
EFFECTIVENESS OF HOMOEOPATHIC TREATMENT IN LEFT KNEE OSTEOARTHRITIS FOLLOWING ACL (LIGAMENT) INJURY: AN OBSERVATIONAL CLINICAL STUDY

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ABSTRACT

Background

Anterior cruciate ligament (ACL) injuries are well-established risk factors for the accelerated development of secondary knee osteoarthritis (OA). While conventional management relies heavily on non-steroidal anti-inflammatory drugs (NSAIDs), physical therapy, or surgical interventions, prolonged pharmaceutical use is frequently limited by systemic adverse effects. Homoeopathy offers a holistic, individualized system of medicine, yet observational data regarding its specific effectiveness in post-traumatic, secondary knee osteoarthritis remains scarce.

Objective

To evaluate the clinical effectiveness of individualised homoeopathic treatment in managing pain, reducing stiffness, and improving the physical functions of patients suffering from left knee osteoarthritis secondary to a chronic ACL ligament injury.

Methods

This prospective, observational clinical study monitored patients diagnosed with post-traumatic left knee OA following a prior ACL injury over a baseline period. Patients received individualised homoeopathic remedies selected via classical repertorisation based on their

unique totality of symptoms (common remedies including *Arnica Montana*, *Rhus Toxicodendron*, *Bryonia alba*, and *Pulsatilla*). Clinical outcomes were measured at baseline, 6 months, and 12 months using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) score, the Knee Injury and Osteoarthritis Outcome Score (KOOS), and a Visual Analogue Scale (VAS) for pain estimation.

Results

A statistically significant reduction in mean VAS pain scores was observed between baseline and the 12-month follow-up. Substantial improvements were documented across all domains of the WOMAC index, notably in the Activities of Daily Living (ADL) subset and morning stiffness criteria. The KOOS parameters indicated improved joint mobility and quality of life. No significant systemic adverse events or drug interactions were reported during the course of the treatment.

KEYWORDS: *Knee Osteoarthritis; ACL Injury; Individualised Homoeopathy; WOMAC Score; KOOS Scale; Observational Study.*

INTRODUCTION

Osteoarthritis (OA) is the most common form of arthritis globally and a major driver of chronic disability and healthcare costs worldwide. While primary osteoarthritis is predominantly associated with aging and wear-and-tear, **secondary osteoarthritis** often stems from mechanical trauma or joint injury. Specifically, **anterior cruciate ligament (ACL) injuries** are potent risk factors for the accelerated onset of post-traumatic knee osteoarthritis. Clinical data indicates that up to 50% of patients sustaining an ACL injury, with or without reconstructive surgery, progress to secondary osteoarthritis within 10 to 14 years. This degenerative trajectory occurs due to altered joint biomechanics, chronic low-grade intra-articular inflammation, and persistent instability that accelerates the erosion of the articular cartilage.

The standard medical management for knee osteoarthritis relies heavily on conservative pharmacological interventions, notably oral and topical **non-steroidal anti-inflammatory drugs (NSAIDs)**. However, long-term administration of oral NSAIDs is tightly restricted by adverse event profiles, including gastrointestinal bleeding, nephrotoxicity, and cardiovascular risks. When conservative therapies fail, advanced disease frequently necessitates invasive and costly procedures, such as total knee arthroplasty. Given these parameters, there is a distinct clinical pivot toward exploring safe, non-invasive, and cost-effective **complementary**

systems of medicine that can effectively manage pain and preserve functional mobility over extended periods.

Homoeopathy offers a therapeutic modality centered on individualized prescribing based on the patient's unique holistic presentation, or "totality of symptoms," incorporating physical, mental, and constitutional attributes. Emerging research highlights that individualized and complex homoeopathic interventions can match the efficacy of conventional analgesics like acetaminophen in alleviating osteoarthritic knee pain, without generating systemic health hazards. Despite these promising outcomes for degenerative joint conditions, targeted clinical tracking of homoeopathy's effectiveness in post-traumatic secondary osteoarthritis—specifically left knee OA following a chronic, structurally destabilizing ACL injury—remains exceedingly limited.

Therefore, this prospective, observational clinical study was designed to evaluate the real-world therapeutic utility of **individualised homoeopathic treatment** in relieving pain, reducing morning stiffness, and restoring physical function in patients managing secondary left knee osteoarthritis secondary to historical ACL trauma.

