

## The arthroscopic SFM - a minimally invasive nanotool for probing articular cartilage

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In our attempts to detect early signs of osteoarthritis (OA) in the human hip and knee joint, we inspected the morphological and biomechanical status of articular cartilage biopsies representing different grades of OA according to the "Outerbridge scale". Most significantly, the early changes (grades 0 to 2) which are often not yet symptomatic, were only detectable at the nanometer scale, but not at the micrometer or millimeter scale. These observations have been validated with articular cartilage of aging and OA mice. Motivated by these experimental findings, we developed a scanning force microscope [SFM] that fits into the lumen of a canula typically used in knee arthroscopy (Imer et al., 2006). We will introduce the concept of this minimally invasive instrument and present measurements conducted in a knee phantom, and a pig's ankle. First promising tests using optical arthroscopy for positioning the instrument inside the knee of a cadaver will also be presented.



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