BIOBEHAVIORAL STRATEGIES FOR PEDIATRIC PAIN

Pediatric Pain PRN Curriculum

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The MAYDAY Fund

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Objectives

- Explain the mechanism of action and potential outcomes of a variety of biobehavioral strategies used to manage children's pain
- Select biobehavioral strategies based on type and characteristics of pain as well as patient's developmental level, characteristics, and condition to help manage children's pain or help children cope with pain
- Demonstrate at least four different comfort, cognitive, and physical biobehavioral strategies for pediatric pain management

Support for Biobehavioral Strategies

Support for biobehavioral strategies for pain

Biobehavioral strategies enhance pain management and facilitate relief of associated suffering. Pain management plans should address pain intensity as well as pain control, function, emotional distress, anxiety and depression related to pain. In some cases, the addition of biobehavioral strategies reduces analgesic use and associated analgesic side effects. While biobehavioral strategies may allow reduction of analgesics, these interventions enhance the effect of analgesics and rarely replace them. Keep in mind:

- Pain is multidimensional.
- Multimodal treatment plans optimize outcomes by treating the many dimension of pain through complementary mechanisms of action.
- Biobehavioral strategies may target dimensions of pain that medications do not address.
- Multimodal analgesia may address individual genetic differences in analgesic metabolism and pain sensitivity.

Patient and provider barriers

- Lack of knowledge regarding strategies
- Lack of confidence to discuss risks and benefits
- Lack of equipment and time to teach or provide therapy
- Lack of availability of reputable providers for referral

Role of parents

Parents fear uncontrollable pain for their child

Parents play an instrumental role by:

- Providing skin-to-skin care for their neonate's heel lance
- Providing omfort holds for their toddler and preschooler during immunizations
- Coaching for distraction, relaxation, and use of cognitive skills for their child with pain

Research demonstrates that reassurance and apologizing by parents and healthcare professionals is associated with increased behavioral distress during medical procedures.

When child demonstrates positive behaviors (e.g., cooperating with healthcare providers during procedures or practicing relaxation techniques, etc.) use praise and tangible motivators as rewards. Conversely, negative behaviors (e.g., whining, trying to delay medical procedures) should be ignored.

Choosing biobehavioral strategies

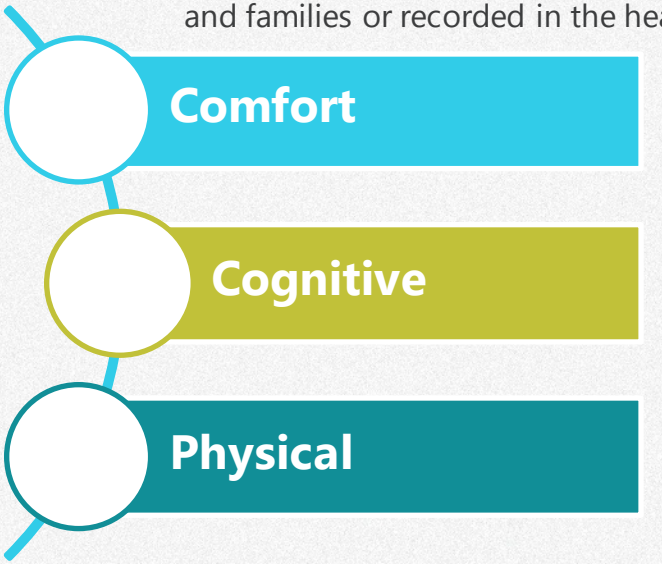
Many factors should be considered when selecting biobehavioral strategies for children's individualized pain treatment plan. Children's past experiences with pain and successful interventions should also be considered.

- Mechanism of action
- Type of pain, intensity & duration
- Child's age, cognitive, and developmental abilities
- Behavioral factors
- Coping style
- Past experiences
- Sociocultural factors
- Patient/family preference

Categories

Biobehavioral strategies can be categorized into ***comfort, cognitive***, and ***physical methods*** to manage and help children cope with pain.

These strategies are also called non-pharmacologic, integrative medicine, complementary medicine or alternative therapies (CAM). Unlike medications, these strategies are often not reported by patients and families or recorded in the healthcare record.



Choosing biobehavioral strategies

It is estimated that approximately 12% of children use some form of biobehavioral strategies for a variety of conditions. Use is greater in children who(se):

- parents use biobehavioral strategies (23.9%), and had higher educational level (more than high school-14.7%)
- are White (12.8%) compared to Hispanic (7.9%) or Black (5.9%)
- had 6 or more health conditions (23.8%)
- families delayed conventional care because of cost (16.9%)

Mind-body techniques most frequently used include chiropractic or osteopathic manipulation, massage, meditation, and yoga.

