



Whole Pet

Orthotics and Prosthetics

Introduction to Veterinary Orthotics and Prosthetics

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Over the last several years there has been a growing public interest in animals using prosthetic and orthotic devices. When your clients inquire about getting an orthotic or prosthetic device for their pet, do you have the information that they need?

This is an introduction to Veterinary Orthotics and Prosthetics, (Veterinary O&P) so that you may have some answers and resources for your clients. What are they? Who makes them? How are they made? Do they work? What is the role of the veterinarian and the owner?

What are they?

An orthosis is a device used to support or “brace” an existing limb. An orthotic device can be easily put on or taken off with a Velcro system. An orthosis can either replicate the immobilization of a traditional cast or create dynamic range of motion featuring control, resistance, enhancement, protection and guidance over an affected joint.

A prosthesis is a device that replaces a missing limb or other body part. Most four-legged animals will do just fine with three limbs however, compensatory injuries may occur as a result. A prosthesis can aid in mobility, prevent injuries to the remaining limbs, or may be useful if the animal injures one of their remaining limbs.

Who makes them?

Most commonly, the person designing, fabricating and fitting a device is a Certified Orthotist Prosthetist, (CPO). These individuals have extensive education, training and experience in physics, human biomechanics, material science, shear and friction, wound management, anatomy and physiology. While this training is geared towards humans, many of the concepts can be applied to veterinary O&P.

Ideally, the CPO will have some experience with animals. Persons entering the field of O&P are creative and possess the ability to innovate which allows them to cross over into the world of veterinary O&P. With that being said, most do not have any formal veterinary education and rely on a team approach with the referring veterinarian, the owner and any other specialist involved in the animal’s treatment and care.



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What is the process?

- Determine the diagnosis and desired outcomes.
- Consult with CPO
 - If there is a local Veterinary O&P company available, schedule an evaluation with a CPO and the animal. Otherwise, choose a national Veterinary O&P company to work with.
 - Determine if animal is suitable for device. If so, design the device. Articulated, adjustable ROM, free motion, or solid. What are the therapeutic goals of orthosis or prosthesis?
- Obtain a cast impression, taken by a CPO or the veterinarian.
- Device is fabricated- see “How are devices manufactured?”
- Fit the device and educate the owners on wear, care and precautions
- Adjustments are expected and are a normal part of the custom orthosis process.
- Annual or bi-annual maintenance appointments
 - Assess the fit and adjust as needed
 - Complete refurbishing- device is stripped down to the shell, cleaned and all soft goods such as foam liners, tread, straps, pads, etc. are replaced.

How are devices manufactured?

The first and most important piece of making a custom device is taking a good negative mold. This is usually done weight bearing, when possible, positioning the animal in the desired alignment.

The second step is creating a positive mold, either utilizing CAD CAM technology or with plaster.





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The mold is then modified, adding or removing plaster where needed and creating the definitive shape.



The third step is dependent on the material being used for the device. 3D printing is available but more commonly used is thermoplastics or laminating with acrylic resins. Materials are vacuum formed over the modified positive model, trim lines are established, and the final product is ground and polished to final shape. The benefit of using thermoplastics is that they are easily adjusted by applying heat.





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The fourth step is usually adding straps and padding, and attaching the distal end, usually made of shock absorbing material and tread for weight bearing.



The device is then ready to be fit. During this visit, definitive trimlines and strap tensions are established. Initial adjustments are made, instructions on care, use and precautions are given to the owners. It is recommended a one week follow up is scheduled to check the wear pattern and make additional adjustments if necessary.

Are orthotic and prosthetic devices effective?

If a device is designed, fabricated, and fit correctly they can be very effective and aid in treating many orthopedic pathologies and injuries. They can reduce pain and lameness, provide support and comfort, and return pet's quality of life through restored mobility. Some common orthotic and prosthetic solutions include:

- Pre and post-operative custom bracing has been successfully used to replace splinting.
- Adjustable ROM tarsal, carpal and stifle orthoses have effectively supported, healed and rehabilitated muscular and soft tissue injuries.
- Long term bracing solutions can be a successful alternative when surgery is not an option due to:
 - Advanced age of the pet
 - Concerns about the surgery recovery period
 - Desire for conservative management
 - Concerns about funding the surgery



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- Prosthetic devices help to reduce the load on the contralateral limbs, allow a smoother and more natural gait, and protect the integrity of the animal's joints. Criteria for a prosthesis includes:
 - Healthy distal end for weight bearing
 - To attach a functional forelimb prosthesis, 40% of the radius and ulna needs to be intact
 - To attach a functional hind limb prosthesis, ideally the entire tibia and fibula would be intact

What are the risks and complications involved?

Tissue damage is the primary risk factor. Fur loss, redness of skin, increased lameness, swelling, and skin breakdown may occur. This is usually secondary to an ill-fitting device or a device that was donned inappropriately. Typically, when this occurs, an adjustment and/or additional instruction on wear and care will resolve the issue.

When allowed, a break-in period is recommended for the animal to adjust to new alignment, pressures, and materials. A break-in period can decrease the risk of skin irritation. If this is not an option, it is best if the device can be removed for short periods, 3-5 times a day.

What is the role of the veterinarian?

As mentioned above, it is likely the CPO designing the device has little to no formal veterinary training and depends on the referring veterinarian's knowledge and input. A conversation with the CPO regarding the details of the animal's injury, ROM, strength, and goals of utilizing a device is essential when designing a custom device.

Ideally, the CPO will be local and available to do an evaluation, take a mold, fit and adjust the device as well as educate the owner on proper care, use and precautions of each device. If there is not a veterinary O&P company available locally, there are companies in the United States that will provide a device via mail. When using a national company casting, fitting and follow up is the responsibility of the veterinarian. If adjustments are required, the device may need to be mailed back to the manufacturer.

Make sure you check with each manufacturer what your role is when providing an orthosis or prosthesis.



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What is required of the owner?

There is a high level of commitment required from the animal's owner in order for an orthosis or prosthesis to be successful. The design and fit of a custom device is very intimate and precise and requires daily attention.

- Follow the recommended break in schedule or removing the device several times a day while animal is being supervised
- Daily skin checks and cleaning of a device
 - This may require two people if the animal cannot be weight bearing without support
- Awareness of any volume changes that may affect the fit
- Multiple appointments-some devices require several adjustments
- Annual or bi-annual maintenance appointments

In conclusion, Veterinary O&P is becoming more available as a treatment for orthopedic deficiencies. Hopefully you now have some information that will allow you to add orthotics and prosthetics to the highly sophisticated, specialized care you already provide.



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