Clinical Trial Protocol
Iranian Registry of Clinical Trials

09 Nov 2026

Investigating the effect of cinnamon extract on reducing pain and improving function in patients with knee osteoarthritis compared to diclofenac gel.

Protocol summary

Study aim

Determining the effectiveness of a topical cinnamon product in improving pain in primary knee osteoarthritis compared to topical diclofenac

Design

A controlled, double-blind, randomized, phase 3 clinical trial with parallel groups on 72 patients. Randomization will be performed using the randomization block permuted method.

Settings and conduct

This study is a double-blind RCT with a parallel design. Only the pharmacist knows the nature of the drugs. Patients with a diagnosis of early osteoarthritis based on the American College of Rheumatology clinical criteria and review of inclusion and exclusion criteria are enrolled in the study, and an initial assessment of pain is performed based on a validated questionnaire. Diclofenac or cinnamon gel is applied to the patients' knees 3 times daily for 28 days, and then re-evaluation is performed.

Participants/Inclusion and exclusion criteria

People aged 50 to 80 years with a diagnosis of primary knee osteoarthritis who refer to the Medical centers, with osteophyte severity grade 1 to 3 according to the Kellgren–Lawrence Classification and a VAS score between 4 and 8 . These people should not have other secondary knee diseases and rheumatological diseases, as well as uncontrolled underlying diseases.

Intervention groups

Control group: People using diclofenac gel on their knees. Intervention group: People using cinnamon essential oil gel on their knees.

Main outcome variables

Primary outcome: To investigate the effect of a topical cinnamon product on pain reduction in patients with osteoarthritis using the VAS tool for 28 days and five self-assessed assessments. Secondary outcome: To investigate the effect of a topical cinnamon product on pain reduction and improvement in symptoms, physical activity, and quality of life in patients with osteoarthritis using the KOOS tool for 28 days and three physician-assessed assessments.

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20230314057713N2**
Registration date: **2025-10-23, 1404/08/01**
Registration timing: **prospective**

Last update: **2025-10-23, 1404/08/01**
Update count: **0**

Registration date

2025-10-23, 1404/08/01

Registrant information

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Name of organization / entity

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Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2025-11-22, 1404/09/01

Expected recruitment end date

2026-09-23, 1405/07/01

Actual recruitment start date
empty
Actual recruitment end date
empty
Trial completion date
empty

Scientific title
Investigating the effect of cinnamon extract on reducing pain and improving function in patients with knee osteoarthritis compared to diclofenac gel.

Public title
Investigating the effect of cinnamon on knee osteoarthritis
Purpose
Treatment
Inclusion/Exclusion criteria
Inclusion criteria:
Age between 50 and 80 years Osteophyte severity grade 1 to 3 according to the Kellgren-Allrens classification Visual Analog Scale (VAS) score less than or equal to 4 to 8 in X.ray
Exclusion criteria:
Participation in another clinical study in the past 6 months Cognitive or mental disorder Use of oral and intra-articular corticosteroids in the past two months People with a history of allergies to herbal medicines Skin disease at the joint site Patients with acute arthritis, osteoarthritis secondary to rheumatological diseases such as rheumatoid arthritis and gout, infectious arthritis, metabolic arthritis, traumatic arthritis, uncontrolled diabetes, known heart, liver, cancer cases Surgical joint replacement Fibromyalgia, radiculopathy, and neuropathy Those who are unable to tolerate the study and complete the treatment and follow-up period Patients who take glucosamine, chondroitin sulfate, and muscle relaxants at the same time
Age
From **50 years** old to **80 years** old
Gender
Both

