Complications of Diabetes

Principal Proposed Natural Treatments | Other Proposed Natural Treatments | References

Related Terms
- Autonomic Neuropathy, Diabetic; Cardiac Autonomic Neuropathy, Diabetic; Cataracts; Cataracts, Diabetic; Diabetes, Complications; Diabetic Neuropathy; Diabetic Retinopathy; Peripheral Neuropathy, Diabetic; Retinopathy, Diabetic

Principal Proposed Natural Treatments
- PERIPHERAL NEUROPATHY: Acetyl-L-Carnitine; Evening Primrose Oil (Gamma-linolenic Acid); Lipoic Acid; Vitamin B
- CARDIAC AUTONOMIC NEUROPATHY: Lipoic Acid

Other Proposed Natural Treatments
- CARDIAC AUTONOMIC NEUROPATHY: Vitamin E
- CATARACTS: Bilberry
- FOOT ULCERS Tinospora cordifolia
- IMMUNITY AND INFECTIONS Multivitamin/Multimineral Supplements
- LOWER LEG SWELLING (MICROANGIOPATHY): Oxerutins
- PERIPHERAL NEUROPATHY: Fish Oil; Magnet Therapy; Selenium; Vitamin E
- RETINOPATHY: Bilberry; Oligomeric Proanthocyanidins (OPCs)

For more information on natural treatments for diabetes in general, see the full Diabetes article. This entry discusses natural treatments for the complications of diabetes.

Diabetes is an illness that damages many organs in the body, including the heart and blood vessels, nerves, kidneys, and eyes. Most of this damage is believed to be caused by the toxic effects of abnormally high blood sugar, although other factors may play a role as well.

So-called "tight" control of blood sugar greatly reduces all complications of diabetes. Some of the natural treatments described here may help as well.

Principal Proposed Natural Treatments

Several supplements may help prevent or treat some of the common complications of diabetes. However, because diabetes is a dangerous disease, alternative treatment should not be attempted as a substitute for conventional medical care.

Atherosclerosis is one of the worst problems associated with diabetes, and all the suggestions discussed in the article on that topic may be useful. Similarly, natural treatments helpful in general for improving cholesterol and triglyceride profiles may be useful to people with diabetes. Note: Contrary to some early concerns, both fish oil and niacin (treatments used for improving triglyceride and cholesterol levels, respectively) appear to be safe for people with diabetes.\(^1\)\(^3\)

High levels of blood sugar can damage the nerves leading to the extremities, causing pain and numbness. This condition is called diabetic peripheral neuropathy. Nerve damage may also develop in the heart, a condition
named cardiac autonomic neuropathy. Below, we discuss three natural supplements—acetyl-L-carnitine, lipoic acid, and gamma-linolenic acid (GLA)—that have shown promise for the treatment of diabetic nerve damage.

**Acetyl-L-Carnitine**

The supplement acetyl-L-carnitine (ALC) has shown promise for diabetic peripheral neuropathy. Two 52-week double-blind, placebo-controlled studies involving a total of 1,257 people with diabetic peripheral neuropathy evaluated the potential benefits of ALC taken at 500 mg or 1000 mg daily. The results showed that use of ALC, especially at the higher dose, improved sensory perception and decreased pain levels. In addition, the supplement appeared to promote nerve fiber regeneration.

ALC has also shown some promise for cardiac autonomic neuropathy. For more information, including full dosage and safety issues, see the Carnitine article.

**Lipoic Acid**

Lipoic acid is widely advocated for treatment of diabetic neuropathy. However, while there is meaningful evidence for benefits with *intravenous* lipoic acid, there is only minimal evidence to indicate that *oral* lipoic acid can help.

A double-blind, placebo-controlled study that enrolled 503 people with diabetic peripheral neuropathy found that intravenous lipoic acid helped reduce symptoms over a 3-week period. However, when researchers substituted oral lipoic acid for intravenous lipoic acid, benefits ceased. Benefits were seen with oral lipoic acid in a study published in 2006. In this double-blind, placebo-controlled trial, 181 people with diabetic peripheral neuropathy were given either placebo or one of three doses of lipoic acid: 600 mg, 1,200 mg, or 1,800 mg daily. Over the 5 week study period, benefits were seen in all three lipoic acid groups as compared to the placebo group. However, while this outcome may sound promising, one feature of the results tends to reduce the faith one can put in them: the absence of a dose-related effect. Ordinarily, when a treatment is effective, higher doses produce relatively better results. When such a spectrum of outcomes is not observed, one wonders if something went wrong in the study.

