

# Points selection pattern in acupuncture-moxibustion treatment of gouty arthritis: an analysis based on bibliometrics

## 基于文献计量学的针灸治疗痛风性关节炎选穴规律分析

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### Abstract

**Objective:** To discuss the selection pattern of points and meridians in acupuncture-moxibustion treatment of gouty arthritis (GA) by analyzing clinical literatures related to GA, and to provide reference for acupuncture-moxibustion treatment of GA.

**Methods:** Clinical literatures related to GA treated with acupuncture-moxibustion published between January 1981 and July 2017 were collected from Chinese databases. The points, meridians, frequency and treatment methods were analyzed.

**Results:** A total of 78 studies were included. For meridians, the top 5 meridians used were the Spleen Meridian (67 times), Liver Meridian (59 times), Stomach Meridian (53 times), Kidney Meridian (49 times) and Large Intestine Meridian (44 times). For points selection, the leading 5 points were Taichong (LR 3) (79 times), Taibai (SP 3) (68 times), Sanyinjiao (SP 6) (61 times), Taixi (KI 3) (57 times) and Yinlingquan (SP 9) (55 times). For major and adjunct points, the 5 most significant major points were Taichong (LR 3) (79 times), Taibai (SP 3) (68 times), Sanyinjiao (SP 6) (61 times), Yinlingquan (SP 9) (37 times) and Taixi (KI 3) (32 times). The 5 most significant adjunct points were Yanglingquan (GB 34) (31 times), Fenglong (ST 40) (30 times), Xuehai (SP 10) (29 times), Taixi (KI 3) (25 times) and Quchi (LI 11) (21 times). For treatment methods, the top 5 methods used were acupuncture-moxibustion alone for 15 studies, acupuncture combined with medicinal herbs for 11 studies, acupuncture-moxibustion combined with medicinal herbs for 10 studies, acupuncture alone for 7 studies, and electroacupuncture combined with bloodletting for 5 studies.

**Conclusion:** The main meridians chosen in acupuncture-moxibustion treatment of GA were the Spleen, Liver, Stomach, Kidney and Large Intestine Meridians, conforming to the syndrome differentiation principle of tonifying spleen and kidney, clearing heat and draining dampness. Points mainly locate at lower limbs and feet around the affected area, which was a reflection of peripheral treatment function of points. The data mining results of meridian and point selection in acupuncture-moxibustion treatment of GA conform to the disease and syndrome differentiation theory and provide references for acupuncture-moxibustion treatment of GA.

**Keywords:** Acupuncture Therapy; Moxibustion Therapy; Acupuncture-moxibustion Therapy; Arthritis, Gouty; Point Selection; Bibliometrics

**【摘要】目的:** 基于文献计量学对针灸治疗痛风性关节炎(GA)的临床文献进行梳理, 分析针灸治疗 GA 的择经特点与选穴规律, 为 GA 的针灸临床提供参考依据。**方法:** 运用文献计量分析法, 对 1981 年 1 月到 2017 年 7 月之间国内中文数据库中针灸治疗 GA 的临床研究文献进行搜集和遴选, 对纳入文献中的腧穴种类、归经、使用频次和治疗方法进行统计分析。**结果:** 筛选出符合纳入标准的文献 78 篇。从择经频次分析, 经脉频次排名前 5 位的依次为脾经(67 次)、肝经(59 次)、胃经(53 次)、肾经(49 次)和大肠经(44 次)。从选穴频次分析, 穴位频次排名前 5 位的依次为太冲(79 次)、太白(68 次)、三阴交(61 次)、太溪(57 次)和阴陵泉(55 次)。从主穴、配穴配伍处方分析, 主穴频次排名前 5 位的依次为太冲(79 次)、太白(68 次)、三阴交(61 次)、阴陵泉(37 次)和太溪(32 次); 配穴频次排名前 5 位的依次为阳陵泉(31 次)、丰隆(30 次)、血海(29 次)、太溪(25 次)和曲池(21 次)。从治疗方法分析, 排名前 5 位的依次为单独针灸治疗的文献 15 篇, 针刺加药物的文献 11 篇, 针灸加药物的文献 10 篇, 单独针刺文献 7 篇, 电针加放血的文献 5 篇。**结论:** 针灸治疗 GA 主要选择脾经、肝经、胃经、肾经和大肠经, 遵循补益脾肾、清热利湿的辨证论治原则。取穴以足部及下肢穴为主, 主要是局部取穴, 体现了穴位的近治作用。针灸治疗 GA 择经取穴具有辨病、辨证相结合的特点和规律, 可为针灸治疗 GA 提供参考。

【关键词】针刺疗法; 灸法; 针灸疗法; 关节炎, 痛风性; 选穴; 文献计量学

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Gouty arthritis (GA) is a metabolic disorder caused by genetic or environmental factors, and characterized by purine metabolism failure and elevated level of uric acid in the blood. Elevated levels of uric acid leads to crystals precipitating in joints and can cause acute inflammatory arthritis—a red, tender, hot, swollen joint and movement dysfunction. GA affects about 0.34%-2.84% population in China in all age groups. GA is linked with living habit and dietary structure, and the recurrence rate is high. It puts a substantial burden on patients' quality of life and has become an urgent issue to address in medical field.

