ERNIA DEL DISCO: NON E’ RARA MA SI OPERA SEMPRE MENO; LA RADIOFREQUENZA NEL DOLORE RADICOLARE

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9 Novembre 2022

LE PROCEDURE ANTALGICHE MININVASIVE

- Blocco peridurale lombare, interlaminare selettivo, caudale o con approccio transforaminale
- Blocco peridurale cervicale
- Peridurografia e peridurolisi per via caudale
- Blocco delle faccette e della branca mediale del nervo ricorrente posteriore
- Discectomia decompressiva percutanea con ago motorizzato Reliefer
- Neurostimolazione midollare (SCS) per via percutanea
- PRF e CRF sui nervi periferici (ganglio impari o di Walter; articolazioone sacroiliaca; nervo occipitale; ganglio di Gasser; ganglio sfenopalatino; nervo sovrascapolare; nervo intercostale; corpi genicolati)

Yu *et al. Arthritis Research & Therapy* (2022) 24:205
https://doi.org/10.1186/s13075-022-02894-8

Arthritis Research & Therapy

REVIEW **Open Access**

Characteristics and mechanisms of resorption in lumbar disc herniation

Pengfei Yu[1†], Feng Mao[2†], Jingyun Chen[3], Xiaoying Ma[3], Yuxiang Dai[1], Guanhong Liu[1], Feng Dai[1] and Jingtao Liu[1*]

Abstract

Lumbar disc herniation (LDH) can be spontaneously absorbed without surgical treatment. However, the pathogenesis and physiological indications for predicting protrusion reabsorption are still unclear, which prevents clinicians from preferentially choosing conservative treatment options for LDH patients with reabsorption effects. The purpose of this review was to summarize previous reports on LDH reabsorption and to discuss the clinical and imaging features that favor natural absorption. We highlighted the biological mechanisms involved in the phenomenon of LDH reabsorption, including macrophage infiltration, inflammatory responses, matrix remodeling, and neovascularization. In addition, we summarized and discussed potential clinical treatments for promoting reabsorption. Current evidence suggests that macrophage regulation of inflammatory mediators, matrix metalloproteinases, and specific cytokines in intervertebral disc is essential for the spontaneous reabsorption of LDH.

Keywords:

Joint Bone Spine
Volume 73, Issue 2, March 2006, Pages 151-158

Review

Pathophysiology of disk-related sciatica. I. —Evidence supporting a chemical component

Denis Mulleman [a, b], Saloua Mammou [b], Isabelle Griffoul [b], Hervé Watier [a], Philippe Goupille [a, b]

Abstract

Sciatica in patients with disk disease was long ascribed to pressure put on the sciatic nerve root by a herniated disk. However, a role for chemical factors acting in conjunction with this mechanical insult is suggested by a number of clinical observations: disk surgery does not consistently provide pain relief, large disk herniations are not always symptomatic, severe pain may be present in patients without imaging evidence of nerve root compression, the severity of symptoms and neurological signs is not well correlated with the size of the disk herniation, and conservative therapy is often effective. Experimental studies have provided further evidence for a chemical component: disk herniations can undergo spontaneous resorption, the intervertebral disk is immunogenic, and mediators for inflammation have been identified within intervertebral disk tissue.

The current pathophysiological theory incriminates proinflammatory substances secreted by the nucleus pulposus (NP). When preexisting or concomitant mechanical injury to a nerve root occurs, these substances can cause nerve root pain. Animal experiments have established that the NP can induce functional and structural nerve root abnormalities in the absence of mechanical compression and that this effect is mediated by substances located at the surface of NP cells. Methylprednisolone, diclofenac, indomethacin, doxycycline, and cyclosporine induce variable inhibition of this effect. Available information points to tumor necrosis factor-α (TNF-α) as the main candidate among substances potentially responsible for nerve root pain. Therefore, trials of TNF-α antagonists in patients with disk-related sciatica are warranted.

INIEZIONE EPIDURALE

- ALLA CIECA O RX GUIDATA (SENZA FLUOROSCOPIA POSIZIONE NON CORRETTA DELL'AGO NEL 30,4% DI PAZIENTI)
- CAUDALE
- INTERLAMINARE (DIFFUSIONE DEL CONTRASTO NELLO SPAZIO PERIDURALE ANTERIORE NEL 36% DI PAZIENTI)
- TRANFORAMINALE

Open Access Original Article

DOI: 10.7759/cureus.723

Role of Epidural Injections to Prevent Surgical Intervention in Patients with Chronic Sciatica: A Systematic Review and Meta-Analysis

Adnan Bashir Bhatti [1] , Sunny Kim [2]

studies employed specified the use of EI to treat sciatica caused by LDH. A total of 19 papers meeting the eligibility criteria (mentioned below) were included in this study. The pain scores, functional disability scores, and surgical rates from these studies were considered, and meta-analysis was performed.

Outcome measures: Pain scores, functional disability scores, and surgical rates were assessed from the included studies. The Numeric Rating Scale (NRS) and Visual Analogue Scale (VAS) have been the most commonly used baseline scales for pain evaluation followed by the Verbal Numerical Rating Scale (VNRS) and Japanese Orthopedic Association (JOA). The Oswestry Disability Index (ODI) and Roland Morris Disability Questionnaire (RMDQ) scales were used for the functional disability scoring system in the literature.

Results: Significant improvement in the pain scores and functional disability scores were observed. Additionally, greater than 80% of the patients suffering from chronic sciatica caused by LDH could successfully prevent surgical intervention after EI treatment with or without steroids.

Conclusion: The management of sciatica with EI treatment results in significant improvements in the pain score, functional disability score, and surgical rate. We concluded that EI provides new hope to prevent surgical intervention in patients suffering from sciatica caused by LDH.

International Journal of
Environmental Research and Public Health

Review

Epidural Steroid Injections for Low Back Pain: A Narrative Review

Massimiliano Carassiti [1,*], Giuseppe Pascarella [1], Alessandro Strumia [1], Fabrizio Russo [2], Giuseppe Francesco Papalia [2], Rita Cataldo [1], Francesca Gargano [1], Fabio Costa [1], Michelangelo Pierri [3], Francesca De Tommasi [4], Carlo Massaroni [4], Emiliano Schena [4] and Felice Eugenio Agrò [1]

Int. J. Environ. Res. Public Health **2022**, *19*, 231.

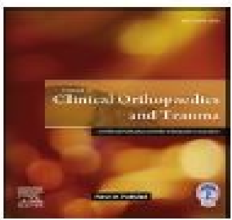
Abstract: Low back pain represents a significant socioeconomic burden. Several nonsurgical medical treatments have been proposed for the treatment of this disabling condition. Epidural steroid injections (ESIs) are commonly used to treat lumbosacral radicular pain and to avoid surgery. Even though it is still not clear which type of conservative intervention is superior, several studies have proved that ESIs are able to increase patients' quality of life, relieve lumbosacral radicular pain and finally, reduce or delay more invasive interventions, such as spinal surgery. The aim of this narrative review is to analyze the mechanism of action of ESIs in patients affected by low back pain and investigate their current application in treating this widespread pathology.

Journal of Clinical Orthopaedics and Trauma 11 (2020) 802–809

Contents lists available at ScienceDirect

Journal of Clinical Orthopaedics and Trauma

journal homepage: www.elsevier.com/locate/jcot



Role of transforaminal epidural injections or selective nerve root blocks in the management of lumbar radicular syndrome - A narrative, evidence-based review

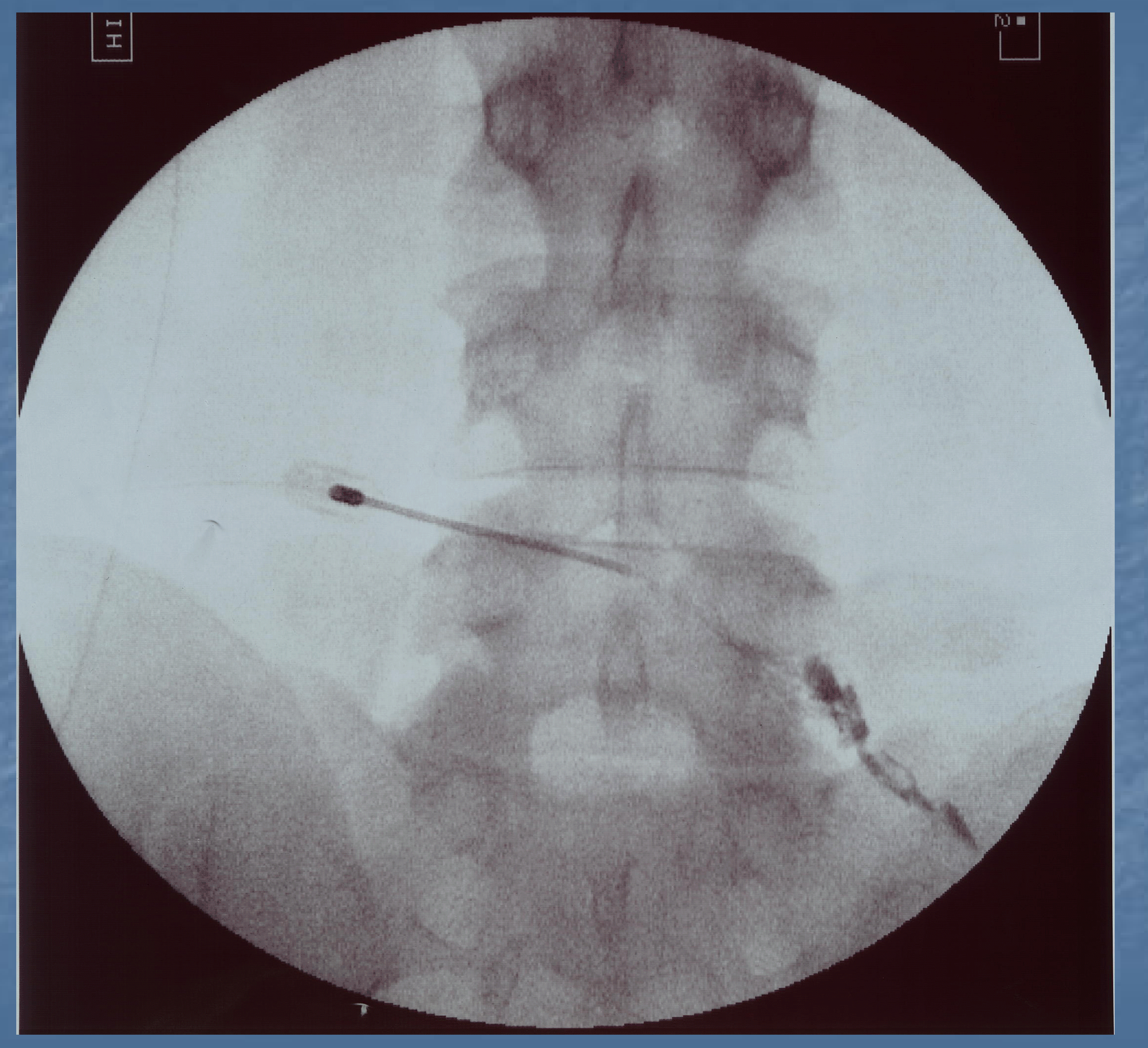
Vibhu Krishnan Viswanathan [a], Rishi Mugesh Kanna [a, *], H. Francis Farhadi [b]

