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Advances in the Theoretical Basis and Clinical Research of Acupuncture and Moxibustion in the Treatment of Rheumatoid Arthritis in Chinese and Western Medicine

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Abstract: ***Rheumatoid arthritis (RA) is an autoimmune disease characterized by synovial inflammation and bone erosion. This paper elucidates the pathogenesis of RA from the perspective of integrating Chinese and Western medicine, and reveals the central role of acupuncture in the reconstruction of immune homeostasis through multi-target regulation. Studies have shown that acupuncture exerts its therapeutic effects by regulating Th17/Treg balance, inhibiting inflammatory factors (IL-17, TNF-α) and activating the HPA axis. Clinical practice has confirmed that characteristic therapies such as electro-acupuncture and fire-acupuncture combined with western medicine can synergistically improve joint symptoms. This article provides theoretical basis and practical path for the treatment of RA by combining Chinese and Western medicine.***

Keywords: Rheumatoid arthritis, Acupuncture, Integrated Chinese and Western medicine, Immunomodulation, Th17/Treg cells**.**

1. Introduction

Rheumatoid arthritis (RA), as a chronic joint disease with the highest disability rate, involves the imbalance of genetic-environmental-immune network. Western medical treatment has side effects and drug resistance problems, while traditional Chinese medicine classifies RA as a "paralytic syndrome", emphasizing the pathogenesis of "deficiency of positive energy and invasion of evil energy". Acupuncture and moxibustion have shown their unique advantages by harmonizing yin and yang and dredging meridians and channels, and recent studies have confirmed that they can precisely regulate the immune-endocrine-neurological axis. This article integrates the results of Chinese and Western medicine to systematically describe the mechanism and progress of acupuncture in the treatment of RA, and provides a scientific basis for optimizing the treatment plan.

2. The Understanding of Rheumatoid Arthritis from the Perspective of Chinese and Western Medicine

According to Western medicine, the etiology and pathogenesis of RA have not yet been fully elucidated, and the disease is not triggered by a single factor, but is a complex autoimmune disease caused by multiple factors, such as genetic susceptibility, environmental factors and infectious factors [1]. In Chinese medicine theory, RA belongs to the category of "paralysis". In Su Wen, Paralysis, it is mentioned that "wind, cold, dampness and three qi are mixed together to become paralysis", and it is believed that its onset is due to the deficiency of positive qi, and external evils such as wind, cold, dampness, and heat invade the human body, blocking the meridians and channels, and the poor operation of qi and blood. At the same time, deficiency of the liver and kidney and insufficiency of qi and blood are also intrinsic factors in the development of the disease.

2.1 Genetic Factors

Studies have shown that RA is characterized by significant genetic susceptibility, with first-degree relatives having a 3-5-fold elevated incidence rate compared to the general population. Analyzed from the molecular genetic perspective, MHC class II gene polymorphisms are the core genetic risk factors for RA, with the HLA-DRB1 allele carrying specific amino acid sequences increasing the risk of developing the disease by 4-7-fold. Genome-wide association studies further confirmed that HLA-DR4 haplotypes were significantly and positively associated with the degree of joint erosion and anti-CCP antibody positivity in RA [2]. The above genetic variants not only significantly increase the susceptibility to RA, but may also influence the clinical phenotypic progression of the disease by modulating the T-cell receptor signaling pathway.

The Lingshu·Tian Nian states that "the mother is the foundation for the birth of a human being, and the father is the tatting", indicating that the innate endowment originates from the essence of the parents, and also states that "the five viscera are strong ..... and therefore long-lasting", suggesting that the strength of the innate endowment determines the ability of resistance to disease. *The Suwen·Wei Lun* further explained: "the kidney is the foundation of the innate, the main bone marrow", kidney essence deficiency can lead to "bone marrow is not full, the organs are not conducive to", and modern medicine in the HLA-DRB1 gene polymorphisms lead to the bone erosion mechanism echoed; *The Suwen·Ping Re Bing Lun* said: "the evil of the gathering, its gas must be weak', and Western medicine genetic susceptibility echoed, traditional Chinese medicine emphasizes that the lack of natural endowment is the inherent basis of the lack of positive qi! The Chinese medicine emphasizes that the lack of innate

endowment is the internal foundation of the lack of positive qi.