With the development of modern medicine, the pathogenesis of acute GA has gained some progress with the help of molecular biology, while the causes and mechanism of GA still remain unclear. Western medicine advocates using non-steroidal anti-inflammatory drugs (NSAIDs) for treating GA, while the adverse event is common with a disappointing long-term effect. Acupuncture-moxibustion can treat GA with a rapid action, low cost and easy manipulation without causing adverse reactions. It can relieve inflammation, reduce pain, lower blood acid and has been proven as an effective method in treating acute GA<sup>[1-2]</sup>. Hence, we collected the relevant literatures to analyze the features in points selection and combination in acupuncture-moxibustion treatment of GA based on bibliometrics, with a hope to provide references for clinical application.

## 1 Subjects and Methods

### 1.1 Resources

The target databases included China National Knowledge Infrastructure (CNKI), Wanfang Academic Journal Full-text Database (Wanfang), and Chongqing VIP Database (CQVIP). All included documents were journal articles, without master or doctor students' theses, conference articles or articles from newspapers.

### 1.2 Retrieve method

Subject headings retrieve and basic retrieve were both adopted. The retrieve words were 'Acupuncture', 'Moxibustion', 'Acupuncture-moxibustion', 'Electro-acupuncture (EA)', 'Acupoint/point thread-embedding', 'Bloodletting' respectively matching with 'Gouty arthritis' and 'Clinical research'. The range of time for retrieve was between January 1981 and July 2017.

### 1.3 Inclusion criteria

Clinical studies on various acupuncture-moxibustion methods in treating GA; acupuncture-moxibustion treatments were the main methods, including acupuncture, EA, moxibustion, warm needling acupuncture, bloodletting, cupping, thread-embedding, and acupoint/point injection; the diagnostic and

evaluation criteria were all based on international or domestic general standards; the meridians and points selection all met the standards formulated by State Administration of Traditional Chinese Medicine; only included one article among all with similar contents or same authors; only counted one with the same meridians or points in one article.

### 1.4 Exclusion criteria

Literature review or recitation, master or doctoral degree candidates' theses; articles about animal experiments; clinical research with sample size below 30 in each group (2 groups) or 20 (3 groups); took none acupuncture-moxibustion treatment methods, like those only adopted medicinal herbs, prescription, bloodletting, plum-blossom needle or other methods; points or meridians used were not included in authority textbooks; invalid results or literature with no statistical significance.

### 1.5 Data mining

Eligible literatures were categorized and put into Microsoft Excel 2016 according to the publishing time, publishing amount, meridians or points selection and the frequency of meridians and points used were analyzed.

## 2 Results

A total of 342 literatures were retrieved in three databases. According to the exclusion criteria, 118 articles of literature review, conference articles or academic dissertation, 44 animal experiment articles, 27 repetitive articles, 58 articles with other treatment methods or experience introduction, and 17 clinical studies with small sample size were excluded. Finally, 78 articles were recruited according to the inclusion criteria.

### 2.1 Frequency of meridian selection

Of all the 78 articles, 14 meridians were involved<sup>[3-10]</sup>. The frequency of the Spleen Meridian was 67 times, Liver Meridian 59 times, Stomach Meridian 53 times, Kidney Meridian 49 times, Large Intestine Meridian 44 times, Gallbladder Meridian 38 times, Bladder Meridian 35 times, Triple Energizer Meridian 28 times, Small Intestine Meridian 24 times, Lung Meridian 21 times, Heart Meridian 17 times, Governor Vessel 12 times, Pericardium Meridian 7 times, and Conception Vessel 3 times (Figure 1).

### 2.2 Frequency of point selection

Of all the 78 articles, 109 points were involved, all pertained to the 14 meridians<sup>[11-15]</sup>. The top 20 points used were Taichong (LR 3) (79 times), Taibai (SP 3) (68 times), Sanyinjiao (SP 6) (61 times), Taixi (KI 3) (57 times) and Yinlingquan (SP 9) (55 times), Zusanli (ST 36) (48

times), Xuehai (SP 10) (44 times), Yanglingquan (GB 34) (42 times), Fenglong (ST 40) (39 times), Quchi (LI 11) (33 times), Neiting (ST 44) (26 times), Yinbai (SP 1) (19 times), Shousanli (LI 10) (13 times), Pishu (BL 20) (11

times), Shenshu (BL 23) (10 times), Shaohai (HT 3) (8 times), Xiaohai (SI 8) (7 times), Neiguan (PC 6) (5 times), Waiguan (TE 5) (4 times), and Houxi (SI 3) (3 times), (Figure 2).

