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ARTICLE REVIEW

Strategies for pain control during endodontic treatment by biopulpectomy

Estrategias para el control del dolor durante el tratamiento endodóntico por biopulpectomía

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ABSTRACT

The control of pain and inflammation that occur during endodontic treatment can be treated by means of local and pharmacological procedures such as analgesics or antibiotics when endodontic infection is present. Although NSAIDs are considered the drugs of first choice for the management of endodontic pain, there are other therapeutic variants of proven effectiveness. The aim of the present study is to describe alternatives for pain control during endodontic treatment by biopulpectomy. Acupuncture treatment for pain care in emergency stomatology services should be a resource of choice in acute pulp processes. Laser constitutes another alternative for pain treatment in dentistry, since it produces analgesic and anti-inflammatory effects, muscle relaxation, tissue regeneration and repair, reduction of edema and hyperemia, luminous hemostasis, stimulates natural defense mechanisms, as well as the formation of secondary dentin by odontoblasts by biostimulation process.

Keywords: Pain; Pain Management; Analgesics; Complementary Therapies; Laser Beams; Acupuncture.

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RESUMEN

El control del dolor e inflamación que ocurren durante el tratamiento endodóntico pueden ser tratados mediante la acción de procedimientos locales y farmacológicos como analgésicos o antibióticos cuando existe infección endodóntica. Aunque los AINEs son considerados los fármacos de primera elección para el manejo del dolor endodóntico, existen otras variantes terapéuticas de probada efectividad. El objetivo del presente estudio es describir alternativas para el control del dolor durante el tratamiento endodóntico por biopulpectomía. El tratamiento acupuntural para la atención al dolor en los servicios de urgencia de estomatología debe constituir un recurso de elección en los procesos pulpares agudos. El láser constituye otra alternativa para el tratamiento del dolor en odontología, pues produce efectos analgésicos, antiinflamatorios, relajación muscular, regeneración y reparación de tejidos, reducción de edema e hiperemia, hemostasia luminosa, estimula mecanismos de defensa naturales, así como la formación de dentina secundaria por los odontoblastos por proceso de bioestimulación.

Palabras clave: Dolor; Manejo del Dolor; Analgésicos; Terapias Complementarias; Rayos Láser; Acupuntura**.**

INTRODUCTION

Pain is one of the most common causes of consultation to health services at every level of care. Pain has been identified by man since ancient times and has been one of the most difficult challenges to overcome for health care professionals.[1]

Pain implies the existence of an emotional factor that regulates the conscious perception of the sufferer, in short, it is a subjective experience and the psychological aspects of the patient are involved.[2] Orofacial pain is a complex pain that is usually caused by diseases located in the maxillofacial region or in a few cases related to neurogenic sources.[3,4,5]

Most dental consultations are related to intraoral pain affecting dental, periodontal and mucosal structures, as well as the patient's health status.[6]

Within the endodontic field, pain can be considered one of the side effects most frequently present after endodontic treatment, which is known as post-endodontic or postoperative pain.[7] However, it is not the only stage where the patient may feel pain, but also before or during endodontic treatment. Similarly, the main symptom that appears in infections is pain and inflammation, the pain is manifested when the pulp tissue becomes inflamed as a result of deep caries or other irritants.

Endodontic treatment aims to hermetically seal the canal by means of an adequate instrumentation, without causing further discomfort to the patient and providing relief to his condition.[8,9]

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Vital pulpectomy or biopulpectomy is an endodontic technique that includes removing, cleaning and shaping the pulp cavity, in order to create a suitable environment for three-dimensional obturation of root canals.

In these situations, the dental professional should consider various clinical, pharmacological and combined strategies to mitigate the pain processes through which the patient goes through when his dental organ is affected. In addition to pharmacological therapy such as the use of analgesics and anti-inflammatory drugs,[8] the professional can rely on additional strategies to counteract the pain, including acupuncture and the use of therapeutic lasers as viable variables in the management of dental pain.

The interest of this study is to present strategies for pain control during endodontic treatment of a biopulpectomy in order to demonstrate that there are viable alternatives for pain management during endodontic treatment.

