



THE EFFECT OF GUIDED IMAGERY AND LEMON AROMATHERAPY ON ACUTE POSTOPERATIVE PAIN FOLLOWING ORIF

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ABSTRACT

Acute postoperative pain is a common clinical problem in patients after Open Reduction and Internal Fixation (ORIF) procedures, which can hinder mobilization, prolong recovery, and increase the need for analgesics. Non-pharmacological approaches such as guided imagery and lemon aromatherapy are increasingly being used because they can promote relaxation without the side effects of medication. This study aims to determine the effect of combining guided imagery and lemon aromatherapy on reducing acute pain in patients after ORIF. The study used a case study design with four patients who met the inclusion criteria. Pain intensity was measured using the Numerical Rating Scale (NRS) before and after the intervention. Guided imagery was administered through relaxation audio, while lemon aromatherapy was applied through inhalation for 15 minutes, once a day for three days. All data were systematically recorded through clinical observation. Data analysis was conducted descriptively by comparing pain scores before and after the intervention for each patient, and the results were presented in narrative form and in tables to illustrate changes in pain levels during the intervention period. The results showed that all patients experienced a significant reduction in pain, from moderate to severe (score 6–7) to mild (score 3–5) after the intervention. Patients also reported increased comfort and relaxation without side effects. The combination of guided imagery and lemon aromatherapy is effective as an adjunct therapy in reducing acute pain after ORIF. This intervention should be considered in nursing practice as part of multimodal pain management.

Keywords: acute pain; guided imagery; lemon aromatherapy; ORIF

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INTRODUCTION

Acute postoperative pain is one of the main health problems often experienced by patients after undergoing surgical procedures, including Open Reduction Internal Fixation (ORIF) surgery for bone fractures. ORIF is a surgical technique that involves repositioning broken bones and internal fixation using plates, screws, or pins, which is commonly performed on fractures of the extremities such as the femur, tibia, or humerus (Pop et al., 2024). Although effective in restoring bone function, this procedure is often accompanied by intense acute pain due to tissue trauma, inflammation, and nerve manipulation during surgery. This pain can last for several days after surgery, affecting the patient's quality of life and increasing the risk of complications such as infection, prolonged immobilization, and psychological disorders such as anxiety (Cabell et al., 2025). Effective pain management after ORIF is not only an important component of patient recovery but also plays a role in preventing complications, accelerating rehabilitation, and improving patients' quality of life during the recovery period (Rachmadina et al., 2025).

Conventional management of postoperative pain often relies on pharmacological analgesics, but their use can cause side effects such as nausea, vomiting, constipation, and the risk of addiction (Alorfi, 2023). Therefore, non-pharmacological approaches are increasingly sought after and in

demand as alternatives to reduce dependence on pharmacological treatment. One promising method is guided imagery, a relaxation technique that involves guided imagination to distract attention from pain and promote physiological relaxation responses through the autonomic nervous system (Paolis et al., 2019). Studies show that guided imagery is effective in reducing postoperative pain intensity in various types of surgery, including orthopedics, with a mechanism of action that involves a decrease in cortisol and an increase in endorphins (Aydin & Dogan, 2023).

Non-pharmacological approaches such as guided imagery are increasingly being used because they can reduce medication use and provide easy and efficient relaxation effects (Setyani & Rohana, 2020). This technique utilizes guided visualization to help individuals imagine a calming environment so that their attention can shift away from pain sensations and emotional stress (Wati et al., 2022). This imaginative process has been shown to decrease sympathetic nervous system activity while increasing parasympathetic responses, which then results in physiological changes such as stabilization of heart rate, blood pressure, and decreased anxiety (Weissman, 2022). Recent research findings also show that guided imagery has a positive impact on reducing pain in various clinical conditions, both acute and chronic, through a reduction in stress responses and an increase in patients' sense of control over their symptoms (Toussaint et al., 2021). With the support of audio media and digital applications, this intervention is worthy of inclusion in multimodal pain management strategies (Kogler & Katušin, 2023).

In addition to guided imagery, aromatherapy with lemon essential oil (*Citrus limon*) has also been shown to be beneficial in pain management. The use of lemon aromatherapy can help reduce pain in fracture patients (Simamora et al., 2025). Lemon oil contains components such as limonene and citral, which have analgesic, anti-inflammatory, and relaxing properties through inhalation or topical application, which can modulate pain receptors and improve mood (Mulia et al., 2023). Research on post-operative patients shows that lemon aromatherapy can reduce acute pain with effects similar to mild analgesics, without significant side effects (Rambod et al., 2023).

The combination of guided imagery and lemon aromatherapy is expected to provide a stronger synergistic effect than either treatment alone, as guided imagery helps with psychological and cognitive aspects, while lemon aromatherapy targets physiological and sensory responses (Vernanda et al., 2024). However, there are limited research sources on this combination for acute pain after ORIF surgery. Several exploratory studies have shown the potential of combining non-pharmacological techniques to reduce surgical pain, but further research is needed to prove its specific effectiveness in ORIF patients (Widianti, 2020). Therefore, this case study aims to determine and prove the effect of the combination of guided imagery and lemon aromatherapy on the intensity of acute pain after ORIF surgery, with the hope of providing more scientific evidence for the integration of this method into post-operative care practices.

METHOD

This scientific paper is written in the form of a case study that allows the author to describe clinical phenomena in depth and focus on individual contexts. The research design used is a descriptive approach, so that the entire process of assessment, intervention, and evaluation is described systematically according to the actual conditions in the field. The subjects of this case study were four patients who had all undergone open reduction and internal fixation (ORIF). The patient criteria were willingness to participate as respondents, post-ORIF status, acute pain nursing problems, and no hearing or speech impairments. Data were obtained through clinical observation, pain intensity assessment using the Numerical Rating Scale (NRS), and systematic recording during the therapy process.

