



## Animal Surgery: Advancing Veterinary Care Through Precision and Skill

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### Introduction

Animal surgery is a critical aspect of veterinary medicine that involves the medical treatment of animals through surgical procedures. It is a vital tool for treating injuries, diseases, congenital conditions, and other health issues that require intervention beyond medical management alone. From routine spaying and neutering to complex surgeries for life-threatening conditions, animal surgery plays a key role in improving the health and well-being of animals, whether they are pets, livestock, or wildlife. As veterinary techniques and technologies continue to advance, animal surgery has become safer, more efficient, and more effective [1,2]. This article explores the importance of animal surgery, common procedures, and the evolving field of veterinary surgery.

### What is Animal Surgery

Animal surgery encompasses a broad range of procedures performed on animals to diagnose, treat, or alleviate medical conditions. It can be categorized into two main types: elective and emergency surgery.

**Elective surgery:** These are procedures that are planned in advance and are typically not urgent, such as spaying or neutering, dental extractions, and soft tissue surgeries.

**Emergency surgery:** These procedures are performed in response to acute conditions, such as trauma, gastrointestinal obstruction [3], or internal bleeding, requiring immediate intervention. Veterinary surgeons use specialized tools and techniques to perform surgeries, ensuring that animals receive the best possible care. Just like human surgery, veterinary surgery requires skilled professionals who are trained to operate with precision and compassion, considering the unique anatomical and physiological characteristics of different species.

### Common Types of Animal Surgery

**Spaying and neutering:** Spaying (for females) and neutering (for males) are common elective procedures performed on pets, particularly cats and dogs [4]. Spaying involves the removal of a female's ovaries and uterus, while neutering refers to the castration of a male animal by removing the testes. These surgeries not only help control the pet population but also prevent health problems such as uterine infections, testicular cancer, and certain behavioral issues.

**Orthopedic surgery:** Orthopedic surgery addresses musculoskeletal issues, including fractures, ligament injuries, and joint diseases. Common orthopedic procedures include:

**Fracture repair:** In cases of broken bones, veterinary surgeons use pins, plates, or screws to stabilize the bones and allow for proper healing [5].

**Cruciate ligament repair:** A torn cranial cruciate ligament (similar to an ACL tear in humans) is common in dogs, especially in active breeds. Surgical reconstruction can restore stability and mobility to the affected knee.

**Hip dysplasia surgery:** Hip dysplasia is a hereditary condition in which the hip joint fails to develop properly, leading to arthritis and

pain. Surgical options, such as total hip replacement or femoral head ostectomy, can help alleviate symptoms and improve mobility.

**Soft tissue surgery:** Soft tissue surgery involves procedures on the body's internal organs, skin, muscles, and tissues. These surgeries are performed to address a variety of conditions, such as:

**Tumor removal:** When animals develop benign or malignant tumors, veterinary surgeons may perform excision to remove the growth and prevent further health complications.

**Gastrointestinal surgery:** Conditions like gastrointestinal obstruction, foreign body ingestion, and volvulus (twisted stomach) may require surgical intervention to remove blockages or repair damaged organs.

**C-section (Cesarean Section):** In cases of difficult labor or when a mother is unable to deliver her young naturally, a C-section may be necessary to save both the mother and her offspring.

**Ophthalmic surgery:** Ophthalmic (eye) surgery is required for conditions that affect an animal's vision. Some common ophthalmic surgeries include:

**Cataract surgery:** Cataracts can cause vision impairment or blindness in animals. Surgery to remove the clouded lens and, in some cases, replace it with an artificial lens can restore vision.

**Entropion repair:** Entropion is a condition where the eyelids roll inward, causing irritation and damage to the cornea. Surgical correction can help prevent long-term eye problems.

**Dentistry and oral surgery:** Dental surgery is necessary for animals suffering from severe periodontal disease, tooth fractures, or oral tumors. Dental extractions are commonly performed to remove damaged or infected teeth, while other oral surgeries may be required to treat abnormalities or injuries in the mouth and jaw.

### Advancements in Animal Surgery

The field of animal surgery has evolved significantly over the years, thanks to advancements in surgical techniques, anesthesia, and diagnostic tools. Some of the key advancements include:

**Minimally invasive surgery:** Laparoscopic (keyhole) surgery has revolutionized veterinary medicine by allowing veterinarians to perform surgeries through small incisions, reducing trauma to the

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animal's body. This technique is commonly used for procedures like spaying, organ biopsies, and abdominal surgeries. The benefits of minimally invasive surgery include smaller incisions, quicker recovery times, and less pain for the animal.

**Improved anesthesia:** Anesthesia has advanced considerably, ensuring safer surgeries for animals. Modern anesthetic protocols allow for better control of the animal's vital signs, minimizing risks during surgery. Anesthesia monitoring devices help veterinarians track heart rate, blood pressure, oxygen levels, and other critical parameters in real-time, enhancing patient safety during surgery.

**3D imaging and surgical planning:** Advanced imaging techniques such as 3D CT scans and MRIs allow veterinary surgeons to visualize internal structures in great detail before performing surgery. These technologies help with pre-surgical planning, allowing for more accurate and targeted interventions, particularly in complex procedures like orthopedic or neurological surgeries.

**Regenerative medicine:** The use of stem cells and platelet-rich plasma (PRP) therapy is gaining traction in veterinary surgery, particularly in orthopedic treatments. Stem cell therapy can help repair damaged tissues, while PRP, which is derived from the animal's own blood, can promote healing and reduce inflammation. These cutting-edge treatments offer promising options for improving recovery after surgery.

### The Role of Animal Surgeons

Veterinary surgeons play a critical role in animal healthcare. In addition to their surgical expertise, they must be skilled in diagnosing conditions, preparing animals for surgery, and managing post-operative care. Surgeons must have a deep understanding of animal anatomy, physiology, and behavior to ensure that the surgery is both effective and safe for the animal. Additionally, animal surgeons often work closely with other veterinary professionals, including anesthesiologists, nurses, and technicians, to ensure that all aspects of the surgery, from pre-operative assessment to post-operative care, are carefully managed.

### Challenges in Animal Surgery

Despite the significant advancements in veterinary surgery, there are still challenges that must be addressed:

**Cost:** Surgical procedures, particularly complex ones, can be

expensive for pet owners and livestock producers. This can sometimes limit access to necessary surgeries for animals in need of treatment.

**Specialization:** Not all veterinary clinics are equipped to handle complex surgeries. Specialized veterinary surgical centers or referral practices are often required for advanced procedures, which may not be accessible to all pet owners.

**Anesthesia risks:** While advances in anesthesia have made surgeries safer, there are still inherent risks, particularly in older animals or those with underlying health conditions. Proper pre-surgical evaluations and monitoring are essential to minimize these risks.

### Conclusion

Animal surgery is a vital component of modern veterinary medicine, enabling veterinarians to treat a wide range of medical conditions that cannot be addressed through medication or other non-surgical interventions. As surgical techniques and technologies continue to advance, the field of veterinary surgery will undoubtedly improve, offering safer, more effective treatments for animals in need. Whether for routine procedures or complex surgeries, veterinary surgeons play an essential role in improving animal health, alleviating pain, and enhancing the quality of life for animals. The continued development of new technologies and techniques promises to further transform the landscape of animal surgery, making it an even more powerful tool for promoting the well-being of animals worldwide.

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