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Core Principles and Components of Exercise Prescription

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The health benefits of physical exercise are numerous and the list of benefits appears to be growing rapidly. Therapeutic exercise is particularly significant for doctors of chiropractic and its effectiveness has been documented for many musculoskeletal disorders, including back and neck pain.^{1,2} Doctors of chiropractic are well-positioned to prescribe, implement, and guide exercise programs for many reasons in various formats, including resistance exercise, cardiovascular exercise, flexibility exercise, balance/coordination exercise, therapeutic exercise, preventive exercise, sports-specific exercise, functional exercise, general conditioning exercise, and many others. The purpose of this article is to provide a summary

of the core principles and components of exercise prescription for resistance exercise training. While these factors may be commonplace, they are extremely important, yet easily overlooked. Given the potential benefits of physical exercise combined with the lack of clarity about what forms of exercise are most beneficial for specific chiropractic patients, addressing these factors in the therapeutic plan is critical.

The Three Principles of Resistance Exercise Training are Overload, Specificity and Reversibility³

► Overload indicates that skeletal muscle must be trained beyond its current capacity in order to provide the necessary stimulus for mor-

phological and physiological gains, such as muscle hypertrophy, changes in intracellular enzymes, and improvements in strength, endurance, and physical functioning. Exercise load or intensity must be gradually increased throughout the time course of the exercise program in order to optimize and preserve gains.

- Specificity indicates that the effect of exercise training is specific to muscles involved and movements incorporated. The target muscle group must be isolated in order to achieve the desired effects.
- Reversibility indicates that physiological, morphological, and functional gains are lost when progressive overload stimulus is removed. This concept is important to clinicians, since it suggests

that patients must continue exercising beyond their clinic-based, supervised exercise program in order to maintain the associated health benefits.

The five components of exercise prescription for resistance exercise training are mode of activity, frequency, intensity, volume, and duration⁴

- ▶ Mode of activity describes the type of exercise (e.g. machine, floor, weights, functional) and type of muscular contraction (e.g. concentric/eccentric/isometric, isokinetic/ isotonic).
- ▶ Frequency is the number of exercise training sessions per week. In general, one to three exercise sessions per week of resistance training are recommended by the American College of Sports Medicine.⁵ Frequency is highly individualized and dependent on several factors, including the program's goals, person's condition, target muscle group, and stage of the training program.
- ▶ Intensity is the degree of overload stimulus that a muscle or system encounters during exercise. For resistance exercise, intensity is characterized by the relative exercise load. Lower intensity exercise (low load / high number of repetitions) tends to increase muscular endurance, while higher intensity exercise (high load / load number of repetitions) tends to increase muscular strength. In general, starting a training program at a low intensity and gradually increasing intensity over time is recommended. Typically, six to 20 repetitions per set of resistance exercise are recommended,⁵ beginning at 30 to 60 percent of peak strength. Resistance is increased at the next training session when a person exceeds the prescribed number of repetitions.
- ▶ Volume is the total number of exercise sets performed at each exer-

cise session. For resistance exercise, one to three sets are recommended,⁵ with programs for patients usually on the low side of this range.

- ▶ Duration is the length of time of an exercise training program. The minimum duration of a resistance exercise training program to achieve significant morphological changes (e.g. hypertrophy) in skeletal muscle is 12 weeks, while neural adaptations are seen earlier.⁴

These core principles and components of resistance exercise provide a starting point for exercise prescription. Nevertheless, customizing each of these components is crucial to obtain the desired training responses, since specific requirements vary on an individual basis. Systematically varying each component throughout the exercise program is recommended for optimal functional gains. Periodic clinical evaluations and fitness tests, complete with objective measures, should always guide exercise prescription. Therefore, documenting specifics about each of the core components in the exercise prescription plan is essential.

Finally and most importantly, safety is top priority. Safety assessment includes, but is not limited to: screening for contraindications and precautions prior to implementing an exercise program and regularly throughout the program; allowing for adequate recovery between exercise sessions; and closely monitoring and supervising the exercise program.



References

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