

Meet a new approach to acute postoperative
chest wall pain treatment

Cryoanalgesia

**This is a medical device. Use it in accordance
with the instructions for use or the label.**

Postoperative pain

Post-thoracotomy pain (experienced by patients who have undergone surgery) is considered to be one of the most severe pain sensations.

Intraoperative application of Cryoanalgesia prevents postoperative pain.

The purpose of cryoanalgesia is to temporarily freeze and defrost a fragment of the intercostal nerve in its dorsal course. Active freezing and passive defrosting of the nerve is followed by blocking the transmission of pain impulses originating from the thoracotomy area. Even though the nerve regenerates quickly, it takes several months for the nerve impulses to be transmitted again.

By using cryoanalgesia, we reduce the patient's risk of

chronic post surgical pain (CPSP). The application of intraoperative cryoanalgesia also has a positive impact on the costs associated with the patient's postoperative hospitalisation, as the patient's recovery period is shorter thanks to cryoanalgesia. Severe, persistent postoperative pain is very often one of the causes of extended hospitalisation period or readmission of a patient.

Thoracoscopy + Cryoanalgesia

up to **70%** less
need for opioids

up to **40%** lower
risk of chronic postoperative pain

reduction of
hospitalization

improvement
of quality of life

Cryoanalgesia

reduces the reliance on strong pain relief medication, including opioids in the postoperative and recovery period.

It has a demonstrated beneficial effect in reducing the dosage or even not requiring opioids for patients in the postoperative period.



Mechanism of Cryoanalgesia



During frosting and defrosting:

- Significant endoneurial oedema when frosting and defrosting of the intercostal nerves.
- Increased interstitial fluid pressure and Wallerian degeneration of the axon of intercostal nerve with the myelin sheath of the intercostal nerve remaining intact.



After frosting and defrosting:

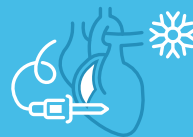
- Schwann cell basal lamina remains intact facilitating the regeneration of the intercostal nerves.
- When the endoneurium of the intercostal nerve remains intact, no neuroma is formed and the nerve is capable of regenerating at a rate of 1-1.5 mm/week.
- The intercostal nerve is fully recovered, but pain sensation is blocked for the next few months.

Indications for Cryoanalgesia



Pediatric and thoracic surgery:

MIRPE: minimally invasive repair of Pectus Excavatum (NUSS);
Minimally invasive video-assisted thoracoscopic surgery (VATS) and via lateral thoracotomy:
lobectomy, segmentectomy, rib fractures, other surgical indications within the mediastinum;



Cardiac surgery:

Minimally invasive surgery via a lateral thoracotomy approach;
MVR/MVP: mitral valve replacement/repair, MIDCAB: minimally invasive direct coronary artery bypass

The Advantages of Cryoanalgesia

in thoracic and cardiac surgery



No neuritis or neuroma
– no risk of secondary pain



Destroys the function,
not the structure



Reduced risk
of complications from
epidural & intravenous drugs



No risk of vessel proliferation
and obliteration



Immediate post-op
pain relief



Reduced incidence
of pneumonia



Reduction in hospital stay



Long-term postoperative pain
relief: 6 to 12 months



Reduced opioid intake

CRYO - S[®] Painless

Device for Cryoanalgesia

Chip system communication (RFID)

Electronic communication between the probe and the device enables the device to identify the optimal operating parameters and automatically configure them for the best cryoanalgesia performance.

No manual adjustment of the freezing process is required during the preparation of the probe for treatment or throughout the procedure. When freezing is complete, the probe defrosts within a few seconds.

Voice communication

Built-in voice communication enables easier device control. A special system that reports essential data (procedure time, device status) during the procedure allows full control without taking your eyes off the treatment area.



CE 2274

Two sources of freezing

The working medium for CRYO-S Painless is carbon dioxide: CO₂ (-78°C) or nitrous oxide: N₂O (-89°C). They are very efficient and easy to use gases that are generally available in hospitals for laparoscopy or general anesthesia.