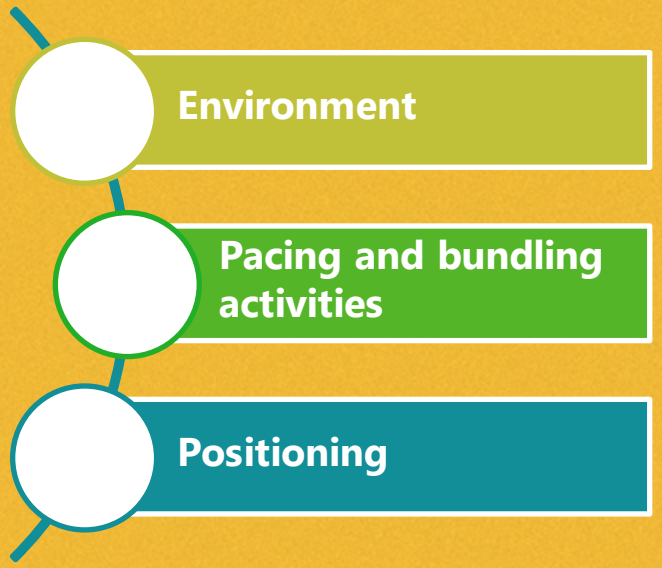
The most common nutritional supplements included fish oil and melatonin.

The Use of Complementary and Alternative Medicine in the United States. U.S. Department of Health & Human Services, National Institutes of Health, USA.gov. https://nccih.nih.gov/research/statistics/2007/camsurvey_fs1.htm#use

In a study of children with recurrent headaches (Bethel, 2013):

Of the 10.6% of youth experiencing headaches, 29.6% used biobehavioral strategies and 41% of the headache sufferers who also experienced difficulties with emotions, concentration, behavior, school attendance, or daily activities used biobehavioral strategies.

Comfort Measures



Environment

Environment

- *Ensure proximity to parents and comfort objects, such as a familiar blanket, doll, or toy*
- *Coach parents how to talk to and coach their child*
- *Consider light, noise, odors, temperature*

Manage the environment

Proximity to a parent and comfort objects such as a familiar blanket, doll, or toy is critical for helping a child feel secure in any healthcare setting. The touch and voice of a parent is familiar, and can calm, soothe, and help a child manage pain related fear and anxiety . Coach parents how to coach their child. Hearing the voice of a parent is often empowering for a child in healthcare settings.

- Regulate temperature for patient comfort
- Dim lights and reduce noise to decrease stimulation or regulate light and noise to mimic day/night cycle
- Monitor and dissipate odors and consider aromatherapy

Aromatherapy is popular, widely used in the community, and is being used in several children's hospitals around the world. How it works or even whether it works is not really known.

Mechanism of action: Unknown; thought to be related to maintenance of norepinephrine, competing sensory experience, stimulating recall of pleasant memory, or placebo effect.

Most studies of aromatherapy have small sample sizes, are observational and poorly designed. Despite the lack of evidence to support aromatherapy , it is used to control nausea, improve mood and decrease anxiety.

Scents preferred by children are citrus (lemon/sweet orange) and mint (peppermint/spearmint).

Pacing and bundling

Pacing and bundling activities

Set realistic goals for functional recovery, functional restoration and pain.

Children with pain after surgery, trauma, or chronic pain may fatigue easily and pacing is critical for recovery.

Pacing build capacity; but avoid overuse by:

- Clearly defining goals and progressions
- Reinforcing progress

Bundling care to conserve energy and prevent pain with movement

When bundling care, consider:

- Is patient hurt every time patient is handled?
- Does minimal stimulation become painful simulation?

Positioning

Positioning

Align, elevate, minimize pressure, redistribute weight

Positioning

Mechanism of action:

- Alignment and splinting may decrease pain by limiting movement and continued tissue damage, for example after a bone fracture
- Elevation may decrease pain from swelling, for example after surgery or trauma
- Assistive devices may minimize further tissue damage from pressure and redistribute weight to alleviate pain.

Kinesiotape

- Provides support and helps to reduce muscle fatigue
- Simulates muscles to strengthen
- Encourages relaxing of soft tissue and improve lymphatic flow, thus aiding rin reducation of pain and swelling
- Mechanical "recoiling" – provides positional stimuli throughout the skin
- Fascia "holding" – aligns tissue in desired position
- Space "lifting" - creates more space above area of pain and/or swelling
- Ligament/tendon "pressure" – increases stimulation to the mechanoreceptors over ligament or tendon
- Functional "spring" – sensory stimulation to either assist or limit motion
- Lymphatic "channeling" – creates areas of decreased pressure that act as channels to direct exudate to the nearest lymph duct

Splinting

- Provides alignment and control of a joint
- Provides stretch to an overworked or neurologically impaired joint

Assistive Devices

- May be a better alternative than immobility
- Use to reduce stress and fatigue
- Avoid long-term use that may impede functional progression

Positioning

Positioning

Positioning for neonates

Mechanism of action: Infants benefit from supports that mimic the calming sensory experiences of the womb, helping them to achieve a calm state. Co-regulation, therefore requires the parent or provider to maintain a calm state. This has been coined "the 4th trimester."

