It is well known that aging affects the biology, healing capacity, and biomechanical function of the musculoskeletal system. Over time, this effect can potentially manifest as clinical pathologies including osteoarthritis, tendinopathies and osteoporosis. It is an inarguable fact that better understanding of age-related changes to the connective tissues will ultimately lead to better patient care. It has been suggested that physical exercise counteracts this age-related changes by altering the cellular cross-talk signals via various mechanical processes. The changes within the cellular conditioning are briefly known as mechanotransduction. In this physiological process, cells sense and respond to mechanical loads and translate them into cellular expressions, which in turn results in cellular repair responses. Chondrocytes has been shown to be influenced by such phenomenon and that the present environment i.e. cartilage, further facilitate the mechanical cue processes involved. For example, the human cartilage deforms very little in vivo during physiological activities and, recovers from deformation within 90 minutes after loading. This provides a more deform-resistant environment for chondrocytes to reside in, thus regulating how the cells express themselves. Taking this into account, and considering the fact that chondrocytes are also fibroblast derived, it is not to be unexpected that other cells of similar lineage would be regulated in similar manner. Physiological changes to tissues containing fibroblastic cells should be observed when subjected to mechanical loading, and that these observations should be universal. It is thought that this process can be harnessed to produce good outcome clinically; leading to superior tissue repair and remodeling. These can also be expected in various tissue of mesenchyme origin such as tendon, muscle, cartilage and bone. Based on several high-quality randomized controlled trials and systematic reviews that we have reviewed, it is clear that certain forms of exercise or movement prescription have shown to be beneficial to patients, and in many have been therapeutic. However, the mechanism involved at the cellular level that leads to these observations remains to be elucidated. A pertinent question that needs to be answered would be whether the impact of different levels and patterns of exercise can lead to varying cellular responses that translates to cartilage regeneration responses. Another intriguing question is whether these responses are as predictable when they involve tissues from individuals of advanced age. The present lecture would discuss our research involving the fundamental understanding relating to the mechanistic, functional and bio-molecular interactions involving exercise and cartilage. The results will be presented and discussed to determine whether these exercise regimes would form a basis that determines a quality baseline data that underpins the role of exercise in cartilage homeostasis.