# The Effect of the Role of Nurses in Managing Pain on the Pain Scale of Postoperative Cranioctomy Patients in the ICU of Prof. Dr. H. Aloei Saboe Hospital, Gorontalo City

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## ABSTRACT
**Background:** The pain felt by the patient after undergoing craniotomy surgery is physical stimulation resulting from the incisions and traction used during craniotomy to stimulate specific terminal and nociceptoral nerves. One of the usual pain managements is finger palm relaxation.
**Objective:** To determine the effect of finger grasp relaxation on the reduction of pain scale in patients after craniotomy surgery.
**Method:** Using a quantitative method with a pre-experiment, pretest, posttest, one group design. The population and sample of the study were 10 respondents determined by the total sampling technique. Data collection was done using observation sheets. The data was analyzed using a statistical test of the pairet t test.
**Results:** The average value of the pain scale before administration of the finger grip relaxation technique was 7.6 or the severe pain scale and after the intervention was 5.8 or the moderate pain scale.
**Conclusion:** That there was an effect of giving finger grip relaxation techniques in reducing pain in patients after craniectomy surgery with a p value of 0.000 ($\alpha < 0.05$). It is recommended to the implementing nurse to consider using finger grip relaxation therapy interventions as one of the nursing interventions in reducing pain.
**KEYWORDS**: Finger Grip Relaxation, Pain Scale, Craniectomy

## INTRODUCTION
Surgery is a treatment procedure using invasive procedures, with stages of opening or displaying the part of the body being treated. The opening of the body part that is performed by surgery is generally done by making an incision, after the treatment is visible, then repairs will be made by closing and suturing the wound. There are various types of surgical procedures, including craniotomy surgery. (Fitzgerald, 2020).

Craniotomy is a surgical procedure on the skull bone (cranium) that is performed to treat various types of damage that occur to the brain and is a recommended action if other therapies are not effective. This procedure is usually performed in hospitals that have a neurosurgery department and an ICU. Manipulations performed on the duramater during the surgical process activate the pain pathway. (Pratama. 2020).

Acute pain after craniotomy is often assumed to have a lower level of pain than other surgical procedures. Some of the underlying reasons are the low number of pain receptors in the dura, pain insensitivity in the brain, reduced pain fiber density along the surgical incision line, and the development of autoanalgesia. Therefore, postcraniotomy pain is often overlooked (Pratama, 2020).

The pain felt by the patient after undergoing craniotomy surgery is physical stimulation resulting from the incisions and traction used during craniotomy stimulating the terminal nerves and specific nociceptors. Almost 75% of postoperative patients experience pain complaints. Severe and persistent postoperative pain affects 2 to 10% of adults who undergo surgery. Worldwide, about 235 million patients undergo surgery each year, and this means that millions of patients suffer from the consequences of persistent postoperative pain. (Stu. 2020).

The follow-up treatment of patients after cranioctomy surgery is carried out in the Intensive Care Unit room. From the data obtained from the hospital. Prof. DR. H. Aloei Saboe Gorontalo City in the last 3 months there have been 30 patients with craniotomy surgery where these patients need to receive treatment, treatment and follow-up observation after surgery, including pain management. Pain management provided by nurses is more about the use of pharmacological therapy and no one has yet used pain management that focuses on nursing interventions. Pain management in special care in the ICU room carried out by nurses is specifically indicated for observation, treatment, and treatment in patients who suffer from acute, injury or life-threatening or potentially life-threatening illnesses with a prognosis that can still be cured (Ministry of Health of the Republic of Indonesia, 2018).

Excessive pain control efforts may be accompanied by excessive sedation that disguises new-onset neurological deficits and inhibits monitoring of neurological responses. Compressed breathing can cause

hypercarbia, which increases the blood volume of the brain resulting in increased intracranial pressure (ICT). In the absence of strong evidence-based guidelines, proper postoperative pain management in postcraniotomy cases has been difficult to do to date. A number of evidence-based studies often provide contradictory results, causing the use of therapeutic measures to be inconsistent and leading to suboptimal treatments (Pratama, 2020).