There is strong support for these interventions for **procedural pain** during the first **3 months** of life and some support for up to 6-12 months of age.

Swaddling

This helps provide the baby with a snug feeling of containment. Untuck only the arm or leg needed for the procedure.

Back, side, or belly?

Babies should always sleep on their backs. However, when you are there, rolling baby onto belly or side can help to calm baby.

Positioning

Positioning

Skin-to-skin care (Kangaroo care)

Mechanism of action: Increases β-endorphin levels and decreases presence of cholecystokinin (CCK), a neuroactive hormone that acts as a mu-opioid antagonist in circulation.

- Holding the infant skin-to-skin has been shown to decrease behaviors associated with pain, and to:
  - regulate infant temperature
  - increase weight gain velocity in premature infants
- For certain procedures, such as heel sticks, the infant may remain tucked in the skin-to-skin position throughout the stick, thus receiving co-regulation support from the parent.

Skin-to-skin care significantly increases endorphin levels and is associated with greater analgesia in full term neonates compared to non-nutritive sucking.

Other comfort measures for neonates

Non-nutritive sucking

Mechanism of action: Non-nutritive sucking exerts its effects independent of the opioid pathway and has been shown to provide orotactile/mechanical sensory input that may disrupt the sensory processing of a painful procedure through a process similar to sensory and/or cognitive distraction in adults.

Non-nutritive sucking has been associated with decreased stress hormones and stress response (blood pressure, heart rate).

Non-nutritive sucking can be paired with breastfeeding, sucrose and glucose to significantly reduce behaviors associated with pain in neonates and infants.

Other comfort measures for neonates

Sweet solutions

Mechanism of action: global opioid pathway dependent analgesia

Breastfeeding not breast milk

- Breastfeeding is equally as effective, if not more effective, than sweet tasting solutions, like sucrose and glucose
- When compared to breastfeeding, music therapy is ineffective for reducing procedural pain in neonates.
- When combined with EMLA, breastfeeding demonstrated significantly lower pain scores and shorter duration of cry than EMLA alone or placebo, suggesting synergistic effects

Sucrose and Glucose 24-50%

- Reversed by naloxone
- Place on end of pacifier, tip of gloved finger, directly onto tongue, syringe, or in buccal space 2 minutes prior to start of procedure.
- Re-dose as needed every 30-45 seconds during procedure.
- Given miniscule volume, sweet solutions may be given to patients who are NPO. No evidence to prevent use in neonates at risk for NEC.

Montana

What factors are likely to be involved in Montana's experience of pain?

What barriers might prevent nurses from using biobehavioral strategies with Montana?

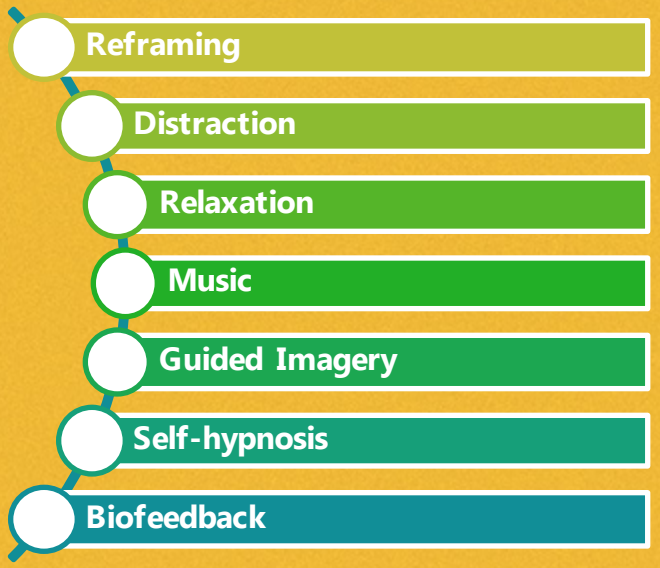
What ideas do you have for overcoming these barriers in your setting?

Montana is an obese 12-year-old girl with a prolonged hospital stay (>4 months) status post exploratory laparoscopy and partial pancreatectomy for treatment of gallstone-induced necrotizing pancreatitis.

Her hospital course has been complicated by multiple intra-abdominal abscesses. She currently is receiving negative pressure wound therapy over a large abdominal wound and 3 pigtail catheters draining intra-abdominal abscesses. Her dressing is changed 3 times/week.

