

Analysis of research hotspots and development trend of acupuncture for facial muscle spasm

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Abstract: Facial muscle spasm is a common clinical cranial nerve disease, mainly manifested as repeated spasmodic twitching of facial muscles, starting from the orbicularis oculi muscle and spreading to the ipsilateral facial muscles, with a few patients affected bilaterally, and the common cause of the disease is that the facial nerve root is compressed by blood vessels in the area of exiting the brainstem. With the development of the disease, it seriously affects the daily work and life of patients. At present, the clinical treatment of this disease is mainly based on local injection of botulinum toxin type A and surgical treatment, but it is easy to cause a series of complications such as facial stiffness, and there are defects such as high surgical risk. Acupuncture therapy has the advantages of easy operation, stable efficacy, and few adverse reactions, and has achieved significant efficacy in the treatment of facial muscle spasm in numerous ways. In order to better summarise the research hotspots and development trends in the field of acupuncture and moxibustion for facial muscle spasms, the research progress of acupuncture and moxibustion in the treatment of facial muscle spasms is now summarised, and the authors, institutions, and keywords of the relevant literature are analysed to summarise the current status of research and development trends, and to find out the inadequacies of the research in this field, with the aim of providing references for the standardisation of the application of acupuncture and moxibustion for the treatment of facial muscle spasms in the clinic, and to facilitate the further development of the discipline. We hope to provide a reference for the standardised clinical application of acupuncture in the treatment of facial muscle spasm and promote the further development of this discipline.

1. Introduction

Hemifacial spasm (HFS) is a kind of cranial nerve disease, the main clinical manifestation is painless, paroxysmal, involuntary, irregular twitching of facial muscles innervated by the facial nerve, starting from orbicularis oculi, orbicularis oris and other muscle groups, most of which are unilateral in onset, and a small number of patients may be affected bilaterally, it is usually aggravated by external stimuli, emotional tension, fatigue and stress, relieved by rest and disappears during sleep[1]. The disease is prevalent in middle-aged and elderly people, and is more common in females[2]. HSF, which occurs on the face, is prone to cause mood disorders such as anxiety and

depression, which reduces the quality of life and affects the social life of the patients, and brings them a great deal of pain [3]. This disease can be divided into primary and secondary, and its etiology and pathogenesis have not been completely clarified, mainly due to the neurovascular compression of the exit area of the facial nerve root[4]. Currently, modern medical treatments for HSF include local injection of botulinum toxin type A, oral sedative or antiepileptic drugs, facial nerve closure therapy, microvascular decompression, etc.[5], which, although able to alleviate the spasticity symptoms of the patients to a certain extent, have the defects of unsatisfactory therapeutic effect, easy recurrence, high risk, etc., and the repeated application of botulinum toxin type A may cause a series of complications, such as crooked corners of the mouth and facial rigidity, etc.[6]Therefore, the search for safe, simple and efficient non-pharmacological treatment options has become a hotspot and a difficult issue of concern for patients and the medical community today. With the development of Chinese medicine, acupuncture technique occupies an important position in the treatment of facial diseases, which has the advantages of easy operation, few adverse reactions, and stable therapeutic effect[7], and has achieved remarkable efficacy in the treatment of facial muscle spasm.

At present, there are more studies on the treatment of facial muscle spasm by acupuncture, but there is a lack of unified combing of the main research hotspots and research directions in this field. Therefore, this study summarises the authors, institutions, keywords, etc. of the literature related to the treatment of facial muscle spasm by acupuncture, in order to understand the hotspots of the research and the development of the current situation of the treatment of facial muscle spasm by acupuncture, to find out the deficiencies of the research in this field, and to provide the basis for the in-depth research in the future, and to promote the further development of this discipline.

2. Information and methodology

2.1 Data sources

We searched the China Knowledge Network (CNN) database for literature related to acupuncture and moxibustion for facial muscle spasms, set the search condition: "subject" (precise), the search term was "(acupuncture + acupuncture + electroacupuncture + moxibustion + needle knife) * facial muscle spasms", and the year of searching was from the establishment of CNN database to 1 February 2023, a total of 769 related documents were retrieved.

