

# Effect of *Fatigue Three-Needle* acupuncture therapy in a patient with cancer-related fatigue

## A case report

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### Abstract

**Rationale:** Cancer-related fatigue (CRF) is a persistent, subjective sense of tiredness or exhaustion experienced by cancer patients. Acupuncture is a safe and feasible optional method for adjunctive treatment for CRF. However, the therapeutic effect of *the Fatigue Three-Needle* acupuncture therapy in patients with CRF has not been well-investigated.

**Patient concerns:** A 53-year-old woman had been experiencing fatigue since the radical resection of sigmoid colon cancer 2 years ago, for which she underwent traditional Chinese medicine treatment.

**Diagnosis:** After some review, she was diagnosed with CRF. Although she underwent traditional Chinese medicine treatment, she continued experiencing fatigue symptoms.

**Interventions:** When she visited our hospital, she was treated with *the Fatigue Three-Needle* for 3 sessions a week, 30 minutes per session.

**Outcomes:** After 4 weeks of treatment, the patient felt refreshed and relieved from the fatigue.

**Lessons:** The finding from this case provides further evidence for the therapeutic benefits of *the Fatigue Three-Needle* therapy for patients with CRF, suggesting that acupuncture treatment with *the Fatigue Three-Needle* is an effective option for patients with CRF.

**Abbreviations:** 5-HT = 5-hydroxytryptophan, ACTH = adrenocorticotropic hormone, ATP = adenosine triphosphate, BFI = the Brief Fatigue Inventory, CRF = cancer-related fatigue, CT = computed tomography, EEG = electroencephalography, EORTCQLQ-C30 = 30-item European Organization for Research and Treatment of Cancer Quality of Life Questionnaire, GSH = glutathione, HPA = hypothalamic-pituitary-adrenal, IL-6 = Interleukin-6, LPO = the serum lipid peroxide, MeF = mental fatigue, MeS = mental somnolence, PFS-R = The Revised Piper Fatigue Scale, TNF- $\alpha$  = tumor necrosis factor- $\alpha$ , WBC = white blood cell.

**Keywords:** cancer-related fatigue, *the Fatigue Three-Needle*, acupuncture, case report

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## 1. Introduction

Cancer-related fatigue (CRF) is a distressing, persistent and, subjective sense of physical, emotional and cognitive tiredness or exhaustion related to cancer or cancer treatment that is not proportional to the recent activity and is never improved by rest. It may affect patients' memory, concentration, or ability to focus; and also hinders people from their family and social life, their job, and other activities that they enjoy doing.<sup>[1,2]</sup>

In various publications, some clinical trials and systematic reviews established that the acupuncture might be a safe and feasible optional method for adjunctive treatment in CRF.<sup>[2–6]</sup> Although several clinical trials have been conducted to study acupuncture treatment, currently there is no standard program for this treatment, especially the standard acupuncture points.

Prof. Rui Jin, who established the *Jim's Three-Needle* was the Chief professor of the First Affiliated Hospital of Guangzhou University of Chinese Medicine. *Jim's Three-Needle* has been widely used to improve chronic fatigue syndrome conditions.<sup>[7]</sup> *The Fatigue Three-Needle* is a part of *Jim's Three-Needle*, consisting of *Sishenzhen*, PC6, and ST36, which are commonly used for chronic fatigue.

However, to the best of your knowledge, the therapeutic effect of *the Fatigue Three-Needle* acupuncture therapy in patients with CRF has not been well-investigated. Here, we report the case of a 53-year-old woman with CRF after radical resection of sigmoid

colon cancer. She received an effective acupuncture treatment at her *Fatigue Three-Needle* points: ST36, PC6, and *Sishenzhen*, after other treatments proved ineffective.

## 2. Case presentation

### 2.1. Patient information

A 53-year-old woman was presented to our hospital on April 23, 2018 due to the persistent fatigue. She was experiencing physical exhaustion, poor memory, and insomnia ever since she underwent a radical resection of sigmoid carcinoma 2 years ago.

On June 3, 2016, the patient went to the hospital with a complaint of hematochezia for 15 days. Colonoscopy revealed a cauliflower-patterned mass, 18 cm away from the anus, occupying 2/3 of the colon cavity; and its surface was ulcerative and bleeding. Enhanced computed tomography (CT) scan showed an irregularly thick sigmoid colon wall, which was established to be colorectal cancer.

On June 12, 2016, the patient underwent a radical resection of sigmoid carcinoma and regional lymph node resection with laparoscopy. Pathological examination of the sigmoid colon suggested a moderately differentiated adenocarcinoma (pathological stage: pT3, pN0, pMx, Stage IIa).

After the surgery, patient's stools were normal and the surgical incision was well-healed. Neither adjuvant chemotherapy nor radiotherapy was performed. Recurrence of the tumor was not found in a regular CT scan. The patient, however, always complained of tiredness and physical and mental weakness. Fatigue symptoms continued, though she was treated with traditional Chinese medicine (prescription: attachment 1).

### 2.2. Clinical findings

A recent CT examination revealed no signs of tumor recurrence or metastasis. She had no complaints of pain or anemia, which were the most common course of CRF.

