

Observation on therapeutic effect of electroacupuncture plus Tanbo-plucking the trigger points for scapulohumeral periarthritis

电针联合弹拨激痛点治疗肩关节周围炎疗效观察

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Abstract

Objective: To observe the clinical efficacy of electroacupuncture (EA) plus Tanbo-plucking the trigger points for scapulohumeral periarthritis (SP).

Methods: A total of 80 patients with SP were randomized into an observation group and an EA group by the random number table, with 40 cases in each group. The EA group was treated with EA therapy, and the observation group was treated with EA therapy plus Tanbo-plucking the trigger points. After treatment, the visual analog scale (VAS) and Melle scores of the two groups were compared to evaluate the improvement of shoulder pain and functional activity, and meanwhile the clinical efficacy was observed.

Results: After treatment, the total effective rate of the observation group was 95.0% and the cure and markedly effective rate was 72.5%. The total effective rate of the EA group was 87.5% and the cure and markedly effective rate was 42.5%. There was no significant difference in the total effective rate between the two groups ($P>0.05$). The cure and markedly effective rate of the observation group was higher than that of the EA group, and the difference between the two groups was statistically significant ($P<0.05$). After treatment, the intra-group differences in VAS and Melle scores of both groups were statistically significant (both $P<0.001$). The inter-group differences in the changes of the VAS and Melle scores after treatment were statistically significant (both $P<0.001$).

Conclusion: EA plus Tanbo-plucking the trigger points has a better curative effect than EA therapy alone in the treatment of SP.

Keywords: Acupuncture Therapy; Electroacupuncture; Tuina; Massage; Trigger Points; Frozen Shoulder; Periarthritis; Shoulder Pain

【摘要】目的: 观察电针加弹拨激痛点治疗肩关节周围炎(SP)的临床效果。**方法:** 共纳入SP患者80例,按随机数字表法分为观察组和电针组,每组40例。电针组采用电针治疗,观察组在电针治疗基础上加用弹拨激痛点治疗。治疗后,观察比较两组的视觉模拟量表(VAS)和Melle评分,以评价肩部疼痛和功能活动改善情况,同时进行临床疗效观察。**结果:** 治疗后,观察组总有效率为95.0%,愈显率为72.5%;电针组总有效率为87.5%,愈显率42.5%。两组总有效率差异无统计学意义($P>0.05$);观察组愈显率高于电针组,组间差异有统计学意义($P<0.05$)。治疗后,两组VAS和Melle评分与同组治疗前均有统计学差异(均 $P<0.001$),观察组VAS和Melle评分的治疗前后差值均与电针组有统计学差异(均 $P<0.001$)。**结论:** 电针加弹拨激痛点治疗SP疗效优于单独电针治疗。

【关键词】 针刺疗法; 电针; 推拿; 按摩; 激痛点; 肩凝症; 关节周围炎; 肩痛

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Scapulohumeral periarthritis (SP) refers to the chronic aseptic inflammation of the joint capsules and soft tissues around the joints caused by soft tissue injury and degeneration of the muscles, ligaments and tendons around the shoulder joint^[1]. SP often attacks one side of the shoulder and causes pain, soreness or throbbing pain, which may aggravate at night. At the

beginning stage, the patient is usually afraid to move because of the pain. After a long time, it would cause adhesions and contractures, resulting in limited movement, especially for abduction, elevation and extension, or even loss of mobility of the shoulder joint. A trigger point is the point on skeletal muscle that can induce pain. Usually, a tight muscle (tension band) or a cord-like induration can be touched at this point. Touching and pressing the point can cause local pain with distal radiating pain^[2]. To observe the clinical efficacy of electroacupuncture (EA) plus Tanbo-plucking

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the trigger points for SP, we performed this clinical observation with 80 cases.

1 Clinical Materials

1.1 Diagnostic criteria

This study referred to the diagnostic criteria of SP in the *Shanghai Diagnostic and Therapeutic Guidelines of Traditional Chinese Medicine*^[3]: chronic strain, traumatic injuries of tendons and bones, insufficiency of qi and blood, exposure to wind-cold-dampness; more common in people about 50 years old; females at a higher risk than males; more right shoulders than the left ones; most likely to affect manual workers; mostly chronic; shoulder pain, worse at night, often induced by weather changes and fatigue, dysfunction of the shoulder joint; atrophy of shoulder muscle, tenderness in the anterior, posterior and lateral sides of the shoulder, obvious limitation of abduction, a typical shoulder resistance symptom; X-ray examination is mostly negative, and osteoporosis can be seen in long-duration cases.

