

Global Trends and Performances of Acupuncture Therapy on Bell's Palsy from 2000 to 2023: A Bibliometric Analysis

Guangbin Yu¹, Shuping Luo¹, Cuilian Zhu¹, Li Chen¹, Hao Huang², Bin Nie^{1,3}, Jianhao Gu⁴, Jianxin Liu¹

¹Fifth Clinical Medical College, Guangzhou University of Chinese Medicine, Guangzhou City, People's Republic of China; ²First Clinical Medical College, Guangzhou University of Chinese Medicine, Guangzhou City, People's Republic of China; ³Guangdong Second Traditional Chinese Medicine Hospital, Guangzhou City, People's Republic of China; ⁴Clinical Medical College of Acupuncture-Moxibustion and Rehabilitation, Guangzhou University of Chinese Medicine, Guangzhou City, People's Republic of China

Correspondence: Bin Nie, Guangdong Second Traditional Chinese Medicine Hospital, Guangzhou City, People's Republic of China, Tel +86 13826067459, Email niebing26@163.com

Purpose: Recent studies have shown that acupuncture may have great potential in the treatment of Bell's palsy. However, the bibliometric analysis of this field has not been summarized properly. Thus, the purpose of this study is to analyze the hotspot of acupuncture for Bell's Palsy.

Methods: The core collection database of Web of Science was searched for relevant publications from 2000 to 2023, and countries, institutions, authors, keywords, and literature were analyzed and visualized by bibliometric software CiteSpace 5.1.R6, Vosviewer, BICOMB, and gCLUTO to explore the scientific achievements, research collaboration networks, research hot spots, and research trends.

Results: 229 publications were included in this study. The most cited journal is Journal of Otolaryngology-Head & Neck Surgery; the most prolific country is China; the most prolific author is Li Ying, moreover, the collaboration among scholars is poor; Kyung Hee University is the most prolific institution studying acupuncture for Bell's Palsy. Reference burst detection indicates that traditional Chinese Medicine philosophy, the role of acupuncture in the prognosis of facial palsy, mechanism of acupuncture to improve facial nerve function, and the use of electroacupuncture are starting to become new research hotspots.

Conclusion: The field of acupuncture for Bell's Palsy has developed rapidly in recent years, and new research trends are mainly: combination with traditional Chinese medicine, the role of acupuncture in the prognosis of facial palsy, mechanism of acupuncture to improve facial nerve function, and the use of electroacupuncture. However, research in this field is still dominated by case reports and clinical trials, and there is a lack of large-scale, multicenter clinical trials and animal experiments there are still many problems in institutional cooperation and experimental design, which requires relevant researchers to strengthen cooperation and improve experimental design.

Keywords: acupuncture, Bell's palsy, CiteSpace, bibliometric analysis, Vosviewer

Introduction

Bell's palsy, also known as "idiopathic facial palsy", is characterized clinically by paralysis of the pathetic muscle of the affected face¹ and accounts for 70% of peripheral facial palsy.² Epidemiologic studies show that 11 to 40 persons per 100,000 are affected each year, most commonly between the ages of 30 and 45 years.^{3,4} In addition, studies in the United States have shown that approximately 60,000 people in the United States develop Bell's Palsy each year.⁵ It is evident that the current prevalence of Bell's Palsy is extremely high and its treatment is receiving attention from researchers worldwide.

Since its specific pathogenesis and etiology are still uncertain,^{6,7} there are many treatments options available, which can be mainly divided into pharmacological and non-pharmacological treatments, among which, pharmacological

treatments commonly include: corticosteroids,⁸ acyclovir,⁹ vitamin B,¹⁰ etc.; non-pharmacological treatments include: surgery,¹¹ acupuncture, etc. At present, numerous research results have confirmed the efficacy of pharmacological treatment^{12–14} as well as surgery¹⁵ in the treatment of Bell's palsy. The cure rate as well as the overall efficiency of acupuncture in treating Bell's palsy is superior to pharmacological treatment,¹⁶ however, the distribution of studies of acupuncture treatment for Bell's Palsy is scattered relatively, which makes it difficult for clinical practitioners and researchers in related fields to understand the emerging trends of a research field timely and effectively. Through bibliometrics, scholars can quantitatively identify detailed research trends and abrupt changes, thus making academic decisions.¹⁷

Materials and Methods

In this study, publications of acupuncture for Bell's Palsy published from 2000 to 2023 were retrieved from the Web of Science, to explore, using the topic search.CiteSpace 5.1.R6, Vosviewer 1.6.18, BICOMB (Bibliographic Items Co-occurrence Matrix Builder), and gCLUTO (Graphical Clustering Toolkit) are visualization software used in this study, both of them are specially designed to meet the demand for generating visualization mapping of specific research areas.

Data Collection

Relevant literature was retrieved from the Web of Science Core Collection using the following Search strategy: TS = ((Acupuncture or Electroacupuncture or acupuncture analgesia or EA or Electrothermal acupuncture or warm needling or ear needling) AND (Bell palsy or Facial paralysis or Facial nerve disease or Facial nerve paralysis or facial paralysis or facial paresis or Cranial nerve paralysis or cranial paralysis or Ramsay-Hunt syndrome or idiopathic facial palsy)). This search strategy was limited to published English papers between January 2000 and March 2023. The final results were saved as a plain text file with full records and cited references.

Inclusion and Exclusion Criteria

Inclusion criteria were: (1) articles published from 2000 to 2023; and (2) articles retrieved from the Web of Science. Exclusion criteria were: (1) articles not officially published; (2) unrelated articles. The search process and the search results are shown in [Figure 1](#).

Tools

In this study, publications of acupuncture for Bell's Palsy published from 2000 to 2023 were retrieved from the Web of Science, to explore, using the topic search. The main visualization software used in this study are CiteSpace 5.1.R6 and Vosviewer 1.6.18, where the former is used to visualize the network through the Java platform and is used in this paper for the analysis of journals, institutions, authors, keywords, and references; the latter is used in this paper for the visualization and analysis of countries. In addition, this paper uses the BICOMB (Bibliographic Items Co-occurrence Matrix Builder) platform (version 2.01, China Medical University) to analyze relevant meteorological data and generate matrix data, which are analyzed by gCLUTO (Graphical Clustering Toolkit) software.

Results

Analysis of Papers

A total of 229 relevant papers were obtained, with an average annual output of 9.54. As seen in [Figure 2](#), the number of papers published on acupuncture for Bell's palsy showed different performance in different periods, which can be divided into three stages: the first stage, the slow development period (2000–2007), with an average annual output of 2.9 papers, which was the beginning stage of research in the field of acupuncture for Bell's Palsy and the number of papers published was low; the second stage, stable period (2008–2018), with an average annual output of 9.3 papers, this phase is significantly higher than the previous phase, and the average annual output of researchers is relatively stable; the third phase, rapid development period (2019–2023), with an average annual volume of 20.8 articles, this phase has significantly increased, indicating that the current research results in this field have significantly increased and gradually become a new research hotspot.