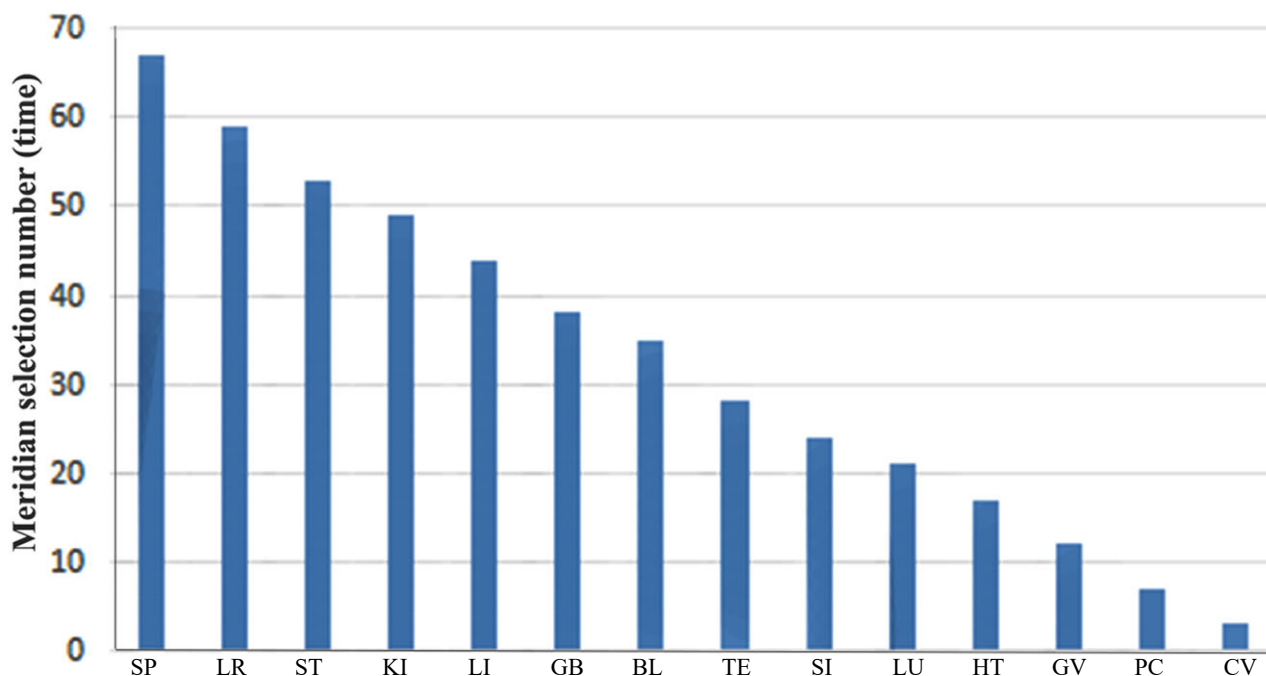


Figure 1. Frequency of meridians

Note: SP=Spleen Meridian; LR= Liver Meridian; ST=Stomach Meridian; KI=Kidney Meridian; LI=Large Intestine Meridian; GB=Gallbladder Meridian; BL=Bladder Meridian; TE=Triple Energizer Meridian; SI=Small Intestine Meridian; LU=Lung Meridian; HT=Heart Meridian; GV=Governor Vessel; PC=Pericardium Meridian; CV=Conception Vessel