MATERIALS AND METHODS

Study Design

This was a prospective, longitudinal, open-label, **observational clinical study**. The protocol was carried out in accordance with the Declaration of Helsinki and ethical guidelines for biomedical research. All participating subjects provided written informed consent prior to enrollment. Because this was an observational study, investigators did not manipulate the assignment of treatments; instead, the selection and administration of homoeopathic remedies occurred naturally within everyday clinical practice routines.

Setting and Participants

Patients presenting to the outpatient department (OPD) with persistent **left knee joint pain** were screened for study eligibility.

- **Inclusion Criteria:** Male and female patients aged **25 to 65 years**; diagnosed with secondary left knee osteoarthritis (OA) based on the **Kellgren-Lawrence (K-L) radiological grading scale** (Grades I–III); and featuring a documented clinical history or MRI validation of a **prior left knee ACL ligament injury** sustained at least 12 months before enrollment.
- **Exclusion Criteria:** Patients presenting with Kellgren-Lawrence Grade IV (advanced) joint destruction requiring immediate arthroplasty; concurrent rheumatoid arthritis or

alternative systemic autoimmune arthropathies; active intra-articular corticosteroid or hyaluronic acid injections within the preceding 3 months; or severe, uncontrolled systemic comorbidities (e.g., end-stage renal disease, decompensated cardiac failure).

Homoeopathic Intervention

Prescriptions were formulated strictly using the principles of **classical homoeopathy**. A detailed, individualized case-taking process recorded the patient's local knee symptoms, physical generals, mental attributes, and overall constitutional makeup.

1. Repertorisation: The accumulated totality of symptoms was processed utilizing standard homoeopathic software systems to isolate a shortlist of potential remedies.

2. Remedy Selection & Dispensing: Final selection targeted the remedy demonstrating maximum simillimum to the patient's individual presentation. Frequently prescribed medicines included *Arnica montana*, *Rhus toxicodendron*, *Bryonia alba*, and *Ruta graveolens*.

3. Posology: Medicines were sourced from licensed pharmacies and dispensed in centesimal (30C, 200C) or 50-millesimal (LM) potencies, strictly customized according to individual susceptibility and disease intensity.

Outcome Assessment

Clinical changes were evaluated over a comprehensive follow-up trajectory spanning baseline, **6 months, and 12 months** of continuous treatment.

- **Primary Outcome Measure:** Alterations in pain intensity evaluated via a 10-cm **Visual Analogue Scale (VAS)**, graded from 0 (no pain) to 10 (unbearable pain).
- **Secondary Outcome Measures:** Functional constraints and joint rigidity calculated via the standardized **Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC)** [8] and the **Knee Injury and Osteoarthritis Outcome Score (KOOS)**.

Statistical Analysis

Data extraction and analysis were executed using SPSS software. Continuous parameters, including individual subsets of the WOMAC index, KOOS scores, and the linear VAS scale, were characterized utilizing mean values and standard deviations ($\pm$ SD). Changes occurring across the timelines (baseline vs. 6 months vs. 12 months) were scrutinized using a **Repeated Measures ANOVA** or a Friedman test for non-parametric evaluation. A **p-value of less than 0.05 ($p < 0.05$)** was determined as the threshold for statistical significance.

RESULTS

Demographic and Baseline Characteristics

A total of **45 patients** who met the selection parameters were enrolled and completed the 12-month observational period. The baseline evaluation showed that the cohort had a mean age of **44.8 ± 8.3 years**, with a higher distribution of male participants (57.8%), reflecting typical epidemiological trends in post-traumatic sports injuries.

Table 1: Baseline Demographic Features of the Study Cohort. (N = 45)

Baseline Parameter	Value / Distribution
Age (Years), Mean ± SD	44.8 ± 8.3
Gender, n (%)	
• Male	26 (57.8%)
• Female	19 (42.2%)
Mean Duration Since ACL Injury	4.2 ± 2.1 years
Kellgren-Lawrence (K-L) Grade, n (%)	
• Grade I	9 (20.0%)
• Grade II	24 (53.3%)
• Grade III	12 (26.7%)
Most Frequently Prescribed Simillimum, n (%)	
• <i>Rhus Toxicodendron</i>	15 (33.3%)
• <i>Arnica montana</i>	12 (26.7%)
• <i>Bryonia alba</i>	10 (22.2%)
• <i>Ruta graveolens</i> / Others	8 (17.8%)

Clinical Outcome Assessment

Statistical analysis using Repeated Measures ANOVA confirmed a highly significant clinical improvement across all primary and secondary outcome measures over the 12-month observation window.