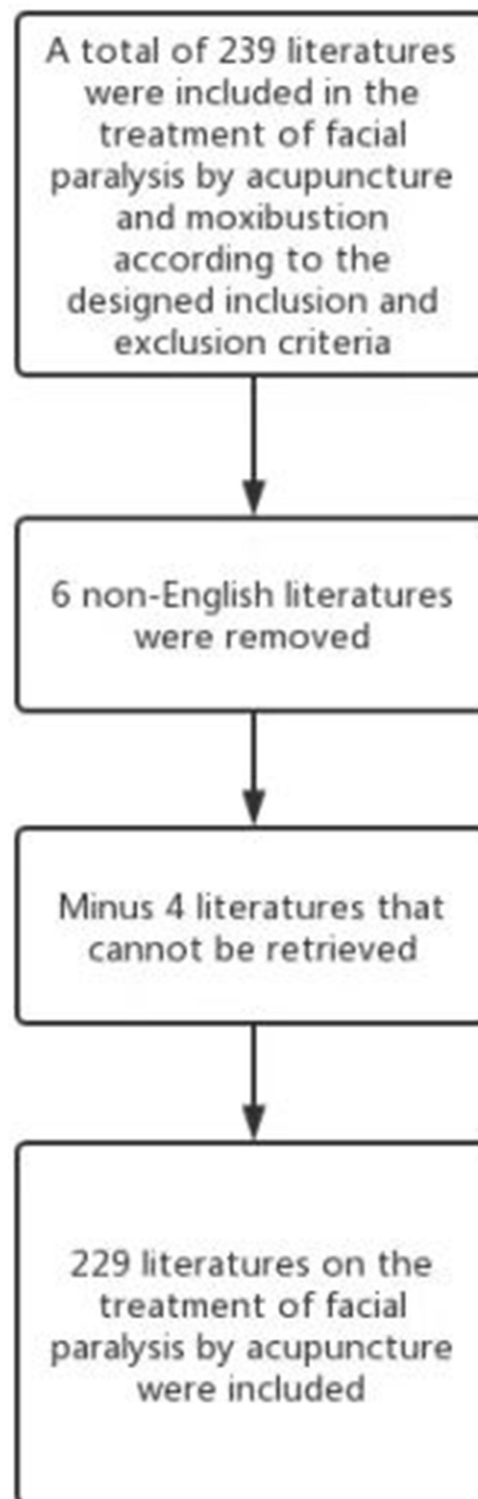


Figure 1 Flowchart depicting the article selection process.

Analysis of Journals

The analysis of journal co-citation was formed by CiteSpace software (Figure 3), and only the top 5 journals among them are listed in this paper (Table 1), among which the highest number of citations are Journal of Otolaryngology-Head & Neck Surgery (86) with IF 2022 (Impact Factors 2022) of 5.591, which mainly This journal focuses on the treatment and

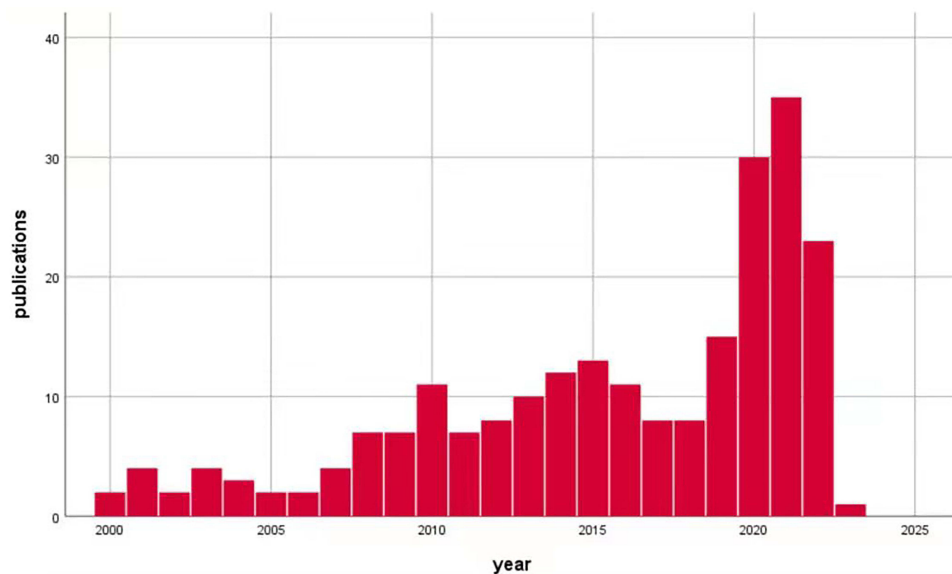


Figure 2 Annual publications of acupuncture for Bell's Palsy.

CiteSpace v. 5.1.R3 (64-bit)
 2/16/2024 11:10:45 AM CST
 gws: C:\Users\j\Documents\Hsp\hsp\data
 Pruning: Modularity: 0.97 (k=0.01)
 Selection Criteria: LRF=0.01, ZIN=0.01, W=2
 Network: Q=0.97, S=0.97
 Labels: L=0.01
 Modularity: 0.97
 Pruning: Pathfinder

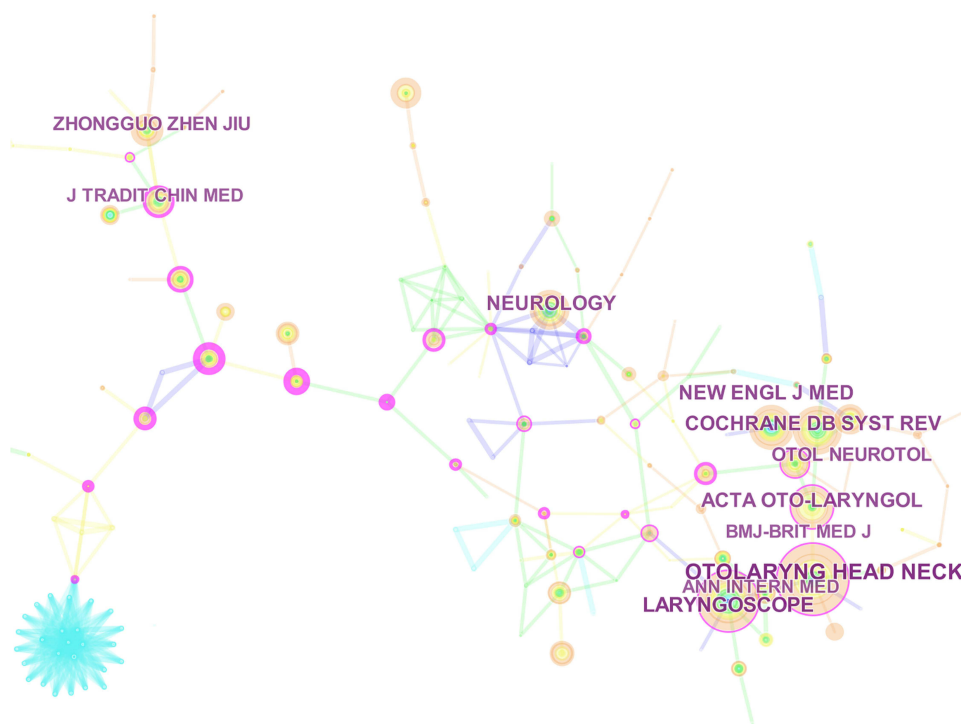


Figure 3 The network visualization map of journal co-citation analysis by CiteSpace. The larger circle in the graph means that the journal corresponding to that circle has been cited more often and has more influence in the field of acupuncture for Bell's Palsy.

