

## Research Paper

# Effect of Foot Reflexology on Postoperative Pain in Patients Undergoing Tibia Plating Surgery: A Randomized Clinical Trial



Fateme Imani<sup>1</sup> , \*Ebrahim Nasiri<sup>2</sup> , Houshang Akbari<sup>3</sup> , Mohammad Reza Safdari<sup>4</sup>

1. Department of Operating Room, School of Allied Medical Sciences, Medical Student Research Committee, Mazandaran University of Medical Sciences, Sari, Iran.
2. Department of Anesthesiology, Operating Room, School of Allied Medical Sciences, Addiction Institute, Traditional and Complementary Medicine Research Center, Mazandaran University of Medical Sciences, Sari, Iran.
3. Department of Anesthesiology, Operating Room, School of Allied Medical Sciences, Mazandaran University of Medical Sciences, Sari, Iran.
4. Department of Orthopedic, Anesthesiology and Surgery, School of Medicine, North Khorasan University of Medical Sciences, Bojnourd, Iran.



**Citation:** Imani F, Nasiri E, Akbari H, Safdari MR. [Effect of Foot Reflexology on Postoperative Pain in Patients Undergoing Tibia Plating Surgery: A Randomized Clinical Trial (Persian)]. Complementary Medicine Journal. 2020; 10(3):258-269. <https://doi.org/10.32598/cmja.10.3.1019.1>

<https://doi.org/10.32598/cmja.10.3.1019.1>



### Article Info:

Received: 27 Jul 2020

Accepted: 06 Sep 2020

Available Online: 01 Oct 2020

### Key words:

Foot reflexology, Pain, Surgery, Tibia plating, Bone fracture

## ABSTRACT

**Objective** One of the major problems of patients after orthopedic surgeries is acute pain. The present study aims to evaluate the effect of foot reflexology massage on postoperative pain in patients undergoing plating surgery for tibia fracture.

**Methods** This study is a randomized clinical trial conducted on 96 patients who were candidates for tibia plating surgery referred to Imam Ali Hospital in Bojnourd, Iran, randomly divided into intervention and control groups. Foot reflexology massage in the intervention group was performed on patients' healthy feet for 10 minutes, one hour before surgery. In the control group, the foot sole was touched for one minute without any pressure. Pain intensity was measured using the standard Visual Analog Scale before and immediately after the intervention and 2, 4, 6, 12 and 24 hours after surgery. Data were analyzed using chi-square test, t-test, repeated measures ANOVA, Mann-Whitney U and Friedman tests.

**Results** The baseline pain scores in the intervention and control groups were reported  $8.1 \pm 0.9$  and  $8.4 \pm 0.9$ , respectively. After the intervention, the pain score in these groups was reduced to  $6.9 \pm 1.1$  and  $8.1 \pm 1.0$ , respectively ( $P < 0.001$ ). At other times, up to 24 hours after surgery, the pain reduction was higher in the intervention group ( $P < 0.05$ ).

**Conclusion** Foot reflexology massage reduces postoperative pain of patients undergoing tibia plating surgery. Therefore, this method can be used to reduce pain and anxiety in orthopedic surgery patients.

## Extended Abstract

### 1. Introduction

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ain is a common phenomenon after all surgeries. Approximately 70% of patients complain of severe pain on the first day after surgery. Pain delays wound healing and

increases the chances of developing thromboembolic disorders. High levels of pain after surgery increase drug use, decrease lung capacity, cause pneumonia or tachycardia, increase blood pressure, delay recovery, and prolong hospital stay. Although medication is the most common pain management intervention, the prevalence of postoperative pain is still reported in up to 80% of cases. Drug side effects and other existing problems such as lack of access or inad-

### \* Corresponding Author:

Ebrahim Nasiri, PhD.

**Address:** Department of Anesthesiology, Operating Room, School of Allied Medical Sciences, Addiction Institute, Traditional and Complementary Medicine Research Center, Mazandaran University of Medical Sciences, Sari, Iran.

**Tel:** +98 (911) 1517836

**E-mail:** rezanf2002@yahoo.com

equacy of painkillers to relieve pain have led to the attention of nursing systems to non-pharmacological pain relief techniques. One of the non-pharmacological approaches is complementary medicine. Foot Reflexology is one of the most common methods of complementary therapies. This method is done by applying pressure on the sole of the foot with the help of fingers, especially the thumb, to change the body's energy flow. The advantages of this method include cheapness and cost-effectiveness, patient satisfaction, ease of use and independence of technology. Considering the frequency of tibial plateau fractures and severe pain in after plating surgery, the present study was performed to determine the effect of foot reflexology massage on post-operative pain in patients undergoing tibia plating surgery.

