

ORIGINAL ARTICLE

Exercise-Induced Side Effects Prevention through Massage: A Historical Perspective in Traditional Persian Medicine

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Abstract

The culture of practicing massage therapy in Traditional Persian Medicine (TPM) dates back more than a thousand years. In this article, the authors have tried to evaluate sports massage as a culture while reviewing massage in TPM texts. The types of massage, their functions, and their effects are presented in this study. There is also a brief comparison of the effects of sports massage in current studies. Today, massage has become a widely popular complementary medicine approach. Every year, 18 million Americans receive massages. There are different types of massage in various complementary medicine schools, such as Tuina massage (in Traditional Chinese Medicine) and abhyanga (in Ayurveda), which are related to Chinese and Indian medicine, respectively. In addition, modern therapeutic methods, such as chiropractic and Osteopathy, have their roots in massage.

Massage is used in Traditional Persian Medicine under the titles of Dalk (to rub) and Ghamz (to squeeze). In Traditional Persian Medicine, massage serves as both a preventive and therapeutic measure for a variety of health conditions.

Key words: Massage, Persian Medicine, Complementary Therapies, Chiropractic, Sport Massage, Dalk, Ghamz

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Zahra Ghahremani (Ph.D. Candidate)¹

Mohammad Hossein Ayati (Ph.D.)²

1- Department of History of Medicine, School of Traditional Medicine, Tehran University of Medical Sciences (TUMS), Tehran, Iran

2- Associate Professor, Department of Traditional Persian Medicine, School of Traditional Medicine, Tehran University of Medical Sciences, Tehran, Iran

Correspondence:

Mohammad Hossein Ayati
Associate Professor, Department of Traditional Persian Medicine, School of Traditional Medicine, Tehran University of Medical Sciences, Tehran, Iran

e-mail: ayatimd@gmail.com

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Introduction

In Traditional Persian Medicine textbooks, Dalk, a specific type of massage, is categorized as a subset of sports medicine. However, Dalk is a kind of exercise performed by another individual rather than the person himself (Khalilzadeh and Tabarrai, 2019, pp. 176-180; Bayat, et al, 2019a, pp. 33-44; Sanei, et al, 2020, pp. 123-130; Ibn-abbas, 2008; Jorjani, 2001; Avicenna, 2005; Azam Khan, 2008).

According to Iranian traditional medicine dictionary, the terms Malidan, Malesh, Mosht-O-Mal, Dalk-Ol-Esterdad, Dalk-E-Mosakken, Dalk-Ol-Este'dad, Dalk-Ol-Am-las, Dalk-Ol-Khashen, Ghamz and Kabs are associated with massage and the terms Ri-azat and Aaya are connected to exercise and pain and fatigue that may follow physical activity (Soltani, 2014).

From the point of view of TPM, massage has similar effects to physical exercise. Meanwhile, Avicenna (a renowned TPM scholar; ca. 970–1037) considers Dalk an integral component of sports medicine. According to him, sports massage is done before and after exercise to minimize possible injuries and enhance the overall effectiveness of physical activity (Avicenna, 2005).

Therefore, we have a culture of preventive sports massage in Traditional Persian Medicine (TPM). The main objective of this article is to examine sports massage from the perspective of TPM, focusing on its indications, techniques, and effects. Moreover, it attempts to compare the benefits of TPM's approach to sports massage with contemporary research findings.

Methods

A comprehensive literature search was conducted using PubMed to evaluate available articles published between 1980 and April 2021. We searched the MeSH terms “mas-sage” and “exercise-induced” or “Headache Disorders” which yielded nearly 4000 re-sults. Language restrictions were not included. All research conducted on the association of massage with exercise-induced injuries was thoroughly evaluated. Additionally, cita-tions and bibliographies of these studies were examined for additional relevant results. Moreover, a MEDLINE search was carried out using the keywords “Persian Medicine,” “Iranian Traditional Medicine,” and “Islamic Medicine” to identify relevant papers. This search strategy pointed to the primary texts of Persian Medicine. In this review study, the words Dalk, Ghams, Riazat (exercise), Malesh (rubbing), and Malidan (to rub) were investigated within the context of TPM.

Results

As shown in the search results, summarized in Table 1, multiple positive effects are as-sociated with sports massage, including the reduction of delayed onset muscle soreness (DOMS), fatigue, and pain. Additionally, sports massage has been shown to enhance exercise performance and recovery while decreasing inflammation and creatine kinase levels in athletes. However, it is worth mentioning that a clinical trial and a systematic review reported no significant effect of sports massage on muscle performance and dam-age (Medeiros, et al, 2020, pp. 148-154; Mine, Lei and Nakayama, 2018, pp. 789-799).