1.2 Inclusion criteria

Those who met the above diagnosis criteria; aged 35 to 85 years old; agreed to participate in this clinical trial and signed informed consent.

1.3 Exclusion criteria

Those with severe diseases of cardiovascular system, liver or kidney; patients with tuberculosis, tumors or fractures; those who were unable to cooperate due to mental disorders.

1.4 Statistical method

All data were statistically analyzed by SPSS version 20.0 statistical software. Measurement data were expressed as mean \pm standard deviation ($\bar{x} \pm s$), and *t*-test was applied. Counting data were expressed as percentage, and processed by Chi-square test. $P < 0.05$ was considered to indicate a statistically significant difference.

1.5 General data

A total of 80 patients with SP were enrolled from our clinic between January 2015 and December 2016. All patients were randomly divided into two groups by the random number table, with 40 cases in each group. The ages of the observation group ranged from 36 to 83 years old; and the course of disease was from 3 months to 2 years. The ages of the EA group ranged from 40 to 83 years old; and the course of disease was from 2 months to 3 years. There were no statistically significant differences in the general data between the two groups (all $P > 0.05$), indicating that the two groups were comparable (Table 1).

Table 1. Comparison of general data between the two groups

Group	n	Gender (case)		Average age ($\bar{x} \pm s$, year)	Average duration ($\bar{x} \pm s$, year)
		Male	Female		
Observation	40	15	25	58.4 \pm 1.3	1.0 \pm 0.1
EA	40	21	19	60.1 \pm 1.2	1.3 \pm 0.1

2 Treatment Methods

2.1 Observation group

2.1.1 EA

Acupoints: Jianqian (Extra), Jianyu (LI 15), Jianliao (TE 14), Jianzhen (SI 9), Tiaokou (ST 38) and Chengshan (BL 57) on the affected side.

Methods: The physician punctured the points listed above using disposable sterile acupuncture needles of 0.25 mm in diameter and 60 mm in length. The patient took an upright sitting position. After routine disinfection, the physician first punctured Tiaokou (ST 38) toward Chengshan (BL 57), that was to puncture Tiaokou (ST 38) with the tip of needle towards Chengshan (BL 57). After the arrival of qi, the twirling reducing manipulation was performed, and the patient was told to move the shoulder joint of the affected side. The needle manipulation lasted for 2 min before the removal of the needle. Regular acupuncture was applied to the other 4 acupoints of shoulder, and after the arrival of qi, the physician connected those acupoints with Hwato Brand SDZ-II EA apparatus, with a sparse-dense wave, at 2 Hz/100 Hz, and 2-5 mA in current intensity. The stimulation lasted for 20 min, once a day, and 10 times constituted a treatment course. The efficacy was observed after 2 courses of treatment.

2.1.2 Tanbo-plucking the trigger points

After EA, the patient still took the upright sitting position. The physician held the patient's upper arm with one hand and made it slightly abduct, applying An-pressing, Rou-kneading and Gun-rolling to relax the shoulder (Figure 1). Meanwhile, targeting the trigger points, Tanbo-plucked the tension band and the cord-like induration for 5-8 min (Figure 2). And then, the physician supported the patient's shoulder with the left hand and held the patient's upper arm with the right hand to Yao-shake the shoulder joint clockwise and counterclockwise. Finally, the physician relaxed the patient's upper arm with Cuo-twisting (Figure 3), Rou-kneading, Pai-tapping, Qianla-traction, Ti-lifting and Yao-shaking (Figure 4) manipulations. The treatment was performed once a day, and 10 times constituted a treatment course. The efficacy was observed after 2 courses of treatment.



Figure 1. Gun-rolling manipulation



Figure 2. Tanbo-plucking the trigger points



Figure 3. Cuo-twisting manipulation



Figure 4. Yao-shaking manipulation

2.2 EA group

The EA group only received EA therapy, and the acupoints, the acupuncture manipulation and treatment courses were the same as those in the observation group.

