Earlier today I had the opportunity to visit Dr. Paul Ivancic PhD who is faculty at the the Yale University School of Medicine Biomechanics Research Laboratory in the Department of Orthopaedics & Rehabilitation. He obtained his PhD from Yale University in 2006, specializing in human injury biomechanics. He has over 60 publications in peer-reviewed scientific journals, most in the area of traumatic spinal injuries. He has provided expert testimony at depositions and trials. He has also consulted on numerous cases including traumatic injury associated with vehicle crashes; product liability; sport, recreation & playgrounds; slip, trip & fall; and human factors & performance. I asked Paul to write a short introduction on spinal injuries for the newsletter and he provided this to me by the time I arrived back in my office.

**Traumatic Spinal Injuries**

A summary by Dr. Paul Ivancic, PhD

Does a causal association exist between traumatic spinal loading and the clinically diagnosed injuries that lead to surgeries? Multiple factors are considered when determining whether or not a causal association exists. Injury tolerance is subject-specific. A motor vehicle crash that may injure an older frail occupant who has pre-existing medical conditions may not injure a younger, physically active occupant. Important occupant characteristics include age, height, weight, gender, the existence of medical conditions or pain, and the subject history including prior trauma or surgeries. Multiple pre-crash factors are considered including whether or not the occupant anticipated the crash and their position at the time of the crash. The crash-related factors include crash orientation, points of impact, vehicle dynamics, usage of safety systems, occupant motions, and whether or not blunt impact occurred. Finally, post-crash factors consider whether or not the occupant experienced immediate or delayed pain and the severity of the pain.

In our recent review papers, we have summarized the anatomical locations of the neck that can be injured due to motor vehicle crashes and traumatic loading with emphasis on the role of soft tissue injury, including injuries to the spinal discs and ligaments. The soft tissues of the neck, including the facet capsules, spinal ligaments, intervertebral discs, vertebral arteries, dorsal root ganglia, and neck muscles, are strained during a motor vehicle crash. Partial or complete rupture occurs when strain during a motor vehicle crash exceeds the tissue’s tolerance. There exists significant scientific evidence in support of neck loading due to motor vehicle crashes causing lesions to the soft tissues of the neck which leads to pain and clinical sequelae. The studies have demonstrated strains beyond physiologic limits in the facet joint capsules and annular fibers of the disc; partial or complete ruptures of capsules, ligaments, and annular fibers; intra-articular contusions; intra-articular fractures; and transarticular synovial joint fractures.

I am excited that Paul has agreed to join me in a presentation series tentatively scheduled to start later this year when we will have experts from multiple disciplines present on topics that I’m sure will be of value to your practice. I expect that you will find Paul as interesting and knowledgeable as I did during our meeting. I was very pleased to see that he brings an unbiased and extremely informed perspective relative to injury biomechanics and particularly as it relates to the types of injures we see routinely. And even better, he is right here in our back yard. Dr. Ivancic is available to consult on personal injury cases and can be reached by telephone at: 203-785-4052 and by email at: [paul.ivancic@yale.edu](mailto:paul.ivancic@yale.edu). His CV is available at [www.ShawChiropractic.com](http://www.ShawChiropractic.com) along with this newsletter.