Table 1: Effects of massage

#	Author(s)	Year	Study type	Findings of sport massages effect
1	E Ernst (Ernst, 1998, pp. 212-214)	1998	Systematic review	Potential improving effect on delayed onset muscle soreness (DOMS)
2	N Nelson et al, (Nelson, 2013, pp. 475-482)	2013	Systematic review	Prevent DOMS and pain
3	J Guo et al, (Guo, et al, 2017, p. 747)	2017	Systematic review & meta-analysis	Improve DOMS and muscle performance
4	K Mine et al, (Mine, Lei and Nakayama, 2018, pp. 789-799)	2018	Systematic review	No effect on muscle performance
5	O Dupuy et al, (Dupuy, et al, 2018, p. 403)	2018	Systematic review & meta-analysis	Alleviate DOMS and fatigue
6	P Weerapong et al, (Weerapong, Hume, and Kolt, 2005, pp. 235-256)	2005	Narrative review	Some effects on recovery (insufficient data)
7	PU Bender et al, (Bender, et al, 2019, pp. 75-80)	2019	Clinical trial	Small reducing pain
8	FVA Medeiros (Medeiros, et al, 2020, pp. 148-154)	2020	Clinical trial	No effect on muscle damage and performance
9	SJ Aboodarda et al, (Aboodarda, Spence, and Button, 2015, p. 256)	2015	Clinical trial	Reduce pain
10	H Zhong et al, (Zhong, et al, 2018, pp. 365-372)	2018	Clinical trial	Improve recovery and reduce fatigue
11	JE Hilbert et al, (Hilbert, Sforzo and Swensen, 2003, pp. 72-75)	2003	Clinical trial	Reduce soreness
12	Z Zainuddin et al, (Zainuddin, et al, 2005, pp. 174-180)	2005	Clinical trial	Reduce DOMS and swelling
13	LL Smith et al, (Smith, et al, 1994, pp. 93-99)	1994	Clinical trial	Reduce DOMS and creatine kinase
14	T Farr et al, (Farr, et al, 2002, pp. 297-306)	2002	Clinical trial	Reduce DOMS
15	P Bakowski et al, (Bakowski, et al, 2008, pp. 261-265)	2008	Clinical trial	Reduce DOMS
16	CA Mancinelli et al, (Mancinelli, et al, 2006, pp. 5-13)	2006	Clinical trial	Reduce DOMS and improve muscle performance



17	AK Kaplan et al, (Kaplan, et al, 2014)	2014	Clinical trial	Reduce hypoalgesic response
18	S Imtiyaz et al, (Imtiyaz, Veqar, and Shareef, 2014, pp. 133-136)	2014	Clinical trial	Reduce DOMS and improve muscle performance
19	JH Han et al, (Han, et al, 2014, pp. 136-140)	2014	Clinical trial	Reduce DOMS and improve muscle performance
20	TH Tanaka et al, (Tanaka, et al, 2002, p. 9)	2002	Clinical trial	Reduce fatigue
21	JD Crane et al, (Crane, et al, 2012, p. 119ra13)	2012	Clinical trial	Reduce muscle inflammation and improve recovery
22	A Delextrat et al, (Delextrat, et al, 2014, pp. 716-727)	2014	Clinical trial	Improve recovery (especially combination of massage with stretching)
23	Kargarfard et al, (Kargarfard, et al, 2016, pp. 959-965)	2016	Clinical trial	Improve recovery and exercise performance
24	WJ Kraemer et al, (Kraemer, et al, 2001, pp. 11-23)	2001	Clinical trial	Improve recovery and performance Reduce creatine kinase Reduce DOMS and swelling
25	R Ogai et al, (Ogai, et al, 2008, pp. 834-838)	2008	Clinical trial	Improve recovery Reduce fatigue
26	L Visconti et al, (Visconti, et al, 2015, pp. 458-463)	2015	Clinical trial	Reduce DOMS
27	MD Weber et al, (Weber, Servedio and Woodall, 1994, pp. 236-242)	1994	Clinical trial	No effect on DOMS
28	C Haas et al, (Haas, et al, 2013, pp. 1105-1112)	2013	Animal study	Improve recovery Reduce inflammation
29	SK Crawford et al, (Crawford, et al, 2014, pp. 671-678)	2014	Animal study	Reduce muscle stiffness
30	PB Resnick (Resnick, 2016, pp. 4-10)	2016	Case study	Facilitating return to parasympathetic activity

Sports Massage in TPM

In TPM, the term Dalk or Dalk treatment method is considered the most accurate equivalent to the modern concept of massage. Additionally, the term Ghamz is likely to be equivalent to various other therapeutic techniques, such as compression, acupressure, and reflexology (Khoramizadeh, et al, 2020, pp. 150-155).

