Efficacy of Weight Training: Multiple Sets versus Single Sets

INCREASES IN STRENGTH IN untrained subjects in the first 8–12 weeks of a resistance-training program are mostly due to neural recruitment. After this, the muscle begins to hypertrophy. Most of the research that claims that performing a single set to failure is as effective as multiple-set training has been done on untrained subjects within the first 8 weeks of a new program. During this phase of training, beginners will react to almost any stimulus. Therefore, single-set training will elicit some increase in strength in these individuals.

There are several flaws in the single-set theory. First, most beginners, as well as some advanced subjects, can’t tolerate the pain levels associated with this method. Second, these programs typically do not involve enough muscle mass or involve enough total work to achieve the hormonal responses associated with strength gains and hypertrophy. Third, many of the so-called single-set programs include warm-up sets in the beginning and brake-down sets at the end of the workout, which technically means that they are not single-set programs.

Studies appropriately designed to compare these 2 training regimens have shown that multiple-set protocols are superior for developing strength, building lean body mass, and enhancing various elements of athletic performance. Multiple-set protocols also involve higher workloads, which are necessary to stimulate the hormonal responses associated with muscular adaptation. Single-set protocols may have some value for untrained individuals in the first 8–12 weeks of a resistance-training program, but for maximal results, nothing beats a periodized, multiple-set protocol.

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ONE SET OF RESISTANCE TRAINING exercise is sufficient to elicit near-maximal gains in strength as long as the quality (intensity) of the set is appropriate. Studies done by Berger in the 1960s that suggested that multiple-set resistance training is more effective than training involving a single set are difficult to interpret because many training variables were manipulated at the same time. In addition, the magnitude of the differences noted in these studies, although statistically significant, was relatively small. More recent research that has directly compared single-set training programs with programs involving multiple sets shows similar results for both types of training with respect to increases in both muscle strength and size. In addition to the fact that strength gains are similar, the time saved during single-set programs compared with multiple-set programs is a significant factor for most participants in adult fitness programs. The time required to complete a well-rounded resistance-training program with 3 or more sets can be prohibitive. Although training volume may be an important factor for certain adaptations to resistance training, differences reported between single- and multiple-set training programs are small and not meaningful for most participants.

Multiple-set programs often involve several warm-up sets. While warm-up sets might be prudent for individuals lifting heavy loads with few repetitions, they are not required for most participants using an 8–12 repetition maximum range. For individuals not willing to exercise at high intensity (volitional fatigue), training volume may become more important.