DEVELOPMENT

Vital pulpectomy or biopulpectomy is an endodontic technique that is performed in cases of vital pulps suffering from irreversible inflammatory processes, when the dental organs are irreversibly affected by an inflammatory process induced by the action of bacteria, physical or chemical agents that damage it in such a way that its total removal is required. This procedure is indicated in cases of pulpitis, whether acute, irreversible and chronic, with or without internal resorption, recurrent pulp exposures of carious lesions, where the pulp root tissue presents severe hemorrhage, with blood, altered coloration and decomposition of the pulp tissue.[10]

The dental pulp becomes inflamed in response to an aggressor agent, which may or may not originate from pathogenic microorganisms; that is, they may come from physical and chemical agents. However, the vast majority of pulp alterations are of bacterial etiology due to the presence of caries. Initially, after being exposed to caries, the pulp becomes inflamed, although it does not become infected in its center, that is, in its interior.[10,11]

When the pulp tissue is vital, it indicates the absence of infection. This vitality is verified clinically, when the pulp chamber is opened and the tissue present is macroscopically vital, that is, with normal consistency, resistant to cutting and with slight bleeding of a bright red color.

The objectives of biopulpectomy are to provide immediate relief of painful disease, to exclude the root canal system as a source of infection and to avoid recurrent local and systemic painful symptoms. This is indicated in conditions such as symptomatic irreversible pulpitis, asymptomatic irreversible pulpitis, for prosthetic and/or surgical indication or internal resorption.[12]

In endodontic treatment, i.e. biopulpectomy, pain is usually caused by the existing infection in the dental organ, but there are other causes that could cause discomfort to the patient. Instrumental techniques, working length methods, irrigation systems and closure methods are causes of postoperative pain.[8,13]

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Among the most frequent causes of painful sensitivity during endodontic treatment are anesthetic failure due to decreased pH, anatomical factors such as atypical accessory nerves and foramina, presence of inflammation and infection, psychological factors, lack of skill in the anesthetic technique, factors specific to the anesthetic solution (potency and duration of the anesthetic), poor instrumentation, incorrect irrigation of sodium hypochlorite, among others.[2,8,14]

Current panorama of endodontic pain management

Pain management has a positive impact on the patient's endodontic treatment, which is why dentists must be able to relieve pain. To treat pulpitis pain, immediate treatment by pulpectomy is required, but there are cases in which this cannot be done urgently, hence different measures have been studied to relieve preoperative pain. An example is the use of acupuncture, laser therapy or the use of corticosteroids.[11,15]

Regarding pharmacological therapeutics in postoperative pain, most studies show that NSAIDs are considered the drugs of first choice for the management of endodontic pain, while opioids are used less frequently.

Ibuprofen has been highlighted as the most appropriate drug in endodontic practice with doses of 400-600 mg every eight hours, but they also mention the use of Ketorolac at 20 mg every eight hours.[8]

NSAIDs are the drugs of first choice to regulate pain. Ibuprofen is widely used in doses of 400-600 mg or associated with acetaminophen (600 mg - 650 mg). The use of 4 mg of dexamethasone, 40 mg of prednisolone, have demonstrated effectiveness and without adverse effects, being the administration of a single dose.[8,11,15]

The use of oral preoperative corticosteroids has been suggested, since they are effective in reducing moderate or severe postoperative pain up to 24 hours after pulpectomy, when pain is more intense. Likewise, it should be noted that premedication with NSAIDs has been related to a higher success rate of local anesthesia, thus providing predictable anesthesia, as well as greater pain control during the treatment of irreversible pulpitis.[15]

Regarding anesthetics, a meta-analysis found that the success of pulp anesthesia is improved when the volume of the anesthetic solution is increased, when it is prescribed 30, 45 to 60 minutes before the biopulpectomy is performed, and when the premedication of an NSAID, such as indomethacin, meloxicam, piroxicam and diclofenac potassium, in conjunction with paracetamol or an opioid, is given in a single oral dose.[7,15]

Others state that the use of articaine as a local anesthetic helps to achieve anesthetic success; this is based on its chemical activity that allows the solution to diffuse to the apex of the teeth. In addition, the administration of ibuprofen 600 mg 1 hour before as pre-medication generates success in the blockade of the inferior alveolar nerve, since it will reduce the risk of pain after the anesthetic effect.[2,8,14,15]

ALTERNATIVE THERAPIES FOR THE TREATMENT OF ENDODONTIC PAIN

Pharmacological management to treat endodontic pain is effective, however, it is not free of side effects and in certain cases may not provide adequate relief.[16,17] That is why it is highlighted that there is another type of strategy for pain control represented by alternative therapies.

