



The Use of the Nonionised Electromagnetic Waves’ Enhanced Autogenous Adipose Tissue & Platelet Rich Plasma Injection for Treatment of Osteoarthritis: Case Report

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Abstract

Osteoarthritis is a joint degradation disorder presenting with joint pain, tenderness, stiffness, locking, and sometimes an effusion. Diagnosis is confirmed by x-ray. Traditional treatment involves a combination of exercise, lifestyle modification, analgesics, steroids, glucosamine, and finally arthrodesis and joint replacement surgery. A 59 years old female with grade IV osteoarthritis that did not respond to traditional medical treatment nor physiotherapy was treated by nonionised electromagnetic waves’ enhanced autogenous adipose tissue & platelet rich plasma injection where 60 ml of subcutaneous adipose tissue & 60 ml of blood was subjected to series of centrifugation in speeds ranging from (4000-12000) round per minute then the autogenous adipose tissue & platelet rich plasma was exposed to nonionised electromagnetic waves in a spectrum ranging from (350-850) nanometer and for duration ranging from (60-180) seconds in complete aseptic precautions Each knee was injected with 15 ml of cells in aseptic precaution and under cover of antibiotic. Improvement of pain was recorded from the 4th post injection day and x-ray after 6 months showed evidence of cartilage regeneration.

Keywords: Osteoarthritis; knee; autogenous adipose tissue; platelet rich plasma; injection; electromagnetic waves; enhanced; regeneration; pain.

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1. Introduction

Osteoarthritis is thought to be the most prevalent chronic joint disease [1]. Osteoarthritis is believed to be caused by mechanical stress on the joint and low grade inflammatory processes [2].

The incidence of osteoarthritis is rising because of the ageing population and the epidemic of obesity [1].

The main symptom is pain, causing loss of ability and often stiffness. "Pain" is generally described as a sharp ache or a burning sensation in the associated muscles and tendons.

OA can cause a crackling noise (called "crepitus") when the affected joint is moved or touched and people may experience muscle spasms and contractions in the tendons. Occasionally, the joints may also be filled with fluid. Some people report increased pain associated with cold temperature, high humidity, and/or a drop in barometric pressure, but studies have had mixed results [3&1].

Osteoarthritis commonly affects the hands, feet, spine, and the large weight bearing joints, such as the hips and knees. Symptoms may include joint pain, tenderness, stiffness, locking, and sometimes an effusion. A variety of causes; hereditary, developmental, metabolic, and mechanical deficits may initiate processes resulting in destruction of cartilage. When bone surfaces become less well protected by cartilage, bone may be exposed and damaged. As a result of decreased movement secondary to pain, ligaments may become more lax and regional muscles become atrophied [4].

X-rays may confirm the diagnosis. The typical changes seen on X-ray include: joint space narrowing, subchondral sclerosis, subchondral cyst formation, and osteophytes. Plain films may not correlate with the findings on physical examination or with the degree of pain. Clinicians recognize that the diagnosis of osteoarthritis is established late in the disease process, may be too late to expect much help from disease modifying drugs. Treatment generally involves a combination of exercise, lifestyle modification, analgesics, oral & intra-articular steroids, oral glucosamine & intra-articular hyaluronic acid. If pain becomes debilitating, arthrodesis & joint replacement surgery may be used to improve the quality of life [1].

2. Materials and Methods

59 years old, non smoker, female patient, 90 Kg weight, suffering from advanced osteoarthritis of both knee joints, with pain in both knees, increasing with climbing up stairs, down stairs, & with kneeling (she pray in the sitting position) & unable to sit in the squatting position.

Examination reveals, tenderness over the patella & joint line, crepitus over the patella with active & passive motion, full range of knee motion with tenderness on full flexion, stable knee, no evidence of knee joint effusion

Plain x-ray of both knees, antero-posterior erect & lateral views show sharp tibial spine, spurring of the upper pole of the patella, & narrow joint space more in the medial joint compartment.

