

Acupoints selection pattern in acupuncture-moxibustion treatment of perimenopausal syndrome from 2007 to 2016

2007-2016 年围绝经期综合征针灸选穴规律研究

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Abstract

Objective: To discuss the acupoints selection pattern in acupuncture-moxibustion treatment of perimenopausal syndrome (PMS) from 2007 to 2016.

Methods: Clinical literatures related to PMS treated with acupuncture-moxibustion published from 2007 to 2016 were collected from Chinese Biomedical Literature Database (CBM), Chongqing VIP Database (CQVIP), China National Knowledge Infrastructure (CNKI), and Wanfang Academic Journal Full-text Database (Wanfang). The retrieved data underwent descriptive analysis, cluster analysis and association pattern analysis to determine the acupoints selection principle in acupuncture-moxibustion treatment of PMS.

Results: The top five acupoints used in acupuncture-moxibustion treatment of PMS were Sanyinjiao (SP 6), Shenshu (BL 23), Guanyuan (CV 4), Baihui (GV 20), and Shenmen (HT 7). The leading 4 meridians were Bladder Meridian, Conception Vessel, Spleen Meridian, and Governor Vessel. The clustering analysis showed that the 5 core acupoint groups were: ① Sanyinjiao (SP 6); ② Shenshu (BL 23) and Guanyuan (CV 4); ③ Baihui (GV 20), Shenmen (HT 7), Zusanli (ST 36), Ganshu (BL 18) and Taichong (LR 3); ④ Taixi (KI 3), Pishu (BL 20), Xinshu (BL 15), Qihai (CV 6) and Neiguan (PC 6); ⑤ Sishencong (EX-HN 1), Zhongwan (CV 12), Hegu (LI 4), Yintang (GV 29), Fengchi (GB 20), Zhongji (CV 3) and Feishu (BL 13). The three most significant acupoints were Sanyinjiao (SP 6), Shenshu (BL 23) and Guanyuan (CV 4). Acupoint groups based on syndrome differentiation included: ① Hegu (LI 4), Zhongwan (CV 12) and Sishencong (EX-HN 1); ② Feishu (BL 13), Zhongji (CV 3), Fengchi (GB 20) and Yintang (GV 29); ③ Xinshu (BL 15), Pishu (BL 20), Qihai (CV 6), Neiguan (PC 6) and Taixi (KI 3); ④ Ganshu (BL 18), Zusanli (ST 36), Shenmen (HT 7), Taichong (LR 3) and Baihui (GV 20). The analysis of association pattern elaborated that Shenshu (BL 23) and Sanyinjiao (SP 6) won the highest support rate in the paired groups; Ganshu (BL 18), Shenshu (BL 23) and Sanyinjiao (SP 6) had the highest support rate among the acupoint groups.

Conclusion: The data mining results of acupuncture-moxibustion treatment of PMS substantially conform to the general principle in traditional acupuncture-moxibustion theories, able to reflect the acupoints selection and grouping pattern and provide references for acupuncture-moxibustion treatment of PMS.

Keywords: Acupuncture-moxibustion Therapy; Point, Sanyinjiao (SP 6); Point, Shenshu (BL 23); Point, Guanyuan (CV 4); Premenopause; Climacteric; Data Mining; Point Selection

【摘要】目的: 探析2007-2016年针灸治疗围绝经期综合征(PMS)的选穴规律。**方法:** 收集、整理2007-2016年中国生物医学文献数据库(CBM)、重庆维普(CQVIP)、中国知网(CNKI)和万方数据库(Wanfang)中针灸治疗PMS的临床文献,建立PMS的现代针灸临床处方数据库,采用描述性分析、聚类分析和关联规则分析明确针灸治疗PMS的选穴规律。**结果:** 针灸治疗PMS所选穴位频次位居前五位的是三阴交、肾俞、关元、百会和神门。所选经脉频次前四位的是膀胱经、任脉、脾经和督脉。聚类分析结果显示:治疗PMS的5个核心用穴群为 ①三阴交; ②肾俞和关元; ③百会、神门、足三里、肝俞和太冲; ④太溪、脾俞、心俞、气海和内关; ⑤四神聪、中脘、合谷、印堂、风池、中极和肺俞。重点用穴为三阴交、肾俞和关元。辨证用穴群为①合谷、中脘和四神聪; ②肺俞、中极、风池和印堂; ③心俞、脾俞、气海、内关和太溪; ④肝俞、足三里、神门、太冲和百会。关联规则分析显示穴对配伍支持度最高的为肾俞和三阴交; 穴组支持度最高的为肝俞和肾俞配三阴交。**结论:** 针灸治疗PMS文献的数据挖掘结果与传统医学中针灸治疗理论的一般规律基本相符,能够反映出PMS的临床选穴常用组合规律,可为临床针灸治疗PMS提供参考。

