

Clinical Observation on Distribution Characteristics and Regularity of Liminous Acupoints in Patients with PCOS Ovulation Disorder

Xiao Zhang ¹, Yuting Xiong ², Yi Zong ^{2,*}

¹ The Affiliated Hospital of Jiangxi University of TCM, Nanchang, Jiangxi, China

² Jiangxi University of Traditional Chinese Medicine, Nanchang, Jiangxi, China

* Corresponding author: Yi Zong (Email: 82307025@qq.com)

Abstract: objective based on the theory of acupoint sensitization, to explore the distribution of acupoints on the body surface of patients with polycystic ovary syndrome (PCOS) and analyze its distribution characteristics and rules, to provide a new idea of acupoint selection and theoretical basis for clinical treatment of PCOS. Methods: 60 patients with PCOS ovulation disorder were treated with whole body surface stress-sensitive acupoint exploration. The location of stress-sensitive acupoints was recorded, and the distribution of nerve segments and meridians was analyzed by frequency statistics. Results: 439 acupoints were found in all the 60 patients (7.32 ± 2.46), and the occurrence rate was 100%. In the distribution of nerve segments, limin acupoints are located in the waist (154, 35.1%), followed by the chest (T1-T12, 131, 29.8%), sacrum (S1-S5, 92, 21.0%) and neck (C1-C8, 62, 14.1%), among them, L2, L3, S1, L1, L5, and T12 segments occurred more frequently and were highly concentrated in the T10-S2 segment (275, 62.6%), this segment is the range of spinal cord nerve segments that innervate pelvic reproductive organs such as ovaries and uterus, the acupoints of li-min are kidney meridian of foot-shaoyin, ki-bl, bladder meridian of foot-taiyang, spleen meridian of foot-taiyin, conception vessel and governor vessel. Conclusion there are specific distribution of limin acupoints in patients with PCOS ovulation disorder, its distribution is highly consistent with the nerve segments (T10-S2) innervating the ovary and uterus, the kidney, spleen and liver related to reproduction in TCM theory, and the Chongren two vessels, the exploration of limin acupoints can provide objective clinical evidence and point selection basis for the diagnosis and treatment of PCOS.

Keywords: Polycystic Ovary Syndrome; Ovulation Disorder; Acupoint Sensitization; Stress-sensitive Acupoints; Distribution Law; Acupuncture.

1. Introduction

Polycystic ovary syndrome (PCOS) is an endocrine disease with high incidence, complex condition and unknown etiology. The main clinical features are ovulation disorders, hyperandrogenism and polycystic ovarian changes, the incidence of women of childbearing age is 10%-15%, accounting for 30%-40% of infertile patients [1]. The treatment is difficult, and there is no specific treatment at present. It is a hot and difficult topic in the field of gynecology and endocrinology [2]. Although there is no name for polycystic ovary syndrome in traditional Chinese medicine, according to its clinical manifestations, such as late menstruation, amenorrhea, infertility, and symptomatic abdominal mass, many will be attributed to "Late menstruation", "Amenorrhea", "Infertility", "Zhengjia" and other categories [3].

Acupoints are special parts for Qi infusion of zang-fu organs and meridians. In physiological state, they are mostly in "Resting state", while in pathological state, they are activated, mapping the pathological changes of meridians, zang-fu organs and organs, and there are corresponding heat sensitivity, electric sensitivity, force sensitivity and other reactions [4]. Some acupoints are very sensitive to mechanical stimulation such as acupuncture and massage, and can produce specific reactions such as "Pressing quickly and naturally", comfort or pain reduction, that is, limin acupoints [5]. In this study, based on the theory of acupoint sensitization, the acupoints of PCOS ovulation disorder patients were

explored, and the distribution characteristics and rules of the acupoints were explored, so as to provide a new idea of acupoint selection for acupuncture treatment of PCOS.

