

# [Effect of tailor made technique nursing essay](https://assignbuster.com/effect-of-tailor-made-technique-nursing-essay/)

Children are members of families, communities, populations and overall society, which shape the context, experiences, and opportunities of their lives. Thus, their wellbeing is inextricably linked to the well-being of their families, communities and the society in which they live.

Hospitalization of children is for acute or chronic conditions. Many factors contribute to the distress of young children during hospitalization, and existing fears and emotions may be intensified with prolonged hospitalization. Children become anxious and normal fears are exacerbated when they think about being in pain, harmed, or mutilated in some way or being separated from parents (Nicki and Barbara, 2007). Cannulation causes moderate or severe pain and fear in a substantial number of children and adults.

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage (Merskey and Bogduk, 1994). Pain relief is a human right, yet pain in children is an under-recognized problem around the world. Children not only have pain from injuries, surgery, burns, infections, and the effects of war, terrorism, and violence, but also undergo pain from many procedures and investigations used by doctors and nurses to investigate and treat disease.

Fear can be explained as a state of dread, apprehension or trepidation related to the future. Fear is a major stressor among hospitalized children. According to children, insertion of needle is one of the most fearful experiences. For many people, the needle can only be a source of fear to the extent that a needle is a necessary part of the procedure that initiates a terrifying involuntary reaction of one's body. For some the fear may extend up to needle phobia, who has thought about the nature and origin of their condition, they actually have no fear of needles at all, but may have an extreme fear of suffering the physical effects of a needle phobia reaction.

Thus, these problems of a hospitalized child can be alleviated by the nurse who is directly responsible for their protection and guidance. Nurses are at high risk for liability with regard to the under treatment of pain and fear. Of all the members of the health care team, nurses spend most of the time with patients and are recognized as the patient's primary pain managers. The nurse is concerned not only with providing nursing interventions to children, but also with obtaining cooperation of children to the procedures to them. This is possible for a nurse with the skill in wide variety of interventions such as therapeutic play and the use of the arts and humanities as music, drama, television etc.

Some institutions have procedures for minimizing the predictable pain and fear of cannulation, especially in children. Current advances are being made to control pain by integrating both the science of pain medications and the science of the human mind. According to Brunner and Suddharth (2004), distraction is thought to reduce the perception of pain by stimulating the descending control system, resulting in fewer painful stimuli being transmitted to brain. Distraction techniques may range from simple activities, such as watching TV or listening to music, to highly complex physical and mental exercises.

Topical analgesics have been one important tool in reducing and preventing pain during minor procedures. As elicited by Potter and Perry (2005), the anesthetic cream which is thickly applied is placed on the skin 15 minutes before local anesthetic infiltration or minor procedures, e. g., IV start. The Lidocaine patch is a topical analgesic effective in cutaneous pain. Three patches are placed on and around the pain site using a 12-hour on, 12-hour off schedule to avoid Lidocaine toxicity.

According to Sr. Nancy (2005), hot applications can be dry heat applications or moist heat applications which may be applied either locally or generally. Hot applications have many local physiological effects on the body. One among the many local physiological effects of hot application is vasodilatation. Dilatation of vein aids in reducing the number of phlebotomy attempts. Also, the chief therapeutic use of local hot application is that it decreases pain due to ischemia, local congestion and muscle spasm.

Injections of any kind can hurt! Children know this pain is predictable. How they respond to an injection depends in part of their developmental age and their previous experience. Intravenous and intramuscular injections should be given in such a manner that the children do not have time to build up their anxiety about the procedure. Tailor-made means, it has been specially designed for a particular purpose. Thus the researcher uses tailor-made technique for preschool and school-aged children who enjoy active play, during the injection the nurse can suggest distraction activities along with local analgesics agent and hot application.

## NEED FOR THE STUDY

The leading health indicators, the 'healthy people 2010' provides a framework for identifying essential components of child health promotion programs, designed to prevent future health problems in our nation's children (Department of health and human service, 2007). The present total population of children in the world is 2. 2 billion where in India, 13. 1 percent of the population that is 15, 87, 89, 287 are children (Census, 2011).

The Paediatric ward of Sri Ramakrishna hospital receives an average of 1414 admissions per year. Almost all of them ought to have venipuncture since it is an integral part of performing diagnostic procedures and administering therapy during a patient's hospitalization. Each hospitalized child has to undergo at least a single venipuncture within every three days of hospital life. Thus, attention in relieving such pain and fear is a must.

