

Efficacy of Tuina plus Ba Duan Jin for primary dysmenorrhea due to cold-induced blood stasis

推拿联合八段锦练习对寒凝血瘀型原发性痛经的疗效观察

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Abstract

Objective: To observe the effect of Ba Duan Jin (Eight-brocade Exercise) plus Tuina (Chinese therapeutic massage) in treating primary dysmenorrhea due to cold-induced blood stasis in female college students and on the score of fatigue scale-14 (FS-14).

Methods: Seventy-two female college students with primary dysmenorrhea due to cold-induced blood stasis were randomized into a Tuina group and a joint group, with 36 cases in each group. The Tuina group only received Tuina manipulations. In the joint group, besides the same Tuina manipulations, patients practiced Ba Duan Jin. For both groups, the once-daily intervention was conducted from 6 d before the menstrual period until menstrual day 1 for 3 menstrual cycles. Changes in the scores of COX menstrual symptom scale (CMSS), visual analog scale (VAS), and FS-14 after the intervention were observed. Clinical efficacy was also estimated.

Results: During the process, 1 case dropped out in the Tuina group, and 35 cases completed the intervention; 2 cases dropped out in the joint group, and 34 cases completed the intervention. The total effective rate was 94.1% in the joint group, higher than 88.6% in the Tuina group ($P < 0.05$). After treatment, the symptom duration and intensity scores in the scores of CMSS, VAS, and FS-14 declined in both groups ($P < 0.05$ or $P < 0.01$); the CMSS symptom duration score and FS-14 score were lower in the joint group than in the Tuina group ($P < 0.05$).

Conclusion: Tuina manipulations alone or combined with Ba Duan Jin practice can effectively treat primary dysmenorrhea due to cold-induced blood stasis in female college students; when combined with Ba Duan Jin practice, Tuina manipulations can more significantly improve pain duration and fatigue, suggesting the advantages of combining Tuina Gongfa and manipulations.

Keywords: Tuina; Massage; Eight-brocade Exercise; Dysmenorrhea; Cold-induced Blood Stasis Pattern; Fatigue; Women

【摘要】目的: 观察八段锦练习联合推拿对女大学生寒凝血瘀型原发性痛经的治疗作用及对疲劳量表-14(FS-14)评分的影响。**方法:** 将72例寒凝血瘀型原发性痛经女大学生随机分为推拿组和联合组, 每组36例。推拿组采用单独推拿手法治疗, 联合组在推拿治疗基础上加用八段锦功法练习。两组均于月经来潮前6 d进行干预, 至月经第1 d停止, 每天1次, 共治疗3个月经周期。观察两组治疗后COX痛经症状评分量表(CMSS)、视觉模拟量表(VAS)和FS-14的评分变化, 并评价临床疗效。**结果:** 治疗过程中推拿组脱落1例, 完成35例, 联合组脱落2例, 完成34例。联合组总有效率为94.1%, 高于推拿组的88.6% ($P < 0.05$)。治疗后两组的CMSS症状持续时间、CMSS严重程度、VAS及FS-14评分均较本组治疗前下降 ($P < 0.05$ 或 $P < 0.01$); 联合组CMSS症状持续时间评分和FS-14评分均低于推拿组 ($P < 0.05$)。**结论:** 推拿手法或推拿手法联合八段锦练习对寒凝血瘀型女大学生原发性痛经均有治疗作用; 推拿联合八段锦练习在改善疼痛持续时间和疲劳方面优于单独推拿手法治疗, 体现了推拿功法和推拿手法相结合的优势。

【关键词】 推拿; 按摩; 八段锦; 痛经; 寒凝血瘀证; 疲劳; 妇女

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Primary dysmenorrhea is a common medical condition in young women without reproductive organic abnormalities. It is marked by pain in the lower abdomen, sometimes radiating to the lumbosacral region,

and may be accompanied by spiritless symptoms like lack of energy, pale complexion, drowsiness, forgetfulness, and lassitude. Cold-induced blood stasis is the most frequent pattern^[1]. In China, the incidence of primary dysmenorrhea has reached 40%-80%^[2], and it is especially more common among female college students. Primary dysmenorrhea is usually persistent and recurrent, harming the physical and mental health

