



The Effect of Length of Injury on the Success of Effriction Massage in Knee Injury Rehabilitation

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Abstract

This study evaluated the effectiveness of effriction massage in reducing pain and increasing range of motion (ROM) in patients with knee injuries based on the duration of injury. Using a prospective controlled clinical trial involving 20 participants aged 20 to 40 years, participants were grouped into two groups: acute (10 days) and chronic (1 month) injuries. The effriction massage intervention was performed for 15 minutes, and outcomes were measured using the Visual Analog Scale (VAS) for pain and the goniometer for ROM. Results showed significant pain reduction in both groups, with the chronic group obtaining a greater reduction (58.33%) than the acute group (44.44%). However, the increase in ROM showed significant variation, with the chronic group increasing ROM by 21.64%, while the acute group increased by 21.02%. Analysis showed that duration of injury had no significant effect on pain ($p=0.334$), but did affect ROM ($p=0.035$). These findings confirm the importance of early intervention and the implementation of rehabilitation tailored to the chronicity of the injury, opening up opportunities for developing more individualized therapy guidelines. This study recommends the integration of additional modalities for longer injury cases to improve rehabilitation outcomes.

How to Cite

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INTRODUCTION

Knee injury is among the most common musculoskeletal disorders in athletes and the general public (Kabbani & Shibli, 2023). This condition often causes pain, limited range of motion (ROM), and decreased quality of life (Syarifudin & Roepajadi, 2020; Laily et al., 2024). The complex anatomy of the knee includes ligaments, meniscus, cartilage, and surrounding muscles, making it vulnerable to various acute and chronic injuries, such as ligament sprains, meniscus tears, and tendinopathy (Musahl et al., 2015). If not treated appropriately, these injuries not only result in short-term functional impairment, but can also trigger serious complications such as osteoarthritis and chronic pain syndrome (Rosenow & Munk, 2021).

The knee is a part of the lower extremity that is often injured during exercise, which can be caused by trauma, excessive pressure, or direct impact (Hasan, 2024). Therefore, effective rehabilitation strategies are essential to restore optimal knee function. One of the manual therapy interventions is massage, which involves applying deep and targeted pressure on soft tissues. This method is thought to break down fibrotic tissue, improve local blood circulation, and stimulate collagen fibre regeneration, accelerating tissue healing and reducing pain (Yuniana et al., 2022). However, despite its widespread use in clinical practice, the massaging method is not yet fully understood, and evidence-based guidelines for its application in knee injuries are still being developed. In the management of sports injuries, there is an effriction masque method (combined effleurage and friction). Effriction breaks down damaged tissue while increasing local blood circulation (Moshrif et al., 2020; Chaves et al., 2020). This method reduces pain, improves blood flow, and effectively relieves muscle tension (Setiawan et al., 2024). Meanwhile, friction helps break down myofibrosis or deposits of muscle metabolic waste, while effleurage improves blood circulation.

One of the critical factors affecting the success of the massage method is the duration of the injury. Knee injuries can be divided into acute and chronic phases, each with different pathophysiological characteristics. Acute injuries are generally characterized by inflammation and edema, whereas chronic injuries often involve tissue degeneration, fibrosis, and altered pain perception (Masala et al., 2017; Xue et al., 2021). This difference suggests that the timing of intervention largely determines the outcome of therapy, with early treatment tending to provide better analge-

sic effects and mobility recovery.

Recent studies have begun to explore the relationship between injury chronicity and response to effriction masque methods. According to García et al. (2024), patients who sustained acute knee injuries showed greater pain reduction and joint function recovery than chronically injured patients. These findings suggest that therapeutic interventions such as effriction massage are more effective when administered in the early phase of injury, where there is a critical period to maximize rehabilitation outcomes. However, existing evidence is still limited by methodological heterogeneity, small sample sizes, and inconsistencies in reporting injury duration.

Therefore, further research is needed to understand how injury duration modulates the effectiveness of effriction massage with a more systematic approach, rehabilitation protocols can be tailored based on the level of injury chronicity, resulting in more optimal treatment outcomes. This understanding will guide clinical decisions and contribute to evidence-based rehabilitation practices. Penelitian ini mengevaluasi efektivitas pijat effriction dalam mengurangi nyeri dan meningkatkan rentang gerak (ROM) pada pasien dengan cedera lutut berdasarkan durasi cedera.

