



# CRYONEUROLYSIS

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SOUTHEASTERN SPINE AND JOINT

CHATTANOOGA, TN

# THE IOVERA SYSTEM IS...

- A handheld cryoneurolysis device that works by applying targeted cold to a peripheral nerve, temporarily destroying the pain-transmitting components nerve.
- The effect of Iovera is immediate and can last up to 90 days.

# CONTRAINDICATIONS

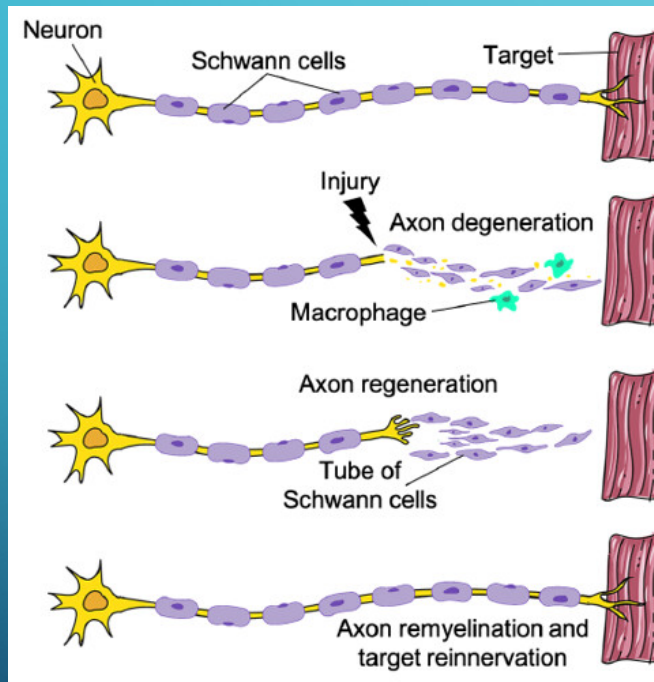
Vascular or skin reactions to cold

- Cryoglobulinemia
- Paroxysmal cold hemoglobinuria
- Cold urticaria
- Raynaud's disease
- Open and/or infected wounds at or near treatment site

# SUNDERLAND NERVE INJURY CLASSIFICATION

<b>Type 1</b>	Conduction block (neurapraxia)
<b>Type 2</b>	Axonal injury (axonotmesis)
<b>Type 3</b>	Type 2 + Endoneurium injury
<b>Type 4</b>	Type 3 + Perineurium injury
<b>Type 5</b>	Type 4 + Epineurium injury (neurotmesis)

# AXON DEGENERATION



## 2<sup>nd</sup> degree nerve injury results in degeneration of peripheral nerve

- 2 weeks: Axon and myelin degeneration
- 4 weeks: Axon and myelin sheath regeneration begins
- 8 weeks: Newly regenerated axon to original state

# SAFETY: EFFECT ON ADJACENT TISSUES

Short intense cooling spares surrounding tissues; minimal to no damage

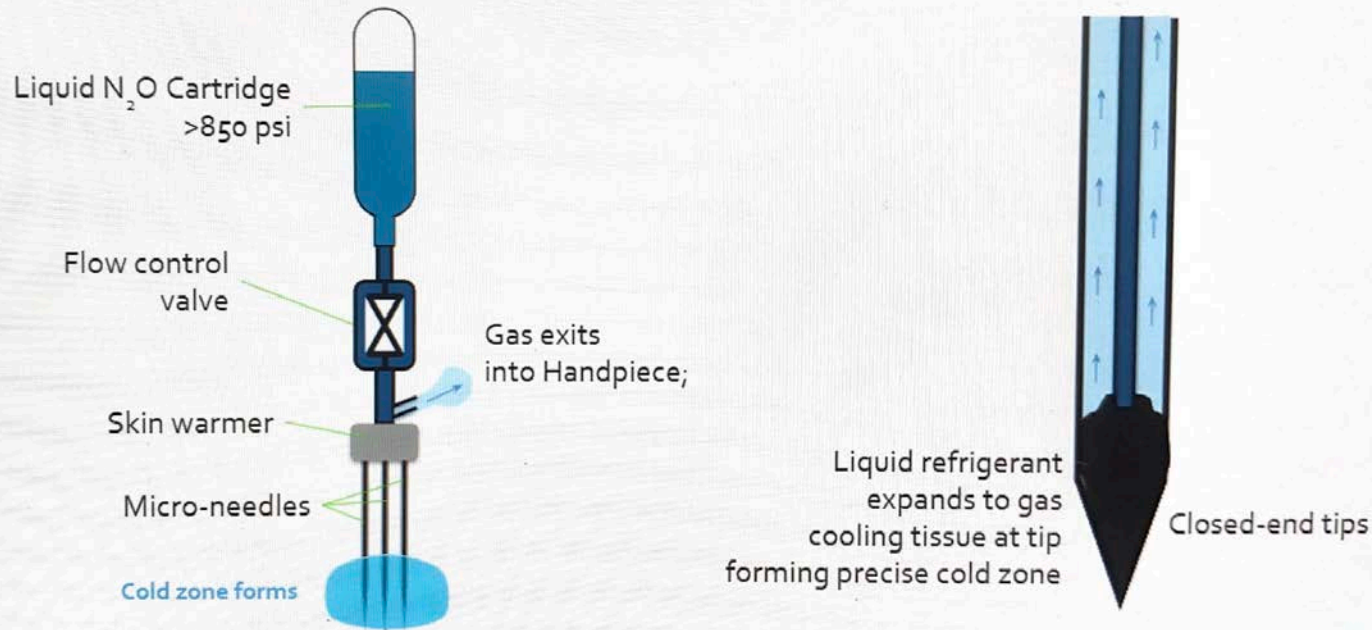
- Blood vessels
- Hair follicles, sebaceous glands, or sweat glands
- Muscle tissue
- Fat cells

