## Original article

# The Effect of Combining Two Methods of Massage Therapy and Mental Imagery in Reducing Pain in Children Suffering From Cancer

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**Abstract:**

**Introduction**: The purpose of this study was to investigate the effect of combining two methods of massage therapy and mental imagery in reducing pain in children suffering from cancer.

**Method**: The statistical population included all children suffering from different types of cancer who were admitted in Taleghani and Mofid Hospitals in Tehran. 41 pair of children were selected and randomly divided into two experimental and control groups. Children were visited twice. At the first visit, both groups underwent routine care and on the second visit, the experimental group received cognitive interventions and the control group received routine care. The data were collected through demographic information questionnaire, Ocher scales, visual analog CHAOS (Children's Hospital of Eastern Ontario Pain Scale) of current practice in pediatric medicine.

**Findings**: The results showed that massage therapy and the mental image of the child could reduce pain and distress level. There was a significant correlation between the severity of the pain and the distress level.

**Conclusion**: Combining two methods of massage therapy and mental imagery in the treatment of children suffering from cancer can reduce pain and distress. Therefore, in order to reduce the psychological complications of cancer and the side effects of its various treatments, teaching the authorities these two methods is recommended since their use can be effective.

**Keywords**: Mental imagery, Anger, Childhood Cancer, Massage Therapy

## Introduction:

Childhood cancer refers to types of cancers that are diagnosed in children under the age of 15. The mortality rate of childhood illness (especially infectious diseases) declined in industrialized and developing countries while the number of children with a cancer diagnosis has increased (1). In some countries, following cardiovascular diseases, cancer is the second main cause of death in some countries and is considered one of the most important health problems in the world(2). In recent years, the survival rate in childhood cancer has increased significantly which is the result of advanced and successful treatments. Approximately 60% of all children and adolescents suffering from cancer are treated. Despite the reports on the survival of such patients, cancer remains a life-threatening factor. On the other hand, children and families face

many challenges during the course of treatment, and most children experience physical side effects and unpleasant behavioral and emotional problems (3). Considering the effects of cancer on an individual such as anorexia, nausea, vomiting, sensory changes, and psychiatric stresses, it can be concluded that cancer also affects the quality of life and the performance of the individual, family, and other systems related to the family(4). In addition to the apparent side effects of chemotherapy, cancer is a disincentive factor that prohibits the infected children from enjoying various aspects of their lives. Families with cancer patients are also experiencing stressful events and continuous conditions anxiety. Issues such as psychosocial problems, tension in parent relationships, financial problems, social isolation, changes in family and professional duties, recreational patterns, and lack of time to care about the children's health are among stressors in families with children suffering from cancer(5). In recent years, the trend towards complementary and alternative therapies has grown and such treatments are increasing as a subsidiary and complementary therapies. They are essentially considered as supportive care, in many healthcare and care centers. Many of these treatments have been based on the attitude that mental events directly affect physical changes. Supplementary therapies are divided into two groups of pharmaceutical and non-pharmaceutical treatments for the improvement of symptoms in children and adolescents suffering from cancer who are under chemotherapy. Drug prescriptions have many dangers and side effects, and they usually do not relieve the patients' pain (4).

The sick child's quality of life will be at risk due to the self-sickness and invasive treatment methods as well as reduced energy to enjoy daily routine activities. Treatment methods make the child continually get tired and sick. These children are also susceptible to infection and are continuously admitted to the hospital, leading to the separation of the child from the family and community. Cancer treatments are associated with complications and toxicity that in the short or long term threaten the individual's quality of life. This has led the quality of life to be as a focus of treating the children suffering from cancer. Today, the goal of treating the children who are suffering from cancer is not only to increase their survival but also to improve these children's quality of life (6). One of the non-pharmacological complementary therapies is guided mental imagery. Mental imagery is the language of art and emotions. It is essentially a way of thinking that uses sensory attributes in the absence of sensational inputs which shows physical changes in the body. Studies have shown that mental imagination and massage therapy can be used to reduce the pain in children and adolescents who are suffering from cancer. A study showed that mental imagery can treat the anxiety and mood disorders in children who are suffering from progressed cancer. In many cases, they combine mental imagery with the methods of progressive muscle relaxation. In fact, using this technique alongside one of the relaxation techniques is more common. One of the beneficial complementary therapies is massage therapy which is also considered as a special nursing technique (7). One of the most popular therapies is massage therapy, and among complementary therapies, massage stands in the third place in terms

of its growing use for patients. Among the various types of massage, Swedish massage is a relaxing massage, which first was used by Professor Pehr Henrik Lin at the beginning of the nineteenth century. It has other benefits such as increasing blood flow, relaxing the mind and body, reducing stress and muscular pressure, and increasing health level. During their study, Albert et al. (8) stated that Swedish massage had a greater effect on reducing the stress and anxiety in patients with open heart surgery. In this study, we tried to examine that whether massage therapy and mental imagery reduce the pain in children who are suffering from cancer or not.

