Dynamic Chiropractic

BACK PAIN

Exercises for Back Pain: Low-Compression Training Program

Joseph D. Kurnik, DC

Editor's note: While technically not a part 2, this article expands upon concepts introduced by Dr. Kurnik last year in "Low Compression Resistance Exercises for Back and Neck Pain Sufferers" (Nov. 4, 2012 issue).

This program is intended for two groups of people: 1) those who want to engage in resistance exercises for the major regions of their body without developing back pain in the process; and 2) those who already have back pain and want to do resistance exercises, but consistently re-irritate their back when trying to do so. There is a point at which traditional methods of exercise fail to do what is hoped for: a more pain-free and fit body with increased endurance and muscle tone. This does not make traditional training methods bad or wrong. This simply means that for many, a new and safer path is needed at a certain point.

In general, what we are dealing with are the effects of two forces, compression and decompression. Compression is going on in the spine every day, every moment we sit or stand. The weight of the body and gravity cause compressive effects on the intervertebral discs and facet joints. The disc bears about 80 percent of the spinal compressive load, and the facets bear the remaining 20 percent.

The natural way to decompress the spine, of course, is to lie down. Pressures are lowest in the spine when lying down and highest when sitting and standing. Bending, slumping, twisting, reaching and lifting things (such as weights) will significantly raise the pressures in the discs and facet joints. Lying down, doing inversion by hanging, doing certain exercises and spinal traction will lower disc pressures.

There is actually a battle going on each day in the spine between compression and decompression. The effect of compression is to squeeze the disc, forcing water out of it and gradually changing its composition. The other effect is the consequential thinning of the disc as it loses water. As the disc thins, it puts more weight on the facet joints and they become arthritic. The net result is that the holes through which nerves exit the spine become smaller and can cause pinching of spinal nerves. This can cause leg pain or sciatica.

As the disc degenerates during thinning, its outer fibers can become damaged enough to contribute to back pain. Pressure on the facet joints can cause back and leg pain. This is all attributed to compression as a major element, combined with other simultaneous body movements, such as bending and twisting. Add weights to that, and you accelerate the effects of compression.

The goal is to reduce compression as much as possible, especially while performing weighted exercises, and to add elements of decompression as much as possible.

Cautions / Considerations

In order to avoid or minimize spinal pressures during resistance and compression exercises, certain principles need to be followed. In general, avoid standing and seated exercises using free weights. Avoid using machines in the upright position that exert vertical pressure on the spine, such as standing squats or seated presses above the shoulders. We are trying to reduce the vertical compressive loads on the spine. Other considerations are as follows:

- Avoid standing extension and flexion exercises. These increase vertical spinal compression.
- If sciatic pain or numbness is present, avoid hamstring stretching.
- Avoid sitting or standing exercises whereby the head is put into extension, i.e., bending backward.
- Avoid exercises that require sitting / standing and raising the arms higher than shoulder level (exceptions include cable bar pulldowns for the back). You don't want to do presses above the head or shoulders.
- Avoid picking up free weights when standing or sitting.
- Avoid hard-floor-impact exercises, jumping or twisting.
- When lying on your back, keep the knees up and feet flat. This reduces the lumbar curve and spinal pressure.
- Avoid ball exercises. Trying to keep oneself balanced causes stressful positioning and tensing of muscles. Tensed muscles contract, shorten and compress the spine.
- Avoid lunges if back arching is painful. Do not hold weights while lunging.

In order to give more perspective, consider an experiment conducted in Sweden [Nachemson AL. "The Lumbar Spine, an Orthopaedic Challenge." *Spine*, 1976;1(1):61], that demonstrated relative spinal pressure in lower lumbar discs in various positions and with various exercises. These are listed below with their relative values. They are relative values, but for illustration, think pounds per square inch in the lower lumbar spine.