Pain is the primary complaint for which people seek medical treatments. Sr. Callista Roy (1991), defined pain within the psychological mode, as a sensory experience of acute and chronic nature, coded into the somatosensory pain pathways. Acute pain, according to Sr Callista Roy, refers to " Discomfort which is intense but relatively short and reversible". Using principles from neuropsychology; Roy stated that a sensory experience such as pain involves the transmission of information from sensory pathways to the cerebral cortex.

The theoretical explanation for the effectiveness of distraction lies in its ability to divert attention away from the painful stimulus. McCaul and Malott (1984) hypothesize that the brain has a limited capacity to focus attention on stimuli. Therefore, using up attentional resources while engaging in a distracting task leaves little capacity for attending to painful stimuli. The Gate Control Theory of Pain proposed by Melzack and Wall (1965, 1995) offers a physiological explanation of the effectiveness of attention diversion. In brief, the Gate Control Theory explains that pain perception can be affected by factors other than the stimulus itself. This theory suggests that pain perception is controlled by a neural mechanism or " gate" in the spinal cord. Depending on how the mechanism is activated, the gate can be opened or closed. When the gate is open, 8 pain signals are transmitted to the brain, and when the gate is closed, they are not. Melzack originally proposed this theory to explain why physically stimulating an area can lead to reduced pain perception, but later modified his theory to suggest that cognitive factors can also open or close the gate. Cognitive and behavioral processes, such as distraction, Lamaze, and self hypnosis, cartoons can close the gate to subsequent pain perception by diverting attention away from the painful stimulus and toward focal points.

Neglected pain erodes a patient's trust in the health care system. In 1995, the American pain society challenged all health care systems to make pain as the fifth vital sign. James Campbell, the society's President noted that, " if pain were assessed with the same zeal as other vital signs, there would be a much better chance of its being treated properly . Failure to appropriately assess and treat pain is a liability issue for facilities and members of the health care team .

Pain is always a source of anxiety, as well as a constant companion. Furthermore about 10% of adults in the United States have " needle phobia", as intense fear of needle that triggers immediate anxiety in the most severe cases, vasovagal response can lead to shock. The phobia may intensify for most people with the minimal pain of venipuncture. The fear usually begins in childhood and it may lead to avoidance of medical care.

According to Journal of Anxiety Disorders (2006), the tendency to experience pain, disgust, and fear of fainting during injections was associated with anxious responding to the venipuncture and a probable diagnosis of needle phobia. A local anesthetic, Lidocaine blocks the conduction of pain impulses and stabilizes the neuronal membranes, thereby relieving pain. The drug penetrates the skin to act locally on the damaged or dysfunctional nerves and soft tissues, underlying the site. The benefit of local mechanism of action is that, with appropriate use, there is minimal systemic absorption of Lidocaine and adverse effects such as central nervous system depression or excitation are averted . Local absorption, also results in fewer drug interactions , an important consideration , because many people with chronic pain requires opioids, nonopioids or adjuvant analgesics.

A study was conducted by C V Bellieni et al., in 2006 conducted to the children, the results of is reported in the November 28 issue of the Archives of Disease in Childhood. In this study, 69 children aged 7 to 12 years undergoing medical procedure were randomized to receive no distraction procedure (controls), active distraction by their mother, or passive distraction by a television cartoon. Both the mothers' and children's rating scores suggested that procedures performed during television watching were perceived as being less painful than procedures performed during active or no distraction.

Many studies have tested the effectiveness of Eutectic Mixture of Local Analgesics (EMLA) and Lidocaine gel . Since the application of Lidocaine is one quarter the cost of EMLA cream, significant saving can be obtained if it is proven to be effective as a topical anesthetic agent. It was seen in earlier studies that, IV cannulation was easier with Lidocaine gel as compared to EMLA cream.

A randomized, double-blinded, placebo-controlled study by J. B. Rose et al., (2002) of Lidocaine Iontophoresis for Paediatric venipuncture among 59 children aged 6-17 years suggested that lidocaine iontophoresis is safe in children, reduces discomfort associated with venipuncture, and increases satisfaction when compared with the placebo.

Hot applications promote vasodilation. A study was conducted on effect of EMLA Cream and Application of Heat to Facilitate Peripheral Venous Cannulation in Children' by Lori Huff et al., (2009). There was a significant increase in vein visualization from pre-application of heat to post application of heat with a success rate of 80% with the first time attempt of IV insertion. Therefore, application of heat counteracts the adverse effect of vasoconstriction that occurs with EMLA cream application, potentially increasing peripheral venous cannulation success rates.

