

# Effects of Resistance Training on Lumbar Extension Strength

Michael L. Pollock, PhD  
James E. Graves, PhD  
Michael N. Fulton, MD

Scott H. Leggett, MS  
Arthur Jones  
Joseph Cirulli

## **Abstract**

Development of a new testing machine, which stabilizes the pelvis, allowed us to evaluate the lumbar extensor muscles before and after training. Fifteen healthy subjects ( $29.1 \pm 8$  years of age) trained 1 day per week for 10 weeks and 10 healthy subjects ( $33.7 \pm 16$  years of age) acted as controls. Training consisted of 6 to 15 repetitions of full range of motion variable resistance lumbar extension to volitional fatigue and periodic maximal isometric contractions taken at seven angles through a full range of motion. Before and after the 10 week training period, subjects completed a maximum isometric strength test at seven angles through a 72 degree range of motion (0, 12, 24, 36, 48, 60, and 72 degrees of lumbar flexion). The training group significantly improved in lumbar extension strength at all angles ( $P \leq 0.01$ ). The result at 0 degree (full extension) showed an increase from  $180.0 \pm 25$  Nm to  $364.1 \pm 43$  Nm (+102%) and at 72 degrees (full flexion) from  $427.4 \pm 44.1$  to  $607.4 \pm 68$  (+42%) Nm. Results from the control group showed no change ( $P \leq 0.05$ ). The magnitude of gain shown by the training group reflects the low initial trained state of the lumbar extensor muscles. These data indicate that when the lumbar area is isolated through pelvic stabilization, the isolated lumbar extensor muscles show an abnormally large potential for strength increase.