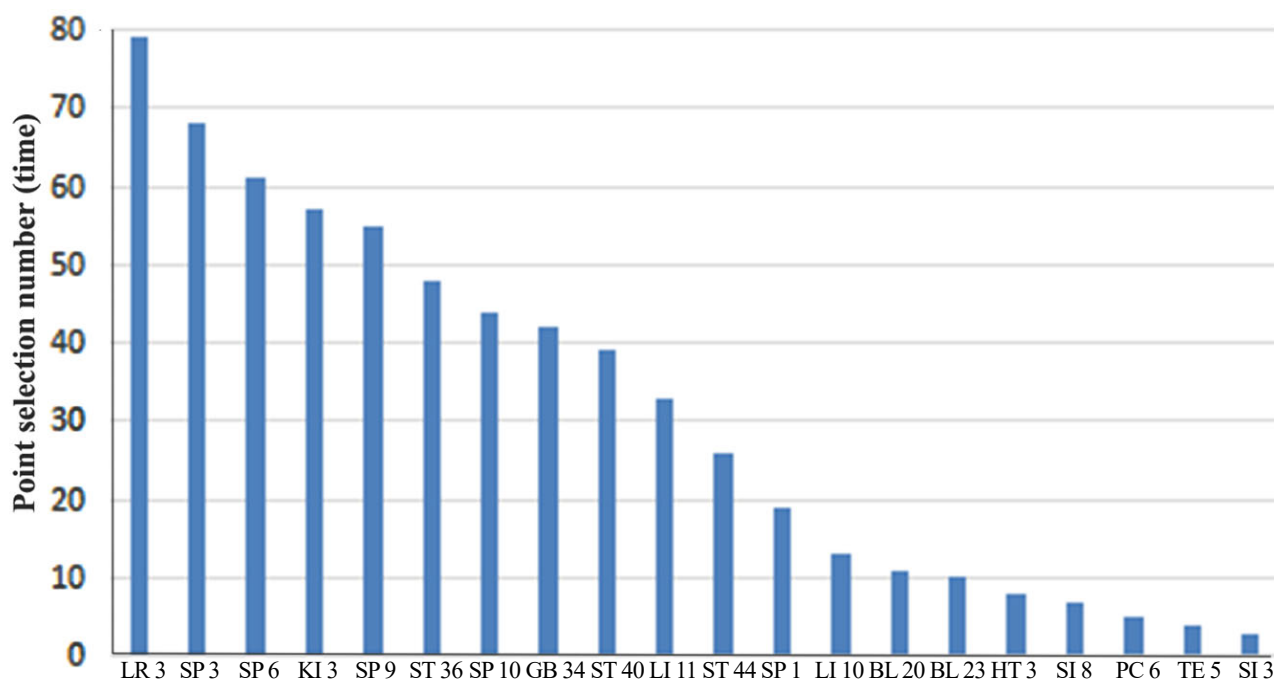


Figure 2. Frequency of points (top 20)

Note: LR 3=Taichong (LR3); SP 3=Taibai (SP 3); SP 6=Sanyinjiao (SP 6); KI 3=Taixi (KI 3); SP 9=Yinlingquan (SP 9); ST 36=Zusanli (ST 36); SP 10=Xuehai (SP 10); GB 34=Yanglingquan (GB 34); ST 40=Fenglong (ST 40); LI 11=Quchi (LI 11); ST 44= Neiting (ST 44); SP 1=Yinbai (SP 1); LI 10=Shousanli (LI 10); BL 20=Pishu (BL 20); BL 23=Shenshu (BL 23); HT 3=Shaohai (HT 3); SI 8=Xiaohai (SI 8); PC 6=Neiguan (PC 6); TE 5=Waiguan (TE 5); SI 3=Houxi (SI 3)

### 2.3 Number and frequency of major and adjunct points

Of the 78 articles, a total of 109 points were involved with a total frequency of 1 057. Forty-nine major points were used for 638 times, 72 adjunct points were used for 419 times, and 12 major and adjunct points were repeated and used for 198 times<sup>[16-23]</sup>. In their ranking order, the top 20 major points included Taichong (LR 3) (79 times), Taibai (SP 3) (68 times), Sanyinjiao (SP 6) (61 times), Yinlingquan (SP 9) (37 times), Taixi (KI 3) (32 times), Zusanli (ST 36) (28 times), Yinbai (SP 1) (19 times), Xuehai (SP 10) (15 times), Quchi (LI 11) (12 times), Yanglingquan (GB 34) (11 times), Neiting (ST 44) (11 times), Pishu (BL 20) (11 times), Shenshu (BL 23) (10 times), Fenglong (ST 40) (9 times), Shaohai (HT 3) (8 times), Xiaohai (SI 8) (7 times), Neiguan (PC 6) (5 times), Waiguan (TE 5) (4 times), Houxi (LI 10) (3 times), and Shousanli (LI 10) (3 times), (Figure 3).

The top 20 adjunct points included Yanglingquan (GB 34) (31 times), Fenglong (ST 40) (30 times), Xuehai (SP 10) (29 times), Taixi (KI 3) (25 times), Quchi (LI 11) (21 times), Zusanli (ST 36) (20 times), Yinlingquan (SP 9) (18 times), Neiting (ST 44) (15 times), Shousanli (LI 10) (10 times), Xingjian (LR 2) (2 times), Jiexi (ST 41) (2

times), Shangjuxu (ST 37) (2 times), Liangqiu (ST 34) (2 times), Tianshu (ST 25) (2 times), Zhaohai (KI 6) (2 times), Fuliu (KI 7) (2 times), Qiuxu (GB 40) (2 times), Kunlun (BL 60) (2 times), Weizhong (BL 40) (2 times), and Shenmai (BL 62) (2 times), (Figure 4).