The primary metric, **VAS Pain Score**, decreased progressively from a baseline mean of **7.4 ± 1.1** (severe pain) to **3.1 ± 0.9** at the 12-month endpoint ($p < 0.001$). Substantial, matching structural changes were captured in the functional subsets of both the **WOMAC** and **KOOS** tracking matrices.

Table 2: Evolution of Clinical Scores at Baseline, 6 Months, and 12 Months.

Outcome Metric	Baseline (Mean ± SD)	6 Months (Mean ± SD)	12 Months (Mean ± SD)	p-value
VAS Pain Score (0–10 cm)	7.4 ± 1.1	4.8 ± 1.2	3.1 ± 0.9	< 0.001
WOMAC Score (Total)	62.4 ± 8.5	41.2 ± 7.3	24.5 ± 5.8	< 0.001
• <i>Pain Domain</i>	13.8 ± 2.4	8.5 ± 1.9	5.2 ± 1.2	< 0.001
• <i>Stiffness Domain</i>	6.2 ± 1.1	3.9 ± 0.8	2.1 ± 0.6	< 0.001
• <i>Physical Function Domain</i>	42.4 ± 6.2	28.8 ± 5.1	17.2 ± 4.3	< 0.001
KOOS Score (Total)	44.1 ± 9.2	63.5 ± 8.1	78.4 ± 6.9	< 0.001
• <i>Quality of Life (QoL) Subscale</i>	38.2 ± 7.5	58.4 ± 6.8	72.8 ± 5.4	< 0.001

Note: Higher values for VAS and WOMAC indicate worse symptoms; higher values for KOOS indicate better functional status and joint quality of life.

DISCUSSION: Analysis of Frequently Prescribed Homoeopathic Remedies

1. Rhus Toxicodendron

In this cohort, *Rhus Toxicodendron* was the most frequently indicated simillimum. This aligns with its profound clinical affinity for periarticular structures, tendons, and ligamentous attachments—all of which undergo severe mechanical stress and chronic remodeling following an ACL tear.

From a symptomatological perspective, patients requiring *Rhus tox* presented with a classic manifestation of the "gel phenomenon" (morning stiffness). Their left knee pain and rigidity were characteristically severe upon waking or after prolonged periods of rest, but gradually eased with continued, gentle joint movement. The remedy's known clinical modalities—aggravation from cold, damp weather or rest, and relief from heat and continuous motion—matched the daily functional challenges reported by a substantial portion of this osteoarthritic population.

2. Arnica Montana

As a primary remedy for mechanical trauma, *Arnica Montana* was frequently indicated due to the specific inclusion criteria of this study: secondary osteoarthritis arising directly from a historical ACL injury.

Even years after an initial ligamentous rupture, the intra-articular environment often retains a state of chronic, low-grade inflammatory stress. Patients matching *Arnica* typically described their left knee pain as a deep, bruised, or sore sensation, often accompanied by a distinct psychological or physical aversion to having the joint touched or examined. The selection of *Arnica* highlights the importance of incorporating remotional or historical trauma into the homoeopathic totality, showing therapeutic utility in settling chronic tissue changes triggered by past injuries.

Bryonia alba

In contrast to *Rhus tox*, *Bryonia alba* was indicated for patients whose symptom profiles were dominated by the immediate effects of mechanical friction within the joint.

The core modality of *Bryonia* is marked aggravation from the slightest movement and substantial relief from absolute rest or firm external pressure. This profile mirrors the clinical

picture of advanced articular cartilage erosion and secondary synovitis, where any load-bearing pivot or flexion triggers sharp, stitching pains due to structural instability from the old ACL injury.

Ruta graveolens:

Ruta graveolens was frequently prescribed for cases where the chronic injury presented with prominent periosteal irritation and deep-seated tendon tightness around the left knee. The clinical profile of *Ruta* closely tracks chronic strains of the attachments around the joint capsule, making it highly applicable for the chronic joint laxity and secondary hamstring or patellar tendon compensations that occur after an uncompensated ACL tear.

CONCLUSION

Individualised homoeopathic treatment demonstrated clinical utility in alleviating pain and improving physical mobility in patients with left knee osteoarthritis following an ACL injury. These findings suggest that homoeopathy may serve as a safe, cost-effective, and non-invasive complementary modality for post-traumatic degenerative joint diseases. Further multi-centric, randomized controlled trials are warranted to validate these observational outcomes with enhanced methodological rigour.

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