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Osteoarthritis and Its Therapeutic Management in Unani System of Medicine: An Overview

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ABSTRACT

Osteoarthritis (OA) is a progressive, degenerative joint disorder characterized by the breakdown of cartilage, resulting in pain, stiffness, and decreased mobility. Despite the widespread prevalence of OA and the significant burden it places on individuals and healthcare systems globally, conventional treatment options often provide limited symptomatic relief and are associated with adverse effects upon prolonged use. The Unani System of Medicine, a holistic and traditional form of healing rooted in Greco-Arabic philosophy, offers a promising alternative for the management of osteoarthritis. Grounded in the principles of balancing the four humors and strengthening the body's innate healing capacity, Unani medicine emphasizes a multidimensional therapeutic approach. Management of OA in Unani involves lifestyle and dietary modifications, herbal formulations with anti-inflammatory and analgesic properties, regimental therapies (Ilaj bil Tadbeer) such as massage (Dalak), fomentation (Takhmeed), and cupping (Hijamah), alongside personalized care. Unani formulations like *Habb-e-Muqil*, *Majoon Suranjan*, and decoctions of herbs such as *Suranjan shirin* (*Colchicum luteum*) and *Zanjabeel* (*Zingiber officinale*) are traditionally used to alleviate joint inflammation and pain. This paper aims to explore the pathophysiology of osteoarthritis from both modern and Unani perspectives and reviews evidence-based Unani interventions that may provide long-term relief and improved quality of life for patients suffering from osteoarthritis.

Keywords: Osteoarthritis, Management, Unani Medicine.

1. INTRODUCTION

Osteoarthritis is the most widely accepted degenerative disease of the joint which is leading contributor to pain and disability in adults. [1] Pain, stiffness, swelling, and restrictions in joint function are among the major clinical signs of osteoarthritis (OA). Osteoarthritis is a disease that involves several anatomical and physiological changes of joint tissues, such as cartilage degradation of the joint, bone remodeling and osteophyte formation. [2] It is One of the most prevalent chronic illnesses of the joint disorder. OA affects not just physical function and pain but also a wide range of other outcomes including as sleep, mental health, work involvement, and even mortality [3]. Osteoarthritis (OA) is most commonly found in the hands, foot, hips, spine, and knees [16], and its development

is influenced by aging, obesity, trauma, and inflammation. Functional impairment is frequently linked to the corresponding symptoms [17]. In addition to moderate to severe synovial membrane inflammation, subchondral bone remodeling, and osteophytosis [18], the illness is mainly characterized by cartilage destruction [17]. The formation of a fibrocartilage-capped bony protrusion at the joint margins, known as osteophytes, is known as osteophytosis. Osteophytes in OA typically start in the periosteum and grow outside the joint's cortical bone [19]. Numerous variables, such as mechanical forces, growth factors, and cytokines, which promote the proliferation of mesenchymal stem cells in the periosteum, are responsible for the development of osteophytes. Chondrogenesis occurs inside the growing osteophyte, and osteoblasts that mediate bone formation eventually replace the adult hypertrophic chondrocytes [20].

2. Incidence:

Osteoarthritis affected about 528 million people in 2019, an increase of 113% since 1990.[6] The most commonly impacted joint is the knee, which is followed by the hip and hand. [6] This figure increased to 595 million by 2020, or roughly 7.6% of the world's population.[7] Approximately 32.5 million persons in the US suffer from osteoarthritis. [8] In 2017, the age-standardized annual incidence rate was 181.2 per 100,000. [9] Approximately 250 million people worldwide suffer from this degenerative and progressive joint condition [10]. With a prevalence of 22% to 39% in India, osteoarthritis is the most common joint illness and the second most common rheumatologic issue [11]

