

In the Name of GOD



Interventional pain management in common pain syndromes (1)

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Arthritis

- ❖ In December 2012, a study on the Global Burden of Disease and the worldwide impact of all diseases and risk factors reported that **musculoskeletal conditions**, including **arthritis and back pain**, affect **more than 1.7 billion people** worldwide and are the **second greatest cause** of disability worldwide
- ❖ Musculoskeletal conditions have the fourth greatest impact on the overall health of the world population with regard to death and disability
- ❖ It is expected that **1 in 2 women and 1 in 4 men over the age of 50 years** will have an **osteoporosis related fracture** during their remaining years
- ❖ **Rheumatoid arthritis**, an autoimmune form of arthritis, affects over 1.5 million adults in the United States, whereas over 300,000 children are afflicted with juvenile inflammatory arthritis. Both of these conditions not only affect mobility and quality of life but can also shorten life expectancy

❑ **Joint complaints** are divided into three different types:

✓ **Inflammatory**

✓ **Mechanical**

✓ **Fibromyalgia-type discomfort**

- **Inflammatory conditions**, such as rheumatoid arthritis, are characterized by **joint stiffness** in the **morning lasting** at least **30 minutes** but often several hours
- Patients generally feel **better after activity** as the fluid accumulated during inactivity is pumped out of a swollen, stiff joint by the lymphatics, thus reducing the sensation of stiffness
- The presence of inflammatory cytokines such as interleukin (IL)-1 or tumor necrosis factor (TNF) may cause fatigue, anorexia, or a loss of the sense of well-being

- **Mechanical joint pain**, typified by OA, generally causes only **5 to 10 minutes of morning stiffness**, but affected joints become **progressively more painful with activity**. There may be discomfort for some period of time following use as well Swelling may or may not be present or only present following stress. There are **no systemic symptoms** in patients with mechanical forms of arthritis
- **Fibromyalgia-associated pain** is characterized by **all over morning stiffness or pain**, a period of loosening up late morning or early afternoon, followed by **fatigue and increased pain as the afternoon progresses**. **Sleep is poor**, memory may be reported to be poor, and activity and exercise are poorly tolerated, and in fact, patients will report being in bed for 1 or 2 days following a strenuous physical or even emotional event

OSTEOARTHRITIS

- ❑ OA is characterized by progressive **loss of articular cartilage** leading to joint pain and limitation of movement. Weight-bearing and frequently used joints are most often affected. The disease is divided into a **primary (idiopathic) form**, in which no predisposing factors are apparent, and a **secondary form**, which is associated with trauma, sequela of an inflammatory joint disease, a metabolic disease such as hemochromatosis, or a congenital structural abnormality
- **Primary OA is the more common form**, but pathologically, the two forms are indistinguishable

Heberden's nodes (distal interphalangeal joints)
and Bouchard's nodes (proximal interphalangeal joints)



Interventional procedure

- ✓ **Prolotherapy**
- ✓ **Intra-articular pulsed radiofrequency/ cooled radiofrequency**
- ✓ **Radiofrequency ablation of nerves** (genicular nerves, suprascapular nerve, median branches)
- ✓ **Platelet-rich plasma**
- ✓ **Stem cell injections**
- ✓ **Tumor necrosis factor inhibitors and interleukin-1 receptor antagonists**
- ✓ **Oxygen-ozone therapy (OOT)**

CONCLUSIONS: Overall, the studies showed promising results for the treatment of **severe chronic knee pain by radiofrequency ablation at up to one year** with minimal complications. Numerous studies, however, yielded concerns about procedural protocols, study quality, and patient follow-up. Radiofrequency ablation can offer substantial clinical and functional benefit to patients with chronic knee pain due to osteoarthritis or post total knee arthroplasty.

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Systematic Review

Comparative Effectiveness Review of Cooled Versus Pulsed Radiofrequency Ablation for the Treatment of Knee Osteoarthritis: A Systematic Review

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Background: Patients suffering from osteoarthritis of the knee and patients post total knee arthroplasty often develop refractory, disabling chronic knee pain. Radiofrequency ablation, including conventional, pulsed, and cooled, has recently become more accepted as an interventional technique to manage chronic knee pain in patients who have failed conservative treatment or who are not suitable candidates for surgical treatment.

Objective: This systematic review aimed to analyze published studies on radiofrequency ablation to provide an overview of the current knowledge regarding variations in procedures, nerve targets, adverse events, and temporal extent of clinical benefit.

Study Design: A systematic review of published studies investigating conventional, pulsed, or cooled radiofrequency ablation in the setting of chronic knee pain.

Methods: Medline, Google Scholar, and the Cochrane Central Register of Controlled Trials (CENTRAL) databases were reviewed for studies on radiofrequency ablation for patients with chronic knee pain through July 29, 2016. From the studies, the procedural details, outcomes after treatment, follow-up points, and complications were compiled and analyzed in this literature review. Included studies were analyzed for clinical relevance and strength of evidence was graded using either the NHLBI Quality

Conclusion: Genicular RFA of the superior medial genicular nerve, inferior medial genicular nerve, and superior lateral genicular nerve appears to be an effective treatment for painful KOA, but targeting additional sensory nerves may further improve treatment success. Although genicular RFA appears relatively safe on the basis of the available data, additional large-scale studies are needed to provide greater confidence.

Genicular Nerve Radiofrequency Ablation for the Treatment of Painful Knee Osteoarthritis: Current Evidence and Future Directions FREE

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Abstract

Genicular nerve radiofrequency ablation (RFA) is increasingly being performed to treat chronic pain due to knee osteoarthritis (KOA). This narrative review provides a concise summary of the relevant neuroanatomy, randomized controlled trials, appropriate patient selection, and safety relating to genicular RFA. Cadaveric studies demonstrate significant variability in the location of the genicular nerves, which has stimulated debate about the ideal target locations for genicular RFA. Despite this, favorable outcomes have been observed in studies targeting only the superior medial genicular nerve, inferior medial

Conclusions: The analysis of the available RCTs on OOT for KOA revealed poor methodologic quality, with most studies flawed by relevant bias, thus severely limiting the possibility of drawing conclusions on the efficacy of OOT compared with other treatments. On the basis of the data available, OOT has, however, proven **to be a safe approach with encouraging effects in pain control and functional recovery in the short-middle term.**

Review > Arthroscopy. 2020 Jan;36(1):277-286. doi: 10.1016/j.arthro.2019.05.043.

Epub 2019 Oct 31.

Oxygen-Ozone Therapy for the Treatment of Knee Osteoarthritis: A Systematic Review of Randomized Controlled Trials

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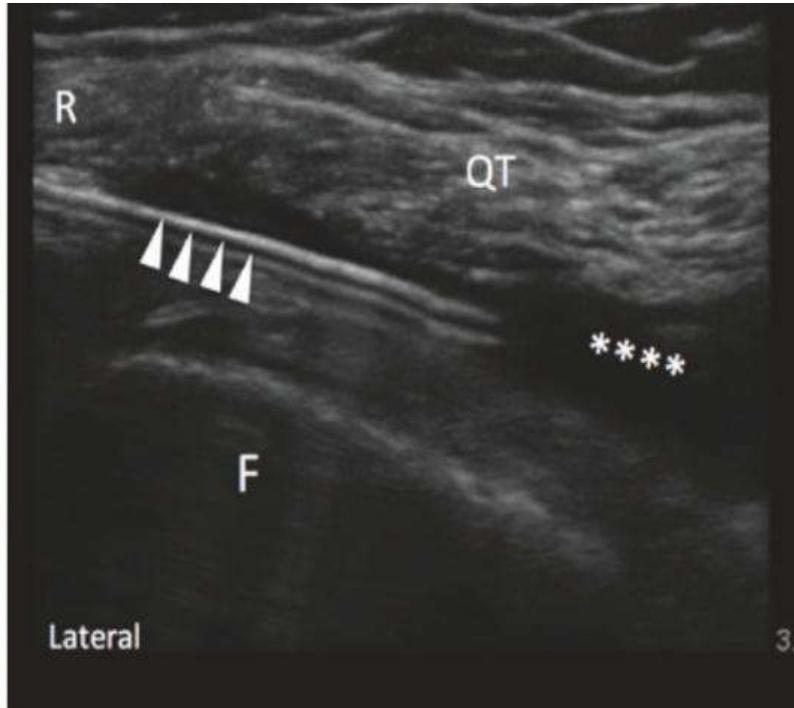
PMID: 31679646 DOI: 10.1016/j.arthro.2019.05.043

Abstract

Purpose: To review the available literature on the application of oxygen-ozone therapy (OOT) in the treatment of knee osteoarthritis (KOA) to understand its therapeutic potential and to compare it with other conservative treatment options.

