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Use of prosthetic limb in veterinary field: An overview

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Abstract
Limb amputation in animals is most frequently performed following trauma, neoplasia, infection, or severe neurologic dysfunction, and although many quadrupeds adapt well to three-legged locomotion, prosthetic devices have become an increasingly valuable option for improving long-term mobility and quality of life. Veterinary prosthetics include exo-prostheses (socket prostheses), endo-prostheses, and intraosseous transcutaneous amputation prostheses (ITAP). This review highlights their objectives, design principles, applications, and limitations. The primary goals of prosthetic intervention are to enhance functional mobility, minimize secondary musculoskeletal strain, allow participation in rehabilitation, and support animals in performing daily activities. Exo-prostheses are the most commonly utilized because they are economical, non-invasive, and adaptable to various amputation levels. Their effectiveness depends heavily on proper socket design, which must ensure stability, efficient load transfer, and comfort while preventing skin injury. Key components including the socket, liner, suspension system, and pylon are constructed from advanced materials such as carbon fiber, silicone, and lightweight metals to optimize durability and biomechanical function. However, socket prostheses may be contraindicated in cases of severe skin mobility, neurologic impairment, or poor owner compliance, and they often require ongoing adjustments due to changes in stump shape or soft tissue health.
In contrast, ITAP systems employ direct skeletal anchorage through Osseo integration, eliminating socket-related complications and enabling improved proprioception and load transmission. Despite these advantages, ITAP remains limited by high cost, surgical complexity, and risks such as infection, bone fracture, and implant loosening. Overall, continued advancements in rehabilitation, biomaterials, and additive manufacturing are expected to enhance prosthetic outcomes. Veterinary prosthetics are progressively evolving toward more customized, functional, and biologically integrated solutions that can significantly improve welfare in companion and farm animals following limb loss.

Keywords: Exo-prosthesis, ITAP, veterinary prosthetics, osseointegration, socket design, pylon, amputation, canine prosthetics

Introduction
Animals frequently sustain fractures and dislocations from a variety of causes, including car crashes, falls from heights, and deficiencies. Amputation of a limb with prosthesis application is a means of rescuing animals of sentimental value (Jean, 1996) [10]. Amputations in dogs and cats are most often due to trauma (65%) and neoplasia (35%), (Carberry and Harvey, 1987; Withrow and Hirsch, 1979) [21, 20]. persistent infections, which includes with osteomyelitis, in addition to denervation main to a nonfunctional limb can also cause amputation. Because quadrupeds adapt effectively to a three-legged walk, prosthetics have not become widely used in veterinary medicine.
Prosthetics have commonly been disregarded in veterinary care, however with the emergence of rehabilitation as an area of expertise, its use is expected to growth. There's nevertheless much to find out about the satisfactory materials to employ, training, help systems, and final outcomes. The objectives of canine limb prosthetics are to provide high quality life, reduce limb length disparities, offer a means of engaging in rehabilitation therapy, prevent additional joint deterioration and deformation, boost exercise and activity levels, and enable the dog to perform daily tasks (Arauz *et al*., 2021) [1].

Different Types of Prosthesis

Endo-prosthesis: Prosthesis, which is fully surrounded by body tissue.

Example: Total hip replacement

- A hip prosthesis is a surgically implanted artificial joint that is made to operate similarly to the natural one. The procedure known as Total Hip Arthroplasty (THA), (Merola *et al*., 2019) [13].

Exo-prosthesis: Exo-prostheses, also known as socket prostheses or prosthetics, are devices that are attached to amputed limbs in order to facilitate movement (Marcellin-Little *et al*., 2015) [12].

Endo-exo Prosthesis: It is also called as Intraosseous Transcutaneous Amputation Prosthesis (ITAP), (Arauz *et al*., 2021) [1].

Fig 1: Sling and wheels (Wheel chair)

Fig 2: Peg-leg system (Prosthetic limb)

Currently present animal prosthetic devices are either composed of a sling and wheels (Figure 1) or feature a peg-leg system (prosthetic limb), (Figure 2). While the peg-leg device is frequently used for single limb amputation, the sling is used when both bilateral limbs are either severed or non-functional. The choice of prosthetic device system for a particular companion animal must be made by the veterinary team and the animal's owner. A front wheel cart can serve as a substitute for an exoprosthesis in situations when elbow joints are not present. Wheelchairs can be used when a hind limb is paralyzed (Marcellin-Little *et al*., 2015) [12].