Nurses have a very important role in managing patients' pain post-surgery. Optimal pain management, which is such as using pain assessment tools, behavioral observation, and selection in determining the right pain relief. Nurses must understand how important pain management is. Poorly managed pain management can delay discharge and recovery, and result in the patient's inability to participate in rehabilitation programs, leading to poor outcomes (Iklima. 2020).

Pain management is a strategy applied in the health sector as a non-pharmacological method to reduce pain sensations felt by patients (Niam et al., 2021). Inadequate pain management can cause patients to continue to feel pain, especially in the first few hours after surgery, which may last until days after surgery (Novia, 2023). Some of the complications caused by this procedure are anxiety, vomiting, and hypertension which can increase intracranial tension and cause drainage, so that the patient's results are not good (Aswad, 2020).

Various pain management nursing interventions can be performed on postcraniotomy patients. Pain management after surgery can be done using non-pharmacological and pharmacological methods. Pharmacological treatment focuses on the use of medications, while non-pharmacological treatment emphasizes more on pain management through techniques such as deep breath relaxation, guided imagery, and finger-grasping techniques (Anugrah et al., 2020).

Based on the above background description of the influence of the role of nurses in managing patient pain after craniotomy surgery. Therefore, the author is interested in knowing more about this. The author conducted a study on "The Effect of the Role of Nurses in Managing Pain on the Pain Scale of Patients After Craniotomy Surgery in the ICU Room of Prof. Dr. H. Aloei Saboe Hospital, Gorontalo City"

## METHOD

The study uses quantitative research with pre-experiment research design, pre post test one group design aims to determine how much the implementation of pain management affects the pain scale of post-craniotomy patients (Nursalam, 2015). The research site has been conducted in the ICU Room of Prof. Dr. H. Aloei Saboe Hospital, Gorontalo City, the time for the research will be carried out in April 2025.

### Data Processing and Analysis Techniques

Data analysis can aim to obtain an overview of the research results that have been formulated in the research objectives. The data analysis stage in this study is univariate analysis.

Univariate analysis is an analysis that is carried out to analyze each variable and research results. Unvariate analysis serves to summarize the data set of measurement results in such a way that the data set is transformed into useful information. In general, this analysis only produces a distribution of frequencies and percentages of each variable (Nursalam, 2015).

Bivariate analysis is an analysis conducted to assess the influence between independent and dependent variables. The analysis used is statistical analysis of the Pairet T Test if the data is normally distributed or the Wilxocon Rank Test if the data is distributed abnormally with a significance level of $\alpha < 0.05$ if there is an influence and the $\alpha >$ significance level of 0.05 if there is no effect.

## RESULTS K

### Respondent Characteristics

Table 1. Frequency distribution of Respondent characteristics

| Yes | Characteristic | Frequency (n) | Presentation (%) |
|---|---|---|---|
| 1 | **Age** | | |
| | 35-45 Years | 4 | 40 |
| | 46-55 Years | 6 | 60 |
| **2** | **Gender** | | |

| | | |
|---|---|---|
| Man | 9 | 90 |
| Woman | 1 | 10 |
| **Total** | **10** | **100** |

Source; Primary Date, 2025

The table shows that most of the respondents studied in this study were 46-55 years old, namely 6 respondents (60%) and only 4 respondents (40%) were aged 35-45 years. Meanwhile, the distribution of respondents by gender was obtained data that most of the respondents were male-gender, namely 9 respondents (90%) and only 1 respondent (10%) were female.

**Unvariate Analysis**
**Pain scale before finger grasping technique**

Table 2. Pain intensity level after craniectomy surgery before being given Finger Grip Relaxation Therapy

| Intervention | Mean | Standard Deviation | Min-Max |
|---|---|---|---|
| Finger grip relaxation therapy | 7,6 | 0,516 | 7 - 8 |

Source; Premiere date 2025

Based on the results of the study on 10 patients after craniectomy surgery before being given Finger Grip Relaxation Therapy, the average pain scale was 7.6 with a standard deviation of 0.516 and the lowest pain scale was 7 and the highest was 8.