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【关键词】 针灸疗法; 穴, 三阴交; 穴, 肾俞; 穴, 关元; 围绝经期; 更年期; 数据挖掘; 选穴

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Perimenopausal syndrome (PMS) refers to a group of symptoms and signs in women, predominantly autonomic system dysfunction, due to hypofunction of ovary around menopause, ovary removal surgery, or caused by other reasons^[1]. Currently, hormone replacement therapy has been taken as a main approach in treating PMS. Although it's effective in improving certain symptoms^[2-3], this method is somewhat risky and doctors need to be really cautious when using it^[4]. It's reported that acupuncture-moxibustion has notable effects in treating perimenopausal hot flushes, insomnia, depression, etc^[5-9], and effectively improve vasomotoricity, producing a total effective rate as high as 80%-100%^[10]. This therapy can significantly enhance patient's quality of life (QOL), and it's safe without causing side effects^[11]. Hence, we collected the relevant literatures published during the recent 10 years to analyze the features in points selection and combination in acupuncture-moxibustion treatment of PMS based on data mining technique, with a hope to provide references for clinical application.

1 Subject and Method

1.1 Retrieve method

The target databases included: Chinese Biomedical Literature Database (CBM), Chongqing VIP Database (CQVIP), China National Knowledge Infrastructure (CNKI), and Wanfang Academic Journal Full-text Database (Wanfang). Subject headings retrieve and basic retrieve were both adopted. The retrieve words were: 'perimenopause' and 'menopause' respectively matching with 'acupuncture-moxibustion', 'acupuncture', 'moxibustion', 'electroacupuncture', 'filiform needle', 'hydroacupuncture', 'acupoint injection', 'fire-needle therapy', 'elongated needle', 'three-edge needle', 'dermal needle', 'intradermal needle', 'acupoint thread-embedding', and 'acupoint application'. The range of time for retrieve was from January 2007 to December 2016. The data retrieve was conducted in January 2017.

1.2 Inclusion criteria

Clinical studies on various acupuncture-moxibustion methods in treating PMS; firsthand data.

1.3 Exclusion criteria

Reduplicate literatures; review, experimental studies, theoretical discussions, and case studies.

1.4 Data mining

Eligible literatures were put into Excel. SPSS 19.0 software was used to analyze the frequencies of commonly-used acupoints, point groups, and their

meridian affiliations. The top 20 acupoints would run Q-type cluster analysis by SPSS 19.0. The dendrogram would be drawn based on inter-group association and squared Euclidean distance. With SPSS Modeler 18.0, the association pattern were analyzed by Apriori method.

2 Results and Analysis

A total of 623 literatures were retrieved. After the titles, abstracts, and full texts were carefully read, 255 articles were finally collected according to the inclusion and exclusion criteria.

2.1 Descriptive analysis

The use frequency of acupoints and meridian affiliations of the 255 acupuncture-moxibustion prescriptions were studied. A total of 131 acupoints were involved with a total frequency of 1 636. In their ranking order, the top 20 acupoints included Sanyinjiao (SP 6), Shenshu (BL 23), Guanyuan (CV 4), Baihui (GV 20), Shenmen (HT 7), Zusanli (ST 36), Ganshu (BL 18), Taichong (LR 3), and Taixi (KI 3), (Table 1).

