Integration of Complementary and Alternative Therapy into Pediatric Pain Management

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Conflicts of Interest Disclosure

The speakers have no conflicts of interest to declare

Objectives

- 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.
What’s it Called?

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

Use of Complementary and Alternative Medicine in Pediatric Pain Management

- 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

Use of CAM in 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
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

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

Clinical Aromatherapy
Aromatherapy

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

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)

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.
Method of Action - Topical

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

Essential Oil Dilution Chart

<table>
<thead>
<tr>
<th>Drops of Essential Oil</th>
<th>Amount of carrier (oil or lotion)</th>
<th>% Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 drop</td>
<td>5 ml</td>
<td>1%</td>
</tr>
<tr>
<td>2 drops</td>
<td>5 ml</td>
<td>2%</td>
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<td>3 drops</td>
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<td>4 drops</td>
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<td>4%</td>
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<tr>
<td>5 drops</td>
<td>5 ml</td>
<td>5%</td>
</tr>
<tr>
<td>1 drop</td>
<td>10 ml</td>
<td>0.5%</td>
</tr>
<tr>
<td>1 drop</td>
<td>20 ml</td>
<td>0.25%</td>
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</tbody>
</table>

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
**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.

**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.

**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.
Aromatherapy and Pain management

- Pain reduction
  - Muscular pain
  - Headaches

- Control of Other Symptoms
  - Nausea
  - Stress/anxiety
  - Fatigue
  - Insomnia

Six Essential Oils

<table>
<thead>
<tr>
<th></th>
<th>Pain</th>
<th>Nausea</th>
<th>Insomnia</th>
<th>Anxiety</th>
<th>Fatigue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lemon</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
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<tr>
<td>Orange</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rosemary</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Lavender</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Peppermint</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spearmint</td>
<td>X</td>
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</tr>
</tbody>
</table>

Pain

- Rosemary: Warming
- Peppermint: Cooling
- Lavender: Neutral
- Pair with calming oils

- Massage
- Rub on the skin
- Compress
- Apply at acupuncture or muscle trigger points for headache
### 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

### Anxiety/Stress and Insomnia

- True Lavender
- Sweet Orange

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

### Fatigue

- Lemon
- Rosemary
- Peppermint

- Inhale from tissue or cotton ball
- Use with diaphragmatic breathing
- Mini-breaks
- Topical
Safety Issues
- Allergies and sensitivities
- Photosensitivity
- Drug interactions
- Accidental ingestion

Pain—evidence for use
- 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

Postoperative Pain
- 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
**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.

**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.
- 2nd 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

**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
**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
Acupoints for Treatment of Pain

- General Pain Points:
  - LI4 in the muscle between the thumb and 1st 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

- GB 20: base of the skull, in the hollow between the vertical neck muscles
- GV 16: center hollow at base of skull
- GV 24.5: 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
**Acupoints for Treatment Side Effects**

**Nausea**
- 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

**Anxiety**
- 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)

**Limits of Acupressure**
- Areas of body with tissue damage
- Wounds not completely healed
- Caution with pregnancy
- Advanced bone disease or osteoporosis
- Caution if clotting problems
- Infection
Evidence for Acupressure:

- **Pain**
  - Most research is in acupuncture and adult pain
  - Acupressure group had higher (better) scores on disability scales and maintained them to 6 month followup

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.

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
Evidence for Acupressure: Nausea

- 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.

Evidence for Acupressure: Anxiety

- 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.

Evidence for Acupressure: Anxiety

- 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.
Mind-Body Therapies

Components of Mind-Body Medicine
- 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

Breathing
- 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
Diaphragmatic Breathing

- 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

Hypnosis

- Achieving of deep relaxation and an altered state of consciousness to effect a change in physical or emotional symptoms

- Imagery, relaxation mental imagery, daydreaming, focused mental work are all altered states

- All hypnosis is self-hypnosis
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)

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.

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
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

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

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.
Evidence for Hypnosis & Pain

- 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.

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

Self-Regulation Skills

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

Types of Massage Therapy

- **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

Benefits of Massage Therapy

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

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)

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
Evidence for Massage and Pain

- 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, Porfyris, 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.

- 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.

Resources

Resources
