Clinical Research

Modified green dragon swaying its tail needling manipulation for treatment of knee osteoarthritis

改良青龙摆尾针法治疗膝骨性关节炎的临床对照研究

HUANG Wei (黄 伟)[1,2,3], JIAO Yang (焦 杨)[2,3], WAN Bi-jiang (万碧江)[1]✉, WU Chang-zheng (吴长征)[1,3], LI Jia-kang (李家康)[2,3]

1. *Hubei University of Chinese Medicine/The Co-innovation Center for Preventive Treatment of Disease of Acupuncture-moxibustion in Hubei Province;* 2. *Department of Acupuncture-Moxibustion, Hubei Provincial Hospital of TCM, Wuhan 430061, Hubei Province, China;* 3. *Institute of Hubei Provincial Hospital of TCM*
（1. 湖北中医药大学/针灸治未病湖北省协同创新中心；2. 湖北省中医院针灸科，湖北武汉 430061，中国；3. 湖北省中医药研究院）

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First author: HUANG Wei (1982-), male, associate chief physician.
Research field: acupuncture-moxibustion treatment for spine-related diseases.
E-mail: 24231637@qq.com

✉ Corresponding author: WAN Bi-jiang (1975-), male, associate chief physician.
Research field: clinical study on acupuncture-moxibustion and acupotomy for treatment of pain.
E-mail：1135359260@qq.com

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ABSTRACT

Objective To compare the difference in the effect of modified green dragon swaying its tail needling manipulation and common needling manipulations on the overall rating of pain of patients with knee osteoarthritis, and to evaluate the advantages of modified green dragon swaying its tail needling manipulation for. **Methods** Ninety-five patients with knee osteoarthritis were divided into 2 groups according to the random number table method with 48 patients in the modified green dragon swaying its tail group (group special manipulation, SM group for short) and 47 patients in the common acupuncture group (group convention needling, CN group for short), and different acupuncture manipulations were applied in the two groups. Internationally recognized Simplified McGill Pain Questionnaire (SF-MPQ) scale used for description and measurement of pain was applied to evaluate the pain degree, including pain rating index (PRI), visnal analogue scale (VAS)and present pain intensity (PPI). The index of severity for osteoarthritis (ISOA) was adopted for evaluation of clinical efficacy. **Results** (1) In SM group, the scores of PRI, VAS and PPI were 6.63±4.67, 2.23±1.45 and 0.65±1.32, respectively, after treatment, and in CN group, the scores of PRI, VAS and PPI were 13.32±7.96, 4.34±1.79 and 2.28±1.21, respectively, the scores decreased in the two groups after treatment (all $P<0.05$), and the improvement in SM group was superior to that in CN group (all $P<0.01$). (2) The clinical cure rate in SM group was 52.08%, and the total effective rate was 97.92%, the clinical cure rate in CN group was 25.53%, and the total effective rate was 85.10%. The comparison of clinical cure rate in the two groups showed that $P<0.01$. **Conclusion** The SM group is obviously superior to CN group in the improvement of overall rating of pain of patients. It is indicated that modified green dragon swaying its tail acupuncture therapy can effectively relieve the pain of patients with knee osteoarthritis, which was worthy of popularization and application with definite clinical efficacy

KEY WORDS: knee osteoarthritis; green dragon swaying its tail of needling manipulation; MPQ pain scale; Index of severity for osteoarthritis (ISOA)

Knee osteoarthritis (KOA) is a kind of common and frequently-occurring disease in seniors, which is the major cause of movement disorders in seniors, and severely affect the health of middle-aged and aged people[1]. In China, about 80% of the people at the age of more than 65 years old are attacked

by osteoarthritis. With the extension of human life, and the aging of social population, the incidence of knee osteoarthritis is increasing year by year[2]. The main clinical manifestations of knee osteoarthritis include knee pain, functional limitation, and even knee deformity, which seriously affect the patients' physical and mental health and the quality of life, and bring great suffering to patients[3]. Acupuncture-moxibustion is one of the therapies with definite efficacy for treatment of knee osteoarthritis[4]. In order to further improve the clinical efficacy of acupuncture manipulation, the authors applied modified green dragon swaying its tail needling manipulation invented by prestigious physician of TCM LI Jia-kang to treat knee osteoarthritis, and made a control study by comparing with common acupuncture manipulations. The details are reported as follows.