3 Observation of Curative Efficacy

3.1 Observation items

3.1.1 Visual analog scale (VAS) score

The VAS score was used to assess the degree of shoulder pain^[4]. Painless: VAS <1 point; mild pain: VAS score ≥ 1 point, but <4 points; moderate pain: VAS ≥ 4 points, but <7 points; severe pain: VAS >7 points.

3.1.2 Melle score

The Melle score was used to evaluate the functional activity of shoulder joint, which was to quantify the 5 ranges of motions of the shoulder^[5].

Abduction: 3 points for <30°; 2 points for 30-90°; 1 point for 90-120°; 0 points for >120°.

External rotation in neutral position: 3 points for <0°; 2 points for 0-20°; 1 point for >20°.

Hand reaching the nape: Unable to complete was scored 3 points; difficult to complete was scored 2 points; comparatively easier to complete was scored 1 point; 0 point for normal completion.

Hand reaching the spine: Unable to complete was scored 3 points; 2 points for reaching S₁ level; 1 point for reaching T₁₂ level; 0 point for reaching above T₁₂ level.

Hand reaching the mouth: 3 points for complete trumpet sign; 2 points for partial trumpet sign; 1 point for shoulder adduction of 0-40°; 0 point for shoulder adduction of 0°.

3.2 Criteria of curative efficacy

According to the *Shanghai Diagnostic and Therapeutic Guidelines of Traditional Chinese Medicine*^[3], the curative efficacy of SP was assessed.

The sum of the VAS and Melle scores were the total score, the efficacy index was calculated based on the change in the total score, and the curative efficacy was evaluated according to the efficacy index.

Efficacy index = (Total score before treatment - Total score after treatment) \div Total score before treatment \times 100%.

Cure: Shoulder pain disappeared, the range of motion of shoulder joint returned to normal, and the efficacy index was $\geq 90\%$.

Markedly effective: The shoulder pain was obviously relieved, the range of motion of shoulder joint was obviously improved, and the efficacy index was $\geq 75\%$, but <90%.

Effective: The shoulder pain was basically relieved, the range of motion of shoulder joint was partially improved, and the efficacy index was $\geq 30\%$, but <75%.

Invalid: No change in symptoms, and efficacy index was <30%.

3.3 Results

3.3.1 Clinical efficacy

The total effective rate of the observation group was 95.0%, and the cure and markedly effective rate was 72.5%. The total effective rate of the EA group was 87.5%, and the cure and markedly effective rate was 42.5%. There was no significant difference in the total effective rate between the two groups. The cure and markedly effective rate of the observation group was higher than that of the EA group, and the difference between the two groups was statistically significant ($P<0.05$), (Table 2).

3.3.2 VAS score

There was no significant difference in VAS score between the two groups before treatment ($P>0.05$). After treatment, the VAS scores of both groups decreased significantly, and the intra-group differences were statistically significant (both $P<0.001$), indicating

that both methods had analgesic effect. After 2 courses of treatment, the improvement of VAS score in the observation group was statistically different from that in the EA group ($P<0.001$), indicating that the observation group had a better analgesic effect than the EA group (Table 3).

3.3.3 Comparison of Melle score between the two groups

There was no significant difference in Melle score between the two groups before treatment ($P>0.05$). After treatment, the intra-group differences in Melle score of both groups were statistically significant (both $P<0.001$), indicating that both methods could improve the shoulder joint activity. After 2 courses of treatment, the improvement of Melle score in the observation group was statistically different from that in the EA group ($P<0.001$), indicating that the improvement in shoulder joint activity in the observation group was superior to the EA group (Table 4).