Montana lives with her mother, her stepfather and twin brother. Her stepfather is a long-distance truck driver who has an aversion to "hospitals". Her mother is staying at the Ronald McDonald House and visits only intermittently.

Cognitive Techniques



Cognitive Behavioral Therapies

Mechanism of action:

Cognitive-behavioral therapies (CBT), and mindfulness decrease intrinsic brain connectivity visualized with fMRIs of adults with chronic pain. These therapies may help reorganize dysfunctional patterns of connectivity between the insula and cognitive and sensory networks.

Teach

- Cause of pain
- Methods of pain assessment
- Goals, expectations for pain relief and how to help the child to reach personal goals
- Treatment options
- Coping skills to decrease painful sensations

Promote family's ability to encourage and reward positive, adaptive behaviors.

Reframing

Reframing

Cognitive reframing is a cognitive behavioral therapy (CBT) skill in which the child modifies thoughts about a distressing situation so that they are less focused on negative aspects of the situation

- **Thought stopping—**using the word stop or visualizing a stop sign to alter negative thoughts or anxious feelings
- **Positive self-talk—**repeating a set of positive thoughts, for example "I can cope with this"

A child can get into a spiral of negative emotions associated with anxiety and fear of an upcoming procedure or hospitalization. Reframing thoughts changes how we feel and behave.

First, the child has to identify negative thoughts and then challenge these thoughts by modifying them in a way designed to elicit fewer negative emotions. By learning reframing techniques, a child is able to focus less on negative aspects of the situation.

Cochrane Review:

- 37 CBT studies reviewed.

(18 headache, 13 abdominal pain, 2 fibromyalgia, 2 pain from sickle cell disease, 2 with mixed pain conditions)

- 2111 participants
- CBT reduced headache pain at follow up (Relative Risk 2.47 [95% CI 1.97-3.09]; Number Needed to Treat 2.94
- CBT reduced non-headache pain significantly ($p<.01$), mean effect -0.57 (95% CI -0.86 -0.27)
- Only those with headache pain demonstrated long-term effects from CBT

Distraction

Distraction

Mechanism of action: Diverts attention from pain towards item or activity. When attention is focused away from the painful stimulus, less able to focus on painful stimuli.

- Effective for procedural, acute and chronic pain.
- Time: limited to duration of distracting activity. Therefore this is a short term strategy and respite from chronic pain may last only as long as the distraction. Active distraction may be more effective than passive distraction
- Requires no formal training for healthcare providers or parents.

Many hospitals have Child Life Specialists who are experts at assessing children's coping styles, developing rapport, and providing distraction in preparation for or during medical procedures.

Parents can learn how to successfully coach their child with distraction. They probably utilize this at home but may not initially feel comfortable in the hospital/healthcare setting.

- **Interactive toys, tablet, videos, video games, virtual reality**
- **Reading** a book, "seek & find" books
- Slow, rhythmic **breathing**- facilitate deep breathing, "blowing the pain away." Bubbles, toy whistles, party blowers, pinwheels, harmonicas
- **Sing, playing music**
- **Coloring books, art activities**
- **Stress ball**
- **Humor/jokes**

Relaxation

Relaxation

Mechanism of action: reduce autonomic nervous system activity.

- Promotes stress reduction, reduces tension in the body and creates sense of calm.
- Often used in conjunction with other cognitive and behavioral strategies.

Examples of techniques include: deep-breathing, progressive muscle relaxation, meditation, mindfulness, prayer.

Progressive muscle relaxation

The goal is to facilitate gradual relaxation by alternating between tensing and releasing different muscles in the body.

Coach child to hold each tension/relaxation for 5-10 seconds. These examples include imagery. *Scripts adapted from Anxiety BC.*

Legs & Feet *(Repeat 2-3 times.)*

- Imagine you are standing barefoot in a giant mud puddle.
- Try to get your feet down to the bottom of the mud puddle. Push down, spread your toes apart, feel the mud squish up between your toes.
- Now step out of the mud puddle. Relax your feet. Let your toes go loose and feel how nice it feels to be relaxed.

Abdomen

- Imagine that an elephant has just stepped on your tummy. Suck in all the muscles in your tummy and hold it.
- Now relax and let your stomach out. Relax all the muscles in your tummy.
- Notice how your muscles feel when you relax them.
- Now take a deep breath, watching your tummy rise. Breathe out slowly and watch your tummy slowly sink down.

Arms and Hands *(Repeat the process for the right hand and arm.)*

- Imagine you have a whole orange in your left hand.
- Now squeeze it hard. Try to squeeze all the juice out. Feel the tightness in your hand and arm as you squeeze.
- Now drop the orange. Notice how your muscles feel when they are relaxed.
- Take another orange and squeeze it harder this time. Try to get all the juice out. Don't leave a single drop. Squeeze hard. Good.
- Now relax and let the orange fall from your hand.

