Repair of Incisional Dehiscence in Mice and Rats

IACUC Standard Procedure
Effective Date: June 2023

UCSF Office of Research
Institutional Animal Care and Use Program

The following policies must be followed for all repair procedures:

- UCSF IACUC Guidelines for Rodent Anesthesia
- UCSF IACUC Guidelines for Rodent Surgery
- Analgesia should be provided at the time of repair per the approved IACUC protocol

The protocol must identify:

- Identify in Section D (personnel) who will perform dehiscence repair surgery.
- Anesthesia and analgesia used for the repair (Section I)
- Dehiscence repair must be approved and indicated in the following sections: Sections F, G, H, I, and J

Objectives:

- Aid researchers in determining the appropriate treatment for incision dehiscence.
- Provide guidance to determine the severity of dehiscence and decision-making strategies for appropriate wound management.

Surgical wound dehiscence is a complication that requires immediate intervention. Treatments for dehiscence include surgical repair or monitoring with treatment. Each of these methods has advantages in various situations. Craniotomy incisions are best surgically closed with sutures (instead of wound clips), minimizing exposure of the craniotomy site. In humans, dehiscence has been studied within the context of episiotomy procedures (Dudley et al 2013), for which primary closure of the wound was most effective. However, skin healing is a conserved process across mammalian species (Sandy-Hodgetts et al 2013; Takeo et al 2015) and these findings suggest that wound dehiscence is best repaired using a surgical method.

Dehiscence repair is only allowed **once** per individual animal, unless under the direction of LARC Veterinarian.

Description of procedure:

1) Perform a physical examination of animal to determine:
    a) Origin of wound (suture or clip failure or implant failure versus trauma such as abrasion or scratching)
        i) Wound closure failure- determine level of contamination, presence of necrotic tissue, discharge, or desiccation.
        ii) Trauma - determine if lesions are self-inflicted, such as over grooming, or abrasion from cage structures (for implanted animals)
            (1) Remove any objects that may aggravate wound from cage, or trim nails

b) Depth of wound/incision
    i) Superficial (epidermis only)
    ii) Partial thickness (epidermis + dermis)
    iii) Full thickness (epidermis + dermis + subcutaneous fat)
    iv) Deep (epidermis + dermis + subcutaneous fat + exposing muscle/bone/connective tissue)
c) Considerations
    i) There must be adequate healthy skin surrounding the wound
        (1) Surgical repair requires additional skin removal; larger incisions may leave a defect too large to close.
    ii) Repairing incisions close to limbs or the head may impact mobility/movement, or the animal's ability to perform normal functions (walking, grooming, blinking.)
    iii) Animals that are hunched or not moving well may not survive a second surgical procedure.
    iv) Large or infected wounds are not likely to heal successfully.
        (1) Excessive tension on the incision leads to poor blood supply and tissue necrosis.
        (2) Severely contaminated wounds do not heal as well as clean wounds.

2) Contact LARC veterinary staff to make the determination if the wound should be surgically repaired, monitored, and treated topically, or if unsure if the animal should be euthanized.
    a) Monitor- Appropriate for superficial or partial thickness wounds
    b) Surgical Dehiscence Repair- Appropriate for full thickness and deep wounds
    c) Euthanasia- Required for deep wounds that are grossly infected, causing severe pain, or cases where surgical repair would impair normal mobility.

3) Repair Procedure:
    a) All dehisced incisions are urgent and require immediate attention.
    b) Repair must be performed as soon as the dehiscence is noticed.
    c) Anesthetize and prep the animal following the UCSF Rodent Anesthesia and Survival Surgery Guidelines.
    d) Gently debride the wound using a sterile swab and flush with sterile saline. Debriding involves the removal of dead or infected tissue.
    e) Instill local anesthetic in the incision per protocol.
    f) Freshen the skin margins with sharp scissors. Freshening the margins involves minimally trimming skin margins until a small amount of bleeding occurs.
    g) Close the incision using wound clips (if closure does not put wound under increased tension) or monofilament suture
    h) Surgical glue may not be used as the sole method of closure after a dehiscence.
    i) Recover the animal following the UCSF Rodent Anesthesia guidelines and provide analgesia as indicated in the approved protocol.
    j) Monitor repaired incision until healed.
    k) Remove clips or suture (if non-absorbable) 10-14 days later post dehiscence repair

4) LARC veterinarians may recommend treatment or veterinary care not described in this document, in consideration of the animal's health, the research model, and the approved protocol.
    a) Departures from these procedures may occur when reviewed and approved by a LARC veterinarian.
    b) If the incision appears grossly infected (marked swelling, redness or purulent discharge) or if a second dehiscence occurs, the animal must be euthanized.

Agents: This procedure requires anesthetics and analgesics. All agents administered to animals should be listed in the "Agents" section of RIO.

Surgery: List dehiscence repair as a multiple survival surgery

Adverse Effects to be considered: Infection, dehiscence, skin ulceration