The Joint Commission on Accreditation of Healthcare Organizations (JCAHO, 2003) has approved revised standards for pain assessment and management in hospital ambulatory and home care settings . The American pain Society's Quality improvement recommendation provides excellent foundations for meeting JCAHO's expectations which includes recognizing and treating pain properly and promising patients attentive analgesic care.

On the investigator's personal experience, it is observed that children are having increased pain and fear during needle-related procedures performing in Paediatric ward. This motivated the researcher to conduct a study to make venipuncture a total painless procedure. Hence Tailor-made technique was selected for the research.

## 1. 2 STATEMENT OF THE PROBLEM

EFFECT OF TAILOR-MADE TECHNIQUE ON PAIN PERCEPTION AND FEAR AMONG CHILDREN UNDERGOING VENIPUNCTURE AT SRI RAMAKRISHNA HOSPITAL, COIMBATORE.

## 1. 3. OBJECTIVES

To administer Tailor-made technique among children before venipuncture.

To assess the pain perception among children after administering Tailor-made technique in experimental and control group.

To assess the fear among children after administering Tailor-made technique in experimental and control group.

## 1. 4. OPERATIONAL DEFINITION

## 1. 4. 1. Effect

Effect refers to the change in the level of pain perception and fear during venipuncture among children after Tailor-made technique.

## 1. 4. 2. Tailor-made Technique

Tailor-made technique refers to the combination of three interventions, such as exposure of the child to cartoon animations, application of 2 % Xylocaine gel for 10 to 15 minutes and application of local heat for 2 minutes over the planned site, before venipuncture.

## 1. 4. 3. Pain Perception

Pain perception means the level of pain experienced by a child during venipuncture, expressed in terms of behavioral responses in face, legs, activity, cry and consolability.

## 1. 4. 4. Fear

Fear is an unpleasant feeling due to frightened situation during venipuncture among children expressed as responses in face.

## 1. 4. 5. Children

Children refer to those who are between the age group of 4-12 years, who need to undergo venipuncture at the Paediatric ward of Sri Ramakrishna hospital.

## 1. 4. 6. Venipuncture

Venipuncture is a needle-related procedure, in which a vein is punctured for medication administration, fluid infusion or blood sampling among children between 4 to 12 years of age at Sri Ramakrishna hospital.

## 1. 5. CONCEPTUAL FRAME WORK

## Modified Weidenbach's Helping Art of Clinical Nursing Theory

Modified Weidenbach's Helping Art of Clinical Nursing Theory (1964) was adopted for developing conceptual framework. The theory views nursing as an act, based on goal oriented care and closely parallels the assessment, implementation and evaluation steps of nursing process. This theory is composed of three basic elements:

Identification.

Ministration.

Validation.

## 1. 5. 1. Identification.

It involves individualization of the patient, his experiences and recognition of the patient's perception of his condition. The researcher identifies the children who need to undergo venipuncture from the medical records, collects the demographic data and then plans for Tailor-made technique.

## 1. 5. 2. Ministration.

It is providing the needed help. It requires the identification of the need-for-help, the selection of a helping measure appropriate to the need, and the acceptability of the help to the patient. In this study, the researcher administers the Tailor-made technique before venipuncture to the experimental group, whereas no intervention is given to the control group.

## 1. 5. 3. Validation.

It is the evidence that the patient's functional ability was restored as a result of the help given. In post test, the researcher assesses the level of pain and fear after the administration of Tailor-made technique and compares the effect of Tailor-made technique on pain perception and fear during venipuncture in experimental group with the level of pain perception and fear during venipuncture without Tailor-made technique in control group.

## 1. 6. PROJECTED OUTCOME

Application of Tailor-made technique reduces the pain perception and fear among children undergoing venipuncture.

## Review of literature

Literature review refers to the activities involved in identifying or searching for information on the topic (Polit and Hungler, 1999). Literature review is an essential component to the researcher for the greater understanding of the research problem and its aspects. It provides the researcher with an opportunity to evaluate many different approaches to the problem. Thus the literature review has organised and presented under three headings.