Methods: A systematic review of the literature was performed on the PubMed, Cochrane, Embase, ResearchGate, and PedRo Databases, with the following inclusion criteria: (1) randomized controlled trials (RCTs), (2) written in English, (3) published on indexed journals in the last 20 years (1998-2018), (4) dealing with the use of ozone intra-articular injection for the treatment of KOA. The risk of bias was assessed by the Cochrane Risk of Bias tool for RCTs.



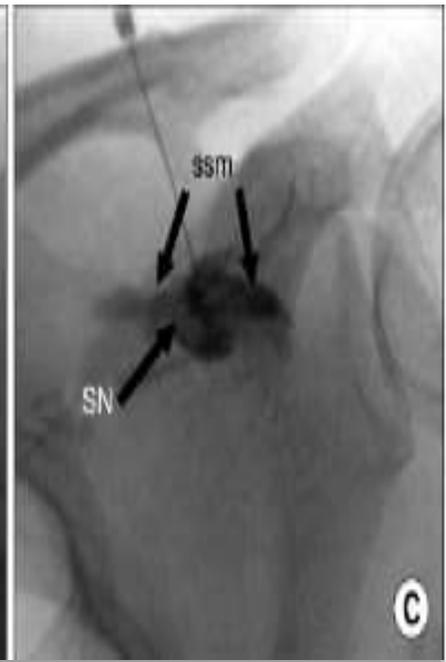
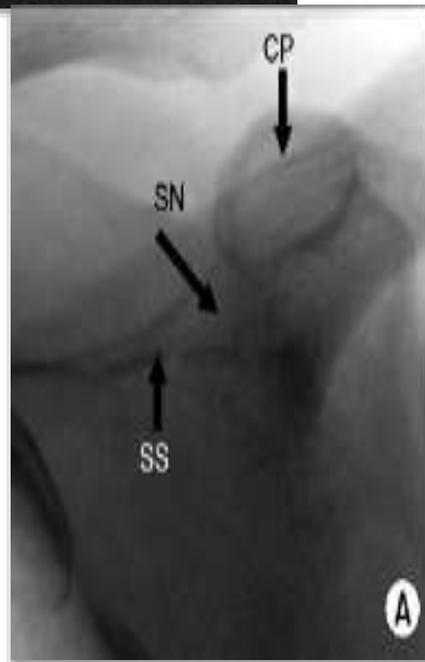


