



**Integration of Complementary and  
Alternative Therapy into Pediatric Pain  
Management**

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**Conflicts of Interest  
Disclosure**

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**The speakers have no conflicts of  
interest to declare**

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**Objectives**

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- Describe the use of complementary and alternative medicine (CAM) or integrative medicine in children with pain
- Discuss the mechanisms of action, efficacy, methods of delivery and safety of selected integrative therapies
- Selected therapies: aromatherapy, acupressure, mind-body skills and massage therapy.

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**What's it Called?**

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- Alternative : instead of
- Complementary: in addition to
- Integrative: blending of best methods




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**Use of Complementary and Alternative Medicine in Pediatric Pain Management**

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- Use of CAM in the pediatric population is widespread
- Survey studies have indicated use ranging from
- Use tends to increase in children with chronic illness




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**Use of CAM in Pediatrics**

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- Spiegelblatt, The use of alternative medicine by children (1994) *Pediatrics*
- Ernst 1999, Review of studies indicated that use of CAM ranged from 9-73% and increased with chronic conditions
- Studies on multiple populations have concluded 11-45% use in well populations, with adolescents tending to have higher use




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★ **Use of CAM with Children with Cancer** ★

- Many studies indicate higher use of CAM over well children
- In US ranges from 46-84%
- More likely to used if prognosis poor
- Frequently cited are prayer, massage, nutritional supplements
- Variation between cultural and ethnic groups as well as geography


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★ **Use of CAM in Sickle Cell Disease** ★

- Sibinga E et al 2006
- 54% used CAM
- 42% bioenergetic (prayer, energy healing)
- 28% lifestyle, mind/body( relaxation techniques, exercise, imagery, diet
- 12% biochemical (herbs, megavitamins, folk remedies)
- 5% massage




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★ **Clinical Aromatherapy** ★




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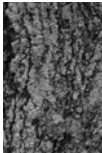

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**Aromatherapy**

- **Medical or Clinical Aromatherapy:** use of essential oils for therapeutic purposes
- **Essential oils:** aromatic compounds extracted from plants
- **Source:** leaves, flowers, roots, seeds, branches, needles, fruits, resins, bark

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**Essential Oils**

- Plant products are grown world-wide
- Chemical profiles are affected by climate, soil and yearly growing conditions
- Some plants with different properties have similar names, e.g true lavender (*Lavendula angustifolia*) and spike lavender (*Lavendula spica*)

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**External or Topical Application**

- **Massage:** add essential oil to massage oil/lotion, 0.5-5% solution
- **Compress/wound dressings:** Mix essential oil in warm or cold water, wet compress material (such as gauze) and apply. Wrap with plastic wrap if using warm compress
- **Bath water:** 5-8 drops mixed with carrier such as shampoo, milk, or alcohol.

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**Method of Action - Topical**

- Direct action at site
- Systemic effect via absorption into blood stream
- Skin condition effects absorption
- Recommended dilution for infants/young children is 0.5-1 %
- Recommended dilution for older children/teens is 2-5%


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**Essential Oil Dilution Chart**

Drops of Essential Oil	Amount of carrier (oil or lotion)	% Solution
1 drop	5 ml	1%
2 drops	5 ml	2%
3 drops	5 ml	3%
4 drops	5 ml	4%
5 drops	5 ml	5%
1 drop	10 ml	0.5%
1 drop	20 ml	0.25%




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**Inhalation**

- **Moist:** Facial steam bath, 2-4 drops of essential oil in steaming but not boiling water, cover face with towel and inhale for 5 minutes
- **Simple diffusion methods:** 2-3 drops of essential oil on a cotton ball or tissue
- **Spray bottle:** essential oil in water or water and alcohol, shake and spray
- **Diffusers:** flame, electric diffuser, lamp ring, air diffusion


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**\*Method of Action – Inhalation  
Pharmacological\***