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of patients to various degrees. Oral non-steroidal analgesics are often used to manage the symptoms. However, these drugs may bring significant adverse reactions, let alone their short reaction time^[3]. Tuina (Chinese therapeutic massage) manipulations and Tuina Gongfa are two approaches of Tuina therapy in treating diseases. They are also unique external treatments of traditional Chinese medicine (TCM) for primary dysmenorrhea. Ba Duan Jin (Eight-brocade Exercise) has been widely spread in clinical application and has achieved good social recognition. As symptoms such as fatigue, drowsiness, and declined attention and memory are also hard to neglect in most primary dysmenorrhea patients^[4], we adopted fatigue scale-14 (FS-14)^[5] in this study besides scales for assessing pain and dysmenorrhea symptoms to fully observe the combined use of Tuina and Ba Duan Jin in treating primary dysmenorrhea due to cold-induced blood stasis in female college students from dysmenorrhea symptoms and fatigue intensity.

1 Clinical Materials

1.1 Diagnostic criteria

The diagnostic criteria for primary dysmenorrhea in Western medicine were developed based on *Obstetrics and Gynecology*^[6]: cyclical pain in the lower abdomen that happened around or during menses, sometimes accompanied by heaviness in the lower back, diarrhea, dizziness, lack of strength, etc.; without organic lesions in the reproductive system.

The criteria for diagnosing the TCM pattern of cold-induced blood stasis were defined according to *Gynecology of Chinese Medicine*^[7]: pain in the lower abdomen, with cold and aversion to pressing but reducing with heat, or delayed menstrual periods, with scant dark menstruation and clots; fear of cold, pale complexion; a dark purplish tongue with white coating, deep tight pulses.

1.2 Inclusion criteria

Conformed to the diagnostic criteria for primary dysmenorrhea in Western medicine and the criteria for the pattern of cold-induced blood stasis in TCM; ages between 18 and 25 years, without a childbirth history; basically normal menstrual cycles, (28±7) d; disease duration over 3 months; visual analog scale (VAS) score ≥4 points; signed the informed consent form.

1.3 Exclusion criteria

Received treatments for dysmenorrhea in the last 3 months; coupled with pelvic inflammation, endometriosis, or adenomyosis; severe primary diseases involving the cardiovascular system, liver, kidney, or hematopoietic system; drug or alcohol dependence.

1.4 Elimination or dropout criteria

Those who required to quit or were out of touch; a grave condition that demanded emergent treatments

or other interventions; failed to stick with the practice of Ba Duan Jin.

1.5 Statistical methods

Data analyses were performed using SPSS version 19.0 software. Measurement data that satisfied normal distribution were expressed as mean ± standard deviation ($\bar{x} \pm s$); for those with homogeneity of variance, the paired-samples *t*-test was used for intra-group comparisons, and the independent-samples *t*-test for between-group comparisons, and *t'*-test was adopted for those with heterogeneity of variance. Numeration data were described using cases or rates and examined using the Chi-square test. *P*<0.05 indicated statistical significance.

1.6 General data

The Biomedical Ethics Committee of Jishou University approved this trial (Approval No. JSDX-2022-0037). We consulted the clinical data^[8] of treating primary dysmenorrhea with Gongfa plus Tuina and our pilot study results to estimate the sample size, taking the pain duration score from the COX menstrual symptom scale (CMSS) as the primary endpoint. The CMSS pain duration score averaged 14.21 points in the Tuina group after 3-month interventions versus 10.42 points in the joint group. The standard deviation was 2.45. We took $\alpha=0.025$ (one-tail), $\beta=0.200$, and the between-group sample size ratio 1:1, and each group required 32 cases according to PASS 2011. Then, we assumed a withdrawal rate of 10%, and the total sample size was expanded to 72.

This study was designed as a randomized controlled trial, recruiting 72 female students suffering from primary dysmenorrhea due to cold-induced blood stasis from Jishou University between April 2022 and May 2023. A random number table ranging from 1-72 was generated by SPSS 19.0. Each random number was sealed in an opaque envelope, which would be opened following the recruitment sequence to reveal allocation. The Tuina group and the joint group both recruited 36 cases. During the process, the two groups each had 1 case of quitting due to taking analgesics because they felt their dysmenorrhea getting worse. In addition, the joint group had 1 case eliminated because she failed to strictly follow the Ba Duan Jin practice. Finally, 69 patients completed the whole study, including 35 in the Tuina group and 34 in the joint group. There were no significant differences in the age and disease duration between the two groups, suggesting comparability (*P*>0.05). The details are shown in Table 1. Figure 1 illustrates the study flow.