Table 1. Commonly-used acupoints in acupuncture-moxibustion treatment of PMS

Order	Acupoint	Frequency	Relative frequency (%)
1	Sanyinjiao (SP 6)	157	9.60
2	Shenshu (BL 23)	118	7.21
3	Guanyuan (CV 4)	111	6.78
4	Baihui (GV 20)	92	5.62
5	Shenmen (HT 7)	79	4.83
6	Zusanli (ST 36)	76	4.65
7	Ganshu (BL 18)	74	4.52
8	Taichong (LR 3)	71	4.34
9	Taixi (KI 3)	58	3.55
10	Pishu (BL 20)	55	3.36
11	Xinshu (BL 15)	54	3.30
12	Qihai (CV 6)	53	3.24
13	Neiguan (PC 6)	51	3.12
14	Sishencong (EX-HN 1)	37	2.26
15	Zhongwan (CV 12)	34	2.08
16	Hegu (LI 4)	34	2.08
17	Yintang (GV 29)	24	1.47
18	Fengchi (GB 20)	20	1.22
19	Zhongji (CV 3)	18	1.10
20	Feishu (BL 13)	18	1.10

The 131 acupoints were distributed in 13 meridians and extra points, predominantly Bladder Meridian,

Conception Vessel, Spleen Meridian, and Governor Vessel (Table 2).

Table 2. Commonly-used meridians and extra points in acupuncture-moxibustion treatment of PMS

Order	Meridian	Frequency	Relative frequency (%)	Number of points
1	Bladder Meridian	376	22.98	25
2	Conception Vessel	258	15.77	13
3	Spleen Meridian	189	11.55	8
4	Governor Vessel	153	9.35	17
5	Stomach Meridian	124	7.58	13
6	Extra points	114	6.97	15
7	Kidney Meridian	99	6.05	11
8	Liver Meridian	88	5.38	5
9	Heart Meridian	82	5.01	3
10	Pericardium Meridian	60	3.67	5
11	Large Intestine Meridian	43	2.63	2
12	Gallbladder Meridian	39	2.38	8
13	Triple Energizer Meridian	8	0.49	4
14	Lung Meridian	3	0.18	2

2.2 Cluster analysis

Hierarchical clustering was used to analyze and extract the information of the top 20 acupoints. Five valid clusters were obtained: Sanyinjiao (SP 6); Shenshu (BL 23) and Guanyuan (CV 4); Baihui (GV 20), Shenmen (HT 7), Zusanli (ST 36), Ganshu (BL 18) and Taichong (LR 3); Taixi (KI 3), Pishu (BL 20), Xinshu (BL 15), Qihai (CV 6) and Neiguan (PC 6); Sishencong (EX-HN 1), Zhongwan (CV 12), Hegu (LI 4), Yintang (GV 29), Fengchi (GB 20), Zhongji (CV 3) and Feishu (BL 13).

According to the analysis, the 20 acupoints were classified into two types. One type was major points, including Sanyinjiao (SP 6), Shenshu (BL 23) and Guanyuan (CV 4). The other type was syndrome-differentiation points, including Hegu (LI 4), Zhongwan (CV 12) and Sishencong (EX-HN 1); Feishu (BL 13), Zhongji (CV 3), Fengchi (GB 20) and Yintang (GV 29); Xinshu (BL 15), Pishu (BL 20), Qihai (CV 6), Neiguan (PC 6) and Taixi (KI 3); Ganshu (BL 18), Zusanli (ST 36), Shenmen (HT 7), Taichong (LR 3) and Baihui (GV 20), (Figure 1).