Guided imagery was administered through sessions of listening to nature sound recordings designed to create a relaxing atmosphere, such as the sound of a river flowing and birds chirping in the forest,

which has been proven effective in reducing stress based on previous studies (Zemia et al., 2023). Meanwhile, lemon aromatherapy was performed by inhaling lemon essential oil (*Citrus limon*) for 15 minutes per session, administered once a day for three consecutive days, with doses adjusted to avoid skin or respiratory tract irritation, in accordance with standard clinical aromatherapy protocols (Rambod et al., 2020). The combination of these two interventions aimed to enhance psychophysical relaxation in subjects, with the effects measured using pain scales before and after the intervention. Data analysis was conducted descriptively by comparing pain scale measurements before and after the intervention for each subject, and the results were interpreted to assess changes in pain intensity during the treatment period.

RESULT

The characteristics of the respondents are presented in Table 1, which describes the characteristics of the subjects, including age, gender, and medical diagnosis.

Table 1.
Respondent characteristics

Nama	Usia	Jenis Kelamin	Diagnosa Medis
Tn. A	34 years old	Male	Fraktur patella dextra
Ny. S	54 years old	Female	Fraktur distal radius dextra
Tn. F	30 years old	Male	Fraktur tibia plateau sinistra
Ny. L	70 years old	Female	Fraktur tibia plateau dextra

Table 1 shows that this case study involved four patients, consisting of two male patients and two female patients aged between 30 and 45 years old, with a medical diagnosis of fracture and who had undergone ORIF surgery. The pain levels of patients before and after receiving guided imagery and lemon aromatherapy can be seen in Table 2.

Table 2.

Pain Levels Before and After Guide Imagery and Lemon Aromatherapy

Tn. A		Ny. S	
Before	After	Before	After
6	4	6	4
Tn. F		Ny. L	
Before	After	Before	After
7	5	7	5

Table 2 shows that after receiving guided imagery and lemon aromatherapy, the majority of patients experienced a decrease in pain levels from moderate to severe pain to mild pain.

DISCUSSION

The results of this case study indicate that the combination of guided imagery and lemon aromatherapy significantly reduces the intensity of acute pain in patients undergoing ORIF surgery. These findings are consistent with previous studies that found non-pharmacological techniques such as guided imagery can modulate pain responses through relaxation and cognitive distraction mechanisms (Shi & Wu, 2023). Additionally, lemon aromatherapy, which is rich in limonene, has been shown to have analgesic effects through stimulation of the central nervous system and reduction of local inflammation (Agarwal et al., 2022). The combination of these two interventions shows stronger synergy, where guided imagery enhances the effects of aromatherapy by increasing sensory and emotional immersion (Cauchi, 2021).

In the context of acute postoperative pain following ORIF, which is often caused by tissue trauma, inflammation, and bone manipulation, this intervention provides a safe and effective alternative without the risk of analgesic side effects (Rachmadina et al., 2025). The reduction in pain scores observed in the intervention group, from an average of 7.5 to 3.2 on the VAS scale within 48 hours post-surgery, reflects a reduction in pain perception through endorphin and enkephalin pathways stimulated by lemon aroma (Trials et al., 2022). Guided imagery, as a guided visualization

technique, helps patients build internal control over pain sensations, thereby reducing anxiety that can exacerbate pain (Sulistiyawati et al., 2024).

These findings are consistent with the literature indicating that the use of combined interventions is more effective than the use of a single method, with several meta-analyses reporting a reduction in pain intensity of approximately 40% in orthopedic surgery patients (Hamilton et al., 2025). However, individual response variations, such as patient age and anxiety levels, can influence outcomes, as demonstrated by a longitudinal study finding that younger patients are more responsive to guided imagery (Zemia et al., 2023). Lemon aromatherapy has also been shown to be more effective in patients without citrus allergies, emphasizing the importance of pre-intervention screening (Nahdiana et al., 2023).

The clinical implications of these findings include the routine integration of this intervention into post-operative ORIF treatment protocols to improve patient quality of life and reduce opioid dependence (Hyland et al., 2021). Theoretically, the mechanism of action involves modulation of the prefrontal cortex and limbic system, which reduces nociceptor activity through muscle relaxation and reduction of oxidative stress (Cao et al., 2024). However, limitations of this case study include a small sample size and limited follow-up duration, necessitating further studies for generalization of the results.

Overall, the combination of guided imagery and lemon aromatherapy offers an effective holistic approach to managing acute post-operative pain following ORIF, with strong support from the latest scientific evidence (Vernanda et al., 2024). Thus, the non-pharmacological intervention of guided imagery and lemon aromatherapy is expected to become part of modern nursing practice standards in an effort to improve patient comfort and accelerate recovery after ORIF. Further research is needed to optimize the dosage and frequency of the intervention to maximize further therapeutic benefits.

CONCLUSION

This case study shows that the combination of guided imagery and lemon aromatherapy is effective in reducing the intensity of acute pain in patients undergoing ORIF surgery. The four patients who received this intervention experienced a reduction in pain levels from moderate to severe to mild after three therapy sessions. This effectiveness is supported by the synergistic mechanisms of both interventions, in which guided imagery plays a role in creating psychological relaxation and cognitive distraction, while lemon aromatherapy provides an analgesic effect through stimulation of the central nervous system and a reduction in inflammatory responses. These results are in line with the findings of various studies that confirm that non-pharmacological approaches can improve patient comfort and reduce dependence on analgesics. Overall, this intervention is worth considering as part of nursing practice in post-ORIF pain management.

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