# Analysis of Acupuncture Selection Rules for Neuromyelitis Optica Spectrum Diseases Treated by Acupuncture Based on Data Mining

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**Abstract: Neuromyelitis optica spectrum disorders (NMOSD) are severe autoimmune inflammatory diseases of the central nervous system, characterized by recurrent attacks and high disability rates. Acupuncture has been increasingly used as an adjunct therapy, but systematic analyses of acupoint selection patterns remain scarce. This study aims to explore the rules of acupoint selection in acupuncture treatment for NMOSD using data mining techniques. A comprehensive literature search was conducted to extract treatment methods and acupoint data, followed by database construction and analysis using cluster analysis and association rule mining. A total of 44 studies were included, encompassing 49 acupuncture prescriptions and 108 acupoints (excluding auricular and empirical points), with a total application frequency of 803. The most frequently used acupoints were ST36, SP6, LI4, BL1, LI11, LR3, GB20, BL23, GB34, and GV20, primarily distributed along the Bladder Meridian, Governing Vessel, and Stomach Meridian. Association rule analysis (confidence ≥90%, support ≥20%) identified 44 significant rules, with "ST36 → SP6" showing the highest support (59.52%), and 25 rules achieving 100% confidence. Cluster analysis grouped acupoints into five functional clusters. These findings suggest that acupuncture treatment for NMOSD follows specific selection patterns, emphasizing syndrome differentiation and strategic acupoint combinations to enhance therapeutic efficacy.**

**Keywords: Neuromyelitis Optica Spectrum Diseases; Analysis of Acupoint Selection Rules; Data Mining; Acupuncture**

## 1. Introduction

Neuromyelitis Optica Spectrum Disorder (NMOSD) is a rare and severe inflammatory demyelinating disease of the central nervous system. Due to its rarity, there is currently a lack of large-scale epidemiological data on an international level. However, small-sample epidemiological studies have shown that the incidence of NMOSD in China is approximately 0.278 per 100,000 person-years, predominantly affecting young and middle-aged women, with high disability and relapse rates[1-2]. Current Western medical treatments for NMOSD primarily rely on immunosuppressants (e.g., azathioprine, mycophenolate mofetil) or targeted biologics (e.g., eculizumab, tocilizumab). However, some patients experience poor efficacy, intolerance, or long-term immune-related side effects[3]. In recent years, traditional Chinese medicine (TCM) has shown good results in the treatment of NMOSD. Clinical studies have shown [4-5] that acupuncture at acupoints around the eyes can improve the blood circulation of fundus and improve vision; TCM can adjust the metabolic balance of the body and improve systemic symptoms. Research shows [6]Acupuncture has shown certain therapeutic effects in relieving neuropathic pain and limb dysfunction. The efficacy of acupuncture in treating NMOSD is closely related to the selection and combination of acupoints, and a rational acupoint prescription may affect the therapeutic outcome. This study

 

systematically reviewed acupuncture treatment literature for NMOSD, extracted and analyzed acupoint data, and applied data mining methods to explore acupoint selection patterns, aiming to provide references for clinical practice and basic research.

## 2. Materials and Methods

### 2.1 Data Sources and Search Strategy

This study searched databases including CNKI, Wanfang, VIP, PubMed, and SinoMed from their inception to May 2025. Chinese search terms included ("acupuncture," "electroacupuncture," "body acupuncture," "filiform needle," "warming needle moxibustion," "scalp acupuncture," "hydro-acupuncture," "acupoint injection") + ("neuromyelitis optica," "neuromyelitis optica spectrum disorder"). English search terms included ("acupuncture," "electroacupuncture," "warming needle moxibustion," "moxibustion") + ("optic neuritis myelitis," "optic neuritis spectrum disorders").

### 2.2 Inclusion Criteria

The inclusion criteria were as follows: (1) Patients diagnosed with NMOSD; (2) Acupuncture as the primary treatment modality, possibly combined with other TCM or Western medical therapies, with clinically reported efficacy; (3) Complete acupuncture prescriptions with clearly defined acupoint selections.

### 2.3 Exclusion Criteria

The exclusion criteria were as follows: (1) Studies not meeting the inclusion criteria; (2) Animal experiments, purely theoretical or review articles; (3) Duplicate acupuncture prescriptions from multiple publications, with only one included; (4) Literature or books with unavailable full text.

