

Reduction of Post-operative Pain by Relaxation Technique and Music Therapy

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Abstract

Pain is a universal patient phenomenon. Likewise, effective pain management should be a universal response by health professionals. The health care providers should have knowledge of the pain nature; various assessment tools that capture the patient's pain experience; the frequency of monitoring pain and pain relief patterns; the types, uses, and timing of non-steroidal anti-inflammatory and opioid agents; and the types, uses, and benefits of non-pharmacological interventions as adjunctive therapy. This article emphasizes on post-operative pain management by using relaxation and music. Opioid medication provided for pain after surgery does not always give sufficient relief and can cause undesired side effects. Thus, additional interventions such as relaxation and music may provide more complete relief.

Keywords: Post-operative pain, relaxation, music, opioid medication.

Introduction

Pain is a stressor; unrelieved, it can cause both physical and psychological strain. Studies of unrelieved pain by Ferrell *et al.* (1995) in older adults reveal harmful consequences such as impaired gait and cognition; sleep deprivation; alteration in nutrition; and decline in socialization. Pain, either acute or chronic, is the most common reason why people seek medical advice (Tollison 1989). The way we define pain influences not only our attitude towards pain, but also our approach towards and care for those in pain (Cupples 1992). Pain is a common accompaniment to many illness situations and impacts on patient's quality of life. However, despite increased knowledge and technological resources for pain management, many hospitalized patients continue to experience pain. Nurses spend more time with patients than any other health professional group and have a key role to play in the management of patients' pain. Thus, nurses should incorporate various pain

management techniques to enhance the satisfaction with pain management practices for the individual patient.

Pathophysiology of Pain

Peripheral (or cutaneous) receptors, including mechanoreceptors, thermoreceptors, and nociceptors, elicit an action potential when activated by specific stimuli. These peripheral receptors are present in the skin and in other body structures, including joints, skeletal muscle, periosteum, arterial walls, and viscera. The peripheral nociceptors are preferentially sensitive to noxious biochemical mediators that are released when tissue is damaged. These noxious substances include bradykinin, histamine, acids, potassium, and substance P. They bind to receptors on the nociceptor fibers, initiating the transmission of painful impulses that are ultimately processed and consciously recognized in the cortex. Once an action potential is initiated and algesia begins, most nociceptors transmit impulses to the spinal

cord. A few, however, synapse on somatic motor neurons or sympathetic fibers, eliciting a reflex response (Wallace 1992).

Mechanism of Nociceptive Pain

According to Cheever (1999), mechanism of Nociceptive Pain is described as follows:

1. Nerve endings turn noxious stimuli into impulses, a process called transduction.
2. Nociceptors (fast-conducting A delta fibers and the slower conducting C fibers) transmit the impulses to the dorsal horn of the spinal cord.
3. At the dorsal horn, neuro-transmitters (including adenosine triphosphate, glutamate, and substance P) carry the impulses across the synaptic cleft to the dorsal horn neurons.
4. Spinothalamic tract neurons carry the impulses to the brain stem and thalamus.
5. Painful impulses reach the cerebral cortex. The patient perceives pain, and the brain acts to modulate the pain by releasing endogenous opioids.
6. Descending pathways are activated to inhibit pain transmission.

Post-operative Pain

When tissue is injured through surgery, cells are damaged and release noxious substances causing pain. Post-operative pain usually experienced by patients tends to be of short duration and acute in nature. The surgical experience places formidable physiological and psychological demands on the human organism, frequently complicated by coexisting pathological processes. The patient's response to surgery and postoperative pain is the result of a lifetime of experience, cultural and religious influences, learned responses to pain, and resources for coping with life. The psychological make-up of the patient is an important element to be considered, particularly in terms of his ability to respond and adapt to stress. There are some specific psychological concerns which the surgical experience creates for the individual. One is the nature and location of the operation and the meaning this has for the individual, that is, the emotional investment associated with the part

of the body that is involved. Whether or not a surgical procedure is elective or exploratory, if an organ is retained or removed, if more than one incision is necessary, possible cosmetic effects, and whether or not a body part is lost are all potential sources of concern to the patient. The location of the surgery also has physiological implications for the degree of postoperative pain. Incisions involving the thoracic, upper abdominal and abdominal cavities are reputed to produce the greatest amount of postoperative pain and related discomforts due to the proximity to the diaphragm and the respiratory function. Closely related to location and a definite factor in the production of postoperative pain is the extent of the surgery. The extent to which the body is subjected to surgical trauma, the kind and amount of manipulation received by the internal organs and the duration of the surgical procedure all influence the degree of postoperative pain from psychological aspects. Physiological and psychological aspects of the surgical experience act in combination to produce the postoperative patient's reaction and response. Fears, anxieties, and previous experiences with pain are interwoven with the processing and conscious recognition of any painful experience.