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Authors such as Trujillo et al.[4] agree that the management of this pain can be treated with alternative therapies such as acupuncture or phytotherapy.

Use of acupuncture for pain management

It is generally defined as an aid in the regulation of the body's energy balance when pain appears, as a defense and protection mechanism for the affected tissues.[4]

One of the best demonstrated Western theories that helps to understand how acupuncture works is Melzack and Wall's Gate Theory. Another is the release of endogenous opioid substances; it is based on the fact that when the acupuncture point is stimulated, these substances are released and act as local hormones on the opioid receptors, which explains the analgesic mechanisms.[4]

Another aspect of the acupuncture phenomenon to be considered is that the acupuncture points located on the surface of the body, present as areas of low resistance to the passage of electric current, and act as a reflex mechanism.[4,18]

In addition, it was reported to have the ability to reduce the anxiety involved in performing this dental procedure and also reduce the intake of analgesics after the procedure, which may cause some undesirable side effects.[16]

Acupuncture treatment applied in stomatology emergencies for both reversible and irreversible pulp processes is very useful in most patients. However, based on advances in recent years, the current level of evidence available places acupuncture within the routine therapeutic arsenal of pain control techniques at the secondary care level.[4]

Research on the safety and efficacy of acupuncture for pain relief still has a long way to go. However, acupuncture treatment for pain care in stomatology emergency departments should be a resource of choice in acute pulpal processes.

Use of laser for pain treatment

Laser constitutes another alternative for pain treatment in dentistry. It has several advantages such as high precision, less discomfort for patients, reduction of bacteria and a reduced risk of traumatizing the surrounding tissue.[13]

In the specialty of endodontics it has been widely accepted, being considered as a complement to endodontic therapy. Its purpose is to perform an effective shaping, cleaning and disinfection of the root canal system, allowing the efficient elimination of microorganisms present, and thus preventing reinfection of the canal.[9,19]

This laser therapy produces analgesic effects, anti-inflammatory action, muscle relaxation, tissue regeneration and repair, reduction of edema and hyperemia, luminous hemostasis and natural defense mechanisms.[20,21]

The application of this therapy seeks to reduce postoperative pain caused by the biomechanical preparation; in addition, to decrease dentinal hypersensitivity. Its effects include the reduction of nerve conduction velocity, reduction of compound action potentials, selective inhibition of Aδ and C fibers, and suppression of nociceptive stimulation.[7] It has also been shown to proliferate the formation of secondary dentin by odontoblasts, by biostimulation process.[1]

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The laser would have the ability to induce a hyperpolarization of the membrane, preventing its depolarization and consequently the transmission of the stimulus would not occur. Clinical studies have shown that it can be an efficient alternative to the use of NSAIDs in the control of post-endodontic pain, thus eliminating the negative effects of drugs on patients. However, the best effects have been obtained when a joint therapy between laser and NSAIDs is performed.[9,13]

It has also been found that the laser is effective when used as an adjuvant in endodontic treatment versus the conventional use of sodium hypochlorite and calcium hydroxide paste in the reduction of periapical lesions in teeth with apical periodontitis.[22]

CONCLUSIONS

Pain management has a positive impact on the patient during endodontic treatment, which is why dentists should have the skills and tools to achieve pain relief. Although NSAIDs are considered the drugs of first choice for endodontic pain management, there are other therapeutic variants of proven effectiveness. Acupuncture treatment for pain care in stomatology emergency services should be a resource of choice in acute pulp processes. Laser constitutes another alternative for the treatment of pain in dentistry, since it produces analgesic and anti-inflammatory effects, muscle relaxation, tissue regeneration and repair, reduction of edema and hyperemia, luminous hemostasis, stimulates natural defense mechanisms, as well as the formation of secondary dentin by odontoblasts by biostimulation process.

Conflict of interest
The authors declare that there is no conflict of interest.

Authors' contribution
All authors participated in conceptualization, formal analysis, project management, writing - original draft, writing - revision, editing and approval of the final manuscript.

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