### 2.4 Data Standardization and Database Construction

Acupoint names and meridian information were standardized according to the "Names and Locations of Acupoints" (GB/T 12346-2006)[7]. An acupuncture prescription database for NMOSD treatment was established using Excel spreadsheets. Descriptive and cluster analyses were performed using IBM SPSS Statistics, and association rule analysis was conducted using IBM SPSS Modeler 18.0.

## 3. Results

### 3.1 Literature Retrieval and Screening

A total of 170 articles were retrieved, and after careful review based on the inclusion and exclusion criteria, 44 articles were finally selected, yielding 49 effective acupuncture prescriptions, 108 acupoints (excluding auricular points and empirical points), and a total of 803 acupoint applications (excluding auricular points and empirical points). The literature screening process is shown in Figure 1.

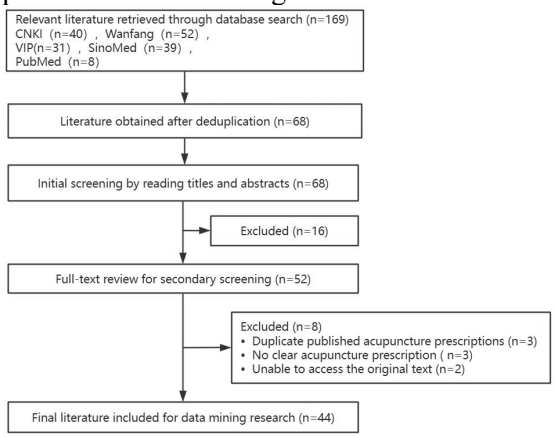


**Figure 1. Literature Screening Process for Acupuncture Treatment of Nmosd.**

### 3.2 Analysis of Common Therapeutic Methods

A cupuncture treatment for NMOSD mainly includes acupuncture, moxibustion, acupoint injection, electroacupuncture, etc., often combined with oral administration of Chinese herbal formulas or Western medicine, and supplemented with rehabilitation therapy (Table 1).

**Table 1. Usage of Acupuncture Treatment Methods for NMOSD.**

| Main Therapy | Adjunctive Therapy | Number of Studies |
|---|---|---|
| Acupuncture | None | 9 |
| | Electroacupuncture | 7 |
| | Acupoint Injection | 3 |
| | Scalp Acupuncture | 5 |
| | Acupoint Application | 1 |
| | Moxibustion | 4 |
| | Chinese herbal formulas | 10 |
| | Western Medical Treatment | 21 |
| | Rehabilitation Therapy | 3 |

 

### 3.3 Statistics of Commonly Used Acupoints

A total of 32 acupoints with application frequencies ≥10 times were identified, including Zusanli (ST36), Sanyinjiao (SP6), Hegu (LI4), Jingming (BL1), Quchi (LI11), Taichong (LR3), Fengchi (GB20), Shenshu (BL23), Yanglingquan (GB34), Baihui (GV20), Zanzhu (BL2), Taixi (KI3), Guanyuan (CV4), Taiyang (EX-HN5), Sibai (ST2), Ganshu (BL18), Xuanzhong (GB39), Guangming (GB37), Neiguan (PC6), Qiuhou (EX-HN7), Yintang (EX-HN3), Xuehai (SP10), Yinlingquan (SP9), Pishu (BL20), Tianzhu (BL10), Jianyu (LI15), Sizhukong (TE23), Waiguan (TE5), Qihai (CV6), Zhongwan (CV12), Shuigou (GV26), and Renzhong (GV26). These acupoints accounted for 54.8% of the total acupoint usage frequency (Table 2).

