Dynamic Chiropractic

NUTRITION / DETOXIFICATION

Nutritional Support For Ligamentous Injuries

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Ligaments are fibrous structures designed to prevent abnormal motion of a joint and connect bones to bones. An injury to a ligament caused by abnormal motion may be classified as a sprain (the term "strain" is generally referring to tendon and muscle injuries.) Sprains may be further divided into three classes: (1) Mild or first degree. A few fibers of the ligament are damaged. Tenderness is present at the site of the injury, as is local swelling. Pain on abnormal stress and active range of motion is present. There may be minor pain on passive motion. There is no rocking, instability or blood in the joint. (2) Moderate or second degree. There is a definite tear in some part of the ligament. Tenderness is present at the injury site. There is local swelling initially that gives way to general swelling later. Pain is present on passive and active motion. Joint rocking, instability and disability may be present in various stages. (3) Severe or third degree. A complete tear of the ligament has occurred. The tear may be within the ligament itself or at the junction where the ligament attaches to the bone. Severe pain, immediate disability, diffuse swelling, and very little, if any, mobility are the signs and symptoms of this condition. Third degree sprains require reconstructive surgery.

Ligamentous Healing and the Inflammatory Process.

Ligaments are composed of a protein substance known as collagen. The collagen that makes up ligaments (and tendons) is also known as dense connective tissue. It is arranged in bundles. Between these long parallel bundles are fibroblast cells. If an injury occurs, fibroblast form collagenous fibers. For the first few days following an injury, the collagen is gel-like and attaches various sites around the injury. There is a synthesis-lysis balance present in times of repair. The collagen synthesis is performed by fibroblasts. The lysis (especially in times of major trauma) occurs in the injured area to make way for new tissue. It may also occur in other areas of the body. This lysis is a reserve mechanism the body utilizes in order to have sufficient ingredients to repair the traumatized area. It is, therefore, critical that diet and supplemental modifications occur as soon as possible after injury, to prevent the body from attaining a generalized lysis stage. Peak collagen synthesis occurs from five to seven days following an injury. The amount of collagen produced then decreases. Stimulation of collagen alignment is through mechanical stress, which triggers an electrical process to quicken healing time and tensile strength. It is important, however, not to introduce mechanical stress too soon. Often, people tend to be too anxious to resume activity, be it normal or athletic, which stresses the injured joint. Once the pain has subsided, it should be emphasized to the patient that the healing process is not 100% complete and that too much activity could cause an aggravation of the injury or a remission of the healing process. Sadly, when a one-or-two-week-old injury is mismanaged, months of chronic problems result.

The body's initial reaction to sprain is inflammation. It is the injured tissues' attempt to restore themselves to normal. There appears to be three phases of inflammation in the area of trauma: (1) Capillary permeability increases, with a corresponding increase in osmotic pressure, which causes protein and fluid to move from the blood vessels to the tissue areas. (2) Fibrin is one of the proteins that enter the area of trauma. It begins to coagulate and becomes trapped, resulting in retained fluid. This, in turn, inhibits the body's ability to commence the healing process. (3) The body then

responds by breaking down the fibrin and its cofactors, thus enabling the tissues to be drained by the lymph, resulting in decreases in pressure and pain. It is, therefore, important to reduce inflammation as soon as possible, so that healing may begin.

Nutritional Support

As mentioned above, the first step in the treatment of a ligamentous injury is to decrease inflammation. The nutrients needed to accomplish this, along with in-office physical therapy and manipulation, include the following: (1) Proteolytic enzymes. These are anti-inflammatory, protein dissolving substances which help clear the protein exudate from the injured area. There are two major groups of anti-inflammatory proteolytic enzymes. They are the vegetable-based enzymes which include bromelain and papin. The animal-based enzymes include trypsin and chymotrypsin. Various studies in the literature support the use of these substances. It is this author's opinion that in times of inflammation, all of the above-described enzymes should be used. When used together, a synergistic effect is promoted, along with each individual enzyme's biochemical ability to degradate various proteins. (2) Zinc. The trace mineral, zinc, is also important in the reduction of inflammation. All tissues contain some zinc, but injured areas of the body have exceedingly high concentrations. As inflammation increases, so do the zinc levels in the compromised area. Therefore, so that other body areas do not suffer a deficiency and the inflamed area can be assured of adequate amounts, supplementation with zinc is recommended. (3) Vitamin C and bioflavinoids. These substances have been documented in numerous studies to be powerful anti-inflammatory nutrients. When given with proteolytic enzymes, the combination has an anti-inflammatory action comparable to, and more effective than, many anti-inflammatory drugs. The combination also has the added benefit of an orthomolecular approach. That is, substances that are native to the body and that are not metabolized as poisons, which, of course, drugs are.