2. Data and Methods

The 60 patients with PCOS ovulation disorder were collected from the outpatient department of acupuncture and Moxibustion and the outpatient department of Gynecology in the Affiliated Hospital of Jiangxi University of traditional Chinese medicine from July 2024 to June 2025, the clinical diagnosis of Western medicine was polycystic ovary syndrome and met the inclusion criteria of this study, and the traditional Chinese medicine diagnosis was irregular menstruation, infertility or amenorrhea. All were female, with a minimum age of 17 years and a maximum age of 43 years, with an average of (27.9 ± 5.7) years.

3. Diagnostic Criteria

Western diagnostic criteria: referring to the Rotterdam criteria developed by the European Society of Human Reproduction and embryology (Eshre) and the American Society for Reproductive Medicine (ASRM) in May 2003 [6]: 1) Sparse ovulation or anovulation; 2) Clinical manifestations of hyperandrogenism and/or hyperandrogenism; 3) Ultrasound findings of polycystic ovary, one or both ovaries with more than 10 follicles 2-9 mm in diameter, and/or ovarian volume greater than 10 ml. PCOS can be diagnosed if two of the three conditions are met and other

causes (such as congenital adrenal cortex hyperplasia, Cushing's syndrome, androgen-secreting tumors, etc.) are excluded.

TCM diagnostic criteria: referring to the TCM diagnostic criteria of "Guiding Principles for clinical study of new drugs of traditional Chinese medicine (1993)" [7]: 1)Irregular menstruation: the menstrual cycle is advanced and/or delayed by more than 7 days and less than 2 weeks;2)Amenorrhea: over 18 years of age, menarche has not yet started, or the previous normal menarche, now more than 3 months amenorrhea; 3)Infertility: Women of childbearing age after marriage normal sex life, male reproductive function is normal, not contraceptive cohabitation for 2 years and cannot be pregnant.

Inclusion criteria:1) Diagnostic criteria for PCOS; 2) Married persons aged 20-35 years.; 3)Excluding tubal and other infertility factors and excluding male factors in pregnancy seekers; 4) Patients who consented to the study and signed an informed consent form.

Exclusion criteria: 1)Failure to meet the diagnostic criteria for PCOS; 2)Severe liver, kidney, cardio-cerebrovascular disease;3)Failure due to combined malignancy, adrenal disease, or other diseases.

Elimination and shedding criteria: 1)Patients with other diseases; 2)Large area defect and ulceration of the skin at the exploration site of the subject are not suitable for exploration.

Research methods

The design of the experiment, including the inclusion of subjects, the exploration of subjects and the processing of data, was carried out by a designated person with fair and impartial records. Clinical observational studies comply with the ethical principles of the Declaration of new Helsinki [8].

Environment of Limin acupoint Exploration: 1) Environment: choose the same consulting room, keep the indoor environment quiet, the indoor light is bright, the room temperature is 20-25 °C; 2)Position: the subject chooses the comfortable position independently, fully exposes the exploration part, rest for 10 minutes after the beginning of exploration; 3)Exploration tools: thumb pulp; 4)Exploration site: in the patient's whole body surface parts by pressing, avoid private parts; 5)Exploration preparation: to ensure the accuracy of the test specification, before the project started, the operators involved in the project received unified training in the methods of acupressure exploration and the criteria for judging force-sensitive acupoints. Only when they are skilled in operation can they perform force-sensitive acupoint exploration on the subjects, to avoid the error caused by different operators, the operator fixed the same person in the sensitizing point exploration.; 6)Exploration method: the Explorer first used the palpation method to test the pressure of the thumb pulp, and compared the "Finger force" intensity of tenderness, then the same pressure intensity was used to expand the exploration range, and the exploration area was focused on but not limited to the acupoints, and the patient's feelings were inquired and recorded, record the "Quick and natural" sensitive acupoint area (acupoint area: In the trunk, the distance between the explored force-sensitive acupoints and the nearest traditional acupoints does not exceed the range of 1 inch of the same body; in the limbs, the distance between the explored force-sensitive acupoints and the nearest traditional acupoints does not exceed the range of 0.5 inch of the same body) , objective record the location of Limin acupoints (note: the phenomenon of pressing (pinching) the same acupoint bilaterally or unilaterally in the same patient,