CLINICAL DATA

General data

The outpatients and inpatients of Department of Acupuncture-Moxibustion, Hubei Provincial Hospital of TCM who visited the hospital from June 2015 to June 2016 were enrolled and divided into 2 groups according to the visiting sequence for the first time by adopting the random number table method: 50 cases in the modified green dragon swaying its tail group (group special manipulation, SM group for short) and 50 in the common acupuncture group (group convention needling, CN group for short). Fifteen males and 35 females were included in SM group, with the age ranged from 40 to 64 years old and the course of disease from 6 months to 5.2 years; 17 males and 33 females were included in CN group, with the age ranged from 41 to 65 years old and the course of disease from 5 months to 4.8 years. According to the statistical analysis of gender, age and course of disease in the two groups, the differences were not statistically significant (all $P>0.05$), and the results were comparable. Among these patients, 95 cases completed the study. One case withdrew from SM group with 1 case of loss to follow-up, and 2 cases withdrew from CN group with 1 case of loss to follow-up. The details were shown in Table 1.

Table 1 Comparison of general data on the patients with knee osteoarthritis in the two groups ($\bar{x}\pm s$)

Groups	Patients	Gender (case)		Age (year)	Course of disease (month)
		Female	Male		
SM	48	33	15	57.12±9.78	21.38±4.74
CN	47	30	17	56.49±11.36	20.29±5.65

Diagnostic criteria

The diagnostic criteria were formulated by reference to the *Guidelines for Diagnosis and Treatment of Osteoarthritis* (Edition in 2007) issued by Chinese Orthopaedic Association, Chinese Medical Association[5]. ① With repeated knee pain in recent one month; ② the X-ray (standing or in weight loading) indicated joint clearance narrowing, subchondral bone sclerosis and (or) cystic degeneration and formation of osteophyte; ③ clear and sticky joint fluid (for at least 2 times), WBC<2000/mL; ④ middle-aged and aged patients (≥ 40 years old); ⑤ morning stiffness≤ 30 min; ⑥ with bony crepitus (bone friction feeling) in the process of activity. According to the clinical, laboratory and X-ray examinations, the patients conforming to ①+②, ①+③+⑤+⑥ or ①+④+⑤+⑥ were diagnosed with knee osteoarthritis.

Inclusion criteria

① With the age ranged from 40 to 65 years old. ② the patients who signed the informed consent form and completed all the examinations and questionnaires according to doctor's requirements.

Exclusion criteria

① Concomitantly with severe diseases including heart, brain, liver, kidney and hematopoietic system diseases; ② the patients who accepted acupuncture-moxibustion therapy within 3 months before this treatment; ③ pregnant women or lactating women, and patients with mental disorder; ④ the patients who were participating in other clinical study; ⑤ the patients who cannot cooperate with doctors or insist on the treatment; ⑥ the patients who had complications affecting the joint, such as psoriasis, metabolic bone disease, tuberculosis or tumor of knee joint, suppurative arthritis, and acute trauma (including meniscus injury of knee joint, collateral ligament injury of knee joint, cruciate ligament injury, traumatic synovitis or hematoma of knee joint), etc..

This study was examined and approved by the Ethics Committee of Hubei Provincial Hospital of TCM (approval No. HBZY2015-C27-01).

METHODS

SM group

Modified green dragon swaying its tail needling manipulation was applied. (1) Acupoint selection: main acupoints: Dúbí (犊鼻 ST 35) and Nèixīyǎn (内膝眼 EX-LE4), combined acupoints: Zúsānlǐ (足三里 ST 36), Yánglíngquán (阳陵泉 GB 34), Xuèhǎi (血海 SP 10), Xuánzhōng (悬钟 GB 39) and *Ashi* point. (2)

