

Distraction during medical procedures: From a psychological strategy to a bioethical necessity

Distracción durante procedimientos médicos: De una estrategia psicológica a una necesidad bioética

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Abstract:

Pain and anxiety during medical procedures are common experiences that, if not properly managed, can lead to negative consequences such as the development of phobias and avoidance of future care. While useful, pharmacological alternatives have limitations such as adverse reactions and drug interactions, especially in vulnerable populations. The aim is to analyze distraction strategies used in medical procedures and discuss their implications for ethical and humanized clinical practice. Distraction is presented as a clinically effective tool, and its systematic implementation adheres to fundamental bioethical principles: preventing avoidable harm, actively promoting well-being, and contributing to equity in the quality of care, respecting the patient as an active agent in their own care.

Keywords:

Distraction, anxiety, pain, bioethics, humanization of care, patient rights, medical procedure

Resumen:

El dolor y la ansiedad en procedimientos médicos son experiencias comunes que, de no ser adecuadamente manejados, pueden derivar en consecuencias negativas, como el desarrollo de fobias y la evitación de cuidados futuros. Las alternativas farmacológicas, si bien útiles, presentan limitaciones como reacciones adversas o interacciones medicamentosas, especialmente en poblaciones vulnerables. El objetivo es analizar las estrategias de distracción empleadas en procedimientos médicos y discutir sus implicaciones para una práctica clínica ética y humanizada. La distracción se presenta como una herramienta clínicamente eficaz, su implementación sistemática responde a principios bioéticos fundamentales: previniendo el daño evitable, promoviendo activamente el bienestar y contribuyendo a la equidad en la calidad de la atención, respetando al paciente como agente activo en su cuidado.

Palabras Clave:

Distracción, ansiedad, dolor, bioética, humanización de la atención, derechos del paciente, procedimiento médico

INTRODUCTION

Over the past 25 to 30 years, rapid advances have been made in research and applied procedures in basic biomedicine, strengthening the application, development, and implementation of different alternatives that allow patients to cope with various medical procedures when anxiety, pain, fear, and/or stress are present, with both pharmacological and non-pharmacological support.¹ It is reported that patients may experience fear, anxiety, and pain before, during, and after procedures.² However, beyond demonstrating its clinical efficacy, the use of distraction is directly connected to fundamental bioethical principles.

Inadequate pain management can lead to consequences such as trypanophobia and reluctance to seek future care^{3,4}, and pharmacological analgesia is not without risks,^{5,6} the omission of effective and low-cost non-pharmacological alternatives could be questioned from the principle of non-maleficence. Therefore, the objective of this article is not only to present the different distraction strategies, but to analyze them as a vehicle for humanizing care, arguing that their implementation is an essential component to guarantee clinical practice that respects the patient's dignity.

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METHODS

For the elaboration of this narrative review, a bibliographic search was carried out in databases such as PubMed, Scopus, SciELO and Google Scholar. Keywords such as 'distraction', 'anxiety', 'pain', 'medical procedures', 'non-pharmacological', 'virtual reality', 'pediatrics' were used. Priority was given to articles published in the last 10 years, although seminal and classic references were included to contextualize the fundamental concepts.⁷

MEDICAL PROCEDURES

A medical procedure is defined as any practice by a health professional that involves a combination of skills and/or abilities where the use of medications, medical instruments, or both can be resorted to,⁸ which can cause negative emotions and sensations in the patient, such as anxiety, stress, fear, insecurity, anguish, and pain.²

ANXIETY

The North American Nursing Diagnosis Association (NANDA) defines anxiety as "A vague and uncomfortable feeling or fear accompanied by an autonomous response, a feeling of apprehension caused by the anticipation of danger. It is an altering signal that warns of imminent danger and allows the individual to take measures to face the threat".⁹

During the preoperative or postoperative period, the patient may feel more vulnerable with respect to their needs, being prone to an emotional imbalance in conjunction with anguish and fear,¹⁰ due to the above it is reported that anxiety induces functional changes in the central nervous system, increasing the harmful effects on the patient's body. considering it as a source of acute stress; In this way, it can produce negative behaviors and high scores in the perception of pain, which can cause sleep disturbances, nausea, fatigue and negative responses to anesthesia, analgesia and the use of analgesics in a constant way, generating higher costs for health services and in turn difficulties can occur earlier. during or after the procedures.¹¹

