Maximum Isometric Voluntary Contraction Testing (MVICT):

There are several methods of obtaining a quantitative measure of muscle strength. The preferred method used at the University of Rochester is the Maximum Voluntary Isometric Contraction Testing (MVICT). MVICT is performed using the Quantitative Muscle Assessment (QMA) system designed by Computer Source, Atlanta, GA. The system uses an adjustable cuff to attach the patient's arm or leg to an inelastic strap that is connected to a force transducer with a load of 0.5 to 1,000 Newtons. We have established the reliability and reproducibility of this testing procedure in FSHD. The quality of testing is greatly dependent on training of the evaluators who follow a detailed, standardized written testing protocol as well as photographs that illustrate patient position, strap placement, examiner fixation, and common substitutions will be used by the evaluators to ensure standardization of testing. Each muscle is tested twice while the patient is encouraged by the evaluator to exert maximal effort. The maximum force generated by the patient is recorded for each trial, and the maximum over the two trials is used as the final measurement for each muscle.

The raw score for each muscle, measure in Newtons, can be standardized relative to a normal individual of the same age, gender and height. The resulting score can then be expressed as either the number of standard deviation from normal or as percent of normal.

Reference 1 below provides a detailed description of the procedure and positioning of the various muscle groups.

References:

1. *Personius KE, Pandya S, King WM, Tawil R, McDermott MP and FSH-DYGroup. Facioscapulohumeral muscular dystrophy natural history study: standardization of testing procedures and reliability of measurements. Phys Ther 1994; 74:253-263.* (Link to Article)

2. Munsat TL, Andres PL, Finison, et al. The natural history of motor neuron loss in amyotrophic lateral sclerosis. Neurology 1988; 38:409-443.

3. Brussock CM, Haley SM, Munsat TL, et al. Measurement of isometric force in children with and without Duchenne's muscular dystrophy. Phys Ther 1992; 72:105-114.

4. The FSH-DY Group. A prospective, quantitative study of the natural history of facioscapulohumeral muscular dystrophy (FSHD): implications for therapeutic trials. Neurology 1997; 48:38-4.