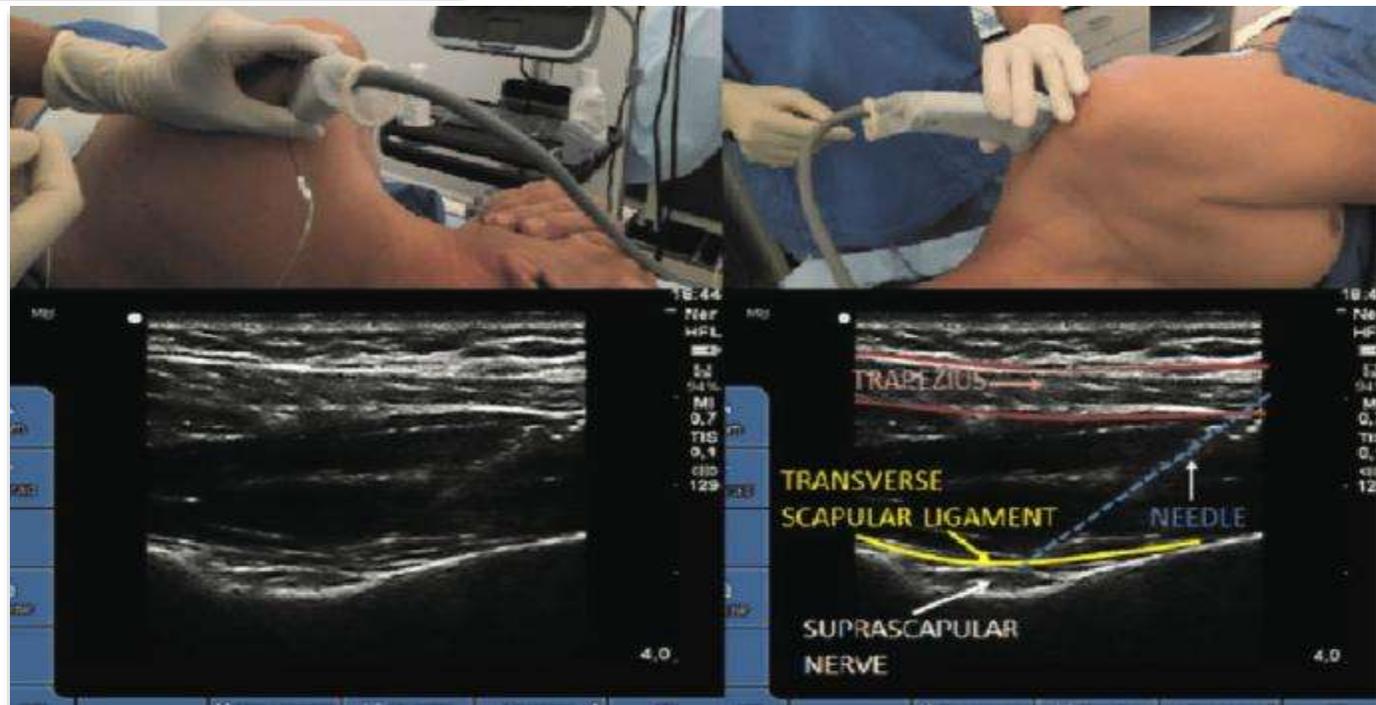
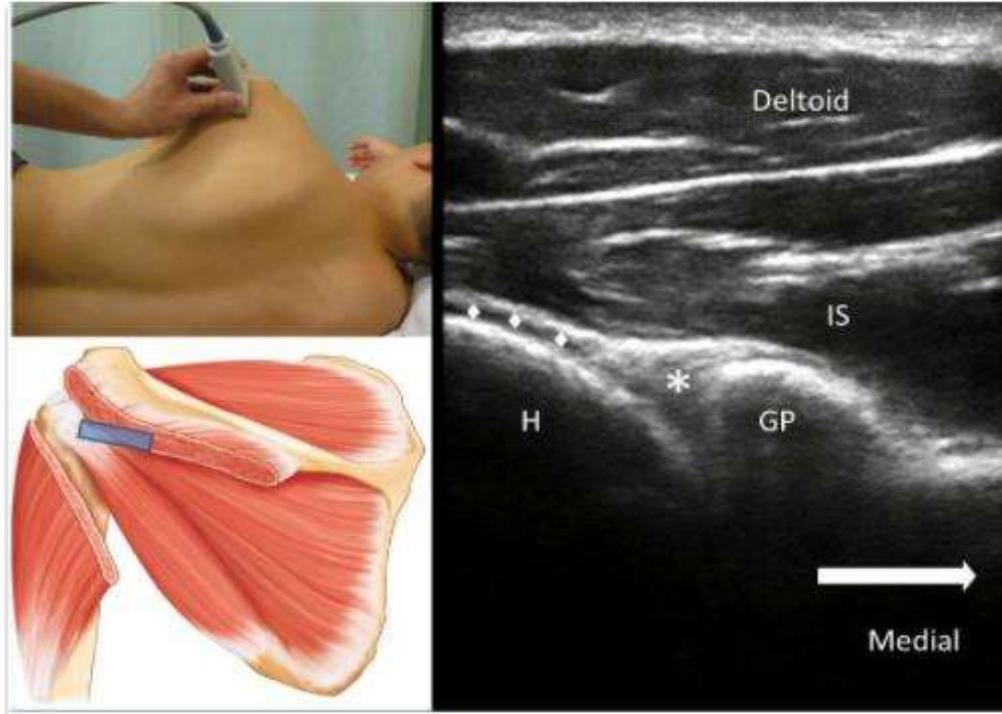
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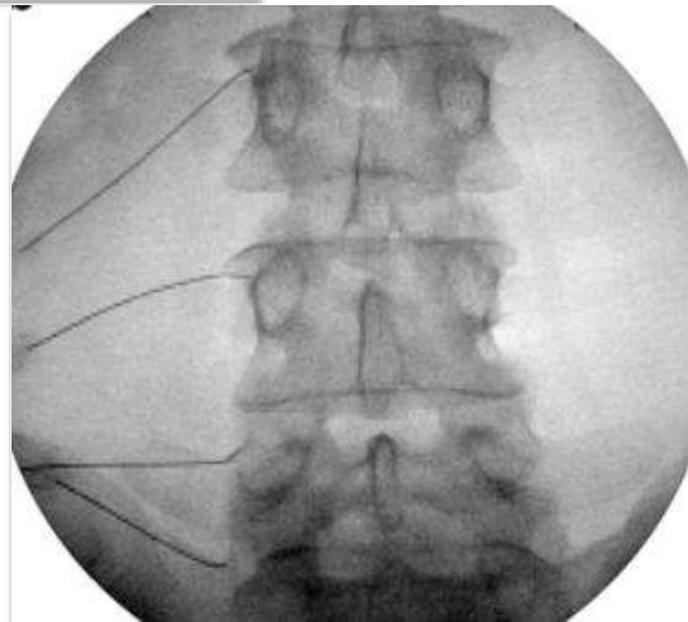
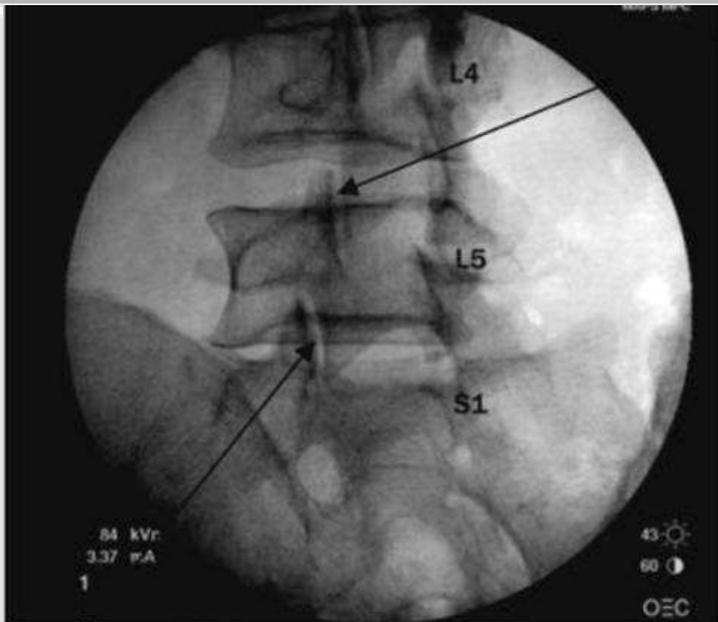
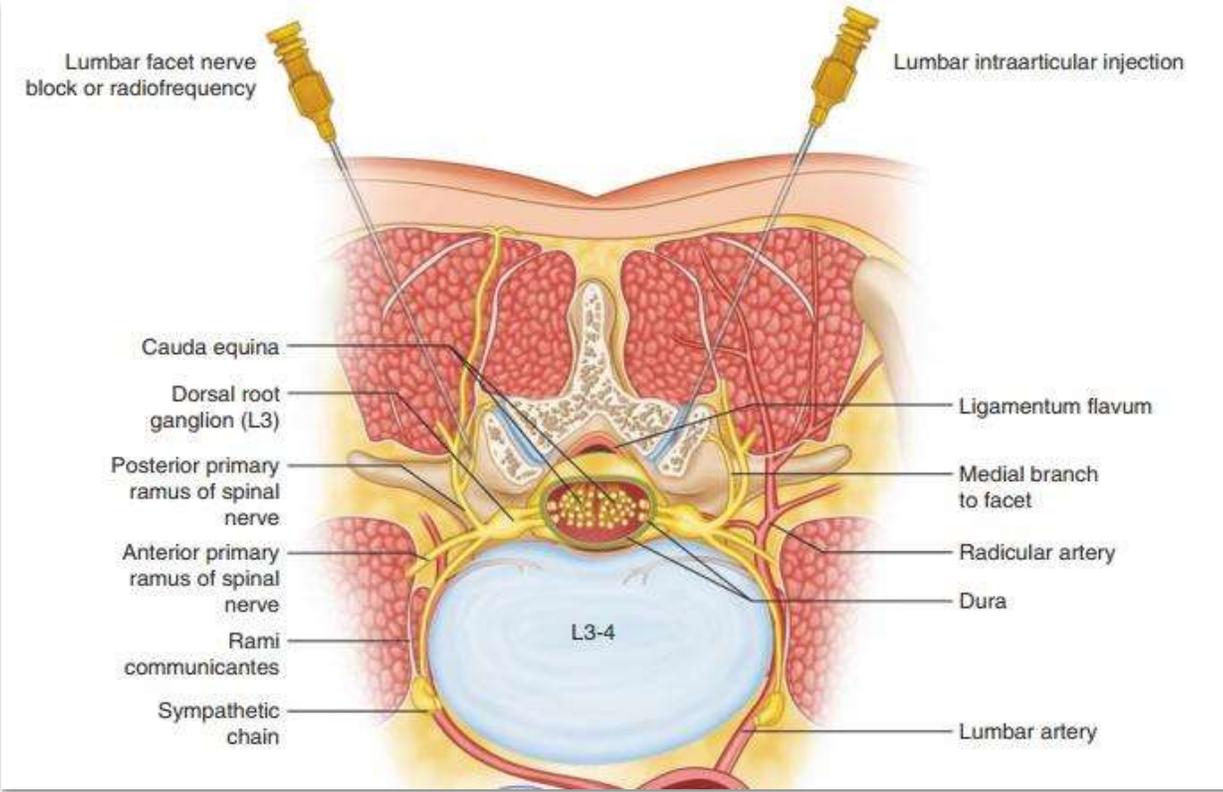


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Pelvic Pain in women

Assessment

- **History**
- **Examination**
- **Investigation**
- **Therapeutic trial** (Hormonal treatment)
- **Diagnostic laparoscopy**
- **Empirical treatment** (Analgesia or hormonal treatments may be appropriate, but it is often worth considering drugs such as amitriptyline, gabapentin, pregabalin, and duloxetine in addition. Nonpharmacologic treatments such as acupuncture, TENS, chiropractic, and osteopathic manipulations may be beneficial, and pain management techniques and support groups can also be of value).