Table 1 Comparison of the general data ($\bar{x} \pm s$)

Group	<i>n</i>	Age/year	Disease duration/year
Joint	34	21.0±1.3	2.4±0.7
Tuina	35	21.0±1.4	2.4±0.7

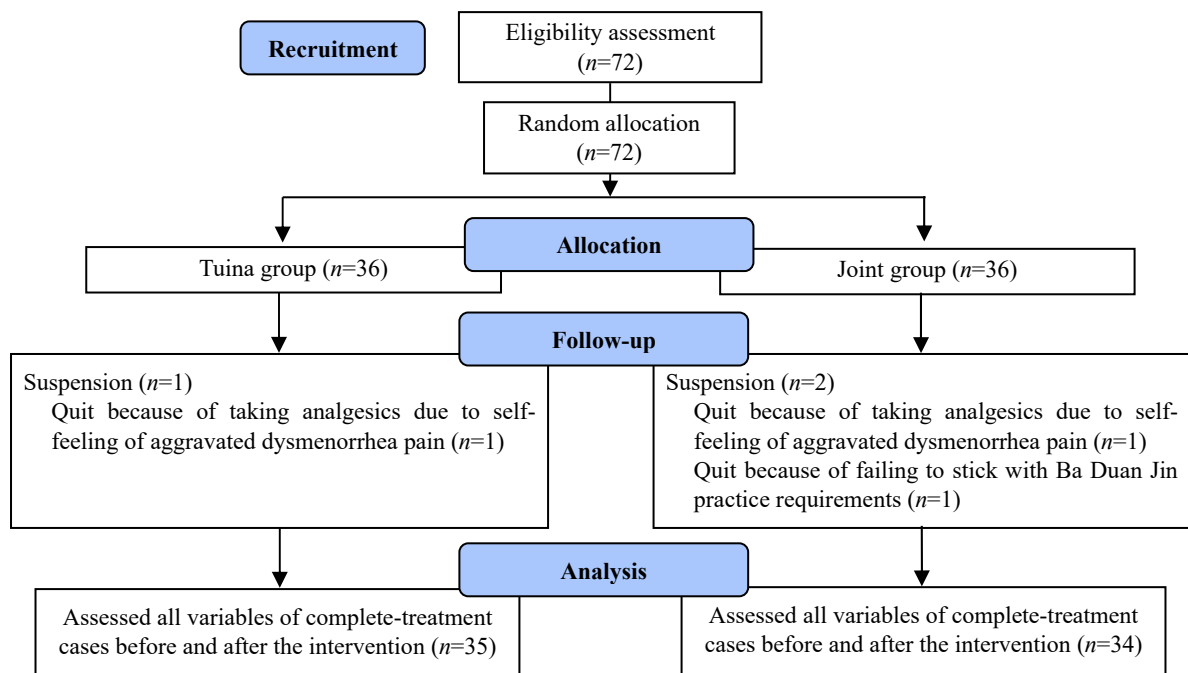


Figure 1 Flow chart of the study

2 Treatment Methods

2.1 Tuina group

The warm-rubbing manipulation was applied to uterus-related meridians based on the treatment regime for dysmenorrhea in *Tuina Therapeutics*^[9], lasting about 15 min.

Preparation: Kept the room temperature suitable and the environment tidy. Glycerol was used as the Tuina medium. The physician sterilized the hands and maintained the hands warm.

Relaxing manipulations: The patient lay on her back to expose the abdomen. The physician applied circular rubbing manipulation with the palm to the patient's lower abdomen for 1-2 min.

Pressing-kneading points: The patient first stayed in the supine position. The physician applied pressing-kneading manipulations to Qihai (CV6), Guanyuan (CV4), Sanyinjiao (SP6), Zusanli (ST36), Yinlingquan (SP9), and Xuehai (SP10), and then to Feishu (BL13), Ganshu (BL18), Shenshu (BL23), and Baliao [Shangliao (BL31), Ciliao (BL32), Zhongliao (BL33), and Xialiao (BL34)] when the patient turned to a prone position. Dull aching or heavy sensations were expected from the treatment.

