B₆/B₁ Plus Zinc

Trigger finger or stenosing tenosynovitis is a condition in which one of the fingers or thumb catches in a bent position. The finger or thumb may straighten with a snap-like a trigger being pulled and released. If trigger finger is severe, the finger may become locked in a bent position.(1)

Trigger finger is caused by a narrowing of the sheath that surrounds the tendon in the affected finger. Susceptibility to trigger finger is greater in those whose work or hobbies require repetitive gripping actions, and trigger finger is also more common in women than in men, and in those with diabetes.

In nature Vitamin B₆ exists as three interconvertable forms, an aldhyde (pyridoxal), an alcohol (pyridoxine), or an amine (pyridoxamine).(2) The coenzyme forms are pyridoxal phosphate and pyridoxamine phosphate. Ellis, JM, et al. reported a severe vitamin B₆ deficiency in a group of patients diagnosed with carpel tunnel syndrome.(3) Additionally, according to Dr. Jonathon Wright, fifty (50) milligrams of vitamin B₆ as pyridoxal-5-phosphate (P5P), taken three times daily will gradually diminish and eliminate even the worst case of trigger finger.(4)

An inverse association between the level of plasma P5P and C-reactive protein, along with other inflammatory makers has been demonstrated in numerous studies.(5,6,7) The plasma concentrations of P5P have also been demonstrated to be reduced during inflammation.(8) Additionally, an increased level of catabolism of vitamin B₆ has been observed during inflammation or activated cellular immunity, resulting in a decreased circulating level of vitamin B₆.(9,10)

Vitamin B₆ (pyridoxine) toxicity has been reported at dosages above 300 mg per day for extended periods. However, the biologically active form of vitamin B₆, pyridoxal-5-phosphate (P5P), has no reported toxicity. Therefore, P5P is the preferred form of vitamin B₆ for higher utilization.

While Vitamin B₁ is widely distributed in the food chain, highly refined foods are virtually absent in thiamin, thus a diet high in these foods will ultimately be low in thiamin. Functionally, thiamin is a part of the coenzyme thiamin pyrophosphate (TPP), also known as cocarboxyrase, and is a required component in the metabolism of carbohydrates as a part of the coenzyme thiamine cocarboxylase.(10) Specifically, TPP “is required for the oxidative decarboxylation of pyruvate to form acetyl-coenzyme A, providing entry of oxidizable substrate(s) into the Krebs cycle for the generation of energy. Additionally, it is also a coenzyme for transketolase, which functions in the pentose phosphate pathway, an alternate pathway for glucose oxidation.”(11)

Thiamine is most strongly linked with carbohydrate metabolism, but TPP is also required for the oxidative decarboxylation of other alpha-keto acids such as
alpha-ketoglutarate and branched-chain alpha-keto acids (i.e., 2-ketocarboxylates) derived from certain amino acids (e.g., valine, isoleucine, leucine). The pyrophosphate ester of thiamine, thiamine diphosphate is a cofactor for enzymatic reactions that cleave alpha-keto acids. TPP activates the decarboxylation of pyruvate in the pyruvate dehydrogenase complex.

Vitamin B1 (thiamin) is also noted for its benefits for inflammation of the nerves (neuritis), and deficiency is associated with "high calorie malnutrition."(12) Deficiency may be established by determination of the erythrocyte (red blood cell) transketolase activity.

Zinc serves as an essential cofactor for greater than seventy (70) enzymes, and participates in binding DNA as a component of the zinc binding proteins (zinc fingers), which consists of a combination of the protein and zinc.(13) Zinc also functions in many other roles in the body, including participation in the role of insulin release.(14)

Zinc functions in membrane stabilization, and is part of the bone mineral apatite. Zinc has also been demonstrated to "increase osteogenic effect" via multiple mechanisms, including via cellular proliferation stimulation, increased alkaline phosphatase (ALP) activity, increased synthesis of collagen in osteoblastic cells, and via a concentration increase of cellular collagen.(15)

A deficiency in zinc results in a decrease in bone weight, delays growth in bone metabolism, and retards bone growth, development and maintenance.(15,16,17) Both in vivo and in vitro studies have also demonstrated that zinc possess stimulatory effects on bone formation and mineralization.(18,19)

Thus, the combination of the above noted nutrients may be beneficial in supporting trigger finger, or for any type of sheath inflammation.