### 2.4 Treatment methods

Of the 78 articles, acupuncture-moxibustion method was used for 15 times, acupuncture-moxibustion plus medication for 10 times, acupuncture-moxibustion plus bloodletting for 4 times, acupuncture-moxibustion plus fire-needling for once, acupuncture-moxibustion plus cupping for once, EA alone for 5 times, EA plus medicinal herb for twice, EA plus bloodletting for 5 times, EA plus acupoint injection for 4 times, EA plus moxibustion for 3 times, EA plus blocking for once, acupuncture alone for 7 times, acupuncture plus medicinal herbs for 11 times, acupuncture plus infrared radiation for 3 times, acupuncture plus cupping for once, acupuncture plus bloodletting for once, acupuncture plus fire-needling for once, moxibustion alone for once, moxibustion plus medicinal herbs for once, and moxibustion plus bloodletting for once<sup>[24-28]</sup>, (Figure 5).

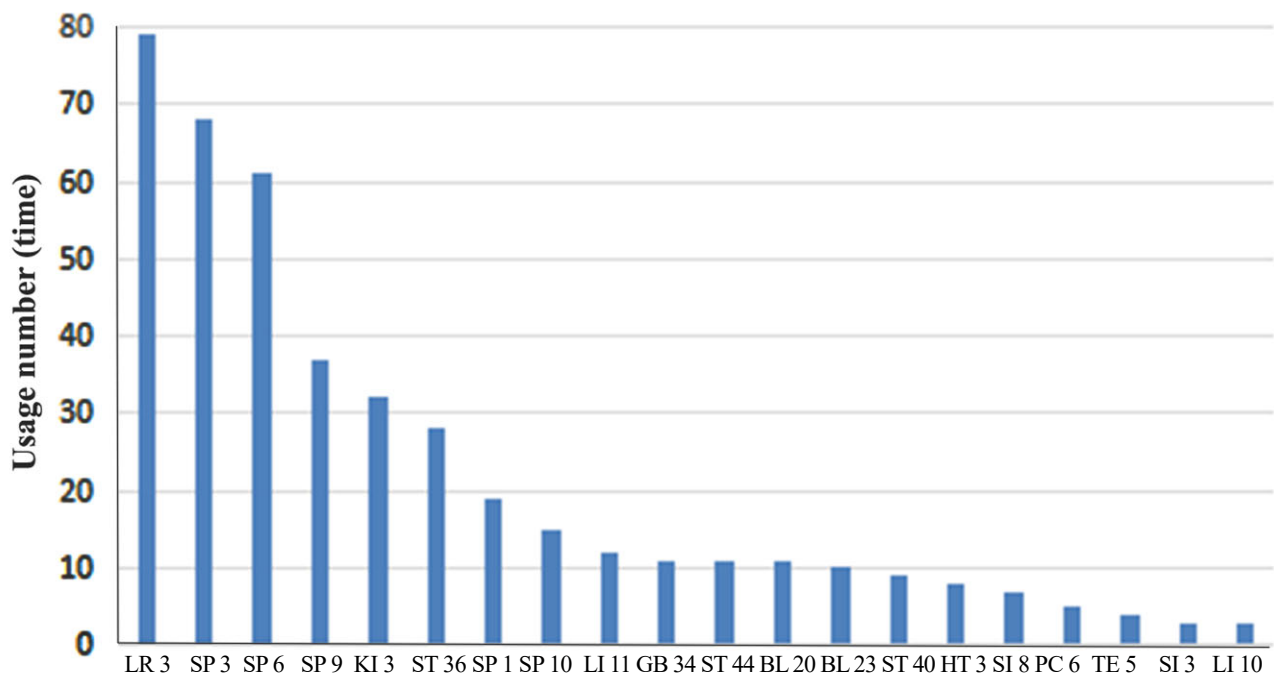


Figure 3. Frequency of major points (top 20)

Note: LR 3=Taichong (LR3); SP 3=Taibai (SP 3); SP 6=Sanyinjiao (SP 6); SP 9=Yinlingquan (SP 9); KI 3=Taixi (KI 3); ST 36=Zusanli (ST 36); SP 1=Yinbai (SP 1); SP 10=Xuehai (SP 10); LI 11=Quchi (LI 11); GB 34=Yanglingquan (GB 34); ST 44=Neiting (ST 44); BL 20=Pishu (BL 20); BL 23=Shenshu (BL 23); ST 40=Fenglong (ST 40); HT 3=Shaohai (HT 3); SI 8=Xiaohai (SI 8); PC 6=Neiguan (PC 6); TE 5=Waiguan (TE 5); SI 3=Houxi (SI 3); LI 10=Shousanli (LI 10)

