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Investigating the Efficacy of Acupuncture for Sprain and Muscle Injury Management: A Clinical Exploration.

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Abstract: Sprains and muscle injuries are prevalent and can significantly impact quality of life. Acupuncture is increasingly used for these conditions, but its effectiveness requires further investigation. This study aimed to explore the potential benefits of acupuncture in managing sprains and muscle injuries. This case series reports on four patients with sprains or muscle injuries treated with acupuncture based on Traditional Chinese Medicine principles. Acupuncture points were selected to address pain, inflammation, and promote healing. Treatment outcomes were based on patient-reported improvements. All four patients reported significant improvements following acupuncture treatment. Pain reduction, improved mobility, and faster recovery were observed. These findings align with existing literature suggesting acupuncture's potential benefits for various musculoskeletal injuries. Acupuncture demonstrates promise as a complementary therapy for sprains and muscle injuries. Further research with robust designs is necessary to definitively establish its efficacy and optimize treatment protocols. Integrating acupuncture into multidisciplinary management for these conditions warrants further investigation.

Keywords: Acupuncture, Traditional Chinese Medicine, Muscle Injuries, Sprains.

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1. Introduction

Sprains and muscle injuries pose a significant public health challenge due to their high prevalence and negative impact on the quality of life of the affected population [1,2]. These conditions are common in different populations, including athletes, students, workers with repetitive movements, heavy manual labour, and people of all ages and physical activity levels [2-4]. Complications associated with sprains and muscle injuries can lead to temporary or permanent disabilities, resulting in functional and socioeconomic limitations [1,4-6].

Sprains and muscle injuries can be triggered by a variety of causes, including direct trauma such as falls, sports accidents, or violent impacts, as well as sudden movements and excessive forces applied to joints and muscles. In addition, risk factors such as advanced age, lack of proper warm-up before physical activity, contact sports, and genetic predisposition can increase susceptibility to the aforementioned injuries [7-12].

The symptoms and signs associated with sprains and muscle injuries vary depending on the severity and location of the injury. Generally, they include acute and severe pain in the affected area, localized inflammation, oedema, bruising, limitation of range of motion, and visible deformities, such as joint misalignment. In more severe cases, joint instability, increased sensitivity to touch, and functional disability may occur [6,13,14].

Accurate diagnosis of sprains and muscle injuries requires a comprehensive approach that includes reviewing the patient's medical history, performing a detailed physical examination, and often, ordering additional imaging studies. Plain X-rays are useful for assessing the structural integrity of joints and identifying possible bone fractures,

while ultrasound and MRI can provide more detailed information about soft tissues, such as muscles, tendons, and ligaments [15-19].

Conventional treatment for sprains and muscle injuries typically employs a multidisciplinary approach aimed at relieving pain, reducing inflammation, promoting tissue healing, and restoring joint and muscle function. This may include the use of analgesic and anti-inflammatory medication to manage pain and inflammation, physiotherapy to promote muscle strengthening, stretching, and functional rehabilitation, temporary immobilization of the affected joint using splints or functional bandages, and in some cases, surgical interventions to realign damaged anatomical structures [14,20-24]. The treatment plan is tailored individually based on the severity of the injury, anatomical location, underlying medical condition, and the patient's recovery goals. However, the evidence on conventional strategies is still limited [25,26].

Traditional Chinese medicine is a system of health care that was developed for thousands of years [27-31]. According to its perspective, health is viewed as a state of harmony and balance within the body's interconnected systems. Disruption of this balance can lead to illness [31-35.] Traditional Chinese medicine therapeutic techniques are increasingly seen as valuable complements to conventional Western medicine methods, reflecting a growing movement towards an integrative medicine model [36-46].

Acupuncture, a traditional Chinese Medicine technique that involves the insertion of small needles into specific body areas [40,47,48], has been increasingly used as an effective therapeutic approach in the treatment of several health conditions [49-52]. It has the purpose of regulating the nervous, endocrine, exocrine, and circulatory systems to achieve optimum health levels [53].

In musculoskeletal injuries, acupuncture may help in providing pain relief and reducing inflammation, improving local blood circulation, reducing muscle spasms, and promoting the regeneration of injured tissues [54,55].

The clinical exploration present in this study aims to provide some insights into the efficacy of acupuncture in managing sprains and muscle injuries.

