

Research Progress on Traditional Chinese Medicine Treatment of Dry Eye Syndrome

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Abstract: *As a common ocular surface disease, dry eye has a rising incidence in recent years, which seriously affects the quality of life of patients. Western medicine treatment mainly focuses on relieving symptoms and has certain limitations. Traditional Chinese medicine has a long history in the treatment of dry eye, accumulating rich experience and possessing a unique theoretical system and diverse treatment methods. This article comprehensively reviews the research progress on the understanding, clinical treatment methods, and mechanisms of action of dry eye in traditional Chinese medicine, aiming to provide reference for the clinical treatment and in-depth research of dry eye in traditional Chinese medicine.*

Keywords: Dry eyes, Traditional Chinese Medicine treatment, Research progress, Acupuncture and moxibustion, Traditional Chinese medicine.

1. Introduction

Dry eye refers to a type of disease caused by multiple factors that lead to an imbalance in the tear film homeostasis, resulting in an imbalance of the ocular microenvironment, accompanied by symptoms of eye discomfort and visual impairment. The causes of dry eye syndrome are related to factors such as genetics, climate, and geographical environment. In recent years, with the change of modern lifestyle, such as the widespread application of electronic products, environmental pollution problems, wearing contact lenses, etc., people's eye use time increases, blink frequency decreases, and the eyes can not get enough rest. Therefore, the incidence rate of dry eye disease continues to rise, the incidence rate of global dry eye is 5% to 50%, while the incidence rate of dry eye in China is 21.0% to 30.0% [1]. Western medicine mainly treats dry eye by promoting tear secretion and anti-inflammation [2]. These methods are mostly effective in the short term, but difficult to maintain, and the symptoms are prone to recurrence, making it difficult to treat the root cause. Based on the holistic concept and syndrome differentiation, traditional Chinese medicine improves dry eye by regulating the balance of yin and yang in the body, starting from the whole body's internal organs, qi, blood, and body fluids. It can fundamentally improve the microenvironment of the eye surface and promote tear secretion, showing unique advantages and good efficacy in the treatment of dry eye syndrome. Therefore, traditional Chinese medicine is very necessary for treating dry eye, which can make up for the shortcomings of Western medicine and provide patients with better treatment plans.

2. The Mechanism of Action of Traditional Chinese Medicine in Treating Dry Eye

Dry eyes in traditional Chinese medicine are mostly classified under the categories of "white astringency syndrome", "Shen Shui Jiang Ku", "dryness and dizziness", referring to eye diseases where the white eyes are not red or swollen, but the eyes are consciously dry, and even blurred vision [3]. The "Shen Shi Yao Han" first proposed the "white astringency

syndrome", stating that it is "neither swollen nor red, neither refreshing nor refreshing, and the sand is astringent and hazy." It also proposed that the divine water outside the pearl is dry and astringent, but not moist and bright [4]. This vividly reflects the typical symptoms of dry eyes, such as dryness, discomfort, foreign body sensation, and unclear vision, although the eyes are not red or swollen. The mechanism of action of traditional Chinese medicine in treating dry eye syndrome includes the following four points.

Regulating organs: Traditional Chinese Medicine believes that the liver is responsible for storing blood and opening the eyes. Its Yin blood can nourish the eye; The kidney stores essence, and the essence is injected into the eyes to nourish them; The spleen and stomach transport water and grains, generating qi and blood to nourish the eyes; The lung governs the dispersion and descent, spreads the body fluids and promotes the distribution of body fluids to the eyes. By nourishing the liver and kidneys, strengthening the spleen and nourishing qi, and other methods, the function of the organs can be normal, and the qi, blood, and body fluids can be sufficient to provide sufficient nutrition for the eyes, thereby improving dry eye symptoms.

Clearing meridians: The human body's meridians run through the entire body, and there are also many meridians distributed in the eyes. Acupuncture, massage and other therapies can unblock the meridians around the eyes, promote the circulation of qi and blood, and make the meridians around the eyes unobstructed, allowing qi, blood and body fluids to reach the eyes smoothly. When treating dry eyes, acupuncture and moxibustion can not only improve eye discomfort, but also recuperate the whole body through the meridian circulation, which has attracted more and more clinical attention [5].