3. Unani Medicine's Perspective:

Waja' al-Mafāsil Balghamī (WMB): Osteoarthritis and Phlegmatic Arthritis It arises from the buildup of Balgham Ghayr Ṭabī'ī (abnormal phlegm) in the afflicted joint, and if the disease persists for an extended period of time, it may cause the joints to harden, becoming stiff and less mobile. [4] Similar to osteoarthritis, Waja' al-Mafāsil Balghamī (WMB) (phlegmatic arthritis) is brought on by the buildup or infiltration of Balgham Khām (immature phlegmatic humor) in the joints, which causes swelling. [4] The buildup or infiltration of morbid matter within the joint spaces is caused by Sū'-i-Mizāj Bārid Mustaḥkam (permanent cold morbid disposition) of joints or their weakening as a result of trauma or severe exercise. Additionally, a sedentary lifestyle, a halt to a normal physical activity regimen, a halt to a regular body waste evacuation regimen, etc., contribute to the invasion of morbid Khilṭ (humor). [4] Due to an abnormal predominance of Burūdat (coldness) and Yubūsat (dryness), the affected joint will have a lower temperature than other parts of the body in this condition. It will also have a color that is comparable to other parts of the body and feel heavier with moderate, regular, and deep-seated pain, as well as the least amount of burning sensation. Furthermore, a large amount of space in joint cavities and the Bārid (cold) Mizāj (temperament) of bones and joints make the joints more vulnerable to the buildup of pathological matter. A slow and uneven pulse, translucent urine with a thick consistency, and pain relief with hot regimes are some of the disease's symptoms. [4, 11].

The thinner part of the matter resolves and the thicker part hardens when this illness reaches a chronic stage, which is typically caused by thick, viscous matter of cold temperament (Taḥajjur). When the acute condition of Waja' al-Mafāsil is not properly managed, such as when Tanqiya (evacuation) procedures are carried out before the full Nuḍj (concoction) of diseased matter, Taḥajjural-Mafāsil (stiffness, hardness, and restricted joint motion) is also the result. [4, 13]

3.1. The Unani definition of osteoarthritis

In Unani osteoarthritis is referred to as tehjurul mafasil, where mafasil means joints and tehjurul means inflammation. [13]

3.2. The View point of Unani Medicine: Etiology

- The accumulation or infiltration of abnormal phlegmatic humor in the joint4
- joint weakness that renders the joints susceptible to the condition. (4)
- retention of immature Khilṭ (humour) in the body (4)
- cessation of a regular regimen for the removal of bodily wastes (4)
- sedentary lifestyle (4,5)
- cessation of a regular regimen for physical activity (4,5)
- joint injury history (4)
- obesity (4,5)
- Inadequate digestion (4,)
- Tadākhul-i-Ṭa‘ām (diet after diet without the appropriate amount of time in between) 4
- History of long-term consumption of thick Khilṭ (humor-producing) diets4
- History of excessive consumption of diets of cold and wet/moist temperaments5
- History of excessive emotional disturbances. (4,5)
- Advanced age (in general). (4)

3.3. Pathophysiology:

Unani medicine states that Sū’-i-Mizāj (morbid temperament) of the entire body or any of the body’s essential parts Ḥārr (hot), Bārid (cold), or Yābis (dry) is the cause of arthritis in general. This Sū’-i-Mizāj (morbid temperament) can be either Sādhij (simple), which is an imbalance of Kayfiyāt (qualities), without the involvement of matter or substance; Ḥarārat (hotness), Burūdat (coldness), and Yubūsat (dryness), or it can be Akhlāṭ (humors) of Ḥārr (hot), Bārid (cold), or Yābis (dry) Mizāj (temperament) and Rīḥ (gaseous matter).[4]

All joint tissues, including cartilage, bone, synovium, capsule, ligament, and muscle, are impacted by OA. The most notable cartilage alterations in OA occur when aggrecanase, collagenase, and stromelysin primarily break down the key structural components, collagen and aggrecan, enzymatically. The cartilage surface eventually fissures (fibrillates), deep vertical clefts form, chondrocytes die locally, and the thickness of the cartilage decreases. Trabecular thickness is increased in the bone directly beneath damaged cartilage. New fibrocartilage is produced at the joint's borders, where it ossifies to generate an OSTEOPHYTE, an aberrant cell in the bone tissue that replaces a regular osteocyte. The joint gradually changes due to bone remodeling and cartilage loss, expanding its surface area. The degree of hyperplasia in the synovium varies. Additionally, the outer capsule compresses and thickens. Fiber atrophy is frequently seen in the muscles that function over the joint. [14]

Imaging techniques that allow for the visualization of these structures and hematological parameters that can assess the beginning and course of disease, such as radiography, magnetic resonance imaging (MRI), optical coherence tomography (OCT), and ultrasound (US), are used to confirm the diagnosis. IL-1 antagonists, antibodies to nerve growth factor, and serotonin-norepinephrine reuptake inhibitors are some new treatments that are now demonstrating encouraging results [15]

