Zoe Fisher. ACPAT & RAMP
Registered Physiotherapist
MSc Chartered Physiotherapist
zoe@physiogold.net

physio gold
Veterinary Physiotherapy
& Chartered Physiotherapy Practice

www.physiogold.net
07833 606 519

SMG injections for joint pain, osteoarthritis in horses

What SMG is, and action of the drugs:

- Sildenafil
  - PDE-5 inhibitor (results in blood vessel dilation), acts as an anti-inflammatory agent by increasing cyclic GMP
- Mepivacaine
  - A local anaesthetic that provides pain relief, and is generally considered safer than lidocaine for joint use
- Glucose
  - Used as a controlled irritant, to stimulate a localised healing response when injected
- Sildenafil and mepivacaine at low concentrations, when combined with glucose, appear to reduce inflammation and restore cellular calcium signalling (healthy cell communication) in joint tissues, which is different to their traditional pharmacological roles

Indication for use:

- This is a recent treatment development, using this combination as an intra-articular injection, for horses with mild osteoarthritis

Effectiveness:

- With limited research to date, this combination, compared to a standard steroid injection, has led to significant improvements in lameness scores and gait quality, favourable changes in joint biomarkers associated with positive cartilage and bone health.

Safety and Risks:

- There is some risk with local anaesthetic in joints, so careful dosing is important, but mepivacaine is generally considered a safer choice
- Infection risk: in first 4 weeks following injection

Conclusion:

- Early clinical evidence supports the use of joint injections containing sildenafil, mepivacaine and glucose for improving lameness, and joint health, in horses with mild osteoarthritis, with favourable short term safety profile
- Further research is required

Zoe Fisher. ACPAT & RAMP
Registered Physiotherapist
MSc Chartered Physiotherapist
zoe@physiogold.net

physio gold
Veterinary Physiotherapy
& Chartered Physiotherapy Practice

www.physiogold.net
07833 606 519

References – SMG Injections

Adler, D., Jørgensen, E., & Cornett, C., 2022. The concentration of lidocaine and mepivacaine measured in synovial fluid of different joints of horses after single intra-articular injection. *Frontiers in Veterinary Science*, 9. https://doi.org/10.3389/fvets.2022.1007399.

Hansson, E., & Skiöldebrand, E., 2021. Bupivacaine in combination with sildenafil (Viagra) and vitamin D3 have anti-inflammatory effects in osteoarthritic chondrocytes. *Current Research in Pharmacology and Drug Discovery*, 2. https://doi.org/10.1016/j.crphar.2021.100066.

Hu, M., Wu, L., Wei, E., Pan, X., Zhu, Q., Xiuyun, X., Lv, L., Dong, X., Liu, H., & Liu, Y., 2025. Sildenafil promotes osteogenic differentiation of human mesenchymal stem cells and inhibits bone loss by affecting the TGF-β signaling pathway. *Stem Cell Research & Therapy*, 16. https://doi.org/10.1186/s13287-025-04320-7.

Menger, M., Emmerich, M., Scheuer, C., Hans, S., Braun, B., Herath, S., Rollmann, M., Menger, M., Laschke, M., & Histing, T., 2024. Sildenafil delays bone remodeling of fractured femora in aged mice by reducing the number and activity of osteoclasts within the callus tissue.. *Biomedicine & pharmacotherapy = Biomedecine & pharmacotherapie*, 173, pp. 116291 . https://doi.org/10.1016/j.biopha.2024.116291.

Pirri, C., Sorbino, A., Manocchio, N., Pirri, N., Devito, A., Foti, C., & Migliore, A., 2024. Chondrotoxicity of Intra-Articular Injection Treatment: A Scoping Review. *International Journal of Molecular Sciences*, 25. https://doi.org/10.3390/ijms25137010.

Skiöldebrand, E., Adepu, S., Lützelschwab, C., Nyström, S., Lindahl, A., Abrahamsson-Aurell, K., & Hansson, E., 2023. A randomized, triple-blinded controlled clinical study with a novel disease-modifying drug combination in equine lameness-associated osteoarthritis. *Osteoarthritis and Cartilage Open*, 5. https://doi.org/10.1016/j.ocarto.2023.100381.