

Model of Distraction and Therapy of Pain Due to Abscess Swelling

Herawati¹; Bedjo Santoso^{2*}; Diyah Fatmasari³

^{1,2,3}Postgraduate Program

Health Polytechnic of Semarang

Semarang, Indonesia

*Co-responding author : Bedjo Santoso²

Abstract:- Swollen gums and/or ulcers (abscess) are lumps or ulcers on the gums, accompanied by the presence or absence of pus exit, occurring due to chronic inflammation and bleeding in the root area of the tooth (periapical abscess). The origin of this disease is the occurrence of caries (cavities) in the teeth, usually in the molars, but it can occur in all teeth. One of the impacts of this abscess is the onset of pain. One of the efforts to overcome pain problems in children is easier and can be done by nurses. Techniques that can be done are by using distraction and therapy techniques. This study aims to produce a distraction and therapy model to reduce pain in swelling due to abscesses. The research method used is Research and Development (R&D) with the Friedman Test effectiveness test. The distraction and therapy model is feasible as an effort to reduce the pain of abscess swelling in abscess patients. This is evidenced by the results of the feasibility test based on expert validation which shows that the p-value is 0.000. The distraction model and therapy are effective as an effort to reduce the pain of abscess swelling in abscess patients. This is evidenced by the results of the effectiveness test of paired variable data showing that the p-value of the compression and infrared intervention group is 0.000 ($p < 0.05$), meaning that there is a difference before and after the distraction and therapy model is given to abscess patients.

Keywords:- Distraction Model, Therapy, Pain, Abscess.

I. INTRODUCTION

Health is an important thing for every individual's life. Health disorders have the effect of inhibiting individual activities [1]. According to WHO, being healthy is a perfect state including physical, spiritual, and social welfare. A person is said to be healthy means that it is not only measured from mental, physical, spiritual, and social aspects, but also seen from the productivity of the person [2].

Dental and oral health is an inseparable part of the general health and well-being of an individual [3]. Good oral health is defined as the state of the dental and oral cavity that is free from oral diseases, throat cancer, wounds in the oral area, periodontal tissue/gum tissue diseases, and disorders in biting, chewing, speech and psycho-social well-being that can interfere with daily life activities [4].

Dental and oral diseases are still a significant health problem worldwide. Dental caries and periodontal disease affect almost 100% of the population worldwide [5]. Thus, currently dental health problems are still a big problem faced by the world.

According to the results of the 2018 Basic Health Research (RISKESDAS) in Indonesia, data on dental and oral problems showed an increase from 2013 by 25.9% to 57.6% in 2018 who received treatment from dental medical personnel from 31.1% to 10.2% [6]

Swollen gums and/or ulcers (abscesses) are lumps or ulcers on the gums, accompanied by the presence or absence of pus exit, occurring due to chronic inflammation and bleeding in the root area of the teeth (periapical abscess). The origin of this disease is the occurrence of caries (cavities) in the teeth, usually in the molars, but it can occur in all teeth [5].

An abscess is a collection of pus isolated under the dermis and deeper skin tissues, caused by infection from bacteria, parasites, or other foreign bodies. This infection can occur due to changes in the quality and quantity of natural microflora in the oral cavity or the entry of pathogens from outside the body through the presence of the oral cavity. Abscesses are part of the body's defense system that aims to prevent the entry of infectious agents into parts of the body. Pus is a collection of cells from dead local tissue, white blood cells, as well as a large number of infection causes (microorganisms or foreign bodies). Pus has a yellowish-white color that comes from organisms and blood cells [7].

Abscesses are formed from normal flora that develops in the body. The location of the abscess can be predicted based on the peculiarities of the normal flora in each part of the body. The bacteria that cause submandibular abscesses generally consist of a mixture of aerobic, anaerobic and anaerobic facultative bacteria [8]. Infection causes the formation of cavities in infected tissue as a result of the death and destruction of cells in the tissue. The cavity contains tissues and cells that are infected. White blood cells will enter the cavity and perform bacterial phagocytosis, one of the most important parts of the human body's defense mechanism [9].

The phagocytosis process is the process of white blood cells eating or swallowing bacteria that aims to block or stop the growth of bacteria. White blood cells that successfully phagocyte bacteria will die and form pus that fills the cavity [10]. One of the consequences of an abscess is the onset of pain.

