Reptile Soft Tissue Surgery

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KEYWORDS

• Coeliotomy • Chelonians • Lizards • Snakes • Prefemoral fossa

KEY POINTS

- The field of surgery on reptiles is in continuous evolution, with novel, less invasive surgical techniques being progressively developed.
- Prefemoral fossa coeliotomy should be the approach of choice in chelonians, especially for reproductive surgeries.
- The paramedian approach is generally indicated in lizards that are dorsally compressed; in chameleons and other laterally compressed lizards, the coelom may be easily approached through the flank.
- A common mistake is to remove the oviduct without the respective ovary, which may lead to yolk coelomitis, and ovarian neoplasia.

INTRODUCTION

The field of reptile surgery is continuously evolving and novel surgical techniques have been reported in recent years. These innovative procedures often reduce the invasiveness of conventional interventions[1–5] or provide insightful solutions to common disorders.[6,7] Most of these novel surgical techniques are described in case reports, case series, or other observational studies, as in other medical fields.[8] However, these reports are often biased toward an overly positive representation of the effectiveness of reported techniques and ideally should be followed up by randomized controlled trials. Contrary to other fields in medicine, such research designs are underused in veterinary medicine.[9] In addition, reptile medicine is an extremely heterogeneous field, including species that have unique physiologic, anatomic, and pathologic differences. Therefore, strong supporting evidence for a specific surgical technique in the reptile species of interest is usually unavailable.

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The purpose of this review was to describe common soft tissue surgical techniques used in reptiles. Clinicians should consider the lack of high-quality evidence for the actual effectiveness of most of these interventions, and use the information provided as a guideline.

SURGERY OF THE SKIN

Surgery of the skin in reptiles is indicated for wound management, cutaneous and subcutaneous abscesses, and removal of neoplasms. General anesthesia or sedation in combination with local tissue infiltration or peripheral nerve block using lidocaine or bupivacaine can be used to desensitize skin and allows for cutaneous surgeries.[10]

Skin Sutures

Reptile skin has the tendency to invert after incision, especially in squamates.[11,12] Therefore, a slightly everting suture pattern (eg, horizontal mattress) is recommended to ensure first intention wound healing.[11] Healing of the skin can be accelerated if reptiles are maintained at the upper end of their preferred temperature range.[13] Often, definitive skin healing with disappearing of the scab occurs after the first or the second ecdysis.[12]

Suture Materials

Most suture materials used for surgery in the higher vertebrates are suitable for use in reptiles.[11] In an early study on wound healing in garter snakes (*Thamnophis sirtalis*) in which sutured and unsutured wounds were compared, unsutured linear incisions tended to have more rapid epithelial maturation and a less intense inflammatory response.[13] On this basis, the investigators suggested that suturing small incisional wounds may not be advantageous.[13] In another study, the tissue reaction to 4 suture materials (chromic gut, polyglyconate, polyglactin 910, poliglecaprone 25) was evaluated grossly and histologically in 258 loggerhead sea turtles. Among the 4 suture types, polyglyconate (eg, Maxon; Covidien Ltd, Dublin, Ireland) and poliglecaprone 25 (Monocryl; Ethicon, Inc, Sommerville, NJ) caused the least tissue reaction. However, patient outcome (eg, eversion size and amount of body weight change) did not vary significantly among suture types.[14]

Tissue adhesive and skin staples can also be used as alternatives to suture materials for closure of skin incisions in reptiles.[15] In a study, the reactions to several suture materials (polydioxanone, polydioxanone with triclosan, poliglecaprone 25, poliglecaprone 25 with triclosan, polyglactin 910, monofilament nylon, chromic gut) and to cyanoacrylate tissue adhesive were compared in the skin of 30 ball pythons.[15] The subjective histologic inflammation scores were significantly higher for suture materials compared with the values for negative control and cyanoacrylate tissue adhesive at several time points. Furthermore, sutures often underwent extrusion from tissues before complete absorption. However, the skin in reptiles needs to support most of the tensile strength of coelomic incisions.[12] Therefore, current recommendation for closure of coelomic breaches is to use absorbable synthetic monofilament suture material (eg, poliglecaprone 25, polyglyconate).

Surgical Technique for Wounds with Avulsion of the Skin from Bone in Chelonians

Traumatic wounds are common in reptiles and may result in the avulsion of the skin from the plastron or the carapace in chelonians. After proper debridement, if the