, after which the surface should be rinsed with saline. Residual blood may be removed with 0.75% to 3% hydrogen peroxide (H₂O₂). Care must be taken to avoid contact between H2O2 and viable soft tissues that are in the process of re-epithelialization.</p>
2019.01.30	<p>5.7.3. Dried blood may be removed by placing a gauze sponge soaked in sterile saline over the area for a short period, repeating as necessary. Cleaning the area of all dried material is not necessary and could be deleterious to wound healing.</p> <p>5.7.4. The wound edge should be flushed with copious amounts of saline/2% povidone-iodine sterile solution, as needed. Following cleaning, a small amount of povidone-iodine ointment or triple antibiotic ointment should be applied to the wound edge.</p>
2019.01.30	<p>6.1 All established chambers (present and in use for several months) should be inspected at least once weekly for evidence of discharge, granulation tissue, or infection.</p> <p>6.2 6.1. Cleaning of the exterior surface of the acrylic implant, recording chamber, and cap.</p> <p>6.1.1. Refer to section 5.5.</p> <p>6.2.1. Prior to opening the chamber, clean the exterior surface of the chamber, its cover, and the surrounding acrylic with 0.05% chlorhexidine solution (for external use only) or 10% povidone-iodine solution and a gauze sponge or animal-specific toothbrush.</p> <p>6.2.2. The minimum contact time is 3 minutes, after which the surface should be wiped clean using a new dry gauze sponge.</p> <p>6.3 6.2. Cleaning the recording chamber.</p> <p>6.2.1. Refer to section 5.6.</p> <p>6.3.1. Chambers should be cleaned at least 3 times weekly.</p> <p>6.3.2. Use an Allen wrench to remove the chamber's cap.</p> <p>6.3.3. Thoroughly clean the cap by scrubbing it with 10% povidone-iodine solution and hydrogen peroxide. Then soak the cap in 10% povidone-iodine solution.</p> <p>6.3.4. Remove bone wax and use sterile gauze to remove accumulated liquid inside the chamber.</p> <p>6.3.5. Flush the chamber 5 times with hydrogen peroxide followed by flushing 5 times with copious amounts of sterile saline or sterile saline/2% povidone-iodine solution.</p> <p>6.3.6. A sterile gauze pad should be placed inside the chamber and a few drops of 2% povidone-iodine solution may be placed on the gauze to reduce bacterial growth. Do not overfill with gauze as this may cause increased cranial pressure. Alternatively, the chamber may be filled with sterile saline/2% povidone-iodine solution.</p> <p>6.3.7. The cap is removed from the povidone-iodine soak, rinsed with alcohol, dried with a clean gauze sponge, and replaced on the chamber.</p>
2019.01.30	<p>6.4 6.3.1. Prior to cleaning the wound margin, the exterior surface of the chamber, its cap, and the surrounding acrylic should be wiped with alcohol to remove any material remaining from the chamber cleaning first cleaned with povidone-iodine or chlorhexidine 2% scrub (soap) and a gauze sponge. Use of hydrogen peroxide should be limited to areas which require a more rigorous approach to cleaning. The minimum contact time is 3 minutes, after which the surface should be rinsed with saline. Residual blood may be removed with 0.75% to 3% hydrogen peroxide (H₂O₂). Care must be taken to avoid contact between H2O2 and viable soft tissues that are in the process of re-epithelialization.</p>

2019.01.30	6.4.3. 6.3.3. Removing hair from the wound margin facilitates cleaning but removal of all hair is not routinely required. Periodically remove hair from the wound margin with small scissors (depilatory cream and clippers are not recommended). Re-growing hair should be carefully removed on an as-needed basis to facilitate cleaning. Remove hair from the wound margin with small scissors (depilatory cream and clippers are not recommended). Care must be taken when removing hair around eye coil wires, at the rostral margin of the wound edge.