Pain is an unpleasant experience of sensations and emotions due to actual or potential tissue damage. The experience of pain is a combination of physiological and psychological and is not a permanent tissue damage [11]. Actions to reduce pain and stress caused by dental and oral diseases are the main concern in providing services.

One of the efforts to overcome pain problems in children is easier and can be done by nurses. The technique that can be done is to use the distraction technique. Distraction is a method or technique that can be used to reduce pain by distracting the client from the pain [12]. One of the distraction techniques that can be done on an abscess is using a hot water compress.

The provision of warm compresses is to provide a warm feeling to the client by using fluids or tools that cause warmth to the parts of the body that need it. The goal is to improve blood circulation, reduce pain, stimulate intestinal peristalsis, facilitate the exudate of inflammatory sap, provide a sense of comfort or warmth and calmness. The administration of hot compresses is carried out on clients with flatulence, clients who experience inflammation, muscle spasms (spasms), abscesses (swelling) due to injections, bodies with absconutes or hematomites.

Some previous studies in reducing facial pain and swelling after impact surgery used heat therapy. This swelling can be reduced by giving anti-inflammatory drugs

or with heat therapy. This heat therapy aims to increase the rate of blood flow due to swelling, so that it can speed up the healing process of damaged tissue. Increasing the temperature of the therapy will also increase the metabolism of local tissues [13].

II. RESEARCH METHODS AND SAMPLE

This research uses the Research and Development (R&D) method. The research stages include 1) information collection, 2) product/model design, 3) expert validation and revision, 4) product/model testing, and 5) product/model results. Product/model testing is carried out using *Quasy Experiment Design* or Pseudo-Experiment test design because this experiment has not or does not have an actual experimental design.

The sample of this study was divided into 3 groups. The first sample group is a sample for the information collection stage with a purposive sampling stage in the form of 3 people consisting of dentists specializing in oral surgery, dental therapists, patients with an abscess diagnosis. The second sample group is a sample for the expert validation stage with purposive sampling totaling 3 people, namely dentists specializing in Oral Surgery, neurologists and physiotherapists. While the third sample group is samples for the product/model trial stage, namely patients with a diagnosis of abscesses.

III. RESULTS AND DISCUSSION

A. Information Collection Stage

The results of information collection were carried out by interview methods with dentists specializing in oral surgery, dental therapy, and patients.

Table 1. Results of Information Collection

It	Question	Conclusion Answer
1	What causes an abscess on the gums?	Abscesses in the gums are caused by bacterial infections that enter through holes or cracks in the teeth. This infection can occur due to cavities, injury to the tooth, loose fillings, cracked teeth, or broken teeth. The stages of an abscess include asymptomatic cavities, tooth sensitivity to temperature, and finally the formation of
2	What are the symptoms that arise as a result of an abscess?	Symptoms that arise due to the occurrence of a tooth abscess include pain that comes suddenly and increases in the teeth and gums, teeth throbbing, tenderness when chewing, fever, increased tooth sensitivity, red and swollen gums, swelling of the facial area, and throbbing pain that appears. These symptoms significantly interfere with daily activities and can even lead to sleep disturbances in patients
3	What is the picture of the pain caused?	The pain caused by a tooth abscess has several common characteristics. First, pain can arise in response to certain stimuli such as heat, cold, sourness, and sweetness. Second, pain often occurs when chewing or biting food, and can be felt for a long time, especially at night. Third, the pain can also spread to other areas such as the neck, head, and ears. Fourth, the pain can be pulsating and sometimes feels so strong that it is difficult to endure. Thus, the pain caused by a tooth abscess tends to be complex and can affect various aspects of daily life, such as sleep and eating activities
4	How is the current pain management done?	Handling pain in the teeth and gums that cause an abscess involves several different approaches. Oral surgeons emphasize the use of warm or cold compresses to relieve pain and reduce swelling, along with the administration of painkillers and antibiotics, as well as performing incision and abscess drainage procedures when necessary. Meanwhile, dental therapists also note the importance of treatment to

		relieve pain and administer antibiotics. On the other hand, the patient's perspective highlights the administration of medication to relieve pain as part of the perceived treatment. Pain management in such conditions involves a combined approach that includes the use of medications, compresses, and medical procedures such as incision and drainage of abscesses, with a focus on pain reduction and treatment of infections
--	--	---

B. Design and Build Models

The data resulting from the collection of information is used to create the design of a product or model. The results of information collection revealed that the treatment of pain due to abscesses that has been carried out so far has been treated and surgical/incision to remove pus/pus, with this treatment there is a feeling of discomfort in the patient because from treatment it still often appears or pain is felt. So researchers created a model of distraction and therapy to reduce pain in swelling due to abscesses. The following is a description of the stages of implementing the distraction and therapy model to reduce pain in swelling due to abscesses.