Face *(Repeat 2-3 times.)*

- Wrinkle your nose, mouth, eyes, forehead, cheeks, and push your lips together. Hold the muscles in your face really tight.
- Now let all the muscles in your face go limp and relax.

Conclusion *(Allow one to three minutes for the conclusion.)*

- Pretend you're a rag doll, and let your entire body go limp. Notice how good it feels to be relaxed. Now, just enjoy the feeling.

Music

Music

Mechanism of action: it is theorized that new thoughts, feelings, and body states stimulated by music may replace other patterned responses.

- Specifically, a pleasant sensory experience promotes relaxation to replace tension and worry once one is conditioned to respond to familiar music.
- The conditioning process takes place when listening to music paired with deep relaxation through repeated practice. Over time, the response becomes automatic when the music is heard

Music therapy reduces pain perception.

Music type, tempo, and tone will have different effects on different individuals.

Listening with headphones is more effective than listening to ambient music. Headphones also allow patients to control the volume without disturbing others.

Encourage patients to engage in the music by tapping out the rhythm, or singing along.

Used for procedural, postoperative, acute, and cancer pain

- Directs attention away from pain or anxiety,
- Provides a stimulus for rhythmic breathing.
- Offers a rhythmic structure for systematic release of body tension.
- Cues positive visual imagery, thus changing thoughts, feelings and mood
- Conditions child to achieve a state of deep relaxation.

Guided Imagery

Guided Imagery

Guided imagery is a form of relaxed, focused concentration that assists a children in imagining and exploring favorite places or activities.

There is a continuum from distraction to guided imagery to self-hypnosis. In guided imagery, the child is actively guided to focus on an experience that is more pleasant.

Children as young as 3 years old can learn these techniques

Children's vivid imaginations combined with stressful events increase their receptivity to guided imagery and self-hypnosis.

Having rapport with the child and knowing about their interests and preferences facilitates success using guided imagery and hypnosis. Although guided imagery does not require formal training it is beneficial to have informal training and experience. ***Teaching children self-hypnosis requires special training.***

Guided Imagery

Guided Imagery

The child should guide the imagery. For example, if a child is afraid of floating or being in the clouds, this imagery would not be appropriate.

Getting ready

- Find a quiet environment away from interruptions, television, and electronics
- Consider playing soft, relaxing music to eliminate background noise
- Adopt a reassuring, positive attitude to encourage child's participation and reflection
- Encourage child to assume a comfortable position and close eyes (a child may not trust enough to close their eyes)
- Select a script or audio recording appropriate for child
- Controlled breathing can be used with guided imagery to enhance relaxation.
- Coach child to inhale deeply through the nose and exhale slowly from mouth.
- For a younger child, encourage deep breathing by focusing on the rising and falling of his or her tummy.
- Practice makes perfect! The more familiar a child becomes with guided imagery, the easier it will be for him or her to relax and receive the full benefits of this technique. Make engaging in this technique a part of your daily or weekly routine.

Sample script *(adapted from ShambolaKids ® & Teens)*

"Imagine you are floating on a huge, white cloud in an open, blue sky. What shape is this cloud? Feel how fluffy this cloud is as you gently drift through the sky. Notice how this cloud supports your body and makes you feel so peaceful and light. The cloud seems to wrap itself around you comfortably like it's giving you a great big hug that will keep you safe and warm. You have a feeling of being loved. Feel yourself floating on this soft, wispy cloud, enjoying the gentle motion of this loving cloud as it glides and softly sways through the sky. There is a feeling of total peace and ease. It feels so wonderful to just relax here."

Self-hypnosis

Self-hypnosis

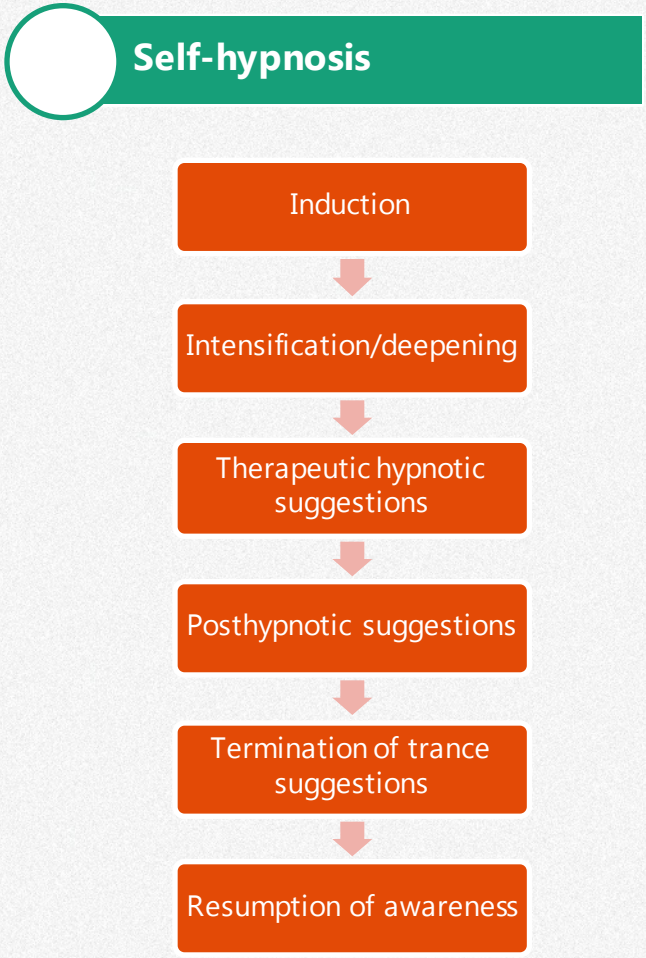
Hypnosis involves the deliberate use of therapeutic suggestion, permissive/evoked imagery, focused attention, and relaxation to reduce peripheral awareness and become internally absorbed.