METHODS

This study used a prospective controlled clinical trial to investigate how the duration of knee injury impacts the effectiveness of effriction massage in relieving pain and improving mobility. A total of 20 participants aged 20 to 40 years with unilateral knee injuries presented to Seger Waras Massage Clinic, Semarang City. To explore the effect of injury chronicity, the participants were categorized into two groups based on the duration of injury: the acute group (injury lasting 10 days) and the chronic group (injury lasting 1 month or more). Patients with systemic inflammatory diseases, neurological disorders, recent knee surgery, or contraindications to manual therapy were excluded to ensure homogeneity and safety.

Each participant received an effriction massage intervention performed by an experienced masseur. The therapy protocol involved the application of deep circular friction on the peri-articular structures and soft tissues around the injured knee; the massages were performed for a duration of 15 minutes. Pressure intensity was individually adjusted based on patient tolerance to maximize tissue mobilization while minimizing discomfort. This study measured two primary

outcomes: (1) pain intensity using Visual Analogue Scale (VAS; 0-10) and (2) knee range of motion (ROM) through active flexion-extension goniometer measurements. Measurements were taken at two stages: pre-test (before the massage) and post-test (after the massage).

Statistical analysis was performed with SPSS software, using ANOVA by comparing changes in pain and ROM between acute and chronic injury groups, with a significance of $p < 0.05$ and calculation of improvement in change. This robust design provides a comprehensive understanding of how injury duration modulates the response to effriction masassage, aiming to inform more tailored and effective rehabilitation protocols.

RESULTS AND DISCUSSION

This study investigated the effectiveness of effriction massage in reducing pain and increasing knee joint range of motion (ROM) with various durations of knee injuries. The various factors of injury occurrence were classified into two groups as described in **Table 1**.

Table 1. Frequency Distribution of Injury Causes

Category	Frequency	Percentage
Sport	13	65%
Occupation/Non Sport	7	35%
Total	20	100%

Significant improvement in pain levels and ROM following effriction massage treatment, with differences observed between the two injury duration groups of 10-day injuries and 1-month injuries.

Table 2. Percentage Improvement of Effriction Treatment

	10 Days			1 Month		
	pre	post	%	pre	post	%
Pain	5,4	3	44,44	6	2,5	58,33
ROM	102,2	123,7	21,02	100,7	122,5	21,64

This study revealed important findings regarding the relationship between intervention time and the effectiveness of the effriction masque method. In patients with acute injuries (10 days), there were significant results with a 44.44% reduction in pain scores (from 5.4 to 3.0 on the VAS scale) and a 21.02% increase in joint range of motion (from 102.2° to 123.7°). More impressive results were found in the subacute group (1 month

post-injury), where there was a greater reduction in pain of 58.33% (from 6.0 to 2.5 on the VAS) with a comparable increase in ROM of 21.64% (from 100.7° to 122.5°).

Table 3. Pain Interaction

Variables	Mean Square	Sig.
Duration of Injury	2.025	.334

Statistical analysis of the relationship between the duration of injury and the effectiveness of the effriction masque method. It showed that the duration of injury had no significant effect on pain reduction ($p = 0.334 > 0.05$), indicating that the method provided consistent analgesic benefits in both the acute (10 days) and subacute (1 month) phases.

Table 4. ROM interaction

Variables	Mean Square	Sig.
Duration of Injury	198.025	.035

The statistically significant p-value (0.035) indicates that the duration of injury affects the degree of improvement in joint mobility. This finding suggests the possibility that patient responsiveness to effriction massage in terms of ROM improvement varies depending on how long the injury has lasted. Clinically, this could imply that interventions should be tailored with consideration of the chronicity of the injury to maximize functional gains. These findings reveal that while the pain relief effect is universal regardless of the length of injury, the functional response in the form of increased ROM shows variation depending on the chronicity of the injury. Clinically, these results confirm that effriction masassage can be relied upon as an effective pain management modality at various stages of knee injury, however, a more individualized approach is required to optimize functional outcomes by considering the time since injury.

This study investigated the efficacy of effriction massage therapy in reducing pain and increasing range of motion (ROM) among patients with knee injuries of varying duration. Significant improvement was observed in both outcomes, confirming the therapeutic value of effriction massage. Specifically, acute (10 days) and subacute/chronic (1 month) injury groups experienced significant pain relief and improved joint mobility, although the influence of injury duration was more pronounced on the ROM outcome.