In this phase, the final form of the distraction and therapy model for pain due to abscess researchers formulate a model which contains: (1) Building a relationship of mutual trust between the operator, the patient, and the patient's family; (2) Subjective assessment; (3) Objective assessment; (4) Measurement of pain; (5) Diagnosis; (6) Maintenance plan; (7) Cold compress; (8) Evaluation; (9) Measurement of pain; (10) Providing infrared; (11) Evaluation. The author describes the design of the model

Table 2. Tract Distraction and Pain Therapy Model of Abscess Swelling

Part	Fill
I	Description and characteristics of patients
II	Distraction model plan and therapy for pain management due to abscess <ul style="list-style-type: none"> a. Definition b. Stages <ul style="list-style-type: none"> 1) Phase I <ul style="list-style-type: none"> a) Building trusting relationships between operators, patients, and patients' families b) Subjective assessment c) Objective study <ul style="list-style-type: none"> 2) Phase II <ul style="list-style-type: none"> a) Pain measurement b) Diagnosis c) Treatment plan d) Administration of cold compresses <ul style="list-style-type: none"> e) Evaluation 3) Phase III <ul style="list-style-type: none"> a) Pain measurement b) Infrared Giving c) Evaluation
III	Standard Operating Implementation Procedures
IV	Examination card format

The results of information collection were obtained from the conclusion that the management of pain in these conditions involves a combined approach that includes the use of drugs, compresses, and medical procedures such as incision and drainage of abscesses, with a focus on pain reduction and treatment of infection, according to the research for the treatment of dental abscesses can be done by administering antibiotics and anti-pain, as well as drainage incisions [14].

The results of the expert validation showed a p-value = 0.000, which means that the model of distraction and therapy to reduce pain in swelling due to abscess is relevant as a model of distraction and therapy to reduce pain in swelling due to abscess. In the stage of developing a product or model that aims to improve its quality, the validation process by experts has an important role. This step not only provides a guarantee of the reliability and effectiveness of the product or

model, but also opens up opportunities to improve and improve its overall quality. By involving the views and input of experts who have a deep understanding of the relevant field, the validation process is a strategic step in ensuring that the product or model developed has significant added value and is reliable in the context of its use.

The development of a distraction and therapy model to reduce pain in swelling due to an abscess is an innovative step in improving dental and oral health standards for individuals with abscesses. These innovations include not only new inventions, but also the dissemination of the understanding and application of these new concepts into common practice in society. It is important to remember that innovation does not only depend on the contribution of key leaders, but is the shared responsibility of all parties involved in the production process. In this context, innovation is understood as the result of the combined creation and

implementation of new ideas and approaches that enrich existing practices. Thus, innovation involves not only the development of new concepts, but also their effective application in daily practice.

This model is the result of the development of dental and oral health care guidelines regulated in the Regulation of the Minister of Health Number 284 of 2006, which is based on various scientific journals on dental health care and the characteristic profile of abscess patients [15]. This model has been adapted to field conditions, including the condition of the oral cavity of the abscess patient, the characteristics of the abscess patient, and the expectations and needs of dental health workers. The preparation refers to the format of the distraction and therapy model to ensure the provision of standardized and effective dental health services for abscess patients.

The implementation of the procedure in accordance with the Regulation of the Minister of Health Number 284 of 2006 begins with the stages of subjective assessment, objective assessment, diagnosis, action planning, implementation, and evaluation [15]. All of these stages are usually carried out in one meeting session, resulting in a lack of opportunities for patients to interact with the operator who provides the oral health care. This kind of situation can cause anxiety in patients suffering from abscesses. In addition, in the implementation of oral health care, there is often negligence in measuring the patient's pain level by using the Visual Analog Scale (VAS) to determine the category of pain felt. Likewise, it is often overlooked to administer cold and infrared compresses that should be done to reduce pain in abscess patients as one of the effective therapies. This research is in line with research, who stated that treating dental abscesses with cold compresses can help relieve tooth abscess pain. Cold compresses can reduce the temperature of the affected area, restrict blood flow, and prevent fluid from

entering the tissues around the wound, thereby reducing the pain and swelling associated with a tooth abscess [10].

