



# Preventing and Managing Childhood Fears with Needles

Pediatric Painless Intervention Workgroup  
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# Objectives

- Define the importance of procedural pain management in infants and children
- List examples and understand the use of pharmacological and non-pharmacological interventions for prevention of pain for infants and children
- Describe the use of comfort positioning during administration of immunizations

# Pain memories formed early

- Nociceptive receptors are present at birth
- Circumcised infant males shown to experience more pain with 4 and 6 month immunizations than:
  - Uncircumcised infants
  - Those provided topical analgesia with vaccines
- Infants born to diabetic mothers
  - Elevated pain response with later pokes

(Taddio, et al., 2009)

# Vaccines not “just a poke”

- Most frightening and painful healthcare procedure
- The most frequently reported painful events in a hospitalized child were IV starts, pokes and lab draws.
- Most common painful procedure worldwide
  - ~12 billion injections/year (WHO), ~5% are vaccines
  - 2-4 vaccines/visit in early months/years

(Chan, Pielak, Melntyre, Deeter, & Taddio, 2013; McMurty, et al., 2015; Taddio et al., 2015; Taddio et al., 2010; WHO, 2015, Wong & Baker, 1988; Inal & Kelleci, 2012;)

# Importance of Pain Interventions

- “First, do no harm”
- Pain relief is a basic human right
  - Vaccines activate peripheral nociceptors TWICE – the poke and the push
- Lack of pain management causes unnecessary suffering

(Taddio, Chambers, et al., 2009)

# Consequences of poor pain management

- Negative impact on level of cooperation
  - Lifetime healthcare avoidance
  - Vaccine non-adherence
    - Possible contributor to vaccine-preventable disease outbreaks
  - ~10% of the population avoids vaccines and needle procedures
    - Fear of needles ~ 25% of adults
- Increased pain sequelae
  - Increased pain response, increased analgesic requirements

(Taddio, et al., 2009)

# How Can Unrelieved Pain Affect Your Practice?

Performance metrics (clinical indicators and patient satisfaction) are affected by pain control and compassion. (Chan, Pielak, McIntyre, Deeter, & Taddio, 2013)

- Press-Ganey / HCAHPS –reimbursement
- Discharge questionnaires
- Post-clinic visit questionnaires

It's the right thing to do AND it improves survey responses!

# WHO & The CDC's Advisory Committee on Immunization Practice (ACIP)

- Pain relief/management is considered part of good vaccination clinical practice
- Pain mitigation techniques that may help counter vaccine hesitancy
  - Have caregiver present
  - Hold infants & young children and allow children to sit upright
  - Using proper technique and appropriate size needle, give most painful injection last
  - Breastfeeding, use distraction, be honest, use appropriate language

(Kroger, Sumaya, Pickering, & Atkinson, 2011; WHO, 2015)

# WHO, 2015 position statement

- Not addressing pain at time of vaccination may be a factor in:
  - Negative health attitudes and behaviors
  - Delay or avoidance of future vaccines
- Pain during vaccination is manageable
  - Mitigation strategies can be low-cost, age-specific, culturally acceptable

(WHO, 2015)

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# The CDC's Advisory Committee on Immunization Practice (ACIP)

- Methods for alleviating discomfort & pain with vaccinations help the child cope
  - Offering distractions
  - Ingestion of sweet liquids
  - Breastfeeding
  - Cooling of injection site
  - Using topical analgesics
- Antipyretics before or during vaccination are **not recommended**

(Kroger, Sumaya, Pickering, & Atkinson, 2011; Shah, et al., 2015)

# Pain management strategies are underutilized

- Despite new evidence and clinical guidelines
- Lack of knowledge about pain & effective pain prevention strategies
- Persistence of attitudes about pain
  - Personal bias & beliefs regarding pain related to immunization and pain-relieving techniques
    - Pain is a subjective experience by an individual
    - Greater distress leads to more negative memories of the event
- Interfere with existing clinical practice/workflow

(Taddio, Chambers, et al., 2009)

# Collaboration: it takes a team

- Nursing Department
- Pediatric General Care
- Pediatric Intensive Care
- Neonatal Intensive Care
- Pediatric Pharmacy
- Pediatric Anesthesia
- IV/Transfusion Service
- Pain Service
- Child Life
- Emergency Department
- Laboratory Medicine
- Laboratory Operations
- ECH Pediatrics
- Mayo Clinic Children's Center
- ComPASS
- CT Radiology
- Radiation Oncology
- Infusion Center
- Phlebotomy Department
- Ambulatory Pediatrics

