

# Unique and Interesting Procedures in the Pediatric UC – Approach, Novel Techniques and Devices

Michael Gorn, MD



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Care Conference



# Disclosure Information

- I am the cofounder and majority holder of EM Device Lab, a medical device company
- I **do not** intend to discuss the company product in my presentation

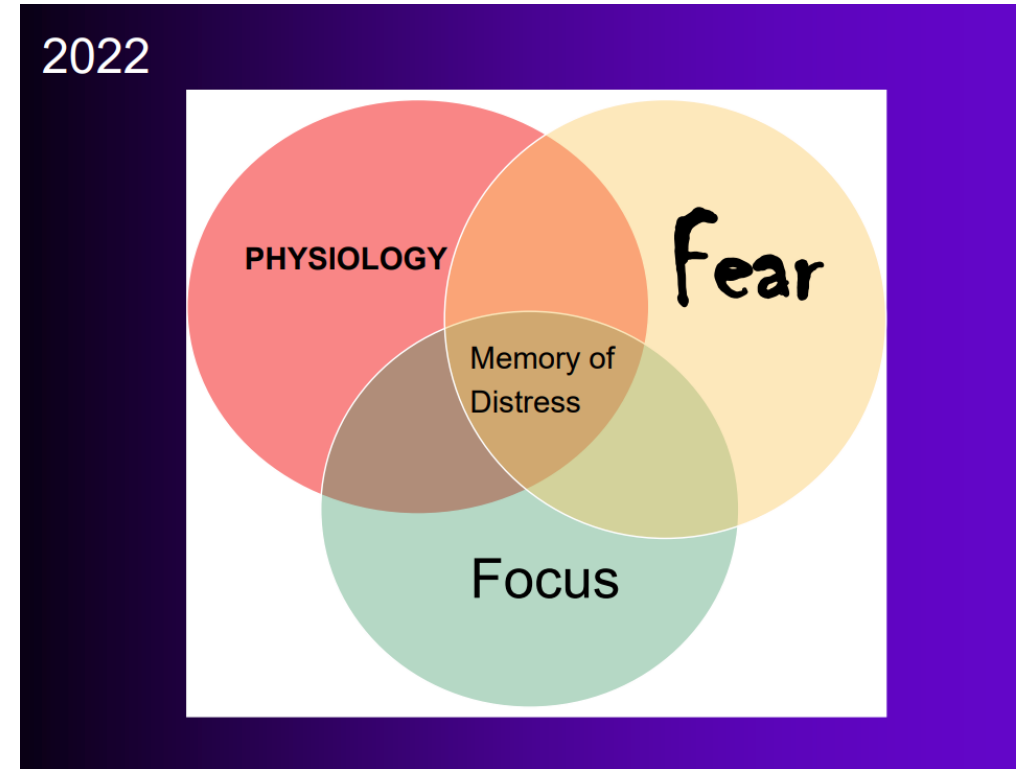
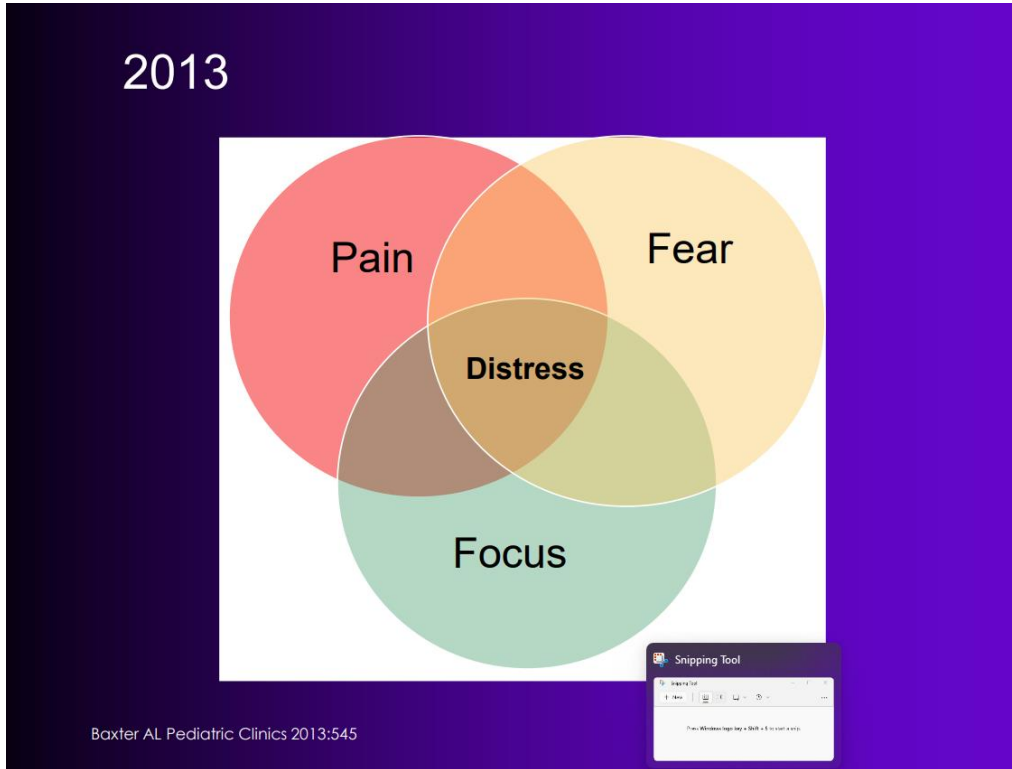
# Poll