**Table 2. Acupoints with Application Frequencies ≥10 Times in Acupuncture Treatment of NMOSD.**

| n | Acupoint | Frequency | % | n | Acupoint | Frequency | % |
|---|---|---|---|---|---|---|---|
| 1 | Zusanli(ST36) | 31 | 3.86 | 17 | Ganshu(BL18) | 12 | 1.49 |
| 2 | Sanyinjiao(SP6) | 25 | 3.11 | 18 | Xuanzhong(GB39) | 12 | 1.49 |
| 3 | Zusanli(ST36) | 20 | 2.49 | 19 | Xuanzhong(GB39) | 12 | 1.49 |
| 4 | Quchi(LI11) | 18 | 2.24 | 20 | Neiguan(PC6) | 12 | 1.49 |
| 5 | Jingming(BL1) | 18 | 2.24 | 21 | Qiuhou(EX-HN7) | 12 | 1.49 |
| 6 | Taichong(LR3) | 16 | 1.99 | 22 | Yintang(EX-HN3) | 10 | 1.25 |
| 7 | Fengchi(GB20) | 16 | 1.99 | 23 | Xuehai(SP10) | 10 | 1.25 |
| 8 | Shenshu(BL23) | 16 | 1.99 | 24 | Yinlingquan(SP9 | 10 | 1.25 |
| 9 | Yanglingquan(GB34) | 15 | 1.87 | 25 | Pishu(BL20) | 10 | 1.25 |
| 10 | Baihui(GV20) | 15 | 1.87 | 26 | Tianzhu(BL10) | 10 | 1.25 |
| 11 | Cuanzhu（BL2） | 14 | 1.74 | 27 | Jianyu(LI15) | 10 | 1.25 |
| 12 | Taixi(KI3) | 14 | 1.74 | 28 | Sizhukong(TE23) | 10 | 1.25 |
| 13 | Guanyuan(CV4) | 14 | 1.74 | 29 | Waiguan(TE5) | 10 | 1.25 |
| 14 | Taiyang(EX-HN5) | 14 | 1.74 | 30 | Qihai(CV6) | 10 | 1.25 |
| 15 | Sibai(ST2) | 12 | 1.49 | 31 | Zhongwan(CV12) | 10 | 1.25 |
| 16 | Zusanli(ST36) | 12 | 1.49 | 32 | Shuigou(GV26) | 10 | 1.25 |

### 3.4 Meridian Distribution of Commonly Used Acupoints

The acupoints used in acupuncture treatment for NMOSD involve 14 meridians and 16 extra points. The most frequently used meridians were the Bladder Meridian of Foot-Taiyang, Governing Vessel (Du Mai), Stomach Meridian of Foot-Yangming, Gallbladder Meridian of Foot-Shaoyang, and Large Intestine Meridian of Hand-Yangming. The meridian distribution of acupoints is shown in Table 3.

**Table 3. Meridian Distribution of Commonly Used Acupoints in Acupuncture Treatment of NMOSD.**

| Meridian | Frequency | | Number of Acupoints | Selected Acupoints and Frequencies |
|---|---|---|---|---|
| | Frequency | % | | |
| **Bladder Meridian of Foot-Taiyang** | 148 | 19.20 | 19 | BL1 (18), BL23 (16), BL2 (14), BL18 (12), BL20 (10), BL10 (10), BL40 (8), BL21 (8), BL57 (8), BL60(6), BL22 (6), BL17 (4), BL30 (4), BL29(4), BL28 (4), BL19 (4), BL15 (4), BL54 (4), BL37 (4) |
| **Stomach Meridian of Foot-Yangming** | 87 | 11.28 | 13 | ST36 (31), ST2 (12), ST40 (8), ST25 (8), ST1 (6), ST34 (6), ST32 (6), ST41 (6), ST42 (4), ST37 (4), ST39 (4), ST28 (4), ST31 (4) |
| **Gallbladder Meridian of Foot-Shaoyang** | 83 | 10.77 | 13 | GB20 (16), GB34 (15), GB39 (12), GB37 (12), GB30 (8), GB1 (8), GB14 (6), GB31 (6), GB12 (6), GB16 (4), GB13 (2), GB21 (2), GB2 (2) |
| **Extraordinary Points** | 78 | 10.12 | 16 | EX-HN5 (14), EX-HN7 (12), EX-HN3 (12), EX-HN4 (6), EX-HN1 (6), EX-B2 (Huatuo 6), EX-HN22 (4), EX-HN (2), EX-HN (2), EX-HN (2), EX-HN (2), EX-HN (2), EX-HN (2), EX-HN (2), EX-HN (2), EX-HN (2) |
| **Large Intestine Meridian of Hand-Yangming** | 60 | 7.78 | 6 | LI4 (20), LI11 (18), LI15 (10), LI10 (8), LI14(2), LI5 (2) |
| **Spleen Meridian of Foot-Taiyin** | 45 | 5.84 | 3 | SP6 (25), SP10 (10), SP9 (10) |
| **Conception Vessel (Ren Mai)** | 43 | 5.58 | 4 | CV4 (14), CV6 (10), CV12 (10), CV3 (9) |

 