# Current Analgesics & Tools

	Age	Onset	Rx
EMLA®	Neonate born at or after 37 weeks gestation and <b>is less than 30 days old. EMLA can be used with any age.</b>  Lidocaine and Prilocaine	60 minutes	Yes
LMX-4®	Neonate born at or after 37 weeks gestation and is <b>greater than or equal to 30 days old.</b>  <b><i>Does not cause vasoconstriction (no prilocaine – only lidocaine)</i></b>	<b>30 minutes</b>	No - OTC
J-Tip®	Neonate born at or after 37 weeks gestation and <b>is greater than or equal to 30 days old</b> , or is a pediatric or adult patient:	2 minutes	Yes
Pain Ease® Spray	3 years and older	Immediate	No
Buzzy®	Any age <3 years may not like ice “Between pain and the brain”	15-60 seconds	No

# Addressing The Barriers

- Time Constraints –
  - Pain-Ease® trialed and implemented
  - J-Tip® re-implemented
- Prescriber order not available –
  - Nurse-initiated Topical Analgesic Protocol and Guideline for Sweetease®
- Medication not available on unit –
  - Replaced EMLA® with LMX-4® in Pyxis machines
  - Added Sweetease® to unit storage areas versus Pyxis
- Vasoconstrictive Properties –
  - Adopt new products without these properties
  - Educate staff about topical analgesic differences
- Patient/Caregiver Refusal –
  - Policy created that all children are offered a topical analgesic
  - “A Poke Is No Joke” posters
  - Workflows/clinical practice changes implemented
  - Addressed personal bias & beliefs

# Challenge: Change our way of thinking

- Identify the best approach to deliver patient-centered care
- Choose the least traumatic approach
- Move away from what is best for the workflow to what is best for the patient
- Pain is real, and it is different for everyone

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# Examples of Frequently Encountered Comments from Staff

# “It only hurts for a minute.”

- The effects of pain can last a lifetime
- Untreated pain can leave a permanent imprint on the nervous system
- Subsequent pain becomes worse
- Leads to fears of needles, doctors, & nurses  
“Am I going to get a shot?”

(Taddio, Chambers et al., 2009)

“There’s not enough time.”  
“Parents don’t want to wait.”

- When practiced routinely, it doesn’t have to add time to the procedure
- Implement beforehand
- Educate parents & staff

(Taddio, Chambers et al., 2009)

# “Kids should get used to shots.”

- The best way to assure a child gets “used to” shots is to provide pain mitigation in every instance
- Anticipatory fear increases pain experience
- The act of crying does not equate to pain
  - Coping mechanism
  - Duration often measured to rate pain response in infants

(Taddio, Chambers et al., 2009)

# Pain-*LESS* Interventions

## Benefits

- Reduces distress for child, caregiver and staff
- Improves satisfaction with immunization experience
- Improves adherence to immunization schedules
- Reduced sequelae of pain

## Risks

- Temporary discoloration of skin (erythema, blanching)
- Discomfort from removal of occlusive dressing
- Systemic toxicity and allergic reactions are rare

(Taddio, Chambers et al., 2009; Taddio et al., 2015)

# Pain Management and Vaccine Efficacy

- Topical analgesia **does not affect vaccine effectiveness!**
- PainLESS interventions **do not decrease effectiveness of the vaccines!**

(Taddio et al., 2015; WHO, 2015)

# Examples of Pain Relief Options

- Oral sucrose
- Topical analgesics
- Buzzy<sup>®</sup> the Vibrating Ice Pack
- Pain-Ease<sup>®</sup> vapocoolant spray
- Comfort Positioning
- Distraction
- Breastfeeding

# Oral Sucrose

- Oral Sucrose 24% (Sweet-Ease<sup>®</sup>)
  - Newborns up to 6 months of age
  - “Food” per FDA
  - Dosing recommendations vary
  - **Give 2 minutes prior to any poke or procedure**
  - Decreases acute distress and crying/recovery time in infants

(Shah, et al., 2015, Stevens, et al., 2016)

# How it works

- Reduces pain in 2 ways:
  - Releases endogenous opioids and the effects are mediated by opioid pathways causing analgesia about 2 minutes after administration
  - Distraction – the sweet taste causes instant calming and cessation of crying
- Absorbed in cheek and sublingually, not swallowed
- Synergistic with sucking
  - Pacifier, gloved finger