Linear rubbing with the palm along three lines on the abdomen: The patient took a supine position. After smearing the medium, the physician rubbed the three lines on the abdomen with the palm. The first line was the transverse line across Shenque (CV8). The second line was the vertical line along the Conception Vessel. The third line referred to the bilateral waistlines along the Belt Vessel.

Linear rubbing with the palm along three lines on the back: The patient took a prone position to expose the back. After smearing the medium, the physician rubbed the three lines on the back with the palm. The first line was the transverse line across Shenshu (BL23). The second was the oblique lines along Baliao points. The third was the vertical lines along the first lateral lines of the Bladder Meridian of Foot Taiyang.

The above rubbing manipulations should penetrate the heat into the body without causing abrasions.

2.2 Joint group

Besides the above Tuina manipulations, patients in the joint group practiced Ba Duan Jin once daily. The moves include holding up the hands to regulate the three Jiao (triple energizer), drawing a bow like shooting a hawk, raising one arm to regulate the spleen and stomach, turning the head back to treat consumptive diseases and injuries, swaying the head and swinging the buttocks to expel heart fire, holding the feet by the hands to reinforce the loins and kidney, punching with angry gaze, and bouncing on the toes to help prevent diseases^[10]. Patients were asked to do 1-min warm-ups each time before practicing Ba Duan Jin, which lasted about 12 min.

The Tuina treatment and Ba Duan Jin practice all started 6 d before menstruation till the first menstrual day, once a day for 3 menstrual cycles.

3 Treatment Results

3.1 Observation indicators

3.1.1 Primary outcomes

CMSS symptom duration score: CMSS assesses the

duration and severity of dysmenorrhea symptoms using 18 items, including nausea, poor appetite, and lower abdominal pain^[11]. The criteria for scoring symptom duration were: no attack, 0 points; duration <3 h, 1 point; duration ≥3 h but <7 h, 2 points; duration ≥7 h but ≤24 h, 3 points; duration >24 h, 4 points.

3.1.2 Secondary outcomes

VAS score: Drew a 10 cm line on a piece of paper, which was taken as a 0-10-point scale to identify pain intensities. The patient made a mark on the line to represent her pain degree^[12].

CMSS symptom intensity score: The scoring criteria were as follows. No discomforts, 0 points; mild discomforts, 1 point; moderate discomforts, 2 points; severe discomforts, 3 points; extremely severe, 4 points.

FS-14 score: FS-14 evaluates the patient’s fatigue symptoms, consisting of 14 items, 6 for checking mental fatigue and the other 8 for physical fatigue. The answer “yes” scores 1 point, and “no” scores 0 points; 3 items are reverse scoring. A higher score indicates more significant fatigue symptoms^[5].

The above scales were scored once before and after the 3 menstrual cycles of interventions.

3.2 Criteria for therapeutic efficacy

The criteria for therapeutic efficacy were developed based on the *Guiding Principles for Clinical Study of New Chinese Medicines*^[13].

Recovered: The CMSS symptom duration or severity score dropped to 0 points; clinical symptoms were gone.

Markedly effective: The CMSS symptom duration or severity scores dropped to 2/3 of the pre-treatment score or lower; clinical symptoms showed notable improvements, and analgesics were no longer needed.

Effective: The CMSS symptom duration or severity score dropped to 2/3-3/4 of the pre-treatment score; clinical symptoms showed improvements, and analgesics were unnecessary.

Invalid: Clinical symptoms showed no improvements; the CMSS symptom duration or severity score was 3/4 higher compared with the pre-treatment score.

3.3 Results

3.3.1 Comparison of the clinical efficacy

After treatment, the total effective rate was 94.1% in the joint group, higher than 88.6% in the Tuina group, presenting statistical significance ($P<0.05$). The details are shown in Table 2.

Table 2 Comparison of the clinical efficacy

Unit: case

Group	n	Recovered	Markedly effective	Effective	Invalid	Total effective rate/%
Joint	34	0	18	14	2	94.1 ¹⁾
Tuina	35	0	10	21	4	88.6

Note: Compared with the Tuina group, 1) $P<0.05$.