PAIN

The other hand, pain is defined as an unpleasant sensation and/or an emotional experience associated with actual or potential harm, or a similar experience. Operative pain is related to an invasive operation or a diagnostic test,¹² according to the American Society Anesthesiologist (ASA) defines postoperative pain as "Pain that is present in the patient due to the disease, the surgical procedure, and/or its complications, this is characterized by being an acute pain, limited in predictable and avoidable time"¹³.

INDIVIDUAL FACTORS IN THE PERCEPTION OF PAIN AND ANXIETY

It is crucial to emphasize that the experience and intensity of pain and anxiety are not solely dependent on the noxious stimulus, but are modulated by individual factors. Personality traits such as neuroticism, and the cognitive strategies of emotional

regulation used by each individual such as catastrophizing or, on the contrary, positive reappraisal, significantly influence the perception and coping with medical stress, this explains why two patients subjected to the same procedure can manifest completely different behavioral responses and levels of suffering¹⁴.

PAIN, ANXIETY, AND/OR DISTRESS IN MEDICAL PROCEDURES

Pain, anxiety, fear and/or anguish incited by medical procedures are common during childhood, unfortunately these emotions can be inadequately managed in routine care,¹⁵ it has been reported that the mismanagement of these emotions can negatively affect the patient, an example of this are treatments that use needles (trypanophobia), which is classified within specific phobias. to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), this condition is characterized by an intense and irrational fear or anxiety towards needles and invasive medical procedures. For diagnosis, the DSM-5 states that this fear must meet several key criteria:

- Be persistent, usually lasting 6 months or longer
- Cause immediate anxiety that can turn into a panic attack
- Leading to active avoidance of stimuli emitted with intense distress and leading to clinically significant impairment in social, occupational, or other important areas of their life, this impairment frequently manifests itself in avoidance of essential medical care, such as check-ups, vaccinations, treatments, and other medications.

This poses a direct risk to physical health and general well-being.¹⁶

In this way, the lack of good management during medical procedures can lead to the present and future development of a significant fear of different procedures. It is reported that these emotions develop at an early age and can sometimes persist into adulthood,³ as it has been shown that 30% of adults have a phobia of needles, of which they mention that in their clinical history they experienced a very painful procedure related to the insertion of a needle. Where it is reported that there was not enough effort on the part of health professionals to relieve pain,⁴ venipuncture being a common procedure; For this reason, day by day we seek to implement alternatives that help improve the quality of life of the patient through an improvement in medical care. This chain of consequences of poorly managed pain leading to phobia, which in turn generates avoidance of care, is not clinically neutral. From an ethical perspective, it brings us face to face with the principle of non-maleficence, which urges us not to cause avoidable harm.¹⁷ If suffering during a procedure can lead to lasting harm such as trypanophobia, and if tools exist to mitigate it, the omission of these strategies could be interpreted as a form of preventable harm. The ethical quality of care is also measured by the ability to anticipate and avoid these consequences.¹⁸

BASIS OF DISTRACTION: PAIN GATE THEORY

A fundamental pillar to understand the effectiveness of distraction techniques in the modulation of pain and anxiety is the Gate Control Theory on Pain, proposed by Melzack and Wall in 1965. This model postulates the existence of a regulatory mechanism at the level of the spinal cord, a neutral "gate" that determines whether pain signals from peripheral tissues are transmitted, or not, to the brain to be consciously perceived.¹⁹ According to the Theory, the openings or closing of this compound is influenced by the competitive interaction between three types of nerve fibers:

- A-beta fibers. Thick and fast-conducting, transmitting non-harmful touch information such as vibration and pressure.
- A-delta fibers. Thin and myelinated that transmit acute and localized pain.
- C. Unmyelinated, slow-conduction fibers, which transmit dull, diffuse and persistent pain.