2.2 Environmental Factors and Hormone Levels

Studies have shown that environmental exposures are key exogenous triggers for the development of RA, with tobacco exposure being the most clearly associated with the disease. Cigarette smoking induces localized protein citrullination modifications in the respiratory tract and joints, triggering an autoimmune response against the modified epitopes, leading to elevated levels of anti-cyclic citrullinated peptide (CCP) antibodies and rheumatoid factor (RF). Clinical data show that smoking RA patients have an average 1.5-2-fold increase in serum RF titers compared to non-smokers, and the rate of progression of joint destruction is accelerated by approximately 30% [3]. In addition, gender-specific hormones have a significant modulating effect on RA susceptibility, with the incidence rate in women about 2-3 times that of men, and the peak premenopausal incidence rate is closely related to fluctuations in estrogen levels. Experiments have confirmed that estrogen can exacerbate the synovial inflammatory response by activating the JAK-STAT pathway in CD4+ T cells and promoting autoantibody production by B cells, while progesterone may exert a protective effect by inhibiting Th17 differentiation, but the specific endocrine regulatory network still needs to be analyzed in depth [4].

The Jingui Yaolue·Zhongfeng Lijie Bing Mai Zheng Bing Zhi states: "These conditions are all caused by drinking alcohol, sweating, and exposure to wind," emphasizing the synergistic role of external pathogens (wind, dampness, and heat) and unhealthy lifestyle habits in disease development. *The Jingyue Quanshu* proposes that "for women, the liver serves as the foundation of the innate constitution," which aligns with the Western medical understanding of estrogen regulation mechanisms. Traditional Chinese Medicine holds that liver blood deficiency can lead to malnourishment of the tendons and bones. The Liver Meridian of Foot Jueyin and the Gallbladder Meridian of Foot Shaoyang are internally and externally related. *The Lingshu·Jingmai* records that the Gallbladder Meridian of Foot Shaoyang "governs diseases of the bones." Its pathway "descends behind the ear... passes through the armpit, travels along the chest and ribs, and converges at the hip joint," closely overlapping with the distribution of joints commonly affected in rheumatoid arthritis (RA), such as the shoulders, elbows, and wrists. Estrogen fluctuations lead to "disharmony of the Chong and Ren meridians," while the Yanglingquan (GB34) acupoint, as the influential point of tendons, can regulate the Shaoyang pivot and modulate the endocrine-immune axis function.

2.3 Microbial Infection and Inflammatory Factors

Studies have shown that microbial infections play an important role in the pathogenesis of RA. Clinical studies have confirmed that pathogens such as EBV and Porphyromonas gingivalis can colonize the synovial microenvironment of RA patients. Such pathogens directly activate CD4+ T cells by releasing superantigens, which in turn prompts B cells to proliferate abnormally and produce RF, and the immune complexes formed trigger the synovial inflammatory cascade through the activation of the complement system [5][6]. From the immunoregulatory level, the imbalance of T-lymphocyte subsets is the core pathology of RA, and the imbalance of the Th17/Treg cell ratio leads to the overexpression of pro-inflammatory factors, such as IL-17 and TNF-α, which not only stimulate the differentiation of B-cells into plasma cells and the secretion of large quantities of immunoglobulins (e.g., IgM-type RF), but also promote the activation of osteoclasts through the imbalance of the RANKL/OPG system and finally lead to irreversible bone erosion [5][6]. causing irreversible bone erosion [7][8][9][10].