Exo-Prosthesis (Socket Prosthesis)

A prosthetic device is utilized when a residual limb is available and a device is needed to replace the missing section of the limb in order to attain meaningful function. By means of a socket, these devices are immediately affixed to the remaining limb. When treating companion animals with partial amputations at the proximal third of the antebrachium, mid-crus, or distal to these levels, exoprostheses may be investigated. The patients should have functional hip and stifle joints or shoulder and elbow joints, respectively. (Marcellin-Little *et al*., 2015) [12].

In cattle, the prosthesis normally is attached to the stump 3 weeks to 1 month following the amputation. The greatest permissible limb ideal should be maintained if prosthesis application is being considered. Because it offers a longer stump, better proprioceptive capabilities, and a greater space for the distribution of floor response force and body weight into the prosthetic device, a longer stump is preferable to a shorter one (Jean, 1996) [10].

The prosthesis ought to be non-irritating, lightweight, self-suspending, and pressure-free on the stump's end. The prosthesis should be made to be easily removed and reapplied by a single person without sedation (Jean, 1996) [10].

Exoskeletal (Figure 3) and endoskeletal (Figure 4) prosthetic limbs are the two types of exoskeletal prosthetic limbs. An internal framework of an endoskeletal prosthesis mimics the kinematics and form of bones it is made of carbon fiber and lightweight aluminum. Every item can be changed to suit the patient's needs. The exoskeletal prosthesis features an exterior framework constructed of fiberglass carbon fiber. These prosthetics are large, heavy, and can be difficult to modify. Cattle's environment and body mass have led to the most common use of exoskeletal prosthetics. (Decante, 1990) [4]. Additionally, homemade prostheses are often exoskeletal, using a metal post as the weight-bearing component and a fiberglass component that is shaped to the limb (Desrochers *et al*., 2014) [5].

Fig 3: Exoskeletal prosthetic

Fig 4: Endoskeleton prosthetic

Prosthetic socket, liner/interface, suspension system and pylon/shaft are main parts of socket prosthetic limb.

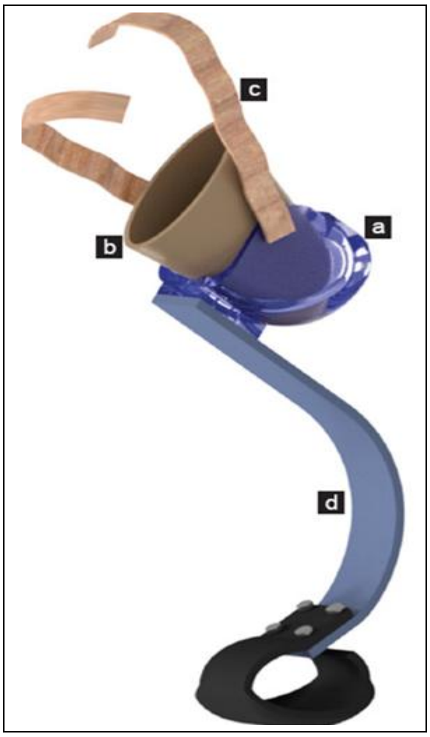

Fig 5: A Schematic Diagram of a Hind-limb Canine Exo-Prosthesis. (A-Socket, B-Interface, C-Suspension, D-Pylon), (Arauz *et al*., 2021) [1]

Prosthetic socket

Because it supports the body and transmits the pressure and forces created by movement to the residual limb, the prosthetic socket is the most important component of a prosthesis. Similar to human prostheses, the socket design of the canine limb-prosthesis interface should suitably offer stability, acceptable load transmission, comfort, and effective mobility control (Paterno *et al*., 1996) [15].

When designing a socket, amputed limb stump soft tissues' ability to withstand changes in pressure and the repeated stresses that come with wearing a prosthesis must be carefully considered. In fact, socket designs that transfer loads from the prosthesis to the residuum more effectively without harming the soft tissue or skin result from a complete understanding and awareness of the anatomy and soft-tissue biomechanics of the amputated limb stump (Laferrier *et al*., 2010) [11].