Table 1 Top 5 Cited Journals Related to Acupuncture for Bell's Palsy

| Rank | Citations | Journal | IF (2022) |
|------|-----------|---|-----------|
| 1 | 86 | Journal of Otolaryngology-Head & Neck Surgery | 5.591 |
| 2 | 73 | Laryngoscope | 2.970 |
| 3 | 59 | Cochrane Database of Systematic Reviews | 12.008 |
| 4 | 56 | New England Journal of Medicine | 176.079 |
| 5 | 56 | Acta Oto-laryngologica | 1.698 |

rehabilitation of Otolaryngology, and head and face diseases. The highest IF (2022) was New England Journal of Medicine(176.079), which focused on the early treatment of Bell’s Palsy since 2000⁹ and the risk of influenza vaccine-induced Bell’s Palsy.⁶ The Journal double overlay analysis was proposed by Professors Chaomei Chen and Jie Li and can be used to study the distribution of disciplines corresponding to the journals, and the results of the journal double overlay are shown in **Figure 4**, the distribution of citing journals on the left side represents the disciplines (knowledge carriers) of acupuncture research output for Bell’s Palsy, mainly in the medical and clinical, while the distribution of cited journals on the right side represents the knowledge sources of acupuncture research results, mainly in health, nursing and medicine, and the color pathway in the middle represents the relationship between cited and cited journals.

Analysis of Countries/Regions

The country co-citation analysis is to classify the research results according to the author’s country and to understand the current location of the main researchers and research institutions in the discipline. As shown in **Figure 5A**, the larger the circular node in the figure, the redder the color of the node, and the greater the influence of the country corresponding to the node. The results of this study show that the top three countries in this field are (number of literatures in theses): China (81, 35.4%), the United States (42, 18.3%), and Korea (20, 8.73%). The combination of centrality can be obtained that the United States and China are the more influential countries in the field of acupuncture for Bell’s palsy.(See **Figure 5B** and **Table 2**) To better analyze the research results and cooperation in this field among countries in the world, this paper conducted a geographical visualization analysis based on the number of publications to get **Figure 5C** and **D**. In the figure, the more the number of publications, the larger the circle, and the connecting lines with the same color represent the cooperation among countries. From **Figure 5C** and **D**, we can get that at present, countries in the world can be divided into three big regions of North America, Western Europe, and East Asia according to the sparseness of

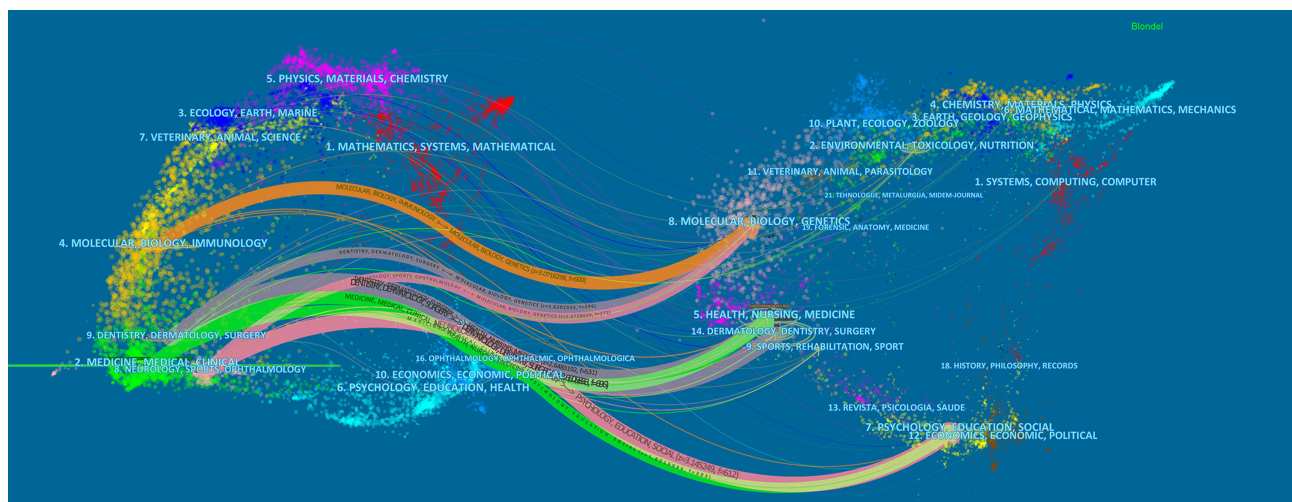


Figure 4 Dual-map overlay of journals related to Acupuncture for Bell's Palsy. The left side of the dual map is citing journals while the right side is cited journals, and the line in the middle indicates the association between them.

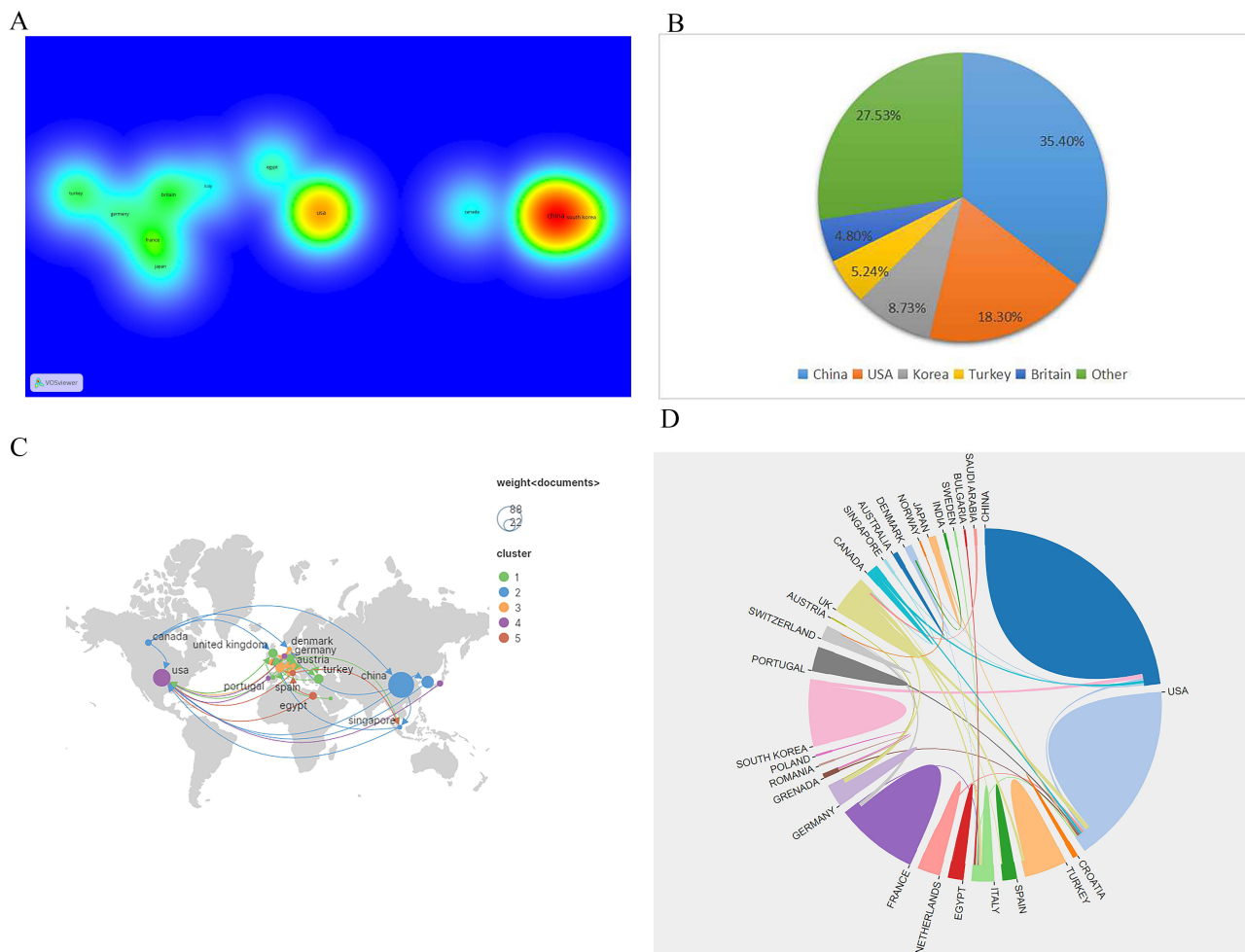


Figure 5 (A) Visualization map of countries involved in Acupuncture Therapy for Bell's Palsy (Vosviewer). (B) The distribution of publications by country. (C) Geographical distribution of acupuncture for Bell's Palsy. The lines with the same color in the figure represent the closeness of the cooperative relationship between the connected countries, while the size of the circles indicates the magnitude of the country's influence. (D) Cooperation network of prolific countries/regions.

cooperation. Among the countries with greater influence, the United States cooperates more with Canada and European countries, while China cooperates more with Korea and Singapore.

