

# B<sub>6</sub>/B<sub>1</sub> 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.<sup>(1)</sup>

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 B<sub>6</sub> exists as three interconvertible forms, an aldehyde (pyridoxal), an alcohol (pyridoxine), or an amine (pyridoxamine).<sup>(2)</sup> The coenzyme forms are pyridoxal phosphate and pyridoxamine phosphate. Ellis, JM, et al. reported a severe vitamin B<sub>6</sub> deficiency in a group of patients diagnosed with carpal tunnel syndrome.<sup>(3)</sup> Additionally, according to Dr. Jonathon Wright, fifty (50) milligrams of vitamin B<sub>6</sub> as pyridoxal-5-phosphate (P5P), taken three times daily will gradually diminish and eliminate even the worst case of trigger finger.<sup>(4)</sup>

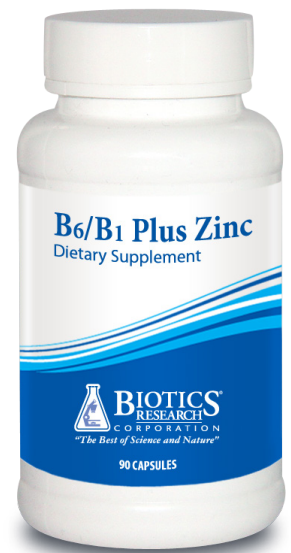
An inverse association between the level of plasma P5P and C-reactive protein, along with other inflammatory makers has been demonstrated in numerous studies.<sup>(5,6,7)</sup> The plasma concentrations of P5P have also been demonstrated to be reduced during inflammation.<sup>(8)</sup> Additionally, an increased level of catabolism of vitamin B<sub>6</sub> has been observed during inflammation or activated

cellular immunity, resulting in a decreased circulating level of vitamin B<sub>6</sub>.<sup>(8,9)</sup>

Vitamin B<sub>6</sub> (pyridoxine) toxicity has been reported at dosages above 300 mg per day for extended periods. However, the biologically active form of vitamin B<sub>6</sub>, pyridoxal-5-phosphate (P5P), has no reported toxicity. Therefore, P5P is the preferred form of vitamin B<sub>6</sub> for higher utilization.

While Vitamin B<sub>1</sub> 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 cocarboxyase, and is a required component in the metabolism of carbohydrates as a part of the coenzyme thiamine cocarboxylase.<sup>(10)</sup> 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."<sup>(11)</sup>

Thiamine is most strongly linked with carbohydrate metabolism, but TPP is also required for the oxidative decarboxylation of other alpha-keto acids such as



**(800) 373-1373**

Metabolic Management  
P.O. Box 715 • Grant Park, IL 60940  
[www.metabolicmanagement.com](http://www.metabolicmanagement.com)

These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.

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."<sup>(12)</sup> 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.<sup>(13)</sup> Zinc also functions in many other roles in the body, including participation in the role of insulin release.<sup>(14)</sup>