3.4. Clinical presentation includes:

- Swelling (4)
- Affected joint temperature will be lower than other body parts (4)
- Affected joint color will be comparable to other body parts (4)
- Joint weight will be greater with minimal burning sensation. (4, 11)
- Mild, consistent, deep-seated pain (4,11)
- Reduced joint mobility (4,13)
- Pain relief with heat regimens4 Translucent urine with a thick consistency. (4)
- Nabḍ Baṭī’ Mukhtalif (slow and uneven pulse) (4)

3.5. Risk factors

Include being elderly, obese, leading a sedentary lifestyle, having a chronic illness, being convalescent, and having a phlegmatic temperament. (4)

3.6. Unani Perspective on Clinical Presentation:

- Swelling [4]
- Afflicted joint will be colder than other body parts [4]
- Affected joint color will be comparable to other body parts [4]
- The afflicted joint will feel heavier with less burning feeling and reduced joint mobility [4,11]
- moderate, frequent, deep-seated pain [4, 22]
- The use of hot regimes to reduce the pain [4, 21]
- Translucent, thick-consistency of urine [4]
- Nabḍ Baṭī' Mukhtalif (uneven and sluggish (slow) pulse) [4]

3.7. Differential Diagnosis (Unani Medicine's Perspective) [20]

Characters	Waja'al-Mafasil Balghamī	Waja'al-Mafāsil Ṣafrāwī	Waja'al-Mafāsil Damawī
Onset	Gradual	Sudden	Abrupt
Nature of pain	Dull pain	Excruciating	Severe
Swelling	Marked	Marked	More marked
Touch	Soft & Cold	Warm & Hard	Warm & soft
Skin over the joint	Whitis	Red	Red
Aggravating factors	Cold	Heat	Heat
Relieving factors	Heat	Cold	Cold

3.8. Diagnosis:

- It is chiefly based on history and clinical examination.
- X-rays may be used as confirmative tool for diagnosis.

3.9. Typical changes seen on x- rays include:

1. Joint space narrowing
2. Sub Chondral sclerosis (increased bone formation around the joint)
3. Subchondral cyst formation
4. Osteophytes.

3.10. Treatment Protocols According to Unani Classical Texts:

- Taskīn-i-Alam (pain relief).
- Tanqiya, or the removal of the cause.
- Taḥlīl-o-Talyīn (to soften the joints and reduce inflammation).
- Taqwiyat-i-Mafāṣil (joint strengthening).

3.11. Suggested Lifestyle and Diet [24, 25,26, 27, 28, 29,]

Encourage exercise as a primary treatment for individuals with osteoarthritis, regardless of their age, co-morbidities, level of pain, or handicap. It includes both aerobic and muscle-strengthening exercises.

3.11.1 Extension and Flexion of the Knee

keeping your knee straight while lying on your back. Bend the injured knee as much as is comfortable over time. After ten seconds of holding the position, slowly straighten out again. Repeat ten times.

3.11.2. Quadriceps of the Inner Range

Under your knee, place a tiny, rolled-up towel. Raise your foot off the ground and tighten your thigh muscles to straighten your knee while maintaining the knee on the towel. Hold for five to ten seconds, then slowly release. Do this ten times.

3.11.3. Three quadriceps Strengthening:

From sitting to standing, fold your arms and take a seat in a chair. Get to your feet slowly and without moving your arms. Without using your arms, slowly make your way back to the chair once you're upright. Do this ten times.

3.11.4. Mini Squat for Quadriceps Strengthening

Squat down, bending both knees while maintaining a straight back, using a chair for balance. There should be no more than 45 degrees in the squat. Do this ten times.

3.11.5. Strengthening the Calf with Heel Raises

Push yourself up onto your tiptoes and back down again while using a chair for balance. If you can balance, you can perform this exercise alone on the leg that is injured. Do this ten times.

3.11.6. YOGA:

Patients with OA can benefit from a variety of yoga techniques. These consist of kriyas (kunjal and kapalbhati), basic joint motions, sukshmavyayama exercises, yoga poses (tadasana, katichakrasana, konasana, urdhwahastottanasana, uttanapadasana, vaksana, gomukhasana, marjari asana, ushtrasana, bhadrasana, bhujangasana, makarasana, shavasana), pranayama (nadishodana pranayama, suryabhedi pranayama, bhramari), and meditation.

