

**Letters to the Editor**

## **The Major Efficient Mechanisms of Ozone Therapy are Obtained in Intradiscal Procedures**

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### **To THE EDITOR:**

Magalhaes et al reported on randomized controlled trials of ozone therapy as a treatment for low back pain secondary to herniated intervertebral discs (HID) (1). We have read their article with interest and want to add important concerns.

Ozone therapy has become an alternative treatment for low back pain secondary to a herniated disc. Although the exact mechanism of action of medical ozone is not completely understood, there are a number of characteristics of this molecule that offer some insights into its mode of action in treating HID. The main mechanisms of action are proposed to explain the efficacy of ozone therapy:

1. Ozone has an effect on the inflammatory cascade by altering the breakdown of arachidonic acid to inflammatory prostaglandins. As a result, by reducing the inflammatory components, there is a subsequent decrease in pain.

2. Herniation can impinge on the venous and arterial flow and cause phlebostasis and arteriostenosis, which leads to a serious hypoxemia of the area. By applying the ozone to the herniated site, hyper-oxygenation of the area occurs, which reduces the pain by direct and indirect mechanisms.

3. This mechanism of action is the direct effect of the ozone as a rapid and strong oxidizing agent. The ozone molecule breaks down some of the glycosaminoglycan chains in the nucleus pulposus and reduces their ability to hold water, thereby diminishing the size of the herniation and subsequently contributing to pain relief.

4. The stimulation of fibroblastic activity by ozone will result in the initiation of the repair process by stimulating collagen deposition(2-3).

Different methods of ozone therapy such as intradiscal, paravertebral, and juxtaforaminal at the HID level are applied (4-6). Although all of these methods have been shown to be effective, it seems that not all

of the mechanisms of action mentioned above exist for all of them. In fact, the direct method, namely intradiscal injection in ozone therapy, seems to have an effect on all the mechanisms of action; however, the paravertebral muscle probably uses only the first mechanism listed above, which is the anti-inflammatory effect, and the juxtaforaminal method lacks the third one.

Based on this hypothesis, it appears that the best site for delivering the ozone is intradiscal not foraminal, nor the paravertebral muscle, nor anywhere else. Meanwhile, clinical evaluations confirm that the therapeutic benefit of ozone therapy is about 80% for intradiscal injections and almost 73% for indirect procedures (2).

Moreover, the reason that ozone therapy is significantly higher in pain relief compared with steroids is due to more than its anti-inflammatory mechanism of action of ozone mentioned above. On the other hand, the proteoglycan mechanism of action of ozone explains the reason why pain relief in ozone therapy compared with steroids was significant in patients with discopathy, but not in patients without it (6).

In order to investigate the maximum effectiveness of ozone therapy in these different methods, we recommend an accurate, multicenter, double blind, randomized controlled trial be undertaken to achieve the best evidence in patients with HID.

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## Obtaining More Information from the Sacroiliac Joint Arthrogram

### TO THE EDITOR:

We applaud Dr. Hansen and colleagues on their systematic evaluation of the therapeutic effectiveness of sacroiliac joint injections (1). The review provided insight into our treatment of a capacious joint, the sacroiliac (SI) joint, which represents a small percentage, in terms of incidence, of all low back pain cases. However, when a degenerative SI joint is the etiology of symptoms, this may result in severe symptoms and may significantly affect lumbosacral spine pathology and pain. Despite the complex anatomy of the SI joint, many of our colleagues deserve praise for their attempts to optimize treatment of it using diagnostic interventional techniques to ensure better therapeutic outcomes, such as the double needle technique (2). It is intuitive that a more definitive diagnosis would ensure a better therapeutic outcome regardless of the therapeutic modality chosen by the treating physician. Dr. Hansen's review has shown that this is not the case, except in the case of using cooled radiofrequency neurotomy, which demonstrated a "fair" therapeutic benefit. In today's health care climate, superior and enhanced results are demanded from us by our patients. Less robust or unsuccessful results also invite our opponents (including the insurance industry) to further launch attacks against our specialty wherein they claim that our ap-

proaches lack evidence and are "experimental."

After reading the present review (1), and after performing a recent sacroiliac joint injection with surprising results, it dawned on us that the problem may not be inherent to the technical aspects of the therapeutic SI joint procedure itself, but rather to the possibility that we are choosing the wrong interventional procedure for the right diagnosis. In other words, depending on the incompetency of the sacroiliac joint, therapeutic results probably vary. During a recent SI joint injection, we decided to inject a larger volume of water-soluble, iodine-based contrast medium (4 mL) than that which is typically utilized for diagnostic purposes (less than one mL). Surprisingly, the contrast medium travelled throughout the entire joint, and exited at the superior region revealing a "water geyser" sign (Figs. 1, 2, 3). After further studying the films, it was obvious that the joint was too incompetent to retain any injectate, and any interventional pain treatment procedure would likely fail to provide long-term relief. Such a patient would probably benefit from a more advanced surgical treatment, such as a lumbar spine fusion. Interpreting the arthrogram more in-depth can allow for a better therapeutic outcome for the patient, and prevent unnecessary procedures, which ultimately leads to overall