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USE OF CRYOTHERAPY AND THERMOTHERAPY IN POSTOPERATIVE RECOVERY IN ORAL AND MAXILLOFACIAL SURGERIES

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ABSTRACT

Cryotherapy and thermotherapy are widely used techniques in the postoperative recovery of oral and maxillofacial surgeries, in order to minimize pain, edema and inflammation, promoting faster and more effective healing. Cryotherapy, through the application of cold, acts on the vasoconstriction of blood vessels, which reduces the extravasation of fluids, reducing swelling and relieving pain in the early post-surgical stages. In contrast, thermotherapy uses heat to induce vasodilation, increasing blood flow and facilitating cellular nutrition and tissue regeneration, which can speed recovery in the later stages. This literature review analyzes the clinical effects of both techniques, highlighting their application protocols and evaluating the efficacy of the combination of the two approaches. The reviewed studies suggest that the joint application of cryotherapy and thermotherapy can optimize post-surgical recovery, providing faster pain relief, edema reduction, and more efficient recovery. However, the literature still presents divergences regarding the ideal application protocols, pointing to the need for more controlled clinical studies to standardize these techniques and ensure their efficacy and safety.

Keywords: Cryotherapy. Thermotherapy. Postoperative Recovery. Oral and Maxillofacial Surgery. Inflammation.

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INTRODUCTION

Postoperative recovery in oral and maxillofacial surgeries is one of the biggest challenges faced by surgeons, as it involves the management of several complications that can directly affect the patient's quality of life. The most common symptoms after these procedures include pain, swelling, trismus, and masticatory dysfunction, conditions that not only generate discomfort, but can also impair daily activities, such as eating and speaking, thus compromising the patient's well-being (Laureano Filho et al., 2005). These adverse effects are natural physiological responses to the trauma caused by the surgical intervention, but if not treated properly, they can prolong recovery and increase the need for analgesic medications, resulting in a negative impact for both the patient and the healthcare provider (McDonald & Guthrie, 2018).

Effective management of these postoperative symptoms is essential for a faster and more comfortable return to normal activities. While adequate control of pre- and post-operative conditions, such as infection management and tight hemorrhage control, is critical, the management of pain, swelling, and trismus remains a significant challenge. Among the strategies used to mitigate these effects, cryotherapy (application of cold) and thermotherapy (application of heat) have stood out as non-invasive and easy-to-apply interventions that aim to reduce discomfort and promote healing (Taneja et al., 2015). These thermal therapies have demonstrated, in clinical studies, good results in reducing postoperative pain and edema, two of the most frequent and bothersome complications after tooth extraction, especially the third molars (Zandi et al., 2016).

Cryotherapy, when applied correctly, can lower the nerve fiber threshold of pain and slow down nerve conduction velocity, offering immediate relief. In addition, it has the ability to limit the formation of edema by reducing the permeability of local blood vessels, preventing excessive fluid accumulation in the tissue and thus decreasing inflammation (Taneja et al., 2015). Although the effect of cryotherapy is temporary, it usually lasts for about 30 minutes after application, which can provide significant relief and contribute to a smoother recovery. However, the application of cold should be done with caution, since excessive use can cause tissue damage (Jain et al., 2018). On the other hand, thermotherapy works by increasing blood flow, speeding up the healing process and promoting the removal of metabolic byproducts from damaged tissue. This technique, while contrary to cryotherapy in terms of physiological effect, is equally beneficial, especially during the later stages of recovery when tissue healing becomes the main

focus (Zandi et al., 2016; Al-Fahad & Shallawe, 2017).

Although the empirical application of these techniques is widely recognized in clinical practice, the scientific literature still has significant gaps regarding the effectiveness of such therapies in reducing postoperative symptoms. Studies on cryotherapy and thermotherapy have shown varying results, with some research suggesting that both approaches may be effective at different stages of recovery, while others indicate that therapeutic protocols may not be universally applicable (Laureano Filho et al., 2005; McDonald & Guthrie, 2018). The effectiveness of these therapies can be influenced by several factors, such as the type of surgery performed, the severity of the trauma, the time of application, the frequency of sessions, and the individual response of the patient, which justifies the need for more controlled and well-structured investigations.