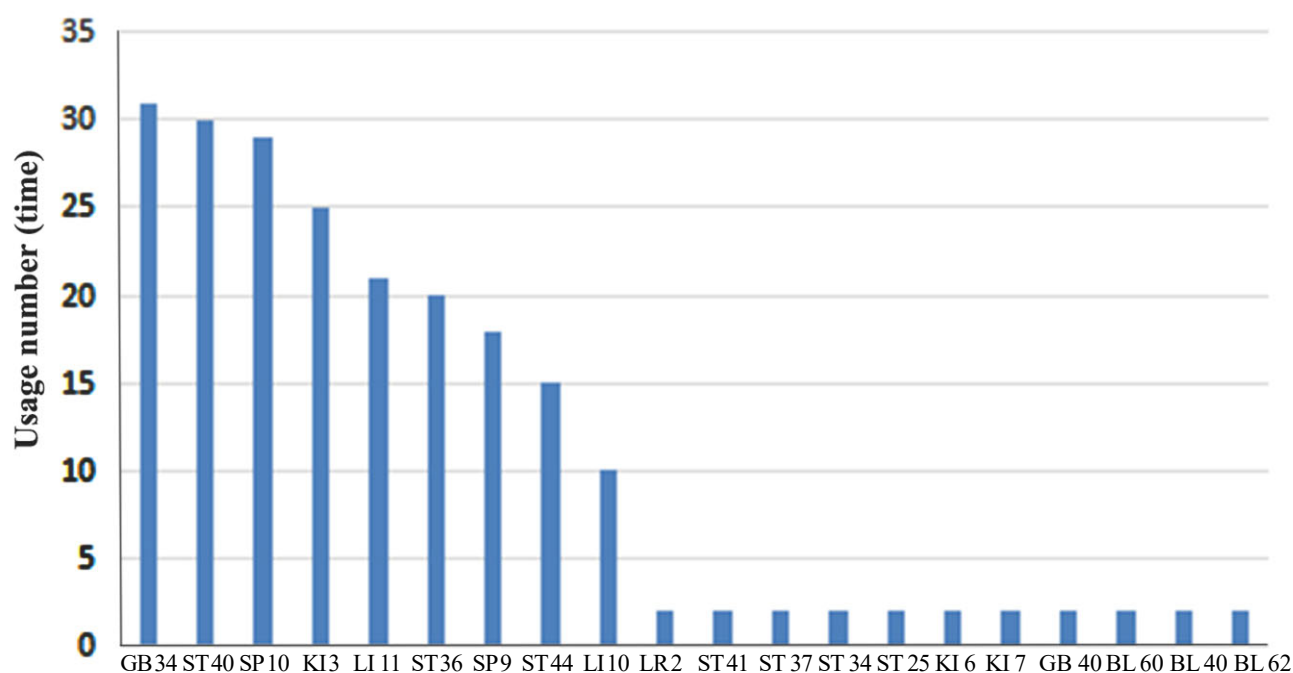


Figure 4. Frequency of adjunct points (top 20)

Note: GB 34=Yanglingquan (GB 34); ST 40=Fenglong (ST 40); SP 10=Xuehai (SP 10); KI 3=Taixi (KI 3); LI 11=Quchi (LI 11); ST 36=Zusanli (ST 36); SP 9=Yinlingquan (SP 9); ST 44=Neiting (ST 44); LI 10=Shousanli (LI 10); LR 2=Xingjian (LR 2); ST 41=Jiexi (ST 41); ST 37=Shangjuxu (ST 37); ST 34=Liangqiu (ST 34); ST 25=Tianshu (ST 25); KI 6=Zhaohai (KI 6); KI 7=Fuliu (KI 7); GB 40=Qixu (GB 40); BL 60=Kunlun (BL 60); BL 40=Weizhong (BL 40); BL62=Shenmai (BL 62)