### 2.3. Timeline

On April 23, 2018, the patient was referred to our clinic with a complaint of fatigue. She accepts the *Fatigue Three-Needle* 3 times a week. We assess the fatigue once a week, 1 month later, she found fatigue reduce.

### 2.4. Diagnostic assessment

Moderate fatigue was indicated by the CRF scale including the Brief Fatigue Inventory<sup>[8]</sup> (BFI) (Table 1), the Revised Piper Fatigue Scale<sup>[9]</sup> (PFS-R) (Table 1), the EORTC (European Organization for Research and Treatment) QLQ-C30<sup>[10]</sup> (Table 2), and electroencephalography (EEG, measured by multifunction combination monitor HXD-I, Heilongjiang Huaxiang Technology Co. Ltd., Heilongjiang, China) (Table 3).

### 2.5. Therapeutic intervention

According to the above findings, we decided to treat her with the *Fatigue Three-Needle* to relieve her persistent fatigue. The *Fatigue Three-Needle* consists of *Sishenzhen*, PC6, and ST36. A senior acupuncturist performed this course of acupuncture. The patient was first placed in a comfortable supine position. Subsequently, the acupuncturist pointed *Sishenzhen*, bilateral

**Table 1**

**The change of BFI and PFS-R.**

	2018/4/23	2018/5/2	2018/5/9	2018/5/16	2018/5/23
BFI score	6	4	3	2	1
PFS-R					
Daily life	23	13	11	11	7
Sensory	22	20	18	18	9
Somatoform symptom	21	18	20	20	10
Cognition and Mood	24	18	15	14	8

BFI = the Brief Fatigue Inventory, PFS-R = the Revised Piper Fatigue Scale.

PC6, and bilateral ST36, respectively. *Sishenzhen* is located at 4 points; 1.5 cun to the right, left, anterior, and posterior to DU20. The acupuncturist used 25 × 0.30 mm sterile acupuncture needles (Huatuo, Suzhou Medical Supply Factory Co., Ltd, Suzhou, China). The angle of the needles was 15°, and the depth of the acupuncture was 0.5 to 0.8 cun. PC6 is located on the anterior aspect of the forearm, between the tendons of the palmaris longus and the flexor carpi radialis, 2 cun proximal to the palmar wrist crease. The angle was 90°, and the depth was 0.5 to 1 cun. ST36 is located 3 cun inferior to the lateral depression underneath the patellar ligament and 1 middle-finger breadth lateral to the tibial crest. The angle was 90°, and the depth was 1.5 to 2 cun with 0.3 × 40 mm acupuncture needles. After acupuncture at the above points, manipulation was performed to make it *deqi*, and the needles were placed for 30 minutes. This acupuncture treatment was performed 3 times a week, once every other day, for 4 weeks.

### 2.6. Follow-up and outcomes

Surprisingly, after 4 weeks of treatment, the patient felt refreshed and relieved from the fatigue. There were significant changes in the scores of fatigue-related scales. During the procedure, we recorded the changes in her fatigue scores, which are displayed in Tables 1–3. After 1-month follow-up, the patient suspected the recurrence of the CRF; however, it was not as worse as that before the beginning of the treatment.

**Table 2**

**Change of EORTC QLQ-C30.**

	2018/4/23	2018/5/2	2018/5/9	2018/5/16	2018/5/23
Physical function	1	1	1	1	1
Role function	2	2	1	2	1
Emotional function	2	2	2	1	2
Cognitive function	2	1	1	1	1
Social function	2	1	1	1	1
General health	5	5	5	5	5
Fatigue	2	2	2	2	1
Nausea and Vomiting	1	1	1	1	1
Pain	1	1	1	1	1
Short of breath	1	1	1	1	1
insomnia	2	2	2	2	2
Loss of appetite	1	4	1	1	1
Constipation	2	2	2	2	2
Diarrhea	1	1	1	1	1
Financial difficulty	1	2	2	1	1

EORTC QLQ-C30 = 30-item European Organization for Research and Treatment of Cancer Quality of Life Questionnaire.

**Table 3****Fatigue measured by EEG.**

	2018/4/23	2018/5/2	2018/5/9	2018/5/16	2018/5/23
MeS	24	16	8	24	41
MeF	13	4	6	22	5

EEG examinations were measured by multifunction combination monitor HXD-I, Heilongjiang Huaxiang Technology Co. Ltd., Heilongjiang, China.

EEG = electroencephalography, MeF = mental fatigue, MeS = mental somnolence.

### 3. Discussion

CRF is a common and frequently disabling symptom in cancer patients and survivors.<sup>[11]</sup> Many patients are affected by sleep disturbances and emotional distress, including anxiety and depression.<sup>[12]</sup> A variety of biological mechanisms of CRF have been proposed and investigated over the past 2 decades.<sup>[13,14]</sup> These include the hypothalamic-pituitary-adrenal (HPA) axis dysregulation and five-hydroxytryptophan (5-HT), tumor necrosis factor (TNF- $\alpha$ ) and interleukin-6 (IL-6).