Analysis of Institutions

The network density of CiteSpace and the network color of Vosviewer can deduce the current cooperation among institutions. The greater the network density of CiteSpace and the less the network color of Vosviewer, the better the cooperation among institutions is considered. CiteSpace software was used to generate a plot of 44 nodes, 33

Table 2 Top 5 Publications and Centrality of Countries of Acupuncture for Bell's Palsy

| Rank | Count | Country | Rank | Centrality | Country |
|------|-------|---------|------|------------|---------|
| 1 | 81 | China | 1 | 0.85 | USA |
| 2 | 42 | USA | 2 | 0.55 | China |
| 3 | 20 | Korea | 3 | 0.52 | Canada |
| 4 | 12 | Turkey | 4 | 0.35 | Italy |
| 5 | 11 | Britain | 5 | 0.13 | Egypt |

connections, and a density of 0.0349 shown in Figure 6A. From the network density, it can be concluded that the cross-institutional cooperation among research institutions is poor, and it is mostly intra-institutional cooperation. From Table 3, the most influential institution in this field is Kyung Hee University in Korea, combining the number of publications and centrality.

Analysis of Authors

The author's co-analysis graph is shown in Figure 6B was generated by CiteSpace, and the connecting lines represent the closeness of the collaboration between different authors. As for the field of acupuncture for Bell's Palsy, there are currently 306 authors who have published, among which the top 5 authors are shown in Table 4, and the most prolific author is Li Ying of Chengdu University of Traditional Chinese Medicine (publication 8), whose research interests are mainly in acupuncture for Headache^{18–21} and facial paralysis.^{22,23} The most cited author is Peitersen (cited 50), whose research direction is mainly on the pathogenesis related to Bell's Palsy.

Analysis of Keywords

The central idea of the article as well as the research area is reflected in the keywords, and the use of keyword analysis is beneficial to the study of hotspots in the field of acupuncture for Bell's Palsy. Figure 7A was obtained by CiteSpace 5.1.R6 thereby analyzing the degree of association between different topics. The width of the connecting line represents the frequency of co-occurrence between the keywords, and the size of the rectangular nodes indicates the frequency of keywords, and the specific contents are shown in Table 5. Combining Figure 7A and Table 5, it can be concluded that the current research on acupuncture for Bell's Palsy mainly focuses on the mechanism of acupuncture in improving facial nerve function, and the research is mostly conducted in the form of clinical trials.

The visual hill map (Figure 7C) and the visual matrix (Figure 7B) were drawn, and the specific clustering content of Figure 7C was shown in Table 6. From Figure 7C, Cluster 0, with the highest height and red color at the top of the mound, indicates that the number of articles within this cluster is the lowest, but the content is highly consistent among articles, mainly a systematic review of acupuncture for Bell's Palsy; followed by Cluster 4, whose cluster is mainly clinical trials and case reports on acupuncture for Bell's Palsy. In the visualization matrix (Figure 7B), if a high-frequency word was included in the corresponding article, intersecting areas would be shown in red, where the higher the occurrence, the deeper the color. From Figure 7B, it can be obtained that Cluster 1 has the highest similarity to the

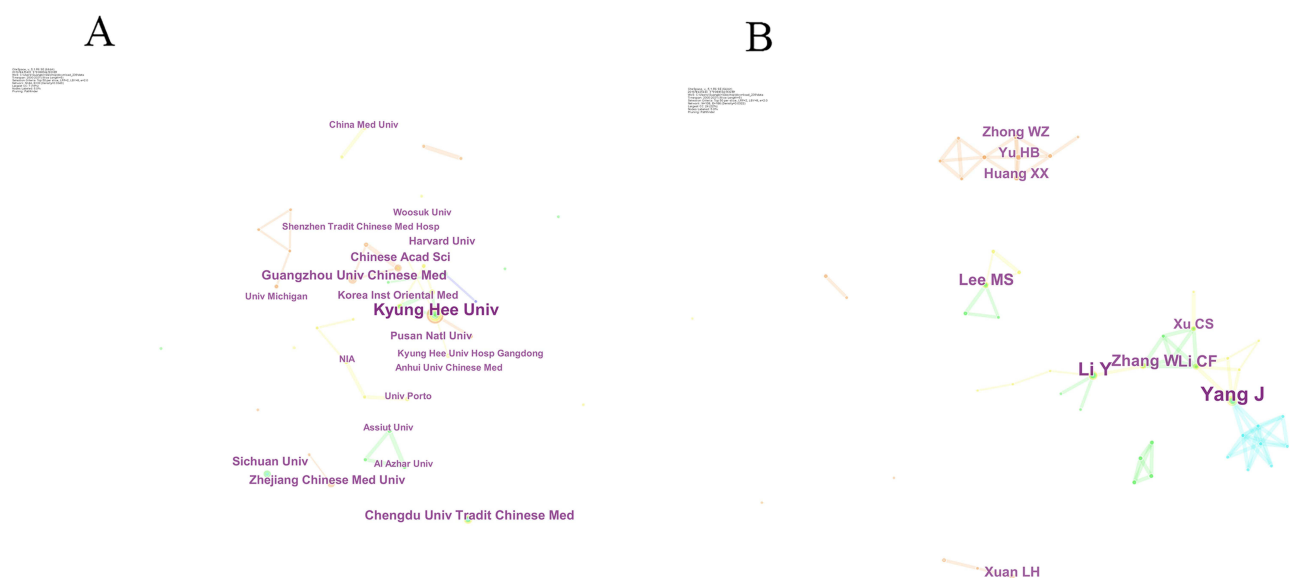


Figure 6 Network map showing the relations between various institutions (A) and the authors (B).

Table 3 Top 5 Publications and Centrality of Institutions of Acupuncture for Bell's Palsy

| Rank | Count | Institutions | Country | Rank | Centrality | Institutions | Country |
|------|-------|---|---------|------|------------|--|---------|
| 1 | 12 | Kyung Hee University | Korea | 1 | 0.03 | Kyung Hee University | Korea |
| 2 | 6 | Guangzhou University of Chinese Medicine | China | 2 | 0.01 | Chinese Academy of Sciences | China |
| 3 | 6 | Chengdu University Traditional Chinese Medicine | China | 3 | 0.01 | Wake Forest School of Medicine | USA |
| 4 | 5 | Chinese Academy of Sciences | China | 4 | 0.01 | Chinese Academy of Medical Sciences | China |
| 5 | 5 | Sichuan University | China | 5 | 0.01 | Guangzhou University of Chinese Medicine | China |

Table 4 Top 5 Productive Authors and Co-Cited Authors of Acupuncture for Bell's Palsy

| Author | Published Articles | Co-Cited Author | Cited Times |
|---------------|--------------------|-----------------|-------------|
| Li Ying | 7 | Peitersen E | 50 |
| Yang Jun | 5 | Li Ying | 39 |
| Lee Myung Soo | 5 | House JW | 33 |
| Li Chuanfu | 5 | Baugh Rf | 29 |
| Zhang W | 5 | Adour KK | 25 |

topic of this article, and its content is mainly related to the clinical trials and treatment techniques of acupuncture for Bell's Palsy.