Clearing heat and moistening dryness: Dry evil is most likely to invade the white eyes and cause dryness, or it may be caused by residual evil lingering on the eyes, damaging the body and consuming qi. For dry eyes caused by the presence of heat evil in the body and burning of body fluids, Li Dian [6] uses a formula that clears heat and eliminates fire, nourishes

yin and moistens dryness, removes heat evil from the body, replenishes body fluids, and ensures sufficient body fluids in the eyes to alleviate dryness symptoms.

Harmonizing qi and blood: The fullness and harmony of qi and blood are crucial for eye health. All diseases arise from the decline of the spleen and stomach. Dysfunction of the spleen and stomach can lead to a decrease in the production of refined substances, weakening the driving force and affecting the generation and distribution of qi and blood. Insufficient refined substances transported to the eyes and orifices can cause dryness and blurred vision [7]. Traditional Chinese medicine regulation, moxibustion and other therapies can promote the circulation of qi and blood, allowing for normal distribution and nourishment of qi and blood in the eye, maintaining the normal function of various tissues in the eye, improving the secretion and distribution of tears, and enhancing the stability of the tear film.

3. Traditional Chinese Medicine Treatment for Dry Eye

3.1 The Etiology and Pathogenesis of Myopia

Research findings indicate that the extracts of *Astragalus membranaceus* and *Lycium barb arum* exhibit significant therapeutic effects, including the promotion of tear secretion, improvement of meibomian gland function, and potent antioxidant activities. *Astragalus membranaceus* can improve dry eye symptoms by regulating immunity, anti-inflammatory and other effects [8-9]; *Lycium barb arum* berries contain active ingredients such as polysaccharides, polyphenols, and carotenoids, which increase antioxidant activity by stimulating endogenous factors in the human body. They can also enhance the activity of antioxidant enzymes, reduce the occurrence of lipid peroxidation, protect liver cell membranes, and thus increase the body's energy reserves, which is beneficial for resisting damage to the liver from foreign substances [10]. These Chinese herbs are all beneficial for patients with dry eye syndrome.

In addition, traditional Chinese medicine is based on a holistic concept and syndrome differentiation to regulate the function of organs, balance yin and yang in the body, promote normal secretion and circulation of tears, and thus improve dry eye symptoms. For patients with liver-yin and kidney-yin deficiency type dry eye syndrome, due to the liver opening to the eyes, the kidneys storing essence, and insufficient essence and blood, the eyes lose nourishment. *Qi Ju Di Huang Wan* and *Liu Wei Di Huang Wan* are often modified to nourish the liver and kidneys, nourish yin and improve vision. Modern pharmacological research suggests that this formula has the effects of correcting endocrine imbalances, enhancing immunity, and improving hormone levels in the body [11-13]. For patients with dry eye syndrome caused by insufficient lung-yin, due to the fact that the lung governs qi and regulates the water pathways, and the lung-yin is deficient, the body fluid cannot reach the eyes. Therefore, *Yang Yin Qing Fei Tang* is often used to nourish yin and moisten the lungs, allowing the body fluid to spread and moisten the eyes. For patients with dry eye syndrome caused by insufficient qi and blood, as qi is the leader of blood and blood is the mother of qi, insufficient qi and blood cannot nourish the eyes. Choosing

Ba Zhen Tang can nourish qi and blood, and improve eye nutrition. For dry eye syndrome caused by damp heat accumulation and steaming, due to damp heat obstruction, the body fluid cannot be distributed normally. Instead, it is fumigated with pathogenic heat. *San Ren Tang* is used to clear heat and dampness, thereby restoring the normal distribution of body fluid. For dry eyes with liver stagnation and qi stagnation, *Xiao Yao San* is used to soothe the liver, relieve depression, nourish blood, and improve vision. Yang Ying et al. [14] found that the dry eye condition of patients with liver depression and qi stagnation was improved after taking *Dan Zhi Xiao Yao San*. The occurrence of eye diseases cannot be separated from the dysfunction of the liver. When qi and blood are out of balance, and liver qi is stagnated and obstructed, the metabolism of qi, blood and body fluids will be disrupted, resulting in a failure to distribute body fluids. If liver depression persists and turns into fire, it will deplete body fluids, eyes, and lose nourishment [15]. The modern research on the correlation between dry eye syndrome and traditional Chinese medicine also indicates that the liver is the primary location of the disease [16]. The internal treatment of traditional Chinese medicine adjusts the balance of yin and yang, qi and blood, and organ functions in the human body, allowing body fluids to be distributed normally to the eyes, thereby alleviating symptoms of dry eye syndrome. And overall regulation helps to improve the body's own regulatory ability, fundamentally improving the condition.

