

# Prolotherapy and Ozone Therapy Combined Applications in Cases of Piriformis Syndrome

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**Received date:** April 01, 2021; **Accepted date:** April 05, 2021; **Published date:** April 08, 2021

**Citation:** Hayriye Alp (2021) Prolotherapy and Ozone Therapy Combined Applications in Cases of Piriformis Syndrome. *J. Heart and Vasculature* 1(2); DOI: 10.31579/JHV-2021/010

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## Abstract

Piriformis syndrome is a condition of neuropathic pain seen as a result of compression of the sciatic nerve by the piriformis muscle. We aimed to present the results of a series of cases, have contributed to tissue cancers, which are rare and diagnosed late. We have also observed that patients benefit from the effects of these complementary treatments that regulate tissue oxygenation and proliferation added to existing conventional treatments. Necessary legal informed consent form was obtained. A total of 10 patients were included. VAS values in 4 patients were reset at the end of week 3. There are 6 patients under went 2. session prolotherapy made. In the first session, 15% of prolotherapy and 20% of prolotherapy were used dextrose solution. Meanwhile, ozone therapy was done 6 times a week, 6 sessions. Ozone dose was made to 10 gamma 5 cc. Second Seasns prolotherapy was performed in 6 patients who continued to have pain, and their vas value was zero in the 6th week In recent years, injection-based studies in piriformis syndrome are important in terms of cost and patient satisfaction.

**Keywords:** prolotherapy, piriformis muscle syndrome

## Introduction

Piriformis syndrome is a condition of neuropathic pain seen as a result of compression of the sciatic nerve by the piriformis muscle [1]. It is more common in female sex (due to the large quadriceps muscle) and in the 3rd or 4th decats [2, 3 and 4]. There is a pain in the inner rotation of the leg, positivity of pace test [5, 6]. Narrow clothes, microtraumas, sitting on hard ground for a long time are accused [1, 7 and 8]. The first definition of the syndrome made by Yeoman in 1928 syndrome's prevalence is 6-8% in the United States [5, 9]. Since the diagnosis of the syndrome is made in the following stages, it may come up with paresthesia and muscle weakness in the clinic [1, 4]. Microtraumas and local ischemia are accused in its etiology [1, 7 and 8]. Piriformis muscle is responsible body postural stabilisation [7]. We aimed to present the results of a series of cases in which prolotherapy and ozone therapy, combined with prolotherapy and ozone therapy, which have become popular in our country, have contributed to tissue cancers, which are rare and diagnosed late. We have also observed that patients benefit from the effects of these complementary treatments that regulate tissue oxygenation and proliferation added to existing conventional treatments. In the religious literature, ozone, which is called "the breath of God": Latin-Greek; It is derived from the word "ozein", which means "bad and sharp smelling". There are rumors that in the 1500s-Queen Elizabeth kept the water in the copper pot in stormy weather and that they drank or washed the ozone water formed after the lightning strike, thus trying to stay young. In the

1600s, Irish peasants closed the "Sick and Wounded" people into a room, aired with bellows and stated that they recovered faster [10].

It was discovered by chemist Von Marum in 1785, but was not called ozone; In 1840, the chemist, C F, was discovered to have three atoms of oxygen by Schönbein. 1856 - 1860 Operating room disinfection and Antibacterial effect -Water disinfection (Keinmann-Monaco) was used for the first time in 1870 by blood (Dr. C. Lender-Germany) [11]. Today, the use of analgesic, antiaging effects has become popular with the development of complementary medicine practices. Major, minor, local, applications can be added to conventional treatments. Minor application is the method of ozonating low volume (1-10 cc) blood with an equal volume of gas, intramuscularly and forming locally resorbable hematomas [12]. A total of 6-12 sessions can be made at a concentration of 1-120 mic/ml ozone gas and a maximum of 2 per week. Ozone molecule is based on the principle of obtaining O<sub>3</sub> with the help of a generator from oxygen. Ozone can be added to conventional applications with its analgesic, wound healing, antioxidant and antiaging properties [13]. Ozone therapy is use in disc herniation therapies [14]. Prolotherapy word means proliferation therapy. With prolotherapy treatment, hypertonic solutions called proliferanes are injected [15]. The most used solution is dextrose. Generally 15% dextrose injection is made around the joint, and 25% sterile in the joint. With the hypertonic effect where the solution is injected, it draws the fluid in the vascular area into the tissue. At the same time, the tissue is traumatized iatrogenically by the injection technique. It is aimed to initiate wound healing phases by contacting the needle with the bone and the wing of the area. Physiological repair

