

## Supplement Science



# A Supplemental Approach to Temporomandibular Joint Disorder

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**T**emporomandibular joint disorder (TMD) is a common condition with approximately 10-15 million people in the US having significant cases. This disorder affects at least five times more women than men and is usually manifested by jaw pain, tooth sensitivity, headaches, limited jaw opening and occasional joint noises, such as popping, clicking or grinding sounds. Less common symptoms include ear pain, ringing in the ears (tinnitus) and dizziness (vertigo).

Often TMD is referred to as TMJ, which actually refers to the temporomandibular joint itself where the lower jaw articulates against the base of the skull or temporal bone. It is comprised of a complex system, made up of two TMJs, one on each side of the jaw, as well as associated muscles, nerves and the teeth. To feel this system in action, place your hand in front of your ear and open and close your jaw.

Common causes for TMD include trauma, poor dental bite (malocclusion), and/or habitual clenching and grinding

of the teeth (bruxism). Traditional treatment of TMD involves fabrication of a bite guard to protect the teeth and joints, and to decrease excessive muscular activity. Fortunately, surgery is only indicated in less than one to two percent of all cases. Early identification and intervention is the key to treating TMD before the condition deteriorates to a more advanced stage, marked by arthritic degeneration of the bony and cartilaginous structures making up the jaw joint. At this point, therapy often becomes more expensive, more invasive and less predictable.

Supplements, when used particularly during the early stages, have the potential to play an important role in TMD. The goal during the initial stages is to reduce inflammation and muscle spasm, though reducing tension, stress and anxiety may also be beneficial, as approximately 80-85 percent of the muscle hyperactivity seen in TMD is related to stress and anxiety.

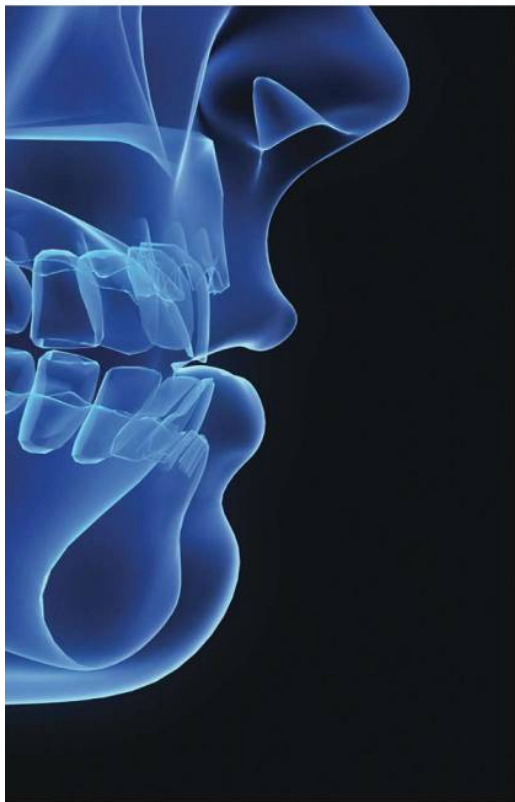
### Vitamins/Minerals

Calcium and magnesium are two of the

most important vitamins related to proper muscle function. Calcium binds to troponin in muscle to promote muscle contraction and when it flows out of the cytoplasm the muscle relaxes. The recommended daily amount for adults is between 1,000-1,300mg.

Muscle spasms and cramps can also be a sign of magnesium deficiency. Magnesium acts as a coenzyme in the body, helping to regulate a number of functions with over 300 enzymes in the body requiring magnesium to function properly. It is estimated that less than 50 percent of the US population meets the RDA of magnesium, about 400mg daily in healthy adults.

Also important for their protective effects on joints are antioxidant vitamins and minerals, such as vitamins A, C and E, selenium and zinc, since free radical formation is increased in chronic inflammation<sup>1</sup> and may contribute to the destruction of bone and cartilage seen in arthritis. A study of 29,368 older women from 1986-1997 looked at the association of antioxidant vitamins and trace elements from supplements, as



well as diet, and the risk of developing rheumatoid arthritis (RA). It found that women with greater intakes of certain antioxidants, particularly beta-cryptoxanthin and supplemental zinc, were less likely to develop RA.<sup>2</sup>

Of these nutrients, vitamin C deserves special mention. Besides being an antioxidant, vitamin C also plays a critical role in collagen formation, as collagen formed in the absence of this vitamin is abnormal and cannot form proper fibers.<sup>3</sup> Collagen is found in the articular surfaces of the temporomandibular joint as well as in the meniscus or articular disc. Proper collagen synthesis and repair is important to maintaining good overall joint health.