You are evaluating a 5-year-old boy with a facial laceration that will require stitching.

What is your plan of attack?

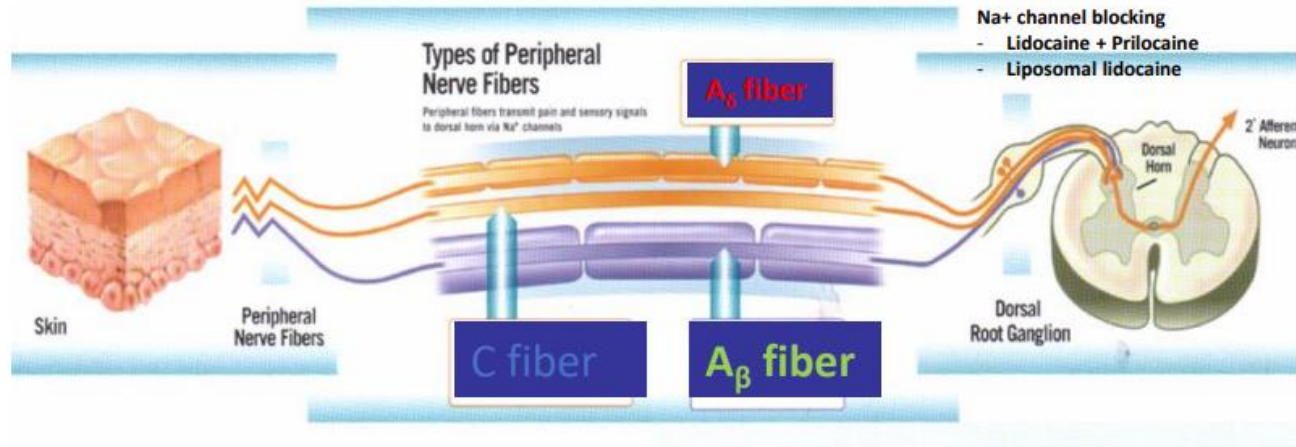
1. Strap him down!
2. Transfer to ER for plastic repair
3. Mutual decision making with family and preplanned anxiolysis and pain control

# Managing Procedural Anxiety and Pain



Slide credit to Amy Baxter MD

# How Sensation Transmission Works



- A<sub>δ</sub> fibers transmit **fast pain**
- C Fibers slow pressure and cold
- **A<sub>β</sub> fibers are huge and fast, transmit sensation from mechanoreceptors**

Slide credit to Amy Baxter MD

# Managing Procedural Anxiety and Pain

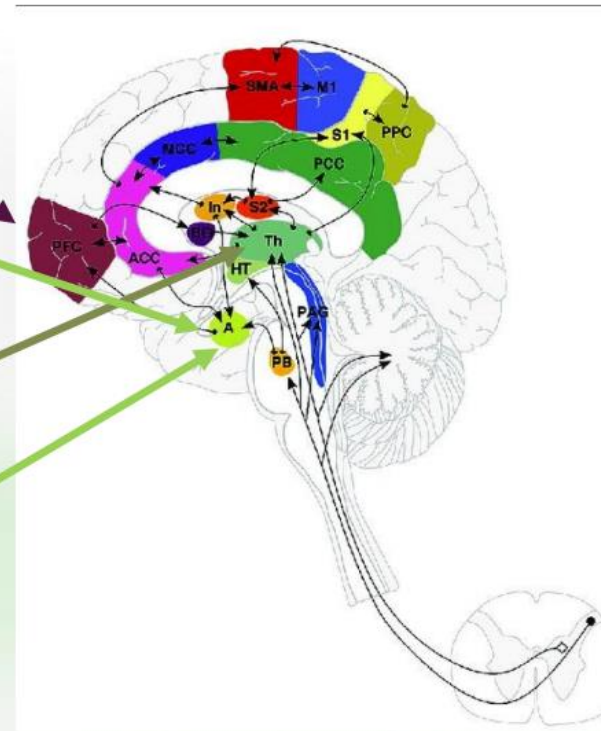
## Fear

**Catastrophizing:** worry increases pain and post-surgical OUD risk

**PTSD:** Adequate pain relief in the trauma bay and post-op reduce chronic pain

**Brain size:** Chronic pain increases and decreases brain size: the thalamus, a "CPU" for pain, is larger before total knee replacements. 6 months later, it is normal sized. In contrast other brain areas shrink in response to pain.