Analysis of Literature

The reference timeline profile (Figure 8A) was generated by clustering the literature in chronological order. From Figure 8A, the three clusters #1 virus, #5 amstar 2, #7 acupoint and #9 prognosis intensity indicate the research direction of new research hotspots.

Among them, #1 virus indicates that the future direction of research in the field of acupuncture for facial palsy will focus more on the efficacy of acupuncture for facial palsy caused by viruses, #5 amstar 2 indicates that researchers are beginning to focus on the review and analysis of clinical trials or basic experiments related to acupuncture for facial palsy, #7 acupoint indicates that current researchers are beginning to focus on the efficacy of acupuncture in treating facial palsy through the guidance of traditional Chinese medicine theory, and #9 prognosis indicates that the role of acupuncture in the prognosis of facial palsy is becoming a new research direction.

From Table 7, the highest number of co-citations (421) in this field was published in 2007 by G. Cruccu of La Sapienza University on the effect of electrical neurostimulation therapy on neuropathic pain,²⁴ which in this article, it was concluded that electrical stimulation was superior to high-frequency transcutaneous electrical nerve stimulation in the treatment of neuropathic pain.

"References with citation bursts" referred to the corresponding articles that had been frequently cited during a period in a field. As exhibited in Figure 8B, the findings of Li et al²⁹ were the first to begin and the duration of the bursts was longer, and the literature focus was a multicenter a clinical trial of acupuncture for Bell's Palsy, proving that the early high-level research results in the field mainly came from multicenter, large-sample clinical trials; and the most recent and strongest the outbreak of research at present comes from Li et al³⁰ from Guangxi Medical University, which analyzed 14 randomized controlled trials and concluded that acupuncture in the treatment of Bell's Palsy has some efficacy, but the methodological quality and data integrity need to be strengthened. It is evident that although the level of research related to the field of acupuncture for Bell's Palsy is rising, there is still a lack of high-level clinical trials providing strong evidence-based medicine, which portends that researchers in this field should improve the design of clinical trials and strengthen the depth of cooperation between different regions and institutions.

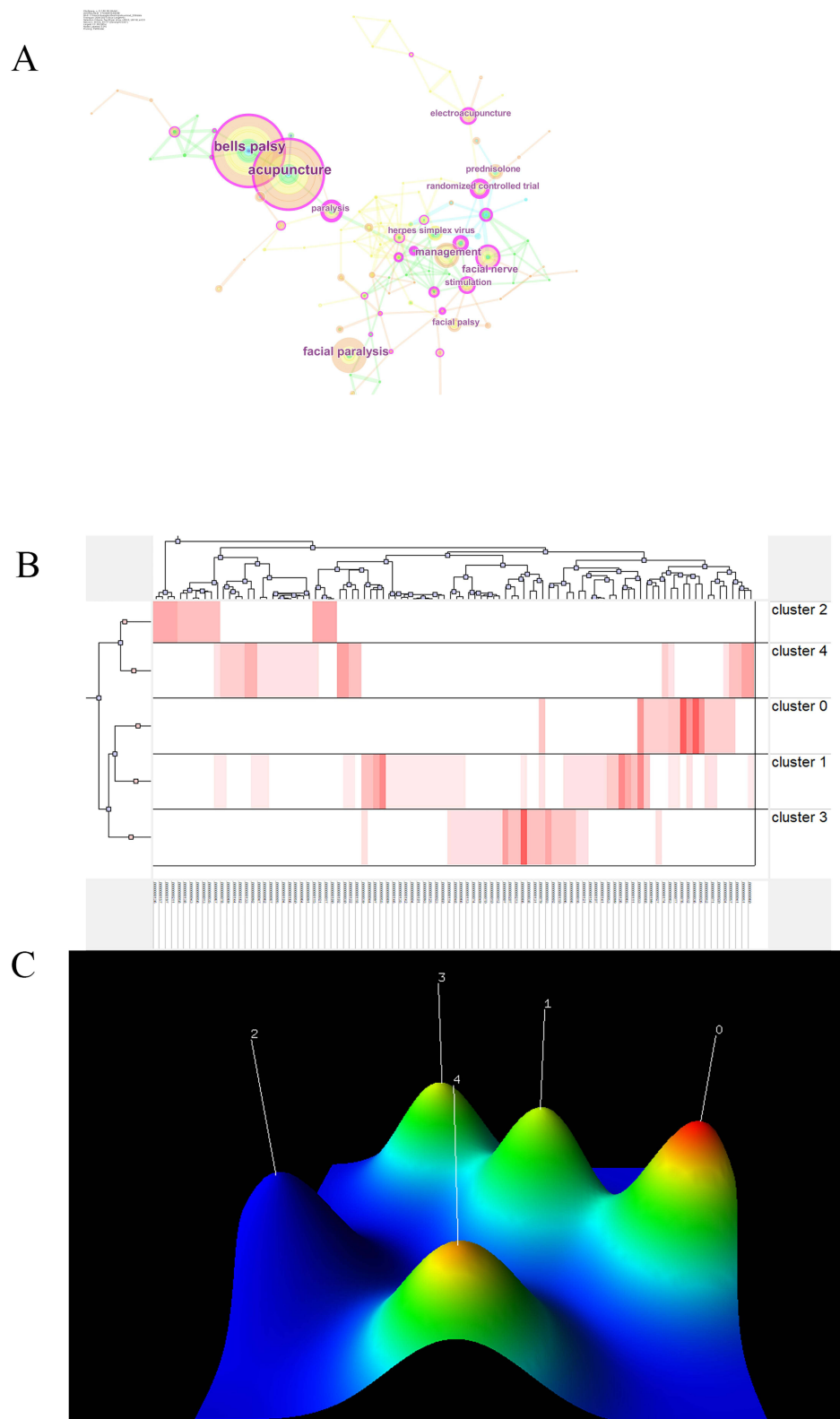


Figure 7 (A) Visualization graph of keywords of acupuncture for Bell's Palsy (CiteSpace). (B) Matrix visualization of biclustering analysis results of high-frequency keywords about acupuncture for Bell's Palsy. (C) Mountain visualization of biclustering analysis results of high-frequency keywords about acupuncture for Bell's Palsy. The clustering results were mainly shown in the visual hill map with different heights and colors, and the height of the hill was proportional to the average similarity of the clusters, the greater the similarity, the steeper the hill. The color of the top of the hill represents the standard deviation of the cluster, where red is low and blue is high, the redder the top of the hill is, the more concentrated the study content is within the cluster.