## 2. 1. Literature related to pain and fear during venipuncture.

Cavender et al., (2004) done a study to determine the effectiveness of parental positioning and distraction on the pain, fear, and distress of pediatric patients undergoing venipuncture. An experimental-comparison group design was used to evaluate 43 patients (20 experimental and 23 comparisons) who were 4 to 11 years old. Experimental participants used parental positioning and distraction. All participants rated their pain and fear; parents and child life specialists (CLS) rated the child's fear, and CLS rated the child's distress. Self-reported pain and fear were highly correlated (p < . 001) but not significantly different between the two groups. Fear rated by CLS (p < . 001) and parents (p = . 003) was significantly lower in experimental participants. Although no difference was found in distress between the two groups, a significant time trend was discovered (p < . 001). The parental positioning-distraction intervention has the potential to enhance positive clinical outcomes with a primary benefit of decreased fear.

Anil Agarwal et al., (2005) conducted a study to evaluate the efficacy of the valsalva maneuver on pain during venous cannulation among children. In this study 75 samples were randomly assigned to 3 groups respectively. Group I was control group without intervention, group II was instructed to blow into a sphygmomanometer tubing and raise the mercury column up to 30 mm of Hg for 20 seconds and group III was instructed to press a rubber ball. After 20 seconds peripheral venous cannulation was performed. Venous cannulation pain was graded by a 4 point scale. Results showed a significant reduction in the incidence of pain in group II (72 %), whereas other two groups experienced 100 % pain. Researcher concluded that, the valsalva maneuver performed at the time of venous cannulation greatly decreases venipuncture pain.

Gupta et al., (2005) carried out a prospective, randomized controlled study to evaluate the efficacy of balloon inflation on venous cannulation pain among children by Devendra. The study was conducted among 75 children aged 6-12 years who were randomly divided into three equal groups. Group I was control group with no intervention, group II was provided with distraction like pressing a ball and group III with balloon inflation. Visual analogue scale was used to assess the venipuncture pain and there was a significant reduction observed in group II and group III, when compared with group I. Visual analogue score in group III was decreased when compared with group II (p < 0. 05). The incidence of pain during venipuncture in group I and in group II was 100 % and which was reduced to 56 % in group III (p = < 0. 05). The study concluded that, inflation of balloon during venipuncture reduced both the incidence and severity of venipuncture pain among children.

Farion et al., (2006) conducted a randomized control study to determine the effect of vapocoolant spray on pain during intravenous cannulation by among 80 children between 6-12 years. The children received either vapocoolant spray or placebo before cannulation. Children rated their pain using a 100-mm colour visual analogue scale. Parents (p = 0. 04), nurses (p = 0. 01) and child life specialists (p < 0. 01) considered the children's pain to be reduced with the use of vapocoolant spray. Thus vapocoolant spray quickly and effectively reduces pain due to intravenous cannulation in children and improved the success rate of cannulation.

Movahedi et al., (2006) conducted a study to examine the effect of local refrigeration prior to venipuncture on pain related responses among school age children. 80 children aged 6-12 years were selected by purposive sampling. In experimental group the injection site was refrigerated for three minutes using an ice bag before venipuncture and in control group venipuncture was performed according to routine procedure. Physiological responses, behavioral responses, and subjective responses were assessed in both groups. Results showed no significant difference between two groups for physiological responses, whereas behavioral responses (p = 0. 0011) and subjective responses (p = 0. 0097) showed that, the test group had lower score in behavioral and subjective responses compared to the control group. The researcher concluded that the use of local refrigeration prior to venipuncture can be considered as an easy and effective intervention for reducing pain related to venipuncture.

Kennedy et al., (2008) reported in an article that pain during venipuncture and intravenous cannulation is an important source of paediatric pain and has a lasting impact. Older children have reported greater pain during follow-up and cancer-related procedures, if the pain of the initial procedure was poorly controlled. Fortunately, both pharmacologic and non pharmacologic techniques have been found to reduce children's acute pain and distress and subsequent negative behaviours during venipuncture. This review gives the evidence for the importance of managing paediatric procedural pain and methods for reducing venous access pain.

