

Multiscale modeling of subchondral bone fatigue injury at the equine fetlock joint

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The equine fetlock joint is one of the most commonly injured sites among racehorses, with racing relating injuries at this location being a significant source of lost training days and morbidity. Throughout the course of a season, young racehorses subject their limbs to repetitive, high intensity loads during high-speed racing and training sessions. Over time, this can result in damage to the bones at the fetlock joint and if this damage continues to accumulate in response to cumulative bouts of activity, it can eventually progress to a fracture.

The objective of this research is to model the equine fetlock joint and investigate how a variety of factors at multiple length scales contribute to the development of these injuries. This will be accomplished through a combination of advanced medical imaging, biomechanical testing, and computational modelling.

Understanding the underlying mechanisms of how these fractures occur will aid in the development of more effective training strategies to reduce the incidence of these injuries. The results of this work will provide a fundamental understanding of the development of these injuries and ultimately contribute to the prevention fractures in racehorses.