3.2 Traditional Chinese Medicine External Treatment for Dry Eye

3.2.1 Acupuncture and moxibustion treatment

Acupuncture therapy, as a characteristic therapy of traditional Chinese medicine, has the effect of promoting peripheral blood circulation and muscle contraction. In clinical practice, acupuncture therapy can be used to regulate the circulation of qi and blood in the eyes, relieve eye muscle tension, and improve discomfort caused by dry eyes. Acupuncture treatment for dry eye syndrome usually adopts a method combining acupoints around the eyes with those at the periphery of the eyes. By needling acupoints, the function of unblocking meridians, harmonizing qi and blood, and regulating organ function can be achieved. The commonly used acupoints around the eyes include *Jingming*, *Cuanzhu*, *Sizhukong*, *Tongziliao*, *Taiyang*, etc. These acupoints are located around the eyes and can unblock the meridians, qi, and blood in the eyes. They directly act on the eyes and can improve vision. Remote acupoints are often selected such as *Hegu*, *Zusanli*, *Sanyinjiao*, etc. *Hegu* is the original acupoint of the *Hand Yangming Large Intestine Meridian*, with the "face mouth *Hegu* convergence" function, which can dispel wind, clear heat, unblock meridians, relieve pain, and improve vision and hearing; *Zusanli* is the acupoint of *Zuyangming Stomach Meridian*, which can strengthen the spleen and stomach, nourish qi and blood, regulate meridians, and is an important acupoint for health care; *Sanyinjiao* is the intersection point of the *Foot San Yin Meridian*, which can nourish yin, nourish blood, regulate liver and kidney, and invigorate spleen and stomach. According to the specific situation of the patient, different acupoint combinations and manual operations are performed to achieve the goal of treating dry eye. Guo Xiacong et al. [17] explored the

clinical rules of acupuncture treatment for dry eye through data mining and found that the acupoints of the Foot Sun Bladder Meridian have the highest frequency of application, among which the most common acupoints are Cuanzhu, Jingming, Tongyang, Dianziliao, and Sizhukong, which have the function of promoting blood circulation and improving vision. Modern research has shown that stimulating the acupoints around the eyes can cause local capillary dilation, increase blood supply around the eyes, improve the conduction function of the parasympathetic nervous system [18], and promote tear secretion [19]. Acupuncture is more effective than artificial tears [20].

Dry eye syndrome can also be treated through moxibustion. Acupuncture therapy for dry eye is mainly carried out by applying warm heat to the acupoints around the eyes, such as Jingming, Cuanzhu, and Taiyang, to warm and clear meridians, dispel cold and dampness, and nourish qi and blood. The warmth generated by moxibustion can promote blood circulation in the eyes, increase local blood supply, provide more nutrients to the eye tissue, and help alleviate eye fatigue and dryness symptoms. At the same time, the warm stimulation of moxibustion can also regulate the circulation of blood and qi in the eye meridians, balance the yin and yang of the human body, enhance the body's self repair ability, and improve the secretion and distribution of tears. In addition, moxibustion also has a certain anti-inflammatory effect, which can alleviate possible inflammatory reactions in the eyes and thus reduce eye discomfort. Zhu Dan [21] studied the effect of warm acupuncture and moxibustion on dry eyes through a randomized controlled trial, and the results showed that warm acupuncture and moxibustion was better than artificial tears in the treatment of dry eyes, and had a positive effect on prolonging the tear film rupture time, corneal injury, and improving tear secretion.