The activity of A-beta fibers (touch and vibration) inhibits pain transmission (they close the gate), while sustained activity of C fibers (Pain) facilitates transmission (opens the gate).²⁰

The distraction acts as a powerful closing mechanism for this gate. By providing an alternative, pleasurable, attention-requiring stimulus (such as a virtual reality environment, a conversation, or the vibration of a device), activation is generated that, in turn, stimulates inhibitory interneurons in the posterior reaches of the spinal cord that block or "close the gate" to pain signals traveling through the A-delta and C fibers. Thus preventing them from reaching the higher centers of the brain.²¹ Subsequently, Melzack expanded this concept with the Neuromatrix Theory, integrating the influence of cognitive factors (such as attention and distraction) and emotional factors (such as anxiety or relaxation) on the subjective experience of pain, which reinforces the central role of psychological processes in its modulation.²² Thus, distraction not only diverts attention, but also involves innate neurophysiological mechanisms to suppress the pain signal, validating its use as an evidence-based non-pharmacological intervention.

PAIN TREATMENT OPTIONS

These alternatives seek to reduce the aforementioned symptomatology, so that the patient obtains or generates tools with the functionality that they can undergo the corresponding procedures in a better way²³ and this can positively influence the health care of the present and future patient.

As for pharmacological help, it depends on the level, type of pain and duration;

- Mild pain: it is usually treated with an oral or local analgesic, such as non-steroidal anti-inflammatory drugs (NSAIDs) so that those commonly used are ibuprofen, aspirin, piroxicam, paracetamol, voltarex. Commonly used local anesthetics are lidocaine, bupivacaine, articaine. The use of these will depend on the needs and type of procedure to be performed,

NSAIDs are used to relieve pain and inflammation orally, on the other hand, local anesthetics allow the patient to remain awake and alert, since these drugs are applied locally in the area that is required.

- Moderate pain: may require an adjunct between drugs such as an analgesic and minor anti-inflammatory/opioid such as codeine, tramadol.
- Severe pain: the use of intravenous opioids, such as morphine, is common, it is important to note that the use of opioids regardless of their analgesic action can generate self-administration behaviors.^{5,24}

Pharmacological therapy seeks to block the conduction of the nerve impulse, producing reversible and predictable insensitivity in an area of the body, without altering consciousness, thus generating a reversible blockage of the conduction of impulses in nerve fibers by stabilizing the membrane avoiding depolarization.⁵

The use of pharmacology, even if controlled, can generate adverse effects, this will depend on the type of anesthetic or opioid, its potency, presence or not of vasoconstrictor and the pharmacokinetic properties of each individual, the effects can be generated locally or systemically, in this way its adverse effects can be considered as a disadvantage, in the same way, its use presents an increase in the costs of the procedures and/or the side effects mentioned above such as allergies, dependence, toxicity, hypersensitivity, respiratory depression, tolerance or resistance to drugs, to mention a few.^{5,12, 25, 26}

We must highlight and take into account that among the patients treated are populations of special vulnerability, such as older adults who are studying polypharmacy due to chronic degenerative diseases. In these cases, the complexity of management and care will be determined by base treatments, since interactions between prescribed medications can alter the safety and efficacy of the drugs used during medical procedures.^{6,27} These limitations of pharmacological analgesia take on a particular ethical dimension when the principle of justice is considered. Justice in healthcare demands the equitable distribution of resources and non-discrimination^{17,28} However, the higher cost of certain drugs and the need for specialized management can generate inequities in access to adequate pain relief. Furthermore, vulnerable populations such as children with less coping capacity or older adults on multiple medications exposed to greater risks of interactions require alternatives that minimize harm.⁶ It is here that non-pharmacological interventions, such as distraction, are clinically useful and ethically necessary to ensure equitable and safe care.