**Procedures:** Anxiety levels correlate with self-report perception of pain. The Amygdala is part of the pain matrix pathway.



Kang BX Brain Beh 2022 Jan;12(1):e2479

Slide credit to Amy Baxter MD

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# Augmented Reality in ED - **FOCUS**

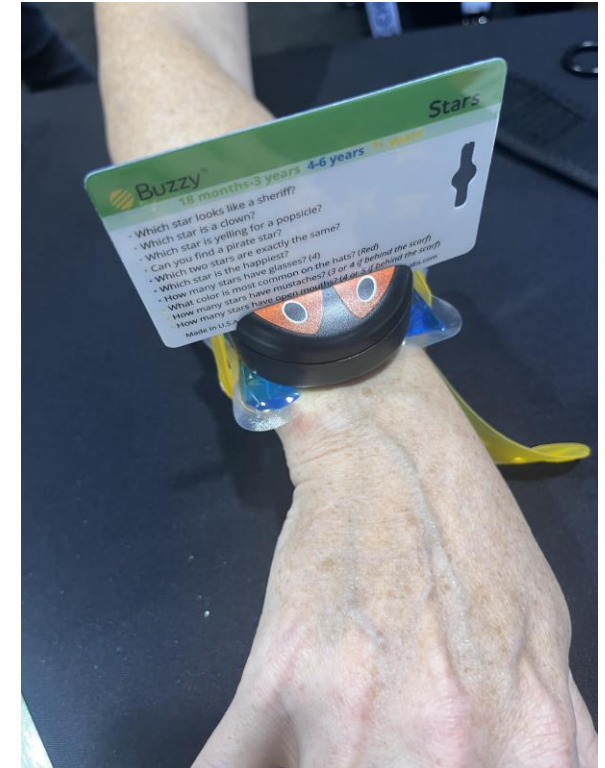
- Schlechter A et al. *Virtual reality distraction during pediatric intravenous line placement in the ED.*
  - ED IV placement VR vs Child Life age 4-17yr, n=116
  - VR shows similar efficacy to standard distraction techniques
- Other studies in ED, Outpatient Oncology and Surgery settings
  - Mostly for IV placement
- **No studies evaluating VR for typical PUC procedures...**

Am J Emerg Med. 2021 Jun;44:296-299

# Distractions and Cognitive Stimulation

## FOCUS, FEAR, PAIN

- Use the nerves
  - Cold and vibration before pain
  - Ask questions to challenge the mind



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# Anxiolytic Medications – Fear and Pain

## Mucosal Atomizer Device (MAD) for Intranasal Medications

- Max volume per nostril is 1ml, dose may be divided
- Dead Space Adjustment - additional 0.1 mL must be drawn
- Aim MAD slightly upwards and toward the ear on the same side as the nostril
- Burning/stinging in the nostrils
- Juice chasers



# Anxiolytic/Pain Medications – Fear and Pain

## Midazolam - pre-procedural anxiety reduction

- Onset of action is 3-5min
- 0.2-0.4mg/kg MAX 10 mg
- **Peak effect 10-15 min**
- Duration of effect 30-60 min

**OR**

## Fentanyl is a fast-acting analgesic, short duration of action

- 1.5-2mcg/kg per dose Max dose 100mcg
- Onset of action is 3-5min
- Peak effect 12-20min
- Duration of effect 30min