The patient was taking NSAID , oral steroids, local intra-articular steroids injection, oral hyaluronic acid with temporary improvement & recurrence of pain once medication is stopped.

C-reactive protein & complete blood picture were done to the patient before injection to exclude the presence of any infection in the body.

2.2 Description of the technique:-

According to the procedure described in patent number 27087 EPO [5&6]. See Figure 1.

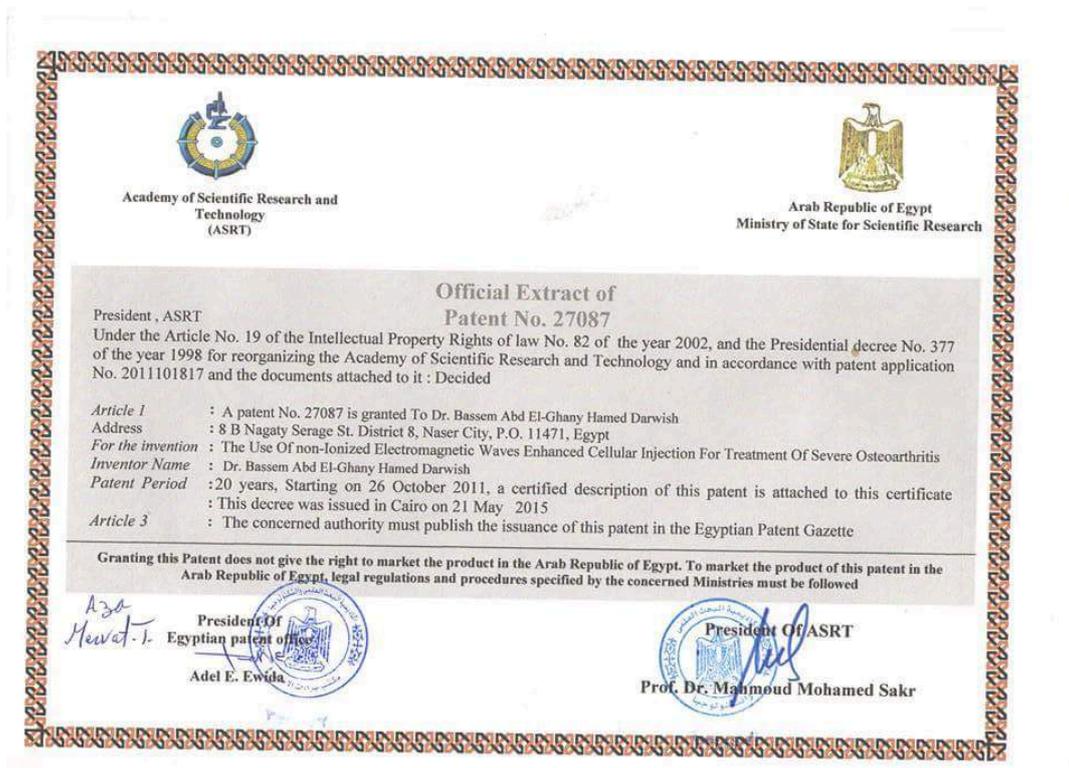


Figure 1: official extract of patent 27087

Nonionised electromagnetic waves' enhanced autogenous adipose tissue & platelet rich plasma injection was done to the patient where 250 ml of tumescent solution composed of 0.5 mg adrenaline, 6.5 ml xylocaine 2%, 1.5ml sodium bicarbonate 8.4% & 250 ml normal saline 0.9% were injected in the subcutaneous tissue of the abdomen around the umbilicus after 30 minutes liposuction was performed with 3mm liposuction handle & 50 ml syringe & 50 ml autogenous adipose tissue was collected & the excess tumescent solution was discarded then 60 ml blood was aspirated from the superficial vein after adding 6 ml sodium citrate 3.13% anticoagulant solution to prevent blood coagulation, after which 1.2 gm Amoxicillin/clavulanic acid is injected intravenously then the blood sample is subjected to series of centrifugation processes in speeds ranging from 4000-12000 round per minutes then the platelet rich plasma was mixed with autogenous adipose tissue & exposed to nonionised electromagnetic waves (spectrum ranging from 350-850 nanometer) & for duration ranging from 60-180 seconds after which the syringes are covered with opaque adhesive cover to isolate the cells from light

