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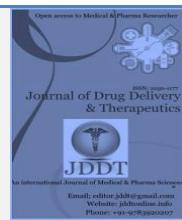
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## Effect of Zimad (Unani pharmacopeial liniment) in the management of Knee osteoarthritis: A case study

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Case Report

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## Abstract

Knee osteoarthritis (Knee OA) is the most common Musculo-skeletal disorder, which causes functional disability thus, increasing the economic burden in the society. In conventional medicine it has been treated with various drugs i.e., NSAIDs, cox inhibitors and steroids. Although these drugs pose only symptomatic relief. In Unani medicine Osteoarthritis is treated with variety of regimens and drugs. Among these regimens Zimad (liniments) prepared with number of single Unani pharmacopeial drugs that exert anti-inflammatory, analgesic and anti-arthritis actions. Keeping this in mind a case study was conducted to assess the efficacy of Zimad containing drugs including *Zingiber officinale* Rosc, *Saussurea lappa*, *Colchicum autumnale*, *Myristica fragrans* Houtt and *Matricaria chamomile* in the management of Knee OA for 14 sittings of alternate application for 28 days. A female patient with chief complaints of pain in left knee joint, along with the swelling, joint stiffness and mild tenderness feeling severe pain while performing daily activity for last 8 months was treated at IPD of the AKTC, AMU, Aligarh. The patient was assessed at baseline, 14<sup>th</sup> day and 28<sup>th</sup> day on the basis of changes in subjective and objective parameters. At the end of the treatment patient got significant relief in subjective (pain, joint stiffness and ROM) and objective parameters (VAS and WOMAC). The present study reveals that Zimad is safe and effective in the treatment of Knee OA without any side effect. Therefore, further randomized clinical studies need to be carried out to validate the effectiveness of Zimad in the management of Knee OA.

**Keywords:** Ilaj Bit Tadbeer, Knee osteoarthritis, Sesquiterpene lactone, *Waja' al-Rukba*, Zimad, Zingiberene

## 1. Introduction

Osteoarthritis (OA) is one of the major causes of impairment in the elderly due to its high incidence rate, particularly in relation to weight-bearing functional tasks of diarthrodial joints. The most frequent kind of Osteoarthritis is Knee Osteoarthritis, which is growing increasingly prevalent as life expectancy and obesity rates rise. Depending on the source, 13% of women and 10% of men aged 60 and over have symptomatic knee osteoarthritis. When a person is above 70, the frequency rises to 40%. Men are less prone than women to have osteoarthritis of the knee<sup>1</sup>. Based on the aetiology of the illness, OA is divided into its idiopathic (primary) and secondary variants. There are no systemic side effects associated with the illness, but clinical symptoms include joint pain and discomfort, mobility restriction, joint stiffness, joint swelling, crepitus and occasional joint effusion<sup>2</sup>. *Waja' al-Rukba* (Knee osteoarthritis) is described under the heading of "*Waja' al-Mafasil*" in the Unani classical literature which is composed of two words *Waja* means pain and *Rukba* means knee joint. A famous Unani physician named *Ali ibne Abbas Majoosi* claims that the aetiology of this illness is extremely obscure and complex. As a result, it is impossible to identify the precise cause of the sickness. It was later stated that the condition is caused by the spread of vitiated materials (*Maddah*) and the weakness of the

joints, which allows them to accept the maddah. The author of *Al-Qanoon*, *Ibne Sina*, stated that psychological factors and emotional moods are significant contributors to the development of this illness. He also claimed that the maddah (vitiated matter) that causes *Waja' al-Mafasil* almost resembles pus but is actually not pus. While *Samarqandi*, a distinguished Unani physician, asserts that the sickness is caused by a *maddah* that is particularly thick and white in color<sup>3</sup>.

In conventional medicine, a wide range of pharmacological and non-pharmacological therapies are used to treat Osteoarthritis. In patients with chronic pain who have seen an unsatisfactory response to non-pharmacological therapy, pharmacological treatment with non-steroidal anti-inflammatory medications (NSAIDs) is often regarded as the first-line therapy with or without adjuvant therapy<sup>4</sup>. The most effective drugs used in the management of acute pain are NSAIDs<sup>5,6</sup>. Dyspepsia or vomiting to more serious injuries such as gastroduodenal ulceration, bleeding, and gastrointestinal lesions are among the GI system side effects associated with the use of NSAIDs<sup>7</sup>. Additionally, several investigations have shown evidence of hepatotoxicity and liver damage<sup>8,9,10</sup>. Cardiovascular problems, peripheral edema, and hyperkalemia are additional risks, especially for diabetics and the elderly<sup>11,12</sup>. In addition to being extremely expensive, other therapeutic modalities including surgical

interventions etc. are also linked to more serious, irreversible consequences. Therefore, there is increased interest in complementary medications and therapies that have been used for ages to treat pain and inflammation with least or no side effects<sup>13</sup>.