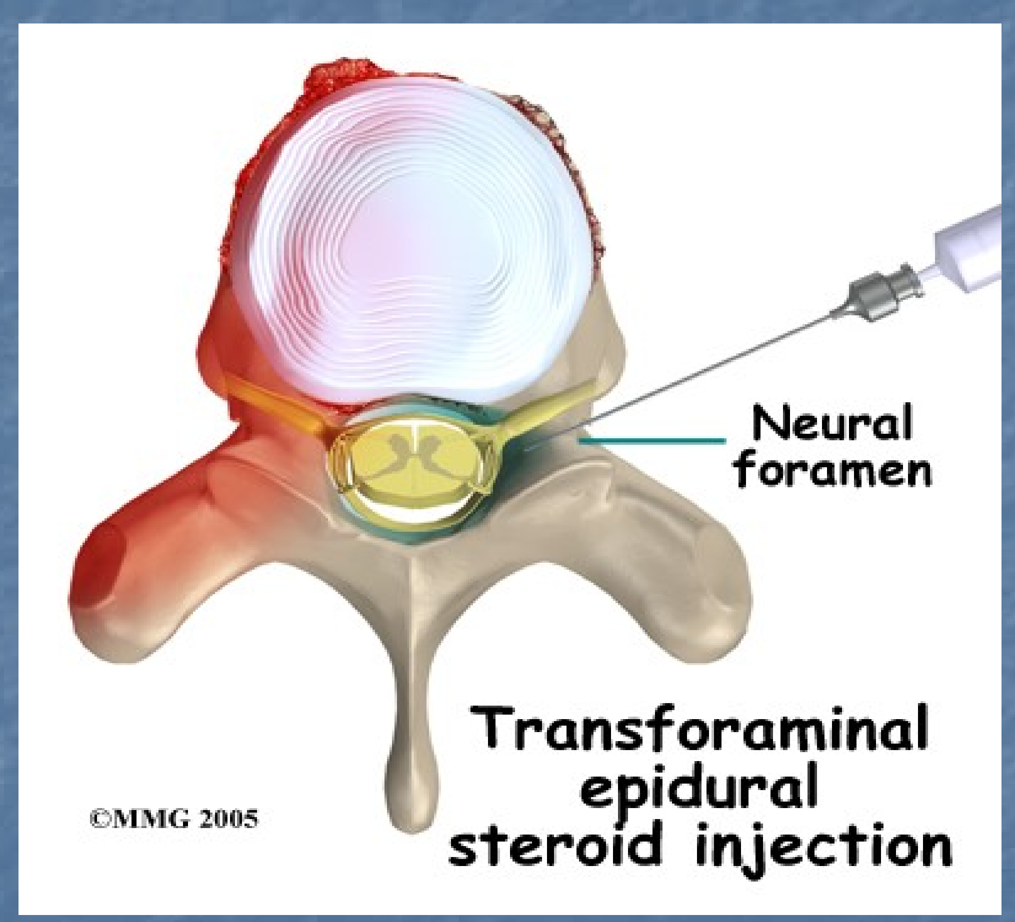
Results: Our search identified 539 articles. All articles discussing alternate procedures, LTFIS in other pathologies, diagnostic roles of LTFIS, not pertaining to concerned questions, in non-English language and duplicate articles were excluded. Review articles, randomised controlled trials or level 1 studies were given preference. Overall, 108 articles were included. Being a focussed narrative review, further screening [Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) or Methodological Index for non-randomized studies (MINORS) criteria] was not performed to select articles. Based on the evidence, LTFIS is an effective and useful treatment modality. It is offered to patients with lumbar disc herniation (LDH) presenting with persistent, unilateral, radiculopathy after a course of conservative measures for around 6 weeks' duration. It has been reported to yield better results than caudal or interluminal epidural injections. The anti-inflammatory and nociceptive signal stabilization actions of steroids, as well as mechanical effects of washout of inflammatory mediators and neural lysis contribute to its efficacy. The three different approaches include sub-pedicular, retro-neural and retro-discal. The procedure is performed under image guidance using a water-soluble contrast under fluoroscopy. The four described radiculogram patterns include "arm", "arrow", "linear" and "splash". Computerised tomography, ultrasonography and magnetic resonance imaging are other modalities, which may be helpful in performing LTFIS. The use of particulate versus non-particulate steroids is controversial.

Conclusion: The overall success rate of SNRB is reported to be 76–88%. The majority of benefits are observed during immediate and early post-injection period. Clinical factors including duration and severity of symptoms, and radiological factors like presence of osteophytes, location, size and type of disc prolapse influence outcomes. The radiculogram "splash" pattern is associated with poor outcomes.

Il blocco peridurale "selettivo"interlaminare

è la somministrazione di un farmaco in prossimità di una specifica radice nello spazio peridurale.