Depending upon the extent of the injury, doses of proteolytic enzymes, vitamin C, bioflavinoids, and zinc should be the highest in the first few days following the injury. After this initial period, doses may be cycled down from 5 to 20 days, depending upon the nature and extent of injury and inflammation present. Proteolytic enzymes have the most beneficial effect on an empty stomach. It is recommended that patients ingest these substances immediately upon arising in the morning and immediately before retiring at night, as well as taking doses during the day of from one to four times, again depending on the severity of the injury. It is also recommended that a good, strong multivitamin-multimineral supplement be taken with meals. Generally, on approximately day three following a ligamentous injury, the body's rebuilding process commences. It is at this time that the patient should be urged to increase his dietary protein to at least three-quarters of a gram of protein per pound of body weight. This author prefers a one-to-one ratio: one gram of protein per pound of body weight for the first 5 to 25 days following the injury, again depending upon the extent of the damage. If possible, the protein should be ingested four to six times a day as opposed to the standard American regimen of three times a day. The reason for the recommended frequency of dosage is that the body can only metabolize 20 to 35 grams of protein per meal, and, if the patient is ingesting the recommended high amounts at two or three sittings, much of the dosage will be wasted -- undigested. By ingestion of protein in larger amounts fewer times during the day, extra stress is exerted on the liver, and, especially, the kidneys, in handling the nitrogenous byproducts of protein digestion. If the patient finds it difficult to ingest protein four to six times a day, amino acids may be used once or twice a day. A balanced formula, including the eight essential amino acids, with additional sulphur containing amino acids (proline, lysine, and cystine) may be utilized in place of a small meal to maintain a positive nitrogen balance throughout the day. Amino acid supplementation should be designed to augment the three or four protein meals the patient is consuming and not be a meal substitute. Additional amounts of the sulphur containing amino acids are recommended, due to the fact that they are the three most important

amino acids for the production of collagen, of which the ligaments are composed.

Vitamins and minerals are also necessary to the production of collagen. Zinc, magnesium, and vitamin B-12 are key micronutrients in the formation of RNA and DNA. Thus, deficiencies of these nutrients block the initiation of collagen production. Vitamin C is used to link amino acids in protein synthesis. Along with iron, it is necessary for hydroxylation of proline and lysine, both essential amino acids in the formation of collagen. Vitamin C also stimulates secretion of collagen from cells, once it has been manufactured. Manganese is a trace mineral which is pivotal in connective tissue production. In humans, manganese concentrations are highest in connective tissue. Its functions include playing a key role in the synthesis of mucopolysaccharides which are a group of polysaccharides that, when combined with protein and dispersed in water, form chondroitin and its sulphate forms -- including A, B, and C -- along with hyaluronic acid, which in turn are major constituents of collagen ground substance. Manganese is also essential for the activation and stimulation of triple helix formation, which is the structure of collagen. Some authors state that manganese is also needed, along with the previously-mentioned zinc and vitamin B-12, for the manufacture of RNA. Obviously, in times of injury and repair, supplemental intake of manganese should be generous throughout the day. Vitamin B-6 is involved in numerous aspects of protein synthesis. In its coenzyme form, it plays a part in the transportation of amino acids, the building of amino acids, the transamination of amino acids (transferring anion groups from one amino acid to another), and the deamination of amino acids (removing anion groups from amino acids). Along with vitamin B-2 and copper, it is used for the cross-linking of the collagen fibers which make this protein strong. The administration of the above-described nutrients should be backed up by a high potency multivitamin-multimineral supplement, as well as with an extra intake of water. It is difficult to prescribe specific amounts of vitamins, minerals, enzymes, and amino acids needed in the synthesis, repair, and regeneration of connective tissue, as each injury and patient are unique. It is, therefore, recommended that the doctor consult with the professional makers of these substances (most of whom have 800 telephone numbers) and give their chief nutritionists and biochemists the particulars of the specific problem being addressed. The doctor may also feel free to contact me at my office regarding any questions about this article or about supplemental protocols.

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JUNE 1990