Table 2. Comparison of clinical efficacy between the two groups (case)

Group	<i>n</i>	Cure	Markedly effective	Effective	Invalid	Cure and markedly effective rate (%)	Total efficiency rate (%)
Observation	40	6	23	9	2	72.5 ¹⁾	95.0
EA	40	5	12	18	5	42.5	87.5

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

Table 3. Comparison of VAS score between the two groups before and after treatment ($\bar{x} \pm s$, point)

Group	<i>n</i>	Before treatment	After treatment	Change after treatment	<i>t</i> -value	<i>P</i> -value
Observation	40	7.13±1.11	1.55±1.03	5.58±1.02	23.31	0.000
EA	40	6.71±1.31	3.12±1.27	3.59±1.16	12.44	0.000
<i>t</i> -value		-1.55	6.07	-8.15		
<i>P</i> -value		0.060	0.000	0.000		

Table 4. Comparison of Melle score between the two groups before and after treatment ($\bar{x} \pm s$, point)

Group	<i>n</i>	Before treatment	After treatment	Change after treatment	<i>t</i> -value	<i>P</i> -value
Observation	40	10.31±2.12	5.83±1.62	4.48±1.86	10.62	0.000
EA	40	10.85±1.91	2.72±1.06	8.13±1.43	23.54	0.000
<i>t</i> -value		-1.20	10.16	-9.84		
<i>P</i> -value		0.120	0.000	0.000		

4 Discussion

SP is a common and frequently encountered disease affecting people's health^[6-7]. Without timely and effective treatment, patients' quality of life (QOL) and shoulder function will be affected. Traditional Chinese Medicine believes that SP belongs to frozen shoulder and shoulder exposure to wind. It is characterized by shoulder pain, distal radiating pain, and dysfunction of the shoulder joint, even local muscular atrophy. It is

mostly caused by the invasion of pathogenic wind-cold-dampness that results in qi and blood stagnation, and blocked meridian and collateral^[8-11]. In summary, the pathogenesis of SP mainly includes three aspects: one is the invasion of pathogenic cold, the second is the deficiency of yang qi, and the third is liver and kidney deficiency. Middle-aged and elderly people are more susceptible to SP due to the deficiency of yang qi, and deficiency of liver and kidney.

In this study, Jianqian (Extra), Jianyu (LI 15), Jianliao (TE 14) and Jianzhen (SI 9) were selected as the major acupoints for SP, which could restore the motor function of the shoulder joint and relieve the shoulder pain. The main activities of shoulder joint are internal rotation, external rotation, abduction and extension. The combination of these four acupoints was applied for improving the motion of the shoulder joint in all directions, by unblocking the meridians of shoulder and accelerating the blood circulation of affected region. In this study, the point-toward-point needling was also applied, as it can regulate yin and yang, unblock the meridian and collateral, expand the needling sensation directly to the diseased area^[12].

Puncturing Tiaokou (ST 38) toward Chengshan (BL 57) was to unblock the meridian qi of Yangming and Taiyang. The Yangming Meridian is full of qi and blood, so that it can regulate and tonify qi and blood, relax sinews and activate collaterals by acupuncture. Taiyang Meridian dominates the exterior of the whole body, and it can dispel wind and dissipate cold, and dissipate stasis to relieve pain by acupuncture. The physician punctured these two points by one needle, in combination with joint movement upon the arrival of needling qi for achieving a better treatment result.

The trigger points belong to the category of Ashi points in Chinese medicine. They refer to the myofascial stabbing pain points, and can be clearly touched. The pain is obvious when the points are pressed, and the pain will involve distant regions^[13-16]. The trigger points are where the local metabolites accumulate at the nerve-muscle junction of the muscle abdomen, stimulating the surrounding tissues, tendons and ligaments, producing non-specific inflammation, and resulting in tension bands or cord-like nodules, causing local pain and upper arm referred pain. The formation of trigger points is due to local blood supply obstruction and energy consumption, which provides a basis for studying the mechanism of tuina manipulation^[17-21]. Stimulating the trigger points by manipulation can stimulate surrounding tissues and tendons, accelerate local blood flow, and eliminate local metabolites and inflammatory substances. Tanbo-plucking the trigger points has the effect of activating blood and resolving stasis, relaxing sinews and dissipating nodules, and freeing meridians and activating collaterals, which is conducive to the release of adhesion and the cord-like substances, and can ultimately reduce the pain and restore the motor function of the shoulder joint^[22-24].

This study indicated that EA plus Tanbo-plucking trigger points could promote the topical blood circulation and accelerate the elimination of local inflammatory substances, and had a better curative effect of relieving shoulder pain and promoting shoulder function recovery than single EA therapy in the treatment of SP.

Conflict of Interest

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

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Statement of Informed Consent

Informed consent was obtained from the patients in this study.

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