Table 3. Pain intensity level after craniectomy surgery before being given Finger Grip Relaxation Therapy

| Yes | Pain scale | Sum | Percentage |
|---|---|---|---|
| 1 | Light | 0 | 0 |
| 2 | Keep | 0 | 0 |
| 3 | Heavy | 10 | 100 |
| | **Sum** | **10** | **100** |

Source; Premiere date 2025

Based on the results of a study on 10 patients after craniectomy surgery before being given Finger Handheld Relaxation Therapy, data was obtained that 10 (100%) patients experienced severe pain.

**Pain scale after finger grip technique**

Table 4. Pain intensity level after craniectomy surgery after finger palm relaxation therapy

| Variable | Mean | Standard Deviation | Min-Max |
|---|---|---|---|
| Pain scale | 5,8 | 0,632 | 5 - 7 |

Source; Premiere date 2025

Based on the results of a study on 10 patients after craniectomy surgery after being given Finger Handheld Relaxation Therapy, the average pain scale was 5.8 with a standard deviation of 0.632 and the lowest pain scale was 5 and the highest was 7.

Table 5. Pain intensity level after craniectomy surgery after finger palm relaxation therapy

| Yes | Pain scale | Sum | Percentage |
|---|---|---|---|
| 1 | Light | 0 | 0 |
| 2 | Keep | 9 | 90 |
| 3 | Heavy | 1 | 10 |
| | **Sum** | **10** | **100** |

Source; Premiere date 2025

Based on the results of a study on 10 patients after craniectomy surgery before being given Finger Handheld Relaxation Therapy, data was obtained that 9 (90%) patients experienced moderate pain and 1 patient (10%) severe pain.

**Bivariate Analysis**

Table 6. Analysis of Differences in Pain Intensity Scale Before and After Finger Relaxation Technique Therapy to Decrease in Pain Intensity After Craniectomy Surgery

| Variable | N | Mean | Standard Deviation | P value |
|---|---|---|---|---|
| Pre-post test pain scale | 10 | 1,8 | 0,422 | 0,000 |

Based on the results of the study, the average difference in pain scale before and after being given the finger grip relaxation technique in 10 respondents was 1.8 with a standard deviation value of 0.422. This means that there was a decrease in the pain scale score by 1.8 after the administration of the finger grip relaxation technique. The results of the statistical test using the paired t test obtained a p value of 0.000 ($<\alpha$ 0.05) which means that the administration of the finger grip relaxation technique can meaningfully reduce pain in patients after craniectomy surgery.

## DISCUSSION

### Characteristics of Craniotomy Postoperative Patients

The results showed that most of the respondents studied in this study were 46-55 years old, namely 6 respondents (60%) and only 4 respondents (40%) were aged 35-45 years. Meanwhile, the distribution of respondents by gender was obtained data that most of the respondents were male, namely 9 respondents (90%) and only 1 respondent (10%) were female.

Pain intensity is a description of how severe the pain is felt by the individual. Measurement of pain intensity is highly subjective and individual. Pain of the same intensity is felt very differently by two different people. Respondent characteristics such as age and gender are one of the factors that affect the intensity of pain felt (Sinatra R. 2021).

There are differences in pain perception between men and women, although it is not yet fully understood. In general, men and women do not respond differently to pain, but men and women have differences in tolerating pain influenced by biochemical factors. Theoretically, men have lower sensitivity (less over-expressing pain) than women or feel less pain. In addition, women usually have greater activity in the areas of the brain that process emotions and pain, so they tend to report pain more often and more intensely than men (Gupta, et al. 2022).

Pain tolerance can improve with age, as experience and understanding of pain improves. The age factor that affects pain can occur because at the age of children there is a lack of understanding of pain and treatment procedures. Children are not yet able to express the pain they experience clearly. From adulthood to the elderly, a more detailed study is needed. Often elderly patients have a source of pain (Bahrudin, M, 2018).

Theoretically, the elderly respond to pain differently from the way younger people respond. Some of the factors that affect the response of parents include parents who think that the pain that occurs is something

they must accept. As we age, the nervous system undergoes degeneration, which can change the way the body detects and processes pain. Some elderly people experience an increase in pain threshold (less sensitivity), while others actually experience a decrease in pain threshold (more sensitive). (Sigit, 2023).

Postoperative craniotomy patients are those who have previously been medically diagnosed through CT scans. The results of the medical record examination found that some patients who underwent craniotomy surgery had a picture of brain hemorrhage due to severe head injury and a picture of a tumor. Of the 10 patients who became respondents, 7 of them were severe head injuries and 3 people were caused by tumors.