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# Topical Medications

Viscous Lidocaine 4%



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# Pain Control Medications

LET  
Lidocaine/Epinephrine/Tetracaine

LAT  
Lidocaine/Adrenalin/Tetracaine

- No evidence of end organ necrosis in otherwise healthy patients

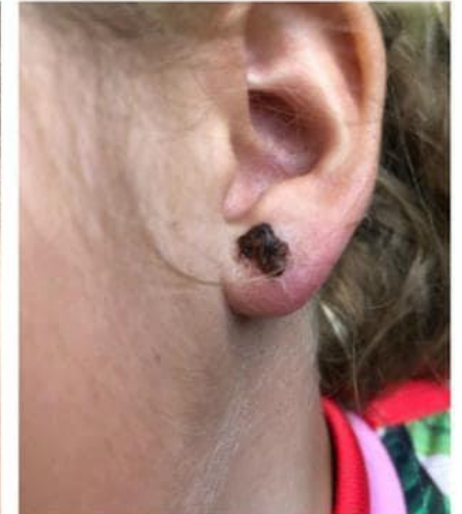
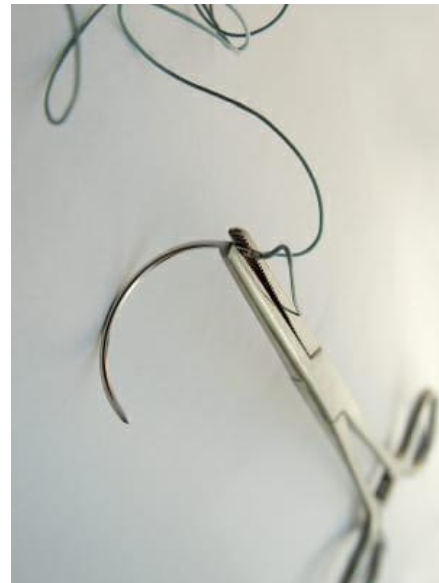


Ilicki J, Safety of Epinephrine in Digital Nerve Blocks: A Literature Review. J Emerg Med. 2015 Nov;49(5):799-809

# Pain Control Medications

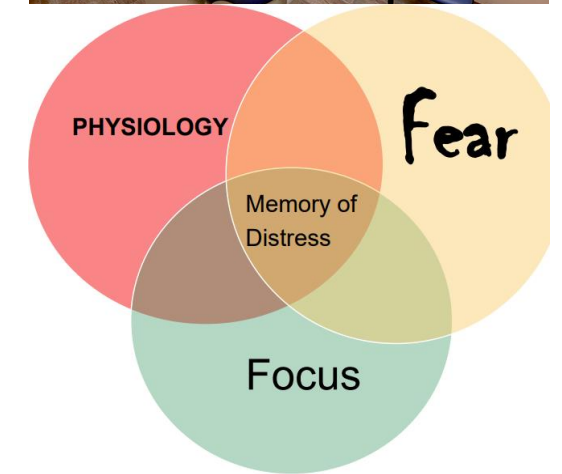
## Lipophilic Lidocaine

- EMLA
- LMX



# Anxiolysis and Procedural Preparation

- Anxiety: children, parents and the doctor/provider!
- Set expectations: pre-procedure, duration, pain, aftercare
- Age-appropriate expectations: language, position, restraints
- Do not lie - tell them what you are doing (age appropriate)
  - Make yourself comfortable
  - Use the correct tools
  - Drugs (PO, IN, Topical)
  - Augmented VR, restraints, distraction



# Speaking of Painful Procedures...

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# Poll

What is the **SECOND** most painful procedure on awake patients in the ED?

1. Laceration repair
2. Nasogastric tube placement
3. Abscess drainage
4. Fracture splint applications

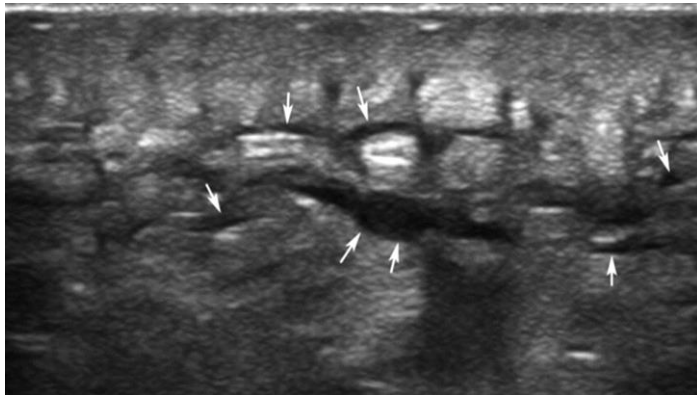
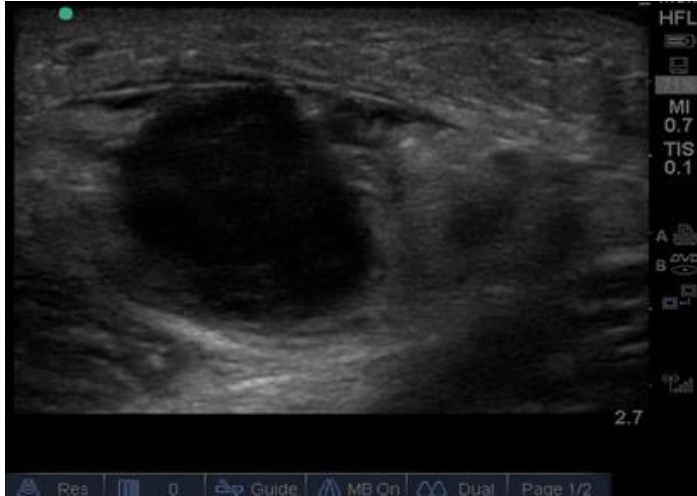


# Abscess Drainage in Children

- Plan adequate anesthesia
  - IN medications
  - Distractions
  - Blocks
  - LMX/EMLA



# Decision to Drain - Ultrasound



## 2010-2017 multiple studies

- Useful adjunct when it is unclear if infection contains pus
- US Improved sensitivity and specificity over clinical exam alone
- Predicts MRSA vs other bacteria
- US can change management in up to 27% of cases!