A variety of materials, including polypropylene, reshaped polyethylene, carbon fiber, glass fiber, high density polyethylene, and polyvinyl chloride, can be used to make prosthetic sockets. The strength to weight ratio, stiffness, and tensile strength of carbon fiber are all quite high. Polyvinyl chloride is inexpensive, easily moldable, and less rigid.

A one-month-old calf was given a socket prosthetic leg by Orsini *et al*. (1985) [14]. They employed fiberglass material for fabrication of prosthetic socket and hefty aluminium for shaft fabrication. The prosthesis was designed to be easily taken off and put back on by one person without the need for anesthesia. The prosthesis was made to accommodate limb lengthening as needed because the animal would be growing quickly over the next few months. This was done to avoid skin abrasions and the development of decubital ulcers, as well as to make routine cleaning and examination easier. According to them, ultimate goal in prosthesis design is to restore lost function in a way that is as close to normal as feasible.

High stiffness, high tensile strength, strong chemical resistance, high temperature tolerance, high specific strength, and low weight are among the many characteristics of carbon fiber. It may be sturdy enough for even a high weight amputee because of all these characteristics (Gutfleisch, 2003) [8].

Suspension system

A suspension system, as the name suggests, keeps the socket in place. A liner's purpose is to provide soft, pleasant material to cushion the residuum. In fact, liners and suspension devices are commonly combined to suit their corresponding functions utilizing many materials and combinations such as rubber, foam, silicone, elastomers, urethanes, silico gels, elastic polymers, and neoprene, among others. Studies on suspension systems for canine limb prostheses are few, although similar materials, including silicone liners, have been shown to improve comfortness and socket-residuum fitting while also reducing skin irritation and pain in human limb prostheses. (Gholizadeh *et al*., 2014) [7]. According to Arauz *et al*. (2021) [1] suspension systems commercially available are:

Self-suspension of the socket

The bony structure of a imputed limb can be used to create self-suspension. In order to suspend the socket, it is made to conform to the shape of this bony architecture.

Suction suspension

An electric or mechanical vacuum pump is used to draw air out of the prosthetic socket, helping to maintain consistent fluid levels in the residual limb and providing one of the most secure and effective methods for prosthetic attachment. For this kind of suspension, urethane gel interface materials are recommended. Increasing the level of negative pressure is reported to enhance blood flow in the residual limb, which supports better tissue health, improved nourishment, and potentially faster healing.

Suspension harnesses

Using belts, straps, cuffs, sleeves and wedges for holding prosthetic limb in place. Most commonly use in veterinary field.

Liner/Interface

Soft substance that sits between the prosthetic socket and the remaining limb. A prosthesis can be secured to the body either through direct contact with the skin or by using a thin cushioning interface worn over the residual limb (stump). The role of a liner is to pad the residuum with comfortable soft material (Arauz *et al*., 2021) [1]. A gel-based cushioning liner worn over the residual limb helps safeguard the skin and distribute pressure more evenly. In cases where the stump has irregular contours such as prominent scars, bony areas, or burn-related deformities custom-shaped liners may be necessary. A prosthetic sock can be used either on its own or in combination with a gel liner. Wool, nylon, or synthetic materials are used to make socks, and occasionally gel is placed in between the fabric layers. Liner/Interface can be made from ethylene foam, ethylene vinyl acetate, thermoplastic elastomer, silicone and urethane.

Pylon

A shock-absorbing prosthetic component called a pylon is designed to lessen the shock forces produced during high-impact activities. These components function like springs and are calibrated according to the level of limb amputation. For example, in a dog with a transtibial amputation, a shock-absorbing pylon is often placed between the tibial portion and the paw segment of the prosthesis to reduce the impact forces experienced during walking.

In humans, pylons are typically made from metals like stainless steel, titanium, or aluminium. The same metals can be utilized in the creation of canine limb prostheses, although each case will require a different choice of metal. For instance, in the case of a small dog, an aluminum pylon may be preferable because it is lighter and more affordable than stainless steel or titanium. (Arauz *et al*., 2021) [1]. Pylon can be constructed from titanium, aluminium, stainless steel and carbon fiber.

Prosthetic limb design

The prosthesis should be lightweight, capable of supporting itself without additional straps, gentle on the skin, and designed to avoid placing pressure on the end of the residual limb. The prosthesis should be designed for easy removal and reapplication by a single person, without the need for sedation (Jean, 1996) [10].