Unani Medicine is a traditional form of medicine that focuses on the prevention and treatment of a wide range of acute and chronic ailments. The four primary treatment modalities used in Unani medicine are *Ilaj Bil Ghiza*, *Ilaj Bit Tadbeer*, *Ilaj Bid Dawa*, and *Ilaj Bil Yad*. *Ilaj Bit Tadbeer* is one of the fundamental forms of treatment in the Unani medical system<sup>14</sup>. Numerous interventions are mentioned in the important treatises and manuscripts for the management of *Waja' al- Rukba* that were written by eminent Unani academics and physicians, such as *Hijamah* (cupping therapy), *Dalk* (massage therapy), *Zimad* (liniments), *Riyazat* (exercise) etc<sup>15</sup>. *Zimad* (liniments) is local application of semisolid medicated preparation of single pharmacopeial drugs over body surface<sup>16</sup>. Significant analgesic, anti-inflammatory, decongestant, antioxidant and anti-arthritis drugs are used in the preparation of *Zimad* are mentioned for the preparation of *Zimad* in the management of osteoarthritis in the Unani treatises. A famous Unani Scholar and physician *Mohd Azam Khan* recommended drugs such as *Zanjabeel*, *Qust talkh*, *Suranjan*, *Jozbua* and *Roghan babuna* in his book *Qarabadeen-i-Azam*<sup>17</sup>. In this study drugs that are *Zingiber officinale* Rosc. (*Zanjabeel*), *Saussurea lappa* (*Qust Talkh*), *Colchicum autumnale* (*Suranjan*), *Myristica fragrans* Houtt (*Jozbua*) and *Matricaria chamomile* (*Roghan Babuna*) when analysed on the basis of studies on their pharmaceutical activities have been selected for the preparation of *Zimad* in the management of knee osteoarthritis.

**Table 1. Ethnopharmacological properties of ingredients of *Zimad* preparations**

Botanical names	Unani names	Therapeutically active constituents	Effects as per Unani Medicine	Associated Pharmacological activity
<i>Zingiber officinale</i> Rosc.	<i>Zanjabeel</i>	Gingerols, (6)-Shogaol, zingiberene, [6]-gingerol	<i>Muhallil</i> (anti-inflammatory), <i>Musakkin</i> (analgesic) <sup>18</sup>	Antiarthritic <sup>21</sup> , Anti-inflammatory <sup>22</sup> , antioxidant <sup>23</sup>
<i>Saussurea lappa</i>	<i>Qust talkh</i>	Sesquiterpene lactone, dehydrocostus lactone (DL), dihydro-dehydrocostus lactone, camphene	<i>Muhallil-e-Waram</i> (anti-inflammatory) <sup>19</sup> , <i>Muqawwi-i-Asab</i> (nervine tonic) <sup>20</sup> <i>Musakkin</i> (analgesic) <sup>27</sup> ,	Analgesic <sup>24</sup> , anti-inflammatory <sup>25</sup> , anti-oxidant <sup>26</sup>
<i>Colchicum autumnale</i> Linn.	<i>Suranjan</i>	colchicine, colchicoresin	<i>Muhallil-e-Waram</i> (anti-inflammatory) <sup>28</sup> , <i>Musakkin</i> (analgesic) <sup>29</sup>	Analgesic, anti-inflammatory <sup>30</sup>
<i>Myristica fragrans</i> Houtt	<i>Joz bua</i>	Triglyceride Trimyristin	<i>Muhallil-e-Waram</i> (anti-inflammatory) <sup>18</sup>	Anti-inflammatory <sup>31</sup>
<i>Matricaria chamomile</i>	<i>Roghan Babuna</i>	Apigenin 7-O-glucoside	<i>Musakkin</i> (analgesic) <sup>35</sup>	Analgesic <sup>32</sup> , anti-inflammatory <sup>33</sup> antioxidant <sup>34</sup>

### 3. Analysis

The patient was assessed on baseline, 14<sup>th</sup> day and after completion of treatment i.e., on 28<sup>th</sup> day with the help of Subjective parameters i.e., Pain, joint stiffness, joint swelling and restriction of movement and Objective parameters i.e., Visual Analogue Scale (VAS) for measurement of pain and Western Ontario and McMaster Universities Arthritis Index

## 2. Materials and Methods

A 67-years-old female patient came to the OPD of Ajmal Khan Tibbia College, AMU, Aligarh with the complaints of pain and swelling in left knee joint with difficulty in standing and walking from last 8 months. Patient was unable to perform her daily physical activity. Patient had no history of any metabolic disease, hypertension and tuberculosis. On general examination her vitals were within normal limits and no abnormality was detected through systemic examination. On palpation of left knee joint crepitus, tenderness and mild swelling was present. There was restriction of flexion and extention during examination of Range of motion of left knee joint. X-Ray of left knee joint Anterio-posterior and Lateral view reveals mild narrowing of medial compartment of tibio-femoral joint space with osteophytes on tibial spine; these findings were suggestive of Kellgren-Lawrence Grade 3 knee osteoarthritis. Based on above findings it was diagnosed as *Waja' al- Rukba* (Knee osteoarthritis).

