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Whatever Happened to Williams' Flexion Exercises?

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One of the primary modalities in the management of back pain is exercise. While various forms of exercise have been used for many years, there is little evidence to substantiate the value of any one particular form over another. I would like to review one of the more well-known, yet seldom-used exercise methods: Williams' flexion exercises.

When I went into practice (way back in the mid-70's), back exercises were fairly straightforward. Everyone basically used the same approach: Williams' flexion exercises. This set of six exercises dominated the back pain world for many years. In general, Williams felt that back pain was the result of the lumbar lordosis. In fact, Williams "first commandment for back and leg pain sufferers" was, "Always sit, stand, walk and lie in a way that reduces the lumbar lordosis to a minimum." He felt that the lumbar lordosis placed unacceptable stress on the posterior aspects of the intervertebral disc, thereby accelerating the degenerative process. The solution, in Williams' mind, was to reduce the lumbar curve. He developed a series of exercises with this in mind. As a side note, Williams felt that the reason for neck pain was the development of the cervical lordosis. To put it simply, he wasn't a fan of spinal curvature.

Conceptually, Williams felt that the goal of exercise was to reduce the lumbar lordosis or to flatten the back. To do this, he suggested strengthening the abdominal muscles in order to lift the pelvis from the front. In addition, he felt that strengthening the gluteal muscles would pull the back of the pelvis down. According to Williams, the combination of these two exercises would accomplish the primary goal of flattening the lumbar curve.

By now, you probably are asking yourself a few questions. So what were the exercises? Did they work? Why did they dominate the world of back pain for so long? And whatever happened to them? Let's see if we can answer these questions.

What were the exercises? While Williams had a series of suggestions for the management of back pain, including what he referred to as "first aid exercises." His general exercise protocol included: 1) partial sit-ups; 2) knee-to-chest exercises; 3) hamstring stretches; 4) lunges; 5) seated flexion; and 6) squat.

Did they work? Remember that Williams wanted to flatten the lumbar curve. With the exception of the lunge, each of the exercises created flexion of the spine. If done properly, the lunge actually placed the lumbar spine in some degree of extension. I'm not quite sure how the lunge fits in with his concept, but let's look at what each of the exercises accomplishes.

1. **Partial sit-up.** The primary goal of this exercise, according to Williams, was to strengthen the abdominal muscles, thereby reducing the lumbar curve. For many years, it was theorized that weak abdominal muscles are a contributing factor to the development of back problems, so it would seem reasonable that strengthening them would be beneficial. More recently, with the advent of sophisticated measuring devices such as Cybex machines, there has been increasing interest in the relative strength of the trunk muscles. Some patients, it seems, do have weak abdominal muscles, while others may have weak extensors. Nevertheless, at least theoretically, strengthening any of the trunk muscles would appear to be helpful. In addition to any increase in strength, the partial sit-up may also be useful as a stretching procedure. It stretches the back muscles, the gluteals and the hips.
2. **Knee-to-chest.** Once again, Williams' goal was to flatten the lumbar curve. In my opinion, however, the value of this exercise was the stretching that was created. The knee-to-chest exercise stretches the back, the hips, the sacroiliac joints and the hamstrings. It's hard to contest the value of that.
3. **Hamstring stretch.** It's fairly easy to establish a rationale for stretching the hamstrings in a patient with a lower back problem. Flexible hamstrings are a necessary component for full flexion of the lumbar spine. For an individual who injures the spine while lifting an object off the floor, it's helpful to have muscles that will allow full range of motion of the joints involved.
4. **Lunges.** Whether or not this exercise accomplishes Williams' objectives of flattening the spine, it would seem to be a useful procedure. Once again, it is a useful stretching exercise. Areas stretched include the lumbar spine; the hips; the sacroiliac joints; the knees; the hamstrings; the quadriceps; the gastrocnemius group; and the ankles. Once again, a very helpful collection of stretches.
5. **Seated flexion.** This exercise is performed by having the patient sit in a chair and flex fully forward in a slumped position. At first glance, this might appear to be fairly aggressive for some people with back pain, but it's a pretty good overall stretch, and for some patients it's relaxing.

6. **Squat.** This was one of Williams' favorite exercises. He used it as a "first aid" step for self-treatment. His instructions were to have the patient assume the squat position and "bounce the buttocks up and down 15 to 20 times, 2 to 3 inches per bounce; rest for a few moments, then repeat 3 or 4 of these series." As with the other exercises in Williams' series, this is a pretty good stretching activity. It might be worth mentioning that cultures that live on the ground, in this position, appear to have less back pain. There is some thought that the flexibility required to achieve this position may actually help ward off back pain. More on that in another column.

So let's get back to the question. Did they work? It depends what the goal was. If the goal was to flatten the lumbar spine, the answer is yes. If the goal was to stretch the spine and the lower kinematic chain, the answer is yes. If the goal was to prevent the development of future back problems, the answer is probably not. Nothing that we know of has been shown to prevent future episodes, so that shouldn't be any major surprise.

Why did they dominate the world of back pain for so long? Unfortunately, I don't have anything concrete to offer regarding these questions, but here's my opinion. The exercises described by Williams were actually a fairly comprehensive series. As indicated earlier, they accomplished more than simply flattening the lumbar spine. I don't think flattening the lumbar spine was all that important. And if we look at McKenzie's work (i.e., McKenzie's extension protocol), flattening the lumbar spine may actually be detrimental. On the other hand, stretching and mobilizing the spine is useful for many patients. The addition of stretching and mobilizing the muscles and joints of the lower extremities is also useful. Consequently, it would appear that the longevity of the exercises may be accounted for by the fact that they were productive.

Whatever happened to the exercises? Over the past several decades, an increasing amount of attention has been paid to the use of exercise for the management and prevention of back pain. The addition of McKenzie's protocol certainly influenced the way we look at back pain. In many respects, McKenzie contradicted Williams' basic assertions that the lumbar lordosis was bad. As a result, followers of McKenzie's model abandoned Williams' exercises. With the advent of computerized exercise devices, the idea of strengthening trunk muscles under controlled and reproducible circumstances gained popularity. And the recent addition of stabilization exercises has given us even more to think about. With this increasing number of exercise approaches, it should be no surprise that any single method would fall out of favor. Add to that the more than questionable rationale that Williams used, and the increasing need for documentation of outcomes, and the demise of his protocol may be seen as predictable.

Note: One of the more interesting aspects of back exercises is the somewhat contradictory ideas of Williams and McKenzie. I'll compare and contrast these methods in a future column.

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