- Standing: 100
- Walking: 115
- Side-bending: 120
- Coughing: 140
- Straining: 150
- Laughing: 150
- Extending (backward): 150
- On your back, lifting legs 45 degrees: 150
- On your stomach, arching backward: 180
- Abdominal crunch 45 degrees: 210 (sit-up, knees up)
- Lying on back (legs up on chair, etc.): 35
- Lying on back, flat: 25
- Lying on side: 75
- Bending forward 20 degrees: 220
- Lifting small weight, sitting upright: 140
- Lifting small weight, slumped sitting: 185
- Sitting and picking up a small weight: 275

Again, these numbers represent the relative change in pressure (or load) in the 3rd lumbar disc in various positions, maneuvers and exercises. What emerges from these facts and considerations are some principles and suggestions when trying to tone the body as a whole in the presence of back problems:

Compression affects all back problems negatively. Therefore, avoid vertical compression exercising, especially using weights or loads (sitting or standing). Work large muscle groups, then isolated muscles if desired. For example, seated or supine bench or chest presses work the chest, deltoids and triceps. If you want more of a workout for the deltoids or triceps, you can also do them

without holding weights in a vertical upright position. Perform about three sets of 10-12 repetitions of each weight exercise. You really don't need more unless you are trying to build large muscle mass.

A Basic Minimal-Compression Exercise Program

1. Seated or supine chest presses. If on your back, historically called bench presses. Seated, your back is against a seat-cushion back support. There is an adjustable grip for each hand about chest level. You push your desired weight forward, away from the chest; then bring your arms back. This exercise works the pectoral muscles, triceps and deltoids (anterior and some lateral elements).

2. Supine bench presses. Lie on your back, knees up, feet flat. This is important; having your knees up flattens and decompresses the lumbar spine. Don't use such a heavy weight that it requires tensing of the low back. The exercise requires that you hold a barbell, bring the bar to your chest; then push it back up. In the case of a machine with grips, push the grips away from your chest; then bring them back to chest level.

In the performance of either of the above exercises, you minimize vertical lumbar compression stress. Perform one or the other in any given workout.

3. Upper back rows. This is a pulling exercise. There are two ways to do this most safely (perform one or both during a workout):

a) Seated rows. For this exercise, you use a rowing machine so you can place your chest against a support. You reach in front of you with both hands and grip a handle in each hand. Be sure to adjust the distances, angles and weights to your comfort level. There are attachments to allow for these factors. Inhale and pull the handles to your body comfortably. Exhale and take the handles back to starting position. This is one row. This exercises the upper and mid-back. The following muscles are used: deltoids, latissimus dorsi, rhomboids, infraspinatus, teres minor and biceps.

b) Seated pulldowns. In this exercise, you are sitting under a bar with a cable attached to it, and the cable is attached to weights, which you can adjust. Try not to sit immediately under the bar; try to sit 10-15 degrees away from the midline, with the cable making this 10-15- degree angle. Set the proper weight. Inhale, pull the weight bar to your chin level or a comfortable level. Exhale, allow the bar to return to the resting position. This is a pulling exercise and it exercises the same muscles as seated rows, but at a different angle.

4. Lateral deltoid abduction – shoulders. This exercise is for the outer (lateral deltoid) muscle. The deltoid has three divisions: front (anterior), side (lateral) and back (posterior). This muscle's purpose is to raise your arm (abduct) laterally away from the body. Traditionally, exercising it is done sitting or standing. Since we are trying to reduce positions involving maximum lumbar or thoracic compression, do the following instead:

Lie on your side. Support your head with your downside arm or use a pillow. The upper arm is at your side. While on your side, head supported, light dumbbell in your hand, palm down, laterally raise (abduct) your right arm toward the ceiling as far as you can comfortably go. Stop, then lower the dumbbell back to the hip region. Perform 10-12 repetitions for three sets on each shoulder.

5. Biceps curls. Again, traditionally biceps are exercised in the seated or standing position. But as mentioned, holding weights seated or standing will cause considerable lumbar and thoracic compression. So, biceps curls can be easily done in a non-compressive mode while lying on your back.

While on your back, knees up and feet flat, arms at your sides, palms up, head supported by a pillow, curl dumbbells to 90 degrees at the elbows, then bring the dumbbells back to floor position.

6. Low back exercise: There are machines that allow you to do back extension motions (e.g., sitting and extending backward against a resistance backrest or pad). This may work effectively for some back problems, but it may aggravate others. It is a trial-and-error situation.