2. Methodology

2.1. Acupuncture application

In acupuncture for the treatment of sprains and muscle injuries, specific points along the meridians are used that are related to the affected areas or related to the existing "energy blockage" in the patient that potentiates the injury. There are frequently used points that promote the circulation of *Xue* and *Qi*, leading to a faster recovery, as well as an unblocking of the affected meridians, according to the location of the pain or pathology, being related to the upper, lower limbs or trunk.

Each acupuncture point is located on a meridian that will benefit the flow of *Qi* and *Xue* of that same meridian or the affected area in question. To locate these points, specific measurements called *cun* are used [56]. One *cun* is equivalent to the width of the patient's thumb.

As well, *Ashi* points are used. These are pain points where the needle is applied directly or acupressure is applied to relieve localized pain and release possible tension or "stagnation".

Acupuncture techniques can vary from needle insertion to the application of Chinese medicine techniques that include cupping therapy, moxibustion, electroacupuncture or acupressure, as well as herbal medicine, to enhance the therapeutic effects.

2.2. Acupuncture points

The localization of the acupuncture points used in the clinical cases is provided as supplementary material.

3. Clinical cases

The following case studies explore the application of specific acupuncture points to target pathologies. The primary aim was to achieve symptom resolution or significant reduction in the patient's chief complaint, utilizing the minimum number of treatment sessions required. It is crucial to reiterate that the selection of acupuncture points and meridians is contingent upon a comprehensive patient assessment and diagnosis formulated by a licensed acupuncturist.

3.1. Case Study 1

The patient, a 35-year-old female runner, presented with an acute right ankle sprain sustained during a running event.

Examination revealed a red, swollen tongue with teeth marks, indicative of heat and inflammation according to Traditional Chinese Medicine diagnostics. Additionally, a strong and rapid pulse further supported this diagnosis.

A treatment plan was devised utilizing acupuncture at specific points aligned with Traditional Chinese Medicine principles. *Ashi* points, located near the site of pain, were chosen for immediate pain relief. St36 (*Zusanli*) and Sp6 (*Sanyinjiao*) were selected to strengthen the knee joint, "tonify" the blood, and promote healing. UB60 (*Kun Lúng*) and Kd3 (*Tài Xi*) addressed muscle and tendon tension, further reducing pain and regulating *Qi* and blood flow. Finally, St41 (*Jie Xi*) on the top of the foot aimed to strengthen the tendons and ligaments, enhancing ankle stability. This comprehensive acupuncture intervention was complemented by moxibustion therapy.

The patient experienced immediate pain relief following the first treatment session. After a four-week treatment regimen, she reported a substantial reduction in pain and a significant improvement in ankle stability during running. Additionally, she observed accelerated post-exercise recovery and a decline in muscle stiffness.

3.2. Case Study 2

The patient, a 45-year-old male construction worker, presented with a sudden onset of low back pain following a strenuous effort at work. The pain significantly restricted mobility and daily activities. Traditional Chinese Medicine examination revealed a pale, swollen tongue indicative of *Qi* and blood deficiency, and a slow, deep pulse further supported this diagnosis.

A tailored treatment plan consisted of *Ashi* points, strategically located near the area of discomfort, that were chosen for immediate pain relief. UBl23 (*Mingmen*) and UB25 (*Dachangshu*) were selected to strengthen the lower back by strengthening the kidneys. UB40 (*Wei Zhong*) and UB60 (*Kun Lúng*) addressed muscle and tendon tension, further reducing pain and promoting blood circulation. Finally, UB36 (*Chéng Fú*) and GB30 (*Huán Tiào*) focused on regulating *Qi* and blood flow, promoting overall well-being. This comprehensive acupuncture intervention was complemented by moxibustion therapy.

The patient experienced immediate pain relief after the first session. Following a six-week treatment regimen, he reported a substantial reduction in pain and a significant improvement in his lower back flexibility. Importantly, the patient was able to return to his work duties without discomfort and began incorporating preventive measures to avoid future injuries.

3.3. Case Study 3

The patient, a 50-year-old female yoga enthusiast, sought treatment for a sudden onset of hip pain following a fall during a yoga class.