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|---|---|---|---|---|
| **Kidney Meridian of Foot-Shaoyin** | 36 | 4.67 | 4 | KI3 (14), KI6 (8), KI1 (8), KI7 (6) |
| **Triple Energizer Meridian of Hand-Shaoyang** | 26 | 3.37 | 4 | TE23 (10), TE5 (10), TE17 (4), TE10 (2) |
| **Liver Meridian of Foot-Jueyin** | 22 | 2.85 | 2 | LR3 (16), LR14 6) |
| **Heart Meridian of Hand-Shaoyin** | 14 | 1.82 | 3 | HT1 (6), HT7 (6), HT3 (2) |
| **Lung Meridian of Hand-Taiyin** | 14 | 1.82 | 2 | LU7 (8), LU5 (6) |
| **Pericardium Meridian of Hand-Jueyin** | 12 | 1.56 | 1 | PC6 (12) |
| **Small Intestine Meridian of Hand-Taiyang** | 8 | 1.04 | 2 | SI6 (6), SI8 (2) |

### 3.5 Acupoint Association Rule Analysis

IBM SPSS Modeler 18.0 was used to analyze the 32 acupoints with application frequencies ≥10 times. Association rules with confidence ≥90% and support ≥20% were selected (Table 4).

**Table 4. Analysis of Acupoint Association Rules in Acupuncture Treatment Of NMOSD**

| Antecedent | Consequent | Support Percentage /% | Confidence Percentage /% | Lift |
|---|---|---|---|---|
| SP6 | ST36 | 59.5 | 92.0 | 1.25 |
| LI4 | ST36 | 47.6 | 90.0 | 1.22 |
| GB34 | ST36 | 35.7 | 100.0 | 1.35 |
| CV4 | ST36 | 33.3 | 100.0 | 1.35 |
| GB39 | ST36 | 28.6 | 100.0 | 1.35 |
| BL18 | BL23 | 28.6 | 100.0 | 2.63 |
| EX-HN7 | BL1 | 28.6 | 100.0 | 2.33 |
| KI3, SP6 | ST36 | 28.6 | 91.7 | 1.24 |
| KI3, ST36 | SP6 | 28.6 | 91.7 | 1.54 |
| GB34, SP6 | ST36 | 28.6 | 100.0 | 1.35 |
| LI11, SP6 | ST36 | 28.6 | 100.0 | 1.35 |
| LR3, LI4 | ST36 | 28.6 | 91.7 | 1.24 |
| LR3, SP6 | ST36 | 28.6 | 91.7 | 1.24 |
| LI4, SP6 | ST36 | 28.6 | 100.0 | 1.35 |
| GB20, SP6 | ST36 | 26.2 | 100.0 | 1.35 |
| SP10 | ST36 | 23.8 | 90.0 | 1.22 |
| CV6 | ST36 | 23.8 | 100.0 | 1.35 |
| GV26 | ST36 | 23.8 | 90.0 | 1.22 |
| GV26 | BL10 | 23.8 | 100.0 | 4.20 |
| BL10 | GV26 | 23.8 | 100.0 | 4.20 |
| GV26 | ST36 | 23.8 | 90.0 | 1.22 |
| BL10 | ST36 | 23.8 | 90.0 | 1.22 |
| GB37 | SP6 | 23.8 | 90.0 | 1.51 |
| GB37 | ST36 | 23.8 | 90.0 | 1.22 |
| GV26, BL10 | ST36 | 23.8 | 90.0 | 1.22 |
| BL18, ST36 | BL23 | 23.8 | 100.0 | 2.63 |
| CV4, SP6 | ST36 | 23.8 | 100.0 | 1.35 |
| GB34, LI11 | LI4 | 23.8 | 90.0 | 1.89 |
| GB34, LI4 | LI11 | 23.8 | 90.0 | 2.10 |
| GB34, LI11 | ST36 | 23.8 | 100.0 | 1.35 |
| GB34, LI4 | ST36 | 23.8 | 100.0 | 1.35 |
| BL23, LI4 | ST36 | 23.8 | 100.0 | 1.35 |
| BL23, SP6 | ST36 | 23.8 | 90.0 | 1.22 |
| LI11, LR3 | ST36 | 23.8 | 90.0 | 1.22 |
| GB34, LI11, ST36 | LI4 | 23.8 | 90.0 | 1.89 |
| GB34, LI4, ST36 | LI11 | 23.8 | 90.0 | 2.10 |
| LI11, LI4, SP6 | ST36 | 23.8 | 100.0 | 1.35 |

 