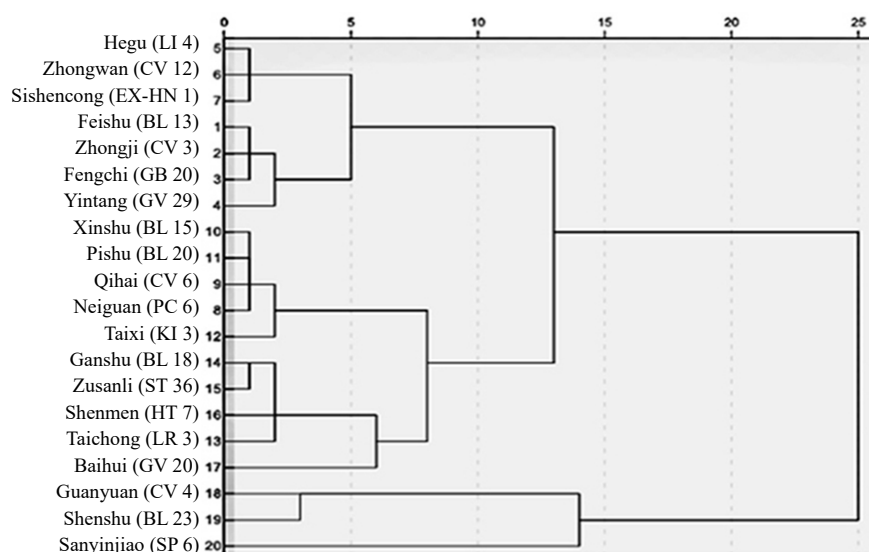


Figure 1. Dendrogram of the 20 high-frequency points

2.3 Association rules analysis

Among the acupuncture-moxibustion prescriptions for PMS, Shenshu (BL 23) and Sanyinjiao (SP 6) won the highest rate of support in acupoint pairings. It's indicated that: the prescriptions containing both Shenshu (BL 23) and Sanyinjiao (SP 6) accounted for 45.74%; the rate of confidence, i.e. the rate that Sanyinjiao (SP 6) occurred in the prescriptions that contained Shenshu (BL 23), was 74.58%. Among acupoint groupings, the group of Ganshu (BL 18),

Shenshu (BL 23) and Sanyinjiao (SP 6) won the highest rate of support. It's suggested that: the prescriptions concurrently containing the three acupoints accounted for 26.36%; the rate that Sanyinjiao (SP 6) occurred in the prescriptions that contained both Ganshu (BL 18) and Shenshu (BL 23), i.e. the rate of confidence, was 75.00% (Table 3). The combination network of the commonly-used acupoints in the treatment of PMS is shown in Figure 2.

Table 3. Analysis of commonly-used points in the treatment of PMS (rate of confidence >70%, rate of support >15%)

Order	Acupoint grouping		Rate of support (%)	Rate of confidence (%)	Increase
	Latter item	Former item			
1	Shenshu (BL 23)	Pishu (BL 20), Sanyinjiao (SP 6)	15.50	95.00	2.08
2	Shenshu (BL 23)	Ganshu (BL 18), Sanyinjiao (SP 6)	20.93	94.44	2.07
3	Sanyinjiao (SP 6)	Zusanli (ST 36), Shenshu (BL 23)	17.83	93.48	1.54
4	Shenshu (BL 23)	Pishu (BL 20)	21.32	92.73	2.03
5	Shenshu (BL 23)	Ganshu (BL 18)	28.68	91.89	2.01
6	Shenshu (BL 23)	Xinshu (BL 15), Ganshu (BL 18)	17.44	91.11	1.99
7	Shenshu (BL 23)	Pishu (BL 20), Ganshu (BL 18)	16.67	90.70	1.98
8	Sanyinjiao (SP 6)	Zusanli (ST 36)	29.46	89.47	1.47
9	Sanyinjiao (SP 6)	Baihui (GV 20), Guanyuan (CV 4)	15.89	87.81	1.44
10	Ganshu (BL 18)	Xinshu (BL 15), Shenshu (BL 23)	18.22	87.23	3.04
11	Shenshu (BL 23)	Xinshu (BL 15)	20.93	87.04	1.90
12	Sanyinjiao (SP 6)	Shenmen (HT 7)	30.62	86.08	1.41
13	Sanyinjiao (SP 6)	Baihui (GV 20), Shenshu (BL 23)	15.12	84.62	1.39
14	Ganshu (BL 18)	Xinshu (BL 15)	20.93	83.33	2.91
15	Guanyuan (CV 4)	Qihai (CV 6)	20.54	83.02	1.93
16	Sanyinjiao (SP 6)	Taixi (KI 3)	22.48	82.76	1.36
17	Sanyinjiao (SP 6)	Shenmen (HT 7), Baihui (GV 20)	20.16	82.69	1.36
18	Sanyinjiao (SP 6)	Guanyuan (CV 4), Shenshu (BL 23)	19.77	78.43	1.29
19	Ganshu (BL 18)	Pishu (BL 20)	21.32	78.18	2.73
20	Ganshu (BL 18)	Pishu (BL 20), Sanyinjiao (SP 6)	15.50	77.50	2.70
21	Ganshu (BL 18)	Pishu (BL 20), Shenshu (BL 23)	19.77	76.47	2.67
22	Sanyinjiao (SP 6)	Baihui (GV 20)	35.66	76.09	1.25
23	Sanyinjiao (SP 6)	Taichong (LR 3)	27.52	76.06	1.25
24	Sanyinjiao (SP 6)	Ganshu (BL 18), Shenshu (BL 23)	26.36	75.00	1.23
25	Sanyinjiao (SP 6)	Shenshu (BL 23)	45.74	74.58	1.23
26	Sanyinjiao (SP 6)	Neiguan (PC 6)	19.77	74.51	1.22
27	Sanyinjiao (SP 6)	Pishu (BL 20), Shenshu (BL 23)	19.77	74.51	1.22
28	Sanyinjiao (SP 6)	Pishu (BL 20), Ganshu (BL 18), Shenshu (BL 23)	15.12	74.36	1.22
29	Sanyinjiao (SP 6)	Ganshu (BL 18)	28.68	72.97	1.20
30	Sanyinjiao (SP 6)	Pishu (BL 20)	21.32	72.73	1.20
31	Sanyinjiao (SP 6)	Xinshu (BL 15), Shenshu (BL 23)	18.22	72.34	1.19
32	Xinshu (BL 15)	Pishu (BL 20), Ganshu (BL 18)	16.67	72.09	3.44
33	Sanyinjiao (SP 6)	Pishu (BL 20), Ganshu (BL 18)	16.67	72.09	1.19
34	Ganshu (BL 18)	Baihui (GV 20), Shenshu (BL 23)	15.12	71.80	2.50
35	Xinshu (BL 15)	Pishu (BL 20), Ganshu (BL 18), Shenshu (BL 23)	15.12	71.80	3.43
36	Sanyinjiao (SP 6)	Xinshu (BL 15), Ganshu (BL 18), Shenshu (BL 23)	15.89	70.73	1.16
37	Sanyinjiao (SP 6)	Guanyuan (CV 4)	43.02	70.27	1.16