In addition, the method of inserting needles or acupoint threads can also be used. Embedding acupressure needles or absorbable threads into specific acupoints, such as Zusanli and Sanyinjiao, can regulate qi and blood and balance yin and yang through long-term stimulation of acupoints. Pressing and embedding needles for treatment can help increase tear secretion, prolong tear film rupture time, and repair pathological damage to the cornea, thereby improving discomfort symptoms such as dry eyes and foreign body sensation, and enhancing visual quality [22]. Liu Jing et al. [23] found through comparing the clinical efficacy of the artificial tear control group and the acupoint embedding group that acupoint embedding therapy can effectively improve eye surface related symptoms such as dryness, foreign body sensation, burning sensation, photophobia, and visual fatigue in patients with insufficient tear production type dry eye syndrome, increase the content of lactoferrin in tears, and have better therapeutic effects than artificial tear drops during the follow-up period. These methods have long-lasting therapeutic effects and can reduce the number of patient visits, especially suitable for patients who are busy with work and cannot receive frequent treatment.

3.2.2 Traditional Chinese medicine hot compress pack

The advantages of using traditional Chinese medicine hot compress for dry eye treatment are unique. Based on the

theory of traditional Chinese medicine meridians and the physiological characteristics of the eye, drugs are infused through the skin through the power of warmth, directly reaching the disease site. Medicinal herbs such as chrysanthemum, cassia seed, lycium chinensis, etc. are commonly used. Chrysanthemums have the effects of dispersing wind and heat, calming liver yang, clearing liver and improving vision, clearing heat and detoxifying, and can alleviate redness, swelling, and blurred eyes; Cassia seed can clear heat, improve vision, moisten the intestines, and promote bowel movements. It can improve blood circulation in the eyes, alleviate symptoms such as redness, pain, photophobia, and excessive tears; Lycium chinensis nourish the liver and kidneys, benefit essence and improve vision, and have good effects on blurred eyes. Crush these medicinal herbs and put them in a cloth bag. Heat them up and apply them to the eyes. The warm stimulation of the hot compress pack can promote blood circulation in the eyes, increase tear secretion, and alleviate discomfort symptoms such as dry eyes, eye irritation, and fatigue. At the same time, the effective ingredients of the drug are absorbed, regulating the meridians, qi, and blood in the eyes, and enhancing the nourishment of the eye tissues. Tian Qingqing et al. [24] found in their exploration of the therapeutic effect of traditional Chinese medicine hot compress on dry eye syndrome in patients after LASIK surgery that it can promote tear secretion and improve bilateral SIT, BUT, FL, reduce inflammatory reactions to improve therapeutic efficacy. In addition, traditional Chinese medicine hot compress can significantly improve the degree of corneal lesions, tear film rupture time, and changes in tear secretion when treating dry eyes [25].

3.2.3 Traditional Chinese medicine fumigation

Traditional Chinese medicine fumigation is an effective external treatment for dry eyes in traditional Chinese medicine. The steam produced by boiling traditional Chinese medicine is fumigated into the eyes, and the medicinal and thermal effects are directly applied to the ocular surface. Common medicines include chrysanthemum, mulberry leaves, mint, honeysuckle, wolfberry, etc., which have the effects of clearing the liver and improving vision, dispelling wind and moistening dryness, clearing heat and detoxifying. After boiling, use the rising warm medicinal gas to fumigate the eyes. The tiny particles in the medicinal vapor directly act on the ocular surface, moistening the ocular tissue, increasing tear secretion, and improving tear film stability,

Traditional Chinese medicine fumigation combines the functions of various treatment methods such as drug therapy, steam therapy, heat therapy, and ion permeation therapy, and has unique advantages in treating dry eye caused by abnormal lipid metabolism. For dry eye caused by excessive evaporation, the combination of nourishing yin and generating fluids traditional Chinese medicine fumigation and artificial tears is superior to using artificial tears alone [26]. Clinical studies have shown [27] that the combination of traditional Chinese medicine fumigation and artificial tears can effectively alleviate clinical symptoms of dry eye syndrome, promote tear secretion, enhance tear film stability, and significantly improve visual related quality of life in affected eyes. The therapeutic effect is significantly better than using artificial tears alone; In addition, its simple

operation, reasonable price, and no obvious adverse reactions provide a mild and effective treatment option for dry eye patients, which can be further promoted and applied in clinical practice.