# Topical Analgesics

- Lidocaine 4% (LMX-4<sup>®</sup>)
  - 30 days and older
  - 30 minute onset
  - Penetrates to muscle
  - OTC
- Lidocaine/Prilocaine (EMLA<sup>®</sup>)
  - 37 weeks gestation
  - 60 minute onset
  - Requires prescription

(Mayo Clinic, 2014, 2016)

# Key Differences Between EMLA<sup>®</sup> vs. LMX-4<sup>®</sup>

	EMLA <sup>®</sup>	LMX-4 <sup>®</sup>
<b>Application</b>	<ul style="list-style-type: none"> <li>-Squeeze prescribed amt</li> <li>-Do not rub</li> <li>-Cover</li> </ul>	<ul style="list-style-type: none"> <li>-Do not cleanse skin</li> <li>-Squeeze small amount and rub for 30 seconds then add another layer</li> <li>-Cover but do not flatten cream</li> </ul>
<b>Onset</b>	60 min	30 min
<b>Who can apply?</b>	RN	Laboratory Technician or RN
<b>Location on Pediatric Unit</b>	Pharmacy delivers/ Pyxis stocked on pediatric units	Pyxis stocked in some areas
<b>Vasoconstrictive Properties</b>	<b>*Yes</b> (Prilocaine is an ingredient)	<b>No</b> (No Prilocaine)

# Topical Analgesics

- Require some planning to implement due to time and cost
- Topical analgesics are often underutilized by healthcare providers
- Parents are willing to wait and pay for topical analgesics
- Pain ratings were higher during subsequent needle-related procedures when a placebo was used instead of a topical analgesic

(Jefferies, Scott & Green, 2011; Taddio et al., 2015; Walsh & Butterfield, 2006; Weisman, Bernstein & Schechter, 1998; WHO, 2015)

# Occlusive Dressing Tips

- Glad<sup>®</sup> Press 'n Seal<sup>®</sup> or plastic wrap
- Have child remove the dressing or lift corner, pull parallel to limb while holding down opposite corner, then lift off
- Place a sticker on top of dressing
- Cover with pants or wrap a blanket around dressing

(Mayo Clinic, 2016)

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# Buzzy® - The Vibrating Ice Pack

- Vibration (only) appropriate for all ages
- Vibration plus ice for 18 months and up
  - Children 3 and under may not like the ice – use Buzzy alone
- Cold and vibration help relieve pain, provide distraction
- Gate Theory of Pain
- Placement between “pain and the brain”

(Baxter, Cohen, McElvery, Lawson, & von Baeyer, 2011; Mayo Clinic, 2016, <https://buzzyhelps.com>)

# Buzzy® - The Vibrating Ice Pack

- Injections, lab draws, or IV starts
  - With Buzzy® activated, wait at least 15 seconds before giving injection or doing the blood draw
  - Slide Buzzy® 2-3 cm proximally (closer to head), making sure it is out of the way of the zone to be prepared
  - Leave Buzzy® vibrating above site during skin prep and administration

(Saniver et al., 2015)

# Vapocoolants (Pain-Ease<sup>®</sup> Spray)

- Ages 3 and up
- Vapocoolant spray that controls pain during injections and minor procedures
- Interrupts body's experience to pain
- Works immediately by reducing the skin temperature by 1-3 degrees
- Easy to apply & cost effective (multi-use container)
- May be reapplied after 1 minute as needed

(<http://www.gebauer.com/painease>)

# Vapocoolants (Pain-Ease<sup>®</sup> Spray)

- When combined with distraction, showed statistically significant decrease in parent and child distress
- The cold/burning sensation may not be well tolerated by young children
- Techniques:
  - Spray directly on skin
  - Cotton ball application

(Burgess et al., 2014; Shah et al., 2015; Mayo Clinic, 2016); <http://www.gebauer.com/painease>)

# Considerations/tips for vapocoolants

- Use only for clean procedures
- Use cautiously in those with poor circulation
- Clean skin, then spray with vapocoolant
- Hold a can length away (3-7 inches)
- Spray with vapocoolant (4-10 sec.) or apply a cotton ball saturated with vapocoolant directly to skin (5-15 sec.) or until skin begins to turn white (whichever is first)
- Immediately perform procedure (<http://www.gebauer.com/painease>)

# Comfort Positions

- A “hug” from a parent or caregiver
- Allows children to feel
  - Secure
  - Reassured
  - Empowered
- Do not forcibly restrain
  - Increases fear
  - loss of sense of control
- Find appropriate comfort position to meet the individual needs of the child

# Comfort Positions

- They support family-centered care
- They help children cope with medical experiences and teach them skills for future visits
- They help to enhance a child's medical experience

