Adhesives in veterinary medicine: a review

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HOW ADHESIVES BENEFIT VETERINARY CARE

Adhesive bonding has increasingly been used in either human and veterinary medicine owing to its applicability across multiple clinical scenarios. Its efficacy lies in its ability to adapt to both soft tissue and orthopedic requirements. Unlike traditional methods, adhesive bonding provides a less invasive alternative, minimizing tissue trauma and preserving bone integrity by avoiding the need for incorporated materials. Moreover, adhesives also fulfill functions beyond the capabilities of conventional methods, such as hemostasis control and tissue sealing. Their smooth and painless application, particularly crucial in emergencies or for animals that cannot withstand prolonged surgical procedures, distinguishes them from other techniques.

ADHESIVE BONDING IN VETERINARY FIELDS

Veterinary practice encompasses various medical disciplines where adhesive bonding plays a significant role. Below, we categorize the areas where adhesive bonding is either commercially utilized or under investigation.

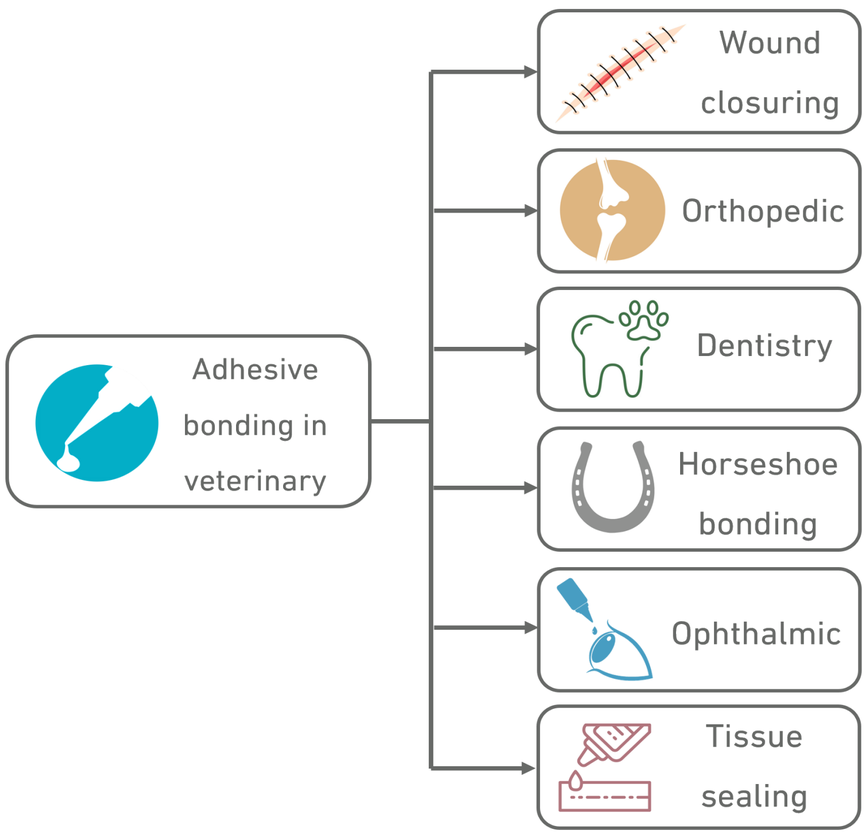

FIGURE 1. Areas of application of adhesive bonding within veterinary medicine.

TABLE 1. Benefits and drawbacks of adhesive bonding in veterinary practice.

ADVANTAGES	DISADVANTAGES
Less tissue trauma	Limited strength specially in high tension areas or load-bearing applications
Bone preservation	Risk of dehiscence
Lower risk of bacterial infection	Possible allergic reactions
Quickly applicable without discomfort	Challenging application due to moisture, blood and hair
Effective bleeding control and tissue sealing	Limited research investment
Replacement of horse nails in horses with hoof problems or lameness issues	Adhesive-bonded horseshoes might not provide enough stability for high-performance activities

EXPLORING ADHESIVE SOLUTIONS IN ANIMAL CARE

Table 2 presents a selection of adhesive products and their applications within veterinary medicine, showcasing their diverse uses and contributions to enhancing animal health and well-being.

TABLE 2. Examples of adhesive solutions employed in the several veterinarian areas.

VET AREAS	ADHESIVE SYSTEM	APPLICATION
Orthopedic	Osteocrete, Bone Solutions Inc. (magnesium-based, injectable bone adhesive) [2]	Tendon-to-bone healing treatment in a rabbit model of anterior cruciate ligament reconstruction.
Dentistry	OptiBond® All-In-One, Brush & Bond®, Excite (bonding agents) [3]	Protection of fractured teeth, by preventing infection, decreasing pain and accelerating healing time
Horse hoof	Hoof Armor® (epoxy coating) [4]	Commercial adhesive coating that completely replaces horseshoes
Ophthalmic	3M Vetbond® (n-butyl-ester cyanoacrylate adhesive) [5]	Treatment of corneal ulceration in rabbits
Tissue Sealant	Tisseel® (Fibrin Glue) [6]	Treatment of intratracheal dorsal laceration in a horse

FIGURE 2. Application of Hoof Armor® epoxy coating on a horse hoof [4]

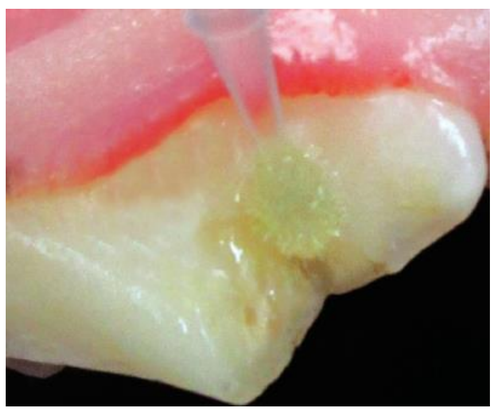

FIGURE 3. Applying bonding agent for protecting dog teeth [3]

CONCLUSION

Adhesive bonding can contribute to improved wound healing, reduced infection risk, and enhanced surgical outcomes in several veterinary specialties. Regardless of their benefits, it's crucial to acknowledge potential limitations, including biocompatibility concerns and variable efficacy in certain clinical scenarios. Continued research and development are essential for ensuring the approval of new solutions in terms of biocompatibility and mechanical strength.

ACKNOWLEDGEMENTS

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