DISTRACTION

One of the most widely used non-pharmacological methods, where it is sought to divert the patient's attention from what may be perceived as a threatening or unpleasant procedure, which can affect the perception of symptoms and even the treatment either positively or negatively before, during or after the procedure, for

this reason it seeks to avoid or reduce harmful behavior in the patient.²⁹

Distraction is any action that interrupts the individual's attention during the performance of an activity that may or may not result in the alteration, prolongation, change in the primary action by the secondary action; distraction can result from multiple sources external or internal to the individual having the ability to impact positively or negatively,³⁰ in this way different doctors recommend distraction as a cognitive coping mechanism that redirects the subject's attention or an activity that involves or does not involve the patient in the procedure.³¹

Distraction can be classified as passive and active:

- Passive distraction requires the patient to be immobile, calm, and silent, so that the stimulus is achieved through the observation of the activity, auditory and/or audio-visual techniques such as background music, televisions, computer games, virtual reality headsets, sensory sensors, among others.³²
- Active distraction involves the patient's participation during the procedure, where interactive toys, singing, squeezing balls, controlled breathing, guided visualizations, relaxation, among others, are used to modify the patient's discomfort and thus achieve a successful treatment.³³⁻³⁶

Beyond its effectiveness in reducing the perception of pain, distraction, particularly in its active form, has an ethical relevance that deserves to be highlighted. Techniques that require patient participation such as controlled breathing, the choice of a virtual environment, or verbal interaction not only divert their attention but also make them an active agent in their own care process. This connects directly with the principle of autonomy, understood not only as the capacity to consent but also as respect for the person's right to exercise control and participate in decisions about their experience.³⁷ In a context of vulnerability, where the patient is in a position of asymmetry with respect to the professional, offering them tools that restore a degree of agency is an act that reinforces their dignity and contributes to truly person-centered care.²⁷

Application of distraction in medical procedures

There are different distraction techniques that have been successfully employed in various medical procedures, such as blood transfusion, tooth extraction, therapy for patients with cognitive and motor impairments, treatment of burns, intravenous catheterization, bronchoscopy, minor surgery for ingrown toenails, venipuncture, just to mention a few, likewise, it has been shown that these techniques can be adaptable before, during or after medical procedures, in different populations and age ranges^{23,35-37}

Here are some strategies for modifying pain care:

Guided Visualization

It is an effective tool for pain management, in such a way that it suppresses the highly salient sensations of pain and anxiety by

shifting attention to a more pleasurable activity or thought. This non-immersive distraction that involves describing in detail a positive situation, intended to evoke feelings of calm, is usually started with relaxation exercises (diaphragmatic conscious breathing) and simultaneously a description of a relaxing activity such as a walk on the beach, flying among the clouds, etc.³⁸

4-7-8 breathing technique

This technique is an effective and quick way to induce a state of calm, it has a structured physiological foundation. The execution consists of inhaling through the nose for 4 seconds, holding the breath for 7 seconds and exhaling through the mouth in 8 seconds. This pattern acts as a natural switch for the nervous system, favoring the transition from the sympathetic nervous system (responsible for the fight-or-flight response) to the parasympathetic nervous system (responsible for relaxation).³⁹ Prolonged exhalation is particularly effective, as it stimulates the vagus nerve, which in turn reduces heart rate and blood pressure, by requiring a sustained mental focus on the count and breathing rate, this technique also works as a deep cognitive distraction, redirecting attention away from the painful or anxiogenic stimulus. helped to regain a sense of control.⁴⁰ Its simplicity and speed make it a tool applicable in a wide range of contexts, from venipuncture preparation to post-operative recovery.

Virtual reality (VR)

Three-dimensional immersive interactive activity in which multiple senses are involved and create an artificial environment in which the user can momentarily inhabit, where a virtual reality adapter/virtual reality headset is occupied, in this way interactive games or videos can be applied.⁴¹ According to Tas et al., (2022)⁴² VR has shown a statistically significant effect on pain and anxiety during medical procedures, due to its easy application it can offer a wide range of opportunities that can be customized to the needs of the patient, it was shown to be highly effective in pediatric patients, the advantage of this distraction is that it is used in medical procedures that require the patient to stay immobile, as it is in venipuncture, catheterization, magnetic resonance among others, however one of the disadvantages that we could find in this distraction is that patients may feel dizzy or feel discomfort during the use of virtual reality glasses and in turn it cannot be used by patients with visual impairments.