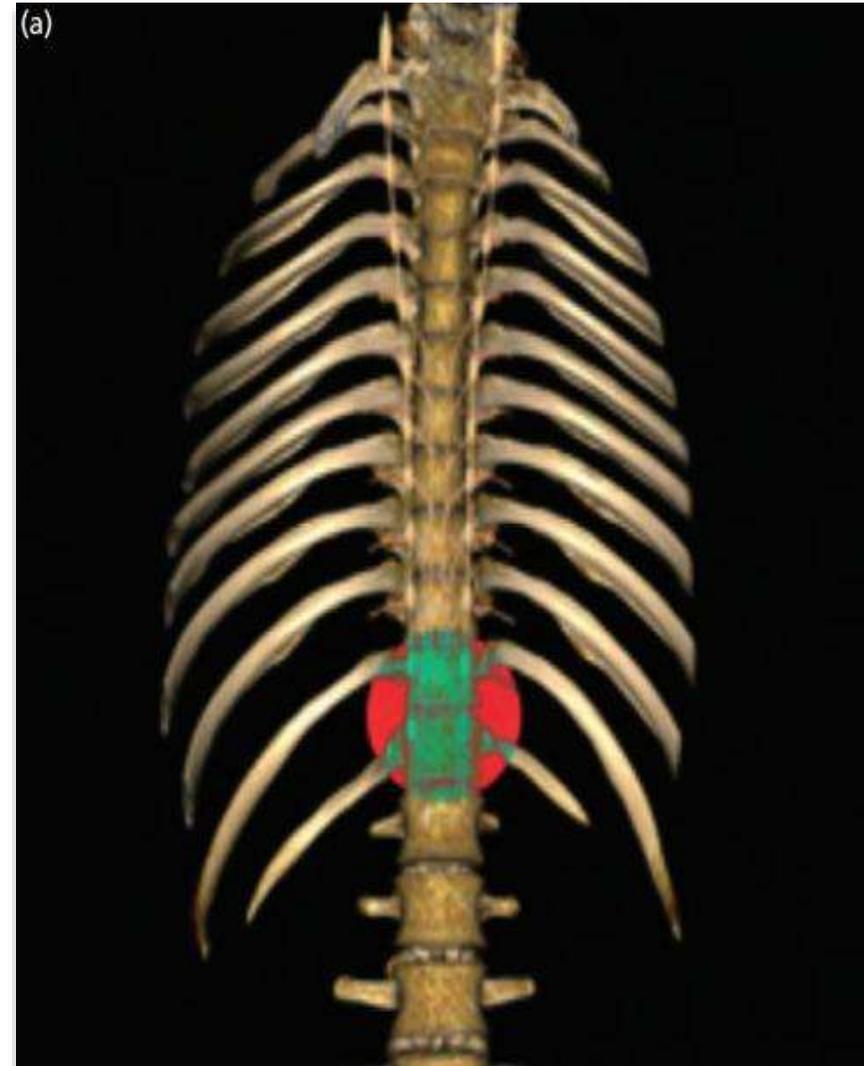
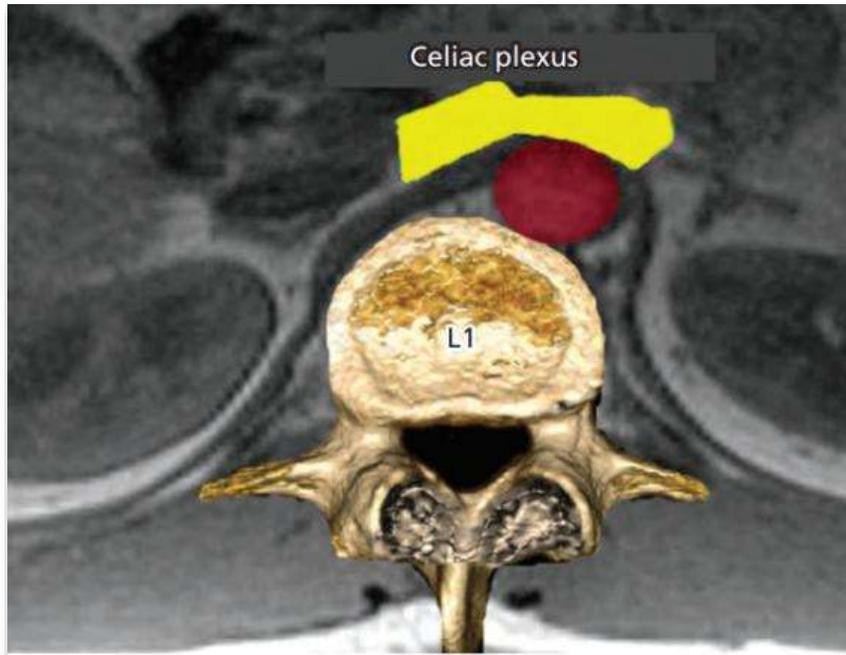
Medical Management

- NSAIDS
- Hormonal therapy
- Neuropathic adjunct: pregabalin, gabapentin, ...
(Chronic inflammation can cause **sensitization of peripheral nerves**, and therefore, a trial of a neuropathic adjunct may be indicated, especially if there are other symptoms suggesting a generalized visceral hypersensitivity syndrome)
- Narcotic

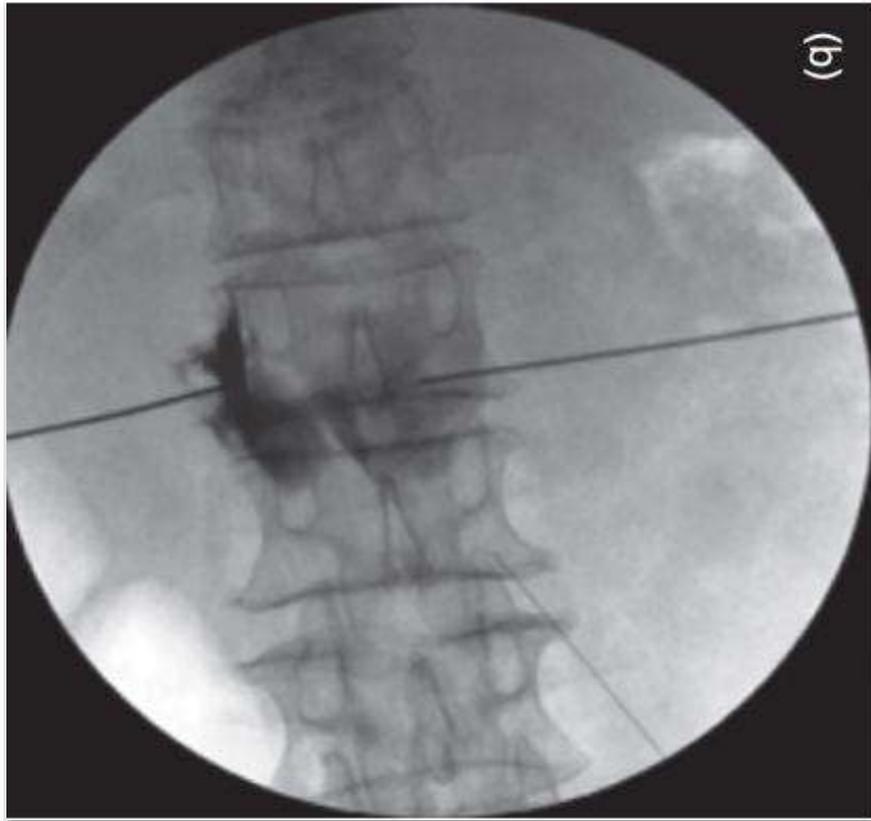
Interventional pain management

- **Celiac Plexus and Splanchnic Nerve Blocks**
- **Hypogastric Plexus Block**
- **Ganglion Impar Blockade**
- **Trigger Point Injections**
- **Botulinum Toxin Injections**
- **Pudendal Nerve Block**
- **Ilioinguinal and Iliohypogastric nerve Block**
- **Intra-articular Joint injections**