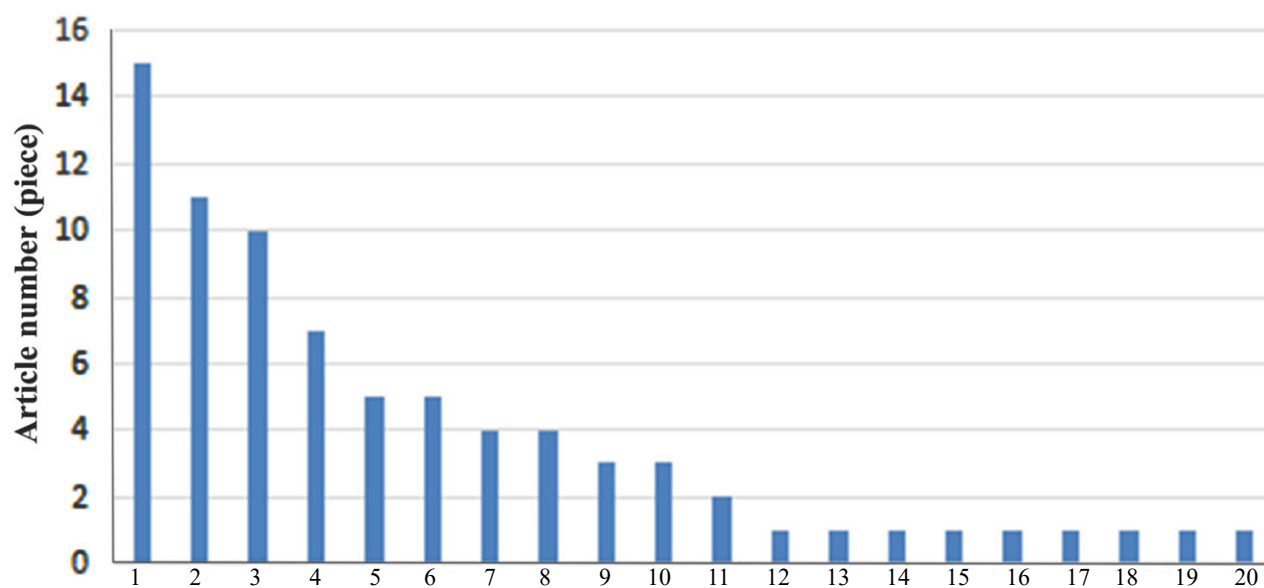


Figure 5. Treatment methods

Note: 1=Acupuncture-moxibustion alone; 2=Acupuncture plus medicinal herbs ; 3= Acupuncture-moxibustion plus medicinal herbs; 4=Acupuncture alone; 5=Electroacupuncture alone; 6=Electroacupuncture plus bloodletting; 7=Acupuncture-moxibustion plus bloodletting; 8=Electroacupuncture plus acupoint injection; 9=Acupuncture plus infrared radiation; 10=Electroacupuncture plus moxibustion; 11=Electroacupuncture plus medicinal herb; 12=Acupuncture-moxibustion plus fire-needling; 13=Acupuncture-moxibustion plus cupping; 14=Electroacupuncture plus blocking method; 15=Acupuncture plus cupping; 16=Acupuncture plus bloodletting; 17=Acupuncture plus fire-needling; 18=Moxibustion alone; 19=Moxibustion plus medicinal herbs; 20=Moxibustion plus bloodletting

### 3 Discussion

GA Gouty arthritis falls under the category of Bi-impediment syndrome or joint wind in Chinese medicine. Doctors in past generations believed that it results from both internal and external factors. Internal factors manifest as retention of water and phlegm fluids due to failure of the spleen to transport and transform. External factors include an improper diet (e.g., overeat of oily, sweet food) damaging the spleen and stomach and causing the retained water phlegm to transform into toxins, which flows with qi and blood into the joints and result in joint pain and tophi. Since disordered qi activity causes water, dampness and phlegm fluids to retain within the body and over time, transforms into heat, damp heat may affect the kidney and result in stony strangury<sup>[29]</sup>. Gouty arthritis has little to do with six exogenous pathogenic factors. It is different from Bi-impediment syndrome due to healthy qi deficiency coupled with contraction of wind, cold and dampness. It is mainly caused by dysfunctions of the spleen and kidney and often triggered by an improper diet. Consequently, in addition to clearing heat and resolving dampness, the treatment strategies are to tonify the spleen and kidney, resolve phlegm and eliminate turbidity so as to circulate qi, restore normal water metabolism and alleviate GA<sup>[30]</sup>.

By literature analysis, we found that the top 5 meridians in GA treatment were Spleen Meridian for 67 times, Liver Meridian for 59 times, Stomach Meridian for 53 times, Kidney Meridian for 49 times, Large Intestine Meridian for 44 times. The spleen governs transportation and transformation. Stimulating points on the Spleen Meridian can fortify spleen and drain dampness, transport nutrients and clear dampness-turbidity. The liver governs free coursing and dredges qi movement. Stimulating points on the Liver Meridian can regulate qi flow. The stomach governs digestion and lifting to spread essence. Stimulating points on the Stomach Meridian can facilitate spleen in transportation. The kidney regulates the waterways and governs receiving qi, which is also the root of innate endowment. Stimulating points on the Kidney Meridian can strengthen constitution and dredge waterways. The large intestine governs fluid. Stimulating points on the Large Intestine Meridian can dry dampness and clear phlegm to regain normal metabolism of water-fluid.