Once the stump has healed and inflammation has subsided, a mould can be created of the severed limb. A double layer of cast stockinette is applied to the stump first, extending to the limb's proximal end. Three layers of cast material are put to the stump and allowed to harden. Cast is then removed by cutting along its lateral surfaces. The cast replicates the amputated stump negatively. Dental plaster or liquid plaster of Paris is used to fill this negative replica, and when it dries, it creates a positive replica of the severed stump. A more comfortable, total contact fit is made possible by under-weight bearing, which modifies this positive reproduction by tightening soft tissue areas and strengthening bony areas.

The positive model has a 0.5-inch rubber pad fabricated to fit the distal end. To increase strength and save weight, an I-beam construction technique is used to laminate acrylic resin, carbon fibers, and fiberglass over the positive model and the end pad. After the lamination hardens, the positive model is taken out leaving only the negative lamination, or socket, with the end pad in situ; a window is cut out medial posterior to allow donning of the socket over the greater condylar surface (Jean, 1996) [10]. The window is covered with a laminated shell and secured into position when the socket is put on. By locking the bulbous distal end into the socket, this technique removes the requirement for straps and permits the use of the end for suspension. To keep the amputee comfortable, the socket must be properly aligned. After that, the finished socket is fastened to the prosthesis's distal section. The contralateral limb is measured to determine the proper angle and length of the distal sections (Jean, 1996) [10].

Daily maintenance (Large animals)

Prostheses should be removed every day. Every day, the stump is examined to look for signs of skin abrasions blister formation that could lead to skin ulcers. When moisture builds up on the prosthesis's inner surface and stump, it might cause skin maceration if it is removed less frequently. When epidermal anomalies are identified, the prosthesis should be removed until the area has healed (Thompson, 1972) [19]. During this time, the stump is wrapped in a strong bandage to promote excellent circulation and reduce stress. The socket should be evaluated properly to decide whether it needs relief. When the stump has healed, the prosthesis can be used again for short time periods until skin tolerance to sustained weight bearing is appropriate.

If the stump's appearance is deemed acceptable during the daily assessment, it is towel-dried, wiped with alcohol, and left to air dry. The stump is covered with a thin layer of cast stockinette, which is fastened proximally with elastic tape. The dry prosthesis is fitted to the stump and fixed in place. According to Jean (1996) [10], the animal must be housed in a location where there is minimal possibility of the prosthesis becoming entangled in an object.

Daily maintenance (Small animals)

The amount of time a prosthesis can be worn varies considerably depending on its fit and the patient's comfort. Some individuals are able to use it throughout the day, while others may only wear it for short walks outdoors. After each removal, the residual limb should be checked for skin condition and any signs of pain or discomfort. Hair loss in the area may indicate poor stability of the device, suggesting friction between the limb and the prosthesis. Skin redness in areas of friction or high pressure may occur before skin injury in people with short hair. Device should be adjusted if any skin ulceration occurs. Depending on how well the device fits and how snug it is, pressure points can be relieved either by adding foam padding around the affected area or by making minor adjustments to the shape of the prosthesis. The orthotic or prosthetic should be inspected each day and can be cleaned as needed (Marcellin-Little, 2015) [12].

Advantages of exoprosthesis (Socket prosthesis)

Socket prosthetic limb is relatively economic than ITAP. It may be applying by one or two person easily without sedation. In socket prosthetic limb, there is no danger of infection to bone directly as in ITAP. Socket prosthetic limb can be fitted to several level of amputation such trans metacarpal, trans metatarsal, trans radial. Special surgery is not needed in socket prosthetic limb fitting (Arauz *et al*., 2021) [1].

Disadvantages of exoprosthesis (Socket prosthesis)

This approach becomes ineffective when used on very short limbs, especially in patients with multiple small residual segments. Achieving an optimal socket fit can be challenging, and poor fit directly affects the user's mobility and overall satisfaction. Ongoing changes in the residual limb such as scarring, neuroma formation, or variations in limb volume or length often require frequent socket modifications. These fluctuations may eventually make it necessary to fabricate a new prosthetic sock*et al*together. It cannot be mass made (Shelton *et al*., 2011) [18].