3.3.2 Comparison of the CMSS symptom duration score

After the intervention, the CMSS symptom duration score decreased in both groups ($P<0.01$) and was lower in the joint group than in the Tuina group ($P<0.05$). Table 3 provides more details.

Table 3 Comparison of the CMSS symptom duration score ($\bar{x} \pm s$)

Unit: point

Group	n	Before treatment	After treatment
Joint	34	18.29±5.01	9.85±4.27 ¹⁾²⁾
Tuina	35	17.74±6.22	12.60±4.93 ¹⁾

Note: CMSS=COX menstrual symptom scale; compared with the same group before treatment, 1) $P<0.01$; compared with the Tuina group after treatment, 2) $P<0.05$.

3.3.3 Comparison of the CMSS symptom severity score

After the intervention, the CMSS symptom severity score dropped in both groups ($P<0.01$), but the between-group difference was statistically insignificant ($P>0.05$). Table 4 presents the data.

3.3.4 Comparison of the VAS score

After the intervention, the VAS score changed significantly in both groups ($P<0.05$, $P<0.01$), but the

between-group difference was statistically insignificant ($P>0.05$). Please find details in Table 5.

3.3.5 Comparison of the FS-14 score

After treatment, the FS-14 score dropped in both groups ($P<0.01$) and was lower in the joint group than in the Tuina group ($P<0.05$). The data are detailed in Table 6.

Table 4 Comparison of the CMSS symptom severity score ($\bar{x} \pm s$)

Unit: point

Group	n	Before treatment	After treatment
Joint	34	17.41±6.92	5.65±2.85 ¹⁾
Tuina	35	15.20±5.62	4.74±2.58 ¹⁾

Note: CMSS=COX menstrual symptom scale; intra-group comparison, 1) $P<0.01$.

Table 5 Comparison of the VAS score ($\bar{x} \pm s$)

Unit: point

Group	n	Before treatment	After treatment
Joint	34	6.11±1.78	4.79±1.80 ¹⁾
Tuina	35	5.77±1.91	4.86±1.99 ²⁾

Note: VAS=Visual analog scale; intra-group comparison, 1) $P<0.01$, 2) $P<0.05$.

Table 6 Comparison of the FS-14 score ($\bar{x} \pm s$) Unit: point

Group	n	Before treatment	After treatment
Joint	34	10.41±2.55	5.97±1.98 ¹⁾²⁾
Tuina	35	9.69±2.68	7.11±2.61 ¹⁾

Note: FS-14=Fatigue scale-14; compared with the same group before treatment, 1) $P<0.01$; compared with the Tuina group after treatment, 2) $P<0.05$.

4 Discussion

Dysmenorrhea due to cold-induced blood stasis occurs when the cold pathogen coagulates and impairs the kidney Yang, whose warming and propelling function then decreases, causing stagnated blood flow and subsequent pain^[1].

In this trial, we applied warm-rubbing manipulation to uterus-related meridians in the Tuina group. Linear rubbing was taken as the primary manipulation as it can warm and unblock meridians and collaterals and circulate Qi and blood^[14]. Palm-rubbing on the abdomen and back was to stimulate the uterus, Conception Vessel, Belt Vessel, and Bladder Meridian for warming the uterus, regulating the Thoroughfare and Conception Vessels, and unblocking meridians to cease pain^[14]. The adjunct manipulations included circular rubbing on the abdomen and pressing kneading points. The circular rubbing manipulation can regulate and unblock meridians and collaterals and promote Qi-blood perfusion to circulate Qi and eliminate stasis^[15]. Qihai (CV6), Guanyuan (CV4), Shenshu (BL23), and Baliao points are located in the abdominal or lower back regions. Pressing-kneading these points can warm and tonify the kidney Yang, warm the uterus, and dissipate cold. Pressing-kneading the other points, including Sanyinjiao (SP6), Zusanli (ST36), Yinlingquan (SP9), Xuehai (SP10), Feishu (BL13), and Ganshu (BL18), can enhance the effects of circulating Qi and blood, harmonizing Ying-nutrient blood, and eliminating stasis. The joint use of pressing-kneading, circular rubbing, and linear rubbing Tuina manipulations sticks to the pathogenesis of dysmenorrhea due to cold-induced blood stasis and manifests the strength of TCM Tuina therapy, “combining spots, lines, and large areas” to fully stimulate pertinent points, meridians, and topical areas to regulate meridian and Zang-Fu functions.

