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## **Support and Rehabilitation After Whiplash**

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Many chiropractors specialize in helping patients who have been involved in motor-vehicle crashes. While many problems can arise after a vehicular collision, returning the neck region to full function is one of the most challenging goals. Several published studies have found that the risk of persistent problems is quite high.<sup>1</sup> Vendrig, et al., reviewed the literature and concluded that "between 14 percent and 42 percent of patients with whiplash injuries have chronic neck pain and that approximately 10 percent of this group experience constant, severe pain."<sup>2</sup>

Chiropractors are the best positioned to provide "multimodal treatment" to whiplash patients, to minimize the risk of long-term problems. As defined by Vendrig, et al., multimodal treatment applies manual procedures (spinal manipulation mobilization, and massage), along with physical training to improve muscle strength and endurance, including sport activities. This treatment has been found effective in preventing many of the persisting symptoms of "late whiplash syndrome."<sup>2,3</sup>

### **Mechanism of Whiplash Injury**

Croft has recommended the use of "cervical acceleration/deceleration injury" as the appropriate term,<sup>4</sup> although many practitioners and researchers still refer to this as "whiplash injury."<sup>5</sup> Another description, "hyperflexion/hyperextension" (or the reverse: "hyperextension/hyperflexion") attempts to explain the movement of the neck, but the injury has been shown to occur without the "hyper" motion.

Panjabi, et al., reported the intervertebral kinematics and quantified the functional injuries to the soft tissues.<sup>6</sup> Panjabi's team found a much more complex injury mechanism than cervical hyperextension, documenting that initially, the spine translates (a straight-line motion), with practically no head extension. They described an "S-shaped curve, resulting in local extension of the lower cervical spine with upper cervical spine flexion." This may help to explain the variety of injuries we see in patients who have been struck from behind. In fact, even at low speeds, the nervous system is "jolted" during this translation

movement. A jolt is "a sudden, unexpected, forced stretching and/or reflex contraction of skeletal muscle induced by a barrage of impulses from receptors in muscle spindles and joint capsules."<sup>7</sup> Effective treatment may involve taking this biomechanical and neurological information into account when planning a rehabilitation program.

### **Initial Care**

**Protection and support:** In the first several hours (up to 72 hrs), there is effusion in the soft tissues and around the joints. This develops rapidly into an inflammatory response, with tissue congestion. At this initial stage, activity restrictions and protection of the injured area are necessary to prevent further damage. This may require the use of a soft cervical collar for one or two days. The habit of recommending complete rest and a collar for one or two weeks has been shown to be unnecessary; in fact, this slows the body's healing response.<sup>8</sup> It is important to keep the patient active, but without causing further injury or aggravation of symptoms.

A cervical pillow designed to support the normal curve of the cervical spine can be tremendously helpful throughout care. In these initial stages, the level of relaxation that is promoted helps patients sleep through the night. Each night, the patient should relax supine on a cervical support pillow for 15 minutes before turning on the side for sleep. This procedure will help regain cervical alignment and induce muscular relaxation.

**Cryotherapy:** Frequent and regular cooling of the inflamed tissues not only helps to control the extent of inflammation and swelling, but also provides pain relief. A cold pack should be placed over the injured tissues approximately 10 minutes per hour. This can also be continued beyond the initial, acute phase to provide localized cooling after each exercise session, which increases the circulation response.

### **Active Strengthening and Movement**

Strengthening can help return the injured neck to full function. Numerous studies using various exercise approaches have described the benefits of the active approach.<sup>9</sup> Simple standard stretching exercises, whether at home or in the clinic, demonstrate little or questionable therapeutic value.<sup>10</sup> Dynamic exercise, using progressive resistance to stimulate the muscles and nerves, is the most useful form of active exercise.<sup>11</sup> A rational approach gives consideration to the following:<sup>12</sup>

- postural control and balance of opposing soft tissues;
- range of active motion of the injured spinal regions;
- strength of the related musculature;
- general muscular power (for daily activities); and
- general aerobic fitness and endurance.

**Loss of support strength:** When injured, the soft tissues of the neck no longer provide adequate support for the movements and weight of the head. Progressive static/dynamic exercise is an efficient method to progressively stimulate these important muscles to strengthen and return to full function. During dynamic exercise, the joints move (stimulating the mechanoreceptors) and the opposing muscles relax through reciprocal inhibition. Dynamic resistance exercise has the distinct advantage of developing neurological coordination through neuromuscular adaptation. When the cervical region is exercised in its position of function (upright), the strength and skills developed will transfer easily to normal daily activities. Recommending the use of a simple at-home neck exercise unit allows the patient to perform the necessary exercises daily, helping ensure a gradual, progressive recovery of strength in the support musculature. In the early phase of treatment, the amount of movement during each exercise should be controlled to avoid further pain and discomfort.

**Posture and movement abnormalities:** A study that investigated the differences in movement patterns between controls and patients with neck trauma found (as expected) that individuals with a history of injury had multiple, significant limitations in their ranges of cervical motion.<sup>13</sup> Whiplash patients have been reported have problems with proper repositioning with their necks.<sup>14</sup> Exercises that include resistive motion train the muscles and encourage the joints to function more fully during normal daily activities.

It is not surprising that many whiplash patients demonstrate an obvious anterior translation postural imbalance. This posture is secondary to the damaging "S-curve" motion that injures the lower and upper spinal regions in very different vectors. Once in the forward head posture, a constant strain develops in the muscles of the neck and (especially) the upper back, because of the leverage of the heavy head. Without correction, this posture may develop into a chronic myofascial complaint in the muscles of the upper back and shoulder girdles. We also know that this abnormal posture is a major contributing factor to neck stiffness, since movement suffers in this position. A study of the measured difference in rotation found that in all age groups, the forward head position resulted in significant decreases in the ability to turn the head.<sup>15</sup> If left untreated, the patient is likely to develop a permanent limitation that affects many activities of daily

living. An effective exercise to correct this postural imbalance is the posterior translation exercise, performed against static and dynamic resistance in a position of function.

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