Review the previous section on relative lumbar disc pressures. Sitting by itself was 150 on the scale, and extending backward was 150 in the standing position. The combination would be well over 150. In other words, a lot of spinal compression results from this exercise. There is a test you can do to minimize the risk of increased back pain with machine lumbar extension. Have the patient stand and bend forward and backward (extensions). If extension hurts, do not do this exercise. If extension does not aggravate; then you may more safely experiment with this exercise. A safer method to exercise lumbar and gluteal muscles is in the supine position:

7. Supine lumbar / pelvic raises. Lie on your back, head supported by a pillow, knees up, feet flat. Raise your pelvis upward toward the ceiling to the point of comfort. Come back to the original position.

The beauty of this exercise, exercising the lumbar paravertebral muscles and the gluteus muscles, is that you never go into hyperextension unless overexerting. You take the spine from a flexion position to a neutral position. With other forms of exercise, you may take the lumbar spine from a neutral position to an overextended position. The result is significant narrowing of the spinal canals and increased disc pressure. If your main symptom is pain with back bending (extension), do not do this exercise if it is irritating.

8. Abdominal exercises. These are crucial "core muscle" exercises. If you have low back problems, you have to differentiate them under the following circumstances:

a) If bending backward is painful, but bending forward is not painful, then avoid back-bending exercises, but do cautious partial sit-ups with knees bent upward. Crunches are also alright. Proceed with caution.

b) If bending forward is painful, but bending backward is alright, then sit-ups and crunches may and probably will be irritating. Crunches on the gym machines, especially in the seated position, increase injury risk in this situation. Sitting has the 150 value and bending forward will add more points, probably 50 or more. This is a lot of stress on the lumbar discs.

c) If bending forward *and* backward is painful, sit-ups and crunches should be avoided.

A safe solution to any of the foregoing conditions: pelvic tilts. The pelvic tilt is an exercise that tractions the lumbar spine (creating more room for nerves) and decreases disc pressure. Additionally, it contracts the abdominal muscles and tones them with decreased disc pressure.

Pelvic tilts are a Godsend. They are almost universally effective in relieving low back issues. They reduce low back compression by creating a traction effect, exercise abdominal muscles, reduce lumbar disc pressures, and create a circulatory environment for the lumbar discs.

The exercise is simple; however, many people get confused. The low back has an inward (lordotic) curve. The inward curve actually creates more lumbar compression. The pelvic tilt is a process of flattening and pushing the low back to the floor or surface you are lying on. This reduces the lumbar curve, flattening the lumbar region, decompressing the lumbar spine and exercising the stomach muscles.

Practice flattening the low back until it is easy to do. Then work up to 50 or more repetitions of flattening per day or every other day.

I want to review pelvic tilts again with different wording: Lie on your back with your knees bent and feet flat on the floor; or you can place your lower legs up on a chair or table. Inhale and then exhale as you flatten the small of your back against or toward the floor, as close as you can get to the floor. Hold for a few seconds and slowly relax.

A variation of this exercise is abdominal crunches. If forward bending is not painful or if there is no painful disc problem, you may cautiously try crunches. Just raise your shoulder blade region 1-2 inches off the floor as you flatten your low back. You can support your head with your hands.

9. Leg presses. Instead of doing squats with a weight across your shoulders, which creates vertical compression of your spinal joints, you get to sit and push a weight horizontally away from you. Almost every gym has a leg-press machine. Procedurally, you sit in a seat that slightly leans back and place your feet on a weighted vertical platform, then push the platform away from you until your knees are fully extended (straightened). You then bring the weight back to its original position. This exercises your quadriceps and gluteal muscles.

Final Notes

This is a basic low-compression resistance workout. It exercises the major muscle groups, but it does not exercise every muscle at many different angles. It is designed to generate a moderate level of tone to the major muscle groups. None of the exercises requires the patient to be in a weighted vertical position, during which weight is compressing downward with gravity.

You may add other exercises to this program as long as you follow the basic rule of not vertically and unnecessarily loading and compressing the spine. Don't let patients do any exercise that is irritating. Remind them not to try to "push through it" using willpower. It won't work. Play it safe.

Finally, these exercises can be done in any order. Don't be concerned about the order; be concerned about minimizing compression.

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