3.2.4 Introduction of traditional Chinese medicine ions

Traditional Chinese medicine iontophoresis therapy for dry eye syndrome is a unique therapy that combines traditional Chinese medicine with modern technology. From a principle perspective, it is based on the principle of electrical repulsion, utilizing the action of a direct current electric field to push the effective ions in traditional Chinese medicine liquid through the skin or mucous membrane into the human body under the force of the electric field, directly acting on the affected area of the eye. In terms of drug selection, traditional Chinese medicine with nourishing yin, moistening dryness, clearing liver and improving vision effects, such as chrysanthemum, Mimenghua, wolfberry, *Ophiopogon japonicus*, etc., are often selected and concentrated into medicinal solutions to provide a basis for treatment. During treatment, place gauze or cotton balls soaked in traditional Chinese medicine solution on the skin around the eyes, connect electrodes, adjust the appropriate current intensity, and treat for 15-20 minutes each time. A course of treatment usually includes multiple treatments. This therapy has significant advantages. On the one hand, it can directly deliver drugs to the disease site, increase the concentration of local drugs, and enhance the therapeutic effect; On the other hand, it avoids the gastrointestinal burden and first pass liver effects that oral medication may bring. Clinical studies have shown [28] that the combination of traditional Chinese medicine Mimenghua granules iontophoresis and sodium hyaluronate eye drops can significantly eliminate or alleviate dry eye symptoms in patients, improve tear quality, and repair corneal epithelium. Zhu Ximen et al. [29] conducted a study and found that the combination of traditional Chinese medicine fumigation and iontophoresis at acupoints for treating dry eye syndrome of liver-kidney yin deficiency showed remarkable efficacy. It regulated liver-kidney functions at multiple levels, effectively improved the tear secretion volume and tear film stability of patients with dry eye, and alleviated symptoms such as dryness and foreign body sensation in the eyes. It is a simple, safe, effective, with few adverse reactions and less tendency to cause dependence treatment method for dry eye syndrome.

3.2.5 Acupoint massage

Acupoint massage is an effective method in traditional Chinese medicine to improve dry eyes. Select acupoints around the eyes such as Cuanzhu, Jingming, Sizhukong, Sibai, and Taiyang, as well as distal acupoints such as Hegu and Zusanli. Press and massage the acupoints with appropriate force, massage each acupoint for 1-2 minutes, 3-4 times a day. By stimulating acupoints through massage, blood circulation in the eyes and the flow of qi and blood can be promoted, the secretion of the lacrimal glands can be stimulated, and clinical symptoms such as dryness in the eyes can be alleviated, this enables the eyes to relax and improves the lack of lipid layer in the meibomian glands [30-31]. Xu Yan [32] et al. found that after acupoint massage intervention, the symptoms of the vast majority of patients were significantly improved, and both BUT and SIt increased, acupoint massage can improve

the symptoms and ocular physiological conditions of patients with VDT-induced visual fatigue. In addition, it can also be achieved through joint applications. Research by Zhang Qiaochu et al. [33] has shown that the optimal treatment time for dry eye with the combination of thunder fire moxibustion and acupoint massage is 20 minutes. It can regulate fluid circulation and nerve reflexes, and promote blood circulation in the eyes through meridian conduction, improving dry eye symptoms.

4. Conclusion

With the progress of science and technology, the incidence rate of dry eye is increasing year by year. Traditional Chinese medicine has a unique theoretical system and diverse treatment methods for dry eye, which have achieved significant therapeutic effects in clinical practice. By combining overall conditioning with local treatment, traditional Chinese medicine can effectively improve the symptoms of dry eye patients, regulate tear secretion and tear film stability, and alleviate ocular surface inflammation. Although traditional Chinese medicine has certain advantages in treating dry eye, there are also many problems. At present, traditional Chinese medicine treatment for dry eye has problems such as difficulty in unifying syndrome differentiation and typing, incomplete quality standards for traditional Chinese medicine preparations, insufficient research on the mechanism of action, and lack of large-scale multicenter clinical studies. In the future, traditional Chinese medicine treatment for dry eyes is expected to make breakthroughs in various aspects. In the future, we will strengthen the research on standardization, conduct large-scale multi-center clinical trials, deeply explore the mechanism of action of traditional Chinese medicine in treating dry eye, tap the potential of traditional Chinese medicine's distinctive therapeutic methods, and collaborate with Western medicine to complement each other's strengths and carry out more large-sample and high-quality clinical studies. Promote the internationalization of traditional Chinese medicine treatment for dry eye and provide new and more effective treatment options for dry eye patients worldwide.

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