- Essential oil has a direct and intrinsic ability to interact with the ANS/CNS and/or endocrine system
- Enters the bloodstream via nasal or lung mucosa or diffuses directly into the olfactory nerves and limbic system
- The composition of the essential oil would reflect different responses
- Scientific study has been mixed




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**\*Method of Action – Inhalation  
Psychological\***

- Essential oils (and any odor) exert effects via emotional learning, conscious perception and belief/expectation.
- Responses are learned through association with emotional experience
- Olfactory nerves have close connection to the limbic system (emotion, memory)
- Many studies on associative learning and belief and expectation




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**\*Oral\***

- Used by this route more frequently in Europe
- Recommended that only be done by medical herbalists or Health Care Practitioners with prescriptive authority
- Should have training in clinical aromatherapy
- Peppermint – common OTC for abdominal pain




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**Aromatherapy and Pain management**

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- **Pain reduction**
  - Muscular pain
  - Headaches
- **Control of Other Symptoms**
  - Nausea
  - Stress /anxiety
  - Fatigue
  - insomnia


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**Six Essential Oils**

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	Pain	Nausea	Insomnia	Anxiety	Fatigue
<b>Lemon</b> <i>Citrus limon</i>		X			X
<b>Orange</b> <i>Citrus sinensis</i>			X	X	
<b>Rosemary</b> <i>Rosemarinus officinalis</i>	X				X
<b>Lavender</b> <i>Lavandula angustifolia</i>	X		X	X	
<b>Peppermint</b> <i>Mentha piperita</i>	X	X			X
<b>Spearmint</b> <i>Mentha spicata</i>		X			




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**Pain**

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- **Rosemary:**
  - Warming
  - Massage
  - Rub on the skin
- **Peppermint:**
  - Cooling
  - Compress
- **Lavender : Neutral**
- **Pair with calming oils**
  - Apply at acupuncture or muscle trigger points for headache


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**Nausea**

- Spearmint
- Peppermint (not recommended for children under 7 in some texts)
- Lemon

- Place 1-2 drops on a tissue or cotton ball and inhale with slow deep breaths
- Uses: motion sickness, postop nausea, chemotherapy related nausea


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**Anxiety/Stress and Insomnia**

- True Lavender
- Sweet Orange

- Inhale from tissue or cotton ball
- Diffuser
- Bath
- Pair with relaxation exercises


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**Fatigue**

- Lemon
- Rosemary
- Peppermint

- Inhale from tissue or cotton ball
- Use with diaphragmatic breathing
- Mini-breaks
- Topical


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**Safety Issues**

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- ✦ Allergies and sensitivities
- ✦ Photosensitivity
- ✦ Drug interactions
- ✦ Accidental ingestion


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
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**Pain –evidence for use**

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- Historical use for pain management is largely by topical application
- Experimental studies in which the essential oil is inhaled and pain is induced (hot/cold water exposure, pressure, ischemic pain) do not demonstrate consistent findings


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**Postoperative Pain**

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- Evaluation of aromatherapy in treating postoperative pain: pilot study (Kim et al, 2006)
- Patients post op for breast biopsy were randomized to lavender essential oil + oxygen or just oxygen
- No difference in report of pain, discharge time from PACU, or use of analgesia
- Significant increase in satisfaction with pain management in intervention group


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**Abdominal Pain/IBS:  
Peppermint**

- Pittler and Ernst (1998) Review: mixed results
- Grigoleit & Grigoleit (2004) Review: 8/12 RCTs found significant results in favor of peppermint
- Kline et al (2001) Peppermint group showed significant improvement in severity of pain and no difference in other symptoms. No adverse drug reactions
- Fennerty (2003) Review of research on conventional and CAM therapies for IBS concluded that there is no strong evidence for many common treatments.