mechanisms of the organism are activated by using hypertonic physiological serum. With the wound healing phases, blood circulation will increase and a sterile inflammation will be initiated. By allowing a controlled inflammation, tissue is enabled to activate fibroblasts. Fibroblasts stimulate collagen production. At the same time, osteoblasts and chondroblasts are activated. Cartilage and bone proliferation is provided by stimulation of osteoblasts and chondroblasts. During the treatment, inflammatory markers CRP and increased sedimentation are observed. Indication areas of prolotherapy are degenerative joint diseases [16, 17 and 18].

Our aim in this study is to examine the effect of ozone-prolotherapy combination in patients with pririformis syndrome.

**Cases**

He applied to the xxx hospital neurosurgery outpatient clinic for leg pain. Neurological examinations of the patients were performed by neurosurgery. During the physical examination, the affected side showed short stature in the affected leg, gluteal atrophy, contralaterate sacrum rotation, lumber rotation. There was pain relief and motion limitation in internal rotation. Freiberg, laseque, beatty and pace tests were done during the applications. In the tests mentioned as the inclusion criterion, patients with VAS 4 and pain severity despite the use of analgesics for more than 6 months were taken. Patients with G-6PDH deficiency, citrus and local anesthetic and citrate allergy, those with inflammatory joint disease were used. was excluded.

VAS values were recorded as an average of 7. Their diagnosis was confirmed by magnetic imaging. And it was seen that there was no other pathology. The informed consent forms were taken and prolotherapy and local ozone therapy were applied. VAS values were reevaluated at the end of the treatment.

**Method**

Prolotherapy sensors were performed on the 1st and 21st days. In the first session, 15% of prolotherapy, and 20% of prolotherapy (23 Gauge, 80 mm;1cc 1% lidocain,15-20% dextrose mixture total volume; 60cc), 5% dextrose solution was used. ozone dose was made as 10 gamma 5 cc. As the application area, the pain points of the adhesion points of the pririformis muscle to the thoracanter major and sacrum a muscle were also selected for palpation on the muscle. All injections were made in the prone position and by the same neurosurgery doctor.

**Results**

In this study, we used ozone therapy and prolotherapy, which are complementary therapies, in patients with pririformis syndrome. The demographic findings of the patients were as follows:4 of the patients were male and 6 were female. The average age of male patients was 61.5, while female patients were 45.5. Vas values in 4 patients were reset at the end of Week 3. Second Seasns prolotherapy was performed in 6 patients who continued to have pain, and their vas value was zero in the 6th week. No side effects or allergies were found in the study. In their 6-month follow-up, it was observed that the recovery process continued.

VAS1(before)	7
VAS2(after)	0
MALE(N=)	4(The average age:61.5)
FEMALE(N=)	6(The average age:45.5)



**Figure 1:** Ozone and prolotherapy application method.

## Discussion

Piriformis syndrome and its neuropathic pain is a condition that affects the patient's quality of life and increases hospital costs due to chronic pain. Piriformis syndrome has a chronic pain with both neuropathic and somatic components [19].

Piriformis syndrome is seen as a rare diagnosed syndrome. In diagnosis, pain in the anterior history of the gluteal outer region, shortness of extremity in inspection, palpation in the piriformis muscle region, painful spots with palpation, pain due to laseq, pace, beatty, freiberg tests, pain due to internal rotation restriction, relief with traction [5, 6]. Thickened piriformis muscle can be observed in magnetic imaging methods [1].