## Methods:

In this research, the statistical population included all children suffering from different types of cancer (including central nervous system tumors and musculoskeletal tumors) who were admitted in Taleghani Hospital and Mofid Medical, Health and Education Center in Tehran for performing LP / IT.

In the research, distribution of children was randomly and in terms of the type of cancer and the frequency of cerebrospinal fluid sampling. In this study, the sampling method was available on a target basis and due to the limitations of the study, the sample size was 41. The children with their parents were randomly assigned to one of the two experimental and control groups. Among 41 participants, 21 (51%) were girls and 20 (48%) were boys. Randomly, 21 pairs of child-parent were placed in the experimental group and 20 pairs were placed in the control group. The mean age of the children was 20.78 months with a standard deviation of 15.884, which is equal to six and a half years. The criteria for the entry into the research project included the age range of 5-8 years, the diagnosis of cancer, the referral to the health center for receiving IT / LP medical procedure, the lack of previous psychological intervention in pain management, the absence of chronic genetic diseases, the use of local anesthetic cream before the procedure and not using systemic antiemetics. The criteria for exiting the project were parent's presence at the time of the LP / IT, received midazolam (outside the standard care of the treatment centers), and congenital diseases such as heart failure, asthma, and diabetes (their possible effect on physiological measurements).

Data collection tools included a researcher-made form, containing demographic information (age, gender, diagnosis), and criteria for entering the project, Ocher's pain intensity self-measurement scale and pulse oximeter. The Ocher scale is a poster -shape tool consisting of two scales: a numeric scale of 0-10 or 0-100 for older children and an image scale with 6 images on the right and 0-10 digits on the left of images for younger children. On a 0-10 numerical scale, the number that the child calls will indicate the score of his pain. If the image scale is used, then the image that the child chooses will be converted to the odd numbers from 0-10. The bottom image =0, the second image = 2, the third image=4, the fourth image =6 the fifth image = 8 and the sixth image = 10. There are currently five versions of the Ocher scale available. Due to the lack of clarity on the reliability of the Asian version and the apparent similarity of the children's images to the Iranian children's face in the Spanish version of Ocher scale, and the reliability of this version, the Spanish version was used in this study. The content validity of this

version was obtained 0.65 through the Kendall rank correlation coefficient, assuming that P <0.001. For the imagery and numerical scales, Bayer et al. have declared the reliability of this scale as 0.912, scale and 0.984 in respect, assuming that p= 0/000. The method was implemented in such a way that the therapist, by referring to the clinic and with the direct participation of a specialist physician, trained the patients individually for a period of three weeks and during six sessions, i.e. two sessions a week. The exercises used in the imagery technique are taken from the instructions of the Carl Simonton Center. One of the principles of massage therapy is the close connection between the therapist and patients in order to make patients feel safe (9). CHAOS behavioral observation scale ((Children's Hospital of Eastern Ontario Pain Scale): This scale includes crying items, facial expressions, child verbal, muscle tension, touch and leg position, and scores range from 4 to 13. Since the differential validity of this scale has not been well proven, it should be considered as a measure of behavioral distress during painful medical interventions, rather than a direct measurement of mental pain (10). Comparative Comparison of Comparative-Visual Quality of Current Life Practice in Pediatrics: This child self-assessment scale and parental report assess anxiety, sadness, anger, fatigue, and pain using a six-fold visual analog scale adapted to evolutionary age. According to the reports, this tool has a desirable validity. In order to use this tool in the present research, its linguistic validity was defined in three stages by the Iranian institute which made it during the implementation of this project and the license was granted to use this tool in Iran. Prior to the research, the content validity of this scale in Iran was evaluated by 11 experts (faculty of psychology and education of Shahid Beheshti University). Generally, these people considered this scale an appropriate tool to assess the quality of life situation in children (11).