Built-in neurostimulation

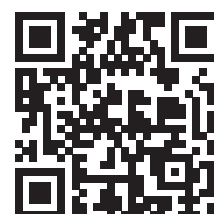
Diagnostic neurostimulation is recommended for percutaneous procedures. It helps to distinguish between sensory and motor nerves and position the tip of the probe correctly on the nerve. It is recommended when performing percutaneous cryoanalgesia under ultrasound, X-ray or CT guidance.

Touch screen

The selection of the probe mode, the initiation and termination of the freezing process can be activated by the footswitch and the touch screen, which allows to keep the site of the procedure under sterile conditions.



Visit our website for more information
about this product



CRYO - S[®] Painless Cryoprobes

Cryoprobe for thoracotomy and thoracoscopy intraoperative cryoanalgesia of the intercostal nerve.

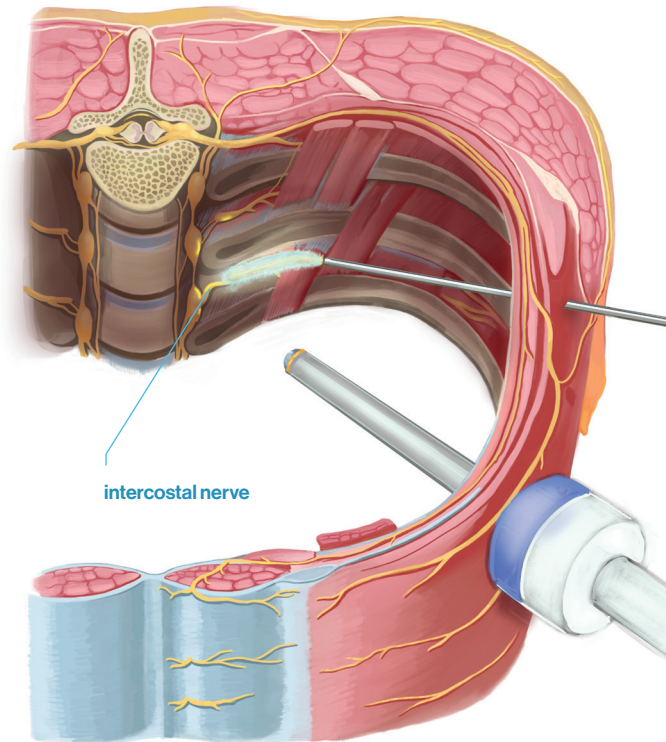
Advantages of the cryoprobe:



The freezing tip is anatomically adjusted to the shape of the rib cage



The freezing component of the probe is coated with gold to optimise freezing parameters. In addition, gold does not cause tissue allergy.



Cryoprobe for percutaneous cryoanalgesia of the intercostal nerve under ultrasound guidance (USG).



Advantage of the probe:



