Description of Figures and Tables

Figure 3 represents relative values from a test of maximal isometric lumbar extensor strength (torque) for Toni Contesti performed on 12/1/2010 at 4:35 PM. Relative torque for lumbar extensor strength is calculated by dividing absolute isometric torque Foot-Lbs by body weight (lb). The patient's test is shown in comparison to average, above average (+1 standard deviation) and below average (-1 standard deviation) relative torque values at each standardized test angle for age-matched 36 - 59 year old healthy, asymptomatic untrained males tested at the University of Florida Center for Exercise Science,Colleges of Medicine and Health and Human Performance,Gainesville, Florida. The graph shows relative torque in Foot-Lbs(y-axis) plotted with degrees of lumbar extensor (x-axis). Figure 4 illustrates the patient's relative strength at each standardized test angle as a percent above (+) or below (-) average age-matched normative values. The relative torque differences, percent from normal, and population percentile rankings are summarized in Table 4.

Interpretation

While absolute torque values give a better representation of a patient's "raw" strength, they are not sensitive to differences in body size. This makes comparisons among individuals difficult. For example, healthy, asymptomatic untrained males with medium to large builds would be expected to produce more torque than healthy, asymptomatic untrained males with smaller builds, because of a large muscle mass. It is often desirable, therefore, to express strength relative to body weight. By accounting for differences in body size, normative strength comparisions become more meaningful.

Data from the University of Florida indicates that the normal torque curve for 36 - 59 year old healthy, asymptomatic untrained males is linear and descending, from 72 degrees to 0 degrees of lumbar flexion. The average flexion:extension strength ratio, which describes the balance of muscular strength through the range of motion, is 2.12:1. In general, a flexion:extension ratio greater than 1.4:1 represents functional weakness in the extended portion of the range of motion, and a flexion:extension ratio less than 1.4:1 represents functional weakness in the flexed portion of the range of motion.

Figure 3 indicates that Toni Contesti has a range of motion of 0 to 72 degrees of lumbar extensor. The patient's flexion:extension strength ratio is 2.19:1. The ideal flexion:extension strength ratio adjusted for this patient's range of motion is 1.40:1. All values below 0 percent in Figure 4 and Table 4 represent functional deficits of relative lumbar extensor strength. Population percentile rankings of relative torque for 36 - 59 year old healthy, asymptomatic untrained males have been divided into three ranges: Lower 25th (0 to 25th percentile); Middle 50th (26th to 75th percentile), and; Upper 25th (76th to 100th percentile). The Middle 50th ranking describes the range of 'normal' strength values. The patient's percentile rankings for relative torque at each angle of measurement are described in Table 4.

Clinical Implication

Research has shown that patients with chronic low back pain are often significantly weaker than healthy, asymptomatic individuals. An evaluation of lumbar extensor strength is clinically important in determining a patient's initial functional status, and subsequent improvements during rehabilitation. General rehabilitative goals associated with specific MedX lumbar extensor exercise are to increase the patient's strength and range of motion to normative values, thereby placing the patient within the Middle 50th percentile ranking. Research indicates that subsequent improvements in pain and functional activities of daily living should follow.