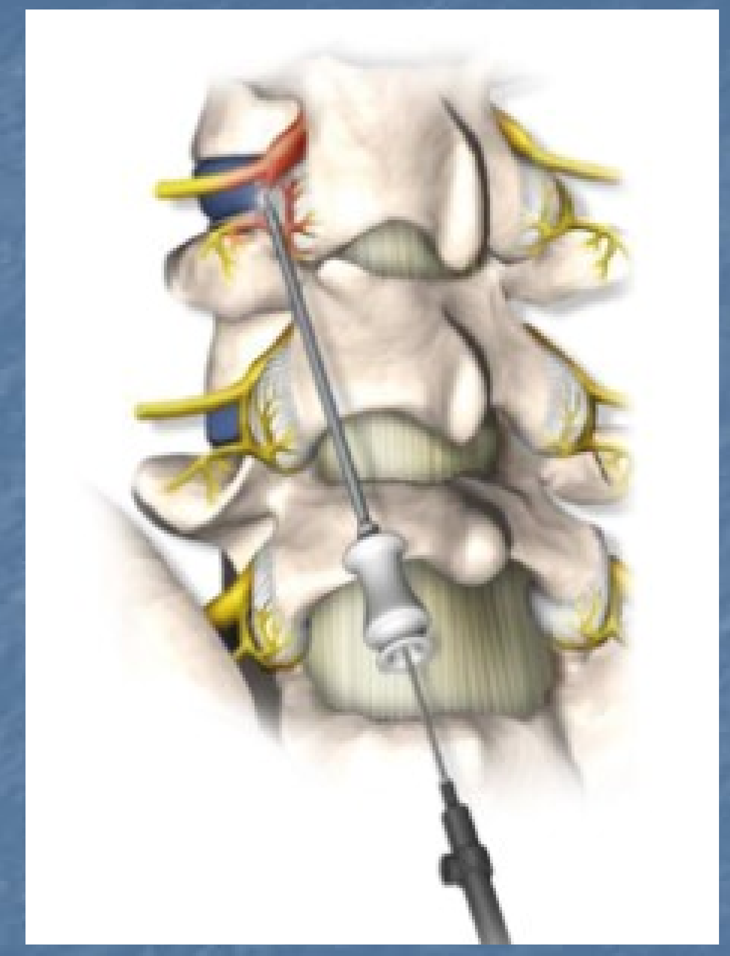



Neural
foramen
Transforaminal
epidural
steroid injection
©MMG 2005

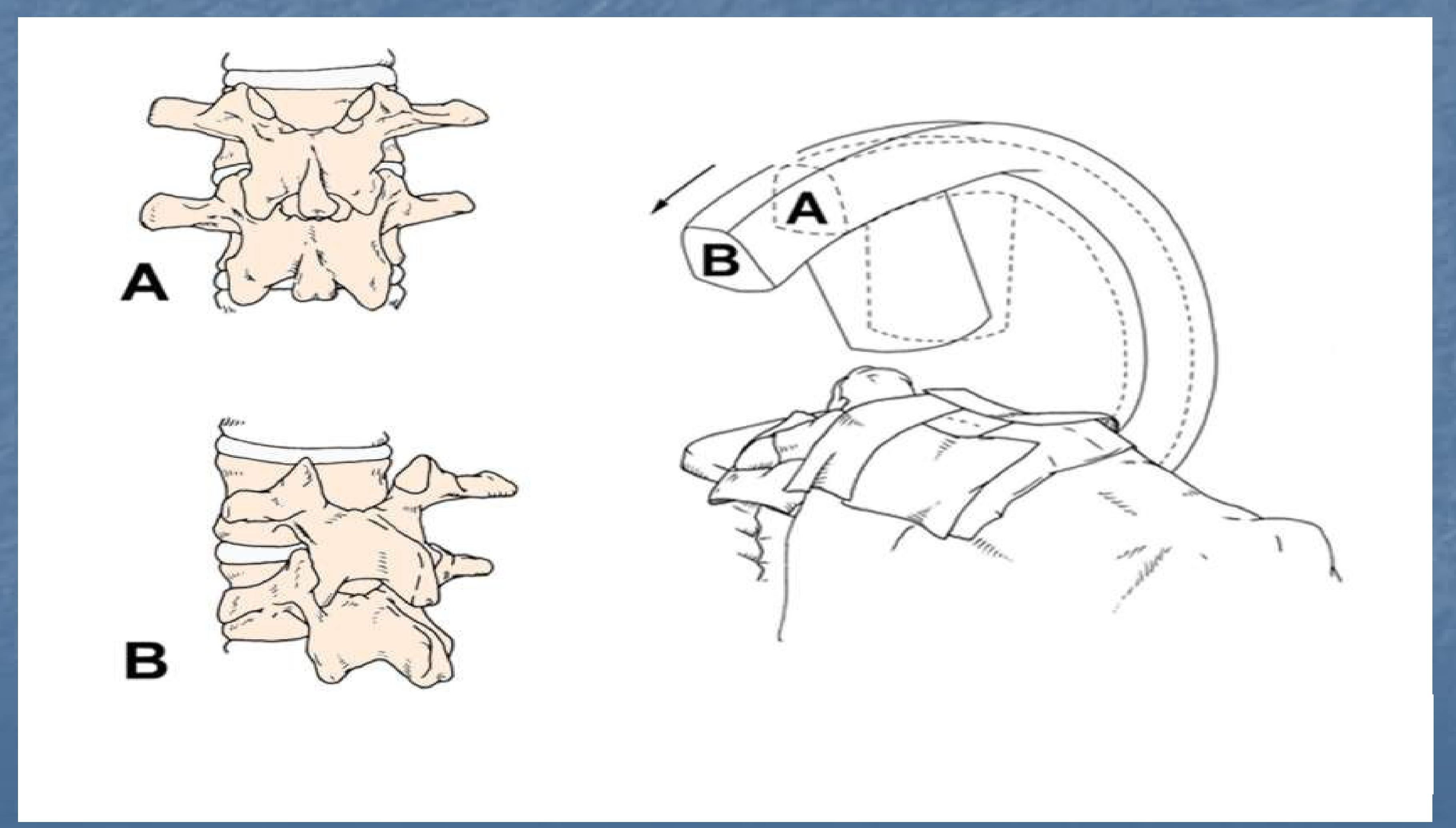
Il blocco peridurale “selettivo”

Presuppone:

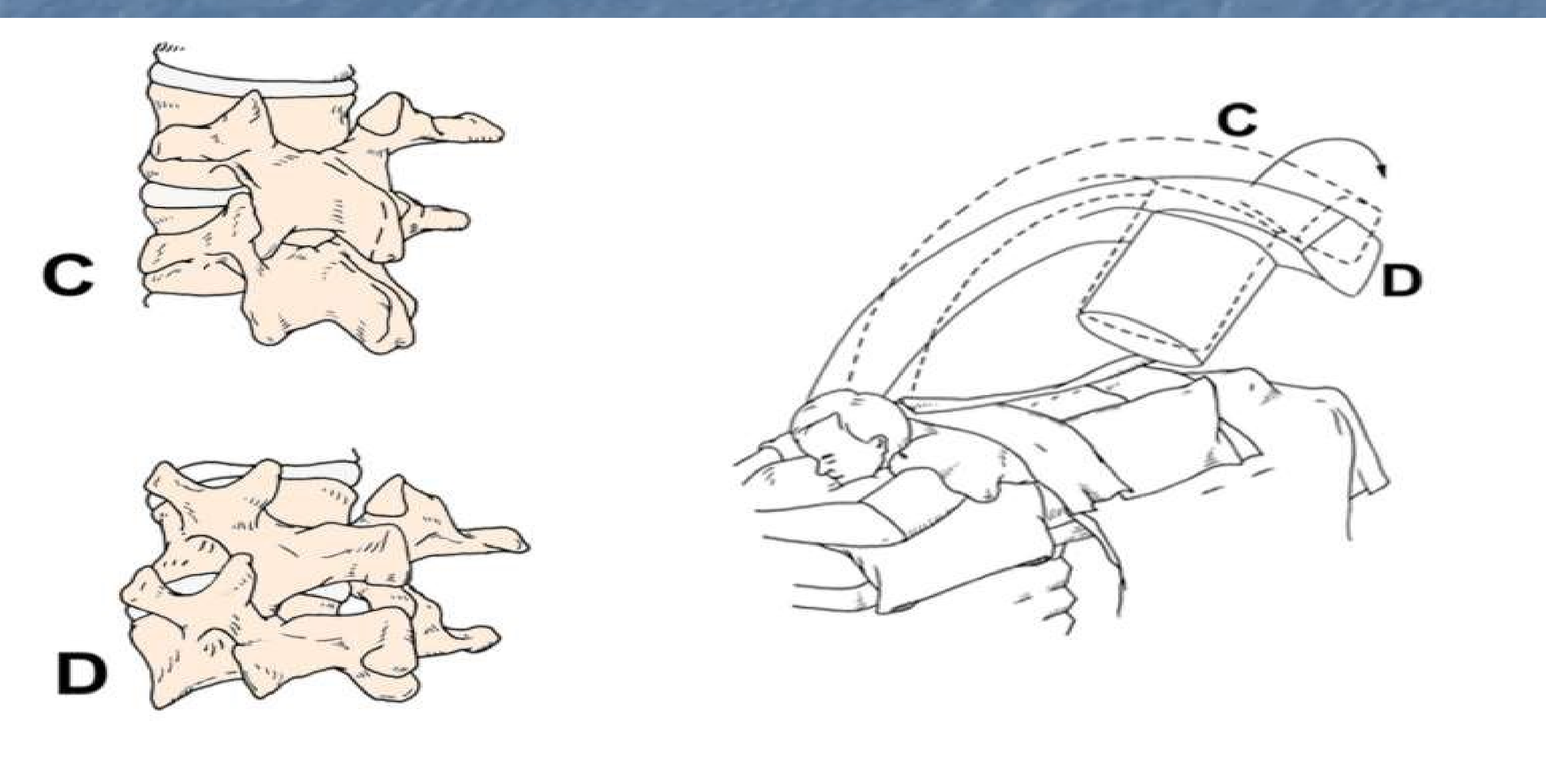
- scelta del lato dove eseguire il blocco
- accurata identificazione dello spazio interlaminare
- iniezione di un piccolo volume di soluzione (2-4 ml)