Phase
3
Groups that have been masked

- Participant
- Care provider
- Investigator
- Outcome assessor
- Data analyser

Sample size
Target sample size: **72**
Randomization (investigator's opinion)
Randomized
Randomization description
Randomization will be performed using the randomized permutation block method. The block size is considered to be 4 and the ratio of drug to control in each group is equal to (1:1).The generation of random sequences will be performed by the methodologist. To conceal the treatment process, random codes are written on the boxes.
Blinding (investigator's opinion)
Double blinded
Blinding description
The cinnamon and diclofenac gel product will be prepared in a single form, with the same label and similar odor and color by adding color and essential oil by a pharmaceutical specialist in the Medicinal Plants Laboratory of the Faculty of Iranian Medicine, Babol. To ensure proper blinding and equalization of sensory conditions of the two groups (cinnamon gel and diclofenac gel), a very small percentage of cinnamon essential oil will be used in the can containing diclofenac gel. This procedure is done to maintain the integrity of the blinding and prevent participants or assessors from identifying the intervention group. The only person who knows the nature of the drugs is the pharmacist who manufactured the drug.
Placebo
Not used
Assignment
Parallel
Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee
Name of ethics committee
Research Ethics Committees of Babol University of Medical Sciences
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Deputy of research and technology, University of Medical Sciences, Ganjafrooz Street, Babol
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Approval date
2025-10-13, 1404/07/21
Ethics committee reference number
IR.MUBABOL.REC.1404.141

Health conditions studied

1

Description of health condition studied
Knee osteoarthritis
ICD-10 code
M17.9
ICD-10 code description
Osteoarthritis of knee, unspecified

Primary outcomes

1

Description
Pain score on the VAS questionnaire
Timepoint
Five self-assessment sessions: before the start of the intervention and on days 7, 14, 21, and 28 after the intervention.
Method of measurement
VAS questionnaire

Secondary outcomes

1

Description
Pain score and symptom improvement, physical activity, and quality of life in patients with osteoarthritis from the Knee injury and Osteoarthritis Outcome Score (KOOS) tool
Timepoint
Three evaluations by a doctor: at the beginning of treatment, after 4 weeks of starting treatment, and 4 weeks after stopping treatment.
Method of measurement
KOOS tool

2

Description
Pain score from VAS tool
Timepoint
Three evaluations by a doctor: at the beginning of treatment, after 4 weeks of starting treatment, and 4 weeks after stopping treatment.
Method of measurement
VAS tool

Intervention groups

1

Description
Intervention group: Topical gel containing cinnamon bark essential oil. First, the pure essential oil of this plant is procured from Giah Kala Company. Subsequently, the gel base is prepared using Carbomer 940 and distilled water: Carbomer 940 is gradually added to distilled water under continuous magnetic stirring until a preliminary gel structure forms. Next, cinnamon bark essential oil is slowly incorporated into the gel base and thoroughly mixed to ensure uniform dispersion throughout the gel. To enhance the solubility of the essential oil and improve skin permeability, varying concentrations of propylene glycol are added as a co-solvent and absorption enhancer, and completely blended into the formulation. Methylparaben and propylparaben are included as preservatives to prevent microbial growth and enhance formulation stability. In the final step, triethanolamine is added dropwise to the mixture to neutralize the acidic groups of Carbomer, thereby yielding a gel with appropriate viscosity and pH. The final formulation is standardized based on the concentration of its active constituent, cinnamaldehyde. Quantification of cinnamaldehyde is performed using High-Performance Liquid Chromatography (HPLC), a method known for its high accuracy and precision in measuring this compound. Additionally, total phenolic content is determined using the Folin–Ciocalteu reagent. Furthermore, to ensure product safety, microbiological quality control tests—including total microbial count, absence of pathogenic microorganisms (such as *Pseudomonas aeruginosa*, *Escherichia coli*, and *Staphylococcus aureus*), and assessment for fungi and yeasts—are conducted in accordance with pharmacopoeial guidelines. One knuckle of the topical product every eight hours.
Category
Treatment - Drugs

2

Description
Control group: Control group: 60 grams of 1% diclofenac gel from Sobhan Pharmaceutical Company, one knuckle of the topical product every eight hours.
Category
Treatment - Drugs

Recruitment centers

1

Recruitment center
Name of recruitment center
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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
Babol 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

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Sharing plan

Deidentified Individual Participant Data Set (IPD)
No - There is not a plan to make this available
Justification/reason for indecision/not sharing IPD
There is no further information
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
Undecided - It is not yet known if there will be a plan to make this available
Clinical Study Report
Undecided - It is not yet known if there will be 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