Therapeutic listening

A communication resource that consists of listening to the indications of the medical staff generating security and confidence about the procedure, has the purpose of relieving anxiety and increasing the patient's adaptive capacity, during this technique a trust and doctor-patient relationship is usually generated, which is beneficial for the security and trust that can be generated. However, it should be considered that there are patients who have hearing difficulties in whom this alternative could not be useful.⁴³

Clown therapy/laughter therapy

The use of laughter therapy physiologically stimulates the production of beta-endorphins, a substance with an effect similar to opiates, where volunteers or health professionals themselves dress up as clowns and carry out activities with patients through stimuli such as jokes, explosive emotions, pleasant thoughts. The use of laughter therapy has not only been applied to reduce pain and anxiety, it is important to note that it is applied to patients with depression, laughter therapy as a type of behavioral-behavioral therapy improves physical, mental, social health and ultimately improves quality of life. This form of distraction is highly applicable in a wide age range since studies show positive results in both pediatric patients, adolescents, adults and older adults, as well as in patients undergoing cancer treatments, hospitalized patients with tuberculosis, depression, depression, and other types of treatment.⁴⁴

Visual distraction with images

The images shown are usually in the form of highly illustrative cards and with striking shapes, later during the procedure questions are asked about the cards that can only be answered with a good examination of them, generating the focus of attention to the illustrations, diverting attention from the ongoing procedure, regardless of the positive results of this alternative, one of its disadvantages is that it cannot be applied to people with visual impairments.⁴⁵

Audio-Visual Distraction

Visual and auditory scenes whether reproduced on TV or virtual reality glasses, this method of distraction is highly used in pediatric patients undergoing treatments, dental, venipuncture, with highly positive results to reduce anxiety and acute pain, it is a type of semi-immersive virtual reality since it is usually applied through screens, where they are usually shown movies, cartoons or videos that are to the liking of the patient, although the drawback that may arise when trying to use this strategy is that it would not be applicable in patients with hearing and/or visual problems.⁴⁶

Verbal distraction

A technique that promotes a good doctor-patient relationship, an active form of distraction, in which you can interact with the patient through conversation or give instructions on moving a part of the body to generate distraction. Communication between the health professional and patient is usually highly effective in reducing stress and anxiety symptoms. Since a bond of trust is generated during the interaction, this technique is applied in dental procedures, in a wide range in which it includes paediatrics to older adults, however this alternative could be affected in a patient with language and/or hearing deficiencies or problems, it can also be affected when the patient presents problems to be able to engage in a conversation.⁴⁷

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Sensory distraction (Buzzy® device)

The Buzzy® instrument is designed in the shape of a bee which produces vibrations and cooling through its frozen wings, the flow is placed above the place to be punctured for 10 minutes, this device is highly used in a pediatric population with favorable results, since its mechanism of action which is based on cooling and vibrating can interfere with the transmission of pain, through distraction, gate control theory, descendant harmful inhibitory controls, local analgesia due to numbness caused by vibration, and the release of endogenous opioids caused by activation of cold-related touch receptors. This device is designed for medical procedures that require needle use.⁴⁸

CONCLUSION

Distraction techniques are effective, safe, versatile, and evidence-based interventions for managing anxiety, fear, and pain associated with medical procedures. Their applicability spans various specialties, including dentistry, anesthesiology, physiology, and psychology, and has demonstrated positive results in reducing distress and pain perception in patients of all ages.

It is important to note that many of these techniques do not entail high additional costs, making them accessible across diverse healthcare settings. Their use is especially relevant in vulnerable populations, such as children or elderly adults taking multiple medications.

By preserving the patient's well-being through more humane care, distraction promotes health and prevents complications associated with procedure-related stress. It also helps prevent avoidance of future medical care, a common consequence of poorly managed pain experiences. Furthermore, it encourages timely interventions by reducing delays caused by fear and anxiety, allowing the patient to feel comfortable and calm during their treatment.

Distraction is becoming established as a key tool for humanizing healthcare and optimizing its outcomes. Its incorporation into clinical protocols is not only a matter of therapeutic efficacy, but also a reflection of the commitment to quality and dignity in care.

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