In addition, the lack of a clear consensus regarding the best way to apply these therapies – such as duration, alternation between cold and heat, and the most appropriate time for their use – makes it difficult to create consistent protocols that can be widely adopted in clinical practice (Taneja et al., 2015; Zandi et al., 2016). However, the applicability of such treatments in the postoperative context of oral and maxillofacial surgeries is an area of great potential, as both therapies offer distinct benefits at different stages of recovery. Cryotherapy is particularly useful in the first 24 to 48 hours after surgery, while thermotherapy may be more indicated in the subsequent stages, promoting complete tissue recovery (Laureano Filho et al., 2005; Taneja et al., 2015).

Thus, the present literature review aims to evaluate the use of cryotherapy and thermotherapy in the postoperative period of oral and maxillofacial surgeries, focusing on the analysis of their efficacy in reducing pain, edema and trismus, in addition to discussing the best practices for the application of these therapies. The review will also seek to identify the scientific evidence that supports the implementation of effective therapeutic protocols, promoting a faster and less painful recovery for patients undergoing these procedures (McDonald & Guthrie, 2018; Zandi et al., 2016).

METHODOLOGY

This is a literature review study with a descriptive approach, focused on the application of cryotherapy and thermotherapy in patients undergoing oral and maxillofacial surgeries. To search and survey the scientific articles, a search was carried

out in the Virtual Health Library (VHL), in addition to the PubMed, Scielo databases, using the descriptors "Cryotherapy", "Thermotherapy", "Postoperative Recovery" and "Oral and Maxillofacial Surgery".

The inclusion criteria involved clinical studies and systematic reviews published between 2005 and 2024, available in full, in Portuguese or English, and that directly addressed the application of these therapies in the postoperative period Duplicate articles, which were not available in full, and were not directly related to the objectives of the study were excluded.

METHODOLOGY

After the conclusion of data collection, the selected sample was read, seeking to identify the information that makes it possible to achieve the proposed objective of the present study. All the productions used in this study are rigorously referenced according to the standards of the Brazilian Association of Technical Standards (ABNT).

The study followed the guidelines established by the Copyright Law (Law No. 9,610, of February 19, 1998), which protects intellectual works, including those of a literary, scientific and artistic nature. These works can be used by researchers or professionals in the field, as long as they are available in online databases for consultation. Thus, the use of the analyzed publications does not infringe copyright, as provided for by the legislation (BRASIL, 1998).

RESULTS

In the analysis of the collected data, it was possible to observe that both cryotherapy and thermotherapy play important roles in the control of postoperative symptoms in patients undergoing oral and maxillofacial surgeries. The results obtained show a significant reduction in pain, edema and trismus in patients who used these therapies. According to several reviewed studies, cryotherapy has been shown to be effective in reducing pain and edema in the first 24 hours after surgery, while thermotherapy, applied in later stages, favored the recovery of blood flow and contributed to the improvement of mandibular mobility.

Cryotherapy, when applied in the first postoperative hours, was effective in immediately controlling pain and preventing excessive swelling, as indicated by Taneja et

al. (2015). Thermotherapy, in turn, had a beneficial effect on tissue recovery, promoting an increase in blood flow and helping in the healing process of the affected areas. In addition, the combination of both therapies was considered a promising approach, enhancing the therapeutic effects and accelerating the recovery time of patients.

Studies such as that by Laureano Filho et al. (2005) and Zandi et al. (2016) also corroborate the findings that the combination of cryotherapy and thermotherapy can offer significant relief from postoperative symptoms, especially in the first 48 hours after surgery.

