Flattened 3D MRI

Published date: Oct. 10, 2017

Technology description

Cartilage Injury Diagnostic Tool

A recent breakthrough in MRI data imaging overcomes the poor spatial correlation between MRI findings in slices and arthroscopic images and allows MRI to be used as a diagnostic tool for cartilage injury. A current trend in orthopedic surgery is to focus on joint preservation by repairing torn cartilage before osteoarthritis and irreversible damage occurs, causing long-term joint pain and disability. While arthroscopy is the gold standard for assessing cartilage integrity, it is invasive and patients may undergo unnecessary procedures when either (1) the cartilage injury is too severe or (2) an open surgery would be preferable.

3D MRI Flattening

Using standard clinical MRI scans, a biochemical (T2*) map can be overlaid over an anatomical image of the cartilage. The joint data can be segmented into regions for which statistics of pathology are generated indicating the likelihood and severity of disease. Moreover, this statistical information is presented in a flattened form, which is consistent with the standard format that orthopedic surgeons are familiar with. The layering of diagnostic MRI readings before flattening allows doctors to better differentiate regions of disease and to more appropriately direct the therapeutic treatment.

Advantages

Patient-specific layering of cartilage and biochemical maps
Potential replacement for invasive arthroscopy
Serves as a screening: able to prevent unnecessary invasive procedures when case is too severe to treat or full-blown open surgery is required.

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