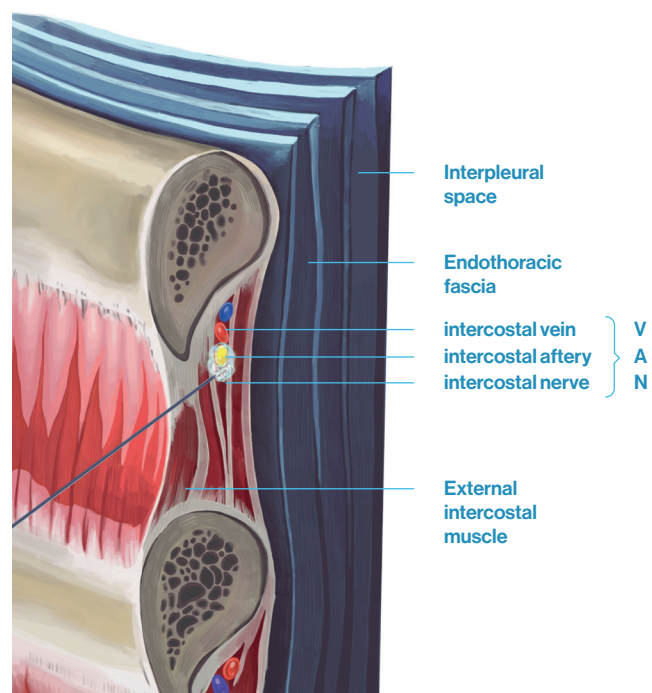
Freezes only with the tip



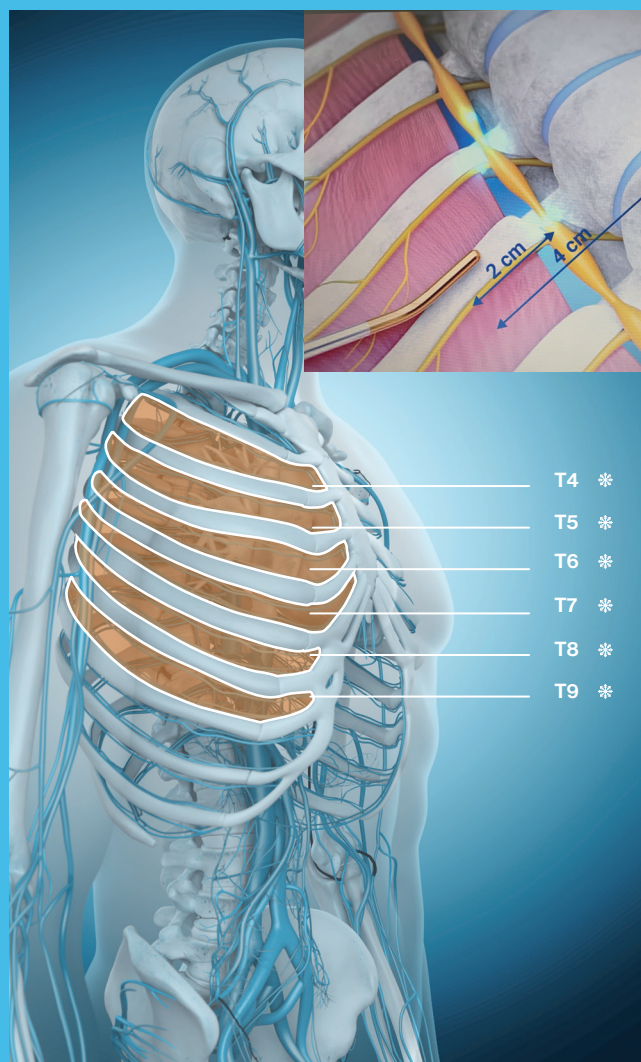
Echogenic - clearly visible on ultrasonography



The probe serves a dual-function - it is used for neurostimulation and cryoanalgesia.



Example of Cryoanalgesia procedure



Freezing time:
120 seconds per nerve,

Freezing temperature:
-50°C to -70°C,

Freezing target for thoracotomies: 2 intercostal nerves above thoracotomy, 2 intercostal nerves below thoracotomy and 1 intercostal nerve at thoracotomy level. Freezing area: recommended between the 4th and 9th intercostal space. The procedure can be performed unilaterally (thoracotomies, thorascopies). Freezing time 120 sec per intercostal nerve. Total time of cryoanalgesia during surgery: 12 min.

Position of freezing tip of the probe: minimum 4 cm from the axis of the vertebral column; 2 cm from the sympathetic ganglion of the intercostal nerves.

Freezing target for chest wall deformities (NUSS-VATS): 5-6 intercostal nerves between the 4th and 9th intercostal space side to sides (bilaterally). Freezing time 60-120 sec. per intercostal nerve. Total time of cryoanalgesia during surgery: 15-25 min.



CRYO-S® Painless
Device for cryoanalgesia

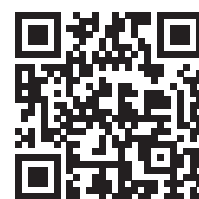
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