Table 5 Keywords in the Acupuncture Treaty on Bell's Palsy

| Rank | Keyword | Centrality | Count |
|------|-----------------------------|------------|-------|
| 1 | Bell's Palsy | 0.31 | 55 |
| 2 | Acupuncture | 0.39 | 54 |
| 3 | Facial Paralysis | 0.00 | 28 |
| 4 | Management | 0.08 | 20 |
| 5 | Facial Nerve | 0.32 | 16 |
| 6 | Paralysis | 0.53 | 12 |
| 7 | Herpes Simplex Virus | 0.04 | 12 |
| 8 | Prednisolone | 0.04 | 12 |
| 9 | Facial Palsy | 0.03 | 11 |
| 10 | Electroacupuncture | 0.28 | 10 |
| 11 | Randomized Controlled Trial | 0.41 | 10 |

Table 6 The Detail of Matrix Visualization

| Cluster | Detail |
|----------|--|
| Cluster2 | Facial Paralysis; Quality of Life; Electroacupuncture |
| Cluster4 | Randomized Controlled Trial; Acupuncture; Case Report; Facial Palsy |
| Cluster0 | Peripheral Facial Paralysis; Protocol; Meta-Analysis; Systematic Review |
| Cluster1 | Acupuncture; Randomized Controlled Trial; Bell's Palsy; Electroacupuncture |
| Cluster3 | Facial Paralysis; Inflammation; Bell Palsy; Ramsay Hunt Syndrome |

Discussion

Summary of the Main Findings

This study used CiteSpace 5.1.R6, Vosviewer, BICOMB and gCLUTO to visualize 229 publications in the field of acupuncture for facial palsy since 2000. The results of the study showed that: the annual number of publications showed a linear increase; the most cited journal was Otolaryngol Head Neck; The highest number of publications is currently in China and the highest centrality is in the United States; the institution with the highest number of publications and the highest influence is Kyung Hee University; the author with the highest number of publications is Li Ying and the author with the highest number of citations is Peitersen E.

Research Hotspots on Acupuncture for Bell's Palsy

The current research results in the field of acupuncture for Bell's Palsy are mostly in the form of case reports³¹⁻³⁴ as well as clinical trials,³⁵⁻⁴⁰ and the research content is mostly to study the role of acupuncture in improving facial nerve function and sequelae.⁴¹⁻⁴³ And this paper analyses the research trends related to acupuncture for Bell's Palsy by bibliometric methods and summarizes the new research hotspots.

1. Integration with traditional Chinese medicine concepts

As shown in [Figure 8A](#), #7 acupoint shows that research on acupuncture for facial palsy is now focusing on the role of traditional Chinese medicine concepts, such as the selection of acupoints, the effect of de qi on the efficacy of acupuncture, and the efficacy of different acupuncture techniques on the acupoints. For example, Wen et al⁴⁴ confirmed through a retrospective analysis that specific acupoints play a crucial role in the treatment of diseases with acupuncture; The study by Chen et al⁴⁵ demonstrated that the inhibition of glial cell activation in the body and the reduction of a large number of pain-related substances produced by glial cells, such as the proinflammatory cytokines tumor necrosis factor α , interleukin-1 β , interleukin- 6, and prostaglandins such as prostaglandins E2, thereby descending the pain modulation system in the brain, and exerting the long-term analgesic effects of acupuncture; in terms of the short-term therapeutic



Top 4 References with the Strongest Citation Bursts

| References | Year | Strength | Begin | End | 2000 – 2021 |
|---|------|----------|-------|------|-------------|
| LI Y, 2004, CHINESE MED J-PEKING, V117, P1502 | 2004 | 5.7261 | 2006 | 2012 | █ |
| HOLLAND NJ, 2004, BMJ-BRIT MED J, V329, P553, DOI | 2004 | 3.1886 | 2008 | 2011 | █ |
| BAUGH RF, 2013, OTOLARYNG HEAD NECK, V149, PS1, DOI | 2013 | 3.2789 | 2016 | 2021 | █ |
| LI PP, 2015, PLOS ONE, V10, P0, DOI | 2015 | 3.9267 | 2017 | 2021 | █ |

Figure 8 (A) A timeline view of acupuncture for Bell's Palsy. In the reference timeline profile, the later the timeline of each cluster appears, the more likely the cluster is to become a new research hotspot. **(B)** Reference with the strongest citation bursts of Acupuncture in Bell's Palsy.

efficacy of acupuncture, the production of a sense of gaining chi also has an In terms of the short-term therapeutic efficacy of acupuncture, whether or not it produces a sense of gaining qi also has an important impact on whether or not it is effective.⁴⁶

In the eyes of a formally trained acupuncturist, the de qi sensation (eg, soreness, swelling, numbness, and other body sensations) produced by acupuncture on an acupuncture point is an important basis for the efficacy of acupuncture. In the past, the specific philosophy of TCM as part of alternative medicine did not receive much attention, but with the development of modern medicine, researchers and clinicians have started to look for ways to significantly improve the

Table 7 Top 5 Co-Cited References in Acupuncture Treaty on Bell's Palsy

| Citation | First author | Year | Journal |
|----------|---------------------------|------|--|
| 421 | Cruccu G ²⁴ | 2007 | European Journal of Neurology |
| 233 | Baugh RF ²⁵ | 2013 | Otolaryngology Y-Head and Neck Surgery |
| 127 | Finsterer J ²⁶ | 2008 | European Archives of Oto-Rhino-Laryngology |
| 89 | Teixeira LJ ²⁷ | 2011 | Cochrane Database of Systematic Reviews |
| 65 | Xu SB ²⁸ | 2013 | Canadian Medical Association Journal |

Abbreviations: USA, United States of America; BICOMB, Bibliographic Items Co-occurrence Matrix Builder; gCLUTO, Graphical Clustering Toolkit; IF, impact factors.

efficacy of TCM in search of better treatment results and a better patient experience. In traditional Chinese medicine, acupuncture is extremely effective in treating facial palsy. Therefore, the study of acupuncture points and the sense of getting qi is expected to become a new research direction and a hot research topic in recent years.

2. The role of acupuncture in the prognosis of facial palsy

The prognosis of facial palsy and the associated sequelae are influenced by several factors,⁴⁷ for example, age, varicella-zoster virus infection, nerve excitability test response, loss of stapedial reflex, and the state of paralysis 1 month after the onset, among others. Among these factors, the sequelae of facial palsy often bring physical as well as psychological discomfort,⁴⁸ and those with severe disease can suffer from the disease for years, which seriously affects the quality of life. The prognostic improvement of facial palsy with acupuncture is supported by relevant clinical data, for example, a clinical study in Turkey in 2019⁴⁹ showed that the scale scores of acupuncture before and after treatment of Bell's facial palsy sequelae, such as, facial nerve compound motor action potential, HouseeBrackmann (HB), and Sunnybrook (SB) grading scales were significantly better than the control group. The early use of acupuncture in the treatment of facial palsy can greatly reduce the chance of sequelae.^{50,51} According to Figure 8A, #9 prognosis is the most recent label for the onset and end time inside, which also indicates that the efficacy of acupuncture on the sequelae of facial palsy will be the latest research hotspot in the field of acupuncture for facial palsy.

3. Mechanism of acupuncture to improve facial nerve function

The specific mechanism of facial palsy is still not completely clear, but the mainstream view now is that neurophilic virus infection causes damage to peripheral facial nerve function, which in turn affects the motor function of facial muscles, which leads to the development of facial neuritis. The slow regeneration rate of peripheral facial nerve fibers makes the recovery process after peripheral facial nerve paralysis slow, which is a long-standing problem in neurology. Among the hotspots of research on facial palsy would be specific studies on the mechanism of action of acupuncture on improving facial nerve function. In fact, in 2022, Shan et al⁵² with the help of transmission electron microscopy observations confirmed that facial nerve injury started to recover to varying degrees after 21 days of acupuncture.

