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Bisphosphonates for joint pain in horses – arthritis and navicular syndrome

What Bisphosphonates are:

- Drugs that prevent the breakdown of bone, slowing osteoclasts, cells responsible for dissolving bone
- Used in the treatment of osteoporosis, and raised blood calcium levels

Indication for use:

- Tiludronate and clodronate are approved for treating navicular syndrome
- They are often used off-label for osteoarthritis in other joints horses, often the distal tarsal (hock) joint
- They are administered by an intramuscular injection

Action

- In addition to slowing bone breakdown, they may reduce inflammation and give some pain relief
- They inhibit bone resorption, but impact on equine bone remodelling is unclear
- No significant changes in bone structure or remodelling in healthy horses after standard dosing, suggesting clinical benefit may be due to pain modulation rather than bone effects
- The pain modulation may involve non-bone pathways

Effectiveness:

- Navicular syndrome:
- Research suggests that bisphosphonates can significantly reduce lameness and improve activity in about 50% of horses treated with navicular syndrome, with effects lasting up to 6 months
- Improvement is more pronounced in recent-onset cases

- Osteoarthritis in other joints:
- There is little evidence to suggest their use over steroid injections or non-steroidal anti-inflammatories (eg. Bute, Equioxx, Danilon), with studies showing modest, short term improvements

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Safety and Risks:

- There are some concerns about using off-label medication in young or exercising horses, with a lack of long term safety data – as bisphosphonates may impair normal bone growth, adaptation, or healing, with unknown long term risks
- Renal injury is a potential but rare complication

Conclusion:

- Bisphosphonates are effective for reducing lameness in many horses with navicular syndrome, but not all respond
- Current research does not support bisphosphates as an effective or superior treatment for arthritis in horses
- Further research is required to understand their benefits and any potential risks

References – Bisphosphonates

Argüelles, D., Saitua, A., De Medina, A., Muñoz, J., & Muñoz, A., 2019. Clinical efficacy of clodronic acid in horses diagnosed with navicular syndrome: A field study using objective and subjective lameness evaluation.. *Research in veterinary science*, 125, pp. 298-304 . https://doi.org/10.1016/j.rvsc.2019.07.018.

Davis, A., Smith, T., Hing, C., & Sofat, N., 2013. Are Bisphosphonates Effective in the Treatment of Osteoarthritis Pain? A Meta-Analysis and Systematic Review. *PLoS ONE*, 8. https://doi.org/10.1371/journal.pone.0072714.

Denoix, J., Thibaud, D., & Riccio, B., 2010. Tiludronate as a new therapeutic agent in the treatment of navicular disease: a double-blind placebo-controlled clinical trial.. *Equine veterinary journal*, 35 4, pp. 407-13 . https://doi.org/10.2746/042516403776014226.

Dubuc, J., 2020. Distal tarsal joints osteoarthritis: Evidence behind bisphosphonates and NSAIDs to improve lameness. *Verbum Et Ecclesia*, 5. https://doi.org/10.18849/ve.v5i1.204.

Eriksen, E., Shabestari, M., Ghouri, A., & Conaghan, P., 2020. Bisphosphonates as a treatment modality in osteoarthritis.. *Bone*, pp. 115352 . https://doi.org/10.1016/j.bone.2020.115352.

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References – Bisphosphonates

Fernández-Martín, S., López-Peña, M., Muñoz, F., Permuy, M., & González-Cantalapiedra, A., 2021. Bisphosphonates as disease-modifying drugs in osteoarthritis preclinical studies: a systematic review from 2000 to 2020. *Arthritis Research & Therapy*, 23. https://doi.org/10.1186/s13075-021-02446-6.

George, J., Leatherwood, J., Arnold, C., Glass, K., Paris, B., Conrad, M., Martinez, R., Hernandez, F., Nielsen, B., Colbath, A., Welsh, T., & Bradbery, A., 2023. PSIII-8 Extra-Label Bisphosphonate Effects on Intra-Articular Inflammation in Juvenile Horses Challenged with Intra-Articular Lipopolysaccharide. *Journal of Animal Science*. https://doi.org/10.1093/jas/skad281.450.

Greene, H., 2020. Are bisphosphonates a more effective treatment than intra-articular steroids in horses with distal hock osteoarthritis?. *Verbum Et Ecclesia*, 5. https://doi.org/10.18849/ve.v5i1.235.

Hayes, K., Giannakeas, V., & Wong, A., 2020. Bisphosphonate Use Is Protective of Radiographic Knee Osteoarthritis Progression Among those With Low Disease Severity and Being Non-Overweight: Data From the Osteoarthritis Initiative. *Journal of Bone and Mineral Research*, 35. https://doi.org/10.1002/jbmr.4133.

McLellan, J., 2017. Science-in-brief: Bisphosphonate use in the racehorse Safe or unsafe?. *Equine Veterinary Journal*, 49, pp. 404–407. https://doi.org/10.1111/evj.12682.

Mitchell, A., Watts, A., Ebetino, F., & Suva, L., 2019. Bisphosphonate use in the horse: what is good and what is not?. *BMC Veterinary Research*, 15. https://doi.org/10.1186/s12917-019-1966-x.

Mitchell, C., & McNulty, M., 2019. What we know regarding the use of bisphosphonates in horses. *The FASEB Journal*, 33. https://doi.org/10.1096/fasebj.2019.33.1_supplement.333.2.

Peris, P., Monegal, A., & Guañabens, N., 2021. Bisphosphonates in inflammatory rheumatic diseases.. *Bone*, pp. 115887 . https://doi.org/10.1016/j.bone.2021.115887.

Soto, S., & Barbará, A., 2014. Bisphosphonates: Pharmacology and Clinical Approach to Their Use in Equine Osteoarticular Diseases. *Journal of Equine Veterinary Science*, 34, pp. 727-737. https://doi.org/10.1016/J.JEVS.2014.01.009.

Suva, L., Cooper, A., Watts, A., Ebetino, F., Price, J., & Gaddy, D., 2020. Bisphosphonates in veterinary medicine: The new horizon for use.. *Bone*, 142, pp. 115711 . https://doi.org/10.1016/j.bone.2020.115711.

Tippen, S., Metzger, C., Sacks, S., Allen, M., Mitchell, C., & McNulty, M., 2024. Clinically relevant doses of tiludronate do not affect bone remodelling in pasture-exercised horses. *Equine Veterinary Journal*, 57, pp. 513 - 521. https://doi.org/10.1111/evj.14119.

Vergara-Hernandez, F., Nielsen, B., & Colbath, A., 2022. Is the Use of Bisphosphonates Putting Horses at Risk? An Osteoclast Perspective. *Animals : an Open Access Journal from MDPI*, 12. https://doi.org/10.3390/ani12131722.

Villatoro-Villar, M., & Kwoh, C., 2021. Bisphosphonates, Bone and Joint Pain. *Current Osteoporosis Reports*, 19, pp. 417 - 428. https://doi.org/10.1007/s11914-021-00687-7.

Yocom, A., Contino, E., & Kawcak, C., 2023. Review of the Mechanism of Action and Use of Bisphosphonates in Horses.. *Journal of equine veterinary science*, pp. 104503 . https://doi.org/10.1016/j.jevs.2023.104503.