ADAPTATIONS IN TENDON PROPERTIES
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The use of ultrasound scanning in combination with dynamometry has recently made it possible to obtain human tendon force-length and stress-strain curves in vivo and non-invasively. This presentation will review experiments in which the above techniques were used to study the adaptability of human tendon properties to mechanical loading. Experiments on tendons subjected to different habitual loading in a given subject population indicate that the material properties of the tendons, reflected by their Young’s modulus values, are similar. This means that if a tendon needs to be stiffer to withstand larger physiological tensile loads than another tendon, it can do so by simply increasing its cross-sectional area. However, measurements on a given tendon in subject groups of different ages and physical activity histories indicate that the material of the tendon can undergo adaptive changes in response to altered loading; The tendon Young’s modulus increases with increased chronic loading and it deteriorates with reduced loading. The same conclusion is drawn from pre- vs. post-intervention comparisons where loading is manipulated by introducing exercise training or disuse. Therefore, it seems that physiological functioning is adequate to maintain the material properties of different tendons at a given base-line level, deviation from which arise when the base-line loading is chronically and substantially altered.