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.<sup>(15)</sup>

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

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

## References

1. <http://www.webmd.com/osteoarthritis/guide/trigger-finger>
2. Berdanier C. *Advanced Nutrition Micronutrients*. CRC Press. 1998. p. 99.
3. Ellis JM, Kishi T, Azuma J, Folkers K. Vitamin B6 deficiency in patients with a clinical syndrome including the carpal tunnel defect. *Biochemical and clinical response to therapy with pyridoxine*. *Res Commun Chem Pathol Pharmacol*. 1976 April 13(4):743-57.
4. <http://wrightnewsletter.com/2011/07/18/trigger-finger-2/#sthash.Tg59SsB2.dpuf>
5. Sakakeeny L1, Roubenoff R, Obin M, Fontes JD, Benjamin EJ, Bujanover Y, Jacques PF, Selhub J. Plasma pyridoxal-5-phosphate is inversely associated with systemic markers of inflammation in a population of U.S. adults. *J Nutr*. 2012 Jul 142(7):1280-5.
6. Friso S, Jacques PF, Wilson PW, Rosenberg IH, Selhub J. Low circulating vitamin B(6) is associated with elevation of the inflammation marker C-reactive protein independently of plasma homocysteine levels. *Circulation*. 2001 Jun 12;103(23):2788-91.
7. Folsom AR, Desvarieux M, Nieto FJ, Boland LL, Ballantyne CM, Chambless LE. B vitamin status and inflammatory markers. *Atherosclerosis*. 2003 Jul 169(1):169-74.
8. Ulvik A, Middtun Ø, Pedersen ER, Eussen SJPM, Nygård O, Ueland PM. Evidence for increased catabolism of vitamin B-6 during systemic inflammation. *Am J Clin Nutr*. 2014 100:250-5.
9. Ulvik A, Middtun Ø, Pedersen ER, Nygård O, Ueland PM. Association of plasma B-6 vitamers with systemic markers of inflammation before and after pyridoxine treatment in patients with stable angina pectoris. *Am J Clin Nutr*. 2012 May 95(5):1072-8.
10. Berdanier C. *Advanced Nutrition Micronutrients*. CRC Press. 1998. p. 83.
11. [https://www.uic.edu/classes/phar/phar332/Clinical\\_Cases/vitamin%20cases/thiamin/thiamin\\_pyrophosphate.htm](https://www.uic.edu/classes/phar/phar332/Clinical_Cases/vitamin%20cases/thiamin/thiamin_pyrophosphate.htm).
12. Lonsdale D. A Review of the Biochemistry, Metabolism and Clinical Benefits of Thiamin(e) and Its Derivatives. *Evid. Based Complement Altern. Med*. 2006 3(1):49-59.
13. Berdanier C. *Advanced Nutrition Micronutrients*. CRC Press. 1998. p. 195-196.
14. Berdanier C. *Advanced Nutrition Micronutrients*. CRC Press. 1998. p. 197.
15. Seo H-J, Cho Y-E, Kim T, Shin H-I, Kwun I-S. Zinc may increase bone formation through stimulating cell proliferation, alkaline phosphatase activity and collagen synthesis in osteoblastic MC3T3-E1 cells. *Nutr Res Pract*. 2010 4(5):356-361
16. Hsieh HS, Navia JM. Zinc deficiency and bone formation in guinea pig alveolar implants. *J Nutr*. 1980;110:1581-1588.
17. Oner G, Bhaumick B, Bala RM. Effect of zinc deficiency on serum somatomedin levels and skeletal growth in young rats. *Endocrinology*. 1984 114:1860-1863.
18. Yamaguchi M, Yamaguchi R. Action of zinc on bone metabolism in rats: increases in alkaline phosphatase activity and DNA content. *Biochem Pharmacol*. 1986 35:773-777.
19. Hall SL, Dimai HP, Farley JR. Effects of zinc on human skeletal alkaline phosphatase activity *in vitro*. *Calcif Tissue Int*. 1999 64:163-172.

**B6/B1 Plus Zinc** is available in 90-count bottles (#1119).

### Supplement Facts

Serving Size: 1 Capsule

	Amount Per Serving	% Daily Value
Thiamin (B <sub>1</sub> ) (as cocarboxylase chloride)	2.7 mg	180%
Vitamin B <sub>6</sub> (as pyridoxal-5-phosphate)	32 mg	1,600%
Zinc (as zinc gluconate)	5 mg	33%

**Other ingredients:** Cellulose, capsule shell (gelatin and water), magnesium gluconate (50 mg) and magnesium stearate (vegetable source).

**This product is gluten and dairy free.**

**RECOMMENDATION:** One (1) capsule each day as a dietary supplement or as otherwise directed by a healthcare professional.

**KEEP OUT OF REACH OF CHILDREN**

Store in a cool, dry area.

Sealed with an imprinted safety seal for your protection.

Product # 1119 Rev. 10/13



**BIOTICS**  
RESEARCH  
CORPORATION  
Utilizing "The Best of Science and Nature"  
to Create Superior Nutritional Supplements



**(800) 373-1373**

Metabolic Management  
P.O. Box 715 • Grant Park, IL 60940  
[www.metabolicmanagement.com](http://www.metabolicmanagement.com)

These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.