Acupuncture manipulation: conventional disinfection was carried out, the patient's emotion was pacified, and the patient was asked to adjust the breath, 0.30 mm× 40 mm filiform needles were applied to perform acupuncture. Nail pressing needling was applied with the needle inserted along with the cough of patient, when the needle reached a certain depth the patient had a sore and swollen sense, the needle was lifted to the subcutaneous part, then the needle body was pressed down with the needle tip pointing to the lesion, the needle handle was held by doctor's hand without inserting or withdrawing, and the needle handle was slowly moved forward, backward, to the left and to the right. Layered needle insertion: three times in the heaven (shallow), nine times in the human (median) and six times in the earth (deep) were manipulated at the time of needle insertion, and the nine times in the earth, three times in the human and six times in the heaven was manipulated at the time of needle withdrawal. Needling manipulation was conducted for three rounds from heaven to earth, and 54 times were needed in total. The patient adopted nasal inspiration and oral expiration, and needle insertion was conducted at the time of expiration. After *deqi*, the needle handle was moved to the left and to the right at the time of inspiration, which was called reinforcing method. If oral inspiration and nasal expiration was carried out, needle insertion was conducted at the time of inspiration, and the needle handle was moved to the left and to the right at the time of expiration after *deqi*, which was called reducing method. Reinforcing method was adopted at ST 36 and GB 39, and reducing method was adopted at ST 35 and EX-LE 4, and the needles were retained for 30 min. Acupuncture was conducted once a day, 6 times was considered as 1 course of treatment, and 4 courses were needed in total.

CN group

Common acupuncture manipulation was applied. Acupoint selection: the same as SM group. Conventional disinfection was performed. Lifting and thrusting and twirling method was adopted for needling manipulation with even reinforcing and reducing. After *deqi*, the needles were retained for 30 min, and twirling was carried out for once every 15 min. The course of treatment was the same as SM group.

EFFICACY EVALUATION

Overall rating of pain

Internationally recognized Simplified McGill Pain Questionnaire (SF-MPQ) scale used for description and measurement of pain was applied to evaluate the pain degree[6]. The scale included three parts: (1) pain rating index (PRI): included 11 sensory words and 4 emotional words with the degree of none, slight, moderate and severe which were expressed as 0, 1, 2 and 3 points, including sensory score (0–36 points) and emotional score (0–9 points). The PRI sensory score, emotional score and total score could be worked out. (2) Visual analogue scale (VAS)[3]: referred to a 10 cm-length straight line with the two ends representing no pain and severe pain, and the patients could express their pain degrees through drawing lines. Zero point: 0 cm, no pain without any pain perception; 2 points: 1–3 cm, slight pain without influence on work and life; 4 points: 4–6 cm, moderate pain which impacted work but without influence on life; 6 points: 7–10 cm, severe pain which impacted work and life. (3) Present pain intensity (PPI): classified as 6 levels: no pain, slight discomfort, discomfort, painful, terrible pain and extreme pain which were expressed as 0, 1, 2, 3, 4 and 5 points.

Clinical efficacy evaluation

Index of severity for osteoarthritis (ISOA) recommended by Legnesne, et al.[7] was adopted for clinical efficacy evaluation. The contents mainly included: 0–2 points for rest in bed at night, 0–2 points for morning stiffness or pain after getting up, 0–1 point for continuous standing, 0–2 points for pain or not when walking, 0–1 point for standing up from sitting position, 0–6 points for the maximum walking distance, and 0–2 points for daily life. The more restricted the activity was, the higher the score would be. The state of illness was extremely severe when the score was 14 points, very severe when the score was 11–13 points, severe when the score was 8–11 points, moderate when the score was 5–7 points and slight when the score was 1–4 points.

Nimodipine method was adopted for efficacy evaluation. Efficacy index＝[(score before treatment－score after treatment)÷score before treatment]× 100%. Clinical cured: the symptoms disappeared, functional activities returned to normal level, efficacy index≥75%. Markedly effective: the symptoms disappeared basically, joint functions returned to normal level, and can participate in activities and work, 50%≤ efficacy index ＜75%. Effective: the pain disappeared basically, the flexion-extension of joint returned to normal level basically, and can participate in certain activities and work, 25%≤ efficacy index ＜50%. Ineffective: effective standard was not achieved, efficacy index ＜25%.

Statistical analysis

SPSS 21.0 statistical software was adopted for data analysis. Measurement data were expressed as mean ± standard deviation ($\bar{x}\pm s$), and *t*-test was used; enumeration data were analyzed via *chi*-square test; the significant level was $P<0.05$.

Safety evaluation

During the treatment for 4 weeks, adverse effects were monitored and recorded. The most common adverse events in all patients included hematoma, local bleeding and pain. No other severe adverse effect was observed.

RESULTS

Comparison of pain rating index (PRI) of patients with knee osteoarthritis in the two groups (Table 1)

It was shown in Table 1 that the differences were not statistically significant according to the comparison of PRI score in the two groups before treatment (all $P>0.05$). The PRI sensory score, emotional score and total score reduced in the two groups after treatment, and the differences were statistically significant when compared with the results before treatment (all $P<0.05$); the score improvement of patients in SM group was superior to that in CN group, indicating that the differences were statistically significant (all $P<0.01$).