C. Expert Validation

The expert validators are 3 people, namely dentists, oral surgeons, physiotherapists, and neurologists. This validation was carried out to obtain data that was used as a basis to test the feasibility of the distraction and therapy model on patients.

The reliability test was carried out Intraclass Correlation Coefficient on expert validators.

Table 3. Expert Validation Results with ICC Test

Average	ICC	p-value
89%	0.989	0,000

Based on the results of the assessment from expert validators who were assessed using the correlation reliability test, the *Interclass Correlation Coefficient* value was 0.989. It can be interpreted in the category of excellent *reliability* because of the value of >0.91 . (Portney & Watkins, 2009). The *p-value* is $p < 0.000$. Thus, there is expert agreement that the model of Distraction and Therapy to Reduce Pain in Swelling Due to Abscesses is relevant and feasible.

D. Model Test Results

The trial results of the development of a distraction and therapy model to reduce pain in swelling due to this abscess using compresses and infra red. This was done in accordance with the purpose of the trial, which was to analyze the influence of the model of the development of dental health care in the curative field of the implementation of distraction through the implementation of compresses and therapy using rays to reduce pain.

Table 4. Statistical Tests of Pain After Compression Intervention and After Infrared Intervention

		Mean±SD	Min-Max	p-value
Intervention	Pre	6.48±1,159	4-8	0.000
	Post 1	3,80±1,323	2-6	
	Post 2	1,00±0,913	0-3	

Based on table 4, the results of the statistical test from the *Friedman test* with a *p-value* of $0.000 < 0.05$, the null hypothesis was rejected and the alternative hypothesis was accepted, meaning that the distraction and therapy model was effective in reducing pain in swelling due to abscesses.

The results of the validity of the paired variable data showed that there was a significant difference in pain reduction in abscess patients between the intervention groups undergoing cold and infrared water compression therapy. The *p-value* obtained, which is $0.000 (p < 0.05)$, confirms that there is a statistically significant effectiveness. Thus, these results indicate that cold water and infrared compress therapy may provide greater benefits in reducing pain in abscess patients compared to no intervention. This is in line with the research who explained that the administration of cold water compresses succeeded in reducing pain in patients who

experienced pain due to swelling which was indicated by the result of *p value* = 0.000 which was marked by a decrease in scoring using the VAS measuring device [16]. In addition, the results of this study are also in line with research that shows that cold water compresses are more effective in reducing pain compared to warm water compresses in cases of pain reduction due to closed fractures. This is indicated by the intensity of pain before and after the procedure and given cold and warm water compresses. The pain felt by respondents before being given a cold water compress was an average of 5.9 and after being given a cold water compress was an average of 3.65. There was a difference in pain intersection with *p value*=0.00.

A very low *p-value* ($p = 0.000$) indicates that combined therapy using cold water and infrared compresses has a clear effect in reducing pain in patients with swelling due to

abscesses, compared to the control group that did not receive the therapy. These results suggest that an approach that combines distraction with physical therapy tested in this study has the potential to be a very effective option in managing pain in abscess patients. The results of the study conducted on respondents who experienced oesthehritis pain showed a significant difference in the decrease in pain scores before and after infrared therapy [17]. The administration of infrared and massage can reduce the problem of physiotherapy in the case of trismus postoperative mandibull abscess surgery in the form of pain and decreased muscle strength. The results of patients with trismus after mandibular abscess surgery require multidisciplinary treatment, namely treatment from doctors with the administration of drugs and physiotherapy exercises [18].

This discovery has significant implications in the context of medical practice, especially in dealing with pain in patients with abscesses. Combining cold water and infrared compress therapy is a viable option in reducing discomfort in patients experiencing similar conditions. More than just providing assistance, the results of this study also provide a foothold for the development of advanced therapies that can improve the standard of care for patients with abscesses.