## 2019 – multicenter, 1111 cases

- Certainty on exam, US changed decision in 1.2%
- Uncertainty on exam, US changed 23.8%
- US use for I&D guidance improves outcomes

# Decision to Drain - Ultrasound

## ORIGINAL RESEARCH

### Abscess Size and Depth on Ultrasound and Association with Treatment Failure without Drainage

2020

n=162 patients (no I&D)

Frances M. Russell, MD, RDMS  
Matt Rutz, MD  
L. Ken Rood, MD  
Justin McGee, MD  
Elisa J. Sarmiento, MD

Indiana University, Department of Emergency Medicine, Indianapolis, Indiana

- The optimal cut-off to predict treatment failure
  - 1.3 cm in longest dimension
  - 0.4 cm in depth from the skin
- Otherwise manage with warm compresses and antibiotics

# Packing



## 2009

O'Malley. RCT n=48, no difference of clinical failure (17 vs 20%)  
Packing more painful, only abscess size <5cm, all treated with antibiotics

## 2012

Kessler. RCT n=57. success 70 vs 59%, some antibiotics  
Leinwand. RCT in OR. N=85. 81 vs 85% antibiotics and soaks

# Antibiotics

## Traditional Approach

- Abscess/Cellulitis
  - Antibiotic use indicated
- Abscess alone, uncomplicated, <5 cm
  - No antibiotics

# Antibiotics




*N Engl J Med.* 2016 March 3; 374(9): 823–832. doi:10.1056/NEJMoa1507476.


## Trimethoprim–Sulfamethoxazole versus Placebo for Uncomplicated Skin Abscess

David A. Talan, M.D., William R. Mower, M.D., Ph.D., Anusha Krishnadasan, Ph.D., Fredrick M. Abrahamian, D.O., Frank Lovecchio, D.O., M.P.H., David J. Karras, M.D., Mark T. Steele, M.D., Richard E. Rothman, M.D., Ph.D., Rebecca Hoagland, M.S., and Gregory J. Moran, M.D.

Infectious disease/systematic review/meta-analysis

## Systemic Antibiotics for the Treatment of Skin and Soft Tissue Abscesses: A Systematic Review and Meta-Analysis

Michael Gottlieb MD   , Joshua M. DeMott PharmD, MSc, Marilyn Hallock MD, MS, Gary D. Peksa PharmD

[Show more](#) 

### 2016-2019

Bactrim improves recurrence rates for abscess infections

Clindamycin used in other studies with 25% side effects

### HOWEVER –

Baseline cure rate is over 80%

Risks of side effects may not outweigh benefits on individual bases

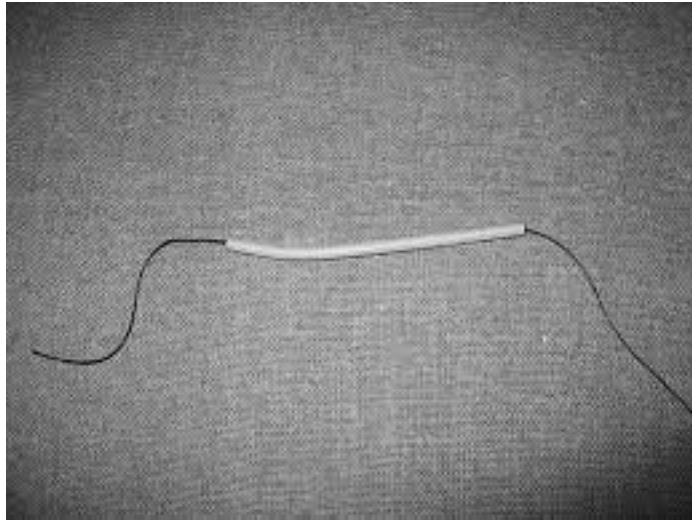
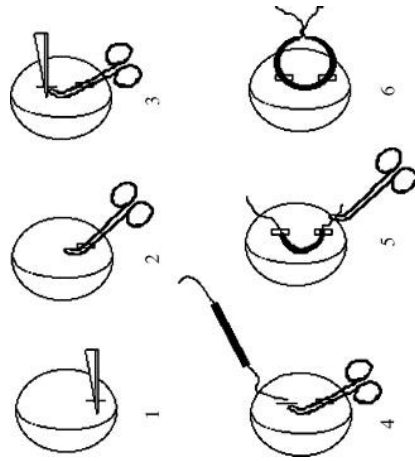
## Summary so far...