Comparison of visual analogue scale (VAS) and present pain intensity (PPI) of patients with knee osteoarthritis in the two groups (Table 2)

It was shown in Table 2 that the differences were not statistically significant according to the comparison of VAS and PPI scores in the two groups before treatment (both $P>0.05$). The VAS and PPI scores reduced in the two groups after treatment, and the differences were statistically significant when compared with the results before treatment (both $P<0.05$); the score decreasing degree of patients in SM group was obviously higher than that in CN group, indicating that the differences were statistically significant (both $P<0.05$).

Comparison of clinical efficacy on patients with KOA in the two groups (Table 3)

In SM group, the clinical cure rate was 52.08%, and the total effective rate was 97.92%; in CN group, the clinical cure rate was 25.53%, and the total effective rate was 85.10%. The comparison of clinical cure rate and total effective rate in the two groups showed that $P<0.01$, indicating that the curative effect in SM group was superior to that in CN group.

Table 1 Comparison of pain rating index (PRI) of patients with knee osteoarthritis in the two groups ($\bar{x}\pm s$, points)

Groups	Patients	Time	PRI sensory score	PRI emotional score	PRI total score
SM	48	Before treatment	11.23±6.24	6.21±3.23	17.47±11.78
		After treatment	4.51±2.87[1)2)]	2.12±1.85[1)2)]	6.63±4.67[1)2)]
CN	47	Before treatment	10.45±5.12	7.73±3.93	18.18±9.45
		After treatment	7.34±4.75[1)]	5.98±2.69[1)]	13.32±7.96[1)]

Notes: compared with that before treatment,[1)] $P<0.05$; compared with CN group,[2)] $P<0.01$.

Table 2 Comparison of VAS and PPI scores and total score of patients with KOA in the two groups before and after treatment ($\bar{x}\pm s$)

Groups	Patients	Time	VAS	PPI
SM	48	Before treatment	7.14±2.43	3.76±1.65
		After treatment	2.23±1.45[1)2)]	0.65±1.32[1)2)]
CN	47	Before treatment	6.69±2.94	3.43±1.72
		After treatment	4.34±1.79[1)]	2.28±1.21[1)]

Notes: compared with that before treatment,[1)] $P<0.05$; compared with CN group,[2)] $P<0.01$.

Table 3 Comparison of clinical efficacy on patients with KOA in the two groups Case(%)

Groups	Patients	Clinical cured	Markedly effective	Effective	Ineffective	Total effective rate (%)
SM	48	25(52.08)	15(31.25)	7(14.50)	1(4.17)	97.92[1)]
CN	47	12(25.53)	16(34.04)	12(25.53)	7(14.90)	85.10

Note: compared with CN group,[1)] $P<0.01$.

DISCUSSION

Knee osteoarthritis (KOA) refers to pain, swelling and limited flexion and extension caused by misfit of patella articular surface and damage of cartilago articularis which are induced by adhesion, scar and contracture due to the surrounding soft tissue damage of the patella. Pain is the most important factor affecting the patients' quality of life in many clinical symptoms of KOA[8]. The treatment for KOA focuses on symptom treatment, and the goal of treatment is to eliminate joint pain and improve joint functions. Although surgical treatment can improve the joint function, there are more or less complications or risks, and tne cost is expensive. Therefore, surgery is only suitable for a few patients[9]. Drug therapy can relieve the pain, but long-term drug treatment will often bring a variety of side effects, especially including peptic ulcer, gastrointestinal bleeding, renal dysfunction, etc. These side effects are often found in seniors, and severe side effects may be life-threatening. Acupuncture-moxibustion treatment for this disease has definite curative effect, which can relax the sinews and unblock collaterals, move *qi* and invigorate blood, improve local blood circulation, and repair tissues[10], regulate the functions of the whole and local body, effectively relieve muscle spasm, and promote inflammation absorption and edema subsiding, so as to achieve the goals of rapidly increasing pain threshold, relaxing the muscle, relieving joint stiffness, unblocking meridians and invigorating blood, thus the pain reduces or disappears.