the number of limin acupoints is 1) . Limin acupoints refer to a kind of disease reaction points with specific effect on mechanical stimulation, which are expressed as "Quickness". "Kuai ran" has three meanings: the first refers to the instant and comfortable feeling of the patient caused by pressing; the second refers to the deqi or qi sensation transmission reaction caused by pressing; and the third refers to the comfort of the patient after his condition is relieved by pressing. Mark the limin acupoints on the human neurocutaneous ganglia diagram.

statistical methods, the EXCEL 2019 software was used to record the distribution and number of clinical sensitive areas of force sensitive acupoints, and descriptive statistical analysis was carried out. The data of the identified force-sensitive acupoints were input into SPSS 25.0 statistical software, and the frequency statistics method was used to calculate the occurrence frequency of their meridians, acupoint areas and nerve segments.

4. Results

In general, the 60 patients with PCOS ovulation disorder were all female, ranging from 17 years old to 43 years old, with an average age of (27.9 ± 5.7) years. They were all patients from the Department of acupuncture and Moxibustion and the outpatient department of Gynecology in the Affiliated Hospital of Jiangxi University of traditional Chinese medicine.

Occurrence of limin acupoints 439 limin acupoints were found in 60 patients with PCOS ovulation disorder, with an average of 7.32.2.46. See Table 1.

Table 1. 60 results of exploring limin acupoints in PCOS patients with ovulation disorder

Number of cases	Number of occurrences	Occurrence rate	Total number of limin points	Average number of cases per case
60	60	100%	439	7.32 ± 2.46

Of the 439 acupoints, 154(35.1%) are located in the waist (L1-L5) , 131(29.8%) in the chest (T1-T12) , and 92(21.0%) in the sacrum (S1-S5) In the neck (C1-c8) , 62(14.1%) points were distributed. The most frequent segments were L 2(38) , L 3(38) , S 1(32) , L 1(30) , L 5(30) and T 12(27) . Limin acupoints are mostly concentrated in the T10-S2 segment, 275(62.6%) , which is the spinal cord nerve segment that innervates the ovary, uterus and other pelvic reproductive organs. See Table 2 and Fig. 1.

Table 2. distribution of pressure sensitive acupoints at different nerve segments in patients with PCOS ovulation disorder

Nerve segments	Frequency of occurrence (unit)	Composition (%)
Neck (C1-c8)	62	14.1
Chest (T1-T12)	131	29.8
Waist (L1-L5)	154	35.1
Sacral (S1-S5)	92	21.0
Total	439	100.0

The meridian distribution of limin acupoints, the distribution of limin acupoints on the meridian shows obvious regularity and specificity, the meridians with higher frequency are kidney meridian of foot-shaoyin, ki-bl, bladder meridian of foot-taiyang, spleen meridian of foot-taiyin, Conception Meridian and Governor Meridian, which are all

related to the reproductive system. See Table 3 and Figure 2.

