

TOWARDS A POTENTIAL COMPLEMENTARY MONITORING TOOL FOR OSTEOARTHRITIS

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ABSTRACT

Osteoarthritis, the most common major disabling disease in humans, is known to cause the breakdown of articular cartilage in elder patients. Except the fact that this degenerative joint disease produces severe financial drain over the national health systems, is also one of the most common challenges in equine orthopedics, causing career-limiting or, even worse, career-ending lameness. Synovial fluid (the biological material in the joint cavity) plays an important role for the proper joint function due to characteristic properties, which are derived from its unique molecular structure; it protects the articular cartilage from the pressure applied to the joints during movement, lubricates the cartilage surfaces and at the same time is a source of its nutrients. Therefore, its current condition is of primary importance for the joints' well-being, reflecting in parallel its current state (rewrite for clarity). A complete biomechanical analysis on more than a hundred synovial fluid samples of both healthy and diseased metacarpophalangeal, intercarpal and interphalangeal joints obtained from 67 equine athletes of Warmblood and Thoroughbred breeds was performed. Our study demonstrated the existence of subtle differences in the biological role of SF in the different joints of the body as well as different predispositions for osteoarthritis. In addition, we detected that the quantitative properties of synovial fluid were related to the horse breed, joint state and type, according to the phenotype of the living organism. The full rheological study, combined with a detailed biochemical and cytological examination, aims to map and understand the biomechanical properties of the equine synovial fluid in order to correlate them with the corresponding clinical and radiographic joint status. Based on these findings, our goal is to create a supplementary tool in medical and veterinary practice in order to assess the state of joint, helping for the prevention of osteoarthritis through therapeutic interventions in an individual basis. Furthermore, the detailed understanding of the SF properties will contribute to the interpretation of the causes of osteoarthritis even the development of new treatments to address the disease.

KEYWORDS: Osteoarthritis, Rheology, Synovial fluid, Individualized approach

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