It is believed in traditional Chinese medicine that knee osteoarthritis belongs to the category of "*bì* syndrome", which is caused by inhibited *qi*-blood circulation and blocked meridians and collaterals due to insufficient healthy *qi*, insecurity of the *wei* exterior and wind-cold-damp invasion[11]. Green dragon swaying its tail of needling manipulation was listed as the first method among the "four methods of hastening the arrival of *qi* "[12]. The green dragon swaying its tail of needling manipulation is just like to hold the rudder without inserting or withdrawing, and the needle handle is slowly moved to the left and to the right." WANG Ji made improvements to the green dragon swaying its tail needling manipulation in *Zhēnjiǔ Wènduì* (《针灸问对》, *Questions and Answers for Acupuncture-Moxibustion)* that "During needling manipulation, the needle is lifted to the heaven part, then the needle body is pressed down, just like to hold the rudder, and the needle handle was slowly moved to the left and to the right for 5 times, respectively, just like the dragon swaying its tail. Pressing can be carried out concurrently, and *wei qi* should be manipulated." At first, the needle is inserted into the earth part (deep), then it is lifted to the heaven part (shallow), later, manipulation is conducted like steering a boat, shaking while pressing. This manipulation aims to stimulate meridian *qi*, unblock collaterals and dissipate masses[13].

According to long-term clinical practice, prestigious physician of TCM LI Jia-kang modified the traditional green dragon swaying its tail needling manipulation, thus forming the modified green dragon swaying its tail needling manipulation. On the basis of green dragon swaying its tail needling manipulation invented by XU Feng, modified green dragon swaying its tail needling manipulation integrates synchronicity with respiration for reinforcing and reducing and nine-six reinforcing and reducing, and needling manipulation is conducted in heaven, human and earth. Needle insertion and withdrawal should be performed gently in order to avoid impairing *qi*[11], and enhance the effect of stimulating meridian *qi* of green dragon swaying its tail needling manipulation. The efficacy of modified green dragon swaying its tail needling manipulation for treatment of pain is significant. In early stage, we applied the therapy for treatment of prolapse of lumbar intervertebral disc, and clinical studies have shown[14-15] that the therapy for treatment of prolapse of lumbar intervertebral disc can supplement the insufficiency, drain the pathogenic *qi*, *deqi*, guide *qi* and move *qi*, further enhancing the needling sensation, dredging local meridians and collaterals, unblocking *qi* movement of joint, and strengthening the analgesic effect. The clinical efficacy was very significant.

The results of this study have shown that curative effect of SM group is significantly superior to CN group in improving patients' PRI sense, PRI emotion, VAS and PPI total pain score, indicating that modified green dragon swaying its tail needling manipulation can significantly improve patients' overall rating of pain. In the process of clinical treatment, with strong needling sensation, modified green dragon swaying its tail needling manipulation can quickly reach the lesions, "after *qi* reaches, the effect will be obtained", rapidly relieve patients' pain, thus improving the symptoms and signs of KOA patients more quickly and effectively, which is worthy of popularization and application with definite curative effect.

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ABSTRACT IN CHINESE

[摘 要] **目的：**比较改良青龙摆尾针法、普通针刺手法对膝骨性关节炎患者疼痛综合评分的效应差异，评价改良青龙摆尾针刺手法治疗本病的优势。**方法：**将95例膝骨性关节炎患者按随机数字表法随机分为2组，其中改良青龙摆尾组48例，普通针刺组47例，分别施以不同针刺手法进行针刺治疗。采用国际公认的描述与测量疼痛的简化MPQ（SF-MPQ）量表评定疼痛程度，其中包括疼痛分级指数（PRI），目测类比定级法（VAS）和现有疼痛强度（PPI）。采用膝骨关节病情严重指数（ISOA）评定临床疗效。**结果：**（1）改良青龙摆尾组治疗后PRI、VAS及PPI积分分别为6.63±4.67、2.23±1.45、0.65±1.32，普通针刺组治疗后PRI及VAS、PPI积分分别为13.32±7.96、4.34±1.79及2.28±1.21，两组患者均较治疗前明显降低（均$P<0.05$），且改良青龙摆尾组改善情况优于普通针刺法（均$P<0.01$）；（2）改良青龙摆尾组临床治愈率为52.08%，总有效率为97.92%；普通针刺组临床治愈率为25.53%，总有效率为85.10%。两组临床治愈率比较，$P<0.01$。**结论：**改良青龙摆尾组在改善患者疼痛综合评分方面明显优于普通针刺组。表明改良青龙摆尾针法可以有效缓解膝骨性关节炎患者的疼痛。

[关键词] 膝骨性关节炎　青龙摆尾针法　MPQ疼痛量表