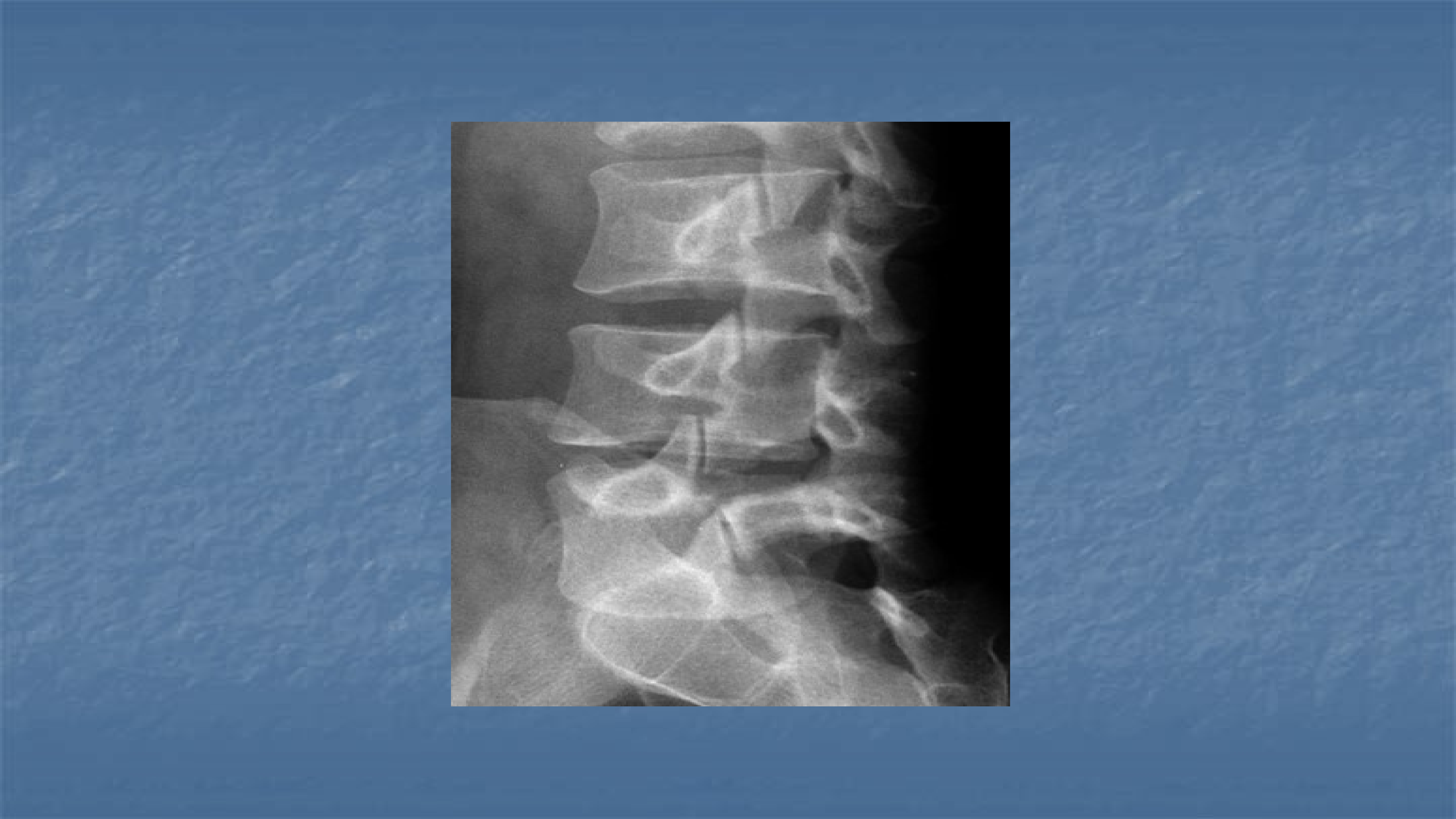


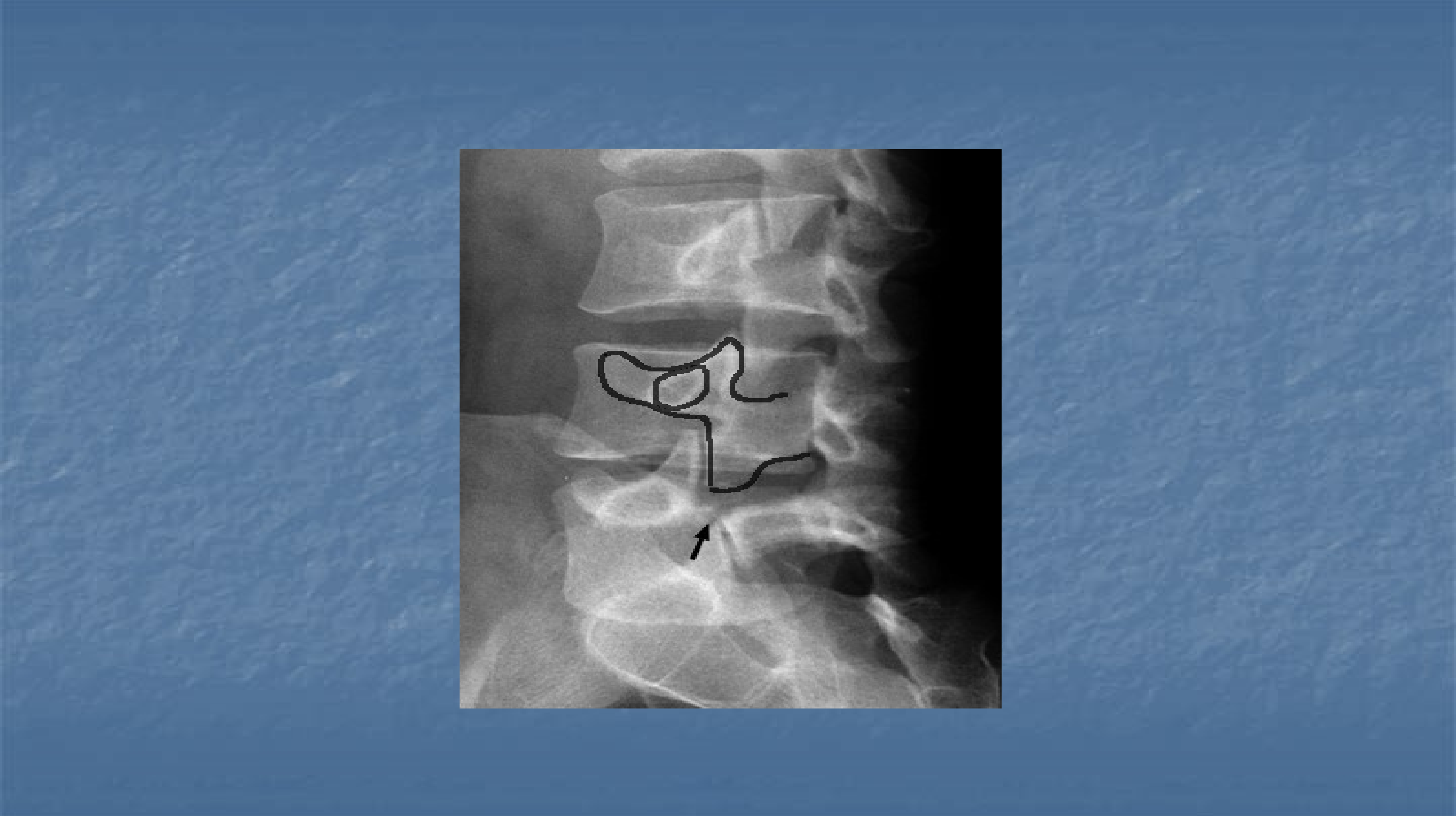
Lateral rotation of C-Arm until spinous process moves to the opposite side



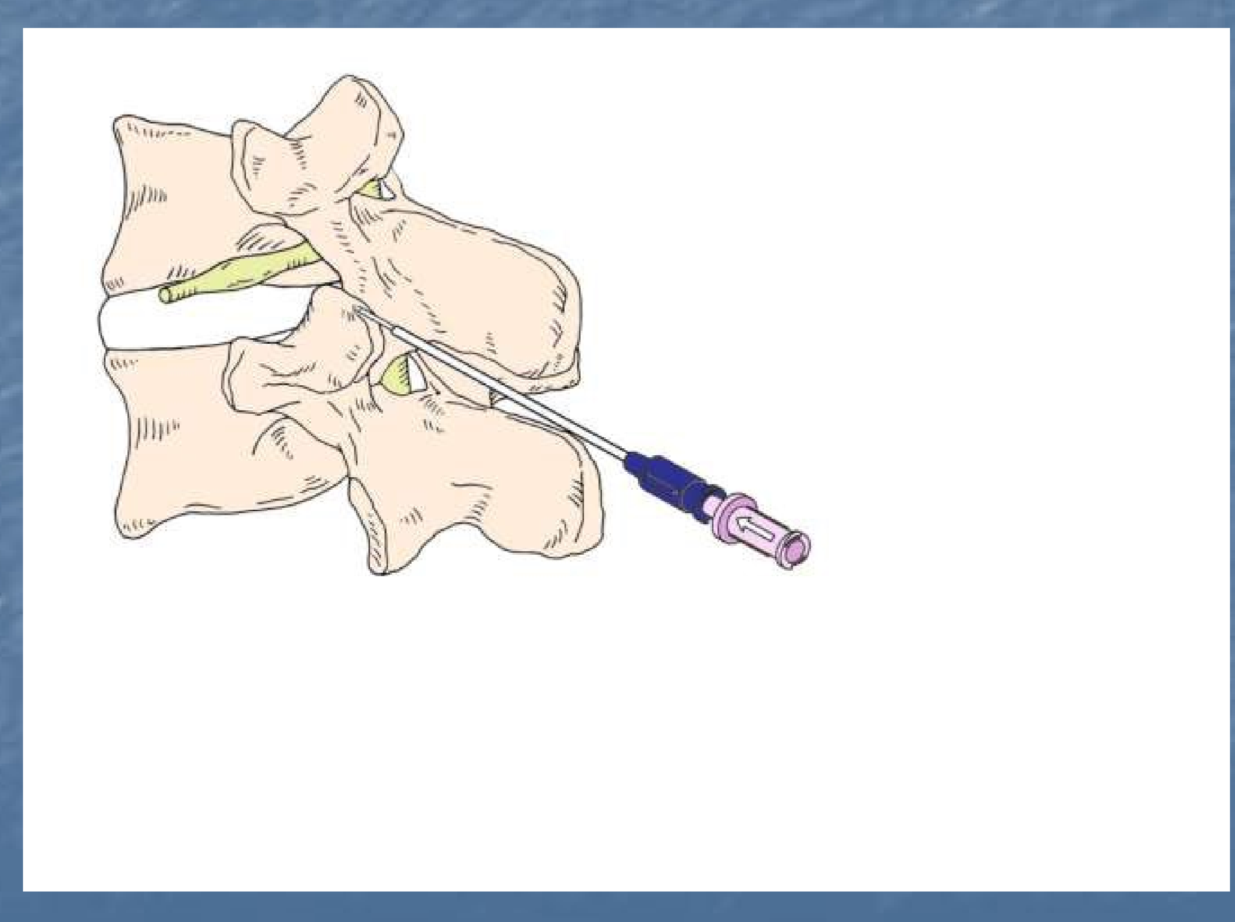
To optimize the transforaminal view, the Cephalad / Caudad rotation of the C-Arm moves the “Scotty Dog’s” ear in the opposite direction. The “Scotty Dog’s” ear should now be covering the disk, the target for positioning the needle should be the tip of the Dog’s ear. This will establish a safe bony target which is behind the nerve root.