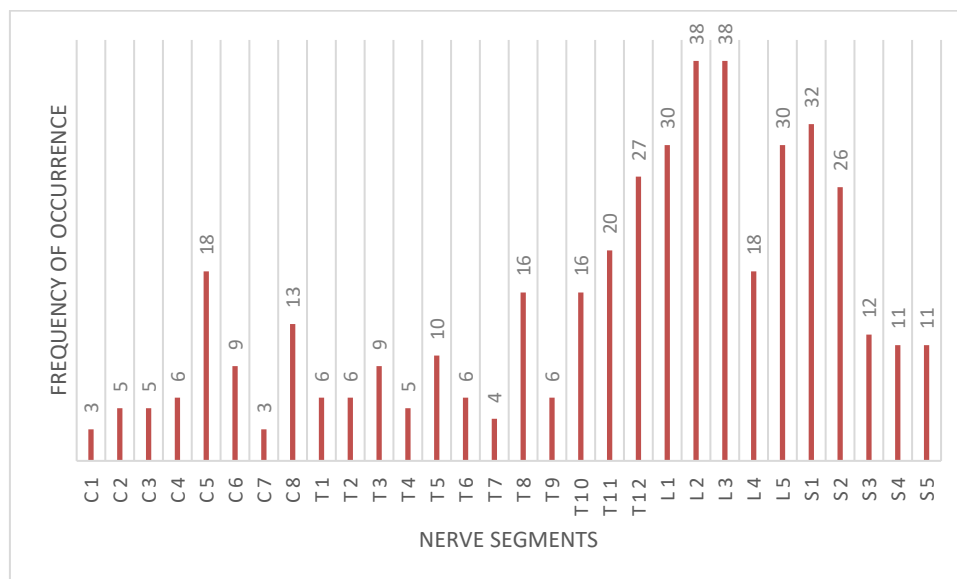


Fig 1. Distribution of nerve segments of acupoints in patients with PCOS ovulation disorder

Table 3. distribution of acupoints in meridians for patients with PCOS ovulation disorder

Meridians	Frequency of occurrence
Kidney meridian of foot-shaoyin, ki	185
BL, bladder meridian of foot-taiyang	120
Spleen meridian of foot-taiyin, SP.	102
Ren meridian	87
Tuk Ma Tei	65
Hand Yangming large intestine meridian	26
Hand Tai tai small intestine meridian	21
Lu, lung meridian of hand-taiyin	12
Stomach meridian of foot-yangming, St	12
Sanjiao meridian of hand-shaoyang, SJ	9
Non-cave areas	7
Heart Meridian of hand-shaoyin, HT	7

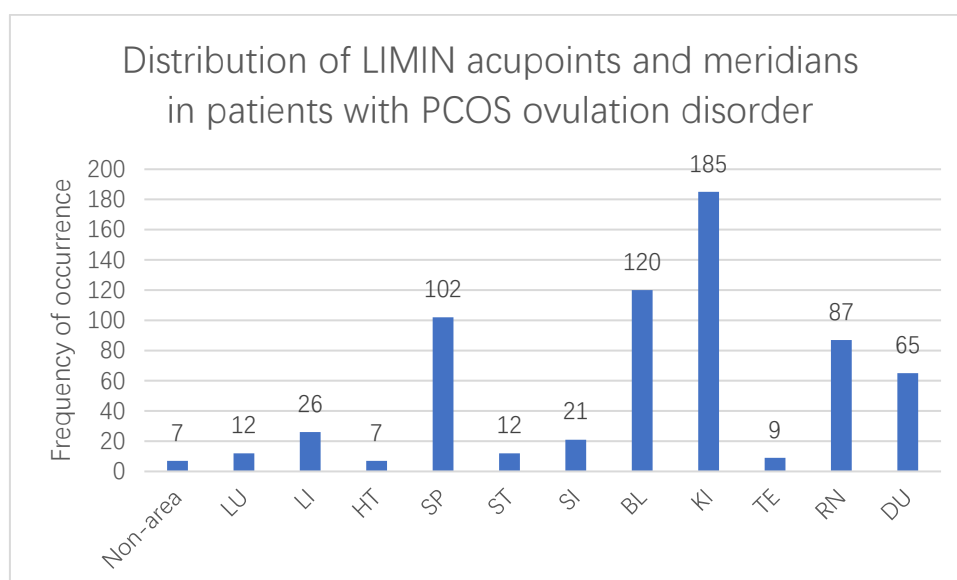


Fig 2. distribution of acupoints in patients with PCOS ovulation disorder

Polycystic ovary syndrome (PCOS) is characterized by late menstruation, amenorrhea, infertility and Zhengjia, which is closely related to the kidney, spleen, liver and Chongren pulse. Kidney is the congenital, the main possession of essence, the main reproduction, Tiangui to, Chong Ren Tongsheng, all pregnant foetuses to kidney Qi filled with the premise. Shengji zonglu has the theory that “Women have no children