The mechanism through which acupuncture helps reduce fatigue is not known, and this should be the focus of the future studies. However, we know that acupuncture affects inflammatory cytokines, T lymphocytes, and various peptides<sup>[15]</sup>; and recent results suggest that cytokines and tumor necrosis factor  $\alpha$  signaling are contributing factors in the development of fatigue.<sup>[16]</sup>

*The Fatigue Three-Needle* includes ST 36, PC 6 and *Sishenzhen*. ST36 in the stomach meridian is commonly used to improve spleen-deficiency syndrome. Recently, ST36 as the primary point has been used in CRF.<sup>[17–20]</sup> Several studies<sup>[21]</sup> showed that ST36 could decrease the content of interleukin-17 (IL-17) and TNF- $\alpha$  in a rat serum. When the body is affected by exhaustion or excessive fatigue, which leads to the adenosine triphosphate (ATP) synthesis disorder, electroacupuncture ST36 treatment can effectively upregulate the level of skeletal muscle ATP synthase and promote the integration of mitochondrial ATP.<sup>[22]</sup> A trial<sup>[23]</sup> suggested that acupuncture at ST36 can regulate the balance of T lymphocyte subsets in the mesenteric lymph nodes of rats with spleen deficiency, thus improving the intestinal immune function, intestinal digestion, and absorption.

PC6 (Neiguan), as a point of the pericardium channel, can achieve a good curative effect on cardiovascular system and nervous system diseases.<sup>[24]</sup> Acupuncture ST 36 and PC6 can reduce the plasma level of adrenocorticotrophic hormone (ACTH) and platelet content of 5-HT in patients with generalized anxiety disorder.<sup>[25]</sup>

*Sishenzhen* is built according to the experience of Professor Rui Jin and is widely used for mental disorders, such as vascular cognitive impairment with no dementia, and mental retardation in children.<sup>[26–28]</sup> *Sishenzhen* has 4 points which locate 1.5 cun to the right, left, anterior and posterior to DU20. The anterior and posterior points amount to DU19 and DU21, which are located in the Governor Vessel. (Governor Vessel is one of the 8 extra meridians. The main portion of the channel ascends along the midline of the back to the top of the head and then descends along the midline of the face down to Yinjiao (GV28), a point between the upper lip and the upper gingiva in the labia frenum) The right and left points are in the Bladder channel (one of the twelve regular meridians which runs from Jingming (BL1) at the medial canthus of the eye, ascends the forehead to the vertex and then enters the brain and exits at the nape of the neck where it divides into 2 parallel

branches: the first branch descends the back at a distance of 1.5 cun from the spine, and during its course it connects with the kidney and bladder, and continues along the posterior thigh to the popliteal crease; the second branch descends the back at a distance of 3 cun from the spine, continues along the latero-posterior side of the thigh to popliteal fold where it meets the first branch. The meridian continues to descend along the posterior calf to the lateral malleolus, terminating at Zhiyin (BL67) on the lateral side of the tip of the small toe). It is generally reported<sup>[29]</sup> that acupuncture of LI 11, ST 36, and DU 19 can lower white blood cell (WBC), TNF- $\alpha$ , IL-6, and the serum lipid peroxide (LPO) level and increase glutathione (GSH) levels. According to the theory of traditional Chinese medicine about “rather missing the acupoint than missing the channel,” *Sishenzhen*, as compared to EX-HNI, has wider mapping area in the brain which can increase the effect on the mind and enhance the curative effect. The heart and the brain are considered to cause insomnia, one of the symptoms of CRF, in Chinese medicine theory. Its pathogenesis likely results in Yin deficiency leading to an excess of Yang. Governor Vessel has a close relationship with the heart and mind and can regulate Yin and Yang. Therefore, Governor Vessel may be conducive to CRF in some way.

These are the reasons that *the Fatigue Three-Needle* has the clinical efficacy and safety for CRF patients. In this case, the effect of *the Fatigue Three-Needle* provides a new thought for reducing CRF.

We use EEG (using a multifunction monitor, model “HXD-I”) to measure the patient’s mental somnolence (MeS) and mental fatigue (MeF). We found that the MeS and MeF indices decreased during the treatment, indicating that this may be an objective diagnostic criterion for CRF. Since there is no objective diagnostic indicator for CRF, further study is needed.<sup>[30,31]</sup>

### 4. Conclusion

The findings from this case suggest that acupuncture of *the Fatigue Three-Needle* is effective and quick for the treatment of CRF. Fatigue is a common symptom experienced by people recovering from the cancer and treatment, and more appropriately-powered trials to evaluate the effect of acupuncture with *the Fatigue Three-Needle* are needed. Because of the limitation of single-case clinical observational studies, a large-scale randomized clinical trial with a sufficient follow-up period is needed.

### Author contributions

Lizhu Lin and Jietao Lin provided the concept and modified the manuscript. Lijun He and Danghan Xu drafted the paper. Nuo Xu finished the data work. Chao Jia modified the manuscript. Jietao Lin orcid: 0000-0002-5507-3499.

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