2.2 Literature Screening

Inclusion Criteria: ① Literature type: clinical observation, literature study, mechanism study, experience of famous authors, medical cases, ancient books, basic theory of Chinese medicine, etc.; ② Disease: facial muscle spasm; ③ Intervention Methods: purely acupuncture or acupuncture combined with other traditional Chinese and western medical therapies, such as traditional Chinese medicine, moxibustion, Tui Na combined with acupuncture, etc.; ④ Literature Language: limited to Chinese.

Exclusion criteria:① the main body of the article is "acupuncture", but does not involve "facial muscle spasm"; ②only the use of Western medicine or other Chinese medicine to treat "facial muscle spasm"; does not involve "acupuncture"; ③ Literature on rat model of facial muscle spasm was excluded; ④ News reports, call for papers, related newspapers, conference papers and dissertations were excluded; ⑤Only the most recent one was selected from the same literature that was repeatedly published in different journals.

After screening by inclusion and exclusion criteria, 556 literatures were finally included.

3. Results

3.1 Year of publication and trend analysis

The number of publications can reflect the status of research in this field to a certain extent. The annual publication volume of acupuncture for HFS over the past 40 years was tabulated and analysed by means of charts and graphs to summarize the current status and heat of research in this field, which is shown in Fig. 1. The overall trend of the publication volume of the research literature related to the treatment of HFS with acupuncture is increasing year by year, which can be roughly divided into 2 phases, i.e., the beginning phase of the study in 1980-1999 and the fluctuating growth phase in 2000-2016, but there is a slight downward trend in recent years, indicating that the study of acupuncture for HFS may have entered a bottleneck period in the future research. 2016 the fluctuating growth stage, but in recent years there is a slight downward trend, indicating that the study of acupuncture treatment of HFS may have entered a bottleneck, and in the future research, we should look for a more novel research angle, and explore from different angles of entry, in order to promote the progress of the study of facial muscle spasm.

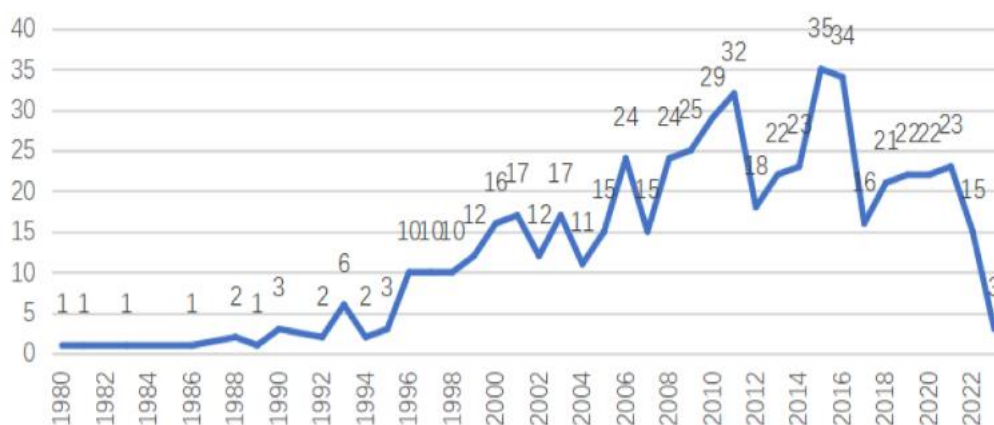


Figure 1: Acupuncture for facial spasms literature in general and annual number of publications

3.2 Author Collaboration Analysis

A total of 660 authors were summarised and analysed in the form of a table in the field of acupuncture for facial muscle spasm, and there were 6 authors with ≥ 3 publications, namely, Zou Wei (6), Sun Xiaowei (3), Liu Peng (3), Wu Xurong (3), Yu Xueping (3), and Zhang Wei (3), as shown in Table 1. 43 authors had a total number of 2 publications, which accounted for only 6.52% of the total number of publications, and the rest of the authors had only 1 paper, but there were fewer cooperative groups and more dispersed researchers in the treatment of facial spasms with acupuncture. Among them, (Wu Xurong, 1993) used electroacupuncture treatment for patients with facial muscle spasm[8], and received satisfactory clinical efficacy; the team represented by (Liu Peng, 2015), (Zou Wei, 2015), etc[9-10]. mainly researched the clinical observation of the burr method combined with other therapies, such as flash canning and hanging moxibustion, for the treatment of facial muscle spasm, and the burr method for the treatment of HFS with appropriate stimulation intensity and fewer complications has a relatively good efficacy [11].