4. Focus on the use of electroacupuncture

Compared with traditional acupuncture, electroacupuncture can provide a stable frequency and duration of action, which provides good clinical efficacy on the one hand and facilitates the control of variables in research design on the other. The studies related to electroacupuncture for Bell's Palsy have also become a new research trend in recent years,⁵²⁻⁵⁴ in which, Cui et al⁵³ confirmed that electro-acupuncture can also induce needle sensation, and also concluded that more trials are needed to find the appropriate current to induce needle sensation.

Limitations

Given the research status of acupuncture in Bell's Palsy, we believe that there are still many limitations:

1. Research design: At present, the field is mostly clinical trials, lacks basic research and animal experiments, and due to the particularity of acupuncture therapy itself, most clinical trials have not reached the "double-blind" design, and there is a lack of multi-center clinical trials.
2. Institutional cooperation: On the one hand, the lack of transnational cooperation. Institutional cooperation between Europe and North America is close, but there is less cross-border cooperation on other continents, mostly domestic cooperation; on the other hand, regional development is uneven. Therefore, researchers should analyze relevant clinical experience and research results with each other to strengthen multinational cooperation.
3. The limitations of the bibliometric software: it is impossible to deal with multiple languages databases at the same time, the algorithm problem of the software itself, etc., which may have a certain impact on the research results, and

the software can only be used to analyze keywords, references, authors and institutions, countries, etc., instead of the entire content of the documents included, which may cause some information omissions.

Conclusion

This paper analyzed data on acupuncture for Bell's Palsy from 2000 to 2023 using bibliometric tools CiteSpace, Vosviewer, BICOMB platform, and gCLUTO software. The results of the study showed that new research hotspots in the field of acupuncture for Bell's Palsy will be:

1. Increased emphasis on acupuncture manipulation and the effect of needle sensation on the efficacy of treatment;
2. The use of acupuncture in the prognosis of Bell's Palsy will be emphasized;
3. The efficacy of electroacupuncture and the optimal current intensity during treatment;
4. The mechanism of acupuncture to improve facial nerve function.

However, there are still problems in this field, such as unreasonable experimental design, imperfect data collection, fragmented cooperation among research institutions, and the research results are mainly cased reports and clinical trials without basic research, which requires relevant researchers to strengthen multinational and cross-institutional cooperation, pay attention to new research trends, and improve experimental design and data collection.

Data Sharing Statement

The raw data can be directly obtained from the Web of Science Core Collection (WoSCC).

Acknowledgments

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Disclosure

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

1. Peitersen E. Bell's palsy: the spontaneous course of 2500 peripheral facial nerve palsies of different etiologies. *Acta Otolaryngol.* 2002;122(6):4–30. doi:10.1080/000164802760370736
2. Shannon S, Meadow S, Horowitz SH. Clinical inquiries. Are drug therapies effective in treating Bell's palsy? *J Fam Pract.* 2003;52(2):156–159.
3. De Diego Sastre JI, Prim Espada MP, Fernández García F. Epidemiología de la Parálisis facial de bell. *Revista de Neurologia.* 2005;41(05):287–290. doi:10.33588/rn.4105.2004593
4. Morris AM, Deeks SL, Hill MD, et al. Annualized incidence and spectrum of illness from an outbreak investigation of Bell's palsy. *Neuroepidemiology.* 2002;21(5):255–261. doi:10.1159/000065645
5. Mutsch M, Zhou W, Rhodes P, et al. Use of the inactivated intranasal influenza vaccine and the risk of Bell's Palsy in Switzerland. *N Engl J Med.* 2004;350(9):896–903. doi:10.1056/NEJMoa030595
6. Gilden D. Treatment of Bell's palsy—the Pendulum has swung back to steroids alone. *Lancet Neurol.* 2008;7(11):976–977. doi:10.1016/S1474-4422(08)70222-9
7. Gilden DH. Bell's Palsy. *N Engl J Med.* 2004;351(13):1323–1331. doi:10.1056/NEJMcp041120
8. Sullivan FM, Swan IRC, Donnan PT, et al. Early treatment with prednisolone or Acyclovir in Bell's Palsy. *N Engl J Med.* 2007;357(16):1598–1607. doi:10.1056/NEJMoa072006
9. Weiju H. Progress in the diagnosis and treatment of Bell's facial paralysis. *Chin J Clin.* 2009;9:1435–1444.
10. McAllister K, Walker D, Donnan PT, Swan I. Surgical interventions for the early management of Bell's palsy. *Cochrane Database Syst Rev.* 2013. doi:10.1002/14651858.CD007468.pub3
11. Altun I, Kurutaş EB. Vitamin B complex and vitamin B 12 levels after peripheral nerve injury. *Neural Regener Res.* 2016;11(5):842–845. doi:10.4103/1673-5374.177150
12. Theil D, Arbusow V, Derfuss T, et al. Prevalence of HSV-1 lat in human trigeminal, geniculate, and vestibular ganglia and its implication for cranial nerve syndromes. *Brain Pathol.* 2001;11(4):408–413. doi:10.1111/j.1750-3639.2001.tb00408.x
13. Stjernquist-Desatnik A, Skoog E, Aurelius E. Detection of herpes simplex and varicella-zoster viruses in patients with Bell's palsy by the polymerase chain reaction technique. *Ann Otol Rhinol Laryngol.* 2006;115(4):306–311. doi:10.1177/000348940611500410
14. Sun DQ, Andresen NS, Gantz BJ. Surgical management of acute facial palsy. *Otolaryngol Clin North Am.* 2018;51(6):1077–1092. doi:10.1016/j.otc.2018.07.005

