A computational measurement of cartilaginous endplate structure using ultrashort time-to-echo MRI scanning

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Highlights

- Cartilaginous endplate (CEP) plays an essential role in intervertebral disc
- Ultrashort time-to-echo (UTE) MRI scanning has been applied to observe the cartilage in the knee joint and intervertebral disc (IVD). As one structural component of IVD, the cartilaginous endplate (CEP) plays an essential role in IVD health and disease; nevertheless, its *in-vivo* studies were still implemented by the observation of signal abnormal patterns or based on a manually selected region of interest (ROI), which were usually time consuming and often disturbed by subjective bias. Importantly, as ROI selection was usually done in a certain section of the MRI data independently, it was difficult to build a global view of the CEP. Thus, a time-saving technique to harvest the global parameters of the CEP based on the UTE MRI scanning is needed. In this study, based on the UTE data obtained from the goat lumbar spine, a method for CEP signal extraction and assessment was developed. Beyond the global view of CEP was realized, the morphology, thickness distribution and signal intensity distribution were also obtained to facilitate CEP evaluation. Hence, this newly-developed technique is helpful for accurately qualitative and quantitative assessment of the CEP structure after UTE MRI scanning.