A larger weight-bearing surface helps reduce the pressure exerted where the stump meets the prosthesis; however, as pressure on the end of the residual limb increases, the amputee's comfort decreases accordingly (Hampton, 1972) [9]. Reported complications associated with human stump-socket prostheses include seroma formation, wound breakdown, infections of the residual limb, and various skin issues at the stump-prosthesis interface, many of which are influenced by the patient's underlying condition (Pollard *et al*., 2006; Ploeg *et al*., 2005) [17, 16].

Contraindications of exoprosthesis (Socket prosthesis)

Contraindications for using a socket prosthesis can stem from factors related to the owner, the patient, or the medical condition. Owner-related factors include insufficient motivation, inability to provide proper supervision, or limited financial resources to support the prosthetic use (Marcellin-Little, 2015) [12].

Patient-related contraindications include behavioral challenges, such as aggression that makes handling difficult. Excessively mobile skin relative to the underlying tissues also poses a problem for socket prostheses. This issue is especially common in cats and dogs that have undergone partial amputations below the stifle, where patients may lift the limb while the skin remains fixed, complicating secure attachment of the prosthesis. In contrast, animals with amputations distal to the carpus or tarsus typically have less problematic skin mobility. Neurological impairments can prevent the use of an exoprosthesis, as affected individuals often cannot position the prosthesis correctly for proper function. Limited joint mobility, such as from contractures, is a contraindication for using an exoprosthesis. In cases where joint movement is partially restricted, dynamic hinged braces can be used to gradually stretch the joint, and some of these braces may even help improve mobility (Marcellin-Little, 2015) [12]. Relative contraindications to using a socket prosthesis include issues with the remaining limbs, such as localized neoplasia, infection, or stump pain. Pain in the residual limb may be caused by chronic inflammation, commonly due to infection, or potentially linked to non-union or other complications. Additionally, the stump can be uncomfortable if adhesions form between the skin and remaining bone, or if the residual bone has sharp edges (Marcellin-Little, 2015) [12].

Intraosseous Transcutaneous Amputation Prosthesis (ITAP)/ Endo-Exoprosthesis

To address the limitations of traditional stump-socket prostheses, a new approach uses a two-part system: An internal component implanted within the limb, known as the endoprosthesis, and an external component called the exoprosthesis. The endoprosthesis, an intraosseous prosthesis, is formed of an inert material which is placed into the bone of the residual limb. Osteointegration is the method used in this portion of the prosthetic. In essence, it is the location where the implant and bone meet, resulting in the prosthetic being surgically attached to the bone.

Osseointegration refers to the direct structural and functional bonding between bone and a metal implant, providing stable fixation. This technique has emerged as a promising surgical advancement to overcome many of the challenges and limitations associated with traditional socket-based prostheses. Arauz *et al*., 2014) [1]. Initially studied in humans, the aim of Osseo integration is to enhance a prosthesis's functionality, durability, and range of motion, while also improving vibrotactile and pressure feedback through Osseo perception.

In ITAP, "intraosseous" refers to placement within the bone, "transcutaneous" refers to passage through the skin, and "amputation" involves the removal of a limb or part of a limb, which is then replaced with a prosthetic device. A portion of the intraosseous prosthesis that is not submerged in the bone is connected to the exoprosthesis, also referred to as the transcutaneous prosthesis. Unlike a traditional stump-socket prosthesis, this intraosseous-transcutaneous design transfers mechanical load directly from the bone to the prosthetic limb. Because of its complexity and the need for several resources and labor, this prosthetic can be rather costly. If the implant is not placed appropriately, it is quite possible to fracture the distal portion of the bone. Further in vitro studies are needed to better understand how load is transferred from the weight-bearing implant to the bone, with the goal of minimizing stress and optimizing the implant's force-dissipation properties (Fitzpatrick *et al*., 2011) [6].