The Zhubing Yuanhou Lun·Fengshi Bi Hou records: "The manifestations of wind-damp bi syndrome include thickened, rough skin or sore and aching muscles," linking externally contracted damp toxins with bi syndrome (painful obstruction syndrome). *The Zhubing Yuanhou Lun·Fengshi Bi Hou* introduces the theory of "latent pathogens," which aligns with the Western medical mechanism of immune dysregulation triggered by dormant pathogens.

3. Mechanism of Action of Acupuncture in the Treatment of Rheumatoid Arthritis

3.1 Regulation of Immune Function

Studies have shown that the core immunopathological feature of RA lies in the abnormal activation of autoreactive T/B cells. Acupuncture intervention remodels the immune homeostasis by triggering the release of β-endorphin from the central opioid system and specifically activating μ-type opioid receptors [11]. Experiments in the collagen-induced arthritis (CIA) model confirmed that electroacupuncture stimulation of the foot-sanli and hanging bell point pairs could up-regulate VPAC1 receptor expression in synovial tissue by 2.3-fold, prompting the restoration of the Treg/Th17 cell ratio to 68% of that of the healthy controls, and that the mechanism was closely related to epigenetic regulatory pathways [12].

The Zhenjiu Jiayi Jing states: "Sanyinjiao (SP6) governs pain on the inner side of the knee, often associated with spleen deficiency and dampness excess." Sanyinjiao, the intersection point of the three foot yin meridians, regulates the liver, spleen, and kidney. Modern research shows that acupuncture at Sanyinjiao can inhibit the secretion of synovial IL-17, aligning with the theory of yin-yang imbalance described in *The Nanjing·Twenty-Ninth Difficulty*: "When the yin qiao vessel is diseased, the yang becomes slack while the yin becomes tense." *The Zhenjiu Dacheng* emphasizes: "The essence of acupuncture lies in achieving the arrival of qi, which ensures efficacy." Acupuncture regulates qi to achieve "the balance of yin and yang," resonating with the yin-yang equilibrium theory of Th17/Treg cells.

3.2 Modulation of the Neurohumoral System for Analgesia

The occurrence of rheumatoid arthritis pain involves neuroplastic changes such as peripheral and central sensitization and up-regulation of nociceptive receptor expression, while the release of pro-inflammatory factors further exacerbates nociceptive sensitization [13]. Studies

have shown that acupuncture can exert analgesic effects by modulating a variety of bioactive substances through central mechanisms. Buccal needle treatment modulates octapeptide cholecystokinin (CCK-8) and β-endorphin (β-EP) levels in the cerebrospinal fluid of experimental animals, the latter of which produces an analgesic effect through activation of endogenous opioid peptide receptors [14]. Under stress, the pituitary-adrenocortical system inhibits nociceptive transmission by releasing substances such as the opioid melanocortin procorticosteroid (POMC), while dynorphinogen (PDYN) is involved in chronic pain modulation [15]. Fire-needle intervention significantly reduced the abnormal expression of inflammatory mediators such as histamine, 5-hydroxytryptamine, and prostaglandin E2 in diseased tissues [16]. These findings suggest that acupuncture may achieve multi-targeted analgesic and anti-inflammatory effects by modulating the neurohumoral system and promoting the release of endogenous analgesic substances while inhibiting the production of peripheral analgesic factors.

The Lingshu·Jiuzhen Shier Yuan states: "For treating various pains, the affected meridians are typically in an excess state," and "excess conditions should be treated with draining techniques." This principle of pain relief aligns with the Western medical mechanism of inhibiting the release of pain-inducing substances. *The Nanjing·Sixty-Eighth Difficulty* states: "The back shu points govern body heaviness and joint pain," revealing the classical theory that these points regulate the endogenous analgesic system.

