

The Effect of Diet on Botulinum Toxin Treatments

Charles N. S. Soparkar, M.D., Ph.D.
Baylor College of Medicine
Houston, Texas

Botulinum toxins, Botox and Dysport included, represent a family of some of the most potent naturally occurring toxins in the world. But to be effective, each toxin molecule must be associated with a molecule of zinc. Without zinc, the otherwise powerful botulinum toxins have little or no effect.

The botulinum toxins are made by bacteria in a laboratory, collected, purified, and then processed into a fine, dry powder which makes storage and distribution for sale to physicians easier. Oddly enough, if zinc is added to the toxin during processing, the toxin's potency is greatly diminished. So, the companies that make and purify the botulinum toxins strip away all zinc during the toxin's processing. Thus, to be effective, the botulinum toxin must find and bind zinc in human tissue after being injected. If a person has inadequate zinc in their tissues, then the botulinum toxin will have a significantly decreased effect.

It is very difficult and expensive to measure zinc levels in people, because the amount of zinc in blood is not well correlated with the amount of zinc in tissues. Nevertheless, an increasing number of studies have suggested that many people in the United States and other developed countries may be zinc deficient.

In humans, zinc levels are increased by eating zinc, and numerous foods are relatively rich in zinc including poultry, beef, pork, some seafoods, eggs, many seeds and nuts, whole grains (some breads and cereals), and beans and lentils with some forms of zinc in different foods being more bioavailable than others. Thus, when we asked our patients to eat a quarter pound of turkey (a relatively good and inexpensive source of zinc) every day for four days prior to their botulinum injections, many saw a significant improvement in their toxin effect. However, to boost one's zinc level, the issue can be more complicated than just eating turkey.

Many other foods block zinc absorption, so if we eat these within a few hours of ingesting zinc rich foods, the zinc will not be absorbed. Prescription and dietary supplements containing calcium, iron, copper, potassium, magnesium, and Vitamin A can all be a problem. Many people believe they are safe taking a zinc supplement obtained from their local nature food or vitamin store, but some forms of zinc are much better absorbed than others, and taking a poorly absorbed form can be worse than taking no zinc at all. Poorly absorbed forms of zinc can compete for absorption with better zinc available through foods.

Alcohol both decreases zinc absorption and increases zinc loss in the urine. So, if your zinc-richest meal of the day is dinner, does that mean it might not be a good idea to have wine, beer, or a mixed drink around dinner time? Maybe.

Milk-based products containing casein seem to decrease zinc levels. No milk with meals? Maybe.

Certain preservatives such as EDTA and E391 as well as phosphates found in most carbonated soft drinks bind zinc and inhibit its absorption. No soft drinks with your lunch? Again, maybe.

Perhaps the biggest culprits responsible for decreasing zinc absorption are the phytates, a group of phosphate containing compounds which tightly bind zinc in the intestinal track and prevent zinc absorption. As little as 0.26 grams of phytate will inhibit the absorption of 50 mg of pure zinc. Phytates are found in whole grain breads, whole wheat products, many cereals, soy, oats, legumes (including peas, peanuts and peanut butter), beans, corn, nuts, and rice.

Given the complexity of dietary impact on zinc levels, and the fact that in many, stress makes blepharospasm worse, we sought a way to safely supplement zinc without making people totally change their eating habits. To this end, we gave patients a combination of a highly bioavailable, organic zinc along with phytase (an enzyme that effectively breaks down phytates) for four days preceding their botulinum toxin injections. Patients reported an increase in both the effect of their toxin treatments and an increase in the duration of botulinum toxin effect by about 25%, suggesting that patients receiving adequate zinc supplementation might benefit from fewer toxin injections at a lower dose and with less treatment-to-treatment variability in effect. We saw the same benefits for patients who were receiving botulinum toxin injections.

So, should everyone who receives botulinum toxin injections be popping as much zinc and phytase as they can? Probably not. More of a good thing is not necessarily better. Examples of medical problems from vitamin overdose abound, and overdosing with either zinc or phytase are both possible. Thus, OCuSOFT, Inc. (Richmond, TX) has developed a safe combination of these two supplements (brand name ZYTAZE™*) which they are packaging in a blister pack to be started just four days before botulinum toxin treatments. ZYTAZE™ should be available within the next couple of months. Does everyone need to use ZYTAZE™ to improve their zinc status? Not necessarily. Careful dietary modification may provide the same results. Remember that overall body zinc status is important for many health reasons.

An essential point, however, is that if someone changes their zinc status either through diet or the use of ZYTAZE™, they need to keep their treating physician fully informed, because maintaining prior injection doses, patterns, and frequency may lead to over treatment with the attendant side effects. For more information on ZYTAZE™, please consult your physician.

**Dr. Soparkar has a joint financial interest in this product.*

Originally published in Benign Essential Blepharospasm Research Foundation Newsletter, Volume 29, Number 4, page 4 (2010)