**Pain Scale Before Giving Finger Palm Relaxation Intervention in Patients After Craniotomy Surgery in the ICU Room of Prof. Dr. H. Aloei Saboe Hospital Gorontalo City**

Based on the research that has been carried out on 10 patients after craniectomy surgery in the ICU room of Prof. DR. H. Aloei Saboe Hospital, Gorontalo City, the average pain scale data before the administration of the finger palm relaxation technique is 7.6 with a standard deviation of 0.516 and the lowest pain scale is 7 and the highest is 8 or is on the severe pain scale.

Postcraniotomy pain is usually throbbing or pounding similar to a tension headache, sometimes it can be stable and ongoing. This is as seen from the expression of pain felt by the patient such as enduring pain and fear of moving the head. This is in line with the theory that infratentorial craniotomy is associated with a higher assessment of pain compared to the supratentorial approach (Razi, et al., 2020).

The severe pain shown by patients after Craniotomy Surgery is a consequence of surgical incision and reflection of the pericranial muscles and soft tissues of the scalp and thus has a somatic origin. Suboccipital and subtemporal approaches involving dissection of major muscles such as the temporal, splenius capitis, and cervicis are associated with the highest incidence of pain. Skull base surgery using this approach results in higher rates of postoperative pain (Haidar, et al. 2022).

This explanation is also in line with the results of research conducted by Razi, et al. (2020) that postcraniotomy pain is divided into acute postcraniotomy pain (ACP) and chronic postcraniotomy pain (CCP), depending on the duration of pain felt (more than 3 months or not). Acute postcraniotomy pain is mostly felt localized to the incision area, around the occipital region and neck, and primarily involves pericranial muscles as well as soft tissues. The intensity of postcraniotomy pain is most severe in the postoperative 48 hours.

**Pain Scale After Finger Palm Relaxation Intervention in Patients After Craniotomy Surgery in the ICU Room of Prof. Dr. H. Aloei Saboe Hospital, Gorontalo City**

Based on the results of the study, data were obtained after the administration of Handheld Finger Relaxation Therapy, the average pain scale was 5.8 or moderate pain scale, with a standard deviation of 0.632 and the lowest pain scale was 5 and the highest was 7.

When compared to the average pain scale felt by patients before the finger palm relaxation intervention, there was a decrease in pain intensity. This decrease in pain can occur because grasping the fingers while regulating the breath slowly (relaxation) can reduce or reduce physical and emotional tension so that it will reduce the pain response. This opinion is in line with the explanation of Indah and Erni (2022) that the relaxation of finger grips has an effect in reducing pain because finger grips will warm the points of exit and entry of energy in the meredian (energy channel) located on our fingers. Reflection points on the hands will provide stimulation reflexively (spontaneously) during the grip. Along the fingers of our hands there are channels or energy meridians that are connected to various organs and emotions. Reflection points on the hands provide stimulation reflexively (spontaneously) during the grip, which will then decrease the pain stimulus.

This is supported by the results of research conducted by Norma et al., (2020) that the finger grip relaxation technique is also able to reduce pain in postoperative appendicitis patients carried out at Sele Be Solu Hospital, Sorong City. This method of finger grip relaxation can help relax the body, mind, and spirit. Holding fingers and controlling breathing can reduce emotional and physical tension because the energy exit point of the meridians is located on the fingers.

In theory, the reason for this reduction of pain is because the use of finger grip relaxation techniques has a very big impact, namely reducing pain. Patients who hold their fingers while breathing, can reduce physical and emotional tension because in this way it can cause the focus that enters and exits the meridians in the hand and the fingers to become warm This finger grasping relaxation technique will usually trigger the release of endorphin hormones or pain-relieving chemicals from the body so that the pain will be reduced (Anugrah et al., 2020).