### Avocado-Soybean Unsaponifiables

Avocado-soybean unsaponifiables (ASUs) refers to a combination of 1/3 avocado oil and 2/3 soy oil. Unsaponifiable means the fatty oils do not break down to form soaps, like many fats do. ASUs have been available in Europe and Scandinavia as a prescription drug or non-prescription supplement for several years. Numerous human studies have shown ASUs to have anti-inflammatory effects, including one 2003 study which indicated that 300mg

daily of ASU reduced non-steroidal anti-inflammatory drug use and provided symptomatic relief in patients with osteoarthritis<sup>4</sup> (OA).

### Omega-3s

There has been much interest in recent years on the potential health benefits of the omega-3 fatty acids. These are felt to be beneficial for cardiovascular and central nervous system health, but recent attention has been focused on its benefits in joint health as well. Clinical studies have shown that diets rich in omega-3s reduce joint tenderness and morning stiffness, and increase walking ability in patients with RA and OA. Results also suggest omega-3s may be effective for asthma, inflammatory bowel disease, dysmenorrhea and other inflammatory conditions.

### Glucosamine/Chondroitin

Glucosamine and chondroitin sulfate are natural substances found in and around the cells of cartilage. Many researchers believe that glucosamine inhibits inflammation and stimulates cartilage cell growth, while chondroitin sulfate provides strength and resilience to cartilage tissues. The usual recommended dose is 1,500mg glucosamine and 1,200mg chondroitin daily. Like many issues in medicine one can find contradictory studies, however, what is known for certain is that glucosamine and chondroitin have minimal side effects and are well tolerated, suggesting little downside to their use, especially when compared to pharmaceuticals.

### Herbs

Many herbs are known to act as anti-inflammatories, such as *boswellia serrata*, which has been used in ayurvedic medicine for its anti-inflammatory, anti-arthritic and analgesic activity, and has additionally been used to treat RA, Crohn's disease, ulcerative colitis and asthma. A double-blind study done in 2003 found that patients taking boswellia over an eight-week period decreased knee pain and swelling and increased walking distance compared to placebo.<sup>6</sup> The main mechanism of action appears to be inhibition of 5-lipoxygenase, thereby reducing the production of pro-inflammatory leukotrienes.

Other herbs that may be beneficial in TMD are white willow bark, valerian root, yarrow, kava-kava and St. John's wort. Unfortunately, unlike *boswellia serrata*, many of these have not been as thoroughly studied, though they may have a long tradition of use in certain cultures.

### Research Needed

More research into the mechanism of action of some of these substances, as well as optimal dosages, potential drug interactions and side effects is needed. Ideally, studies done on TMD patients, looking at clinical endpoints such as mouth opening, joint noise, pain-scale and radiographic findings would be most beneficial.

Though allopathic medicine and dentistry has historically been reluctant to consider so called "alternative" therapies, increasing public acceptance and use of vitamins, herbs and other supplements should drive traditional institutions to investigate the use of these compounds in treating numerous medical conditions, among them TMD. **VR**

### References

- 1 Windrow VR, et al. "Free Radicals in inflammation: second messengers and mediators of tissue destruction" New York: Churchill, Living Stone 1993, 506-22.
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- 3 *Biochemistry* 3<sup>rd</sup> edition. Stryer, L. Stanford University. WH Freeman and Company. New York, 1988.
- 4 Morelli, V., et al. "Alternative Therapies for traditional disease states: Osteoarthritis." *American Family Physician* Jan. 15, 2003.
- 5 Kimmatkar N, et al. Efficacy and tolerability of *Boswellia serrata* extract in treatment of osterarthritis of the knee—a randomized double blind placebo controlled trial. *Phytotherapy* 2003 Jan;10(1):3-7.

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