3.3 Regulation of the Endocrine System

Studies have shown that imbalance in the regulation of the neuroendocrine-immune network is an important feature of the pathological progression of RA. The hypothalamic-pituitary-adrenal axis (HPA axis) regulates glucocorticoid synthesis through the secretion of corticotropin-releasing hormone (CRH), which maintains immune homeostasis by down-regulating Th17 cell activity through inhibiting inflammatory pathways such as NF-κB [17]. Notably, clinical observations have revealed that inhibition of HPA axis function is prevalent in RA patients, leading to insufficient endogenous cortisol secretion and exacerbating the inflammatory response. In terms of intervention strategies, experiments for the collagen-induced arthritis (CIA) model confirmed that acupuncture on the foot-sanli could significantly elevate serum corticosterone levels (1.8-fold increase compared with the control group) by activating the cAMP-PKA signaling pathway, and at the same time, modulate the expression of Cyp11a1, Ptgs2 and other genes in synovial tissues, which promotes the synthesis of steroid hormones and the reprogramming of arachidonic acid metabolism, and ultimately achieves the inflammation abatement and cartilage repair [18].

The Nanjing·Thirty-Sixth Difficulty states: "The Mingmen (Gate of Life) is the residence of all spiritual essences and the foundation of primordial qi." The fire of the Mingmen (kidney yang) warms the entire body, corresponding to the function of the HPA axis in regulating glucocorticoid synthesis. Zusanli (ST36), a point on the Stomach Meridian of Foot Yangming, is described in *The Lingshu·Jingbie* as "connected to the stomach, dispersing to the spleen, and ascending to the heart." The pathway of the stomach meridian "descends through the diaphragm, connects to the stomach, and links with the spleen," forming a spatial correspondence with the anatomical location of the hypothalamic-pituitary-adrenal (HPA) axis, which extends from the base of the skull to the kidneys. Modern research shows that acupuncture at Zusanli can activate the vagus nerve-adrenal pathway, aligning with the description in *The Zhenjiu Jiayi Jing*: "Zusanli governs cold in the abdomen and insufficiency of qi."

4. Clinical Progress of Acupuncture in the Treatment of Rheumatoid Arthritis

4.1 Principles of Acupuncture Point Selection

4.1.1 Supporting the positive and dispelling the evil, tonifying qi, blood, yin and yang

Based on the disease mechanism of "deficiency of positive qi, recurrence of external evil", the acupoints in the meridians of the foot solar bladder meridian (e.g., kidney yu) and the hand yangming large intestine meridian (e.g., Quchi) are adjusted to support positive qi, harmonize the camping and guarding, and enhance the ability of the organism to resist the evil spirits [19].

The Suwen·Ci Fa Lun states: "When upright qi (zhengqi) is preserved within, pathogenic factors cannot invade." Selecting Shenshu (BL23) can "tonify the source of fire to eliminate yin obscurations" (*The Jingyue Quanshu*). Its location overlaps with the surface projection area of the adrenal glands, and it enhances upright qi by regulating adrenal cortical function. *The Lingshu·Zhongshi* states: "When both yin and yang are deficient, tonifying yang will deplete yin, and draining yin will collapse yang. In such cases, sweet medicinal herbs can be used, but strong formulas should be avoided." This emphasizes the need to harmonize yin and yang when reinforcing upright qi. Therefore, in clinical practice, Quchi (LI11), the he-sea point of the large intestine meridian, is paired to clear and drain yangming stagnation heat (inhibiting Th17), while Zusanli (ST36), the he-sea point of the stomach meridian, is used to tonify qi and blood (promoting Treg differentiation).

4.1.2 Yang meridian acupoints are mainly used to stimulate yang qi.

Priority is given to acupoints of the foot solar bladder meridian, the hand yangming large intestine meridian and the gallbladder meridian, such as the high-frequency use of Yanglingquan, Quchi, and Ashansanli, in order to warm yang and disperse cold, solidify Wei and consolidate the surface, clear dampness and heat, and dredge the meridians [19][20].