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|---|---|---|---|---|
| GV26, ST36 | BL10 | 21.4 | 100.0 | 4.20 |
| BL10, ST36 | GV26 | 21.4 | 100.0 | 4.20 |
| GB37, SP6 | ST36 | 21.4 | 100.0 | 1.35 |
| GB37, ST36 | SP6 | 21.4 | 100.0 | 1.68 |
| BL18, LR3 | BL23 | 21.4 | 100.0 | 2.63 |
| BL23, LR3 | BL18 | 21.4 | 100.0 | 3.50 |
| GB34, LI11, LI4 | ST36 | 21.4 | 100.0 | 1.35 |

The results were also visualized using a network diagram (Figure 2). The analysis showed that most support values were ≤30%, with only four rules having support ≥30% and confidence ≥90%, namely, Zusanli-ST36 (ST36) — Sanyinjiao-SP6 (SP6), Zusanli-ST36 (ST36) — Hegu-LI4 (LI4), Zusanli-ST36 (ST36) — Yanglingquan-GB34 (GB34), and Zusanli-ST36 (ST36) — Guanyuan-CV4 (CV4). This indicates that Zusanli-ST36 (ST36) plays a key role in acupuncture treatment for NMOSD and is one of the core acupoints. The overall low support values reflect the considerable heterogeneity in acupoint selection in clinical acupuncture treatment for NMOSD, which may be related to individualized acupoint selection based on syndrome differentiation. This suggests that future research could further explore the common patterns of acupoint selection for NMOSD to enhance the standardization and reproducibility of clinical applications.

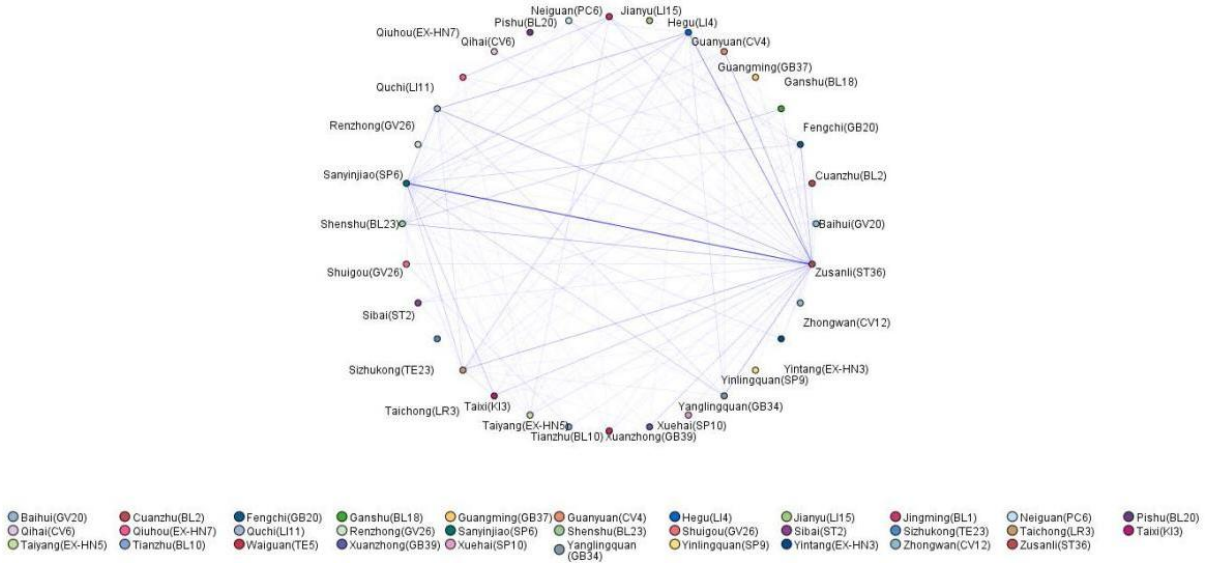


**Figure 2.Visualization of Acupuncture Treatment for NMOSD (Network Diagram).**

### 3.6 Cluster Analysis Results

Cluster analysis was performed on the 32 acupoints with application frequencies ≥10 times using IBM SPSS Statistics, resulting in dendrograms (Figure 3) and phylogenetic trees (Figure 4).