Postoperative Pain Management

Post-operative pain management continues to be one of the most complex and challenging tasks encountered by nurses.

There are two methods of postoperative pain management:

1. Pharmacological management:
 - opioid agents
 - nonsteroidal anti-inflammatory agents
2. Nonpharmacological management:
 - imagery
 - biofeedback
 - relaxation
 - music

Meinhart and McCaffery (1983) identify the three phases of the pain experience as: (i) the anticipatory phase - the period before the

actual onset of pain, (ii) the sensation phase - the time when the pain is present, (iii) the aftermath phase - the period after the pain ceases. Moreover, there are specific nursing assessments and interventions for each phase. Providing information about the quality, intensity, and duration of pain associated with various procedures is essential intervention during the anticipatory phase. During the sensation phase, it is important to note accurately the characteristics of the pain (e.g. onset, location, quality, and severity). Appropriate interventions during this phase would include the administration of pain medication along with holistic therapies such as guided imagery, progressive relaxation, and biofeedback. In the aftermath phase, it is important to determine if the patient is disturbed by his/her pain behavior. If so, every effort should be made to restore the patient's self-esteem. During this phase, it also is important to plan, with the patient, future pain-relief strategies. The initial assessment of pain should include a detailed physical and psychological examination unless the patient is in severe pain. Components of the physical examination include the site, onset, duration, and intensity of pain as well as the referral patterns, and factors that relieve the pain. During the psychological assessment, the nurse should elicit information about the patient's knowledge, preferences and expectations of pain management. The patient should be assessed for mood changes such as depression and anxiety that are commonly associated with chronic pain. Nurses should be aware of general pain management considerations, including families' concerns about pain management. It is important to educate patients and families about the differences between dependence, tolerance, and addiction. Nurses have the most contact with the patients; thus, they are in an excellent position to make significant and unique contributions to the patient's pain management. To attain post-operative pain control in patients, it is important for nurses to incorporate alternative methods of pain management techniques, not just pain-relieving medications. Pain-relieving medications such as narcotic analgesics may diminish post-operative pain; however, they

may not provide adequate pain relief, or they may have side effects that are too distressing for some patients. Narcotic analgesics may produce adverse side effects such as nausea, depressed respiration, altered central nervous system functions, hypotension, and occasionally physiologic dependence. Other methods of pain relief include distraction, cutaneous stimulation, imagery, relaxation and music therapy. Such methods can be used as therapeutic adjuncts to narcotic analgesic administration.

Relaxation

The relaxation response is defined as an integrated hypothalamic response that result in generalized decreased sympathetic nervous system activity. Physiological changes associated with the relaxation response include lowered oxygen consumption, carbon dioxide, respiratory rate, arterial blood lactate level, heart rate and arterial blood pressure. Miller and Perry (1990) studied the relaxation technique and post-operative pain in patients undergoing cardiac surgery. In this study, a two-group pre-test and post-test quasi-experimental design was used to determine the effectiveness of a slow, deep-breathing relaxation technique in relieving post-operative pain after coronary artery bypass graft surgery. A convenience sample of 29 subjects was divided into an experimental group (n=15), who received relaxation training on the evening before surgery and performed the technique after surgery, and a control group (n=14), who did not receive relaxation training. They found that significant decreases were demonstrated as a result of relaxation, in blood pressure, heart rate, respiratory rate, and report of pain on the visual descriptor scale. Relaxation can decrease pain in a person by distracting, reducing anxiety and muscle tension.