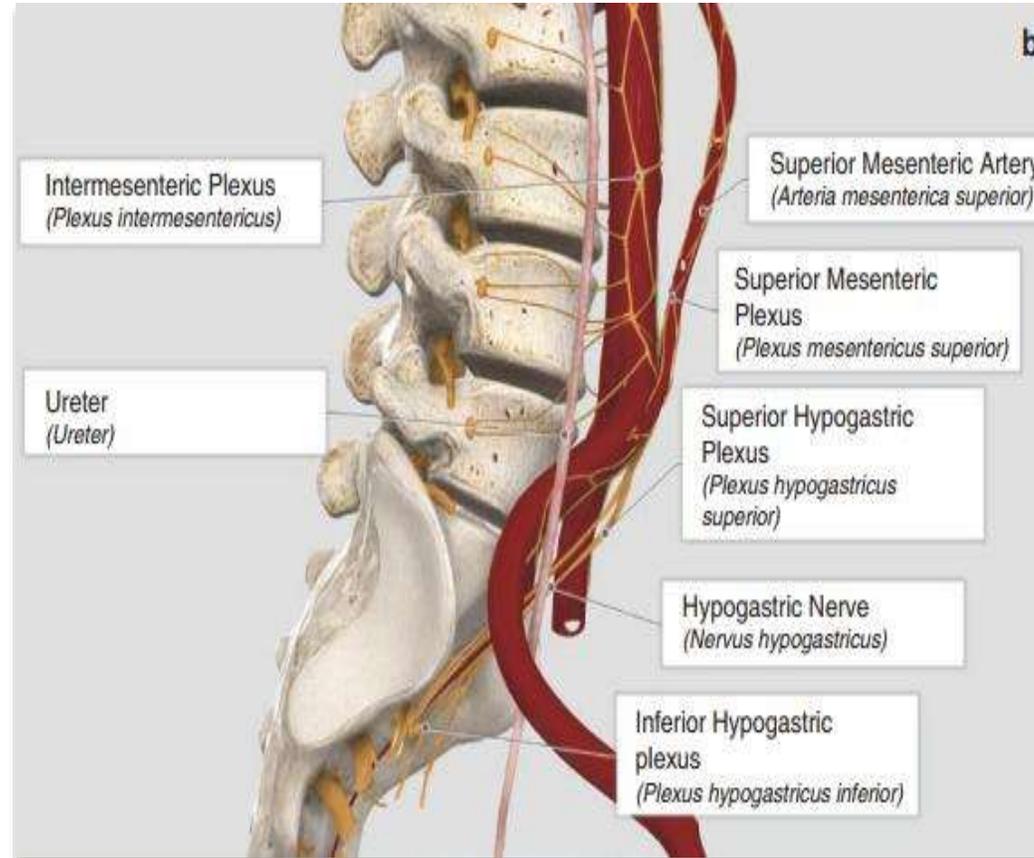
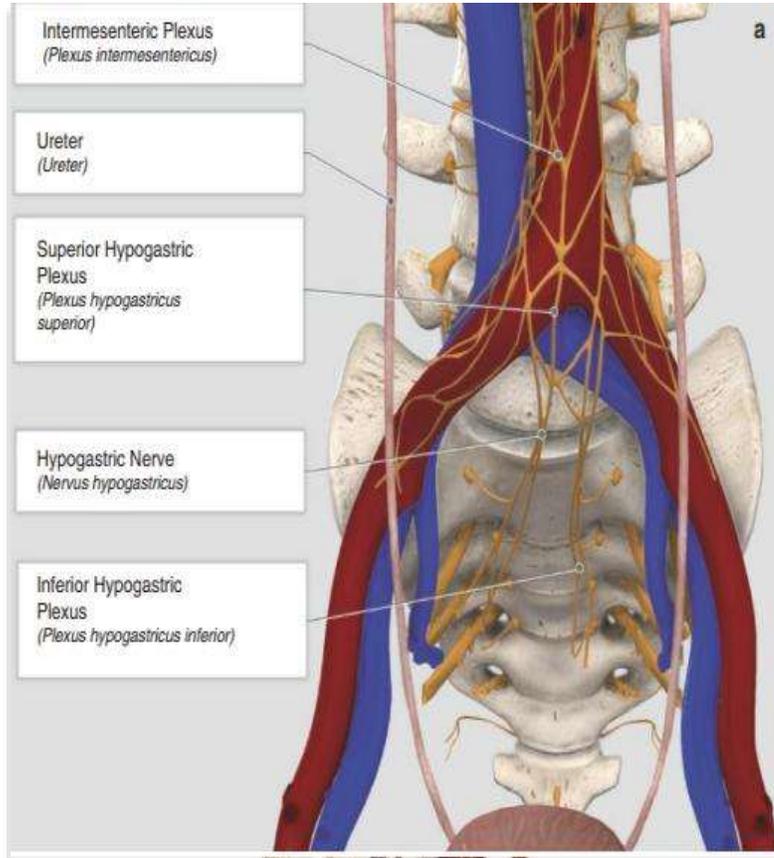
Celiac Plexus and Splanchnic Nerve Blocks