2019.01.30	6.4.4. Gentle flushing and soaking is usually sufficient to maintain the wound margin. The wound edge should be flushed copiously with 2% povidone-iodine solution. Following cleaning, a small amount of povidone-iodine ointment or triple antibiotic ointment should be applied to problem areas at the wound edge. 6.3.4. Cleaning of the skin/implant interface involves gentle removal of loose crusts and rinsing of wound margins. The following solutions should be considered for cleansing: sterile saline, chlorhexidine 0.05% or povidone-iodine 1-2%. Dakin's solution (0.5% sodium hypochlorite) can be used particularly in the presence of necrotic tissue or 1.5 - 3% hydrogen peroxide (to remove dried up blood and other secretions followed by copious saline irrigation). None of the above compounds is effective indefinitely or against all pathogens and a 7 to 10 day rotation of different disinfectants should be employed. Following cleaning, a small amount of Petroleum jelly should be applied to problem areas at the wound edge.
2019.01.30	7.1. Implant margins showing significant granulation tissue, crusting, bleeding, or discharge should be reported to Veterinary Care staff. 7.2. Problem chambers should be cleaned daily for a minimum period of 14 days. Investigators are encouraged to clean as often as possible within the 14 day period, including at least one day on weekends. 7.3. Cleaning should include a daily flush with hydrogen peroxide to remove any build-up of proteinaceous material. The chamber is then flushed copiously with sterile saline/2% povidone-iodine solution. After flushing, the chamber should be filled with sterile saline/2% povidone-iodine solution prior to capping. 7.1. Promptly report implant margins showing significant granulation tissue, crusting, bleeding, or discharge to Veterinary Care staff. 7.2. Clean problem chambers 5-7 times a week for a minimum period of 14 days, or as prescribed by the veterinarian. 7.3. Clean chamber as described in section 5.6.5, using both options. 7.3.1. Include a daily flush with hydrogen peroxide to remove any build-up of proteinaceous material. 7.3.2. The chamber is then flushed copiously with sterile saline/2% povidone-iodine solution. 7.3.3. After flushing, the chamber should be filled with sterile saline/2% povidone-iodine solution prior to capping.
2019.01.30	7.4. If the technique described in 7.3 successfully clears the problem, return to cleaning the chamber 3 times weekly using the routine dry gauze technique described above in section 6.3.5.6 .
2019.01.30	7.5.1. First, flush with hydrogen peroxide to remove any build-up of proteinaceous material. Clean the chamber as in 7.3.1 and 7.3.2. 7.5.2. Next, flush copiously with sterile saline/2% povidone-iodine solution. 7.5.3. 7.5.2. Finally, fill the chamber with 0.5% bleach solution sodium hypochlorite prior to replacing the cap.
2019.01.30	7.6. After the 14-day treatment as described in 7.5, return to cleaning the chamber 3 times weekly as described in section 6.3.5.6 , filling the chamber with sterile saline/2% povidone-iodine solution after each cleaning.
2019.01.30	8. REFERENCES 8.1. Association of Primate Veterinarians Cranial Implant Care Guidelines for Nonhuman Primates in Biomedical Research, published January 23, 2015. file:///F:/Vet%20Care%20Committee/Cranial%20Implant%20Care%20Guidelines.pdf
2023.02.17	3.10. Analgesics: EMLA cream, lidocaine jelly, lidocaine or bupivacaine local block, systemic NSAIDs or opioids
2023.02.17	4.3. Log Document all implant care procedures and observations, including solutions used and drugs administered, into the animal's permanent medical record.
2023.02.17	4.4. To maintain the viability of the acrylic implant and the surrounding tissue, these areas must be frequently cleaned and maintained. The frequency of cleaning is evaluated on a case-by-case basis. The principal investigator is responsible for designating the individual responsible for the regular cleaning of implants and chambers.
2023.02.17	5.1. Be vigilant about potential pain associated with routine cleaning. If there is any sign of discomfort, consult the veterinarian for determining to determine the cause and discuss proper treatment. One or a combination of the following analgesic agents is recommended: EMLA cream, lidocaine jelly, lidocaine or bupivacaine local block, or systemic NSAIDs or opioids. When cleaning implants and chambers, avoid contamination of the chamber by first working on the chamber, then cleaning the implant edge.
