Ozone References

- Bonetti M, Fontana A, Cotticelli B, Volta GD, Guindani M, Leonardi M. "Intraforaminal O(2)-O(3) versus periradicular steroidal infiltrations in lower back pain: randomized controlled study" Am J Neuroradiol. 2005 May; 26(5):996-1000.
  "CONCLUSION: Oxygen-ozone treatment was highly effective in relieving acute and chronic lower back pain and sciatica. The gas mixture can be administered as a first treatment to replace epidural steroids."

- Al-Jaziri AA, Mahmoodi SM "Painkilling effect of ozone-oxygen injection on spine and joint osteoarthritis" Saudi Med J. 2008 Apr;29(4):553-7
  OBJECTIVE: To analyze the painkilling effect of ozone-oxygen injection on joint and spine osteoarthritis. METHODS: This prospective study was completed at the Ozone Clinic, Rashid Hospital, Dubai, United Arab Emirates on 220 mainly local patients 122 women, mean age 47.05 years; 98 men, mean age 52.8 years with radiographic documented spine or extremities osteoarthritis. The patients were treated over 3 years September 2002 to August 2005 by ozone-oxygen injection twice a week for at least 12 sessions. Using the 6 faces pain scale; the patients' pain was recorded at the beginning and at the 4th, 8th, and 12th sessions. They were followed for a mean of 8.48 months and their pain scale was recorded at that time too. RESULTS: Comparison of the patients' 1st day pains with their 4th, 8th, and 12th sessions' pains showed a significant decrease 1st day to 4th session p=0.005, 1st day to 8th week p=0.005, 1st day to 12th session p=0.0043. Comparison of the 1st day pain with the final follow-up pain, which was around 10 months from the first treatment, showed a meaningful decrease of pain p=0.0048. CONCLUSION: This study validates the painkilling effect of ozone-oxygen injection on osteoarthritis of the joints and spine. Its long term effect on pain advocates the likelihood of some histological changes as mechanism of its action

- Fuccio C, Luongo C, Capodanno P, Giordano C, et al "A single subcutaneous injection of ozone prevents allodynia and decreases the over-expression of pro-inflammatory caspases in the orbito-frontal cortex of neuropathic mice" Eur J Pharmacol. 2009 Jan 28;603(1-3):42-9.
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- Marco Paoloni, MD, Luca Di Sante, MD, Angelo Cacchio, MD, et al "Intramuscular Oxygen-Ozone Therapy in the Treatment of Acute Back Pain With Lumbar Disc Herniation-A Multicenter, Randomized, Double-Blind, Clinical Trial of Active and Simulated Lumbar Paravertebral Injection. "SPINE Volume 34, Number 13, pp 1337–1344, 2009
  Ozone vs placebo – 61% vs 33% pain free

- Bonetti M, Fontana A, Cotticelli B, et al.. "Intraforaminal O(2)-O(3) versus perradicular steroidal infiltrations in lower back pain: randomized controlled study" AJNR Am J Neuroradiol. 2005 May;26(5):996-1000
  Ozone more effective than steroids – 8.6 vs 21.4% poor outcomes

- Fifth International Symposium on the Applications of Ozone, April 2007, Havana, Cuba
  "We conclude that intra-articular ozone is an effective therapy in the treatment of grade III knee osteoarthritis resistant to treatment with NSAIDs."

- "Ozone Shot as Effective as Surgery for Herniated Discs" As reported in CyberRounds, by Neil Wagner online at www.cyberrounds.com
  A Toronto team examined the results of 12 previous studies involving over 8,000 patients of ozone treatment of herniated discs. The studies showed ozone therapy to be just as effective as surgery but with a shorter recovery time and a much lower risk of complications.

- Di Filippo C, Cervone C, Rossi C, di Ronza C, Marfella R, Capodanno P, Luongo C, Rossi F, D'Amico M. Antiarrhythmic effect of acute oxygen-ozone administration to rats. Eur. J. Pharmacol. 2010 Mar 10; vol. 629(1-3) pp. 89-95

  The antiarrhythmic effects of 100; 150; and 300microg/kg i.p. oxygen/ ozone mixture were tested on arrhythmias induced by i) ischemia; ii) ischemia/reperfusion; iii) aconitine (15microg/kg/i.v.); potassium chloride (1.5% i.v.) in rats. 25min of cardiac left descending coronary artery ischemia caused severe incidence of ventricular tachycardia, ventricular fibrillation and mortality. These were significantly reduced by pre-treatment of rats with oxygen/ozone mixture at doses of 150 and 300microg/kg. In separate experiments using a protocol of 5min ischemia followed by 8min reperfusion this caused arrhythmias starting within 6+/-1s. The incidence of ventricular tachycardia was 100%, while ventricular fibrillation occurred in 75% of the animals and lasted 85+/-14s. The mortality was 62.5%. These figures were significantly (P<0.01) reduced in animals treated with 150microg/kg oxygen/ozone and a substantial increase observed with 300microg/kg, whilst not affected by the lower dose of 100microg/kg. 150 and 300microg/kg oxygen/ozone prolonged the onset time for the appearance of arrhythmias induced by aconitine (300microg/ kg oxygen/ozone, approximately 81% longer). Oxygen/ozone also reduced the ventricular tachycardia duration, ventricular fibrillation incidence, arrhythmia score, and increased the rat's survival rate. As for example, this latter was increased from 25% (aconitine) to 50% (aconitine+oxygen/ozone 150microg/kg). 100microg/kg oxygen/ozone was without effect. None of the oxygen/ozone doses affected the arrhythmias caused by potassium chloride 1.5% i.v. All the oxygen/ ozone antiarrhythmic effects were similar to those observed with lidocaine (1.5mg/kg i.v.). In conclusion, oxygen/ozone has antiarrhythmic

effects against arrhythmias caused by aconitine, myocardial ischemia and ischemia/reperfusion.

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- [Clinical observation on O3 acupoint injection for treatment of low back pain] [Article in Chinese]
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OBJECTIVE: To explore the value of O3 acupoint injection for treatment of low back pain. METHODS: One hundred and twenty cases of low back pain were randomly divided into an electroacupuncture (EA) group, a Danggui injectio point injection group and an O3 acupoint injection group. They were treated with EA, Danggui acupoint injection and O3 (30 microg/mL) acupoint injection at Qihaishu (BL 24), Dachangshu (BL 25), Guanyuanshu (BL 25) and local Ashi points. RESULTS: There were significant differences in the therapeutic effect as the O3 acupoint injection group compared with the EA group and the Danggui point injection group ($P < 0.01$ or $P < 0.05$), but there was no significant difference between the EA group and the Danggui point injection group ($P > 0.05$). CONCLUSION: The O3 acupoint injection is a convenient and highly effective therapy for low back pain.