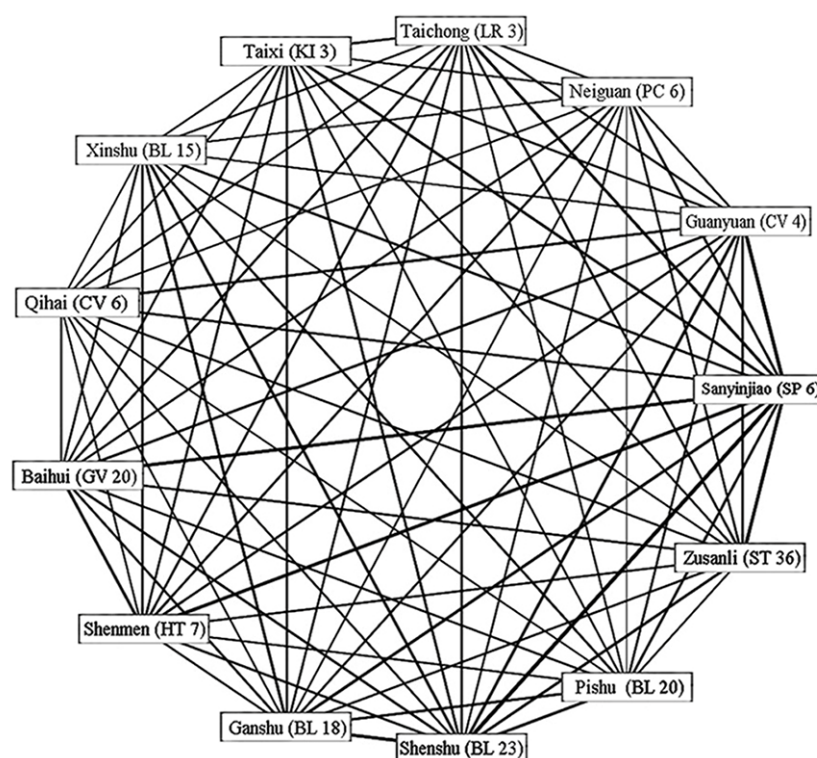


Figure 2. Combination network of commonly-used acupoints in treating PMS

3 Discussion

More and more clinical reports about acupuncture-moxibustion in treating PMS have emerged during the recent years. Acupuncture-moxibustion therapy has significant efficacy and specific advantage in treating PMS^[12]. So far, acupuncture, auricular acupuncture, acupuncture plus medication, and acupuncture plus auricular acupuncture are commonly-used methods^[13-17].