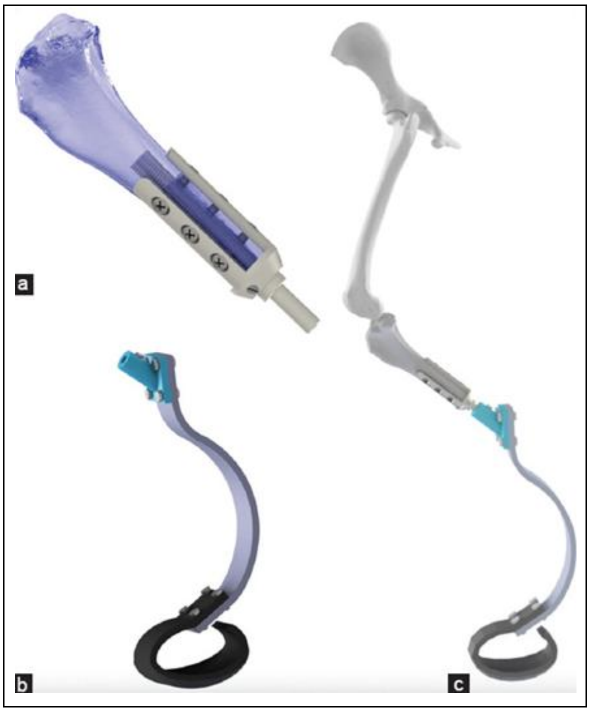

Fig 6: Diagram of an intramedullary osseointegrated transtibial endoprosthesis in a canine hind limb attached to the endo-prosthesis; (c) a schematic of the assembled hind-limb endo-exo-prosthesis.

Osseointegration typically involves placing titanium implants into the intramedullary canal of the bone. A percutaneous fixture is then passed through the skin and connected to the intramedullary implant, providing a secure attachment point for the exoprosthesis. This approach removes the need for direct skin-socket contact, creating a stable anchor for the prosthetic limb while minimizing damage to the skin and surrounding soft tissues (Bates *et al*., 2020; Laferrier *et al*., 2010) [2, 11].

Fig 7: Images illustrating various designs and materials for the transcutaneous components of ITAP implants: (A) Blade design constructed from carbon fiber; (B) Concentric metal cylinders with a rubber insert; (C) Rocker made of Delrin™; (D) Shock-absorbing foam beds encased in rubber with Kevlar reinforcement; (E) Single-piece deformable polymer design; (F) Multidirectional foot piece featuring a Delrin™ shaft

Advantage of ITAP

Fitzpatrick *et al*. (2011) [6] reported that osseointegrated implants offer several potential advantages, including improved proprioception, immediate load transfer, increased comfort, and elimination of common problems associated with the stump-socket interface in traditional prostheses.

Disadvantage of ITAP

Complications associated with osseointegrated implants include distal bone fractures, infections, skin breakdown, and aseptic loosening. Additionally, these prostheses can be costly because of their complexity and the significant resources and labor required (Fitzpatrick *et al*., 2011) [6].

Conclusion

Veterinary prosthetic technology, including exo-prostheses, endo-prostheses, and Intraosseous Transcutaneous Amputation Prostheses (ITAP), offers valuable options for restoring mobility and quality of life in animals with limb loss due to trauma, disease, or congenital defects. Exo-prostheses (socket prostheses) remain the most widely used because they are economical, non-invasive, and adaptable to many levels of amputation, although they require proper fit, regular maintenance, and careful monitoring to avoid skin complications. Advances in materials such as carbon fiber, silicone liners, and lightweight metals have improved comfort, durability, and functionality. ITAP and other Osseo integrated systems help overcome limitations of socket prostheses especially in cases with very short residual limbs by providing direct skeletal attachment and improved proprioception, but they involve greater cost, surgical complexity, and risks such as infection or bone fracture. As rehabilitation becomes more prominent in veterinary practice, continued research on optimal prosthetic design, materials, suspension systems, and long-term outcomes will further enhance mobility and welfare in companion and farm animals requiring limb replacement.

Future Prospects

Future developments in veterinary prosthetics are expected to focus on improving customization, durability, and biological integration through advances in biomaterials, 3D printing, and Osseo integrated implant design. Additive manufacturing will allow highly tailored sockets and implants that match individual anatomy, reducing complications and improving comfort and gait. Emerging materials such as antibacterial coatings, bioactive surfaces, and flexible composites may reduce infection rates and enhance tissue integration for devices like ITAP. Smart prosthetics incorporating sensors, shock-absorbing pylons, and microprocessor-controlled joints could further improve stability and proprioception in animals, similar to trends in human prosthetics. Additionally, improved rehabilitation protocols, pressure-mapping technologies for better socket fit, and long-term biomechanical studies will help optimize outcomes across species. As awareness and demand grow among animal owners, and as costs gradually decrease with technological advancements, veterinary prosthetics are likely to become more accessible, reliable, and widely used in clinical practice.