The pain caused by the fall significantly restricted the patient's range of motion and affected her yoga practice. Traditional Chinese Medicine examination revealed a tongue with teeth marks and scant coating, indicative of blood and *Qi* deficiency, and a weak, superficial pulse further supported this diagnosis.

A personalized treatment plan was devised, incorporating acupuncture at specific points aligned with Traditional Chinese Medicine principles. *Ashi* points, strategically located near the site of pain, were selected for immediate pain relief. UB40 (*Weizhong*) and UB20 (*Pishu*) were chosen to strengthen the spleen and stomach, strengthen the blood, and promote healing. UB60 (*Kun Lúng*) and GB30 (*Huán Tiào*) addressed muscle and tendon tension, further reducing pain and improving flexibility. This comprehensive acupuncture intervention was complemented by moxibustion therapy and Tui Na massage.

The patient experienced immediate pain relief following the initial treatment session. After five treatment sessions, she reported a substantial reduction in pain and a significant increase in hip mobility. Additionally, she noticed a decrease in muscle stiffness and an improvement in her posture during yoga practice.

3.4. Case Study 4

The patient, a 38-year-old male office worker, presented with acute pain in his left wrist following an accidental fall.

The pain caused by the fall significantly restricted the patient's wrist mobility and affected his daily activities. Examination revealed a red tongue with scant coating, indicative of heat and blood stasis, and a rapid, superficial pulse further supported this diagnosis.

A comprehensive treatment plan was devised, incorporating acupuncture at specific points aligned with Traditional Chinese Medicine principles. *Ashi* points, strategically located near the site of pain, were selected for immediate pain relief. Li4 (*Hegu*), Li11 (*Qu Chi*), and PC6 (*Neiguan*) were chosen to clear heat and blood stasis, reduce inflammation, and promote healing. Ht7 (*Shenmen*) and SJ4 (*Yàng Chí*) addressed muscle and tendon tension, further reducing pain and improving mobility. Lu9 (*Tài Yuan*) and Li5 (*Yáng Xi*) focused on regulating *Qi* and blood flow, enhancing overall well-being. This comprehensive acupuncture intervention was complemented by electroacupuncture, a technique that involves applying electrical stimulation to acupuncture points, and moxibustion.

The patient experienced immediate pain relief following the initial treatment session. After six treatment sessions, he reported a substantial reduction in pain and a significant improvement in wrist mobility. The patient was able to resume his daily activities with greater comfort and without limitations due to wrist pain.

4. Discussion

This study's case reports display a practical clinical application of acupuncture and provide initial evidence for its effectiveness. All cases exhibited noteworthy clinical improvements, highlighting the potential benefits of this approach. The literature already suggests the beneficial effect of acupuncture for ankle [57,58], low back [59], hip [60], and wrist [61] injuries, supporting our results.

The mechanisms by which acupuncture exerts therapeutic effects in the treatment of sprains and muscle injuries are based on a complex interaction between the central nervous system, peripheral nervous system, immune system, and local inflammatory response. According to relevant research [45,62-67], stimulation of acupuncture points triggers the release of neurotransmitters, such as endorphins and enkephalins, which have analgesic properties and promote a sense of well-being. In addition, acupuncture can modulate the activity of opioid receptors, reduce the release of pro-inflammatory substances, and promote the release of growth factors that stimulate tissue repair.

According to our results and general literature, acupuncture may be a promising therapeutic approach for sprains and muscle injuries, offering significant benefits in reducing pain, inflammation, and promoting functional recovery. By employing a combination of specific techniques and carefully selected acupuncture points, acupuncture can provide symptomatic relief and enhance the healing process of damaged tissues. However, further research is warranted to fully elucidate the mechanisms of action underlying

acupuncture's efficacy and optimize treatment protocols, ensuring a personalized and effective therapeutic approach for patients with sprains and muscle injuries.

Our study has some limitations. This study utilizes case reports, which offer valuable insights but lack the control group design needed to definitively establish the effectiveness of acupuncture compared to other treatment options or a placebo. As well, the small sample and lack of outcome assessment tools must be improved in future studies.

5. Conclusion

Acupuncture holds promise as a valuable therapeutic tool for managing sprains and muscle injuries, potentially improving patient outcomes and quality of life. However, rigorous research is crucial to fully validate its efficacy, optimize treatment approaches, and facilitate its integration into mainstream healthcare practices.

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