By point-selection frequency analysis, the top 5 points selected were Taichong (LR 3) (79 times), Taibai (SP 3) (68 times), Sanyinjiao (SP 6) (61 times), Taixi (KI 3) (57 times) and Yinlingquan (SP 9) (55 times). Taichong (LR 3) is the Yuan-Primary point of the Liver Meridian. Stimulating Taichong (LR 3) can regulate qi movement. Taibai (SP 3) is the Shu-Stream point of the Spleen Meridian. Stimulating Taibai (SP 3) can fortify the spleen, drain dampness-heat to stop pain. Besides, Taibai (SP 3)

is adjacent to the first metatarsophalangeal joint, thus it has a significant nearby treatment function of point. Sanyinjiao (SP 6) is the crossing point of the Liver, Spleen and Kidney Meridians. Stimulating Sanyinjiao (SP 6) can tonify spleen and kidney, drain dampness and clear turbidity. Taixi (KI 3) is the Yuan-Primary point of the Kidney Meridian. Stimulating Taixi (KI 3) can clear heat and move qi. Yinlingquan (SP 9) is the He-Sea point of the Spleen Meridian. Stimulating Yinlingquan (SP 9) can fortify the spleen, drain water and regulate three jiao.

Major and adjunct point analysis showed the top 5 major points in the whole 78 articles were Taichong (LR 3) (79 times), Taibai (SP 3) (68 times), Sanyinjiao (SP 6) (61 times), Yinlingquan (SP 9) (37 times) and Taixi (KI 3) (32 times), and the 5 most significant adjunct points were Yanglingquan (GB 34) (31 times), Fenglong (ST 40) (30 times), Xuehai (SP 10) (29 times), Taixi (KI 3) (25 times) and Quchi (LI 11) (21 times). Yanglingquan (GB 34) is the He-Sea point of Gallbladder Meridian, also the tendon influential points of the Eight Influential Points. It can dispel wind, stop pain, activate blood and free the collateral vessels when combined with Taichong (LR 3). Fenglong (ST 40) is the Luo-Connecting point of the Stomach Meridian and the crucial point to remove phlegm-dampness. It can harmonize the stomach, remove phlegm-dampness and dredge vessels when combined with Taibai (SP 3). Xuehai (SP 10) combining Sanyinjiao (SP 6) can fortify spleen and harmonize qi movement. Taixi (KI 3) is the Yuan-Primary point of the Kidney Meridian. It can tonify kidney and dredge waterways when combined with Shenshu (BL 23). Quchi (LI 11) is the He-Sea point of the Large Intestine Meridian. It can clear heat, release the exterior, propel wind, alleviate edema, stop pain, regulate qi and blood and dredge channel when combined with Shaohai (HT 3).

Treatment methods analysis showed the top 5 methods in the 78 articles were acupuncture-moxibustion alone for 15 studies, acupuncture combined with medicinal herbs for 11 studies, acupuncture-moxibustion combined with medicinal herbs for 10 studies, acupuncture alone for 7 studies, EA combined with bloodletting for 5 studies. The most frequently used method was acupuncture-moxibustion alone, which had a significant analgesic effect for GA with a quick onset, convenient operation, low costs and rare adverse effect.

### 4 Summary

Meridian frequency analysis showed that the main meridian used in GA treatment was the Spleen Meridian, and points used were mainly on the Spleen Meridian. Though supported by large amount of clinical research and TCM theory, the standardization and

mechanism of treatment remain unclear. Current treatment methods were not uniformed and thus hard for popularization. Therefore, clear targeted multi-center clinical randomized controlled trials (RCTs) with large sample size are required for further understanding the standardization and mechanism of meridian and point selection rules in GA treatment.

For major and adjunct points frequency analysis, removing the repeated ones, the most frequently used points in treating GA were only 20 points ( $\geq 3$  times). For the specification of the disease location (mainly on the first metatarsophalangeal joint), and characteristic of GA (mainly heat syndrome), points selected were largely on lower limbs. Because the Liver, Kidney and Spleen Meridians pass through the lower limbs, local points selection and syndrome differentiation selection were combined to alleviate pain and edema and reduce inflammation to tonify spleen and kidney, clear heat and drain dampness.

For treatment methods analysis, the most frequently used method was acupuncture-moxibustion alone. Although most studies proved its effectiveness, the acupuncture operation details, depth of insertion, point used, syndrome differentiation based point selection principle, and retaining time still lack standardization. Therefore, targeted clinical research is needed in this aspect to form consensus, which is crucial for achieving better therapeutic effect in GA treatment.

To conclude, the syndrome differentiation, meridian and point selection, combining principle and acupuncture treatment methods still lack uniformed standard, and few studies reviewed the best syndrome differentiation and point selection method in GA treatment. Therefore, studies on syndrome differentiation and combining methods in strict standardization of acupuncture treatment are of great importance, and further investigation is required in the related field.

# Conflict of Interest

There was no potential conflict of interest in this article.

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