Intra-articular injection was performed after disinfection of the area from the mid thigh to the mid leg with ethyl alcohol spray 95%. Injection was done in the lateral joint compartment 1cm lateral to patellar tendon & 1 cm above the upper surface of the tibia after 5 minutes from intraarticular injection of 5 ml xylocaine 2%, 15 ml Nonionised electromagnetic waves' enhanced autogenous adipose tissue & platelet rich plasma injection was injected in each knee using 16G needle.

After the injection the knee is flexed & extended 3 successive times to ensure proper distribution of cells in all the knee compartments then the injection site is covered with sterile adhesive which is kept dry for 4 days

The patient experience fluctuant pain in the 1st 4 days

Oral 1 gm Amoxicillin/clavulanic acid was given to the patient every 12 hours for 4 days & acetaminophen 2 tab. 500 mg every 8 hours.

The patient was instructed to measure her body temperature every 12 hrs by a thermometer & was instructed to contact the doctor if she noticed any elevation in temperature.

After 4 days the patient had removed the sterile adhesive & wear hinged knee brace & starts weight bearing. Hinged knee braces were used during the day time & removed before sleep for 9 months after injection.

The patient starts to feel improvement of pain starting from the 4th day after injection. She stopped all the oral & local medication & experienced improvement in pain which was continuous in the 6 months follow up post injection period & erect x-ray of the both knees showed increase in the joint height which is evident in the medial & lateral joint compartment.

The only complication of such procedure is septic arthritis & the prophylactic measures against such complication is the aseptic preparation of the cells, wide disinfection of the injection area, prophylactic antibiotic started 30 minutes before injection.

3. Results and Discussion

Articular cartilage possesses poor natural healing mechanisms, & no drug used for osteoarthritis is known to promote regeneration of the hyaline cartilage. All medication used for alleviation of symptom & not to heal the underlying histopathological condition.

Nonionised electromagnetic waves' enhanced autogenous adipose tissue & platelet rich plasma injection improves the symptoms of osteoarthritis particularly pain which is improved starting from the 4th post injection day in addition to evidence of hyaline cartilage regeneration denoted from the increased joint height in the 6th month post injection x-ray. (Figure 2)