# CRYONEUROLYSIS SAFETY SUMMARY

- Mechanism of action is well understood
  - Nerves reliably degenerate and then regenerate
- Decades of safe clinical experience
  - Used for chronic and postsurgical pain since 1970
  - Nearby structures appeared normal, and small arterioles near treatment site stayed patent, even after multiple treatments

# METHOD OF OPERATION

## Method of Operation





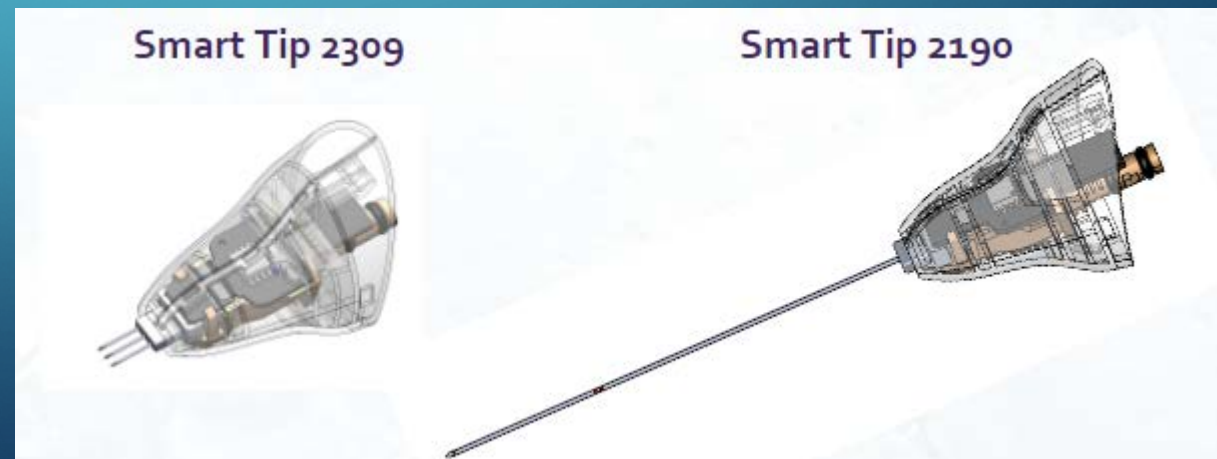
# HANDPIECE



- Cordless, handheld
- Single push-button control
- LCD display guides setup and treatment
- Charges on dock between treatments
  - ~2 hours from zero charge to full charge Treat ~5 knees before battery runs down

# SMART TIPS

- Closed-end needles
- Pre-programmed treatment algorithms
- Snaps on to Handpiece
- Intergrated skin warmer for dermal protection
- Sterile, single patient use



# NITROUS OXIDE CARTRIDGE

- Cartridge contents are highly pressurized
- Ship via ground only
- Provides up to 14 cycles



