

Editorial Commentary: Is Medical Ozone Therapy Beneficial in the Treatment of Knee Osteoarthritis?



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Abstract: Osteoarthritis is a degenerative joint disease that is difficult to manage and a major cause of disability in the elderly population. The use of ozone for treatment of knee osteoarthritis (KOA) is controversial and of interest. Although the exact mechanism of ozone for the treatment of KOA is not fully understood, it has been shown that ozone administration may promote oxidative preconditioning or adaptation to oxidative stress, which in turn will result in the stimulation of antioxidant endogenous system which prevents tissue damage. A number of European studies show ozone injection for treatment of KOA results in pain relief, disappearance of edema, and improved mobility. Dosages and volume of injections vary among studies, risk of bias is generally high, and outcomes are inconsistent and not uniformly excellent. At present, there is insufficient evidence to support the effectiveness of ozone therapy for KOA.

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Osteoarthritis is the most common type of degenerative joint disease and the risk increases with age, with women more likely to develop the disease than men. When it affects the knee, it causes stiffness, impairment of physical function, as well as pain and limited movement of the knee joint. This can result in the limited ability to perform day to day activities and reduced quality of life. Knee osteoarthritis (KOA) mainly affects the articular cartilage, which is a specialized connective tissue lining the joint surfaces and very susceptible to injuries. As with other degenerative diseases, the development and advancement of osteoarthritis is associated with continuous exposure to oxidants.

Since its discovery in the mid-19th century, ozone has been used as a therapeutic agent to treat a variety of diseases. Although this form of therapy has been widely used in the medical field, its use as a therapeutic agent has been dominated by a lot of controversy. To address some of the controversy, Sconza, Respizzi, and Virelli, in "Oxygen Ozone Therapy for the Treatment of Knee Osteoarthritis: A Systematic Review of Randomized

Controlled Trials,"¹ reviewed literature on the application of ozone therapy in the treatment of KOA to understand its benefits when compared with other conservative treatment modalities.

In the past few decades, a substantial number of orthopaedics in Europe have used ozone therapy for treating KOA and the treatment showed pain relief, disappearance of edema, and improved mobility. Unfortunately, there are limited studies currently available that seek to elucidate the mechanism of action ozone therapy in KOA, with a large variability in terms of side of injection, concentration, and volume of ozone.² Repairing damaged articular cartilage remains one of the most difficult conditions to treat because of its limited self-healing capacity and poses a major challenge to many orthopaedic surgeons.³

Sconza et al. did a systematic review of literature available on studies that performed intra-articular injection of oxygen ozone in KOA for the reduction of pain and improvement of joint function. In total, 858 patients from 11 studies were included in the review (629 female and 229 male patients). There were many inconsistencies in these studies with regards to the concentration and volume of the ozone injected in the knee, with volumes ranging from 5 to 20 mL and concentration ranging between 15 and 40 µg/mL. In a study in which ozone was compared with corticosteroid injection, the effect of ozone appeared to be longer lasting and more persistent, whereas in another study, ozone showed no significance when compared with

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hypertonic dextrose injection and radiofrequency. In a study in which ozone was compared with hyaluronic acid, the latter showed superiority in the relief of pain.

The review article by Sconza et al. showed that there was bias in the 11 studies that were considered in the systematic review and there was no clear correlation between ozone therapy and the traditional techniques that are used to treat osteoarthritis. The studies could not clearly demonstrate the potential of ozone as a therapeutic modality for treating KOA; this suggests that there is insufficient evidence to support the effectiveness of ozone therapy. Although there are limitations in the applied methodologies, there are some positives that can be drawn from the currently available literature on ozone therapy, including production of antioxidant enzymes and cytokines that can result in pain relief and improvement in knee functional status.

Sconza et al. should be commended because they do acknowledge the limitations of their study. The review highlighted the controversy that is currently available with regards to the use of ozone and examples of some of the recent work involving the use of ozone were

included in their study. It is my hope that some of the controversies highlighted in the systematic review will be addressed in the near future and a standard protocol for treatment on KOA developed. This protocol should be adhered to by all physicians globally. In addition, more research is required to understand the exact mechanism involved in the stimulation of cells by ozone and pain relief.

References

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