Patients in the joint group practiced Ba Duan Jin in addition to the Tuina treatment. Research shows that Ba Duan Jin benefits the Yang-deficiency constitution, improving the fear of cold, weak and cold sensations in the lower back and knees, and cold extremities^[16]. Infrared imaging technology also reveals increased temperatures on the back of the palm and popliteal fossa. As a form of Tuina Gongfa, Ba Duan Jin is slow, gentle, and low-intensity, stresses the cooperation of breathing, and can concurrently regulate physical and mental states^[17]. Its moves, including “drawing a bow

like shooting a hawk, raising one arm to regulate the spleen and stomach, and turning the head back to treat consumptive diseases and injuries”, can stretch all meridians and collaterals to unblock collaterals and circulate Qi and blood and thus to stop the pain. Research finds that Ba Duan Jin improves the balance function in both dynamic and static states and the upper and lower limb muscle strength in middle-aged and senior females^[18]. The other moves, such as “holding the feet by the hands to reinforce the loins and kidney”, stimulate the Conception and Governor Vessels by moving the lower back and abdomen regions to balance Yin and Yang, promote Qi-blood circulation, and cease pain^[15]. Clinical evidence demonstrates that Ba Duan Jin can significantly improve dysmenorrhea symptoms^[19]. Analgesic mechanism research also proves that Ba Duan Jin can exert a wide range of neuroendocrine and immune regulatory effects by enhancing the sympathetic-parasympathetic balance, and it may also relieve pain-related emotions by intervening in brain regions related to moods and stress^[20]. Besides improving Zang-Fu functions^[21], Ba Duan Jin also regulates the “spirit” as it propels Qi and blood to go to the internal five Zang and six Fu organs and the external limbs and bones, which can externally nourish the body and internally protect the “spirit”. One study^[22] observed the practice of Ba Duan Jin and inspiratory muscle strength training among senior pneumoconiosis patients and discovered that this method encouraged the recovery of pulmonary function, improved dyspnea, and enhanced stamina. Another study^[23] treated hemodialysis patients with the five-element music and Ba Duan Jin and found this regime could improve fatigue and feebleness in the patients and thus enhance their quality of life. In this study, we adopted VAS and CMSS, two scales commonly used to evaluate the clinical efficacy in treating dysmenorrhea, and FS-14, a universally recognized scale for observing fatigue intensity. Our results demonstrated that either Tuina alone or combined with Ba Duan Jin reduced the VAS score, CMSS symptom severity and duration scores, and FS-14 score in patients with dysmenorrhea due to cold-induced blood stasis, proving the efficacy of both regimes. In addition, more significant improvements in the joint group in the CMSS symptom duration score and FS-14 score displayed the strength of the combination of Tuina Gongfa and Tuina manipulations.

TCM stresses the “unity of body and spirit”, which refers to the integrity of physical health and mental health^[24]. Ba Duan Jin, a type of active exercise, emphasizes the coordination of the overall Qi-blood circulation. The passive Tuina manipulations stress the stimulation to topical Qi and blood and can warm and unblock meridians and collaterals and warm the uterus to stop the pain. The combination of the two

approaches is the combination of dynamic and static. They work together to nourish the body and spirit, regulate the topical and the whole, and improve dysmenorrhea symptoms and fatigue. To conclude, Tuina plus Ba Duan Jin can produce satisfactory clinical efficacy in treating primary dysmenorrhea due to cold-induced blood stasis in female college students. This fully demonstrates the advantage of TCM external therapies in integral treatment. And it is well-accepted by patients. Thus, this method is worth promoting in clinical practice.

Conflict of Interest

The authors declare that there is no potential conflict of interest in this article.

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Statement of Human and Animal Rights

This study has been approved by the Biomedical Ethics Committee of Jishou University (Approval No. JSDX-2022-0037). Informed consent was obtained from all individual participants.

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