3.11.7. Weight loss:

The loading across the knee increases three to six times for every kilogram of weight lost. Therefore, significant weight loss may reduce knee and hip OA symptoms.

3.11.8 Nutrition:

A healthy diet should be followed. Osteoarthritis risk can be decreased by eating a diet high in vitamins A, C, E, and K. Consumption of long-chain n-3 fatty acids (oily fish/fish oil supplements), should be increased, which may improve pain and function in OA patients.

3.12. Dietary and Lifestyle Restrictions

3.12.1. Avoid overindulging. Steer clear of items like sweets, deep-fried foods, saturated fats, full-fat dairy, trans fats, refined carbs, alcohol, and preservatives like monosodium glutamate (MSG) that exacerbate the symptoms and indicators of OA.

3.12.2. Avoid smoking. Smoking accelerates the general deterioration of our muscles and bones. This could make you more susceptible to chronic illnesses likeosteoarthritis. Compared to males who do not smoke, men with knee osteoarthritis who smoke experience more severe knee pain and more substantial cartilage loss.

3.12.3. Avoid doing repetitive and strenuous exercises.

3.12.4. Steer clear of jobs involving knee bending and heavy lifting, and refrain from exercising when experiencing flare-ups or acute discomfort.

3.13. The Viewpoint of Unani Medicine:

Consumption of Decanted Black Gram Water.

Consumption of Aghdhiya Laṭīfa (foods that are easily digested but low in nutrients, and that result in a blood viscosity that is normal). such as the meat of little fish, birds, etc.

Consumption of Aghdhiya Musakhkhina (foods that raise the body's metabolism because of their hot nature or heat-producing qualities, such as spices).

3.14. Factors that exacerbate the disease:

- Drinking alcohol, eating non-vegetarian cuisine. (4)
- Having sex, especially after eating. (4)
- Living a sedentary lifestyle. (5)
- Drinking cold water. (6)
- Eating juicy fruits, Dairy products and milk. (4)
- Overindulgence in dinner meal Four
- Severe emotional disorders. (4)
- Using potent purgatives in the early stages of illness (26)

3.15. Single drugs use for the treatment of osteoarthritis (34, 39,40)

S. No.	Name of the drug	Botanical name	Pharmacological action
1.	Zanjabīl	Zingiber officinale Rosc.	Jali, mudirre baol (diuretic), muhallile fuzlate balghami, tiryaq (antidote), muhallile auram (antiinflammatory), mukhrije balgham wa sauda.
2.	Sūranjān	Colchicum autumnale L.	Musakkin, Mufattih Sudad, Muhallil, Mundij, Mu'addilul Qiwam, Jali,Munawwar, Mudirr-i-Bawl (diuretic), Muqwwi-i-Bah, Mushil-i-Balgham.
3.	Būzīdān	Tanacetum umbelliferum Boiss.	Analgesic, Anti-inflammatory activity, its potential effect in managing hyperuricemia and its related joint pain
4.	Muqil	Com miphoramukul Hook.	Munaffi-e-balgham, Muqawwi-e-bah, Muddir-e-haiz, Muhallil-e-waram,kasir-e-riyah, Muddir-i-bowl, Daf-e-sumoom, Mufatteh-e-sudad , Musakkin-e-Alam, Mulattif, Mufattit-e-hasat, Mulaiyan, Jazib, Munaqqi-e-rahem, Qatil-e-kirm-e-shikam, Musammin, Mujaffif.
5.	Ushaq	Dorema ammoniacum D. Don	Mulayyin, Jazibe-Rutoobat ,Mushile-Balgham, Mukhrije Musqite-Janeen Baul and Haiz, Mudirre, Mumbite-Lahm,Jali Habbul Quru, Df e Ta'affun, Muhallil, Mujaffif, Mufattih, Mulayyin.
6.	Asgand	Withania somnifera L.	Muqawwi-e-aasab, Musakkin, Muaddil, Muhallil-e-Warm.
7.	Tukhm-i Khaṭmī	Althaea officinalis L.	Dafa-e-Auram-e-Rahem,Waram-e-Rahem Quruh-e-Rahem Insbab-e-UnqurRahem UqrMulatiff Jali AmarzKulya,Mugharri,Mulayyin,Munzij, Muhallil, Muhallil-e-Waram, Waram-e-Shobatein Waram-e-Unq-ur-Rahem, Waram-e-Uzv-e-Tanasul Auram-e- Miqad, Mudir-e-Haiz,Kharish-e-Mahbil, Kharish-e-Miqad, Musakkin-e-Alam,Waza-ul-Barq,Waza-ul-Uzn, Suda,Is'hal,Zaheer,Mundammil,Tiryaq,Takassur-e-Jild, Tahajjur-e-Aasab,Munaffis-e-Balgham,Dafa-e-Sual, Sual.
8.	Zard Chob	Curcuma longa L.	Musakkin, Mohallil-e-warm, Daf-e-Taaffun,Musaffi, Mudammil-e-Qurooh, Jaali.
9.	Sanā	Cassia angustifolia Vahl.	laxative and detoxifying properties. It's used to treat constipation, and the drug is known for its ability to evacuate morbid matter from the body, making it beneficial for conditions related to the accumulation of such matter.
10.	Turbud	Operculina turpethum L. Silva Manso	expectorant, laxative, anti-inflammatory, and ulcer-protective properties.
11.	Kalonjī	Nigella sativa L.	Munzij-e-Balgham,Jali, Musakkin, Mudirr-e-Baul, Mudirr-e-Haiz, Muqavvi-e-Medah, Mohallil-e-Waram,Qatil-e-Deedan-e-Ama (Antihelminthic) Daf-e-Kharish, Shikam Mulayyin, Anaesthetic,Muharrik, Mujaffif, Mufriz-e-sheer, Musqit-e-janeen Antidiabetic, Antioxidant, Analgesic, Antifungal, Hepatoprotective,Immunomodulatory Neuroprotective and Nephroprotective Activity.