DISCUSSION

The analysis of the results shows that the application of cryotherapy and thermotherapy offers substantial benefits in the postoperative recovery of oral and maxillofacial surgeries, especially with regard to the reduction of pain, swelling and trismus. Cryotherapy, due to its ability to reduce inflammation and control the increase in edema, has been shown to be more effective in the first hours after the procedure, a critical period in which the risk of complications such as bruising and swelling is greater. The reviewed studies indicate that early application of cold can not only decrease these symptoms but also contribute to the prevention of more serious complications, such as mouth opening limitation (trismus) (Jain et al., 2018).

On the other hand, thermotherapy, which can be applied after the initial recovery phase, has been shown to be effective in promoting healing and increasing local blood flow, which facilitates the removal of metabolic products resulting from surgical trauma. This effect is crucial to optimize the tissue recovery process, speeding up the repair process and providing greater comfort to the patient (McDonald & Guthrie, 2018). Thermotherapy can also be useful in relieving muscle spasms, especially in the jaw region, favoring the functional recovery of the treated area.

However, the use of these therapies still lacks more defined protocols. The lack of consensus on the duration, intensity, and combination of therapies prevents the universal and standardized application of treatments. Although cryotherapy is widely recommended in the first few hours after surgery, there is no clear definition of how long it should be applied or of the alternation between cold and heat therapies. The literature also shows a variability in the results of the studies, which highlights the need for further investigations to establish clear guidelines on the optimal application form for each type

of oral and maxillofacial surgery. Such investigations could clarify issues such as the frequency of application, the ideal temperature, and the interval between sessions, allowing oral and maxillofacial health professionals to create individualized protocols, thus increasing the effectiveness of postoperative treatment.

Table 1 - Comparison of the Effects of Cryotherapy and Thermotherapy in the Postoperative Phases of Oral and Maxillofacial Surgeries

Study	Therapy	Effect Type	Postoperative Phase	Key findings
Laureano Filho et al. (2005)	Crioterapia	Reduction of edema and pain	First hours	Cryotherapy was effective in the first postoperative hours, with a significant impact on reducing swelling and pain.
Jain et al. (2018)	Crioterapy Would	Prevention of trismus	First 24 hours	Early application of cold helped prevent limitation of jaw movement and reduce trismus.
McDonald & Guthrie (2018)	Thermotherapy the	Promotion of healing	Subacute phase (days after surgery)	Thermotherapy increased blood flow and accelerated the healing of postoperative tissues.
Zandi et al. (2016)	Crioterapy Would	Reduction of pain, trismus and oedema	First 48 hours	Cryotherapy significantly reduced pain, trismus, and edema, being effective in the first days after surgery
Taneja et al. (2015)	Thermotherapy the	Increased blood flow	Subacute phase	Thermotherapy favored the removal of metabolic products and improved local circulation, accelerating tissue recovery.
Al-Fahad & Shallawe (2017)	Crioterapy Would	Reduction of post-pain Operative	First 24 hours	Cryotherapy has been shown to be effective in reducing pain in the first hours after removal of third molars, especially in the intervention area.

CONCLUSION

Cryotherapy and thermotherapy have been shown to be effective strategies in postoperative management in oral and maxillofacial surgeries, providing significant relief in common symptoms such as pain, edema, and trismus. Cryotherapy, with its effect of reducing inflammation and controlling swelling in the first hours after the procedure,

proves to be particularly advantageous in the immediate post-surgical management. Thermotherapy, on the other hand, when used after the initial recovery period, contributes to the improvement of local blood flow and accelerates the healing process, promoting the removal of metabolic byproducts of trauma.

Although the results of several studies indicate the benefits of these therapies, the lack of standardized protocols still represents a challenge for their universal implementation. Variations in the methods of application, duration, and intensity of therapies make it necessary to deepen the investigations, aiming to establish clear and effective guidelines for postoperative treatment in different types of oral and maxillofacial surgery.

Therefore, it is essential to continue scientific research on the subject so that the use of these therapeutic modalities can be optimized, ensuring improvement in patient recovery, and establishing a standard based on robust clinical evidence.

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