In our initial experience, 3D thickness maps of knee AC walls, allowing for accurate surgical debridement and pre-operative planning for graft material allocation. In no case did the thickness map miss an AC defect of the segmented region. These thickness maps are then reviewed by the radiologist for accuracy, compared to the source images. In patients who underwent subsequent AC defect repair, intra operative measurements were obtained of the AC defect size and location. The intra operative, gold standard data were then compared to the prospectively obtained thickness maps to assess accuracy of lesion size and location.

Results: Initial results (N=12) validate the accuracy of the thickness maps in delineating AC defect size and location (Fig. 1). In addition, the thickness maps accurately delineated the integrity of the AC defect walls, allowing for accurate surgical debridement and pre-operative planning for graft material allocation. In no case did the thickness map miss an AC defect of the segmented region.

Conclusions: In our initial experience, 3D thickness maps of knee AC defects accurately detect and delineate AC defects, and are a clinically useful pre-operative tool. In addition, these automatically generated maps, which can be displayed along any axis, are useful in patient-physician discussions when discussing treatment options. Further work, specifically testing a larger N, is required to obtain statistical validation. Further work also will include also the use of T2 maps, with the thickness maps as a template (Image Available), to further assess the health of the AC surrounding a defect (2), to optimize further intra operative wall debridement and graft material allocation.

osteophyte volume from baseline to 48 months, for 85% (17/20) of the subjects. The average reading time was approximately 10 minutes per knee.

**Conclusion:** The results confirm that quantitative assessment of osteophyte volume can be performed effectively and efficiently and is responsive to change over 48 months. This method has the potential to be a more sensitive, responsive instrument for monitoring longitudinal osteophyte change, and could assess a large study cohort rapidly and accurately potentially reducing study costs and increasing study power for large trials and datasets such as the OA.

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**384 A NEW STANDARDIZATION IN ULTRASONOGRAPHY: SOFT TISSUE HEALTH ANALYSIS AND RESISTANCE FLEXIBILITY TRAINING OF BOB COOLEY**

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**Purpose:** In ultrasonography, while standardizations exist for the evaluation of joint injuries, organ damage, and blood clots in veins and arteries, there is no standardization for the evaluation of soft tissues. Soft tissues visible by ultrasonography include fat, muscle, and fascia. Here, we introduce the use of ultrasound for the detection and analysis of: 1) soft tissue health, disease, and degeneration, 2) dense fascia fibers and scar tissue associated with injury, chronic pain, and poor muscle function, and 3) the effects of Resistance Flexibility™ (RF), a non-invasive, novel therapeutic modality that uses high levels of eccentric force to remove dense fascia and scar tissue.

Standard eccentric training has been shown to prevent injury, reduce pain, and effectively treat tendinopathy. RF differs from other forms of eccentric training, because it includes an advanced biomechanical analysis, uses much greater force, is pain-free, produces rapid biomechanical changes, and requires a high degree of skill by practitioner(s). We introduce the hypotheses that: 1) chronic pain and lack of flexibility, such as that observed in arthritis, is associated with the accumulation of dense fascia fibers, either over time or as a result of trauma, and 2) RF changes the health and structure of fascia, causing an improvement in muscle health and function.

**Methods:** Ultrasound Soft tissue analysis: With high-resolution ultrasound, we captured images of injured and non-injured soft tissue before and after 10 minutes of a) strength training, b) traditional stretching, and c) RF. Video: We collected video of a) strength training, b) traditional stretching, and c) RF in motion. Endoscopy: With high-resolution endoscopy, we filmed a) strength training, b) traditional stretching, and c) RF to analyze the effects of each technique on the fascia of a participant’s right lateral hamstring.

**Results:** Ultrasound Soft tissue analysis: Areas of very high echogenicity, likely indicating abnormally dense fascia fibers, were observed in tissues diagnosed as injured. Non-injured tissues did not contain areas of high echogenicity. A decrease in echogenicity was observed in response to RF in both damaged and normal tissues. Traditional stretching and strength training did not cause a decrease in echogenicity.

Video: Significant tension and lengthening of fascia fibers and structural changes were seen in response to RF, but not in response to traditional stretching or strength training.

Endoscopy: RF training produced fibrillar movement, verticalization of fibers, and changes in the alignment of fascia that traditional stretching and strength training did not produce.

**Conclusions:** These data represent the foundation for a new standardization in the field of ultrasonography to detect diseased and damaged muscle and fascial tissues. Further ultrasound studies are required to investigate how RF may restore fascia to healthier state and to quantify the physical state, hydration, and amount of fascia present in normal and abnormal tissues. The rapid flexibility increases and fascia changes caused by RF are not explainable by current models of muscular change and function. This study represents the first time that a non-invasive modality has been shown to cause a change in fascia in real time by endoscopy.