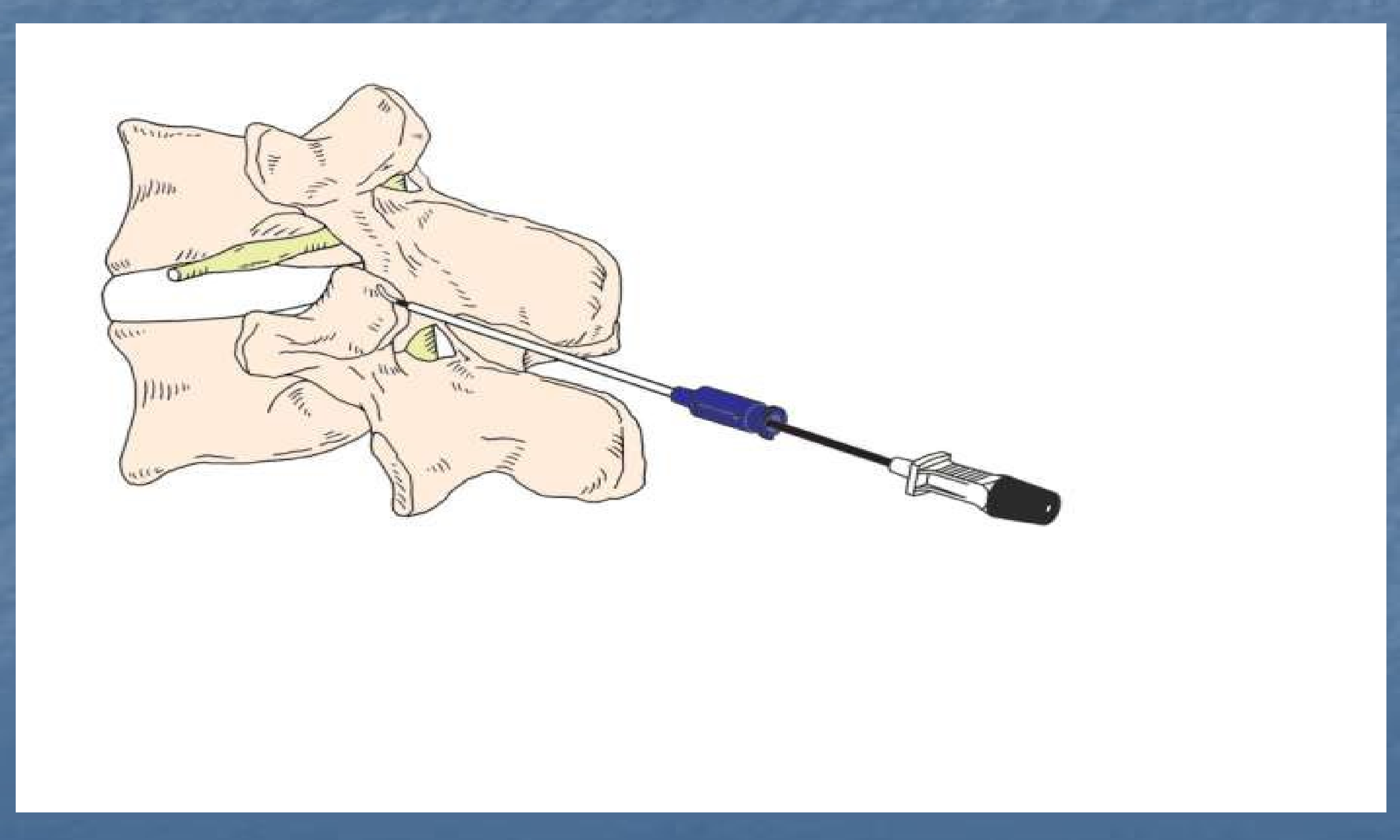




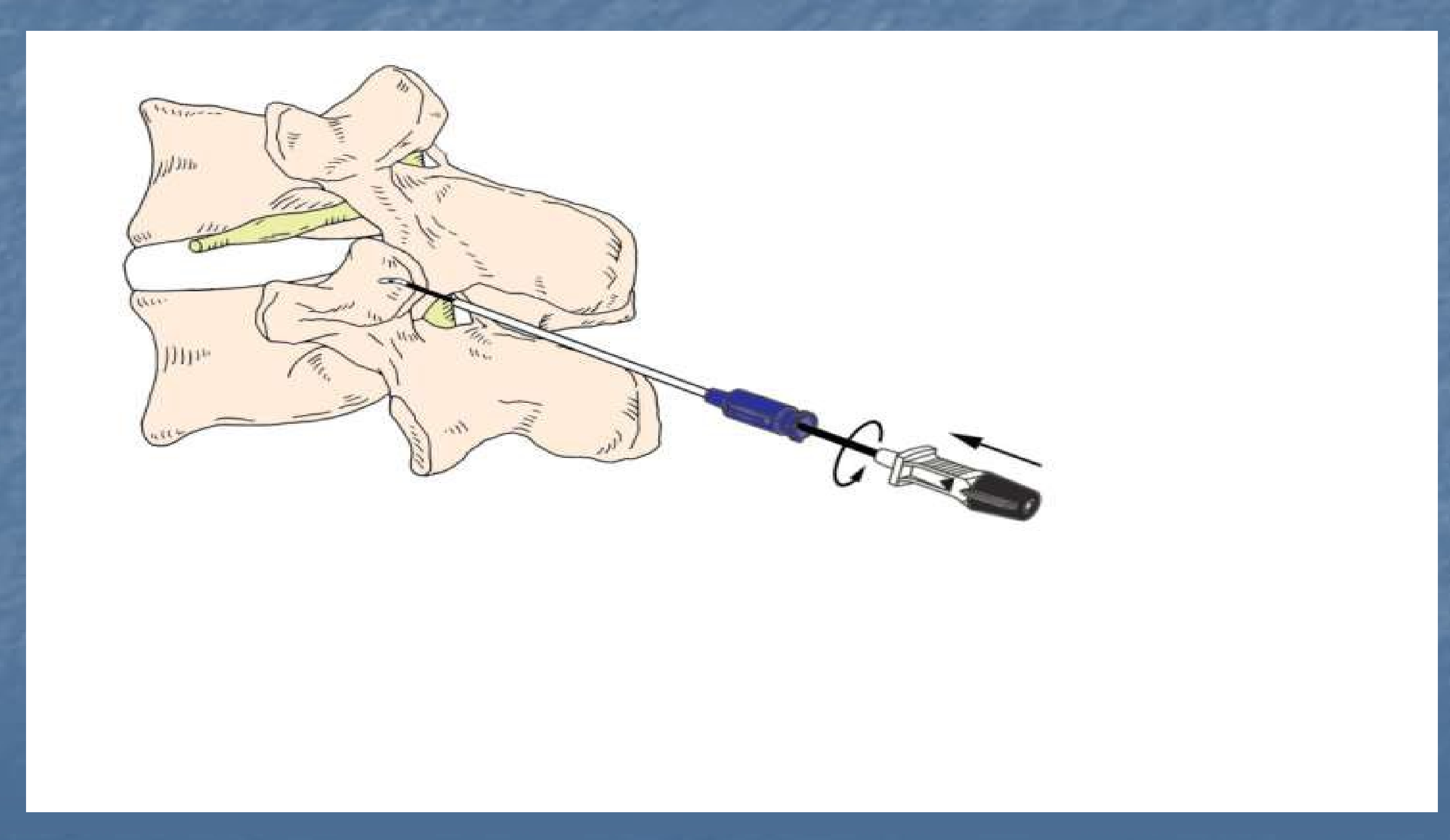
Following local anesthetic infiltration the introducer needle is advanced to the tip of the “Scotty Dog’s” ear. The sharp metal needle is then removed from the introducer cannula.