Celiac Plexus and Splanchnic Nerve Blocks



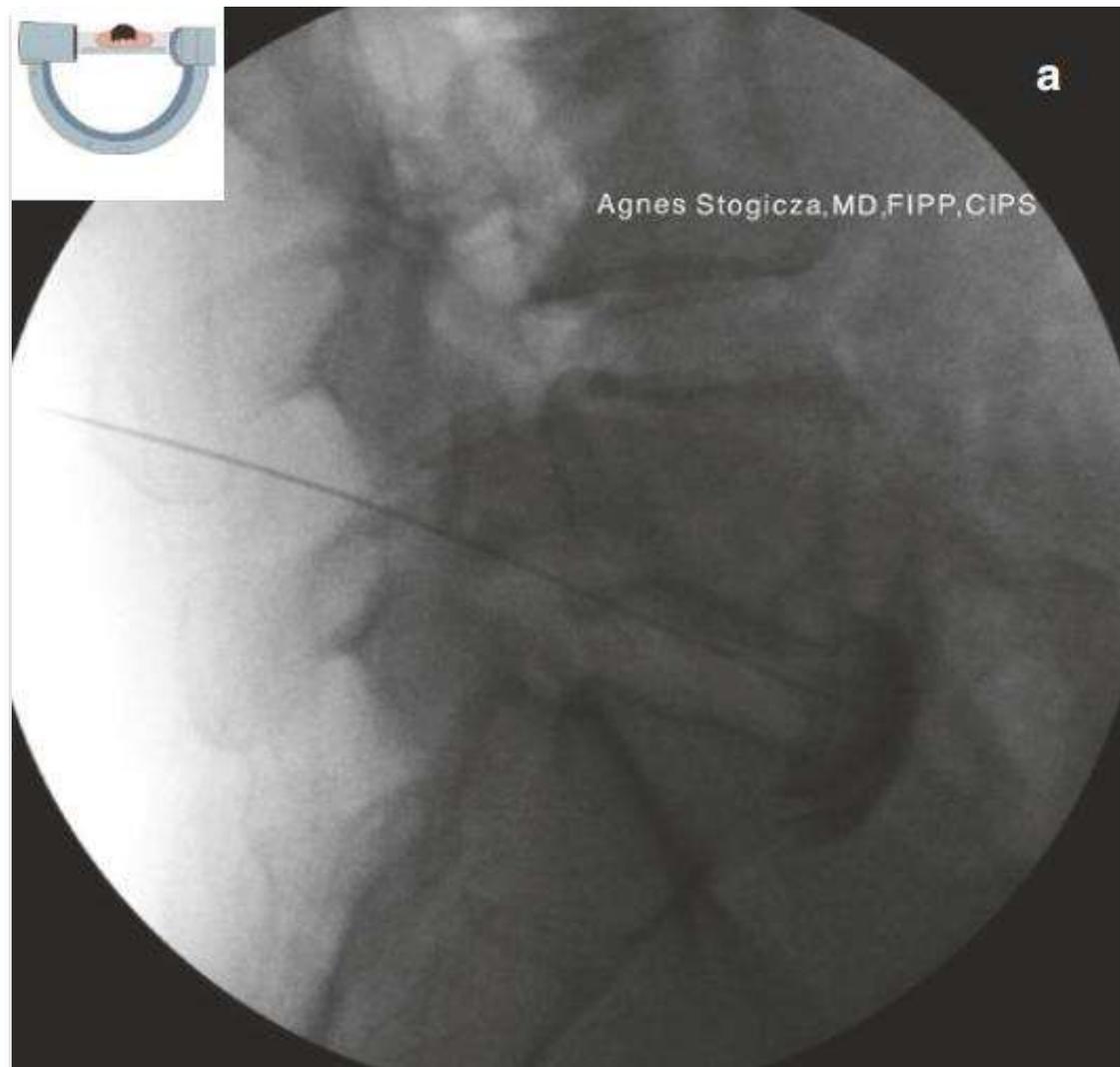
Hypogastric Plexus Block



Indications of superior plexus block

- **Superior hypogastric plexus** block and neurolysis can be done for pain originating from **various organs in the pelvis**. The pain could be either from chronic benign conditions in the pelvis such as **endometriosis** or from **cancer-related metastasis**.
- The organs in the pelvis that are amenable to a superior hypogastric block include **lower gastrointestinal, urogenital, and gynecological tracts**.

Hypogastric Plexus Block



Indications for ganglion impar block

Female patients

Vulvodynia

Vaginal pain (distal third)

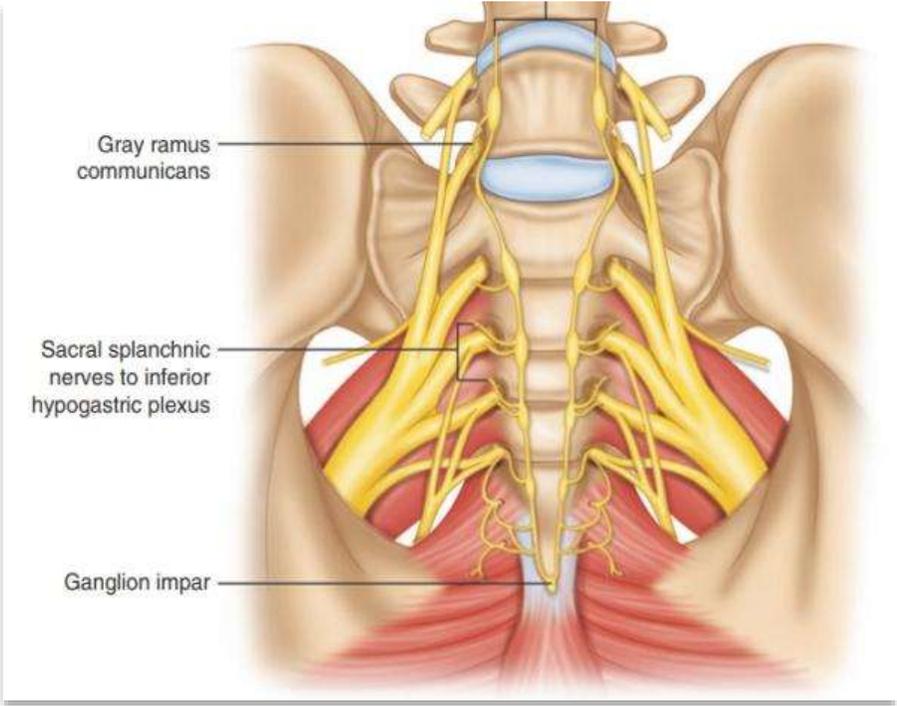
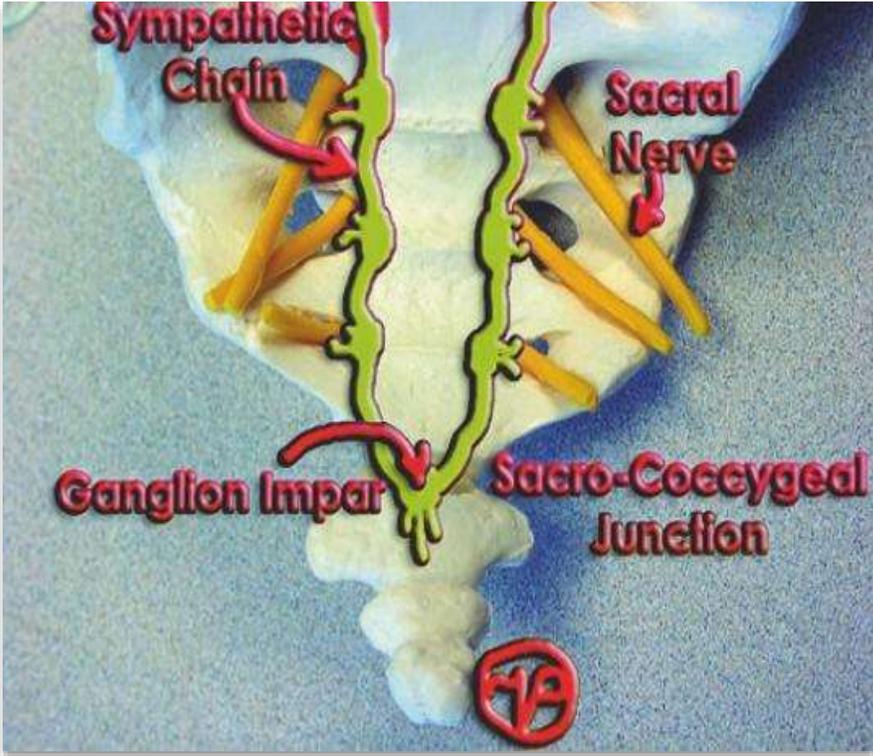
Vaginal protrusion