3.15.1. Compound formulation used in the treatment of Osteoarthritis (37,38)

S. No.	Coumpound formulation	Dosage form	Dose per day
1.	Ḥabb-i Muqil	pills	0.5 – 1 gm tablet
2.	Sufūf-i-Sūran jān	Powder	5-10 g in two divided doses
3.	Ma'jūn Jograj Gūgal	Semisolid paste	5-10 g in two divided doses
4.	Ḥabb-i Chobchīnī	Pills	10 g
5.	Ma'jūn-i- Adhrāqī	Semisolid paste	3-5 g
6.	Ma'jūn-i- 'Ushba	Semisolid paste	7 g

7.	Ayārij-i- Fay qrā	Powder	3-5 g
8.	Kushta-i- Ga'odantī	Powder	60-120 mg in two or three divided doses
9.	Ma'jūn-i Chobchīnī	Semisolid paste	7 g
10.	Ma'jūn-i- Flāsifa	Semisolid paste	5-10 g
11.	Ḥabb-i Muntin Akbar	Pills	5g in divided dose

3.15.2. Formulation for external use (34, 35, 36)

S. No.	Formulation	Dosage form	Dose per day
1.	Roghan-i Sūranjān	Oil	Q.S. for external use Morning and night
2.	Roghan-i-Aw rāq	Oil	Q.S. for external use Morning and night
3.	Roghan-i- Dārchīnī	Oil	Q.S. for external use Morning and night
4.	Roghan-i- Mālkanganī	Oil	Q.S. for external use Morning and night
5.	Roghan-i Haft Barg	Oil	Q.S. for external use Morning and night
6.	Roghan-i- Shibit	Oil	Q.S. for external use Morning and night
7.	Roghan-i- Maṣṭagī	Oil	Q.S. for external use Morning and night
8.	Roghan i-Bābūna Qawī	Oil	Q.S. for external use Morning and night
9.	Roghan i-Chahār Barg	Oil	Q.S. for external use Morning and night
10.	Ḍimād Muḥallil	Poultice	Q.S. for external use as directed by the physician
11.	Roghan-i-Surkh	Oil	Q.S. for external use Morning and night
12.	Roghan-i-zaitoon	Oil	Q.S. for external use Morning and night
13.	Roghan i-Bābūna Sāda	Oil	Q.S. for external use Morning and night
14.	Roghan-i- Shibit	Oil	Q.S. for external use Morning and night
15.	Roghan-i- Ḥinnā	Oil	Q.S. for external use Morning and night

