

Orthotics and Prosthetics for Small Animal Patients

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Now and then, practitioners come across patients with problems and deformities that are not directly amenable to traditional treatment options often putting practitioners in a quandary as to how to manage these cases. The objective of this session is to familiarize the practitioner with options for unusual musculoskeletal injuries and deformities that may be amenable to orthotics or prosthetics and to outline the state of the art for orthotics and prosthetics in veterinary medicine. There are a number of companies that provide assistive devices - we will focus on principles that will help the practitioner navigate this industry.

Definitions and history

Assistive device

Any device that supports or allows for support of an injured limb or body areal. Orthotics and prostheses are examples of assistive devices. Other examples include slings, carts, splints and hobbles.

Orthotics

The science or use of orthopedic appliances (orthoses) to support, align, prevent, or correct deformities or to improve the function of movable parts of the body. Orthoses can be either static or dynamic (jointed). The word splint refers only to a static device, which essentially is a type of temporary orthotic device.

Prosthetics

The science or use of an artificial substitute (prosthesis) for a missing body part, such as an arm or a leg, used for functional or cosmetic reasons, or both.

Orthoses and prostheses have been used for human patients to treat a variety of conditions both musculoskeletal and neurologic in origin. Muscular Dystrophies are commonly treated using orthotic devices designed to support and assist muscular control. Orthopedic conditions for which orthoses are used include deformities, trauma, and muscle and joint weakness or instability. Neurologic conditions include peripheral nerve injury, diabetic neuropathy, and other primary neurologic or vascular diseases resulting in ischemia.

Indications for orthoses and prostheses in veterinary patients

Causes of distal limb dysfunction in animals include nerve injuries, damage to specialized weight-bearing structures such as paw pads, and congenital malformations. Animals with a functional proximal limb, but with poor distal limb function are often treated with amputation of the entire affected limb. Although most patients can do very well with complete limb amputation, it may not be the best option when multiple limbs are affected. Additionally, some owners may be resistant to complete amputation for their pet for aesthetic or other reasons.

Splints and bandages can often provide adequate support during a healing period. However, for patients that need support for a prolonged period of time, splints are usually not practical. They need to be replaced on a regular basis, usually by a veterinarian, and do not allow easy access to wounds underneath.

This session describes the development and application of orthotic and prosthetic devices that can be removed and replaced with ease by the pet owner; hold the affected limb in a weight-bearing, functional angle; protect the foot from trauma; conform to the foot so as not to cause injury to the limb; are well tolerated by the patient; and are durable enough for long-term use (years).

Case selection

Orthotic management may not be appropriate for all veterinary patients. Cats are not known to tolerate traditional splints or bandages well, and may not tolerate even lighter weight custom made orthoses. Patients with dysfunction proximal to the level of the stifle or elbow may not be able to bear weight effectively even with orthotic support.

Successful prosthetic management requires that the prosthesis be well secured to the patient's body. For tumors in the front limb that require amputation at a level higher than the distal third of the radius, there may not be enough of the limb available to secure a prosthesis. Similarly, partial amputation at the level of the tarsal-metatarsal joint or below is optimal for hind-limb prostheses.

Conclusions

The principles of orthotics and prosthetics have been successfully applied to veterinary patients. Animals with severe multiple limb dysfunction may benefit from creative prosthetic or orthotic management. Treatment options that may be less expensive than high-risk or uncertain surgical techniques can also be offered to pet owners.