Female pelvic pain, unspecified

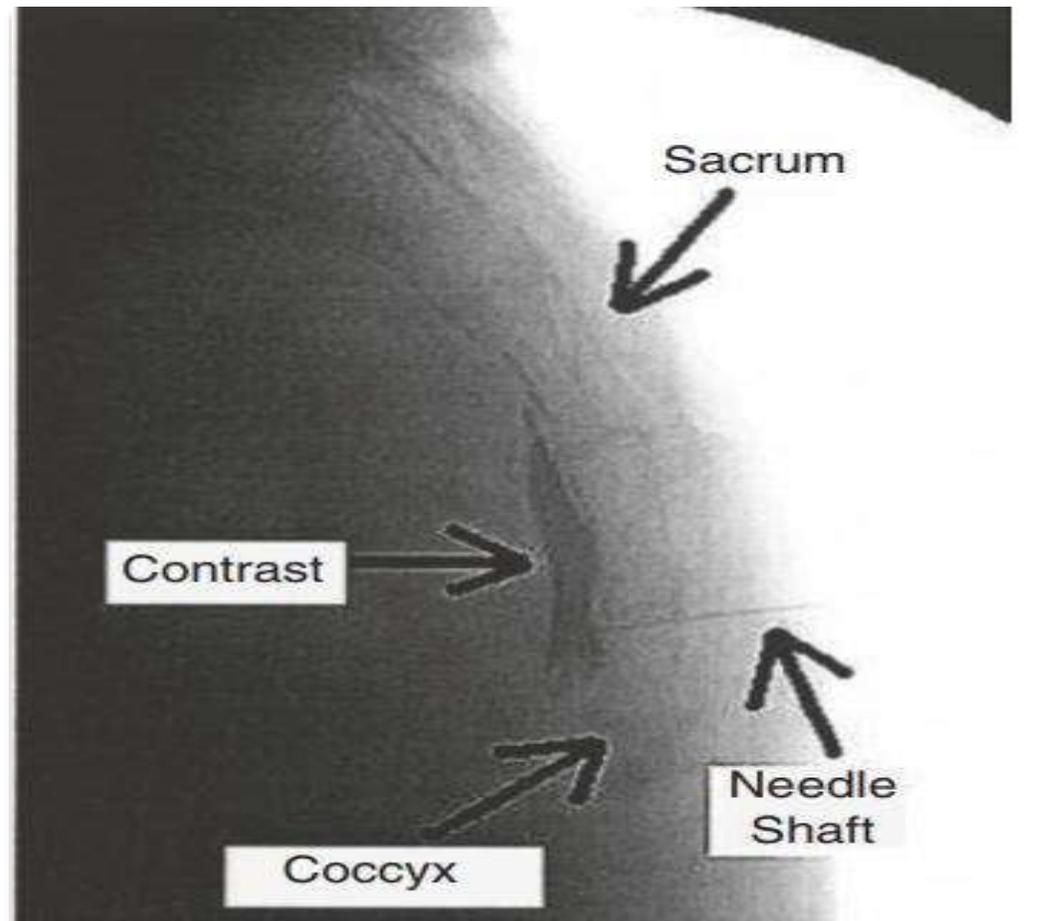
Endometriosis

Post-episiotomy pain

Ganglion Impar Blockade



Ganglion Impar Blockade



MULTIPLE SCLEROSIS

- **Trigeminal neuralgia** has a well-known association with brainstem demyelination in those with multiple sclerosis. Sharp, lancinating facial pain may occur spontaneously or may be evoked by tactile stimulation. An uncommon finding in the idiopathic disorder, trigeminal sensory loss is more common in patients with multiple sclerosis.
- In fact, trigeminal neuralgia is the most frequently occurring neuropathic pain in MS patients with a prevalence ranging from 1.9% to 6.3%. In addition to the episodic pain that MS patients experience, a **constant pain** component is often reported. It has been evidenced that over time the pain becomes **more atypical, more trigeminal divisions** are involved and **bilateral involvement** can occur in **up to 31%** of patients.⁴
- It is generally believed that MS precedes the onset of TN but in **several reports, TN is described as the first symptom of MS** occurring from **5 to 10 years before** the onset of another neurological symptom.

Trigeminal ganglion block and neurolysis

- **Trigeminal Ganglion Block**
- Trigeminal ganglion block is performed using up to 1 mL of local anesthetic such as 1% lidocaine after negative aspirations. A steroid such as triamcinolone, dexamethasone, or methylprednisolone is sometimes included as an attempt to prolong the blockage. Monitoring brainstem function, such as pupillary size and the position and movement of the eye, is imperative in order to ensure patient safety.

Trigeminal ganglion block and neurolysis

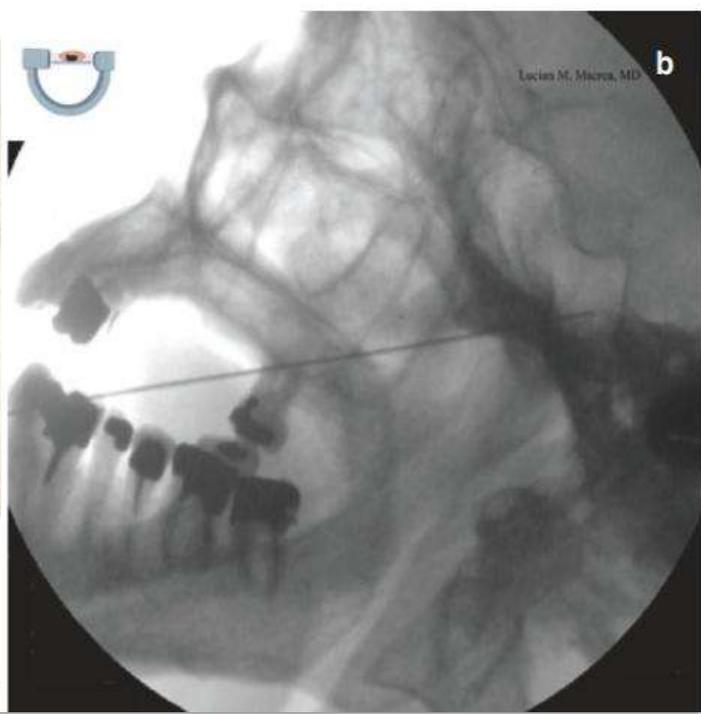
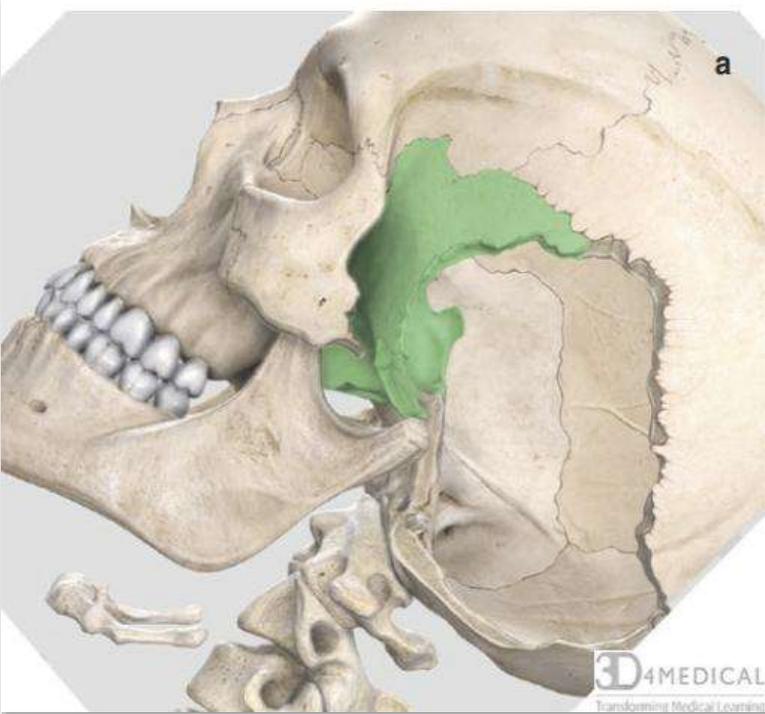
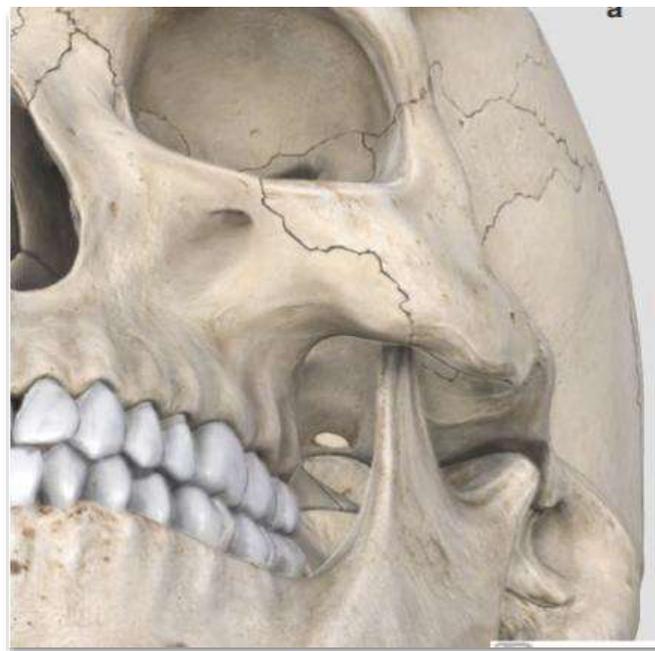
- **Chemical Neurolysis** Chemical neurolysis has been performed with phenol (6% in saline, glycerin, or iohexol), alcohol (97%), or glycerol (40–50%). Volumes used range from 0.3 to 0.5 mL. After confirmation of correct needle placement, the agent is injected in increments of 0.1 mL to avoid inadvertent spread to intracranial structures.