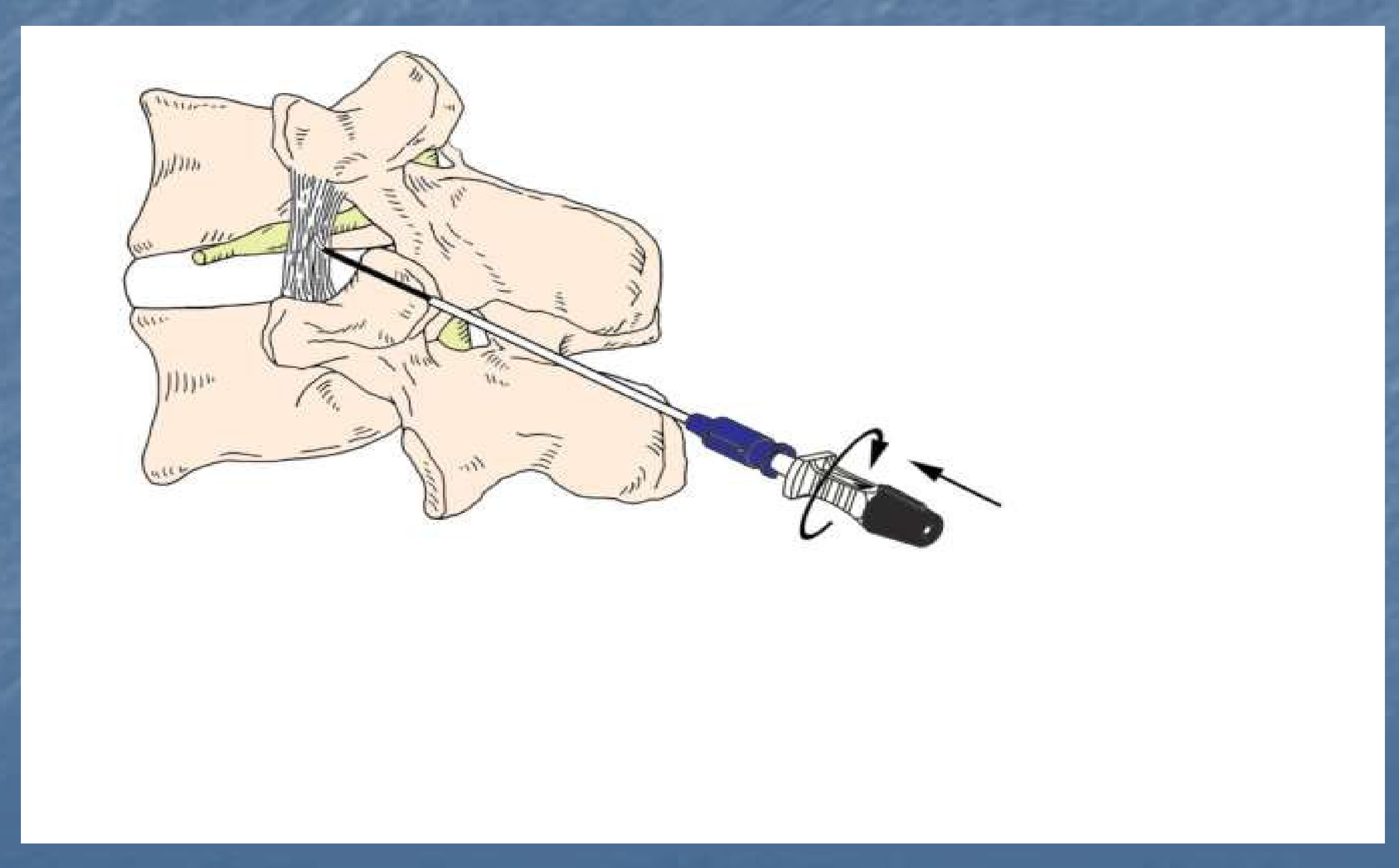
The Blunt Coudé needle is advanced with the tip and arrow marker facing medially until it touches the tip of the "Scotty Dog's" ear.



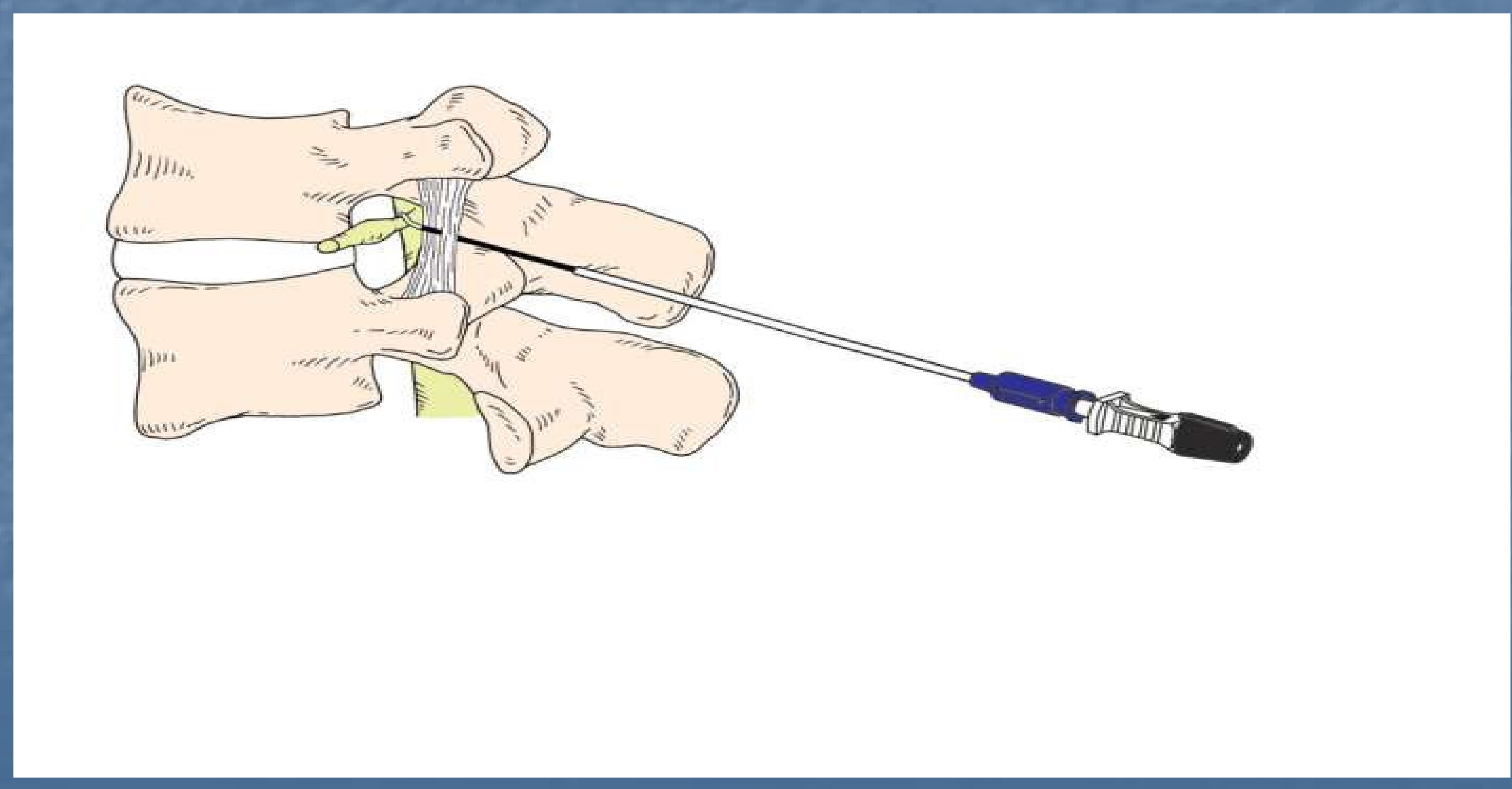
Once bony contact is made with the tip of the “Scotty Dog’s” ear, the arrow on the needle hub should be rotated 180° laterally. Once this has been done, you may advance the Blunt needle



Anterior to the “Scotty Dog’s” ear, the needle hub should be rotated 180° medially and advanced through the intertransverse ligament until you feel a “Pop”

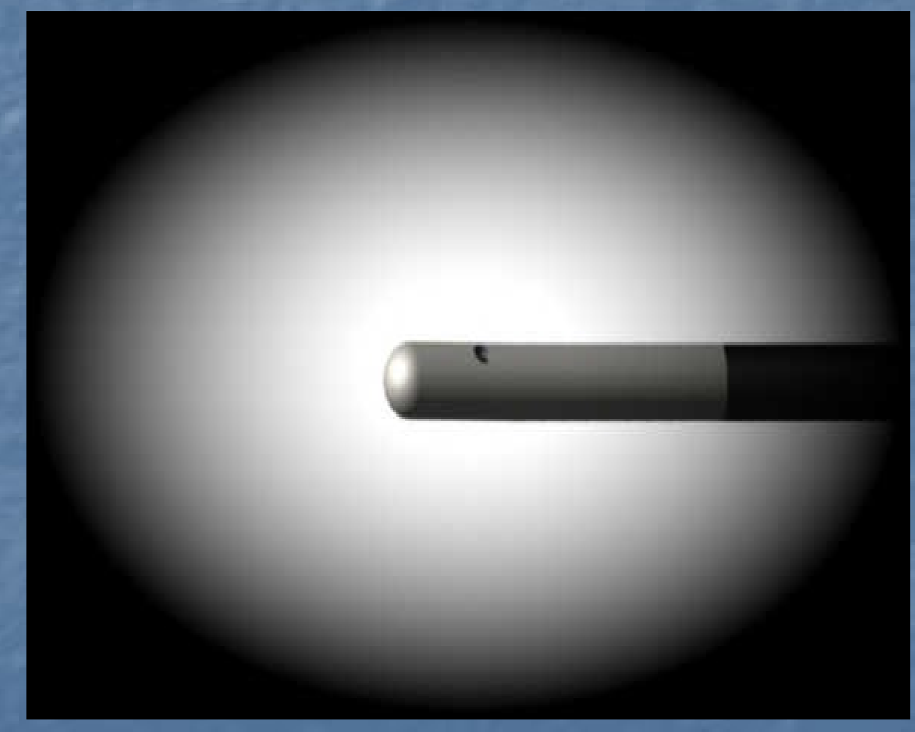


The needle tip will enter the neural foramen with enhanced safety as the blunt needle is less likely to penetrate nerves or arteries. The needle tip now has access to any part of the neural foramen. Needle position is confirmed with A/P and lateral fluoroscopic visualization. Contrast may be injected to verify the spread followed by injection of local anesthetic and steroids.

