

Clinical Trial Protocol

Iranian Registry of Clinical Trials

17 Sep 2026

Effect of intra-articular Ozone injection on pain and function in patients with mild to moderate knee osteoarthritis

Protocol summary

Study aim

The effect of intra-articular injection of ozone on pain and function in patients with mild to moderate osteoarthritis.

Design

Clinical trials with a control group, parallel groups, double-blind, randomized, sample size 60

Settings and conduct

Emam Khomeini hospital

Participants/Inclusion and exclusion criteria

Patients with mild to moderate knee osteoarthritis and aged between 45 and 75 with body mass index less than 30 were included. If they started drugs they were excluded.

Intervention groups

Intervention group: 6 knee intraarticular injections per week, including 10 cc of 20 micrograms of Ozone were received, for 6 weeks. Control group: 6 placebo injections with an insulin syringe per week were received for 6 weeks.

Main outcome variables

Pain; function

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20111025007903N13**

Registration date: **2023-05-11, 1402/02/21**

Registration timing: **retrospective**

Last update: **2023-05-11, 1402/02/21**

Update count: **0**

Registration date

2023-05-11, 1402/02/21

Registrant information

Name

Zahra Alizadeh

Name of organization / entity

Tehran University of Medical Sciences

Country

Iran (Islamic Republic of)

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Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2020-01-15, 1398/10/25

Expected recruitment end date

2021-01-14, 1399/10/25

Actual recruitment start date

2020-04-08, 1399/01/20

Actual recruitment end date

2021-04-19, 1400/01/30

Trial completion date

2021-04-19, 1400/01/30

Scientific title

Effect of intra-articular Ozone injection on pain and function in patients with mild to moderate knee osteoarthritis

Public title

Effect of Ozone injection on knee osteoarthritis

Purpose

Supportive

Inclusion/Exclusion criteria

Inclusion criteria:

Mild to moderate knee osteoarthritis Body mass index less than 30 Pain exacerbation with walking Age between 45 and 75 years

Exclusion criteria:

History of knee trauma or surgery, metabolic or autoimmune diseases Knee effusion Pregnancy or

lactation Usage of anti-coagulant drugs

Age
From **45 years** old to **75 years** old

Gender
Both

Phase
3

Groups that have been masked

- Participant
- Investigator
- Outcome assessor

Sample size
Target sample size: **60**
Actual sample size reached: **42**

Randomization (investigator's opinion)
Randomized

Randomization description
Patients were entered into the study using randomized block tables. We prepared 10 blocks, and six patients were considered for each block. Patient one entered block 1, patient two/block 2, patient 3/block 3... patient 10/ block 10. Then the rotation repeated again, patient 11/block 1...until patient 60/block 10, respectively. After that, the third person who he did not aware of the patients' groups, selected 5 blocks as the control group and 5 blocks as the injection group, according to a random sequence. This method not only caused randomization to be equal in both groups but also at each stage of the study, patients were equally assigned to the groups. These small blocks kept the balance between the two groups and made the number of people in each group the same.

Blinding (investigator's opinion)
Double blinded

Blinding description
Patients were blinded with a shield on the knee The investigator and the outcome assessor were blinded about the type of injection

Placebo
Used

Assignment
Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Research Ethics Committees of Imam Khomeini Hospital Complex- Tehran University of Medical Sciences

Street address

Dr. Gharib street, Tohid square

City

TEHRAN
Province
Tehran
Postal code
1419733141

Approval date

2019-12-28, 1398/10/07

Ethics committee reference number

IR.TUMS.IKHC.REC.1398.211

Health conditions studied

1

Description of health condition studied

Osteoarthritis

ICD-10 code

M17

ICD-10 code description

Osteoarthritis of knee

Primary outcomes

1

Description

knee pain

Timepoint

before intervention, 6 weeks and, 6 months after injection

Method of measurement

Visual Analogue Scale

Secondary outcomes

1

Description

Function

Timepoint

before intervention, 6 weeks and, 6 months after injection

Method of measurement

6minute walking test

Intervention groups

1

Description

Intervention group: For knee injection, a 22-gauge syringe was used by the classic anterolateral approach in a supine position and at an angle of 90 degrees to the knee. In the intervention group, 10 ml of 20 µg of ozone solution was used intra-articular. A total of six intra-articular injections of ozone were given to each patient for six consecutive weeks (one injection per week). After the injection, an ice pack was used at the injection site to prevent hematoma. The patients were advised to rest for up to 48 hours and continue the exercise programs afterwards. Participants were received stretching and

strengthening exercise during the trial. Exercise program in the form of isometric multi-joint exercises of the muscles around the knee was defined, including the quadriceps, abductors and adductors of the thigh, holding for 10 seconds, ten repetitions three times a day. In addition, stretching exercises include stretching the hamstrings, gastrocnemius and soleus muscles, holding for 20 seconds in a state of painless stretching with a feeling of discomfort caused by stretching, which was done 1 set of 5 repetitions a day. After one month, concentric exercises of the thigh muscles (quadriceps, then abductors and adductors) with one set of 10 repetitions were started, then the number of repeats was increased to 12 repetitions. In the next step, the number of sets was increased to 3 sets per day, and finally, the weight was added by controlling patients' pain and symptoms. The mentioned program was monitored and re-educated by a sports medicine specialist in each injection session.

Category

Treatment - Other

2

Description

Control group: In the control group, an insulin syringe was used at the injection point without any injection, only for the feeling of the needle by patients. In addition, the patients were blinded during the injection. A total of six needling with an insulin syringe were given to each patient for six consecutive weeks (one injection per week). The exercise program was similar to the intervention group.

Category

Placebo

Recruitment centers

1

Recruitment center

Name of recruitment center

Imam Khomeini Hospital Complex

Full name of responsible person

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity

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Grant name

Grant code / Reference number

Is the source of funding the same sponsor organization/entity?

Yes

Title of funding source

Tehran University of Medical Sciences

Proportion provided by this source

100

Public or private sector

Public

Domestic or foreign origin

Domestic

Category of foreign source of funding

empty

Country of origin

Type of organization providing the funding

Academic

Person responsible for general inquiries

Contact

Name of organization / entity

Tehran University of Medical Sciences

Full name of responsible person

Zahra Alizade

Position

Associate Professor

Latest degree

Specialist

Other areas of specialty/work

Sport Medicine

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Sports Medicine Research Center, No7, Opposite of Shariati Hospital, Ale-Ahmad Highway

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Person responsible for updating data

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Sharing plan

Deidentified Individual Participant Data Set (IPD)

Undecided - It is not yet known if there will be a plan to make this available

Study Protocol

Undecided - It is not yet known if there will be a plan to make this available

Statistical Analysis Plan

Undecided - It is not yet known if there will be a plan to make this available

Informed Consent Form

Yes - There is a plan to make this available

Clinical Study Report

Yes - There is a plan to make this available

Analytic Code

Undecided - It is not yet known if there will be a plan to make this available

Data Dictionary

Undecided - It is not yet known if there will be a plan to make this available

Title and more details about the data/document

Primary and secondary outcomes, and others according to researchers' request

When the data will become available and for how long

starting 6 months after publication

To whom data/document is available

Please contact with this e-mail: z_alizadeh@tums.ac.ir

Under which criteria data/document could be used

Please contact with this e-mail: z_alizadeh@tums.ac.ir

From where data/document is obtainable

Please contact with this e-mail: z_alizadeh@tums.ac.ir

What processes are involved for a request to access data/document

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Comments