The exercises were performed in one of the clinic rooms that was a quiet place. In this project, six treatment sessions were held. The subject of each session was briefly summarized in table 1. In order to test the hypotheses, multivariate distribution analysis was used.

## Findings:

You can see the results of analyzing the inferential data in Tables 2, 3, 4 and 5: The distribution of average and standard deviations of variables in the post test of Table 2 and the results of the analysis of covariance in Table 3 shows that by applying mental image and massage therapy program for the test group, the effect of the group is significant at the level of p <0001/00, and cognitive interventions in this research has been reported in reducing the intensity of pain, the level of disturbance has been effective. The results of Pearson correlation show that there is a significant positive correlation between the reported intensity of pain and the level of disturbance in the significance level of P <0.0001. Table 5 shows that there is no significant difference between the male and female subjects in the reported pain intensity variables, the level of distress in the pre-test, (39= the degree of freedom, the two domains test).

## Discussion:

The purpose of this study was to investigate the effectiveness of cognitive interventions

in the path deviation of child attention and the preparation of the child and the parent, on the severity of pain reported, the degree of disturbance caused by IT / LP and children with cancer, and also the relationship between variables of pain intensity reported and the level of disturbance. The simultaneous use of both drug and non-pharmaceutical (massage and imaging) strategies is known from the general principles of pain management in children. The results of the present study are consistent with the results of the research on the decrease of pain. According to cognitive theory, limited noticeable capacity, attention capacity is limited. If a task carries out all the resources of the individual, the annoying and harmful stimulant will not be perceived. Prediction of cognitive theory of limited attention capacity. In the field of diversion, path deviation of attention as a pain management technique is that stimulants that involve more attention capacity give less attention to resources that devote to pain experience (12).

It can be argued that cognitive interventions prevent painful stimulant perception by attracting attention resources and individual attention capacity. As a result, cognitive interventions can reduce the pain. On the other hand, it can be pointed out that attention is the primary mechanism through which the painful stimulus reaches the level of consciousness (13).

It seems that the cognitive strategies through which one's attention is deviated from vulnerable and threatening situations can avoid by distracting the individual's attention towards a neutral or pleasant stimulant, from reaching the painful stimulus to the level of the awareness and emergence of threatening thoughts that cause disturbance (14).

Mann et al (15) used Foot Footac study as an attention path deviation strategy. The results of their research showed that the use of this strategy significantly reduced the use of physical inhibition, as compared to other interventions such as parent engagement, positive reinforcement (cartoon character stickers) and preparation therapist but the report did not show significant decrease of pain in the children.

The explanation was that Foot Footac was not as likely as strong as other attention path modifiers in other studies (for example, watching movies or cartoons). In the use of cartoon as attention path deviation strategy, child’s attention is diverted through the two auditory and visual channels of the painful stimulant.

For this reason, it can more effectively reduce the severity of pain caused by painful actions. It is widely believed that pain has a deep impact on the quality of life of a person (16). Most studies have shown that there is a reverse relationship between pain and quality of life. As one increases, another decreases. It has been shown that effective pain relief treatments improve the quality of life through pain relief. In not annoying and emotional distress and pain, they share psychological-biological systems (17). Generally, the more children emotionally, more dissolate and more distracted, the pain will be more severe or more unpleasant (18). In adult studies, it was reported more and sever recurrent pain against stimulant presented in women in compared to men. This finding is less consistent with children (19).

One of the minor findings of the present study confirmed these results. There was no difference in the severity of reported pain due to painful actions among boys and girls. Another result of the present study was that there was not a significant relationship between the child and parent report on the quality of life of the child. In a series of studies, differences in the parent's report against the child's report of child function were recorded in children and adolescents with cancer (20).

Parents are based on observing and talking to the child; the children's report may be based on internal and mental experiences which cannot expect parents to have access to them. These different perceptions are not incredible, and parenting and child reports can be considered as information resources of different but interrelated values (21).