**The Effect of the Role of Nurses in Managing Pain on the Pain Scale of Patients After Craniotomy Surgery in the ICU Room of Prof. Dr. H. Aloei Saboe Hospital, Gorontalo City**

Based on the results of the study, the average difference in pain scale before and after being given the finger grip relaxation technique in 10 respondents was 1.8 with a standard deviation value of 0.422. This means that there was a decrease in the pain scale score by 1.8 after the administration of the finger grip relaxation technique. The results of the statistical test using the paired t test obtained a p value of 0.000 (<α 0.05) which means that there is a difference in average pain before and after the administration of finger palm relaxation so that it can be concluded that there is a meaningful effect of the administration of finger palm relaxation technique in reducing pain in patients after craniectomy surgery.

The pain felt by patients after craniectomy surgery is caused by surgical action in the brain so that it causes tissue damage which then provides a stimulus of pain stimulation. The finger-holding relaxation technique is an easy way to manage emotions and develop emotional intelligence (Kaur, et al., 2024). Emotions are like waves of energy flowing through the body, mind, and soul. When we feel excessive feelings, the flow of energy in our body becomes blocked or restricted, resulting in pain or compression. Along the fingers of our hands there are channels or energy meridians that are connected to various organs and emotions (Astutik & Kurlinawati, 2017).

Pain management by relaxing finger grips can calm the body by restoring and controlling emotions. Stimulation in surgical wounds causes pain mediators, which then carry stimulus impulses through non-receptor afferent nerve fibers to gel-like substances in the spinal cord, through the thalamus, and finally to the cerebral cortex where those impulses are translated as pain (Heriyanda et al., 2023)

According to the theory of acupuncture, each finger is a pathway for the entry and exit of energy and is associated with certain emotions and there are many dots around the fingers and palms. Based on the concept of Gate Control Theory, stimulation of skin tactile fibers can inhibit pain signals from the same or other areas of the body (Gee JR, Ishaq Y, et al. 2021). Finger Grip Relaxation is a gentle touch and massage technique, which can normalize heart rate and blood pressure, as well as improve a relaxed state in the body by triggering a feeling of comfort through acupuncture points on the surface of the fingers. This technique facilitates distraction and decreases sensory transmission of stimulation from the abdominal wall thereby reducing discomfort in the sore area (Morika. 2022).

According to Wahyuni (2022), finger-holding relaxation techniques help the body, mind, and soul to achieve relaxation. In a state of relaxation, it will naturally trigger the release of endorphin hormones, this hormone is a natural analgesic from the body so that pain will be reduced. During the inflammatory phase due to surgical scars, the manifestation that is often felt is pain. This pain, if left untreated, will make postcranioctomy patients uncomfortable. Finger grip relaxation techniques have been proven to reduce pain intensity. According to Subbarao (2022), the technique stimulates the meridians of the fingers that transmit these waves into the brain. The result of the finger grip relaxation treatment will produce impulses that are sent through the nonnociceptor nerve. Nonnociceptor nerve fibers result in the "wave gate" being closed so that the pain stimulus is inhibited and reduced. If the relaxation is carried out regularly, the expected results will be better with the decrease in pain that occurs.

The results of the study also found that there were differences in pain in each patient. According to researchers, the intensity of pain can also be influenced by age and gender factors. This is in line with the explanation of Bahrudin, M. (2018) that factors that affect pain include age, gender, culture, meaning of pain, attention, anxiety, fatigue, previous experience, and coping style. Tolerance to pain is also different from individual to individual, this tolerance is influenced by biochemical factors and is unique to each individual

## CONCLUSION

The average value of the pain scale before administration of the finger grip relaxation technique was 7.6 or the severe pain scale with a standard deviation of 0.516 and the lowest pain scale was 7 and the highest was 8. The mean value of the pain scale after the administration of Handheld Relaxation Therapy was 5.8 or a moderate pain scale with a standard deviation of 0.632 and the lowest pain scale was 5 and the highest was 7. There was an effect of the administration of the finger palm relaxation technique in reducing pain in patients after craniectomy surgery with a p value of 0.000 ($\alpha < 0.05$).

## SUGGESTION

It is hoped that hospitals, especially intensive care units (ICUs), can consider finger grip relaxation techniques as one of the pain management in patients after craniotomy surgery.

Nurses are expected to use finger grip relaxation therapy interventions as one of the nursing interventions in reducing pain.

This research is expected to be developed by future researchers by conducting research on what factors can affect the intensity of pain in patients.

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