

**WCB Alberta – Medical Reference Sheet
(reference for physicians on WCB Alberta website)**

Repetitive Strain Injury

"Repetitive Strain Injury" is not a specific diagnosis but rather represents a broad categorization of a group of disorders with a common proposed etiology. A variety of alternate terms are also used to describe similar conditions. These include occupational overuse syndrome, cumulative trauma disorder, work related upper extremity disorder, and activity related soft tissue disorder.

While the terms utilized above obviously contain connotations with respect to the etiology of these various conditions the current literature with respect to causation is certainly not conclusive. Certainly, the term occupational overuse syndrome would often be inappropriate as all of these disorders can occur in association with non-occupational factors.¹ The current consensus within the literature appears to advocate a multifactorial etiology in most cases.²

An obvious difficulty automatically arises as a result of the terminology frequently used. The terminology implies that repetition or overuse is a major etiological factor, yet what constitutes "overuse" or "repetition" is often ill defined. According to Dr. Carruthers in his recent review paper, "Repetition as a quantitative description of work duties should be considered only if the task in question constitutes greater than 2/3 of the work shift."² According to NIOSH (National Institute for Occupational Safety & Health), most of the specific exposures associated with strong evidence of a causal relationship involved intense or long duration, usually daily, whole shift exposure to the factors under investigation.¹ Experimental animal models of overuse often utilize sustained exposure rates of between 75 – 150 cycles per minute. I also note that research has suggested that rates of repetition below 10 cycles per minute for sixty minutes for the elbow and wrist and 100 cycles per minute for sixty minutes for the fingers pose a minimal risk to healthy workers. Additionally, according to a recent review article by Dr. Jobin, repetition alone is probably not a significant risk factor for the development of musculoskeletal disorders but rather it is when repetition is combined with other factors such as force and awkward posture that it becomes clinically significant.³

According to Jobin's review, imposed non-physiologic posture is probably the most important single risk factor with force and repetition taking on importance when associated with awkward postures. Carruthers suggests that the risk factor becomes significant when the joint position is +/- 25% outside of the neutral alignment and required or maintained in this position at least frequently. "The greater the angle and the greater the time, the greater the risk."²

It is important to note that the data collected by NIOSH however appears to suggest that the relative importance of the individual risk factors varies with the particular specific disorder or body part. For instance, posture seems to be of more importance than does force or repetition where disorders of the neck or neck/shoulder are concerned. Additionally, it is also imperative to state that the literature to date is for the most part inadequate when it comes to providing guidelines regarding quantitative exposure-disorder relationships.

Research by Silverstein in 1986 appears to support the suggestion that risk factors interact in a nonlinear way such that a combination of risk factors are much more important than simply the additive presence of additional single risk factors.⁴

Numerous other occupational risk factors must also be considered in assessing causation. These include exposure to cold and vibration, lack of adequate recovery time, forced static muscle loading, an imposed and rapid rhythm of production, individual variation in technique and stress in the workplace. Non-occupational factors to be considered include age, gender, obesity, strength, smoking, avocational activities and psychosocial factors.

"Repetitive Strain Injury" is best thought of as a group of disorders with a complex and multifactorial etiology and associated with a wide range of both occupational and non-occupational risk factors. Given that this is the case, the determination of causation and work relatedness is extremely difficult and requires a thorough and detailed understanding of the physical demands and conditions of employment as well as a careful review of any potential non-occupational risk factors correlated with an accurate and specific diagnosis. The issue of work relationship is further confused as many of these disorders occur within the general population with unknown background prevalence rates.

Treatment of this type of disorder should be directed at early intervention. Carruthers suggests that "Traditional passive modality driven approaches are appropriate initially up to a two week period." Non-steroidal anti-inflammatories are entirely appropriate during this period. Physiotherapy and an early worksite intervention are also advocated. Treatment for that individual with more chronic symptoms is complex and should be multidisciplinary, reflecting the multifactorial nature of the condition.

References

1. NIOSH, Musculoskeletal Disorders and Workplace Factors, July 1997 US Department of Health and Human Services
2. Carruthers D.B., Summary Comments of Literature Review with Respect to ASTD Claims. Submitted to the Royal Commission Request for Information
3. Jobin, Deny, Musculoskeletal Problems Related With Repetitive Movements: Myth or Reality? The Canadian Journal of CME, June 1997
4. Silverstein B., et al. Hand Wrist Trauma Disorders in Industry. A Meta-analysis. Br J Ind Med., 1986