Conflict of Interest

Not available

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Not available

Reference

1. Arauz PG, Chiriboga P, Garcia MG, Kao I, Diaz EA. New technologies applied to canine limb prostheses: A review. Veterinary World. 2021;14(10):2793-2802. DOI: 10.14202/vetworld.2021.2793-2802
2. Bates TJ, Fergason JR, Pierrie SN. Technological advances in prosthesis design and rehabilitation following upper extremity limb loss. Curr Rev Musculoskelet Med. 2020;13(4):485-93.
3. Branemark R, Berlin O, Hagberg K, Bergh P, Gunterberg B, Rydevik B. A novel osseointegrated percutaneous prosthetic system for transfemoral amputation: A prospective study of 51 patients. Bone Joint J. 2014;96(1):106-13.
4. Decante F. Case report use of a prosthesis in a calf after amputation of the metatarsus. Point Veterinaire. 1990;22(132):675-8.
5. Desrochers A, Jean G, Anderson DE. Limb amputation and prosthesis. Vet Clin Food Anim Pract. 2014;30(1):143-55. DOI: 10.1016/j.cvfa.2013.11.005
6. Fitzpatrick N, Smith TJ, Pendegrass CJ, Yeadon R, Ring M, Goodship AE, *et al*. Intraosseous Transcutaneous Amputation Prosthesis (ITAP) for limb salvage in 4 dogs. Vet Surg. 2011;40(8):909-25.
7. Gholizadeh H, Osman NA, Eshraghi A, Ali S, Razak NA. Transtibial prosthesis suspension systems: Systematic review of literature. Clin Biomech. 2014;29(1):87-97.
8. Gutfleisch O. Peg legs and bionic limbs: the development of lower extremity prosthetics. Interdiscip Sci Rev. 2003;28(2):139-48. DOI: 10.1179/030801803225010368
9. Hampton FL. Prosthetic principles in the lower extremity amputee. Orthop Clin North Am. 1972;3(2):339-347.
10. Jean GS. Amputation and prosthesis. Vet Clin North Am Food Anim Pract. 1996;12(1):249-61. DOI: 10.1016/S0749-0720(15)30446-1
11. Laferrier JZ, Gailey R. Advances in lower-limb prosthetic technology. Phys Med Rehabil Clin N Am. 2010;21(1):87-110. DOI: 10.1016/j.pmr.2009.08.003
12. Little MDJ, Drum MG, Levine D, McDonald SS. Orthoses and exoprostheses for companion animals. Vet Clin Small Anim Pract. 2015;45(1):167-83. DOI: 10.1016/j.cvsm.2014.09.009
13. Merola M, Affatato S. Materials for hip prostheses: a review of wear and loading considerations. Materials. 2019;12(3):495. DOI: 10.3390/ma12030495
14. Orsini JA, Warner A, Dyson S, Nunamaker D. Lower extremity amputation and application of a prosthetic device in a 1-month-old calf. Vet Surg. 1985;14(4):307-9. DOI: 10.1111/j.1532-950X.1985.tb00893.x
15. Paterno L, Ibrahimi M, Gruppioni E, Menciassi A, Ricotti L. Sockets for limb prostheses: A review of existing technologies and open challenges. IEEE Trans Biomed Eng. 2018;65(9):1996-2010. DOI: 10.1109/TBME.2017.2775100
16. Ploeg AJ, Lardenoye JW, Peeters MPV, Breslau PJ. Contemporary series of morbidity and mortality after lower limb amputation. Eur J Vasc Endovasc Surg. 2005;29(6):633-7.
17. Pollard J, Hamilton GA, Rush SM, Ford LA. Mortality and morbidity after transmetatarsal amputation: retrospective review of 101 cases. J Foot Ankle Surg. 2006;45(2):91-7.
18. Shelton TJ, Beck JP, Bloebaum RD, Bachus KN. Percutaneous osseointegrated prostheses for amputees: limb compensation in a 12-month ovine model. J Biomech. 2011;44(15):2601-2606.
19. Thompson RG. Complications of lower extremity

amputations. Orthop Clin North Am. 1972;3(2):323-338.
20. Withrow SJ, Hirsch VM. Owner response to amputation of a pet's leg. Vet Med Small Anim Clin. 1979;74(3):332-334.
21. Carberry CA, Harvey HJ. Owner satisfaction with limb amputation in dogs and cats. J Am Anim Hosp Assoc. 1987;23:227-232.

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