### 2.1. Drug preparation and mode of administration

*Zimad* (*Zanjabeel*, *Qust talkh*, *Suranjan*, *Jozbua* and *Roghan babuna*) was prepared in the Dawakhana Ajmal Khan Tibbia College as per the guidelines of the national formulary of Unani medicine. *Zimad* (semisolid paste) applied locally over the anterior surface of knee joint followed with the bandaging with 6inch gauze bandage every alternate day for 28 days has been done. Information about ethnopharmacological properties of ingredients of drugs used for *Zimad* are listed in table1.

(WOMAC) that is based on the pain intensity, intensity of joint stiffness and difficulty in ADL (daily life activities).

#### 3.1. Subjective Parameters

- **Pain intensity:** Pain score was 4 (pain is very severe at this score) at baseline which improved to 1 on the completion of the study.

- **Joint stiffness:** Stiffness was 3 (stiffness is at moderate level at this score) at baseline which improved to 1 on the completion of the study.
- **Joint swelling:** Swelling was 2 (swelling is mid at this score) at baseline which improved to 0 on the completion of study.
- **ROM:** Restriction of movement of joint was 4 (ROM is severe at this score) at baseline which improved to 2 on the completion of study.

### 3.2. Objective Parameters

- **VAS:** The total VAS was 7 (pain is very severe at this score) at baseline which improved to 3 on the completion of the study.
- **WOMAC:** The total WOMAC score was 48 at baseline which improved to 22 on the completion of the study.

## 4. Results

The total score (subjective and objective parameters) at baseline was 68 which improves to 52 (23.5%) at 14<sup>th</sup> day and 29 (57.3%) at 28<sup>th</sup> day which signifies the considerable improvement in signs and symptoms.

## 5. Discussion

Knee osteoarthritis (*Waja' al-Rukba*) is the most prevalent form of osteoarthritis. Pharmacotherapy is used to treat pain and inflammation. Commonly prescribed medications i.e., NSAIDs for the management of pain are well known for having side effects. Herbs have the potential to provide better and safer ways to relieve pain. traditional systems like Unani medicine that can treat various ailments with minimum side effects. There is a need for *Ilaj Bit Tadbeer* (Regimenal therapy) such as *Zimad* prepared with analgesic and anti-inflammatory Unani pharmacopeial drugs that do not have any adverse effects while simultaneously lowering pain and improving quality of life of patients of knee osteoarthritis. In this case study *Zimad* has been used in the treatment in the knee osteoarthritis. *Zimad* used in this study comprises variety of ingredients which are beneficial in the management of pain and local inflammation. The positive results observed in this study may be due to chemical constituents found in these drugs exert *Muhallil* (anti-inflammatory), *Musakkin-i-alam* (analgesic), *Muqawwi-i-asab* (nervine tonic) actions when applied locally on the affected part of the body<sup>18,19,20,21</sup>. One study revealed that, after being applied locally, *Zingiber officinale* dense extract was found to have strong antinociceptive and anti-inflammatory effects on the model of AITC-induced inflammation in mice<sup>36</sup>. Topical anti-inflammatory effects of *Saussurea lappa* extract were evaluated and its showed analgesic activity in all test systems in a dose- and time-dependent manner<sup>24</sup>. The study conducted by Ayesha A. et al (2019) to evaluate the topical anti-inflammatory effect in the management of knee osteoarthritis showed positive results<sup>30</sup>. Triglyceride Trimyristin of *Myristica fragrans* Houtt. shows anti-inflammatory properties and is used as local message to reduce muscular pain and rheumatic pain of joints<sup>31</sup>. *Matricaria chamomile* oil showed some beneficial effects on pain, stiffness and physical activity of the patients in one such study<sup>32</sup>. The findings of this study suggest that *Zimad* with anti-inflammatory and analgesic Unani pharmacopeial drugs may be beneficial in the management of knee osteoarthritis; The results, however, cannot be generalized, so additional research on more patients is advised, along with long-term follow-up, to ascertain the long-term effect of *Zimad* in the management of knee osteoarthritis.

## 6. Conclusion

In this case report, it is demonstrated that the *Zimad* with anti-inflammatory and analgesic Unani pharmacopeial drugs in the management of knee osteoarthritis is quite effective. Therefore, further randomised clinical studies need to be carried out to validate their effectiveness of *Zimad* in the management of knee osteoarthritis.

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