Other than this one study, the positive evidence for oral lipoic acid in diabetic peripheral neuropathy is limited to open studies of minimal to no validity and double-blind trials too small to be relied upon. Lipoic acid has also been advocated for cardiac autonomic neuropathy, and one study did find benefits: The DEKAN (Deutsche Kardiale Autonome Neuropathie) study followed 73 people with cardiac autonomic neuropathy for 4 months. Treatment with 800 mg of oral lipoic acid daily showed significant improvement compared to placebo, and no important side effects.

Preliminary evidence hints that lipoic acid may be more effective for neuropathy if it is combined with gamma-linolenic acid (GLA), which is described in the next section.

For more information, including dosage and safety issues, see the full Lipoic Acid article.

**Gamma-linolenic Acid (From Evening Primrose Oil)**

Gamma-linolenic acid (GLA) is an essential fatty acid in the omega-6 category. The most common sources of GLA are evening primrose oil, borage oil, and black currant oil.

Many studies in animals have shown that evening primrose oil can protect nerves from diabetes-induced injury. Human trials have also found benefits. A double-blind study followed 111 people with diabetes for a period of 1 year. The results showed an improvement in subjective symptoms of peripheral neuropathy, such as pain and numbness, as well as objective signs of nerve injury. People with good blood sugar control improved the most. A much smaller double-blind study also reported positive results.
Other Proposed Natural Treatments

A 4-month, double-blind, placebo-controlled trial found that vitamin E at a dose of 600 mg daily might improve symptoms of cardiac autonomic neuropathy. Vitamin E as well as selenium have also shown promise for diabetic peripheral neuropathy. Intriguing evidence from a small study suggests that vitamin E may also help protect people with diabetes from developing damage to their eyes and kidneys. However, a large, long-term study failed to find vitamin E effective for preventing kidney damage. (Vitamin E also did not help prevent coronary artery disease.)

In a review of 13 randomized trials, researchers found inadequate evidence for the effectiveness of B vitamins for peripheral neuropathies (diabetic or otherwise).

The supplement inositol has been tried as a treatment for diabetic neuropathy, but the results have been mixed.

In highly preliminary studies, fish oil has shown some promise for diabetic neuropathy, but human trials have not been performed.

Diabetes can cause swelling of the ankles and feet by damaging small blood vessels (microangiopathy). A preliminary, double-blind, placebo-controlled trial suggests that oxerutins might be helpful for this condition.

Weak evidence suggests that the herb bilberry may help prevent eye damage (cataracts and retinopathy) caused by diabetes. Pycnogenol, a source of oligomeric proanthocyanidins (OPCs), has also shown promise for diabetic retinopathy.

It has been suggested that vitamin C may also help prevent cataracts in diabetes, based on its relationship to sorbitol. Sorbitol, a sugar-like substance that tends to accumulate in the cells of people with diabetes, may play a role in the development of diabetic cataracts. Vitamin C appears to help reduce sorbitol buildup. However, the evidence that vitamin C provides significant benefits by this route is at present indirect and far from conclusive.

Another study suggests that vitamin C might be helpful for reducing blood pressure in people with diabetes.

The herb Tinospora cordifolia and honey (applied topically) have shown some promise for speeding healing of diabetic foot ulcers.

Magnetic insoles, a form of magnet therapy, have shown some promise for the treatment of diabetic peripheral neuropathy. A 4-month, double-blind, placebo-controlled, crossover study of 19 people with peripheral neuropathy found a significant reduction in symptoms in people using the insoles as compared to those using placebo insoles. This study enrolled people with peripheral neuropathy of various causes; however, reduction in the symptoms of burning, numbness, and tingling were especially marked in those cases of neuropathy associated with diabetes.

Another type of magnetic therapy, involving low frequency, repetitive magnetic pulses generated by an electric current, was no better than a placebo at relieving painful peripheral neuropathy among 61 people who had diabetes for a long time. In another study, however, high frequency magnetic fields applied repetitively to the brain were more effective than placebo in reducing pain and improving quality of life among 28 subjects with peripheral neuropathy.

One small double-blind, placebo-controlled study suggests that regular use of multivitamin/multimineral supplements may reduce incidence of infectious illness in people with diabetes. Another study failed to find that general nutritional supplementation accelerated healing of diabetic foot ulcers.


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