Nilsson et al., (2008) evaluated the concurrent and construct validity and the interrater reliability of the Face, Legs, Activity, Cry and Consolability (FLACC) scale during procedural pain among 80 children of 5-16 years age. Children scheduled for peripheral venous cannulation of a venous port were included in this study. In 40 cases, two nurses simultaneously and independently assessed pain by using the FLACC scale and in 40 cases one of these nurses assessed the child. All children scored the intensity of pain by using the Coloured Analogue Scale (CAS) and distress by the Facial Affective Scale (FAS). Concurrent validity was supported by the correlation between FLACC scores and the children's self-reported CAS scores during the procedure (r = 0. 59, P < 0. 05). A weaker correlation was found between the FLACC scores and children's self-reported FAS (r = 0. 35, P < 0. 05). Construct validity was demonstrated by the increase in median FLACC score to 1 during the procedure compared with 0 before and after the procedure (P < 0. 001). Interrater reliability during the procedure was supported by adequate kappa statistics for all items and for the total FLACC scores (kappa = 0. 85, P < 0. 001). The findings of this study support the use of FLACC as a valid and reliable tool for assessing procedural pain in children aged 5-16 years.

Hess and Hall (2009) conducted a prospective study to evaluate the effect of a near-infrared light vein viewing device on the success rate of venipuncture performed by staff nurses on a paediatric surgical unit. The number of attempts, age of the patient, and time required to establish successful vascular access were recorded for 91 children and this data was compared to baseline data (n= 150) previously collected on the same unit prior to the implementation of the device. The first attempt success rate for the control group was 49. 3%, and for the experimental group 80. 2% (p <. 001). The mean number of attempts per patient decreased from 1. 97 in the control group to 1. 29 in the experimental group (p <. 001). Comparison of procedure times revealed that 52. 8% of procedures were completed in less than 15 minutes in the control group, whereas 86. 7% were completed in less than 15 minutes for the experimental group (p < . 001). Thus use of a biomedical vein viewing device significantly improved first-attempt venipuncture success rate, decreased the number of attempts per patient, and decreased procedure time for the study population.

Harrison et al., (2011) conducted a randomized controlled study to assess the efficacy of sweet tasting solutions or substances for reducing needle-related procedural pain in children beyond one year of age. A sweet tasting solution or substance was given to 330 children between 1 to 16 years of age randomly in experimental group. Control conditions included water, non-sweet tasting substances, pacifier, distraction, no treatment, positioning or breastfeeding. Results for the toddlers or pre-school children show that in the sucrose group in one study had significantly lower cry duration and behavioral pain scores, compared with the no intervention group, while crying time did not differ between the sucrose and the no intervention group in the other study. For school-aged children, chewing sweet gum either before, or during the procedure, did not significantly reduce pain scores.

## 2. 2 Literature related to distraction strategy, local anesthetics and local heat.

Halperin et al., (1989) conducted a double-blind, placebo-controlled study was conducted by to evaluate the effect of topical skin anesthesia (EMLA, " eutectic mixture of prilocaine and lidocaine")  for venous, subcutaneous drug reservoir and lumbar punctures in children. Venipunctures were performed on 18 children (6. 1 to 12. 2 years of age) equally divided in the study and control groups. . Pain intensity was scored by the children themselves, using a visual analogue scale. EMLA cream was associated with lesser pain scores than those with placebo (means +/- SD: 2. 8 +/- 2. 4 versus 6. 8 +/- 2. 1, P less than . 01). A crossover trial was used in the studies of subcutaneous drug reservoir and lumbar punctures, eight children (6. 1 to 15. 1 years of age) were tested for subcutaneous drug reservoir punctures. Pain induced by this procedure was rated at 3. 9 +/- 2. 2 with placebo compared with 1. 2 +/- 1. 8 with EMLA cream (P < 04). In lumbar punctures (14 children, 5. 5 to 15. 3 years of age), EMLA cream was found with less pain (1. 9 +/- 1. 9) than with placebo (5. 6 +/- 3. 0, P less than . 01). So it was concluded that the use of EMLA cream substantially reduces pain caused by venous, subcutaneous drug reservoir, and lumbar punctures in children.

Peretz et al., (2002) conducted a random crossover study to assess children's reactions while receiving a warmed local anesthetic solution for dental procedures (37o C; W) and to compare with one at room temperature (21o C; RT). 44 children between the ages of 6 to 11 years were randomly assigned to receive either a W or a RT local anesthesia on the first visit and the alternate local anesthesia on the second visit. The modified Behavioral Pain Scale (BPS) was used during the injection. For subjective evaluation, the Wong-Baker FACES Pain Rating Scale (FPS) was used. Using the FPS, 19 boys ranked the experience of local anesthesia as a positive experience , 4 boys and all 21 girls ranked it as negative for both types (W and RT). No significant difference was found in the mean VAS scores between the room-temperature group and the warm group (23. 4 +/- 21. 8 and 20. 8 +/- 18. 9, respectively). Thus there is no advantage to warming local anesthetic solution prior to injection.