In TPM, massage is a widely used and highly effective therapeutic approach. In this medical tradition, there are six essential principles for maintaining health and treating



diseases, with movement being one of the most significant (Lari, Tausif and Lari, 2018, pp. 81-84; Parvizi, et al, 2017; Nimrouzi, et al, 2019, pp. 45-54). Movement is divided into two categories: exercise and massage (Dalk) (Heyat, and Siddiqui, 2015).

According to Avicenna, Dalk is an integral part of sports and should be performed both before and after physical activity to reduce injury and increase the effectiveness of sports performance (Avicenna, 2005).

In TPM, massage is used alone for prevention or treatment and in conjunction with other therapeutic approaches. Among the treatments that incorporate massage, several examples include the use of topical medications such as therapeutic oils in baths or scrubs, the use of aromatherapy, and the implementation of balloon therapy. In addition, bandaging the hands and feet with cloth bands is another method that can be used alongside massage (Ibn-abbas, 2008; Azam Khan, 2008; Kermani, 2004; Aghili, 2006).

In Traditional Persian Medicine (TPM), various massage techniques have been suggested for various diseases including gynecological ones (Khalilzadeh, and Tabarrai, 2019, pp. 176-180). Despite the similarity of TPM massage with other types of traditional and modern massages, this type of massage distinguishes itself by adapting the approach based on individual characteristics such as temperament, age, pregnancy status, athletic involvement, elderly considerations, infancy, and other personal conditions. In terms of being based on a holistic philosophy and acknowledging the importance of vital energy flow in the body, TPM massage is compatible with Indian and Chinese medicine massage (Sadat, et al, 2020, pp. 173-181; Hashemi, et al, 2016, p. S11; Bayat, Mohammadbeigi, et al, 2019, pp. 22-28; Jafarian, Hashemi and Mahlooji, 2023, pp. 173-181) as well as modern methods such as chiropractic and osteopathy (Bayat, et al, 2019a, pp. 33-44).

Traditional Persian Medicine massage is divided into three categories: preventive, therapeutic, and sports (figure 1). In other words, sports massage is a kind of preventive massage for sports complications such as fatigue (Sanei, et al, 2020, pp. 123-130).

Among the mechanisms presented in TPM texts for the effects of massage are organ strengthening, organ cleansing, and improving blood circulation (Ibn-abbas, 2008; Azam Khan, 2008; Kermani, 2004; Aghili, 2006).



Figure 1. Different kinds of Dalk in TPM



Also, a new study has demonstrated that Ghamz significantly increases the quality of life and improves the range of motion of the shoulder and neck joints in people suffering from chronic nonspecific neck pain (Khoramizadeh, et al, 2020, pp. 150-155).

Massage in TPM is based on the principles of TPM treatment and the path of substance movement in the body. Dalk also has a general and preventive model that is done in the form of bagging and footstone massage in the bathroom. According to TPM guidelines, massages should be performed in a specific manner: from the top to the bottom of the body, from the beginning to the end of the muscle and limb, and starting gently and gradually increasing intensity according to the purpose of the treatment (Heyat, and Siddiqui, 2015; Bayat, Vakilinia and Asghari, 2016, p. S45; Fazil, and Nikhat, 2017, pp. 39-52; Khoramizadeh, Hashem-Dabaghian, and Mohammadikenari, 2019, pp. 1-2; Jafar, et al, 2015, pp. 36-38; Jaladat, et al, 2012, p. 51).

Massage can be done with or without the use of oil. Massage with oil facilitates smoother hand movements on the body and prevents transmitting pressure to other areas of the body. It also helps to keep skin pores open. In TPM, rubbing is better than squeezing, and squeezing is better than gentle strokes. According to the recommended massage method, it is advisable to use the palms and fingers while avoiding using the bottom of the hands and forearms, as these can cause pain and discomfort (Jaladat, et al, 2012, p. 51).

To prescribe massage, we always need to take a detailed medical history and examination and pay attention to the circulation of substances in the body. The massage should be administered with appropriate intensity and duration to avoid inducing fatigue or pain because the main objective of massage is to alleviate fatigue and help the body function better. Also, massage should not be done when the individual is hungry, has a full stomach, or when the body is filled with waste products. Also, avoiding excessive pressure on weak limbs that cause pain is important. The time of illness must be considered before performing a massage. According to TPM, the best time for massage is in the morning after waking up, at night before going to bed, after food has been properly digested, and following sexual intercourse (Bayat, et al, 2019a, pp. 33-44).

In TPM, massage is divided into three distinct categories: quality, quantity, and speed. In terms of quality, there are three types of massage: rigid, smooth, and moderate. In terms of quantity, massages are divided into three categories: many, few, and moderate types, and in terms of speed, there are three types of massage: fast, slow, and moderate massage. All in all, these three classification systems yield nine massage types, each with its unique effects (Ibn-abbas, 2008; Azam Khan, 2008; Kermani, 2004; Aghili, 2006).