# PATIENT SELECTION

## Ideal Candidates

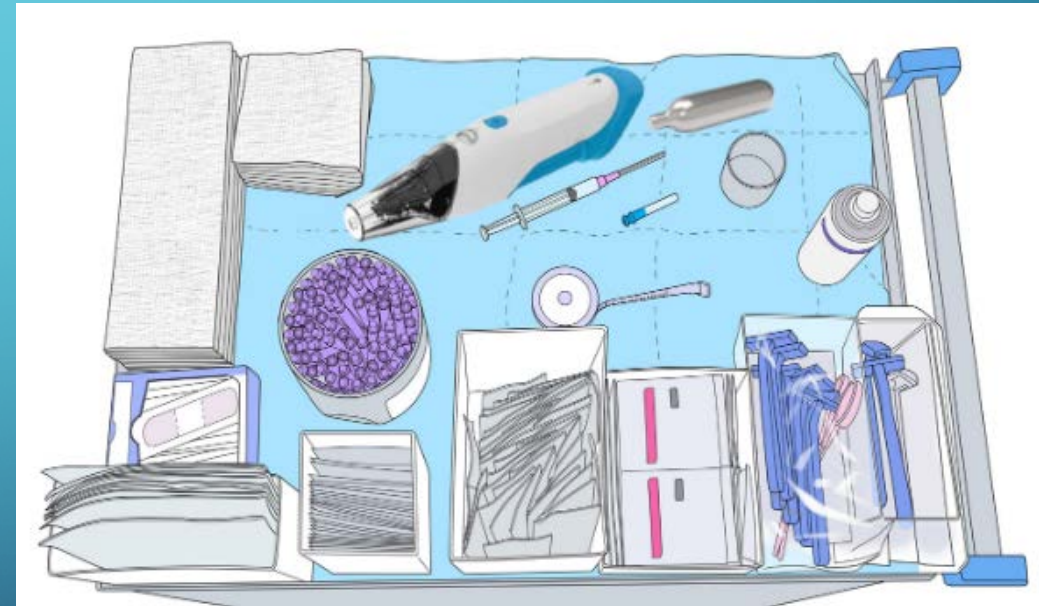
- Patients with identifiable, localized focal pain innervated by accessible peripheral nerve(s)
- Normal nerve anatomy within treatment location
- Able to tolerate treatment positioning and duration

## Non-ideal Candidates

- Patients with complex pain conditions, eg, fibromyalgia
- Prior local trauma
- Depressed mental state

# SUPPLIES

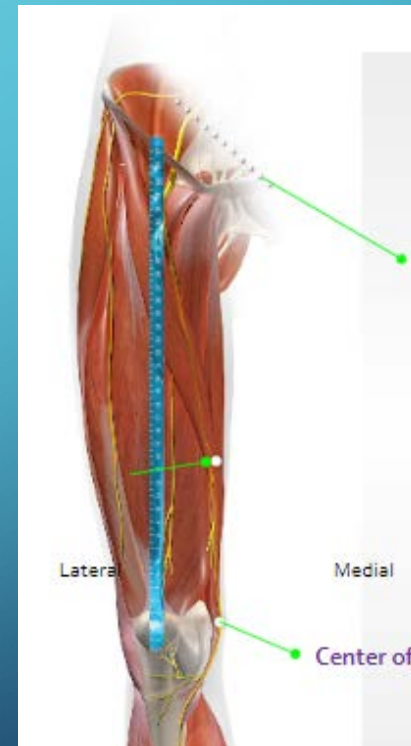
- Iovera system with
- Marking pen
- Flexible ruler
- Measuring tape
- Ultrasound with linear array transducer
- Nerve stimulator
- Topical skin antiseptic
- Gloves
- Local anesthetic and/or ethyl chloride spray
- Bandages



# IDENTIFY AND MARK TARGET NERVES: ANTERIOR FEMORAL CUTANEOUS NERVE (AFCN)

## AFCN Anatomic Landmarks

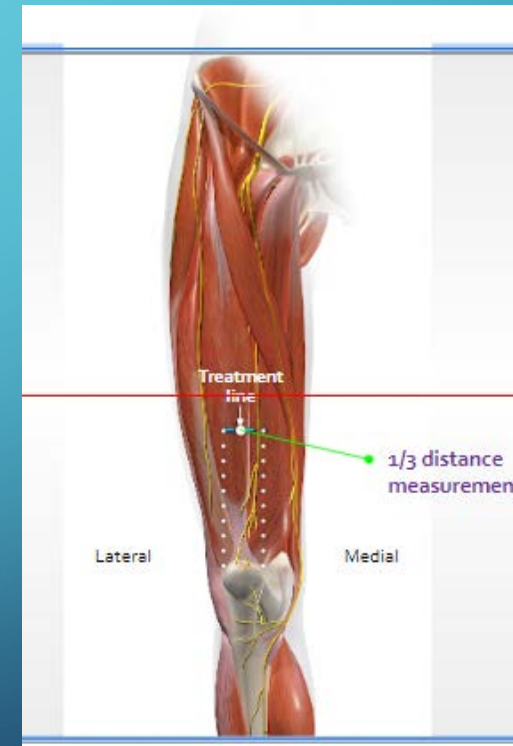
1. Measure distance between center of patella and inguinal crease in cm
  - a. Locate center of patella
  - b. Hold zero point of tape measure at center of patella
  - c. Extend tape measure to inguinal crease
2. Calculate  $1/3$  of total measurement
3. Mark thigh at this calculated  $1/3$  point from center of patella