- Ideal Size?
- Packing?
- Antibiotics?
- Technique??

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# Jacobi Ring



The American Journal of Emergency Medicine

Volume 23, Issue 3, May 2005, Pages 414-415



Correspondence

## Jacobi ring catheter treatment of Bartholin's abscesses

Paul Gennis MD, Siu Fai Li MD [✉](#), Jennifer Provataris MD, Samina Shahabuddin MD, Alison Schachtel MD, Evelyn Lee MD, Paul Bobby MD

- RCT n=25
  - Bartholin cyst abscess
  - Jacobi ring vs Ward catheter
  - Ring is effective and better tolerated

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# Loop Drainage Technique

Opening the Abscess

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**CME** A Randomized Controlled Trial of Novel Loop Drainage Technique Versus Standard Incision and Drainage in the Treatment of Skin Abscesses

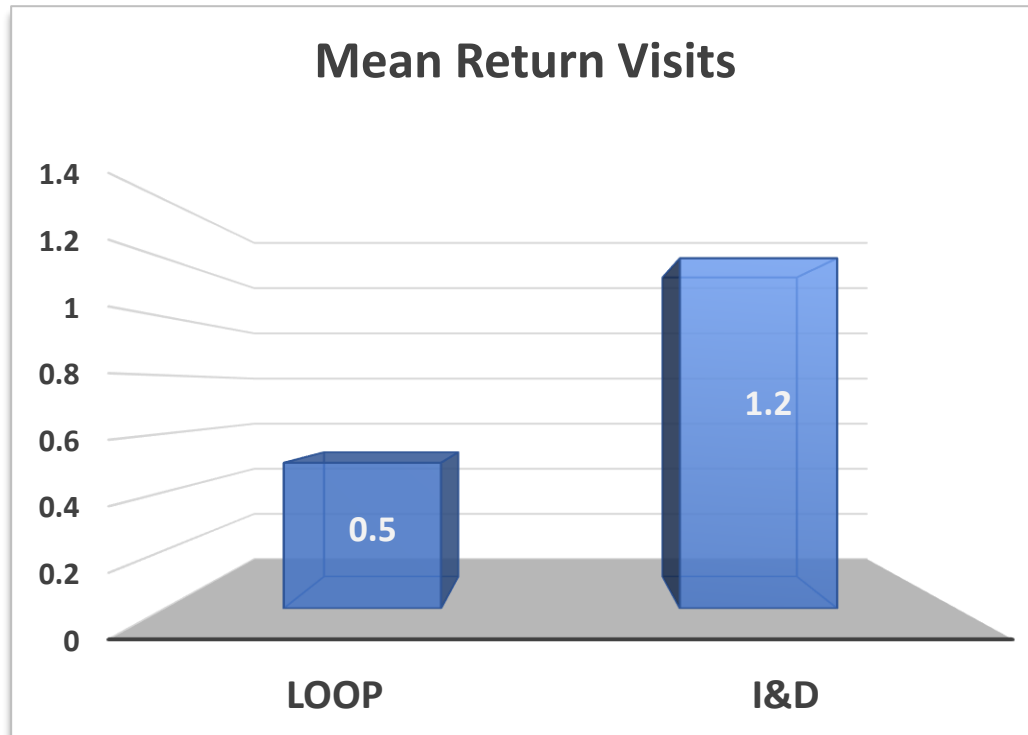


Jay Ladde, MD<sup>1</sup> , Sara Baker, MD<sup>1</sup>, Natali Lilburn, MD<sup>2</sup>, Michelle Wan, MD<sup>3</sup>, and Linda Papa, MDCM, MSc<sup>1</sup>

- *RCT n=277 patients*
- *Significantly less pain at follow-up*
- *Easier to care for over the first 36 hours*
- *Patient satisfaction at 10 days higher in the loop group*

# Loop Drainage Is Noninferior to Traditional Incision and Drainage of Cutaneous Abscesses in the Emergency Department

Elissa M. Schechter-Perkins, MD, MPH<sup>1</sup> , Kristin H. Dwyer, MD, MPH<sup>2</sup> ,  
Anish Amin, MD<sup>3</sup> , Matthew D. Tyler, MD<sup>4</sup> , James Liu, MS<sup>1</sup> ,  
Kerrie P. Nelson, PhD<sup>5</sup> , and Patricia M. Mitchell, RN<sup>1</sup> 



