

Patient Education

IMMOBILIZATION

The three phases of soft tissue healing are the acute phase, repair phase and remodeling phase. Immobilization of the injured site is usually advisable during the acute phase, which usually ends by 72 hours. This phase is also called the inflammatory phase. At the end of this phase fibroblasts are found in greater numbers and are being laid down as the foundation of scar tissue. Research performed by Lehto shows that scar formation will persist and become fibrotic rather than be absorbed if inflammation is allowed to persist. Early, aggressive management is suggested to limit enlargement of the injured site.¹ During the repair phase it is essential to begin passive or active motion exercises as motion is proven to have an effect on soft tissue healing. Salter discovered that after only 3 weeks of immobilization, intra-articular adhesions would be present. When intermittent active or continuous passive motion was used these adhesions were prevented.² During the remodeling phase collagen and scar tissue is reoriented along the same lines of imposed stress during exercise. Noyes studied the effects of immobilization in rhesus monkeys and concluded that ligaments became 69% stiffer than normal after 8 weeks of immobilization. After 5 months of reconditioning ligaments were only 7% stiffer than normal levels.³ A recent study in Spine Magazine confirms that neck pain patients have better results with early activity and mobilization rather than rest, use of a soft collar, and gradual introduction of exercises⁴. What does this mean to the health care practitioner? We have a huge responsibility to give the injured patient proper exercise instructions soon after the injury. Bed rest and bracing is not advised after the acute stage of soft tissue healing.

Rules of Immobilization

Immobilize in a neutral position

Immobilize for no more than 6 hours at a time during the first 72 hours

Immobilize for no more than 2 hours at a time after the first 72 hours

Remove brace for as long as it takes to perform therapy

Immobilization should generally not continue through the night

Negative Effects of Immobilization⁵

Shrinks joint capsules

Leads to joint contracture

Irreversible changes after 8 weeks

Increases compressive loading

Lowers failure point of ligament

Decreases thickness of collagen

Decreases oxygen in disk

Decreases bone density

Decreases muscle mass

Increases connective tissue fibrosis

¹ Lehto M, Jarvinen M, Nelimarkka O: Scar formation after skeletal muscle injury. Arch Orthop Trauma Surg 104:366, 1986

² Salter R, Simmonds DR, Malcolm BW, et al: The biological effect of continuous passive motion on the healing of full-thickness defects in articular cartilage. J Bone Joint Surg [Am] 62:1232,1980.

³ Noyes F: Functional properties of knee ligaments and alterations induced by immobilization. Clin Orthop 123:210,1977.

⁴ Rosenfeld M, Gunnarsson R, Borenstein P: Early intervention in whiplash associated disorders: a comparison of two treatment protocols, Spine 2000, 25(14):1782-1787.

⁵ Liebenson C: Pathogenesis of chronic back pain. J Manipulative Physiol Ther 15:303, 1992.