# IDENTIFY AND MARK TARGET NERVES: ANTERIOR FEMORAL CUTANEOUS NERVE (AFCN)

## Draw the AFCN treatment line

4. Draw vertical lines from medial and lateral patellar borders up to points level with calculated  $1/3$  mark
5. Draw a horizontal line between these 2 vertical lines
6. This is the AFCN treatment line



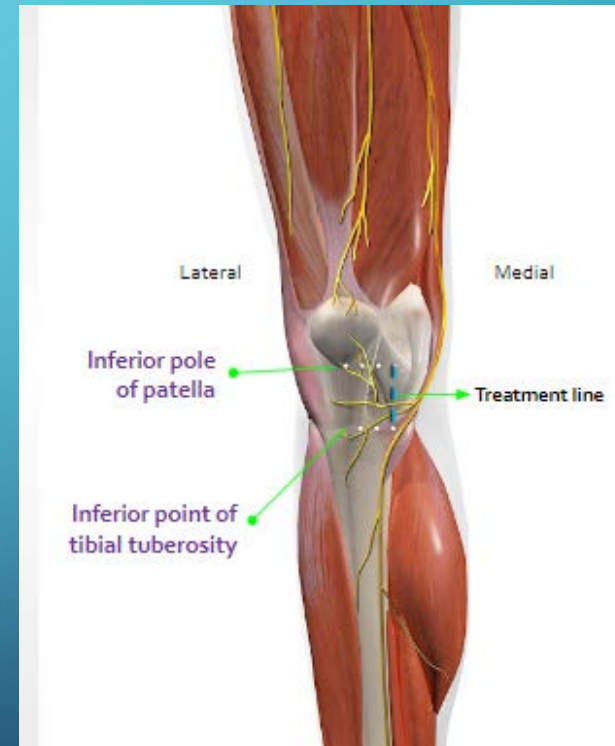
# IDENTIFY AND MARK TARGET NERVES: INFRAPATELLAR BRANCHES OF THE SAPHENOUS NERVE (ISN)

## ISN Anatomic Landmarks

1. Find and mark inferior pole of patella
2. Find and mark most inferior point of tibial tuberosity

## Draw the ISN Treatment Line

1. Draw a horizontal line 5cm medially from inferior pole of patella
2. Draw a horizontal line 5cm medially from inferior point of tibial tuberosity
3. Draw a vertical line between these 2 horizontal lines
4. This is the ISN treatment line





# PATIENT PREPARATION

## Patient Position

- Supine, leg extended
- Maintain same position during measurement, marking, and treatment

## Skin Prep

- Skin antiseptic, betadine, alcohol

# DERMAL ANESTHESIA

Ethyl chloride spray

- Spray only until skin blanches

and/or

Lidocaine wheals

- Shallow injections into dermis along treatment line
- Massage into tissue if skin raised due to injection
- Helpful tip-1-10 bicarb decreases burn from lidocaine

# SET PATIENT EXPECTATIONS

## Sensation Type

- Burning
- Tingling
- Pins & Needles

## Intensity Level

- Mild
- Moderate
- Strong

# TREATMENT

- Press and release button to begin
- Skin warmer should contact skin throughout cycle
- A tone, green checkmark, and LCD message in cycle is complete
- Remove Smart Tip from patient
- Insert in next treatment location, overlap one needle

# ALTERNATIVE BERNARD METHOD

- Localize and mark nerve with stimulator
- Prep and administer local anesthetic
- Confirm and document with USG
- Deliver treatment
- Clean and bandage

# NERVE LOCALIZATION

## ELECTRIC STIMULATION

Variable strength adjust as needed

Start lateral with LFCN

March .5cm medial to branches of AFCN

Continue distal to branches of saphenous

Try it on yourself first

Be persistent- distance from nerve emergence to target differ

Constant communication with your patient



# USG CONFIRMATION



# TREATMENT





# ADVANTAGES TO LOCALIZATION METHOD

- More nerves treated 5-6 vs 3
  - LFCN, 2 -3 branches of AFCN, and 2 branches of saphenous
  - Vs. AFCN and 2 branches of saphenous
- One treatment cycle per nerve vs. field block
- Quicker treatment start to finish
- Less bruising

# LOCALIZATION METHOD BY THE NUMBERS

- We timed 20 consecutive patients
  - Localize and mark <2min
  - Prep and administer local <1 min
  - Confirm and document with USG <30 sec
  - Treat 5-6 nerves <6 minutes
  - Clean and bandage <30 sec
  - Total <10 minutes per patient

# PROCEDURE NOTE

- Document informed consent
- Document procedure
- Document each individual nerves treated
- Document Ultrasound confirmation

# QUESTIONS