The results of the present study supported the effectiveness of cognitive interventions in reducing the severity of pain, the distress levels of children with cancer that were painfully sampled or injected into the cerebrospinal fluid. Therefore, considering the results of this research and other researches in this area, in painful strategies such as sampling of cerebrospinal fluid can be used to reduce the pain intensity and distress in children with cancer. Regarding the effectiveness of the interventions provided in the reduction of acute pain, it is possible by arrangements and adjustments to reduce the pain and distress of children with other acute or chronic diseases of medicine and dentistry, for which painful diagnostic and therapeutic measures are made. The strategies used in this project are also used. Given the fact that prevention is better than treatment, hospital-based child psychiatry and psychology centers can help the children by providing the simple and the economical interventions of the type in the medical painful measures and present more actively in these situations. Have a more active presence and thus prevent the harmful effects of pain and disturbance on painful actions of the child. One of the limitations of this project was the presence of interventional factors such as the dimensions of the injection room, the number of people in the room, how personnel to behave with the child in the two treatment centers of the site. The control of these factors was beyond the control of the researcher. Considering the effectiveness of the strategy of diversions of attention paths and this subject that in some hospitals, a room where sampling of cerebrospinal fluid is performed, or in general, any type of injection, in terms of dimensions, coloring, decorating is not suitable for the children, and it may create fears in them. It can be done better and more beautifully in the room space by sticking posters, childish images or hanging dolls from the ceiling of the room in general and Together with it, with more specific methods such as music and cartoons to distracted the child's senses and help reduction of the pain and distress of the child.

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## Tables:

**Table 1**: Summary of treatment sessions for children with leukemia

| Sessions | 6 Sessions of Workouts |
|---|---|
| **The first session** | Patients completed anger scale to be collected for pre-test data With the help of their parents. Patients were asked to stay in bed in comfortable condition. The hands were warmed and then the patient's legs, from the fingertips to the knees were massaged for 20 minutes i.e each leg, 10 minutes. During massage of foot, the therapist asked the patients to imagine and visualize the river's sound, along with the smell of wild flowers, and then describe what they hear and smell. During the session, the method of work was also taught to the patients' companions to repeat the exercises with the patients 20 minutes per day. The control group also completed the anger scale in the first session. |
| **The second Session** | Hand massage was used at the same time, massaging the leg. The method was to put the palms on the two eyes and visualize the quiet colors of the blue or red. |
| **The Third Session** | At the same time, massaging the leg, the sick children were asked to imagine themselves in a grasshopper, as they were running happily to each side in the direction of the wind. From patients, questions such as "at what time of day are there?"Asked. |
| **The fourth Session** | At the same time, massaging the leg, the children were asked to imagine themselves at the beach and playing with the roaring waves of the sea and to describe their feelings. |
| **The Fifth Session** | The simonant method was used simultaneously with massaging the leg. In this way, the sick children were asked to imagine and visualize the loved and heroic cartoon character, in which the hero destroys cancer cells in her body. |
| **The Sixth Session** | At the same time, massaging the leg, the sick children were asked to imagine themselves along with their family or friends on the foothill, while they were healthy and happy and no longer sick. At the end of this session, again for the collection of post-test data, anger scale was completed by the test group. The control group also completed anger scale at the end of the session too. |

**Table 2**: Distribution and standard deviation of variables of pain, distress

| | Control Group | Test Group |
|---|---|---|
| Variables | Average (Standard Deviation) | Average(Standard Deviation) |
| Intensity of Pain | (2.401)4.42 BVC | (2.228)2.10 |
| Level of Distress | (2.186)9.84 | (2.101)7.76 |

**Table 3**: Covariance results of variables of pain severity, distress

| Indicator / Effect of Group on Variables | Total Squares | Degree of Freedom | Average of Squares | F | Significant Level |
|---|---|---|---|---|---|
| Intensity of Pain | 89.211 | 1 | 90.122 | 30.516 | 0.001 |
| Level of Distress | 64.889 | 1 | 63.111 | 29.601 | 0.001 |

**Table 4**: Summary of correlation coefficients among the variables studied in the pre-test

| Variable / Indicator | Correlation Coefficients | Significant Level |
|---|---|---|
| Intensity of pain reported and level of distress | 0.652 | 0.001 |

**Table 5**: Results of t test to compare the differences of averages of scores of pain intensity, distress according to pre-test scores

| Indicator / Variables | Average (Standard Deviation) | | Difference of Average | T Statistics | Significant Level |
|---|---|---|---|---|---|
| | Girl | Boy | | | |
| Intensity of Pain Reported | (2.154)3.72 | (2.221)3.91 | 0.81 | 0.902 | 0.433 |
| Level of Distress | (2.001)9.46 | (2.531)9.73 | 0.361 | 0.499 | 0.601 |