Table 1: Top 5 authors in terms of publications

No.	Author	Organization	Number of Articles
1	Zou Wei	The First Affiliated Hospital of Heilongjiang University of Traditional Chinese Medicine	6
2	Sun Xiaowei	The First Affiliated Hospital of Heilongjiang University of Traditional Chinese Medicine	3
3	Liu Peng	Beijing University of Chinese Medicine Shenzhen Hospital	3
4	Wu Xurong	Affiliated Hospital of Hubei College of Traditional Chinese Medicine	3
5	Yu Xueping	The First Affiliated Hospital of Heilongjiang University of Traditional Chinese Medicine	3

3.3 Analyses by research institutes

The table summarises and analyses the relevant research institutions in the field of acupuncture and moxibustion in the treatment of facial muscle spasm, as shown in Table 2. There are a total of 533 research institutions, and there are 20 institutions with ≥ 3 publications, among which the top 5 institutions with the highest number of publications are the Heilongjiang University of Traditional Chinese Medicine (15), Guangzhou University of Traditional Chinese Medicine (8), the First Affiliated Hospital of Heilongjiang University of Traditional Chinese Medicine (7), the First Affiliated Hospital of Tianjin University of Traditional Chinese Medicine (7), Hunan University of Traditional Chinese Medicine (6). The research institutions in the field of acupuncture and moxibustion for HFS in China are scattered, and most of them are the universities of traditional Chinese medicine and affiliated hospitals, such as Heilongjiang, Tianjin and Liaoning, etc. A large-scale, cross-institutional and cross-regional research network has not yet been formed, which is unfavourable to the development of this discipline.

Table 2: Number of publications by research institutions

No.	Institution	Number of Publications
1	Heilongjiang University of Chinese Medicine	15
2	Guangzhou University of Chinese Medicine	8
3	The First Affiliated Hospital of Heilongjiang University of Traditional Chinese Medicine	7
4	The First Affiliated Hospital of Tianjin University of Traditional Chinese Medicine	7
5	Hunan University of Chinese Medicine	6

3.4 Keyword Analysis

Keywords are words that summarise the content of the whole text in a concise manner, and high-frequency keywords can reflect the research hotspots in this field[12], which can help to understand the core research content and hotspot direction of a certain research field. By summarising and analysing the keywords in the literature related to acupuncture for facial muscle spasm, a total of 445 keywords were included, and the top 10 high-frequency cited keywords were

ranked by integrating the keywords with similar content, as shown in Table 3. The frequency and centrality of the keyword "facial muscle spasm" is high; the frequency of the keywords "electroacupuncture", "acupoint injection" and "fire needle" is high, which indicates that these methods are more commonly used in the clinic. With the cause of the disease as the object, "facial muscles" and "facial nerve trunk" were cited more frequently, indicating that the research on the disease mostly started from muscles and nerves; with the type of research as the object, "clinical observation" and "experience of famous doctors" were cited more frequently. In terms of the type of research, keywords such as "clinical observation" and "experience of famous doctors" were cited more frequently, indicating that most of the current research in this field is based on clinical observation or the experience of famous doctors.

Table 3: Ranking List of High Frequency Cited Keywords

Arrange in order	Citation frequency	Keywords
1	445	hemifacial spasm
2	181	acupuncture
3	101	Acupunctur and moxibustion
4	42	electroacupuncture
5	37	acupuncture treatment
6	28	acupoint injection
7	26	facial muscle
8	18	clinical observation
9	16	fire-acupuncture therapy
10	14	spasticity