These findings indicate that the subacute

phase is a critical period where manual therapy provides optimal benefits. Some of the mechanisms that explain this phenomenon include: (1) the ability of the therapy to modulate the ongoing inflammatory process, (2) effectiveness in breaking down soft tissue adhesions that have begun to form but have not yet undergone permanent fibrosis, and (3) modulation of pain perception through neurophysiological mechanisms. The consistent increase in ROM in both groups strengthens the evidence that this therapy effectively improves joint function regardless of the duration of injury.

The clinical implications of these findings are significant. Firstly, the results suggest the need to reevaluate the optimal timing of manual therapy, with particular emphasis on the subacute phase. Secondly, the effectiveness of massage in acute injuries supports early intervention strategies to prevent progression towards chronic pain. These findings provide a scientific basis for developing more precise rehabilitation protocols based on the time since injury occurred.

These results align with emerging literature emphasising the importance of early and tailored manual therapy interventions for musculoskeletal injuries (Borys Pustovoyt, 2021). Research shows that massage therapy, specifically effleurage and friction techniques applied for 15 minutes, significantly reduces pain and aids recovery in individuals with mild knee injuries, highlighting its effectiveness in the rehabilitation process (Soegi-yanto et al., 2022; Wall et al., 2023). Research, Priyadarshi (2024), highlights that chronic tissue changes in overuse injuries, such as fibrosis and reduced tissue elasticity, require a more targeted therapeutic approach to restore mobility, consistent with our findings of a significant interaction between injury duration and increased ROM.

The time of injury duration had no significant effect on pain reduction, indicating that effriktion massage can target universal pathophysiological mechanisms of pain, such as inflammatory regulation and nociceptive signalling, independent of injury stage (Zhang et al., 2024; Gupta et al., 2020). This notion is supported by the research of Wei, (2023), who reported that manual therapy effectively modulates pain and restores range of motion in musculoskeletal injuries, making it a valuable non-pharmacological intervention, the efficacy of which supports its application in clinical practice, regardless of the chronicity of the injury.

The findings of this study revealed significant differences in range of motion (ROM) improvement based on injury duration, which

demand a more specialized rehabilitation approach. In chronic injury cases (1 month), joint mobility recovery faces greater challenges than sub-acute cases (10 days). This is mainly due to the formation of irreversible connective tissue adhesions and maladaptation of the neuromuscular system, including changes in muscle recruitment patterns and impaired proprioception (Ishøi et al., 2020; Sasaki et al., 2019). Although the effriktion masque method was shown to effectively improve ROM in all phases of injury, the lower response in the acute group suggests the need for integration of additional modalities (Akbar et al., 2025).

In sub-acute cases, mobility recovery faces greater challenges due to two main factors: the formation of stable connective tissue adhesions and changes in neuromuscular control patterns (Allet et al., 2017; Dan et al., 2021). Tissue adhesions limit joint elasticity, while maladaptive neuromuscular adaptations impair movement coordination. Although effleurage massage continues to benefit, the more limited ROM improvement in this group suggests the need for a multimodal approach. Combining techniques such as instrument-assisted soft tissue mobilization (IASTM) and neuromuscular exercises is recommended to address structural and functional limitations. This opens up opportunities for developing more precise rehabilitation protocols, where the timing of intervention becomes an important consideration in designing therapy programs, particularly for joint function improvement.

These findings emphasise the importance of a time-sensitive approach in knee injury rehabilitation. For acute cases, early intervention with effleurage massage can maximise recovery potential. A more comprehensive rehabilitation program is needed in sub-acute cases, integrating additional modalities. Further research is needed to evaluate the effectiveness of combination protocols and their long-term impact on patients' quality of life. These results provide an important framework for developing more personalized rehabilitation guidelines based on injury duration.

CONCLUSION

This study proves that effriktion massage is effective in reducing pain and increasing range of motion (ROM) with knee injuries, both in the acute (10 days) and subacute (1 month) phases. Results showed that although the pain relief effect was consistent regardless of injury duration ($p=0.334$), the improvement in ROM significantly varied depending on injury chronicity

($p=0.035$), with the subacute group showing a more optimal response at 58.33% and the acute phase at 44.44%. These findings underscore the importance of early intervention and personalized therapeutic approaches. This study supports effriction massage as a versatile rehabilitation modality, emphasizing the need for integration with other therapies for chronic cases and continued research to explore biological mechanisms and long-term benefits.

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