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**Procedural Pain**

- Two studies of effect of vanillin (not an essential oil) on pain response of neonates undergoing heel stick or venipuncture
- random assignment to scent before and during blood draw (familiar), scent only during blood draw (non-familiar), and no scent.
- Infants in the familiar scent category displayed a faster decrease in pain behaviors (crying, grimacing, movement) than the non-familiar and no scent groups.
- 2<sup>nd</sup> study confirmed the previous findings and established that maternal presence during scent exposure did not effect pain response
- Goubet, Rattaz et al, 2003; Goubet, Strasbaugh et al, 2007

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**Essential Oils for Nausea:  
Evidence**

- **Two studies in postoperative adult patients showed mixed results.**
- **Anderson LA, Gross JG:** Aromatherapy with peppermint, isopropyl alcohol or placebo is equally effective in relieving postoperative nausea, *Journal of PeriAnesthesia Nursing* 19:29-35, 2004
- **Tate S:** Peppermint oil: a treatment for postoperative nausea, *Journal of Advanced Nursing* 26: 543-549, 1997.

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**ACUPRESSURE**




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**Acupressure**

- Traditional Chinese Medicine (TCM)
- Stimulation of specific points to balance and smooth the flow of energy (qi, chi)
- Life events and illness can disrupt the energy system
- Energy flows through channels or meridians
- Acupoints are located on meridians




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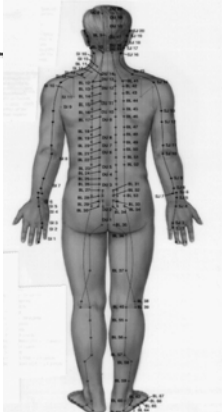

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**Acupoints for Treatment of Pain**

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- **General Pain Points:**
- **LI4** in the muscle between the thumb and 1<sup>st</sup> finger (not recommended during pregnancy)
- **Lv 3** Top of the foot in the valley between the first and second toe




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**Acupoints for Headache**

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- **GB 20** : base of the skull, in the hollow between the vertical neck muscles
- **GV 16**: center hollow at base of skull
- **GV24.5**: indentation between the eyebrows
- **B2**: where the bridge of the nose meets the ridge of the eyebrows – this is often quite tender
- **St 3**: bottom of the cheek bone, in line with the pupil

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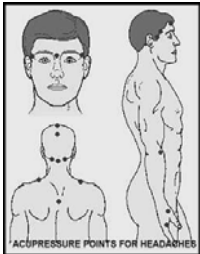
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**Acupoints for Headache**

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ACUPRESSURE POINTS FOR HEADACHES

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\* **Acupoints for Treatment Side Effects** \*  
**Nausea**

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- P6: 3 finger widths above the wrist crease
- LV 3: top of foot between first and second toe
- St 36: four finger widths below kneecap and one width lateral to tibia
- K9: middle phalanx of the ring finger




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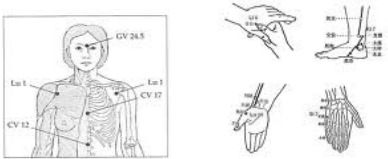
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\* **Acupoints for Treatment Side Effects** \*  
**Anxiety**

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- GV 24.5
- CV 17: on the sternum, three widths up from bottom (Sea of Tranquility)
- H 7: at wrist crease on lateral side of forearm (in line with little finger)




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\* **Limits of Acupressure** \*

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- Areas of body with tissue damage
- Wounds not completely healed
- Caution with pregnancy
- Advanced bone disease or osteoporosis
- Caution if clotting problems
- Infection

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\* **Evidence for Acupressure: Pain** \*

- Most research is in acupuncture and adult pain
- Hsieh et al (2006) treatment of low back pain by acupressure and PT: RCT
- Acupressure group had higher (better) scores on disability scales and maintained them to 6 month followup




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\* **Evidence for Acupressure: Pain** \*

- Madsen et al (2009) acupuncture treatment for pain: systematic review. Found a small but “clinically insignificant” reduction in pain with acupuncture, with small to large placebo effects.
- Cherkin et al (2009) randomized trial of acupuncture for low back pain found improvement on the dysfunction scale and large placebo effect.