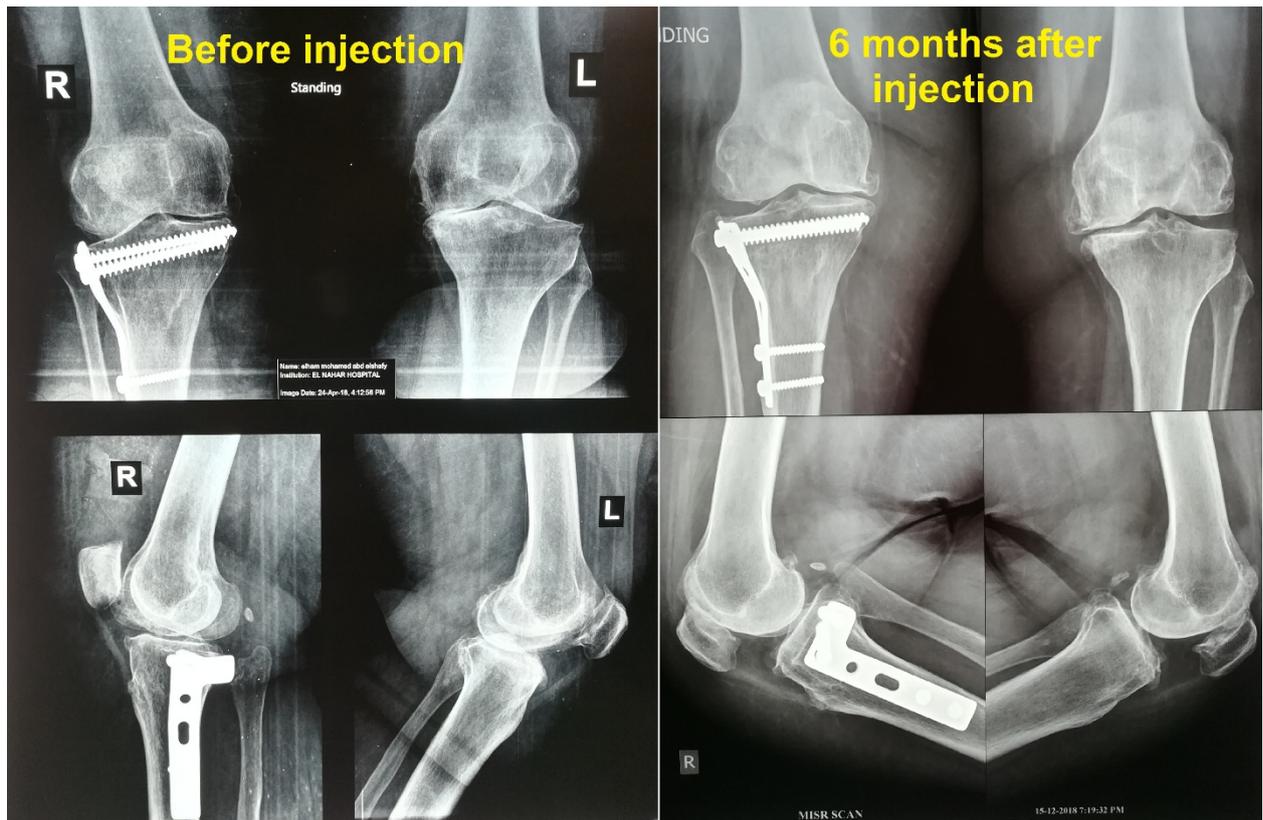


Figure 2: Antero-posterior erect x-ray view of both knees. A: before injection; B: 6 months after nonionised electromagnetic waves' enhanced autogenous adipose tissue & platelet rich plasma injection

4. Conclusion

Limited good result of evidence showed that Nonionised electromagnetic waves' enhanced autogenous adipose tissue & platelet rich plasma injection improve osteoarthritis both clinically and radiologically. Case series study is recommended to augment the evidence of the effect of this type of treatment

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References

- [1]. Johannes Bijlsma, Francis Berenbaum, Floris Lafeber: "Osteoarthritis: an update with relevance for clinical practice." The Lancet, vol. 377, pp 2115–2126, 2011.
- [2]. Berenbaum F: "Osteoarthritis as an inflammatory disease (osteoarthritis is not

- osteoarthrosis!"). *Osteoarthritis and Cartilage*, vol. 21 (1), pp. 16–21, 2013.
- [3]. de Figueiredo EC, Figueiredo GC, Dantas RT: "Influência de elementos meteorológicos na dor de pacientes com osteoartrite: Revisão da literature, Influence of meteorological elements on osteoarthritis pain: a review of the literature". *Rev Bras Reumatol (in Portuguese)* vol. 51 (6), pp 622–628, 2011
- [4]. Manek NJ, Lane NE: "Osteoarthritis: current concepts in diagnosis and management." *Am Fam Physician*, vol. 61(6), pp 1795–1804, 2000.
- [5]. Bassem Darwish "The use of the nonionised electromagnetic waves'enhanced cellular injection for treatment of severe osteoarthritis." *Egypt Patent 27087*, Oct. 26, 2011.
- [6]. Nayera Abdelmoaty, E. Alattar, Khaled Ahmad, Yosra Ibrahim, Bassem Darwish: "Regenerative Power of Autologous Peripheral Blood Stem Cell Injection in Knee Osteoarthritis by A NON Invasive Approach - MRI Study-." *Ann Rheum Dis*, vol.73(2),1066, 2014