Music

Music therapy is also beneficial to relieve postoperative pain. Egyptians called music the "physic of the soul". It was found that postoperative patients report less anxiety and pain after hearing "easy-listening" music. The

patients, whose ages ranged 37 to 57, were randomly assigned to one of two groups. One group listened to a 10-minute tape of easy-listening instrumental music on the first two days after surgery. The control group did not. All the subjects were asked to rate their pain, using a visual analogue scale, and their anxiety, using a five-point scale that ranged from "calm" to "extremely anxious". These subjective ratings were collected at least three hours after the patients had received their analgesic to avoid the possibility that the pain killer, rather than the music, had affected their pain and/or anxiety levels. After listening to the music, the subjects again rated their pain and anxiety using the same two scales. Patients in the control group were asked to complete the two rating scales 10 minutes after their initial rating, although no music or other intervention was used during the intervals. Average anxiety scores were significantly lower in the subjects who listened to the music. Similarly, in those subjects who listened to the music, pain scores were significantly lower, but the drop was noted only on the second postoperative evening. Pain scores on the first postoperative evening did not differ significantly (Mullooly *et al.* 1988).

Relaxation and Music Combination

Good *et al.* (1999) studied the relief of postoperative pain with jaw relaxation, music and their combination. In an experimental design, 500 subjects, aged 18-70, in five Midwestern hospitals in the US, were randomly assigned to a relaxation, music, relaxation plus music, or control group. Interventions were taught pre-operatively and tested post-operatively. The same amount of time was spent with subjects in the control group. Pain was measured with the visual analogue sensation and distress of pain scales. It was found that the three treatment groups had significantly less pain than the controls. The combination group had significantly less sensation and distress of pain than the control group on all post-tests, and the relaxation and music groups had significantly less on all tests except after ambulation.

Discussion

Patients, suffering especially from postoperative pain, may have to suffer for their daily living activities. The pain increases stress responses, which in turn increase tissue breakdown metabolism, coagulation and fluid retention, with deleterious effects on recovery. Pain also interferes with appetite and sleep, and it can contribute to complications, prolonging hospitalization. Even with medication, most postoperative patients report moderate to severe pain at rest that increases during ambulation. After activity ceases, pain may continue but more medication may be unavailable, since it can only be given as prescribed intervals. Some patients may be especially sensitive to pain, or have insufficient response to medication. It is not necessary for them to take only pain-relief medications because there are several methods to relieve pain such as relaxation techniques and music that cause lesser expenses and can be managed at home. Using background music during relaxation practice is helpful because the music can foster a sense of tranquility and aid relaxation. Quiet classical music or easy-listening music is probably preferable. Relaxation and music have been recommended as adjuvants to medications. Both act on pain by decreasing anxiety (Borkovec and Sides 1979; Hanser *et al.* 1983), lowering muscle tension and distracting attention (Good 1995), thereby affecting the central control processes that modulate pain transmission. Relaxation directs the mind to concentrate on relaxing muscles, breathing regularly and reducing thoughts. Music is composed of auditory tones and rhythms that do not direct the mind but distract it, and they relax the body as well. Music can focus attention, facilitate breathing and stimulate the relaxation response (Livingston 1979). When relaxation and music distract the mind, the result is selective attention mediated by the thalamus that alerts the prefrontal cortex to the sound rather than to the painful input (Fuster and Alexander 1973), causing pain inhibition. Relaxation and soothing music reduce muscular and mental tension and thereby, reduce sympathetic

stimulation of the hypothalamus (Beary and Benson 1974) which activates endogenous opiates in the central nervous system, reducing propagation of pain impulses and modulating perception of the sensory and affective components of pain (Vidal and Jacob 1980; Carr and Uysal 1985; Tasher *et al.* 1987; Culhane and Carstens 1988). When music is used in conjunction with other therapies such as relaxation or analgesics, music may offer a simple, accessible, cost-effective nursing intervention to reduce anxiety and pain. Nurses can incorporate various pain management techniques to find what works best for the individual patient. In addition to improving comfort, pain control can decrease the incidence of psychological and physical complications associated with pain. Adequate pain control can result in shorter hospital stays, fewer treatments, decreased hospital costs, and decreased emotional harm to patient and family. Relaxation as well as music may be efficient in postoperative period (Miller and Perry 1990). We as nurses should seek the new techniques to help postoperative patients relieve pain effectively, reduce the period of hospitalization, and prevent complication after surgery.

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