Hypnosis uses the child's imagination, and enhanced capacity for response to suggestion but is not controlled or directed by the clinician

Athletes describe self-hypnosis as "being in the zone" or it can be characterized as "daydreaming on purpose."

All hypnosis is self-hypnosis requiring the patient to be an active participant. The patient is always in control.

Self-hypnosis



Begin by initiating slow, deep diaphragmatic breaths with emphasis on allowing feelings of relaxation, control, and comfort.

Induction is then supplemented with favorite place imagery based on patient's developmental level and preferences (Kohen & Olness, 2011).

Intensification or deepening phrases such as "with every breath you take, your relaxation increases more and more" depict how language is used to provide a "soothing" sensation This favorable feeling is "anchored" by asking the patient to hold two fingers together to make a "relaxation" sign to remember this sensation.

Ego strengthening is used to have the patient feel worthy and more capable of effectively dealing with their pain or anxiety. An example of an ego strengthening phrase is "you are doing this just right."

Patients are then taught to give themselves **therapeutic hypnotic suggestions** based on their hypnosis goal. A heightened awareness of sight, sound, touch, smell, and even taste is common.

Physical indications that an altered state has been achieved include increased swallowing, head bobbing, muscular relaxation or twitching, eyelid fluttering or closure, and slower and deeper breathing. They are aware of their surroundings, but may not be "paying attention" as they focus their hypnosis goal.

Posthypnotic suggestions, such as, "when the blood pressure cuff inflates, use this as a gentle reminder to take slow, deep, relaxed breaths as a way to 'travel' to your favorite place," are taught to the patient and accompanying family member.

Patients are taught to **terminate** the trance when they are "done and have accomplished all they need to." They then simply open their eyes and fully "return" feeling refreshed, energetic, and proud of accomplishing their hypnosis goals.

Biofeedback

Biofeedback

Mechanism of action: Using pulse, respiratory rate, and temperature to teach individuals about the association between their emotions and internal physiological changes and encourage them to manage these physiologic responses to pain by providing consistent visual feedback of status.

- *Promotes decreased muscle tension, reduces anxiety*
- *Used for headache, musculoskeletal, and chronic pain*

Montana

Which psychological or cognitive interventions might be beneficial to Montana?

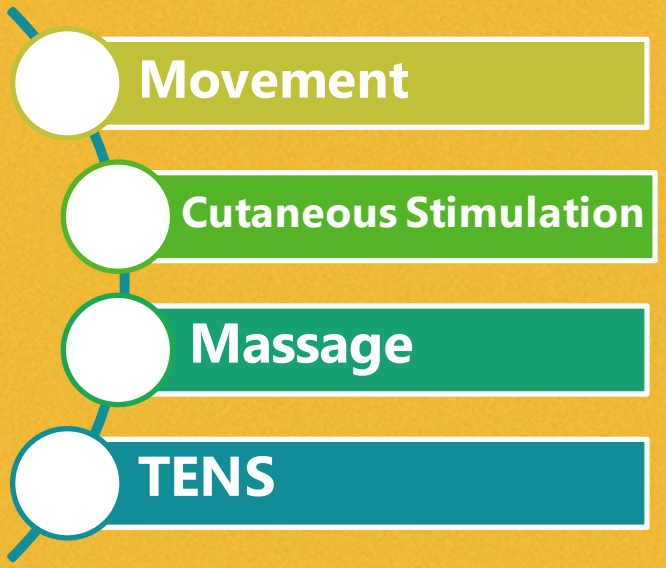
Are there any that might not be appropriate in this case?

Would you use these therapies as primary or adjuvant treatment? Why?