For example, while rigid massage strengthens muscles, linen massage softens limbs and stiff muscles. Multiple massages generate heat, leading to slimming of the limbs, whereas a lower massage causes moisture retention, contributing to obesity. Also, massaging the whole body with strength, speed, and moderate and moderate duration in terms of softness can help alleviate general ailments like fatigue and skin complications such as psoriasis (Jaladat, et al, 2012, p. 51).

Sports massage from the perspective of TPM is divided into two categories: massage before exercise and massage after exercise. Massage performed before exercise is called *Este'dad*, which is equivalent to warming up. Massage conducted after exercise is called *Esterdad* which aligns with the concept of cooling down in modern sports practice. If the



massage is done with oil before exercise, it will leave the skin pores open during exercise to expel waste products. According to TPM, excessive exercise can result in the loss of essential moisture in the body. Hence, it is recommended to stop physical activity before reaching a state of fatigue and excessive sweating. This would facilitate the excretion of residual material present in the organs while in a state of rest (Ibn-abbas, 2008; Azam Khan, 2008; Khalique and Siddiqui, 2017, pp. 15-20).

Discussion

In Traditional Persian Medicine (TPM), fatigue after physical activity is known as a potential complication of exercise. TPM gives a comprehensive definition of fatigue as a disease and sports massage is recommended to prevent or treat fatigue and waste elimination. Modern studies also describe a variety of sports injuries, some of which occur with a delay. A clinical study that measured the effects of foot massage on post-exercise cycling rehabilitation found no significant differences in measurable physiological parameters (such as blood lactate concentration) between the control and massage groups. However, a significant reduction in post-exercise fatigue was observed.

According to Traditional Persian Medicine (TPM), sports massage is an integral part of sports. Avicenna considers exercise to be the most important factor in maintaining health, emphasizing its function in waste elimination and fortifying bodily functions. He also recommends massage as a preventative measure for people who perform physical activity. This would improve the beneficial effects of exercise and reduce its potential complications and injuries.

From the perspective of Traditional Persian Medicine (TPM), the application of massage varies depending on the person's age, occupation, skin, and temperament. TPM outlines different types of massage, such as massage with oil, cloth, or stone, as well as nine distinct massage methods. TPM has described all these techniques and methods in detail.

Owing to the holistic perspective of Traditional Persian Medicine, it takes a different approach to massage, particularly sports massage. TPM considers it necessary to pay attention to both the excretion pathways of materials and the vital energy channels during massage. This holistic perspective is similar to other traditional forms of massage, as well as chiropractic and osteopathic practices. In addition, TPM's emphasis on individual characteristics is comparable to modern personalized medicine and lifestyle medicine. However, whereas TPM highlights the crucial role of addressing exercise-induced fatigue through massage techniques, contemporary understanding puts some prohibitions related to massage and sports massage.

Recent studies acknowledge the beneficial effects of massage in alleviating exercise-induced fatigue. While the mechanisms mentioned for massage in TPM are somewhat adaptable to current studies, the holistic approach of TPM, which considers factors like basal metabolism, may offer a more comprehensive understanding of massage's effects. Since massage exists in most of the ancient and modern medical schools today and different clinical trials have been performed on its various effects, it is necessary to conduct more studies on specific models of TPM sports massage and the methods presented in it to prevent sports-induced fatigue.

In general, the effects of massage in TPM include opening the skin pores to facilitate the excretion of substances and an increase in basal metabolism. In addition, massage can



enhance the elimination of waste products by enhancing blood flow to organs, warming the targeted areas, and stimulating metabolism, ultimately leading to increased excretion. It is also thought that massage aids in dragging waste products either toward distant areas or by altering their natural course.

Massage is recommended for obesity, neurological diseases such as epilepsy and headache, cardiovascular diseases such as fainting and ascites, and gastrointestinal diseases. It is also believed that massage contributes to overall bodily balance by preserving moisture levels, reducing pain, strengthening limbs, relieving limb coldness, and preparing the body for food consumption. The findings of recent research have shown the efficacy of massage in treating various conditions, including asthma, arthritis, insomnia, paralysis, diabetes, and constipation.

The main mechanisms of massage can be divided into four categories: skin involvement of connective tissue, muscles, tendons, joints, nerves, arteries, and organs, involvement of the nervous and hormonal systems, mechanical and physical effects, and its effects on inflammation and the immune system.

Conclusion

Although much research is performed in both Persian and English exploring the specific Dalk massage technique, the present study is unique in that it attempts to specifically examine sports massage from the perspective of TPM. Employing a comparative approach, this study aims to evaluate the effects of pre- and post-exercise massage on reducing the adverse effects of physical activity.

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Authors' Contribution

Zahra Ghahremani and Mohammad Hossein Ayati contributed to the conception and design of the work. All authors read and approved the final version of the work.

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Conflict of Interest

None.

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