E. Model Results

Products in the form of distraction models and effective therapies used to reduce pain in swelling due to abscesses are the *output* of the development of previous models. Distraction and therapy models to reduce pain in swelling due to abscesses.

ACKNOWLEDGMENT

The author would like to thank all respondents who were willing to participate in this study.

REFERENCES

- [1]. P. J. Smith dan R. M. Merwin, "The Role of Exercise in Management of Mental Health Disorders: An Integrative Review," *Annu. Rev. Med.*, vol. 72, no. 1, hal. 45–62, 2021.
- [2]. S. Notoatmodjo, *Ilmu Perilaku Kesehatan*, 2 ed. Jakarta: Rineka Cipta, 2014.
- [3]. T. Maulanti dan A. D. Laksono, "Oral Health Problem in Indonesia: An Ecological Analysis," *Indian J. Forensic Med. Toxicol.*, no. July, 2021.
- [4]. R. Baiju, E. Peter, N. Varghese, dan R. Sivaram, "Oral Health and Quality of Life: Current Concepts," *J. Clin. Diagnostic Res.*, vol. 11, no. 6, hal. 21–26, 2017.
- [5]. World Health Organization, "Oral Health," *World Health Organization*, 2022. [Daring]. Tersedia pada: <https://www.who.int/news-room/fact-sheets/detail/oral-health>.
- [6]. Kementerian Kesehatan RI, "Laporan Nasional RISKESDAS 2018," 2018.
- [7]. M. A. Miller dan J. F. Zachary, *Mechanisms and Morphology of Cellular Injury, Adaptation, and Death*. 2017.
- [8]. S. Rijal dan A. C. Romdhoni, "Bacteria Pattern, Results of Antibiotic Sensitivity Test, and Complications of Deep Neck Abscess Patients in Dr. Soetomo General Hospital," *Biomol. Heal. Sci. J.*, vol. 1, no. 2, hal. 124, 2018.
- [9]. C. A. de Jongh, T. J. de Vries, F. J. Bikker, S. Gibbs, dan B. P. Krom, "Mechanisms of Porphyromonas gingivalis to translocate over the oral mucosa and other tissue barriers," *J. Oral Microbiol.*, vol. 15, no. 1, 2023.
- [10]. Aryani, S. R. Fardani, T. G. Hayuti, A. P. A. Finari, dan B. T. Hartomo, "Penegakan Diagnosis dan Penatalaksanaan Abses Submandibula," *Indones. J. Dent.*, vol. 2, no. 1, hal. 7–15, 2022.
- [11]. S. Liu dan L. Kelliher, "Physiology of pain—a narrative review on the pain pathway and its application in the pain management," *Dig. Med. Res.*, vol. 5, hal. 56–56, 2022.
- [12]. H. S. Rahayu dan D. Darmawan, "Pemberian Teknik Distraksi Pemutaran Video Kartun Untuk Menurunkan Nyeri Pada Anak Post Operasi," *JIKO (Jurnal Ilm. Keperawatan Orthop.*, vol. 4, no. 1, hal. 1–9, 2020.
- [13]. J. Freiwald *et al.*, "A Role for Superficial Heat Therapy in the Management of Non-specific, Mild-to-moderate Low Back Pain in Current Clinical Practice: a Narrative Review," *Life*, vol. 11, no. 8, 2021.
- [14]. J. L. Sanders dan R. C. Houck, "Dental abscess," *Handb. Clin. Anaesth.* 3E, hal. 376–378, 2011.
- [15]. Kementerian Kesehatan RI, *Keputusan Menteri Kesehatan Republik Indonesia Nomor 284/Menkes/SK/IV/2005*. Indonesia, 2006, hal. 1–31.
- [16]. M. Sari, A. Anggraini, S. Sunarsih, dan L. O. Iqmy, "The Effect Of Cold Compress On Perineum Pain Reduction In Public Women," *J. Kebidanan Malahayati*, vol. 9, no. 3, hal. 465–472, 2023.
- [17]. G. T. Shiryan, F. S. Amin, dan E. A. Embaby, "Effectiveness of polarized polychromatic light therapy on myofascial trigger points in chronic non-specific low back pain: a single blinded randomized controlled trial," *Bull. Fac. Phys. Ther.*, vol. 27, no. 1, 2022.
- [18]. L. M. Santiago-rosado dan C. S. Lewison, "Trismus," 2024.