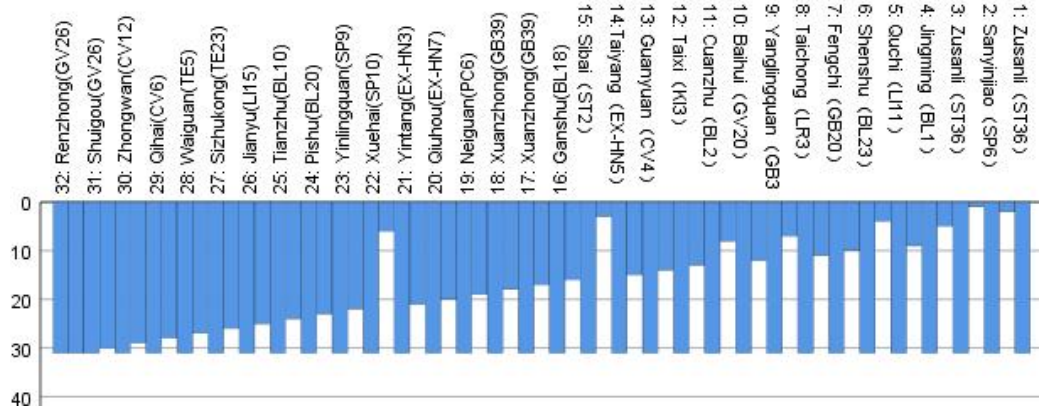


**Figure 3.Visualization of Acupuncture Treatment for NMOSD (Dendrogram).**

 