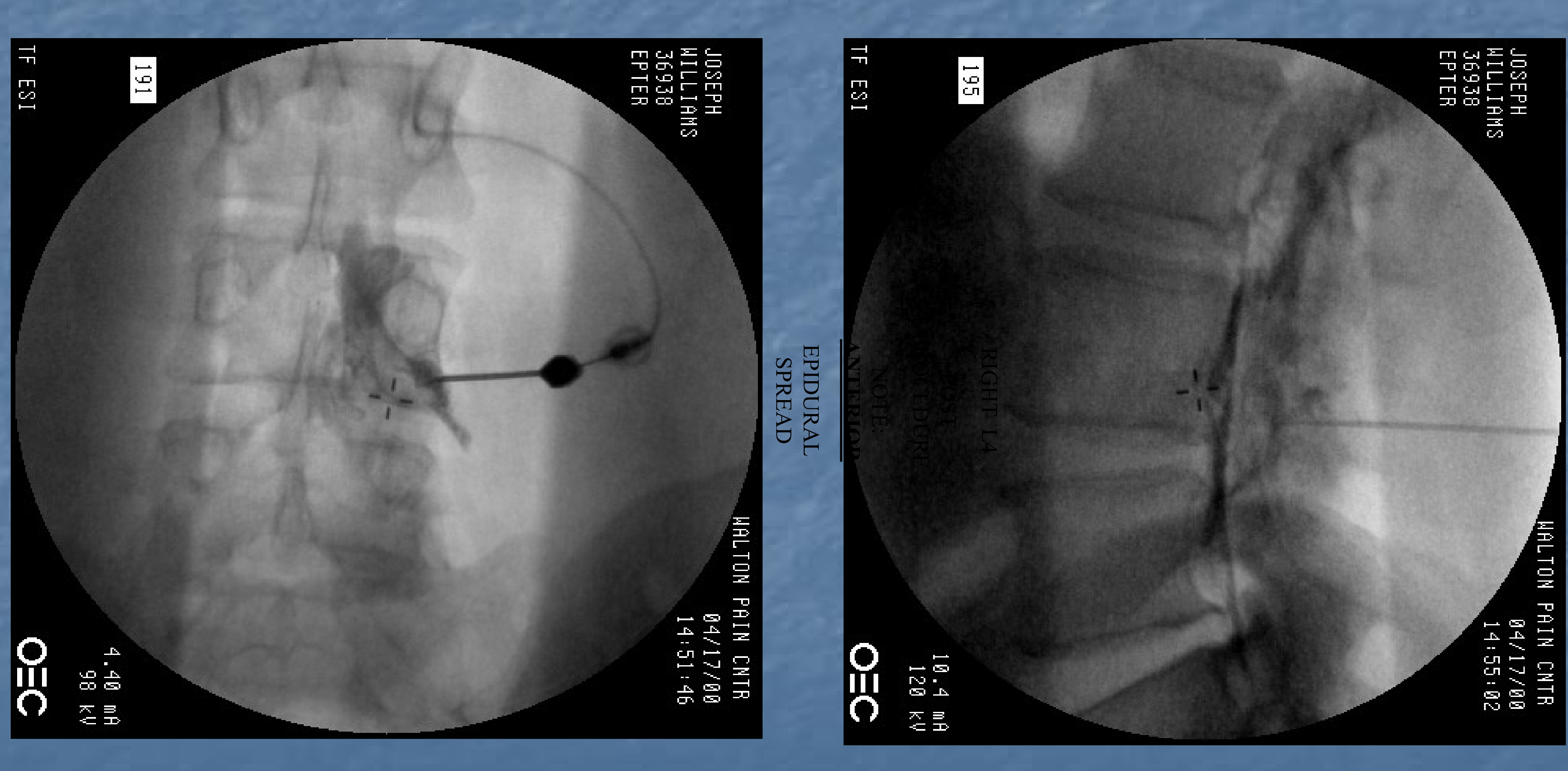


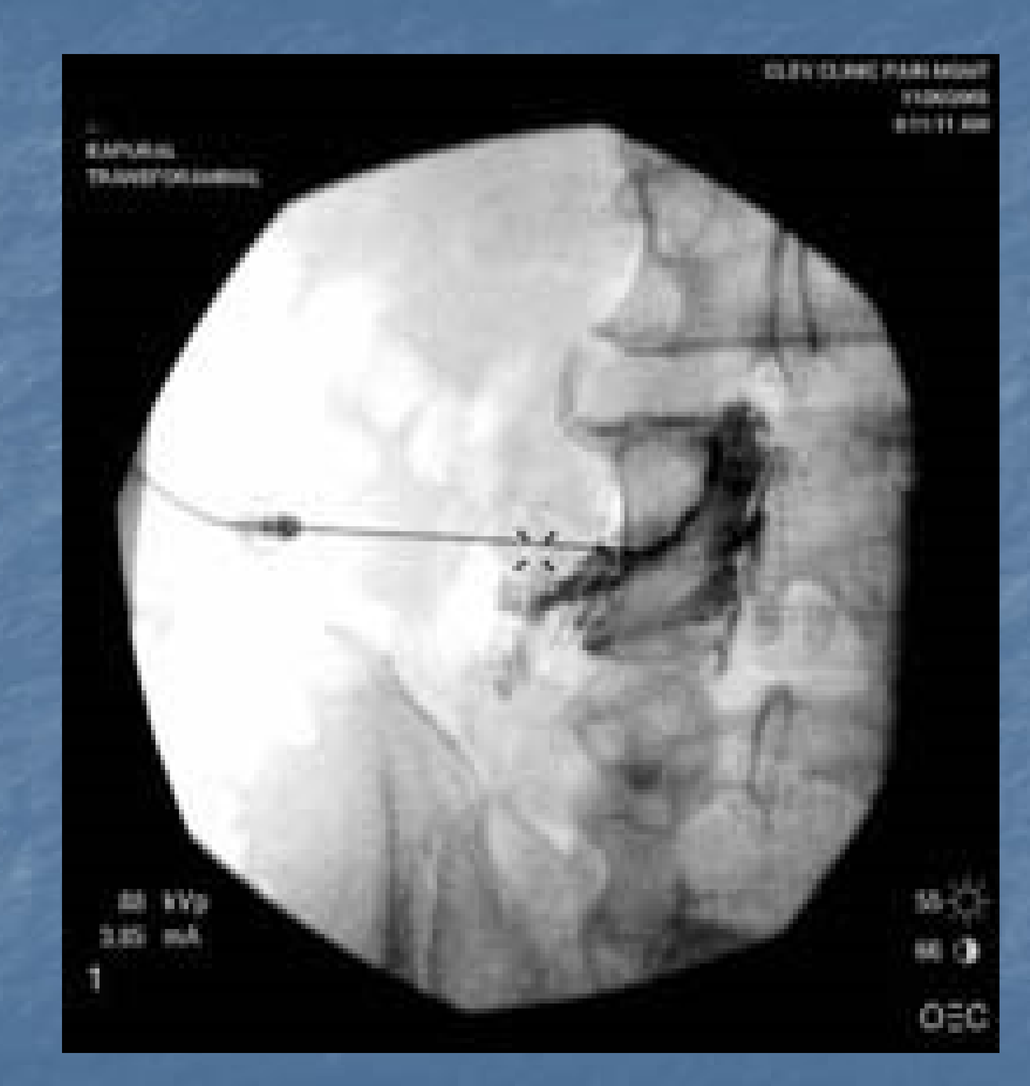
I blocchi selettivi paravertebrali

AGO BLUNT
Un ago a punta chiusa ed arrotondata non carotante.



I blocchi selettivi paravertebrali




kVp
mA
OEC

La radiofrequenza pulsata (PRF)

2 cicli attivi al secondo di 20 millisec ciascuno
T° < 43°C
Impedenza < 400 Ohm
Procedura: 45 Volt per 2 min

La radiofrequenza pulsata (PRF)

- È un metodo non distruttivo
- Non è dolorosa. La temperatura non aumenta a livelli nocicettivi e la frequenza di 500.000 Hz durante la fase attiva è ben al di sopra del range fisiologico
- Può essere usata nel trattamento del dolore neuropatico (catena neuronale intatta)
- Può essere usata per trattare nervi periferici

Chronic intractable lumbosacral radicular pain, is there a remedy? Pulsed radiofrequency treatment and volumetric modifications of the lumbar dorsal root ganglia.

Tortora F[1], Negro A[2], Russo C[3], Cirillo S[4], Caranci F[5]

Author information ▸

La Radiologia Medica, 04 May 2020, 126(1):124-132

Thirty patients, from 2016 to 2018, were enrolled (age: 42-80 aa, 66.7% men and 33.3% females) with low back pain, lumbosciatalgia and/or lumbocruralgia, resistant to previous medical and physical treatments for a period not < 3 months, failure of surgical and chemiodiscolysis with ozone oxygen therapy. Each patient was subjected to a clinical evaluation (antalgic walking, sensitive deficit, interviews with specific questionnaires: ODI, RDQ,VAS) and to a radiological evaluation with MRI examination, before and 30 days after the CT-guided PRF treatment. Measurements of the thickness of the involved and not involved DRG were taken using common postprocessing software of MRI examinations in order to have measurement parameters for comparison. We analyzed the clinical course using the paired samples T test in order to evaluate modification for each clinical and radiological parameter (statistical significance $p < 0.05$).

Results

Significant improvements of the clinical outcomes with a good resolution of the pain symptoms (VAS evaluation: The score fell from 68.47 to 39.17 with a difference of 29.3 and a reduction of the 42.79% in the perceived pain, $p = 0.00000152$). The thickness of DRG falls from an average media of 0.586-0.448 cm ($p = 0.000085$), with a difference of 0.138 cm and a percentage reduction of 22.30%.

Conclusions

PRF treatment of the DRG may be considered for patients with chronic severe lumbosacral radicular pain refractory to conventional medical management when other noninvasive or surgical procedures fail. It is minimally invasive, inexpensive and simple to perform with no complications.