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\* **Evidence for Acupressure: Nausea** \*

- Dune & Shiao (2006) metaanalysis of acustimulation effects on postoperative nausea and vomiting in children
- 12 RCTs were evaluated
- Significant reduction in nausea and vomiting
- Modalities and acupoints were not standardized between studies, controls were variable




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\* **Evidence for Acupressure: Nausea** \*

- Jones et al (2008) acupressure for chemotherapy associated nausea and vomiting in children.
- Prospective, randomized, double-blind crossover trial using wrist bands (P6).
- Patients have moderate expectation that acupressure would reduce nausea
- No difference between groups was noted.




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\* **Evidence for Acupressure: Anxiety** \*

- Wang et al (2004) parental auricular acupuncture as adjunct for parental presence during induction of anesthesia.
- RCT, auricular acupuncture on mothers 30 minutes before child's induction for surgery
- Decreased maternal anxiety, decreased child anxiety, no change in maternal BP or HR




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\* **Evidence for Acupressure: Anxiety** \*

- Wang et al (2008) extra – 1 acupressure for children undergoing anesthesia
- RCT with Acubead placed at point midway between eyebrow
- Reduction in anxiety in the treatment group, no change in anesthetic requirements or bi-spectral monitor




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**Mind-Body Therapies**

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**Components of Mind-Body Medicine**

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- Seeing the whole of the system
- Establishing and enhancing mind-body-spirit connections
- Using mind to change body and body to change mind
- The power of metaphor




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**Breathing**

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- Breathing is controlled by the autonomic nervous system
- Conscious and unconscious control
- Breaths should be comfortable to the patient
- "Belly Breathing"
  - Triggers the parasympathetic response
  - On inhalation the abdomen goes out; on exhalation the abdomen softens
  - Decreases the use of thoracic or accessory muscles




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**Diaphragmatic Breathing**

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- **How we breathe is BOTH:**
  - RESPONSE to our emotional state
    - Rapid, shallow, irregular, breathing is a response to stress
  - DETERMINANT of our emotional state
    - Slow, deep breaths induce relaxation; calms the vagus nerve
- **Proper breathing is the key to good health**

Andrew Weil, MD




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**Hypnosis**

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- **Achieving of deep relaxation and an altered state of consciousness to effect a change in physical or emotional symptoms**
- **Imagery, relaxation mental imagery, day dreaming, focused mental work are all altered states**
- **All hypnosis is self-hypnosis**




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★ **\*Self-Hypnosis/Mental Imagery Helps With:** ★

- Pain reduction and/or relief
- Stress reduction
- Reduction of other symptoms
- Tolerating procedures
- Empowering the patient
- Enhancing self-awareness
- Encouraging participation in one's own care
- Physiologic changes (relaxation response)




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★ **\*The Language of Hypnosis** ★

- **Ego strengthening: good job, well done, see how well you did, I'm impressed**
- **The power of THEN**
  - when you do this then you will....
- **The power of AND – OR**
  - that could happen and you might also find; yes that could happen or you might find
- **The power of YET**
  - "I can't get my pain to go down" "yet"
- **The power of WONDER**
  - "I wonder what that would look like"
- **Trying is not an option - Just Do It.**




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★ **\*When in an altered state....** ★

- Time moves slowly
- Muscles relax
- Heart rate and respiratory rate slow
- Increased suggestibility – but the individual is in control
- Symptom control through metaphor




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**Relaxation Mental Imagery**

- **Induction- Formal or informal:**  
Diaphragmatic breathing, Focus on a point, many others
- **Deepening: favorite place imagery**
- **Suggestions and metaphor**
  - Control station for pain
  - Comfort robe
  - Exhaling colors of discomfort, inhaling colors of comfort and calmness
  - Ripple in water, burn in fire, blow in the wind, bury




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**Hypnosis & Pain Management**

- **Emphasize the patient's control**
- **Adapt to the patient's language and imagery**
- **Address anxiety as well as pain**
  - Fear of pain
- **Get feedback from the patient**
- **Feelings and attitude will impact the level of comfort and expectations of the outcome**