The Lingshu·Jingmai describes the pathway of the Bladder Meridian of Foot Taiyang: "It runs parallel to the spine, reaches the lumbar region... passes through the buttocks, and enters the popliteal fossa." Its back shu points (Ganshu BL18, Pishu BL20, and Shenshu BL23) are distributed alongside the spinous processes of T7-L2, overlapping with the segmental innervation areas of the sympathetic nerve chain. Acupuncture at the back shu points of the yang meridians can

bidirectionally regulate the sympathetic- adrenal medullary system, inhibiting the release of inflammatory factors. *The Zhenjiu Wendui* states: "Yanglingquan (GB34) governs the tendons of the entire body." This point, the he-sea point of the gallbladder meridian and the influential point of tendons, lies on the gallbladder meridian, which "emerges from the lateral side of the knee... and converges at the hip joint," closely corresponding to the knee joint areas commonly affected in rheumatoid arthritis (RA). Acupuncture at Yanglingquan can regulate the Shaoyang pivot, aligning with the Western medical mechanism of inhibiting Th17 cell differentiation.

4.1.3 Combination of local and overall regulation

Local acupoint selection: select neighboring acupoints for the affected joints, e.g. Yanglingquan and Shusanli for knee joints; Kunlun and Xiexi for ankle joints to relieve swelling and pain. Integral regulation: combining lumbar and dorsal (e.g., Ren Yu) and thoracic and abdominal acupoints (e.g., Zhongkou) to harmonize the whole body's qi and blood and improve the immune status [20].

The Biao You Fu states: "For cross-meridian piercing, when the left side is affected, treat the right side." For knee joint conditions, local points such as Yanglingquan (GB34, gallbladder meridian) and Zusanli (ST36, stomach meridian) are selected, while distal points like Taixi (KI3, the source point of the kidney meridian) are paired to "nourish water to nourish wood" (regulate estrogen levels), and Taichong (LR3, the source point of the liver meridian) is used to "soothe the liver and regulate qi" (inhibit JAK-STAT pathway activation and reduce synovial inflammation). *The Lingshu·Guanzhen* proposes: "For distant needling, when the disease is in the upper part, treat the lower part." For ankle joint conditions, local points such as Kunlun (BL60) and Jiexi (ST41) are selected, while Sanyinjiao (SP6, the intersection point of the three foot yin meridians) is paired to regulate the functions of the liver, spleen, and kidney, thereby inhibiting bone erosion caused by RANKL/OPG system imbalance.

4.1.4 Synergistic effect of core acupoint combinations

High-frequency point combinations (e.g., Quchi-Yanglingquan, Yanglingquan-Footsanli) were derived from data mining analysis, reflecting synergistic collaterals, clearing heat and inducing dampness, and clinically reinforcing therapeutic efficacy [21].

The Zhenjiu Juying records: "Quchi (LI11) disperses wind, while Yanglingquan (GB34) relaxes the tendons." The combination of Quchi and Yanglingquan aligns with the theory in *The Lingshu·Jingjin*: "The Yangming meridian governs the nourishment of the sinews, while the Shaoyang meridian governs movement." The Hand Yangming Meridian "ascends to the shoulder and emerges at the front of the acromion," and the Foot Shaoyang Meridian "emerges from the lateral side of the knee... and converges at the hip joint." The pathways of these two meridians cover joints commonly affected by rheumatoid arthritis (RA), such as the shoulders, elbows, and knees. Modern research shows that this combination can synergistically inhibit the synovial IL-17/IL-23 pathway and downregulate RANKL expression, corroborating the statement in *The Zhenjiu Dacheng*: "When these two points are paired, they promote joint mobility."

The Nanjing·Sixty-Eighth Difficulty states: "He-sea points govern counterflow qi and diarrhea." Zusanli (ST36) and Yanglingquan (GB34) form a "wood-earth pairing" (*The Ziwu Liuzhu Zhenjing*), regulating the immune-metabolic network through the five-phase mutual control theory: the wood point (Yanglingquan) drains excessive Th17 activity, while the earth point (Zusanli) tonifies deficient Treg activity. *The Zhenjiu Zisheng Jing* records: "Zusanli treats exhaustion and emaciation, while Yanglingquan governs tendon stiffness." When paired, they can "regulate the middle jiao to nourish the extremities" (*The Leijing Tuyi*), improving muscle atrophy and synovial hyperplasia in RA patients.