The cluster size represents the amount of literature contained in the cluster. By further clustering analysis of the above 445 keywords, the top 10 cluster labels were obtained, which were, in order, "acupuncture therapy", "facial nerve trunk", "acupuncture", "acupuncture", "fire acupuncture", "electroacupuncture", "auricular acupressure", "acupuncture" and "acupuncture". "Acupuncture therapy" "fire acupuncture" "electroacupuncture" "auricular acupoint pressing" "facial muscle" "spasm" "facial muscle twitching", from which it can be learnt that the research theme of acupuncture for facial muscle spasm is relatively more concentrated, reflecting the research hotspot of acupuncture treatment of this disease. The key words "facial nerve trunk", "acupuncture" and "acupuncture treatment" are the key words of the earlier and larger time span of the research; in 1993, we began to focus on the combination of acupuncture and medicine, and the prescription of Yupingfengsan was the main one, indicating that the treatment of facial muscle spasm is not only the most important, but also the most important one of the most important ones. In 1993, the focus on needle-medicine combination was introduced, with the formula Yubingfeng San as the mainstay, suggesting that there are more techniques for treating facial spasms than before; the number of articles on auricular acupoint pressure in this field has decreased after 2019, and the number of articles on the treatment of HFS with fire and electroacupuncture has also gradually decreased from 2021 onwards, so the research may be encountered with impediments; the researchers have placed more emphasis on spasms at present.

By observing the appearance and disappearance time of theoretical ideas related to acupuncture treatment of depression, we can roughly predict the direction of its research development, and keyword emergence can screen the keywords with rapid increase in retrieval frequency within a certain period of time, which can be used to visually display the hot topics in the related fields[13],

so as to analyse the future development direction of the field. The keywords in the field of acupuncture and moxibustion for facial muscle spasm were analysed by keyword emergence, and the top 12 emergent keywords were obtained, among which "acupuncture and moxibustion" had the greatest emergence intensity, followed by "facial nerve trunk"; "facial muscles" was the most frequent keyword in the field of acupuncture and moxibustion, and "facial muscles" was the most frequent keyword in the field of acupuncture and moxibustion. "Facial muscles" has the longest duration from 1993-2008; in 2011-2013, the main focus is on the efficacy of hydroentanglement in the treatment of facial spasms; in 2016-2022, "clinical experience" and "clinical efficacy" become the keywords. "Clinical experience" and "clinical efficacy" became the keywords, indicating that the research direction in recent years mainly focuses on the summary of clinical experience and the assessment of clinical efficacy.

4. Discussion

The clinical incidence of facial muscle spasm is 9.8/100,000, the average age of onset is 44 years old[14], this disease is difficult to cure, recurrent attacks, severe patients can be caused by the affected side of the facial muscle contracture, the affected side of the eye fissure is small, the facial muscle distortion deformation, seriously affecting the patient's work and quality of life[15]. In Chinese medicine, facial muscle spasms fall under categories such as "face wind," "tendon vigilance meat twitch," "tendon anxious," "blending," and "Spasm." Some scholars attribute this condition to "mouth and eyes askew[16]." The onset of the disease is often associated with emotional trauma and deficiency of qi and blood. The fundamental mechanism is typically related to the attack of external pathogens and internal wind disturbance. Acupuncture, as an effective intervention in the treatment of facial muscle spasm, can not only regulate the operation of facial qi and blood, reduce the pain of the patient, but also alleviate the patient's anxiety and tension, so that the qi can be organised and promote the recovery of the body[17].

Through the study of the amount of relevant literature, it can be seen that the amount of annual publications in the field of acupuncture and moxibustion treatment of facial muscle spasm is on the rise, and the trend of decline in the past two years shows that the research lacks innovation, and the amount of annual publications is relatively small, indicating that the attention to this field is not high; from the perspective of authors and institutional partnerships, the amount of publications by researchers is not much, and the cooperation among authors is not close, and the institutional affiliation exists between universities and their affiliates, and fewer scholars and institutions break the disciplinary and geographical limitations of this field. From the perspective of authors' and institutions' cooperation, all research scholars have not published many articles, and the cooperation between authors is not close, and the institutions' connection mostly exists between universities and their affiliated institutions, and few scholars and institutions have broken the limitations of disciplines and regions, which indicates that the continuous research in this field is weak, and there is a relative lack of experts who can conduct further research in-depth.

