Principles of Wound Management and Wound Healing in Exotic Pets

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KEYWORDS

• Wound healing • Wound management • Topical wound therapy • Wound products • Wound dressings

KEY POINTS

- General principles of wound healing are similar across species.
- Selection of appropriate topical therapies and bandaging is based on the phase of wound healing and amount of exudate produced in addition to patient factors.
- When addressing wounds in exotics, it is important to account for individual patient stress levels, behavior, and husbandry when considering wound management techniques and options.

INTRODUCTION

Open wounds often must be managed for several days, weeks, or even months until they can be closed or they heal by second intention. Most wounds heal without complications; however, the care of wounds in exotic animal species can be a challenging endeavor. Special considerations must be made in regard to the animal's temperament and behavior, unique anatomy and small size, and tendency toward secondary stress-related health problems. Basic wound care incorporates principles of aseptic technique and gentle tissue handling, and is similar across veterinary species. In addition, many wound care products are available that will potentially debride the wound without damaging healthy tissue, reduce infection, and increase the rate of wound healing. This article summarizes the phases of wound healing, factors that affect healing, and general principles of wound management. Emphasis is placed on novel modalities of treating wounds and species differences in wound management and healing.

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PHASES OF WOUND HEALING

A wound is a physical injury disrupting the normal continuity of anatomic structures, and the wound-healing process consists of restoring continuity. Wound healing is typically a well-organized process divided into 3 to 5 overlapping phases, depending on the classification system: hemostasis (or coagulation) phase, inflammatory phase, debridement phase (often combined with the inflammatory phase), repair (proliferative) phase, and maturation (remodeling) phase (**Fig. 1**). Chronic or nonhealing wounds do not proceed through the normal phases of wound healing, often unable to make the transition from the inflammatory to the repair phase.[1,2] Knowledge of normal wound-healing physiology provides a framework for understanding factors that impair wound healing and for implementing effective wound-management strategies.

Hemostasis (Coagulation) Phase

Immediately following injury to the skin, hemostasis is achieved through vasoconstriction and platelet-mediated activation of the intrinsic clotting cascade, ending in formation of a fibrin clot. Release of proinflammatory cytokines from damaged tissue and the newly formed clot act as potent chemotactic signals to recruit neutrophils, endothelial cells, and fibroblasts to the wound. Formation of the fibrin clot is therefore an important step in promoting onset of the inflammatory and repair phases.[1,2]

Inflammatory and Debridement Phase

The inflammatory phase is characterized by increased capillary permeability and infiltration of neutrophils, macrophages, and lymphocytes into the wound (**Fig. 2**). Most modern wound-classification schemes include the debridement phase within the inflammatory phase because of the overlapping time and function of leukocytes within the wound.[1–3] After initial vasoconstriction during hemostasis, vasodilation and increased vascular permeability ensue. Increased blood flow and fluid extravasation combined with blockage of lymphatic drainage cause the classic signs of inflammation, including heat, redness, and swelling. This acute inflammatory response usually lasts for 1 to 2 days but may persist in a poor wound environment.[1,2]

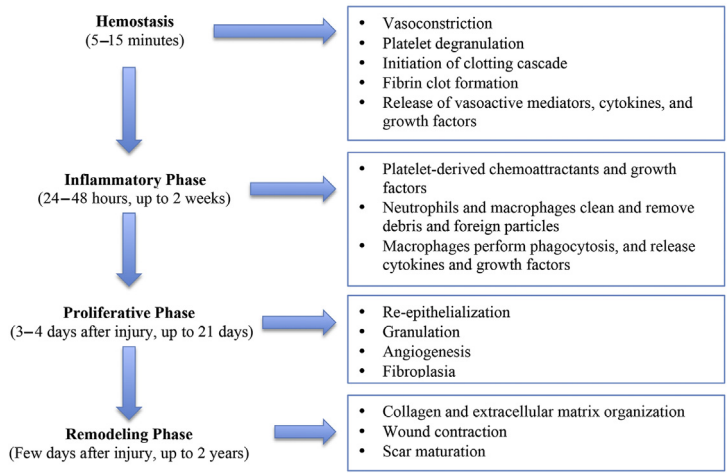

Fig. 1. Stages of wound healing. (*Adapted from* Ozturk F, Ermertcan AT. Wound healing: a new approach to the topical wound care. Cutan Ocul Toxicol 2011;30:95; with permission.)