# Comfort Positions

- They can isolate an extremity for procedure or poke
- They allow for active caregiver participation
- They decrease stress, not only for the patient, but for caregiver & staff

# Physical Interventions for Infant Immunizations

- 5 S's
  - Swaddling
  - Side/stomach
  - Shushing
  - Swinging
  - Sucking
  
- Decreased pain scores & crying time for 2 & 4-month old infants during routine vaccinations

(Harrington et al., 2012)

# Distractions

- Reduction in self-reported pain
  - Breathing exercises – blowing bubbles, party blowers used to “blow the hurt away”
  - Child or nurse-led distractions more effective
  - Parent-led distractions give parent something positive to do
  - Apologies, reassurance, empathy can cause increased anticipatory fear

(Chambers, Taddio, Uman, McMurtry, & HELPinKIDS Team, 2009; Thrane, et al., 2016)

# Breastfeeding

- Reduces stress:
  - Physical comfort
  - Sucking
  - Distraction
  - Sweet-tasting milk
- Does not negatively impact breastfeeding
- MRI to assess brain activity, comparing oral sucrose to breastfeeding
  - “breastfeeding is multisensory experience leading to decreased pain perception” (Thrane, et al., 2016)

(Mayo, 2016; Taddio et al., 2015; Taddio, Ilersich et al., 2009)

# Additional Strategies

- Deep breathing
- Presence of caregiver to lower stress
- Be honest
  - Explain what is about to take place and why
  - Do not be falsely reassuring – it will hurt
- Age appropriate language
  - Neutral/non-threatening words – “Here we go” rather than “Here comes the shot”
  - Use “poke” instead of shot; “bed” instead of table; “feels warm” instead of burn/hot
- Assess situation, implement the best pain management strategy, then poke

(Chambers, Taddio, Uman, McMurtry, & HELPinKIDS Team, 2009; WHO, 2105)

# Physical Interventions

- Child should sit upright
  - 6 months old, or once able to sit upright
  - Upright position is preferred by parents
  - Does not extend length of the procedure
- Do not forcibly restrain - this increases fear and the child loses sense of control
- Breastfeeding during poke – establish a good latch first
- Comfort positions
  - Comfortable and close proximity

(Taddio et al., 2015; Taddio, Illersich et al., 2009)

# Vaccine or Needle Techniques

## The Actual “Poke”

# Procedural Interventions

- \*Add little to no time or cost\*
- No aspiration used during IM injections
  - Not necessary due to lack of major blood vessels in injection sites
  - Decreased pain
- Inject most painful injection last
- Rapid injection
- If the vaccine itself is known to be more painful, technique unlikely to reduce pain without additional intervention

(Kruger, Sumaya, Pickering, & Atkinson, 2011; Taddio et al., 2015)

# Procedural Interventions

- Correct size needle to deliver vaccine to appropriate location for the specific poke
- Sequential vs. simultaneous injections
  - No proof that they are less painful
  - Simultaneous injections are less safe
- No evidence to support stroking site close to injection before or after administration
- No evidence to support use of antipyretics before or at time of vaccine

(Kruger, Sumaya, Pickering, & Atkinson, 2011; Prymula et al., 2009 ; Taddio et al., 2015; Taddio, Ilersich et al. 2009)

# What not to do

- Stroke/stimulate the injection site
- Provide antipyretics *before or at time* of vaccine
- “Warm” the vaccine
  - No evidence to support that it helps with pain, and may interfere with effectiveness of vaccine

(WHO, 2015)

# Process Interventions

- Educate providers who order vaccines and caregivers who administer vaccine injections
  - Time invested in preparation will likely be saved during the procedure itself
- Educate parents – prior and at point of care
  - Increased use of pain management techniques with education
  - 54% increase on day of education; 36% increase 2 months later
- Educate children 3 years and older and adults about pain management on the day of vaccination

(Taddio et al., 2015)

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# Take Home Points

- Children cannot advocate for themselves or express what they are feeling
- They are at risk of developing long-term consequences from unmitigated pain
- There are options available that should be offered to children. Combine methods for optimal results.
- Educational efforts are needed for parents, providers, and vaccinators to promote interventions during shots

(Taddio et al., 2015; Taddio, Ilersich et al., 2009; WHO, 2015)

# Take Home Points

- Remember that children will still cry .....and that's OK.
- Do not guarantee that they won't feel it. They will feel it LESS.
- Remember to offer praise.
- A poke is no joke!

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