The pain is mostly seen at the adhesions of the piriformis muscle/thoracic majus, sacrum)The pain can also be seen in the sciatic nerve trace [20, 21 and 22]. Neuropathic pain can also be monitored by stretching the sacrotuberous ligament or along the pudental-fibular nerve traction. Pelvic, groin pain, dyspareunia, and muscle weakness can be added according to the dermatomal spread of the affected area [4, 21]. While differential diagnosis, pain on the sacroiliac joint and the large sciatic notch and the handling of the sausage-shaped piriformis muscle are typical [1, 5, 7, 9 and 20]. The most proximal muscle groups are affected by pain in the disc hernia, which is mostly involved in the disc hernia, and the distal muscle groups are affected by piriformis syndrome [1, 5 and 6]. Increased pain with bowel movements may be due to pressure on the pelvic floor muscles [1, 21]. Among the conservative treatments that can be done in the early period of Piriformis syndrome, non-steroidal anti-inflammatory, muscle relaxant drugs, immobilization, and mobility restriction can be treated with 79% [1, 9 and 22]. In acute periods, physical therapy modalities such as cold application, isometric exercises (hip abductors and adductors) can be applied in the subacute period, such as TENS [1, 6,20]. In chronic period, usg-guided steroid injections, botox applications, or surgically fibrous bands on the piriformis muscle can be excised [23]. These methods also have their own complications of side effects long term (steroid and botox side effects surgical complications). Complementary therapies in this area can be added to conservative treatments, especially in the chronic period, with fewer side effects. Injection-based studies have been carried out in piriformis syndrome in recent years. Significant analgesic effects were also obtained in lidocaine and dexamethasone injections accompanied by USG [24].

Joint circumference and joint capsule, deep ligament structures can be reached with prolotherapy injector needle. With prolotherapy, shoulder, knee, ankle and hip joints can be treated. Injection is aimed at the starting and ending points of the tendons of the ligaments and muscles. Static stabilizers of the joints are ligaments. Functional and anatomical deficiencies of the ligaments contribute to the development of arthrosis [16,17,18]. If cases of piriformis syndrome are not treated appropriately, degenerative changes are inevitable. It is stated in the literature that prolotherapy is used effectively in many arthrosis case studies.

The places of ligaments sticking to the bone are called 'entheses'. The warnings and hypertonic solutions given to the unstable ligament entheses regions initiate the healing process which is left unfinished. It is a collagen synthesis with repair mechanisms. Tissue healing is expected in about 3 weeks. In the literature, especially in rotator cuff tendinitis and shoulder pain that does not pass, satisfactory results have been obtained [25, 26]. Recently, prolozone applications, which are a combination of regenerative therapies and ozone therapy, have been used in soft tissue lesions [27].

There are many studies on the analgesic effect of ozone therapy. In a study where patients with cervical disc hernias were administered fluoroscopically intradiscal ozone-oxygen mixtures and patients were followed up for 6, patient satisfaction even after 6 months, (VAS); visual

analog scale; (ODI); Oswestry Disability Index scores were decreased. Ozone therapy was mostly used in patients with lumbar disc herniation [28]. In a study conducted by Andreula et al, compared the ozone-oxygen and perianglionic steroid injections with lumbar level in patients with LDH and found the ozone-oxygen mixture applied alone to be 70.3% more successful [29]. Muto et al found it more satisfactory in the long-term (12 and 18 months) follow-ups of both intradiscal and infraforaminal ozone-oxygen injections. They found that the maximum recovery was in the 6th month and that it continued in the 18th month [30]. Buric et al. Reported that LDH patients did not experience a similar pain episode after intradiscal ozone injection for 10 years [31]. Oxygen and ozone therapy is carried out for the effectiveness demonstrated on vascular diseases, intervening on the activation of nuclear factor transcription, hypoxia-inducible factor-1 $\alpha$  (HIF-1 $\alpha$ ) which can be stimulated by moderate stress. The effects on ozonized erythrocytes show better glycolysis and a greater increase in intra-Hypopic ATP and 2,3 phosphoglycerate (2,3-DPG), shifting the dissociation curve of HbO<sub>2</sub> hemoglobin to the right, favoring a better oxygen release to tissues.24,36,40

It is breaks the long fatty acid chains through controlled lipoperoxidation, facilitating the flow of red cells in the capillaries and avoiding the phenomenon of stacking in the vessels (Fahraeus-Lindquist effect) facilitating metabolic exchanges.36

## Conclusion

In this study, we used ozone therapy and prolotherapy, which are complementary therapies, in patients with piriformis syndrome. The results obtained show that the combination of prolotherapy and ozone, which are minimally invasive methods, can yield satisfactory and effective results in piriformis syndrome.

## Limitations

This study a case report about short-time and a few participants and randomized controlled trials are needed.

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