[IMAGE]

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Functional Re-Training and Spinal Support

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Choosing the best exercises for patients with back problems requires judgment based on clinical experience and scientific evidence. There are multiple approaches to rehabilitation and many different types of exercises are available, but patients have a limited amount of time and willingness to exercise. Therefore, we must always try to give our patients the most effective exercises for their conditions. What *are* the best exercises for chiropractic patients?

Exercise Selection

The best exercises for patients are those that are rapidly effective, are easy to learn and perform, and are safe (they don't worsen the current condition or aggravate other problems). The exercises must help patients regain normal alignment and easy, natural movement. The result should include a decreased chance of similar, recurring problems.

A successful and appropriate exercise program for the back and/or neck may not require expensive, joint-specific equipment. While high-tech machines are very useful and helpful, particularly in the research lab, current rehabilitation concepts recognize the value of the low-tech approach. In fact, this can be very effective for the treatment of most spinal conditions. Additional personnel, high-tech equipment, and more office space are usually not essential for general results, but may be helpful in various situations. With an understanding of normal spinal function, knowledge of the involved muscles, and some updating of exercise concepts, doctors of chiropractic can effectively rehab their patients with simple exercise equipment.

SAID

The concept of **specific adaptation of imposed demands** (SAID) is one of the basic tenets of the strength and conditioning field.[1] It describes the observation that our bodies will predictably change in response to the demands that are placed on them. If we frequently perform aerobic activities, then our lungs, hearts and muscles become more efficient at taking in and processing oxygen. When we spend more time in activities requiring force and providing resistance, our bodies develop more muscle mass, and we become stronger. If

we also practice our balance and coordination, we improve our ability to function easier on an unstable surface (such as on a rolling ship or a pair of skates). These improvements in our abilities are quite specific, and we become better at doing whatever it is that we do most often.

It has taken quite awhile for those who specialize in the treatment of the spine to incorporate this idea into neck and back rehabilitation programs. Recently, some of us have begun to use the same thought processes to design spinal exercises that we have used for decades to determine appropriate x-ray positions. As chiropractors, we recognize that the spine functions quite differently when it is not weightbearing. We now know that one method to help our patients return to normal function is with exercises that mimic as closely as possible the real conditions under which the spine must function day after day. That generally will include the specific stress of gravity in the upright position or functional posture.

Closed Kinetic Chain

The spine is part of a closed kinetic chain when it is bearing weight. This is the manner in which we use the joints and connective tissues of the spine during most daily and sports activities. It requires the co-contraction of accessory and stabilizing muscles. Weaker or injured muscles can be quickly strengthened with the additional use of isotonic resistance to stimulate increases in strength. Isotonic resistance can come from a machine; from weights; from elastic tubing; or by merely using the weight of the body. Also important is whether the spinal support structures are exercised in an open or closed chain position. Open-chain exercises for the spine are done non-weightbearing, while either lying on the ground or immersed in water (which removes much of the effect of gravity). Both floor-based and water-based exercises have usefulness, especially during the acute stage. However, there may be a difference in functional end results.

A good example of this is a study comparing closed vs. open kinetic chain exercises for the training of the thigh muscles. The investigators wanted to improve the subjects' vertical jump. Two groups exercised twice a week at maximal resistance: one group doing closed chain exercises (barbell squats); the other working on the knee extension and hip adduction weight machines (open chain exercising). At the end of six weeks, both groups had gained considerable strength, but the closed chain exercisers were the only ones who improved significantly in the vertical jump.[2] Since jumping is a closed chain activity, the SAID concept tells us to expect that closed chain exercising generally will be more effective.

Exercising the Spine in a Functional Position

We know that the origins and insertions of many muscles change when going from a standing position to lying down. The proprioceptive input from receptors in the muscles, connective tissues, and joint capsules is very different between the two positions. This is why it is so important to also bring neck and back rehabilitation exercises closer to real-life positions, and it explains why patients make rapid progress when taught to exercise in a functional position.

Patients may need to exercise when lying down during the acute phase of recovery. Floor-based exercises train muscles and joints to begin to accept function in normal posture. Neurological patterns developed on the floor or in a pool assist in improving upright activities. However, learning new skills and habits on the floor may not translate to better functioning during all upright activities. The time and effort patients spend on open chain exercises is preparatory to more functional patterns and generally is not all that should be provided.

Exercising in a weightbearing position is generally accepted by most patients. In addition to being focused and practical, upright exercising trains and strengthens the spine to perform everyday activities. Patients recognize the value of doing exercises that clearly prepare them for better function during normal activities of daily life.

Exercises for Back Pain

When investigators want to test treatments, they always need to have a "control" group, which is given a treatment that is known to be ineffective. A recent study on back pain published in *Spine* taught several popular low back exercises to the control group. As with other studies, the researchers reported no improvement using these exercises.[3] The six exercises considered "sham" treatments included: knee-to-chest stretches; partial sit-ups ("ab crunches"); pelvic tilts; hamstring stretches; and "cat," "camel," and side leg lifts. The problem with these back exercises, if they are the only ones performed, is that the joints, discs, muscles and connective tissues are not bearing weight during the exercise; therefore, the movements performed while exercising do not prepare or retrain these structures for daily activities. On the other hand, exercises performed with the spine upright (standing or sitting) against resistance specifically train and condition all involved structures to work together smoothly. Thus, effective exercises given are those that are performed while upright or functionally.

Proprioception and Balance

For many athletes (whether recreational or competitive), it is important to regain the fine neurological control necessary for accurate spinal and full body performance. This means that about 5-10 minutes of each workout can be spent exercising while standing on one leg, with the eyes closed, while standing on a mini-trampoline, or using a special rocker board. The advantage of these balance exercises is seen when patients return to sports activities and can perform at high levels without consciously having to protect their backs. Exercises done on a rocker board or while standing on one leg are useful since the entire body is in a dynamic position during the exercises. The stabilizing muscles, the co-contractors, and the antagonist muscles all have to coordinate with the major movers during movements that are performed. This makes these types of exercises very valuable in the long run, particularly for competitive athletes.

Functional Alignment

Many chronic spinal problems develop secondary to an imbalance in weightbearing alignment of the lower extremities. In fact, lower extremity misalignments such as leg-length discrepancies and pronation problems are frequently associated with chronic pelvis and low back symptoms.[4] Any problems that are present will need to be addressed in order to resolve the patient's current symptoms and prevent future back problems. The use of adjustments, exercises, and custom orthotics for the lower extremities is especially critical when a functional approach is taken. The effects of weightbearing and the alignment of the kinetic chain must be considered.

Conclusion

Selecting the best exercise approach for each patient's back problem is important. A well-designed exercise program allows the doctor of chiropractic to provide cost-efficient, yet very effective rehabilitative care. Exercises performed with the spine in a functional position will ultimately specifically train and condition all the involved structures to work together smoothly. The result is a more effective rehabilitation component and patients who make a rapid response to their chiropractic care. When you persist with this type of program, you will experience dramatic improvements in patient outcomes.

References

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