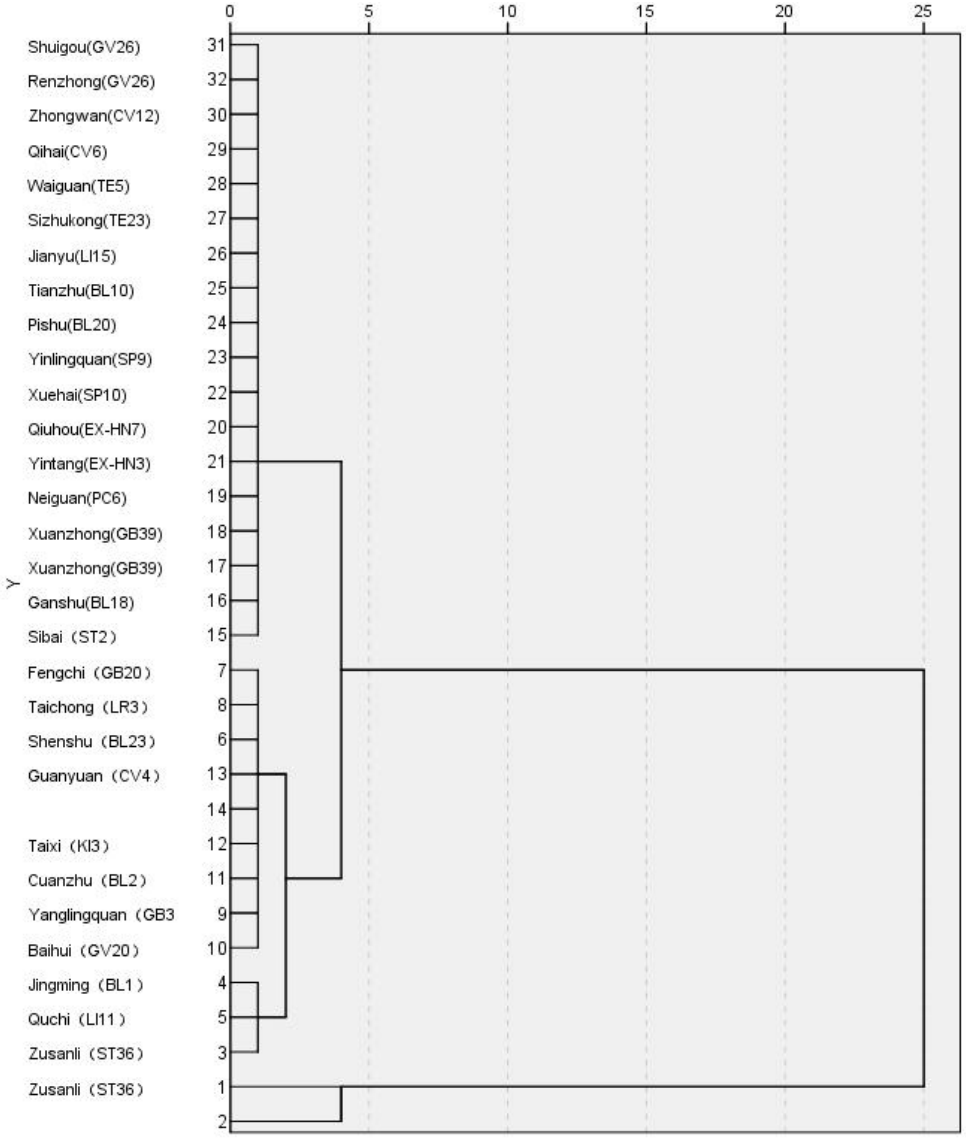


**Figure 4. Visualization of Acupuncture Treatment for NMOSD (Phylogenetic Tree).**

Acupoints were grouped into five clusters: (1)Zusanli (ST36); (2)Sanyinjiao (SP6); (3)Hegu (LI4), Jingming (BL1), Quchi (LI11); (4)Shenshu (BL23), Fengchi (GB20), Taichong (LR3), Yanglingquan (GB34), Baihui (GV20), Zanzhu (BL2), Taixi (KI3), Guanyuan (CV4), Taiyang (EX-HN5); (5)Sibai (ST2), Ganshu (BL18), Guangming (GB37), Xuanzhong (GB39), Neiguan (PC6), Qiuhou (EX-HN7), Yintang (EX-HN3), Xuehai (SP10), Yinlingquan (SP9), Pishu (BL20), Tianzhu (BL10), Jianyu (LI15), Sizhukong (TE23), Waiguan (TE5), Qihai (CV6), Zhongwan (CV12), Shuigou (GV26), Renzhong (GV26).

## 4. Discussion

In traditional Chinese medicine (TCM) literature, there is no direct equivalent term for Neuromyelitis Optica Spectrum Disorder (NMOSD). Based on its clinical features, NMOSD can be categorized under "wind paralysis," "atrophy syndrome," "blurred vision," or "visual impairment"[8]. The statistical results of syndrome differentiation by various medical experts [9]indicate that the acute phase of NMOSD is predominantly characterized by excess patterns, with common pathological factors such as phlegm, dampness, and blood stasis. These pathogenic factors may manifest externally or exist as primary accompanying syndromes. In contrast, the remission phase is primarily marked by deficiency patterns, mainly involving the liver, spleen, and kidney. As stated in the *Inner Canon of Huangdi,* "The liver stores blood, the spleen transforms the source of qi and blood, and the kidney governs the

marrow". These three organs are interconnected and collectively maintain the abundance of marrow and blood. When marrow and blood are sufficient, the liver governs tendons and nails, the spleen governs muscles, the kidney governs bones, the eyes maintain clear vision, and the body functions smoothly. However, damage to the marrow and orifices primarily affects the liver, spleen, and kidney. Coupled with congenital insufficiency or postnatal disharmony, the remission phase often manifests as liver-kidney yin deficiency, spleen-kidney yang deficiency, and qi deficiency, accompanied by excess pathogens such as blood stasis, phlegm, and damp-heat, further exacerbating the condition. Therefore, adopting syndrome differentiation-based treatment tailored to the characteristics of different stages can provide an effective TCM approach for the clinical management of NMOSD.

The core of acupuncture treatment for NMOSD lies in regulating qi and blood, unblocking meridians, and thereby improving neurological function and modulating immune abnormalities. The results of this study show that the most frequently used acupoints for NMOSD treatment are Zusanli (ST36), Sanyinjiao (SP6), Hegu (LI4), Jingming (BL1), Quchi (LI11), Taichong (LR3), Fengchi (GB20), Shenshu (BL23), Yanglingquan (GB34), and Baihui (GV20). Among these, Zusanli (ST36), as the He-Sea point of the Stomach Meridian, regulates the spleen and stomach, tonifies qi and blood, and enhances immune function by modulating the central nervous system. Sanyinjiao (SP6), the intersection point of the spleen, liver, and kidney meridians, nourishes the liver and kidneys, regulates qi and blood, and helps alleviate symptoms such as visual impairment and limb numbness. Hegu (LI4) and Quchi (LI11) clear heat and unblock collaterals, making them suitable for headaches, eye pain, and limb numbness. Jingming (BL1) stimulates local nerves to improvevisual function, while Yanglingquan (GB34), the influential point of tendons, regulates lower limb muscle tone and relieves spasms[10]. Taichong (LR3) and Fengchi (GB20) soothe the liver and extinguish wind, addressing headaches and dizziness. Shenshu (BL23) and Baihui (GV20) tonify the kidneys, boost qi, and awaken the brain, alleviating symptoms such as lower back pain and dizziness. The combination of these high-frequency acupoints reflects a treatment approach that emphasizes "holistic regulation and addressing both the root and branch."