Around menopause, women usually suffer from kidney-qi depletion, deficient function of the Thoroughfare and Conception Vessels, insufficient essence and blood, and imbalance between yin and yang, which consequently lead to PMS. PMS is located in the kidney, but closely associated with the liver, spleen and heart at the same time^[18]. Kidney deficiency is regarded as the main factor in pathogenesis while insufficient liver blood should also be blamed^[19].

The current study showed that in the treatment of PMS with acupuncture, Bladder Meridian was most commonly selected. It's because that the Back-Shu points of five Zang organs all belong to this meridian. Of which, Shenshu (BL 23) ranked the top in the frequency list, followed by Ganshu (BL 18), Pishu (BL 20) and Xinshu (BL 15). These points all conform to the location of PMS^[20]. In the order of frequency list, the commonly-used acupoints in treating PMS were Sanyinjiao (SP 6), Shenshu (BL 23), Guanyuan (CV 4), Baihui (GV 20), Shenmen (HT 7), Zusanli (ST 36), Ganshu (BL 18), Taichong (LR 3) and Taixi (KI 3), which are points

with function to tonify liver and kidney, supplement essence and blood, and regulate the Thoroughfare and Conception Vessels. It's in accordance with the pathogenesis of PMS.

The cluster analysis of the top 20 acupoints in the frequency list obtained 5 valid clusters. Of which, Sanyinjiao (SP 6) alone was a cluster, with the highest frequency. Thus, we can say that Sanyinjiao (SP 6) is the No.1 key point in acupuncture-moxibustion treatment of PMS. It can be explained by its function in adjusting kidney, liver and spleen, harmonizing qi and blood, nourishing the uterus, and regulating the Thoroughfare and Conception Vessels, subsequently producing positive effect on reproductive and endocrine systems^[21-23]. The diagram revealed that Sanyinjiao (SP 6), Shenshu (BL 23) and Guanyuan (CV 4) were crucial points in the treatment of PMS. The association pattern analysis showed that the leading two pairs of acupoints regarding the rate of support were: Shenshu (BL 23) and Sanyinjiao (SP 6); Guanyuan (CV 4) and Sanyinjiao (SP 6). When working together, Guanyuan (CV 4) and Sanyinjiao (SP 6) can regulate the activity of hypothalamus and produce a positive regulation on hypothalamic-pituitary-gonadal axis^[24-25]. Plus Shenshu (BL 23), they can reinforce kidney essence, and regulate Thoroughfare and Conception Vessels. Hegu (LI 4), Zhongwan (CV 12) and Sishencong (EX-HN 1) can harmonize the stomach and dissolve phlegm, awaken brain and open orifices. This group of points is suitable for pattern of accumulation of phlegm. Feishu (BL 13), Zhongji (CV 3), Fengchi (GB 20) and Yintang (GV 29) can

disperse wind and release external pathogens, unblock and regulate water flow. Thus, this group can be used to treat vertigo, headache, perspiration, and difficulty urinating. Xinshu (BL 15), Pishu (BL 20), Qihai (CV 6), Neiguan (PC 6), and Taixi (KI 3) can calm heart and mind, tonify the spleen and regulate qi flow, used for heart-spleen deficiency. Ganshu (BL 18), Zusanli (ST 36), Shenmen (HT 7), Taichong (LR 3) and Baihui (GV 20) act to soothe the liver and cease the wind, unblock meridians and collaterals, used for pattern of hyperactivity of liver yang. Therefore, in treating PMS in clinic, adjunct acupoints can be modified according to syndromes and symptoms based on the selection of key points.

To conclude, the results in this study indicate that the acupoints selection principles in acupuncture-moxibustion treatment of PMS conform to the pathogenesis, location and syndrome of the disease, able to provide references for the treatment of PMS in acupuncture clinic. Nevertheless, current literatures about acupuncture-moxibustion treatment of PMS still need to improve in some aspects: the prescriptions are not unified^[26-28], various assistant therapies^[29-31], lack of evidence-based standardized treatment protocol for wide application. Meanwhile, perimenopausal women usually present significant decline in general structure and function, which is closely related to body constitution^[32-33]. Hence, in the future, when treating PMS with acupuncture-moxibustion, physicians should also consider to differentiate body constitutions in addition to syndromes, so as to provide novel idea for disease prevention and health care of perimenopausal women^[34-35].

Conflict of Interest

The authors declared that there was no potential conflict of interest in this article.

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