## 2020




RTC n=238 patients

- Mean return visits: 1.2 vs 0.5
- Unscheduled visits within 14 days: 63 vs 37%

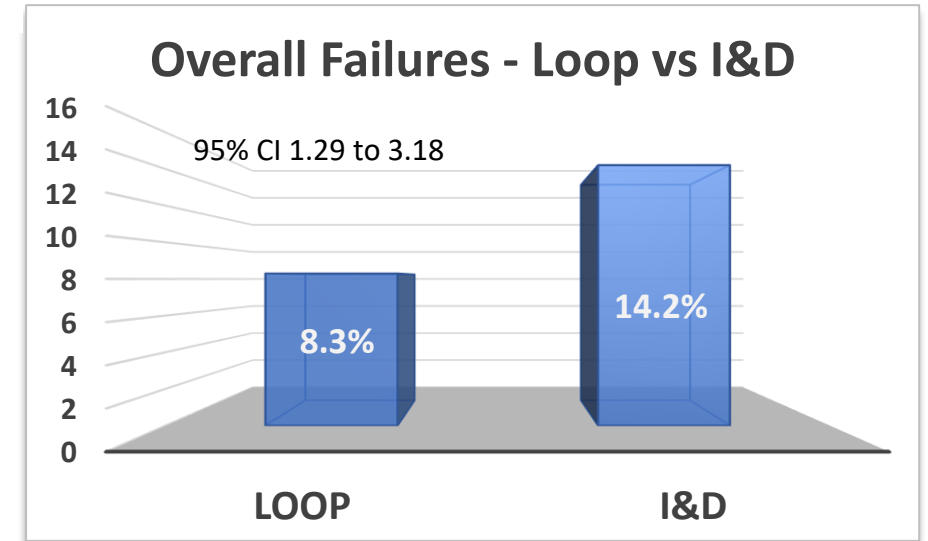
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## Comparison of the Loop Technique With Incision and Drainage for Skin and Soft Tissue Abscesses: A Systematic Review and Meta-analysis

Michael Gottlieb, MD<sup>1</sup> , Gillian Schmitz, MD<sup>2</sup> , and Gary D. Peksa, PharmD<sup>1</sup> 

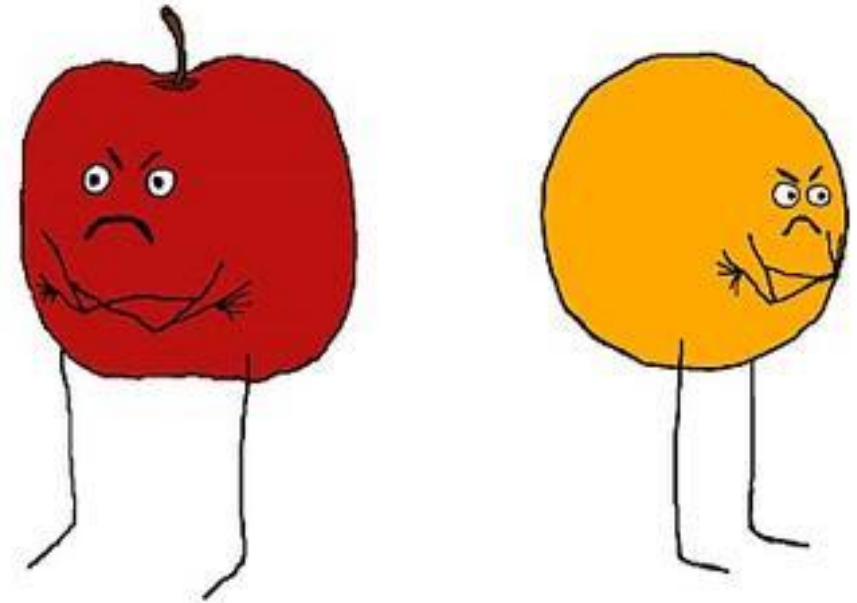
- 8 studies of 910 patients
- 5 studies were RTC
- 42% Reduction in treatment failure
- Pediatric loop subset had 75% lower failure rate



# Loop Technique Clinical Data Summary

## Studies spanning 10 years & 5000 patients Standard I&D vs Loop Technique

- 42% Reduction in Treatment Failures
- 58% Reduction in Return Visits
- Significantly Lower Pain Scores
- Significantly Easier Home Care
- Significantly Higher Patient Satisfaction
- 57% Adoption in 18 months





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# POLL

You work in the Urgent Care because you LOVE doing procedures! Let's review some cool devices that can make your life a little easier (and more fun). Your Favorite Procedure is:

1. Suturing
2. I&D
3. Fracture Care
4. Nursemaid reduction
5. Foreign Body Removal

# Right Tools at the Right Time!



The ultimate foreign  
body removal!

