

## Pre-existing Neck Surgery Worsens Injury Potential

The significance of pre-existing conditions has been debated since long before I began practicing 23 years ago. The defense position has always been that the reason for the patient complaints is the pre-existing condition. The plaintiff position has always been that the pre-existing condition made their client more vulnerable to injury. Approximately 175,000 cervical spine surgeries are performed per year in the United States for disc disease. A new study from the Journal Spine (*Volume 31(21) October 1, 2006 pp. 2439-2448*) provides us with some insight about the way that pre-existing cervical fusions might influence injury potential. The study is titled "Motion Compensation Associated With Single-Level Cervical Fusion: Where Does the Lost Motion Go?"

The study examined human cadavers biomechanically and looked at the effects of altered stress on the cervical spine when fusions were performed at different levels. The authors found that there was increased motion compensation at the levels immediately adjacent to the fusion segment. In the upper cervical segments of C3-4 and C4-5 the increased motion was found at the levels above for both flexion and extension. In the lower segment of C5-6 and C6-7, increased motion was noted both above and below the fusion segments but to a greater degree below.. The authors noted that "*Application of fusion caused a significant reduction in motion at the fused level. The reduced motion at the operated site was compensated for by increased rotation at the adjacent segments during flexion/extension, lateral bending, and axial rotation.*" They also noted that "*the common pathologic conditions found at adjacent segments to a cervical disc fusion are "disc degeneration, disc herniation, instability, spinal stenosis, spondylosis, and facet joint arthritis."*

The reasoning behind this process is that there is a transfer of mechanical forces to the adjacent level of the spine which will be characterized by increased movement or even instability. Over time, the spine will attempt to protect and compensate for the increased motion by developing bone spurs thereby stabilizing the motor unit segment. This process is called degenerative arthritis and results in limitation of motion and eventually, as it progresses, a degenerative fused segment. Just like the original fusion site which had progressed to adjacent level disease, this new site of reduced function will also lead to adjacent level disease and so on and so on.

Believe it or not, many people with these motion altering conditions have little or no pain. As doctors we see patients all the time that have very severe degenerative spine conditions without any history of spine pain. The degenerative process may have taken many years to develop yet there were no complaints of pain. Why is this? Well, it is because the degenerative process itself is a normal healing process designed to help protect the spine from further damage.

These findings are significant to doctors and attorneys who have patients and clients that have pre-existing conditions that limit motion function of the spine. While this study looked only at cervical fusions and the effects on adjacent level disease, the data from this paper may reasonably be extrapolated to other pre-existing conditions or accident related conditions that affect the spine in a similar manner. These may include degenerative changes or even the “chiropractic subluxation” which is characterized by its loss of motion in specific planes of motion.

Let’s put this in a real world context. Take a patient with a pre-existing condition that limits cervical motion and is asymptomatic for some time before they are in a traumatic event. They are likely to have a greater degree of injury for several reasons.

1. They may have already developed degenerative changes making the adjacent joint less capable of withstanding the forces of the trauma. There will also be transfer of forces to joints adjacent to the degenerated joints.
2. The adjacent joint might have laxity without degenerative changes yet. As a result, the impact forces are focused on a joint that does not have the normal ligamentous restraint system in place. This results in an already lax joint being unable to protect itself from forces it might otherwise manage just fine.
3. The adjacent joint might not yet have developed any laxity or degenerative changes. However, the trauma forces are no longer distributed evenly between the joints of the spine. The fused area does not move resulting in a rapid transfer of the trauma energy to the adjacent level. This causes an acute increase in motion in an otherwise healthy joint overcoming the normal joint ligamentous restraint system.

The bottom line is that your clients can sustain very serious injuries, even when they have pre-existing conditions. This study provides you with a basis to explain why these previously asymptomatic patients have such a poor prognosis, even in minor impact and low property damage collisions.