2023.02.17	5.2. Avoid the use of hydrogen peroxide for at least 2-3 weeks following implantation of head fixation device surgery; hydrogen peroxide can be irritating to the skin margins.
2023.02.17	5.4 Animals should not be head fixed for 6-8 weeks following placement of the head post. If the head post and chamber are placed during the same surgery, chamber cleaning can be done either with the animal awake (with a second person distracting the monkey by feeding treats) or is performed while the animals is anesthetized.
2023.02.17	5.6.2. Prior to opening the chamber, clean the exterior surface of the chamber, its cover, and the surrounding acrylic with povidone-iodine or 2% chlorhexidine scrub (soap) and a gauze sponge or animal-specific toothbrush cotton-tipped swabs.
2023.02.17	5.6.3. Use an Allen wrench to Open or remove the chamber's cap.
2023.02.17	5.6.3. It is preferable to replace the old cap with a new sterilized (i.e., autoclaved, or cold-sterilized with glutaraldehyde) cap each time; or Thoroughly clean the cap by scrubbing it with 10% povidone-iodine solution and hydrogen peroxide, and soak the cap in 10% povidone-iodine solution for the duration of the cleaning procedure.
2023.02.17	5.6.5. Flush and suction the chamber 5 times with copious amounts of sterile saline. Carefully examine the dura for the presence of focal infection, necrosis, cuts or tears before any cleaning agents are applied. Alternating between the two options below every 7-10 days to prevent microbial resistance: 5.6.5.1. Rinse and suction several times with a 3% H2O2 solution or a 1:1 mixture of H2O2 and povidone-iodine. 5.6.5.2. Rinse and suction several times with a dilute povidone-iodine solution at 1-2%.
2023.02.17	5.6.6. A sterile gauze pad should be placed into the chamber. A few drops of 2% povidone-iodine solution may be placed on the gauze to reduce bacterial growth. Do not overfill with gauze as this may cause increased cranial pressure. Alternatively, the chamber may be filled with sterile saline or a dilute sterile saline/povidone-iodine solution.
2023.02.17	5.6.7. A new sterile cap is used or The same cap is removed from the povidone-iodine soak, rinsed with sterile saline or alcohol, dried with a clean, sterile gauze sponge, and replaced on the chamber.
2023.02.17	5.7.1. An uninfected surgical wound that is healing well is best left alone for a period of 7-14 days post-operatively. Cleaning or rough handling of the tissue can promote swelling and infection and delay healing.
2023.02.17	5.7.3. Gentle sterile saline rinses can be used if needed to clean the wound during this period. Petroleum jelly or wet dressings applied every 2-3 days will keep the scabs soft and facilitate healing.
2023.08.29	2. RESPONSIBILITY Principal investigator (PI) and their research staff, veterinarians , veterinary care staff and all qualified personnel who care for cranial implants and recording chambers in non-human primates (NHP) or assisting in the procedures.
2023.08.29	4.5. Implant margins should be inspected at least once weekly. Chambers should be inspected at least three times weekly. The frequency of inspection of the margin and chambers can be altered as per the veterinarian's recommendation.
2023.08.29	5.4. Animals should not be head fixed for 6-8 weeks following placement of the head post. If the head post and chamber are placed during the same surgery chamber cleaning is performed while the animal is anesthetized.

2023.09.07	3.8.2. Gloves or sterile gloves
2023.09.07	4.1. Wear the adequate PPE at all times for the procedures. The use of sterile gloves may be recommended in some cases by the veterinarian.
2023.09.07	8. REFERENCES 8.1. Association of Primate Veterinarians Cranial Implant Care Guidelines for Nonhuman Primates in Biomedical Research, published January 23, 2015. (2021). Journal of the American Association for Laboratory Animal Science : JAALAS, 60(5), 496–501. https://doi.org/10.30802/JAALAS-JAALAS-21-000108.
2023.09.14	4.6. Use food rewards as a form of positive reinforcement after each procedure. Reward preference should be predetermined by preference testing but typically can include dried or fresh fruit, nuts, etc.
2023.09.14	8.2. Assessing Laboratory Macaque Food Preferences in Positive Reinforcement Training. Animal Welfare Institute, Winter 2018.