because of insufficient Chongren and kidney-qi deficiency is the root cause of women's infertility”. Zhu Danxi, a physician in the Jin and Yuan dynasties, pointed out in his book Danxi xinfu that “A fat woman, who suffers a lot, and who indulges in drinking and eating, cannot bear a fetus because of the maladjustment of the water. This is called a fat body, which blocks the uterus”, it is considered that obesity and phlegm-

damp obstruction are the main factors that prevent obese women from ingesting sperm and becoming pregnant Wan Quan in the Ming dynasty, “Wanshi Women's division” also said, “Phlegm saliva stagnation, blood waves do not flow, it has expired and started to line, or a few menstrual line”; In the Qing dynasty, Wu Qian wrote in his book *Yizong Jinjian* that “If the evil of the three Yins injures the pulse of the Chong and Ren, there will be irregular menstruation... or because the old blood accumulates in the cell, the new blood cannot become pregnant”, fu Shan “Fu Qing zhu gynecology” stressed that “Women have body fat, salivating a lot, cannot be pregnant. Thus, PCOS ovulation disorder is based on kidney deficiency, phlegm-dampness and blood stasis are the standard, spleen disorder and liver disorder are also important pathogenesis.

Based on the acupoint sensitization theory proposed by Professor Chen Rixin of Jiangxi University of traditional Chinese medicine, acupoints are distributed on the body surface, individualized, dynamic and sensitized parts, there are two states of “Rest” and “Sensitization”, and the acupoints in the sensitization state are the reaction site of the disease on the body surface and the best acupuncture site for treating the disease. [4] Its theoretical origin can be traced back to “Taking pain as loss” in *Jingjin* of *lingshu* and “According to its place, pain should be explained in the middle, which is the acupoint” in *Backshu* of *Lingshu*. Modern studies have shown that a series of neurogenic reactions such as pain threshold reduction, skin temperature change and neurogenic inflammation can occur in the local tissues of relevant acupoints under diseased conditions [9]. Force-sensitive acupoint is an important manifestation of acupoint sensitization, which is manifested by the specific effect of “Pressing quickly” on mechanical stimulation [10], which is used as the criterion in this study. Fu et. [10] pointed out that “Quickness” is an important feature of the effect of acupuncture treatment, which reflects the clinical effect of “Small stimulation, large response”, the therapeutic effect is much better than that of traditional acupoints.

The spinal nerve segments innervating the pelvic reproductive organs, such as the ovary and uterus, are mainly located at the T10-L2(sympathetic) and S2-S4(parasympathetic nervous system) levels. This study found that the limin acupoints of PCOS ovulation disorder patients were highly concentrated in the lumbosacral and lower abdomen, with the lumbar (L1-L5) being the most distributed (35.1%) , and there were 275 limin acupoints in the T10-S2 segment, 62.6%, which is highly consistent with the innervation segment of the pelvic reproductive organ. This suggests that the distribution of stress-sensitive acupoints in PCOS patients is closely related to the functional state of ovary and uterus, which provides objective evidence of modern neuroanatomy for the TCM theory that “The acupoints with inner parts must be shaped outside”. At the same time, it also shows that in the state of disease, the acupoints change from “Resting state” to “Active state” and become dynamic sensitization sites distributed on the body surface, the distribution of acupoints is determined by the relevant zang-fu organs and their innervating nerve segments.