Montana describes her abdominal pain as a crampy, aching pain. She reports that the pain is constant, usually rated 5 on a 0-10 scale, but during wound vac dressing changes it flares to 8 or 9 out of 10.

She is irritable and is frustrated that she "is not getting better". She tries to avoid dressing changes and cries for her mother, who is often absent.

Physical Interventions



Movement and physical activity

Movement

Pain with movement can lead to decreased activity, decreased activity tolerance, and fear of exercising and being active.

This deeply ingrained instinctive reflex can be difficult to overcome.

Movement reduces pain. Movement and exercise may improve:

- perceptions of physical ability
- symptoms of depression

Mechanism of action: Conditioned pain modulation suggests that pain inhibits pain, and that painful exercise can activate descending inhibitory pathways. However, recently published research suggests that exercise relieves pain even when adolescents do not rate the exercise as painful (Stolzman & Hoeger-Bement, 2016).

- Set realistic goals for movement, exercise, function and pain.
- Children with persistent pain should avoid high-intensity exercise and exercise only to the onset of pain or below painful levels rather than to maximal pain levels.

Patients need to be assured that in time movement will actually lessen pain. Patients should be reminded of the need to continue exercise programs indefinitely, even after pain resolves to prevent recurrence. Exercise should be part of an active lifestyle change.

Movement and physical activity

- Continuum from passive range of motion to aerobic exercise and resistance training
- Identify pleasurable activities; for example, yoga is effective for abdominal pain
- Collaborate with physical therapist to design program of graduated pacing
- Practice on a regular basis
- Supervise training
- Allow for periods of rest between active periods
- Intensity, frequency, duration should be individualized to avoid exacerbation of pain

Cutaneous Stimulation

Heat & Vibration

Cutaneous Stimulation

includes:

- application of heat and cold
- vibration

Mechanism of action: May stimulate large-diameter pain fibers and interrupt transmission of pain.

Possible placebo effect?

Heat

Heat includes use of electric heating pads, commercial heat wraps, warm damp towels (compresses), or warm baths/showers

Mechanism of action: May reduce or relieve pain by inducing vasodilation and increasing blood flow, releasing muscle tension and reducing muscle spasms, decreasing sensitivity to pain, and providing a competing sensory experience. Possible placebo effect?

- Useful for muscle pain and spasm, postoperative pain, and sickle cell pain
- Use with caution in very young children or those with cognitive impairments.
- Dangers of heat on insensate body parts (spina bifida) clearly outweigh any benefits.

Temperature

- Temperature should be based on patient preference and tolerance.
- If unable to express heat preference, 40-45˚C should be used.
- Monitor frequently for comfort level and signs of skin irritation.
- Duration of heat therapy is usually limited to 20-30 minutes
- Heat application is contraindicated over areas of bleeding, over topical menthol or other medicated ointments, and over burned or radiated skin.

Vibration

Mechanism of action: May alter the quality of pain by interrupting the transmission of pain signals or by increasing blood flow and changing skin temperature. Possible placebo effect?

- Useful for muscle pain, tension headaches and procedural and postoperative pain.
- ***Buzzie™*** is a product that uses both vibration and/or distraction, and/or cold in young children to reduce the pain of needle procedures.

Cutaneous Stimulation

Cold

*Trials of cold therapy have been inconsistent and frequently found **no** differences compared to no cold therapy for pain, edema or analgesic use.*

These findings suggest that cold has no long lasting benefits; rather it provides temporary numbness at the site of pain.

Cold

Cold therapy refers to the superficial application of cold to the surface of the skin, with or without a mechanical recirculating device to maintain cold temperatures.

- ice packs,
- bag of frozen vegetables,
- frozen damp towel or cloth dipped in ice water

Cold therapy is often provided in conjunction with rest, compression, and elevation.

Mechanism of action: Thought to be related to reductions in tissue temperature, decreasing sensitivity to pain, reducing muscle spasms, and providing a competing sensory experience. Possible placebo effect?

- Localized therapy is commonly used for acute pain, trauma and postoperative pain.
- Use with caution in very young children or those with cognitive impairments.
- Cold therapy is dangerous and contraindicated for use on insensate body parts (spina bifida), areas of poor circulation, or for patients with sickle cell anemia.

Cold application

- Cold therapies should not be applied directly to the skin (wrap with cloth).
- Temperature should be based on patient preference and tolerance.
- If unable to express cold preference, 15˚C should be used.
- Monitor frequently for comfort level and signs of skin irritation.
- Duration of cold therapy should be limited to 20 minutes.

Massage

Massage

Useful for headache, musculoskeletal pain, cancer pain, procedural and postoperative pain, post-exercise pain and pain at the end of life

Massage involves rubbing, kneading, tapping or manipulating soft tissue.

Mechanism of action: May promote comfort through relaxation, and may also reduce pain by improving circulation and reducing edema.