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# Tick Removal

- 🏠 Ticks Home
- Avoiding ticks +
- Removing a tick -**
- Tick Bite Bot
- Symptoms of tickborne illness
- Regions where ticks live
- How ticks spread disease
- Diseases transmitted by ticks
- Tick bite data tracker +
- Tickborne disease continuing education
- Tickborne Diseases of the United States—reference guide
- Tick surveillance +
- Reported tickborne disease cases
- Asian longhorned ticks
- Alpha-gal syndrome +
- Communications resources +
- Tickborne disease videos +

## Tick Removal

[Español \(Spanish\)](#) | [Print](#)



### Tick Bite Bot

A tool to assist people in removing attached ticks and seeking health care, if appropriate, after a tick bite.

[Get Started](#)

[About the Tool](#)

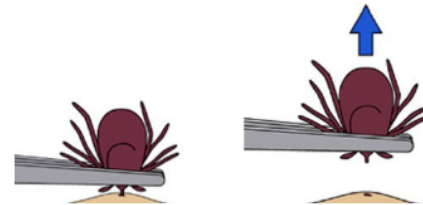
### Removing a tick

### Testing of ticks

If you find a tick attached to your skin, simply remove the tick as soon as possible. There are several tick removal devices on the market, but a plain set of fine-tipped tweezers works very well.

## How to remove a tick

1. Use clean, fine-tipped tweezers to grasp the tick as close to the skin's surface as possible.
2. Pull upward with steady, even pressure. Don't twist or jerk the tick; this can cause the mouth-parts to break off and remain in the skin. If this happens, remove the mouth-parts with tweezers. If you cannot remove the mouth easily with tweezers, leave it alone and let the skin heal.
3. After removing the tick, thoroughly clean the bite area and your hands with rubbing alcohol or soap and water.
4. Never crush a tick with your fingers. Dispose of a live tick by
  - Putting it in alcohol,
  - Placing it in a sealed bag/container,
  - Wrapping it tightly in tape, or
  - Flushing it down the toilet.



## Follow-up

If you develop a rash or fever within several weeks of removing a tick, see your doctor:

- Tell the doctor about your recent tick bite,
- When the bite occurred, and
- Where you most likely acquired the tick.

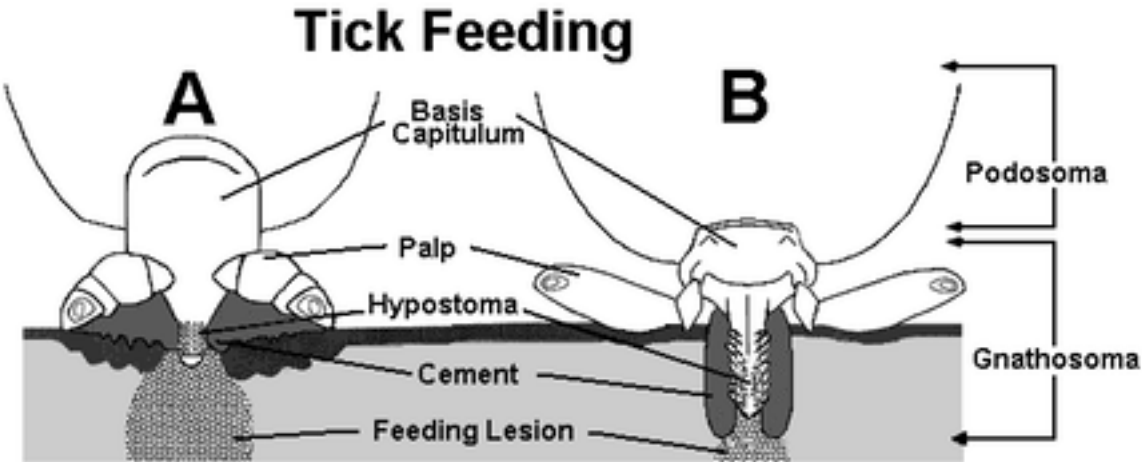
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# Tick Removal

comg.



Source: <https://identify.us.com/idmybug/ticks/tick-FAQS/do-ticks-really-cause-harm.html>



# Tick Removal - Moistened Q-tip Technique



# Tick Removal - Moistened Q-tip Device



# Ring Removal – Cut vs Remove



# Ring Removal Device

## Considerations

- How long (edema vs weight gain)
- How many attempts
- Neurovascular compromise
- Arthritis
- Digital block, lubrications



1. Describe mechanisms of pain and anxiety associated with both acute and chronic pain
2. Select age-appropriate pain control and anxiolysis necessary for a successful Pediatric Urgent Care procedure
  - Physiology, Fear, Focus – Memory of Distress
3. Describe the benefits of the Loop Abscess Drainage
4. Recognize device aids that can be used in various "foreign body" removal procedures

# Session Evaluation

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- To claim CME, you must complete a separate survey available after the convention.

\* How likely are you to recommend this **content** to a colleague?

Not likely at all                      Neutral                      Extremely likely

0   1   2   3   4   5   6   7   8   9   10

What did you find most valuable about this **content**?

What would have made this **content** better?

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