4.1.5 Identification and allocation of points and application of specific points

Fixed main points: Fengchi, Hegu, Taichong, etc. are often chosen to promote Qi and blood circulation, dispel wind and remove paralysis.

Add and subtract: shallow stabbing and cathartic method for heat paralysis, deep stabbing and moxibustion for cold paralysis, and warm needling or cupping for wet paralysis.

Specific point enhancement: high-frequency use of combined points (such as foot Sanli, Quchi) to regulate the meridian qi, combined with meridian outside the odd points (eight evils, knee eye) or A Yes point to enhance the local therapeutic effect [20][21].

The Lingshu·Jiuzhen Shier Yuan proposes: "For heat conditions, use swift needling; for cold conditions, retain the needles." For heat-bi syndrome (characterized by elevated IL-6 and TNF-α), shallow needling at Fengchi (GB20) and Hegu (LI4) is used to drain superficial heat. *The Zhenjiu Jiayi Jing* records: "Hegu governs febrile diseases without sweating." Clinically, the slow-fast draining technique can inhibit NF-κB nuclear translocation, as described in*The Lingshu·Jingmai*: "When needling heat conditions, it should feel like touching hot water."

The Suwen·Tiaojing Lun states: "Blood and qi prefer warmth and dislike cold." For cold-damp obstruction syndrome (HLA-DRB1 positive with high RF titers), deep needling at Shenshu (BL23) to the periosteal layer, combined with ginger-partitioned moxibustion at Guanyuan (CV4), can activate TRPV1 channels to promote endogenous cortisol secretion, achieving the warming and cold-dispersing effect of "treating cold with heat."

The Lingshu·Weiqi emphasizes: "Those who can distinguish the yin and yang and the twelve meridians understand the origin of diseases." The extra point Baxie (EX-UE9), located between the metacarpal bones on the dorsum of the hand, overlaps with the skin region of the Hand Shaoyang Sanjiao Meridian, which "runs along the wrist." Needling this point can regulate C-fiber-mediated neurogenic inflammation. The Xiyan (EX-LE5) point lies on the pathway of the Stomach Meridian of Foot Yangming, which "descends to the knee joint." Penetrating needling at this point can inhibit synovial VEGF expression, aligning with the description in *The*

Zhenjiu Jicheng: "Xiyan treats swelling of crane's knee wind (a type of joint disorder)."

4.2 Acupuncture Treatment Methods

4.2.1 General Acupuncture

Ordinary acupuncture is the core method of traditional acupuncture, which is used to stimulate specific acupoints (e.g. Foot Sanli, Yanglingquan, Quchi, etc.) through millimetre needles, together with tonic and diarrhoeal techniques (e.g. flat tonic and flat diarrhoeal, twisting and lifting and inserting) to regulate qi and blood. Clinical studies have shown that common acupuncture combined with western medications (e.g., methotrexate) can significantly improve the symptoms of joint swelling, pain, and morning stiffness, and reduce inflammatory indicators such as CRP, ESR, and RF [22]. Animal experiments further revealed that acupuncture can exert anti-inflammatory and antioxidant effects through mechanisms such as inhibiting the NF-κB signaling pathway and enhancing the level of synovial cell autophagy [23][24].