Using massage

- Techniques: gentle kneading strokes, Infant, Swedish & modified Swedish, deep tissue, Shiatsu, Craniosacral, and Lymph drainage massage
- Site of pain, references points on feet and ears
- Duration: usually 5-60 minutes
- May be taught to parents
- May include use of aromatherapy

Contraindications:

- Thrombocytopenia
- Skin infection or open wound
- Thrombophlebitis or deep vein thrombosis
- Palpable tumors at risk for spread

Transcutaneous Electrical Nerve Stimulation (TENS)

TENS

Children should be developmentally able to understand and control the therapy

Children should also be able to understand that the current will not hurt them.

TENS is noninvasive and indicated for acute and chronic pain, including musculoskeletal pain, abdominal pain, neuropathic pain, phantom limb pain, and postoperative pain.

Mechanism of action: is thought to be through stimulation of large-diameter cutaneous nerve fibers to inhibit nociceptive responses along the descending pathway, reducing central excitability and pain perception through stimulation of A-beta nerve fibers.

- Low and high frequency TENS also release endogenous opioids.
- Pain is modulated through the stimulation of peripheral (primary afferent nerves through the delivery of electrical current across the skin (transcutaneous).

Using Transcutaneous Electrical Nerve Stimulation (TENS)

- Electrodes are placed directly over the site of pain and at the related nerve root, proximal to the pain, or at an acupuncture point.
- Generates a small electrical pulse to produce a painless, low-voltage electrical stimulation of peripheral nerves.
- The electrical impulses create a buzzing, tingling, or tolerable twitching sensation.

Possible male>female response.

- Low risk (do not place electrode over baroreceptors of the carotid artery or eyes; use with caution in patients with seizure disorder, and may be contraindicated with cardiac pacemaker use).
- Low cost – <$100 USD.
- Patient controlled relief.
- May be passed from one patient to another.
- Over-the-counter devices now available in the US

Montana

What physical modalities might be useful for Montana?

Are there any that might not be appropriate in this case?

Are there any basic comfort measures you would provide in addition to the cutaneous stimulation techniques?

Would you use these therapies as primary or adjuvant treatment? Why?

Montana is getting daily PT and OT to increase her mobility. She is resistant to participating in therapies and says it hurts to sit up in a chair. She says she hurts everywhere and does not turn herself in bed.

Referrals

Other specialists to include on your care team

- Social support
- Support groups
- Physical therapist
- Occupational therapist
- Child Life Specialist
- Psychologist
- Chiropractor
- Massage therapist
- Osteopath
- Art therapist
- Music therapist
- Social Worker
- Acupuncturist
- Naturopath
- Clergy
- Others?

Montana

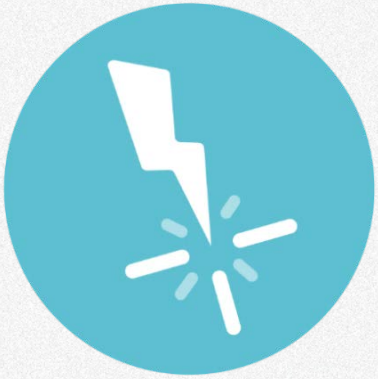
How might you respond when Montana's mom asks your opinion of these therapies?

Montana's Grandmother, who is a registered nurse, is visiting the patient. The bedside RN hears her talking to Montana's Mom about trying aromatherapy and Reiki. She encourages Mom to see if these therapies are available to facilitate relaxation and promote healing.

If not available, she offers to provide them.

In Summary…

Key Points



In some cases, the addition of biobehavioral strategies reduce analgesic use and associated analgesic side effects.

Parents play a key role in helping the child cope with pain.

Support for biobehavioral strategies

Biobehavioral strategies enhance pain management and facilitate relief of associated suffering.

These strategies are useful in conjunction with pharmacological options to help lower levels of anxiety, distress, and pain in children.

Categories

Biobehavioral strategies can be categorized into comfort, cognitive, and physical methods to help children manage and cope with their pain.

These strategies are also called non-pharmacologic, integrative medicine, complementary or alternative medicine (CAM).

Interventions to treat pain and help children cope with pain…

Comfort measures

These are techniques t are designed to provide physical ease and freedom from pain.

- Examples include managing the environment, pacing and bundling activities, and positioning.

Cognitive techniques

Cognitive-behavioral therapies (CBT) may help reorganize dysfunctional patterns of connectivity between the insula and cognitive and sensory networks.

- Techniques include reframing, distraction, relaxation, music, guided imagery, self-hypnosis, and biofeedback.

Physical interventions

Physical interventions may stimulate large-diameter pain fibers and interrupt the transmission of pain.

- Examples include cutaneous stimulation (cold, heat, and vibration), massage and transcutaneous electronic nerve stimulation (TENS).

Appendix

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