THE USE OF OPEN-SOURCE WEB-BASED TOOLS TO FACILITATE AND SUPPORT AN MRI IMAGING STUDY OF ANTERIOR VAGINAL WALL DESCENT IN WOMEN WITH PELVIC ORGAN PROLAPSE.

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The primary aim of the Defining Mechanisms of Anterior Vaginal Wall Descent (DEMAND) trial is to compare the amount of anterior descent following the repair of pelvic organ prolapse with two distinct surgical procedures. Quantitative endpoints are obtained via finite element modeling of MRI images based on the establishment of a 3D pelvic coordinate system. Prior to proceeding with the analysis, the study requires that two individuals annotate the x-axis of the coordinate system on identical MR images while blinded to each other’s work. Concordance between their two measurements within a specified range is required by the study prior to proceeding with the complete analysis.

This presentation will discuss the constraints of the trial and how these impacted the technology solution, notably its multicenter nature, the need for near real-time measurements, the need for centralized web-based access to the images, and the necessity of a consistent algorithm to establish concordance of the measurements. Challenges included the need to transmit large MRI images from participating sites to a central repository, development of a method to ensure that all images were de-identified, presentation of the images on a web-page for review, development of web-based tools that facilitate annotation, and implementation of the algorithm to establish concordance.

These challenges were addressed through a combination of open-source tools and innovative web programming techniques. An open-source DICOM library was used to interact with and de-identify the MRI images, cascading style sheets and JavaScript were used to present the images to the user, and concordance was recorded upon post back using standard techniques. The presentation will discuss the different technical challenges of this approach and how they were resolved. Pros and cons of the approach will also be discussed along with future applications of the developed techniques.