Glycerol neurolysis can also be performed via a retrogasserian approach. The needle is further advanced into the trigeminal cistern until free flow of CSF is observed. The patient is then placed in a semi-sitting position and the head is flexed forward. Contrast of 0.1–0.5 mL is injected to visualize the cistern. Once confirmed, the contrast is allowed to leak out of the needle. The same amount of glycerol is injected into the cistern. The patient should sit with the head tipped forward for 2 h. Potential complications include paresthesia, dysesthesia, anesthesia dolorosa, corneal hypoesthesia or anesthesia, diminished corneal reflex, and masticatory weakness.

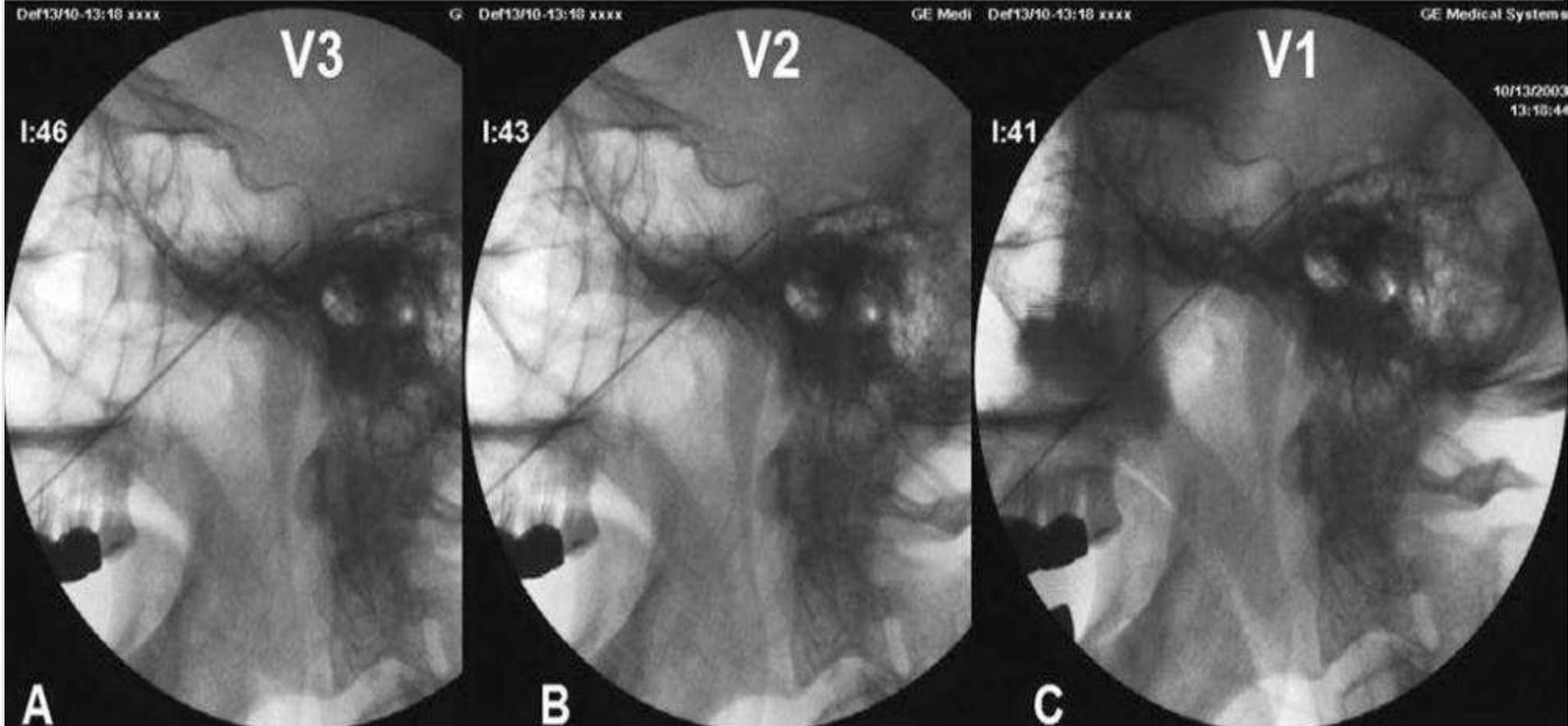
Trigeminal ganglion block and neurolysis

- **Trigeminal Ganglion Radiofrequency Lesioning** After the placement of a radiofrequency needle (22 gauge, curved, 10 cm) in the foramen ovale, fine adjustments are made to cover the desired division(s). A test stimulation is required to locate the active tip of the needle at a depth appropriate to the division desired. The responses to stimulation include motor and sensory components. The motor component is contraction of the masseter and movement of the mandible in response to stimulation at 2 Hz (0.1–1.2 V). Since the mandibular division is the only branch exiting the foramen ovale and the only branch with motor fibers, motor response can be used to confirm the needle is in the foramen ovale.

- The sensory component is paresthesia, and the patient may experience a tingling-like sensation or electric-like paresthesia in specific area of the face in response to 50 Hz (0.1–0.5 V) stimulation
- It is important to keep the patient awake to respond to the stimulation. Typically, the depth of the tip is 4 mm proximal to the clivus for V3, at the clivus for V2, and 2 mm distal to the clivus for V1



- Conventional radiofrequency (CRF) neurolysis is performed at temperatures ranging from 60 °C to 80 °C for 60–90 s
- A local anesthetic (0.5–1 mL) should be injected prior to lesioning to alleviate the pain
- Typically, a 60 s lesion cycle is repeated at 65 °C, 70 °C, and 75 °C
- A sensory test should be performed to confirm effective lesioning. The corneal reflex should be preserved if possible



- Electromagnetic field (EMF) **pulsed radiofrequency (PRF)** is a new option for neurolysis to block transmission through A-delta and C fibers
- The anti-allodynic effects of PRF were significantly greater when the PRF exposure duration was increased from **2 to 6 min**
- PRF is applied for **6 min at 45 V**, with a pulse width of 10 ms and a pulse frequency of 4 Hz. The cutoff needle tip temperature was set at 42 °C

THANK YOU
For your attention