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**Safety**

- **Generally safe if working within scope of practice**
- **Let the patient be the guide to the imagery**
  - Practitioners help to guide patients to favorite, comfortable, safe, places where they can be in control
- **If the patient has a history of trauma, use of hypnosis should be reserved for skilled practitioners with advanced training.**




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**Evidence for Hypnosis & Pain**

- Lioffi, White & Hatira (2009). A randomized clinical trial of a brief hypnosis intervention to control venipuncture-related pain of pediatric cancer. *Pain*, (142) 255-263.
- **Controlled trial with three groups**
  - Local anesthetic, local anesthetic plus hypnosis, and local anesthetic plus attention
- **Children in the EMLA plus hypnosis group reported lower levels of anticipatory anxiety as well as less procedural pain and anxiety**
- **Parents levels of anxiety were also decreased compared to the local anesthetic and local anesthetic plus attention group.**




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**Biofeedback**

- **The body's functions are monitored**
  - Muscle tension, skin temperature, respiratory, sweat gland activity, heart rate, heart rate variability, neuro, capnometry
- **The information helps the patient to understand physiological changes needed for a change in the feedback signal**
- **Three Steps:**
  - Get to know your body
  - Be the boss of your body
  - Be the boss of your life




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**Self-Regulation Skills**

- **Other mind-body strategies**
  - Progressive muscle relaxation
  - Autogenics
  - Meditation
  - Drawing
  - Journaling
  - Yoga


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**Therapeutic Massage**

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**Types of Massage Therapy**

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- **Swedish**
  - Light effleurage, soft tissue mobilization: long strokes, kneading, vibration, tapping
- **Deep Tissue**
- **Sports Massage**
  - Adapted to needs of athletes
- **Trigger Point**
  - Myofascial trigger point release
- **Reflexology**
  - Pressure to the feet, hands, or ears to promote healing in other parts of the body




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**Benefits of Massage Therapy**

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- **Pain reduction**
- **Anxiety management**
- **Stress reduction**
- **Relaxation- mental and physical**
- **Improved circulation**
  - Prevention of pressure sores
- **Improved sleep**
- **Increased body awareness**
- **Comfort**




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**Massage for Pain**

- Promotes relaxation
- Alleviates perception of pain and anxiety
- Focuses on the body system and relationship to soft tissue; not specifically on the site of pain
- Promotes awareness of body and sources of pain
- Familiarizes patients with pain experience
- Impact of human touch

National Center for Complementary and Alternative Medicine (NCCAM)

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**Safety**

- Generally safe when using Swedish Massage techniques
- Should not be done on areas with blood clots, fractures, wounds, skin infections or recent surgery
- Caution: if risk of thrombosis
- Avoid vigorous massage in those with bleeding disorders and those with low platelet counts (no specific guidelines but caution is needed if <10,000)

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**Other Bodywork techniques**

- **Craniosacral Therapy**
  - Cerebrospinal Fluid
  - Guiding and releasing tension using mild pressure while evaluating imbalances and restrictions
- **Healing Touch**
  - Energy-based approach
  - Restores balance and harmony
  - Hand motions to clear, energize and balance

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\* **Evidence for Massage and Pain** \*

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- Von Stulpnagel, Reilich, Staube et al (2008). Pilot study showing a reduction in headache frequency by 67.7%, intensity by 74.3%, duration by 77.3% in girls receiving trigger point therapy twice weekly for two weeks.
- Suresh, Wang, Porfyrus, et al. (2008). Study showed significant improvement in distress, pain, tension, discomfort levels as mood after children receiving care in a chronic pain clinic received massage.




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\* **Evidence for Massage and Pain** \*

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- Parlak Gurol, Polat & Akcay (2010). Massage therapy reduced itching, pain and anxiety levels in adolescents who were hospitalized on a burn unit.
- Russell (2007). Patients with restless leg syndrome received a 45 minute massage two times a week for three weeks. Symptoms decrease and improved throughout the weeks.
- Wang & Keck (2008). Foot and hand massage decreased pain intensity and distress in patients with postoperative pain.




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