High-frequency keywords help to understand the disciplinary structure and research hotspots in the field [18]. In the keyword analysis, it was found that the research topics were changing in each time period, and the research on acupuncture for facial muscle spasm was diversified. The high-frequency keywords for acupuncture for facial muscle spasm in the results of this study mainly revolved around the method of acupuncture, the cause of pathogenesis, and the type of research, among which the keywords related to the method of acupuncture were "electroacupuncture", "acupoint injection" and "fire acupuncture" with the highest mediated centrality. (Shi Xuehui, 2021) Professor believes that electro-acupuncture can inhibit the excitation of the facial nerve, and together with snap needling can prolong the stimulation time, accelerate the blood flow, and

promote the recovery of neuromuscular normal [19]; (Zhao Hui, 2020) and others believe that acupoint injection can improve the local inflammatory reaction and microcirculation, dilate the peripheral blood vessels of the face, accelerate the blood flow rate, reduce the neurovascular pressure, so as to alleviate the symptoms of facial muscle spasm [20]; (Wang Shiguang, 2020) Professor quantified the depth of the fire-needle puncture according to the grading of facial muscle spasm, and the wonkiness of the patient's form, and paid attention to the shape of the spirit and the same adjustment, so as to make the patient's mood and spirit soothed, and played good The clinical efficacy [21]. Acupuncture and moxibustion treatment of facial muscle spasm presents a blossoming pattern, indicating that with the development of Chinese medicine technology, the treatment is not only limited to a single acupuncture, but also other types of special acupuncture therapy is also more and more widely used, and has achieved obvious clinical efficacy.

Study type related keywords to "clinical observation" is the highest, this type of research is mostly for the combination of acupuncture and medicine and Western medicine conventional treatment (western medicine carbamazepine)/ordinary acupuncture as a control or observation of different methods of acupuncture and moxibustion between the differences, etc., through the observation of its main therapeutic indicators, the results of the study are better for the acupuncture treatment group [17]. At the same time, the experience of famous doctors is also a research hotspot of acupuncture treatment of facial muscle spasm. Guangdong Province famous old Chinese medicine (Zhuang Lixing, 2020) Professor focused on "acupuncture and medicine double adjustment of God", in the clinic to achieve satisfactory results [22]. Shanghai Famous Chinese Medicine (Zhang Ren, 2020) used "millimeter needle method, acupoint injection method, Ear point pressure method and skin needle method" as well as four prick methods to achieve effective regulation of smooth qi and blood, and relieve spasm [23]. It is evident that medical practitioners are innovating in the field of acupuncture. However, the understanding of HFS still remains at the empirical level, lacking literature on mechanism and experimental research, and suitable animal models for clinical trials [24-25]. It is hoped that in future research, more large-sample, multi-center randomized controlled trials can be carried out to explore the exact mechanism of acupuncture treatment of facial spasm and further guide clinical practice effectively.

Keyword highlighting can tap into the research frontiers and trends in the field [13]. The results of keyword highlighting in the relevant literature of this study indicate that the field has concentrated on exploring different acupuncture techniques and acupoint applications in the early stage and systematically evaluating the effects; in recent years, the research frontiers are mainly the studies of personal treatment experiences and clinical observations on the relevant populations and their treatments. The incidence of facial muscle spasm is increasing every year in China[26], but the etiology and pathogenesis of facial muscle spasm have not yet been fully clarified by modern medicine, so the research on the etiology and pathogenesis of facial muscle spasm by relevant researchers may become a research hotspot; the clinical observation of acupuncture treatment and the experience of various medical practitioners have contributed to the development of acupuncture treatment for HFS, which greatly reduces the pain of the patients, therefore, the research hotspot of future research may be the continuation of clinical observation and the experience of famous medical practitioners. Therefore, the hotspots for future research may continue to be clinical observation and the experience of famous doctors.

5. Conclusions

This study analyses the literature related to acupuncture for facial muscle spasm to understand the current research status, hotspots and cutting-edge trends in this field. The quality of China's research in this field needs to be improved, so further mechanism studies and multi-centre, large-sample, high-quality clinical studies are needed to support this study, and the literature

included in this study is only from Chinese databases, and the search platform can be further expanded in the future to comprehensively and objectively analyse the content and hotspots of the research in this field.

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