Biswas, D. (2005) conducted a study on effectiveness of four modalities (hot fomentation, glycerine Magnesium Sulphate application, and Ichthamol Magnesium Sulphate and Ichthamol Belladonna) of nursing interventions on phlebitis pain was evaluated. Ichthamol Belladonna along with hot fomentation was effective in reducing pain, erythema, swelling, induration, palpable venous cord at 0. 01 as compared to Ichthamol Belladonna dressing, glycerine Magnesium Sulphate dressing and glycerine Magnesium dressing with hot fomentation. Tools included the demographic data to know the sample characteristics, phlebitis measurement chart, observation check list and visual analogue scale. The pre test mean pain score related to peripheral IV infiltration were 61. 23 and post test mean pain scores were 13. 27 in treatment with Ichthamol Belladonna dressing with fomentation which was found to be the most effective out of all the 4 interventions. Thus the study concluded that Ichthamol Belladonna dressing with fomentation was effective.

Vangoli et al., (2005) conducted a study to investigate the presence of clown doctors on a child's preoperative anxiety during the induction of anaesthesia and on the parent who accompanies them until he/she is asleep. There were 40 samples of 5-12 years of age who were assigned randomly to the clown group in which the children were accompanied in the preoperative room with the clown doctors and a parent and to the control group in which the children were accompanied by only 1 of his/her parents. The anxiety of the children in the preoperative period was measured through the Modified Yale Preoperative Anxiety Scale instrument and the anxiety of the parents was measured using State-Trait Anxiety Inventory. Also, a questionnaire was developed for health professionals to obtain their opinion about the presence of clowns and a self-evaluation form was developed to be filled out by the clowns themselves about their interactions with the child. This study shows that the presence of clowns during the induction of anaesthesia with the child's parents was an effective intervention for managing children's and parents' anxiety during the preoperative period.

Anjum. S (2007) conducted a study on hot fomentation versus cold compress, to reveal that the pre-treatment mean score of degree of infiltration was 7. 1667 and it was decreased to 0. 7071 on the third day of treatment with hot fomentation. In cold compress group, pre-treatment mean score of degree of infiltration was reduced from 6. 9333 to 0. 7571 on the third day of cold compress treatment. The intensity of pain was reduced from severe [56. 66%] to no pain [93. 4%] in hot fomentation group. In cold compress group, the intensity of pain was reduced from moderate [60. 0%] to no pain [86. 6%]. The mean score of hot fomentation group was 6. 5067 in reducing the degree of infiltration while cold compress the mean score was 6. 6. The study concluded that hot fomentation better than that of cold compress.

Lee (2008) done a randomized cross-over study to determine the effect of heat and duration of stretching on the extensibility of hamstring muscles and their electromyographic responses to passive stretch in children with hypertonia and severe mental retardation. There were 29 participants with ages from 4 to 13 years who randomly received 4 treatment sessions as (A)10-second stretching, (B)30-second stretching, (C) hot pack followed by 10-second stretching, and (D) hot pack followed by 30-second stretching each consisting of 5 repetitions of stretching and successive treatments were separated by at least 24 hours. The distance between greater trochanter and lateral malleolus and hamstring electromyographic (EMG) activity during passive knee extension stretching were measured. Two-way ANOVA showed a larger increase in hamstring extensibility in conditions C and D (1. 3 +/- 1. 1 cm) than conditions A and B (0. 7 +/- 0. 9 cm) (P <0. 001). For the EMG recordings, conditions B and D (-25. 1 +/- 58. 4 microV) had greater decrease than conditions A and C (-3. 5 +/- 36. 6 microV) (P= 0. 039). Thus the researcher concluded that heat application to the hamstrings before stretching could result in greater increase in extensibility than stretching alone in children with hypertonia and severe mental retardation.

Warming local anesthetics has been proposed as a cost-free intervention that reduces injection pain. Hogan et al., (2011) conducted a study to determine the effectiveness of warming local anesthetics to reduce pain in adults and children undergoing local anesthetic infiltration into intradermal or subcutaneous tissue. 29 studies were retrieved for close examination and 19 studies met inclusion criteria. A total of 18 studies with 831 patients were included in a meta-analysis. 17 studies had