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Tendon response to loading

Abstract:

The force of contracting muscles is transmitted via tendons to bone and produce joint moments that achieve human movement. Therefore, conceivable changes in tendon composition, structure and mechanical properties as a result of exercise and aging can influence the overall function of the muscle-tendon unit. However, in contrast to muscle, our understanding of the effects of aging and exercise on the structure and function of the connective tissues is comparatively sparse. While connective tissues, i.e. tendons, have been historically thought of as relatively inert structures, more recent data suggest that tendons can respond and adapt to loading and aging. Although we now know that connective tissue is not inert, its poor healing ability remains a clinical challenge, and both tendon ruptures and chronic overload injuries of tendons are frequently occurring problems. Moreover, tendon tissue injuries appear to be more frequent with aging, and yet the underlying mechanisms remain poorly understood. A key problem is that the optimal properties of a given tendon are poorly understood making it difficult to define what constitutes a detrimental or an advantageous change. Further, the cellular regulation of tendon tissue homeostasis, and how such mechanisms contribute to overall tissue mechanical properties have yet to be clearly outlined, and while it appears that the mechanical function of tendon can be altered, little is known about the origins of these alterations. The presentation will consist in a review of the current understanding of how tendons respond and adapt to exercise and ageing

Bio:

Peter Magnusson is a senior researcher at the Institute of Sports Medicine, Copenhagen, the head of the Musculoskeletal Rehabilitation Research Unit at Bispebjerg Hospital and full professor at University of Copenhagen, Denmark. He began his career at the Nicholas Institute of Sports Medicine, New York prior to moving back to Sweden to begin working for Team Denmark that services the various Olympic national teams in Copenhagen, Denmark. He is currently a fulltime researcher and has published >170 peer-reviewed articles and numerous book chapters related to the muscle-tendon unit. The overall focus of our research is gain insight into the structure and function of human tendons as it relates to i) force transmission on a macroscopic and nanoscale level, ii) adaptation to physical activity and inactivity, and iii) responses to various forms of treatment of tendon injuries. He has served a section editor for the Scandinavian Journal of Medicine and Science in Sports for over a decade, and he serves on the board for several research agencies.