## 2. Materials and Methods

In this randomized clinical trial, 96 patients referred to Imam Ali Hospital in Bojnourd, Iran who were candidates for tibia plating surgery were studied in two groups of intervention (n=48) and control (n=48). Inclusion criteria were: age 18-75 years, any tibial plateau fracture that requires surgery according to the surgeon, health of the soles and toes and no fractures in other parts, and no vascular disease, inflammation, diabetes, sensory-motor impairments, drug and alcohol addiction, chronic pain such as migraine, and history of receiving massage. Exclusion criteria were: patients' dissatisfaction at each stage of follow-up, instability of hemodynamic status after surgery, and failure to achieve suitable environmental conditions for the intervention. After obtaining the informed consent and one hour before the surgery, the reflexology massage of the sole of the foot was performed in the intervention group for 10 minutes;

for the control group, the foot sole was touched for one minute without any pressure. Patients' pain intensity was measured using the standard Visual Analog Scale (scored on a 10-point scale) before and immediately after the intervention, and at 2, 4, 6, 12 and 24 hours after surgery. To analyze the data, chi-square tests (for qualitative variables), t-test and repeated measure ANOVA (for quantitative variables) as well as Mann-Whitney U and Friedman tests were used. The P value less than 0.05 was considered as the statistically significance level.

## 3. Results

Of 96 participants, 34 (35.4%) were female and 62 (64.6%) were male. The patients in the two study groups were similar in terms of demographic characteristics. The difference between the mean pain scores in the intervention and control groups was statistically significant immediately after and 2, 4, 6, 12 and 24 hours after surgery, where patients in the intervention group had lower mean pain than the control group (Table 1). The pain intensity in the control group was also significantly reduced, but the reduction was relatively greater in the intervention group. Figure 1 compares the declining trend between the two groups. No any significant complication was observed in the groups.

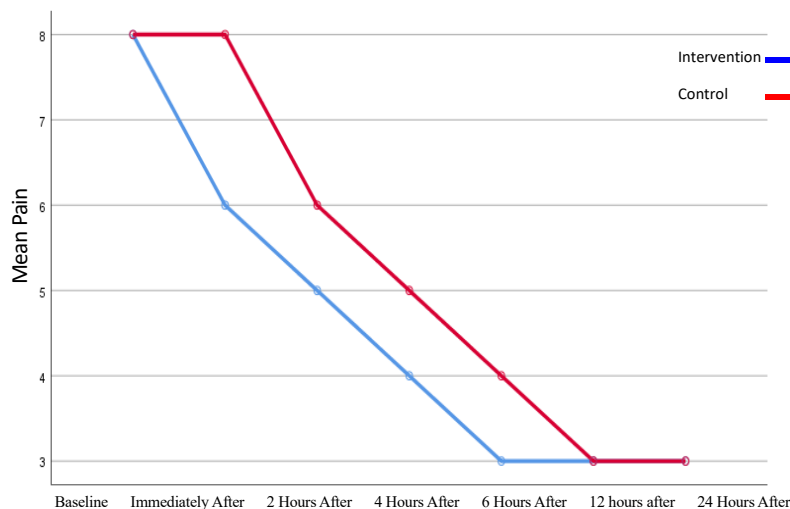
## 4. Conclusion

Foot Reflexology massage reduces postoperative pain in patients undergoing tibia plating surgery. Due to the lack of reporting of any specific complication, this method can be used to reduce pain in orthopedic surgery patients.

**Table 1.** Mean pain scores in the intervention and control groups

Time	Mean±SD		P
	Control	Intervention	
Baseline	8.4±0.9	8.1±0.9	0.123 <sup>‡</sup>
immediately after intervention	8.1±1.0	6.9±1.1	<0.001 <sup>‡</sup>
hours after surgery 2	6.3±1.1	5.2±0.9	<0.001 <sup>‡</sup>
hours after surgery 4	5.4±1.2	4.4±0.8	<0.001 <sup>‡</sup>
hours after surgery 6	4.4±1.1	3.6±0.7	0.001 <sup>§</sup>
hours after surgery 12	3.9±0.9	3.4±0.5	0.008 <sup>§</sup>
hours after surgery 24	3.6±0.7	3.3±0.5	0.038 <sup>§</sup>
p*	0.001	0.001	-

<sup>‡</sup>Independent-Samples t-test; <sup>§</sup>Mann-Whitney U test; \*Friedman test.



**Figure 1.** Comparing the declining trend in postoperative pain between the two groups

## Ethical Considerations

### Compliance with ethical guidelines

This study was approved by the Ethics Committee of Mazandaran University of Medical Sciences (Code: IR.MAZUMS.REC.1399.110), and is a registered clinical trial (Code: IRCT20200502047265N1).

### Funding

The present paper was extracted from the MSc. thesis of the first, Department of Operating Rome, School of Allied Medical Sciences, Medical Student Research Committee, Mazandaran University of Medical Sciences, Sari.

### Authors' contributions

Conceptualization: Ebrahim Nasiri and Mohammad Reza Safdari; Methodology: Fatemeh Imani and Mohammad Reza Safdari; Data analysis: Ebrahim Nasiri and Fatemeh Imani; Editing & review: All authors.

### Conflicts of interest

The authors declared no conflict of interest.

### Acknowledgements

The authors would like to thank the Deputy for Research and Technology of Mazandaran University of Medical Sciences and North Khorasan University of Medical Sciences, patients, operating room staff and orthopedic department of Imam Ali Hospital for their valuable cooperation.