The most frequently selected meridians in clinical practice include the Bladder Meridian (Foot-Taiyang), Governor Vessel (GV), Stomach Meridian (Foot-Yangming), Gallbladder Meridian (Foot-Shaoyang), and Large Intestine Meridian (Hand-Yangming). The Bladder Meridian, which "enters the brain from the vertex" and runs alongside the spine, is closely related to the brain and spinal cord. The Governor Vessel, known as the "sea of yang meridians," governs all yang meridians, regulates qi and blood circulation, and treats spinal cord-related disorders. The Stomach Meridian, abundant in qi and blood, is closely associated with the production of qi and blood. The Gallbladder Meridian governs dispersion and influences emotional regulation and qi movement. The Large Intestine Meridian, internally and externally connected to the Lung Meridian, regulates water metabolism. According to meridian theory, diseases arise from an imbalance between healthy qi and pathogenic factors, and NMOSD manifests as immune dysregulation and myelin sheath damage. Acupuncture may play a role in immune regulation and neural repair by balancing qi and blood in the meridians. Experimental studies by Liu et al. [11] have also confirmed that acupuncture can reduce disease severity in NMOSD animal models, improve CD4+ T cell balance, and inhibit abnormal T cell proliferation.

Among the 44 strong acupoint associations identified in this study, the combination of "Zusanli (ST36) and Sanyinjiao (SP6)" had the highest support (59.52%) and confidence (92%). These two acupoints were also the most frequently used, highlighting their central role in NMOSD acupuncture treatment. Additionally, Zusanli (ST36) formed high-support associations with Hegu (LI4, 47.62%), Yanglingquan (GB34, 35.71%), Guanyuan (CV4, 33.33%), and Xuanzhong (GB39, 28.57%), reflecting its key role in NMOSD treatment and its close relationship with acupoints that tonify qi and blood and regulate the spleen and kidneys. Another high-support association was "Jingming (BL1)

 

and Qiuhou (EX-HN7)" (support 28.57%, confidence 100%), both of which are periocular acupoints, indicating a focus on improving visual function in NMOSD treatment. Furthermore, the association between Shenshu (BL23) and Ganshu (BL18) (support 28.57%, confidence 100%) reflects the treatment principle of "the liver and kidneys sharing a common source." Notably, the combination of Shuigou (GV26) and Tianzhu (BL10) (support 23.81%, confidence 100%) suggests a clinical focus on the Governor Vessel and its regulatory role in spinal cord function.

Cluster analysis revealed that the acupoints could be grouped into five effective clusters. Zusanli (ST36) and Sanyinjiao (SP6) formed independent clusters due to their core physiological functions, highlighting their unique roles in regulating zang-fu organs, balancing qi and blood, and modulating neuroimmune functions. The third cluster primarily consisted of facial and limb acupoints, targeting local nerve regulation to alleviate limb numbness in NMOSD patients. The fourth cluster included acupoints from the head, back, lower limbs, and zang-fu organs, addressing various symptoms of NMOSD. The fifth cluster involved multiple acupoints from the head, abdomen, and back, simultaneously participating in zang-fu regulation, qi and blood circulation, and nervous system modulation.

## 5. Limitations and Future Directions

This study has several limitations: (1) The small sample size may affect statistical power, and future studies should expand the data scale to improve reliability. (2) The correlation between acupuncture prescriptions and clinical efficacy was not systematically analyzed, making it difficult to determine the efficacy differences of specific acupoint combinations. Future research could use quantitative indicators to evaluate the effects of acupuncture interventions. (3) Mechanistic studies are still needed. Future research could combine imaging and biomarkers to explore the pathways through which acupuncture exerts its effects in NMOSD treatment.

## 6. Conclusion

From a theoretical perspective, acupuncture treatment for NMOSD should integrate the holistic principles of TCM with modern neurology to further explore the mechanisms of meridian-immune-neural regulation. By refining syndrome differentiation-based acupoint selection and emphasizing individualized treatment strategies, more precise and effective therapeutic approaches can be developed. In clinical practice, the acupoint selection patterns identified in this study can serve as a valuable reference. Considering patients' pathophysiological characteristics, imaging findings, and individualized symptoms, clinicians can formulate targeted acupuncture treatment plans to enhance therapeutic efficacy. Future research should focus on clinical validation of these optimized acupoint combinations through well-designed studies, further verifying their efficacy and promoting the broader application of acupuncture in neuroimmune disorders.

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