This study also found that in PCOS ovulation disorder patients, the frequency of the kidney meridian of foot-shaoyin, ki-bl, bladder meridian of foot-taiyang, spleen meridian of foot-taiyin, conception meridian and governor vessel is the highest. According to *lingshu* meridians, “The kidney-foot-shaoyin meridians. run through the spine and belong to the

kidney and collateral bladder”, the kidney meridian of foot-shaoyin and ki-bl, the meridian of foot-taiyang bladder meridian is exterior and interior, which go deep into the lumbosacral, directly connecting the kidney and the bladder (where the uterus is) The governor vessel is the “Sea of Yang vessels”, and the governor's body is full of Yang. The spleen channel of foot-taiyin is the source of Qi and blood biochemistry, and spleen deficiency causes phlegm-dampness, which can lead to obesity and lipid membrane obstruction of the uterus. The high frequency distribution of limin acupoints in the above meridians, SP., it is consistent with the TCM pathogenesis of PCOS kidney deficiency, spleen deficiency causing phlegm, phlegm-dampness and blood stasis, and also confirms the innervation segment of ovary and uterus in modern medicine, from the point of view of “Acupoint sensitization”, it provides an objective basis for the selection of PCOS points based on syndrome differentiation.

5. Discussion

In conclusion, PCOS ovulation disorder patients have specific distribution of surface stress-sensitive acupoints with high occurrence rate and wide distribution, and with the control ovary, the womb nerve segment and the Chinese medicine theory highly tallies with the reproduction related meridian. In clinical practice, exploring limin acupoints on the body surface of patients can provide direct basis for acupoint selection and precise stimulation targets for mechanical stimulation intervention of PCOS, such as acupuncture and massage, it is helpful to optimize the treatment scheme and improve the clinical efficacy. However, the sample size of this study is still small, there is no healthy control group, and the determination of limin acupoints depends on the subjective feelings of the subjects to a certain extent, the correlation between its distribution and clinical efficacy needs to be further verified by larger samples and controlled clinical studies.

Acknowledgments

General Project of Science and Technology Plan of Jiangxi administration of traditional Chinese medicine (2023B0067).

References

- [1] Xie, X., & Gou, W. L. (2013). *Obstetrics and gynecology* (8th ed.). People's Medical Publishing House.
- [2] Song, Y., & Li, R. (2018). Interpretation of Chinese guidelines for the diagnosis and treatment of polycystic ovary syndrome. *Journal of Practical Obstetrics and Gynecology*, 34(10), 737–741.
- [3] Luo, S. P., & Tan, Y. (2015). *Gynecology of traditional Chinese medicine*. People's Medical Publishing House.
- [4] Chen, R. X., Kang, M. F., & Chen, M. R. (2011). The return of Qi Bo — On the theory of acupoint sensitization state. *Chinese Acupuncture*, 31(2), 134–138.
- [5] Wan, M., Zhou, Y. M., Zhou, J., et al. (2017). Analysis of the phenomenon and law of acupoint sensitization. *Clinical Journal of Acupuncture*, 33(3), 74–77.
- [6] Rotterdam Eshre/ASRM-Sponsored PCOS Consensus Workshop Group. (2004). Revised 2003 consensus on diagnostic criteria and long-term health risks related to polycystic ovary syndrome (PCOS). *Human Reproduction*, 19(1), 41–47. <https://doi.org/10.1093/humrep/deh098>

- [7] Ministry of Health of the People's Republic of China. (1993). Guiding principles for clinical research of new drugs of traditional Chinese medicine (Volume 1).
- [8] Li, H. (2005). Declaration of Helsinki. Introduction to Japanese Medicine, (8), 381–382.
- [9] Ren, J. Y., Mou, Q. J., Wang, S., et al. (2019). Analysis of acupoint sensitization. Clinical Journal of Acupuncture, 35(7), 1–4.
- [10] Fu, Y., Cao, G. A., Zhang, H. F., et al. (2020). Discussion on the “Quick-ran” characteristics of sensitized acupoints based on the theory of internal canon of medicine. Journal of Jiangxi University of Traditional Chinese Medicine, 32(4), 9–11.