3.15.3. Munḍij-o-Mushil therapy [MM Therapy] (33)

S. No.	Formulation of Munḍij-o-Mushil	Dosage form	Dose
1.	Gul-i-Banafsha (flowers of Viola odorata L.) 7 g, Chirā'ita (swertia chirayita)7 g, Shāhtara (Fumaria officinalis L.) 7 g, Mako Khushk (dried Solanum nigrum L.) 5 g, Bādiyān (Foeniculum vulgare Mill.) 7 g, Bekh i-Bādiyān (Foeniculum vulgare Mill. root) 7 g, Sūranjān (Colchicum autumnale L.) 5 g, Mawīz Munaqqā (deseeded dried fruit of Vitis vinifera L.)	Decoction	100ml
2.	Gul Surkh (Rosa damascena Mill.) 7 g, Sanā (Cassia angustifolia Vahl.) 7 g, Maghz-i-Falūs Khayārshambar (fruit pulp without seeds; Cassia fistula L.) 46.8 g, Turanjbīn (Alhagi pseudalhagi (Bieb.) Desv.) 46.8 g, Maghz-i-Bādām (Amyg dalus communis L.) 5 g	Decoction	100ml

NOTE- Munḍij-o-Mushil therapy is given in the morning (empty stomach) up to 15 -21 days with water.

4. DISCUSSION

In Unani medicine, osteoarthritis is conceptually aligned with conditions such as Wajaʿ al-Mafāṣil (joint pain) or Niqris (gout), depending on the clinical presentation and humoral imbalance involved. The pathogenesis is largely attributed to Suʾ Mizāj (morbid temperament), particularly the dominance of Barid wa Yābis Mizāj (cold and dry temperament) in the affected joints, which results in deranged Rutūbat (moisture) and loss of Tālīf (cohesion) in cartilage and synovial structures. Classical scholars like Ibn Sīnā (Avicenna) and Zakariyā Rāzī have discussed musculoskeletal ailments in relation to deranged humors (Akhlāṭ) and emphasized correcting the underlying Mizāj as a therapeutic goal.

The Unani system advocates a comprehensive treatment plan combining Ilāj bi'l-Ghidha (dietotherapy), Ilāj bi'l-

Tadbīr (regimenal therapy), and Ilāj bi'l-Dawā (pharmacotherapy). Regimenal therapies such as Dalāk (massage with medicated oils), Hammām (steam baths), and Hijāma (wet cupping) are traditionally employed to improve joint mobility, reduce stiffness, and enhance circulation. These interventions may offer anti-inflammatory and analgesic benefits, as indicated by emerging evidence supporting the role of manual therapies in pain management.

In terms of pharmacotherapy, several classical formulations—such as Habb-e-Suranjan, Majoon Suranjan, and topical oils like Roghan-e-Baboona and Roghan-e-Kunjad—have been traditionally used to reduce inflammation and restore function. These formulations often contain herbs with pharmacologically active constituents such as colchicine (from Colchicum autumnale) and boswellic acids (from Boswellia serrata), which exhibit anti-inflammatory, anti-arthritic, and chondroprotective properties. Recent pharmacological studies lend support to the efficacy of these agents, validating traditional claims and offering potential for integrative therapeutic approaches.

While the Unani framework provides a multifactorial approach to managing OA, there remains a paucity of high-quality clinical trials and mechanistic studies evaluating the safety and efficacy of its interventions. Standardization of formulations, pharmacovigilance data, and evidence-based validation are critical to advancing Unani therapies within mainstream medicine. Additionally, interdisciplinary research involving Unani scholars, pharmacologists, and rheumatologists can facilitate the development of integrated treatment protocols that bridge traditional wisdom with modern biomedical insights.

5. CONCLUSION

The Unani system of medicine offers a promising, holistic alternative for the management of osteoarthritis, particularly for patients seeking integrative or complementary therapies. Rooted in centuries-old principles focusing on the balance of humors and natural elements, Unani medicine addresses the underlying causes of disease rather than merely alleviating symptoms. Through the use of herbal remedies, dietary and lifestyle interventions, and regimental therapies, Unani treatments have the potential to reduce inflammation, improve joint mobility, and enhance overall quality of life in osteoarthritis patients. Expanding access to Unani medicine could contribute to more personalized and preventive care strategies, potentially reducing the need for invasive procedures or long-term pharmacotherapy. However, to ensure its broader clinical application and integration into modern healthcare systems, further scientific research and well-designed clinical trials are essential to validate its safety, efficacy, and long-term benefits.

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