4.2.2 Electroacupuncture

Electroacupuncture superimposes low-frequency pulsed current on the basis of traditional acupuncture to enhance the intensity of acupoint stimulation. Studies have shown that electroacupuncture combined with western drugs (e.g., celecoxib, methotrexate) in the treatment of RA can effectively reduce serum inflammatory factors (e.g., TNF-α, IL-1β, NF-κB) and improve the joint function, and its mechanism is related to the inhibition of mTORC1 phosphorylation and activation of adenosine A2A receptor to regulate the p38MAPK pathway [25][26][27]. For liver and kidney yin deficiency type of RA, electroacupuncture selected points (e.g., foot-sanli, kidney yu, liver yu) combined with localized acupoints in the lesioned joints can significantly relieve pain and regulate immune imbalance [26].

4.2.3 Fire Needle Therapy

Fire needle rapidly pierces into acupoints by heating the needle body to exert the effects of warming the meridians and dispersing cold, activating blood circulation. Clinical studies have shown that fire acupuncture can reduce CRP, RF, ESR and other indexes of RA patients, improve morning stiffness and joint pressure pain, and its mechanism is related to the inhibition of the release of IL-6, IL-1β, TNF-α, and inflammatory mediators (e.g., 5-hydroxytryptophan) [27][28]. Compared with traditional acupuncture, fire acupuncture is more advantageous in relieving acute joint inflammation and pain sensitivity [27].

4.2.4 Bee-needle therapy

Bee acupuncture uses the tail needle of bees to directly pierce the acupoints, combining both acupuncture and bee venom pharmacological effects. Studies have shown that bee-needle stimulation of acupoints such as foot-sanli can regulate the balance of Th17/Treg cells, reduce synovial tissue CD40/CD40L mRNA expression, and attenuate inflammatory cell infiltration and arthropathic damage [29][30]. Combination of conventional drugs (e.g. methotrexate) can significantly improve patients' quality of life and delay the progression of RA [31].

4.2.5 Needle knife therapy

Needle knife combines acupuncture and minimally invasive release techniques to improve joint mobility by cutting and peeling off diseased tissues (e.g. synovial adhesions). Clinical observation shows that needle knife treatment of RA elbow joint lesions can significantly reduce matrix metalloproteinase expression such as MMP-1 and MMP-3, regulate TIMP-1 balance, and inhibit cartilage degeneration [32]. The total effective rate of combined western drugs (e.g., methotrexate, leflunomide) is as high as 97.87%, and the safety is high [33].

4.2.6 Warm acupuncture and moxibustion

Warm acupuncture and moxibustion combines needling and moxibustion, and enhances the effect of channelization and dispersal of cold through the heat effect. Clinical studies have confirmed that warm acupuncture and moxibustion can reduce serum CCL19 and ANGPTL2 levels and improve synovial thickness and blood flow in RA patients [34]. Animal experiments have shown that the mechanism involves up-regulation of SIRT1 protein, inhibition of the NF-κB pathway, and reduction of the release of inflammatory factors such as IL-1β, IL-6, etc [35].

4.2.7 Other acupuncture methods

Acupuncture point buried thread: absorbable threads are implanted into acupoints for continuous stimulation to regulate immunity. Studies have shown that buried thread therapy can reduce IL-6 and IL-8 levels and inhibit inflammation through the PD-1/OX40 signaling pathway [36].

Intradermal needling: microneedles are left subcutaneously and combined with antirheumatic drugs (DMARDs) to reduce inflammation levels and joint pain [37].

5. Conclusion

Acupuncture exerts synergistic therapeutic effects through the mechanisms of multidimensional regulation of immune imbalance (regulating Th17/Treg ratio), improvement of microcirculation (lowering blood viscosity), activation of endogenous analgesic system (up-regulating β-endorphin), and reestablishment of HPA axis function (promoting cortisol secretion). The clinical use of Yang meridian acupoints (Quchi, Ashigaru, Yanglingquan, etc.), combined with electro-acupuncture and fire-acupuncture, can significantly improve the joint function and slow down the progression of the disease. In the future, it is necessary to deeply analyze the specific regulatory network of acupoints, establish a precise evaluation system for acupuncture treatment protocols, and promote the standardization of the treatment of RA by combining traditional Chinese and Western medicine.

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