15. Zhang R, Wu T, Wang R, Wang D, Liu Q. Compare the efficacy of acupuncture with drugs in the treatment of Bell's palsy. *Medicine*. 2019;98(19):154.
16. Chen C, Hu Z, Liu S, Tseng H. Emerging trends in regenerative medicine: a scientometric analysis in CiteSpace. *Expert Opin Biol Ther*. 2012;12(5):593–608. doi:10.1517/14712598.2012.674507
17. Hao X, Liang F, Wang L, et al. Identifying Chinese medicine patterns of tension-type headache and understanding its subgroups. *Evid Based Complement Altern Med*. 2021;2021:1–23. doi:10.1155/2021/5544571
18. Lu L, Wen Q, Hao X, Zheng Q, Li Y, Li N. Acupoints for tension-type headache: a literature study based on Data Mining Technology. *Evid Based Complement Altern Med*. 2021;2021:1–10.
19. Hao X, Shi Y, Zhu J, et al. Evaluating influential factors of acupuncture for tension-type headache. *Medicine*. 2020;99(46):e23118. doi:10.1097/MD.00000000000023118
20. Zhao L, Chen J, Li Y, et al. The long-term effect of acupuncture for migraine prophylaxis. *JAMA Intern Med*. 2017;177(4):508–515. doi:10.1001/jamainternmed.2016.9378
21. Xiao X, Zheng Q, Shi Y, et al. Association of patients' characteristics with acupuncture treatment outcomes in treating Bell's palsy: results from a randomised controlled trial. *Evid Based Complement Altern Med*. 2019;2019:1–7. doi:10.1155/2019/6073484
22. Chen X, Li Y, Zheng H, et al. A randomized controlled trial of acupuncture and moxibustion to treat Bell's palsy according to different stages: design and protocol. *Contemp Clin Trials*. 2009;30(4):347–353. doi:10.1016/j.cct.2009.02.006
23. Liang F, Li Y, Yu S, et al. A multicenter randomized control study on clinical acupuncture treatment of Bell's palsy. *J Trad Chinese Med*. 2006;26(1):3–7.
24. Cruccu G, Aziz TZ, Garcia-Larrea L, et al. EFNS guidelines on neurostimulation therapy for neuropathic pain. *Eur J Neurol*. 2007;14(9):952–970. doi:10.1111/j.1468-1331.2007.01916.x
25. Baugh RF, Basura GJ, Ishii LE, et al. Clinical practice guideline. *Otolaryngology*. 2013;149(3_suppl):554.
26. Finsterer J. Management of peripheral facial nerve palsy. *Eur Archiv Oto-Rhino-Laryngol*. 2008;265(7):743–752. doi:10.1007/s00405-008-0646-4
27. Teixeira LJ, Valbuza JS, Prado GF. Physical therapy for Bell's palsy (idiopathic facial paralysis). *Cochrane Database Syst Rev*. 2011. doi:10.1002/14651858.CD006283.pub3
28. Xu SB, Huang B, Zhang CY, et al. Effectiveness of strengthened stimulation during acupuncture for the treatment of Bell Palsy: a randomized controlled trial. *Can Med Assoc J*. 2013;185(6):473–478. doi:10.1503/cmaj.121108
29. Li Y, Liang F, Yu S, et al. efficacy of acupuncture and moxibustion in treating Bell's palsy: a multicenter randomized controlled trial in China. *Chin Med J*. 2004;117(10):1502–1506.
30. Li P, Qiu T, Qin C. Efficacy of acupuncture for Bell's Palsy: a systematic review and meta-analysis of randomized controlled trials. *PLoS One*. 2015;10(5):55.
31. Alptekin DÖ. Acupuncture and Kinesio taping for the acute management of Bell's palsy: a case report. *Complement Ther Med*. 2017;35:1–5. doi:10.1016/j.ctim.2017.08.013
32. Lei H, Wang W, Huang G. Acupuncture benefits a pregnant patient who has Bell's palsy: a case study. *J Alternative Complement Med*. 2010;16(9):1011–1014. doi:10.1089/acm.2009.0180
33. Wong CL, Wong VCN. Effect of acupuncture in a patient with 7-year-history of Bell's palsy. *J Alternative Complement Med*. 2008;14(7):847–853. doi:10.1089/acm.2007.0780
34. Rosted P, Woolley DR. Bell's palsy following acupuncture treatment – a case report. *Acupunct Med*. 2007;25(1–2):47–48. doi:10.1136/aim.25.1-2.47
35. Li X, Chen C, Zhao C, Li Z, Liang W, Liu Z. Augmentation effect of acupuncture on Bi'Nao for hypophysis in patients with Bell's palsy: study protocol for a randomized controlled trial. *Trials*. 2018;19(1):125.
36. Ton G, Lee LW, Ng HP, et al. Efficacy of laser acupuncture for patients with Chronic Bell's palsy. *Medicine*. 2019;98(15):e15120. doi:10.1097/MD.00000000000015120
37. Goo B, Jeong SM, Kim JU, et al. Clinical efficacy and safety of thread-embedding acupuncture for treatment of the sequelae of Bell's palsy. *Medicine*. 2019;98(7):e14508. doi:10.1097/MD.00000000000014508
38. Kwon HJ, Choi JY, Lee MS, Kim YS, Shin BC, Kim JI. Acupuncture for the sequelae of Bell's palsy: a randomized controlled trial. *Trials*. 2015;16(1). doi:10.1186/s13063-015-0777-z
39. Zhang CY, Xu SB, Huang B, et al. Needle sensation and personality factors influence therapeutic effect of acupuncture for treating Bell's palsy. *Chin Med J*. 2016;129(15):1789–1794. doi:10.4103/0366-6999.186640
40. Xia F, Han J, Liu X, et al. Prednisolone and acupuncture in Bell's palsy: study protocol for a randomized, controlled trial. *Trials*. 2011;12(1). doi:10.1186/1745-6215-12-158
41. Ton G, Liao HY, Chiang JH, Chen YH, Lee YC. Chinese herbal medicine and acupuncture reduced the risk of stroke after Bell's palsy: a population-based retrospective cohort study. *J Alternative Complement Med*. 2019;25(9):946–956. doi:10.1089/acm.2018.0496
42. Ton G, Lee LW, Ho WC, Tu CH, Chen YH, Lee YC. Effects of laser acupuncture therapy for patients with inadequate recovery from Bell's palsy: preliminary results from randomized, double-blind, sham-controlled study. *J Lasers Med Sci*. 2021;12(1):e70–e70. doi:10.34172/jlms.2021.70
43. Pu JK, Wong SC, So KH, Tsang AC, Li L. Acupuncture as part of iatrogenic facial nerve palsy rehabilitation—first report. *World Neurosurg*. 2020;140:e343–e347. doi:10.1016/j.wneu.2020.05.079
44. Wen J, Chen X, Yang Y, et al. Acupuncture medical therapy and its underlying mechanisms: a systematic review. *Am J Chin Med*. 2021;49(1):1–23. doi:10.1142/S0192415X21500014
45. Chen T, Zhang WW, Chu YX, Wang YQ. Acupuncture for pain management: molecular mechanisms of action. *Am J Chin Med*. 2020;48(4):793–811. doi:10.1142/S0192415X20500408
46. Li M, Yuan H, Wang P, et al. Influences of De Qi induced by acupuncture on immediate and accumulated analgesic effects in patients with knee osteoarthritis: study protocol for a randomized controlled trial. *Trials*. 2017;18(1):251. doi:10.1186/s13063-017-1975-7
47. Ikeda M, Abiko Y, Kukimoto N, Omori H, Nakazato H, Ikeda K. Clinical factors that influence the prognosis of facial nerve paralysis and the magnitudes of influence. *Laryngoscope*. 2005;115(5):855–860. doi:10.1097/01.MLG.0000157694.57872.82
48. Robinson MW, Baiungo J. Facial rehabilitation: evaluation and treatment strategies for the patient with facial palsy. *Otolaryngol Clin North Am*. 2018;51(6):1151–1167. doi:10.1016/j.otc.2018.07.011

49. Öksüz CE, Kalaycıoğlu A, Uzun Ö, et al. The efficacy of acupuncture in the treatment of Bell's palsy sequelae. *J Acupunct Meridian Stud.* 2019;12(4):122–130. doi:10.1016/j.jams.2019.03.001
50. Zhong RF, Huang SX. Observation on therapeutic effect of acupuncture on spontaneous facial paralysis in acute stage. *Zhongguo Zhen Jiu.* 2011;31(7):587–590.
51. Liu ZD, He JB, Guo SS, et al. Effects of electroacupuncture therapy for Bell's Palsy FROM ACUTE STAGE: study Protocol for a randomized controlled trial. *Trials.* 2015;16(1). doi:10.1186/s13063-015-0893-9
52. Shan Z, Chen H. Electron microscope observation of acupuncture and nerve repair in the treatment of peripheral facial paralysis. *Emerg Med Int.* 2022;2022:5432223. doi:10.1155/2022/5432223
53. Cui H, Yu H, Huang X, et al. Electroacupuncture and transcutaneous electrical nerve stimulation induced sensations in Bell's palsy patients: a quantitative current intensity analysis. *Front Neurosci.* 2021;15. doi:10.3389/fnins.2021.692088
54. Qin Y, Yang L, Zhang M, et al. Efficacy evaluation and mechanism study of electroacupuncture intervention in acute phase of IFP: study protocol for a randomized controlled trial. *Trials.* 2021;22(1):663. doi:10.1186/s13063-021-05632-8

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