Pulsed Radiofrequency for Radicular Pain Due to a Herniated Intervertebral Disc—An Initial Report

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*Clinica de Dor, Oporto, Portugal; †Department of Radiology, Zentrum hospital, Biel, Switzerland; ‡Pain Unit, Swiss Paraplegic Center, Nottwil, Switzerland

Pulsed Radiofrequency in Lumbar Radicular Pain: Clinical Effects in Various Etiological Groups

David Abejón, MD, FIPP[*]; Santiago Garcia-del-Valle, MD[†]; María Lorenza Fuentes, MD[‡]; Juan Ignacio Gómez-Arnau, MD, PhD[†]; Enrique Reig, MD, PhD, FIPP[§]; Jan van Zundert, MD, PhD, FIPP[¶]

[*]*Hospital Universitario Clínica Puerta de Hierro, Madrid;* [†]*Department of Anesthesia and Critical Care, Fundación Hospital Alcorcón, Madrid;* [‡]*Department of Anesthesia and Critical Care, Anesthesia and Pain Unit, Fundación Hospital Alcorcón, Madrid;* [§]*Clínica del Dolor de Madrid, Madrid, Spain;* [¶]*Department of Anesthesiology, Intensive Care, Emergency Medicine and Multidisciplinary Pain Therapy, Ziekenhuis Oost-Limburg, Campus Andre Dumont, Stalenstraat, Belgium*

Risks and Complications

No complications have been recorded in any of the controlled trials, and none have been reported when operators have followed prescribed guidelines for the conduct of the procedure.

**International Spine Intervention Society. Lumbar transforaminal injections. In: Bogduk N (ed). Practice Guidelines for Spinal Diagnostic and Treatment Procedures.
International Spine Intervention Society, San Francisco, 2004, pp 163-187.**

Minor complications of Lumbar Transforaminal injections

- Injection site pain, 17% - 11.5%
- Short term increased radicular pain, 8.8%
- Light headedness, 6.5%
- Increased spinal pain, 5.1%
- Nonspecific headache, 1.4%

Minor complications of Lumbar Transforaminal injections

- Vomiting, 0.5%
- Other reported minor side effects, vasovagal reactions, flushing (up to 5%)
- Karaman: Vasovagal 8.7%
  Intravascular penetration 7.4%

Huston, Slipman, Pain Physician, 2007; 10: 697-705
Karaman et al, Spine 2011; 36(13): E819-824

Safety of Epidural Steroid Injections for Lumbosacral Radicular Pain

Unmet Medical Need

Steven P. Cohen, MD, Emileigh Greuber, PhD,† Kip Vought, BSc,†*
and Dmitri Lissin, MD†

(*Clin J Pain* 2021;37:707–717)

Discussion: The risk of complications for transforaminal ESI is greater with particulate corticosteroids. Nonparticulate corticosteroids, which are often recommended as first-line therapy, may have a short duration of effect, and many commercial formulations contain neurotoxic preservatives. The safety profile of ESIs may continue to improve with the development of safer, sterile formulations that reduce the risk of complications while maintaining efficacy.

Se non si ha pain relief:

- il meccanismo patogenetico non è la flogosi neurale…
- continua liberazione di materiale nucleare attraverso una breccia dell’anulus fibrosus…
- l’iniezione è stata eseguita al livello metamerico sbagliato, sul lato sbagliato o fuori dallo spazio peridurale…
- nello spazio peridurale vi sono aderenze periradicolari che impediscono al farmaco di raggiungere la radice infiammata…

INIEZIONE EPIDURALE TRANSFORAMINALE CONCLUSIONI

- CONSENTE L' ACCESSO ALLO SPAZIO EPIDURALE ANTERIORE E PERIRADICOLARE
- CONSENTE IL TRATTAMENTO SPECIFICO DELLA RADICE NERVOSA COINVOLTA (ERNIA DISCALE O STENOSI)
- SI OTTIENE PAIN RELIEF SENZA IPOTENSIONE ARTERIOSA E DEFICIT MOTORIO
- RIDUCENDO L' INFIAMMAZIONE RADICOLARE FACILITA LA RIABILITAZIONE

PER LA FUTURA RICERCA:

- STUDI MULTICENTRICI
- 4 GRUPPI (PLACEBO; ANESTETICO LOCALE; STEROIDE; ANESTETICO LOCALE + STEROIDE)
- PAIN SCORE A 1 SETTIMANA; 3 MESI E 12 MESI
- DOSI E VOLUMI STANDARD DI STERODI E ADDITIVI (ANESTETICI LOCALI E SOLUZIONE SALINA)
- COMPARARE EFFICACIA E SICUREZZA DEL CORTISONE PARTICOLATO (METILPREDNISOLONE, TRIAMCINOLONE) E NON PARTICOLATO (DESAMETASONE)
- NUMERO DI PROCEDURE DA ESEGUIRE E INTERVALLO FRA LE PROCEDURE
- EVENTI AVVERSI

IL NOSTRO CENTRO DI TERAPIA DEL DOLORE

	PRF TRANSFORAMINALE	PRF e CRF NERVI PERIFERICI	DECOMPRESSIONE DISCALE	TOTALE
ANNO 2016	338	85	30	453
ANNO 2021	696	64	32	792
ANNO 2022 SETT	505	59	27	591

Also there's swimming, pain clinic, acupuncture, laser discectomy...
CHIRO
PHARMACIST
SURGERY
ORTHOTICS
Ph. THERAPY
BRACE
TRACTION
REST
Back School!
GYM EXERCISE
Compensation
PERCUTANEOUS DISCECTOMY
LITIGATION

GRAZIE PER L' ATTENZIONE

LE ADERENZE EPIDURALI LOMBARI

FBSS (failed back surgery syndrome):

"FBSS is persistent or recurrent pain, mainly in the region of the lower back and legs, even after *technically*, *anatomically* successfull lumbosacral spine surgeries" *(The Failed Perfect Surgery)*

Fritsch, Spine 1996

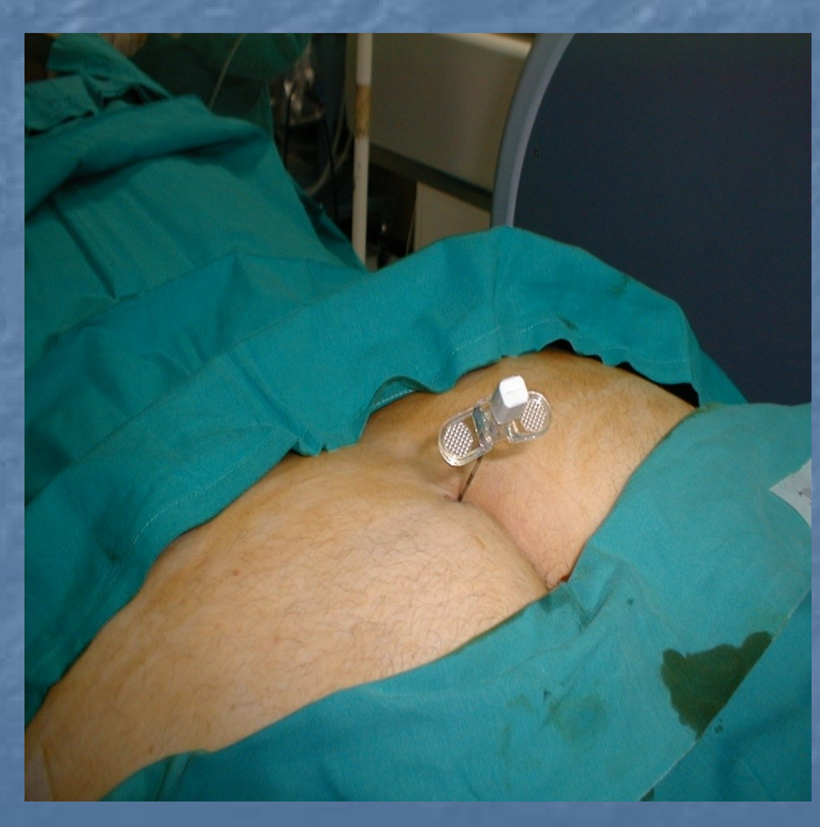
The term FBSS implies that the final outcome of surgery did not meet the expectations of both the patient and the surgeon that were established before surgery

Schofferman, Spine J 2003

The FBSS is a heterogeneous entity that may result from incorrect diagnosis, poor patients selection, incomplete decompression, decompression at the wrong level, recurrent disc herniation, segmental spinal instability, facet joint disease, permanent nerve root damage, epidural fibrosis, or arachhnoiditis

Fiume; Acta Neurochir, 1995
Long; J Neurosurg, 1988
North; Neurosurg, 1991

PERIDUROLISI



Nata circa 25 anni fa (G. Racz)
Concetto di persistenza del dolore dovuta allo sviluppo di fibrosi cicatriziale post intervento di emilaminectomia

PERIDUROLISI

Tecnica:

- Approccio caudale o up-down
- Inserimento di catetere dedicato fino a raggiungere il livello interessato
- Lisi meccanico-chimica delle aderenze

PERIDUROLISI
CONTROINDICAZIONI

- Lesioni cutanee nel sito di entrata
- Turbe della coagulazione
- Sepsi
- Disfunzione vescicale (studio urodinamico)

PERIDUROLISI

- Esami di laboratorio (emocromo con formula, PT, PTT)
- Accesso venoso con cannula
- Eventuale blanda sedazione
- Amplificatore di brillanza
- Miscela di farmaci

PERIDUROLISI
FARMACI

- Lidocaina 2% 4 ml
- Ialuronidasi 900 ui
- Levobupivacaina (Chirocaina) 0.125 4 ml
- Salina ipertonica 10% 6 ml
- Cortisone depot (triamcinolone) 40 mg

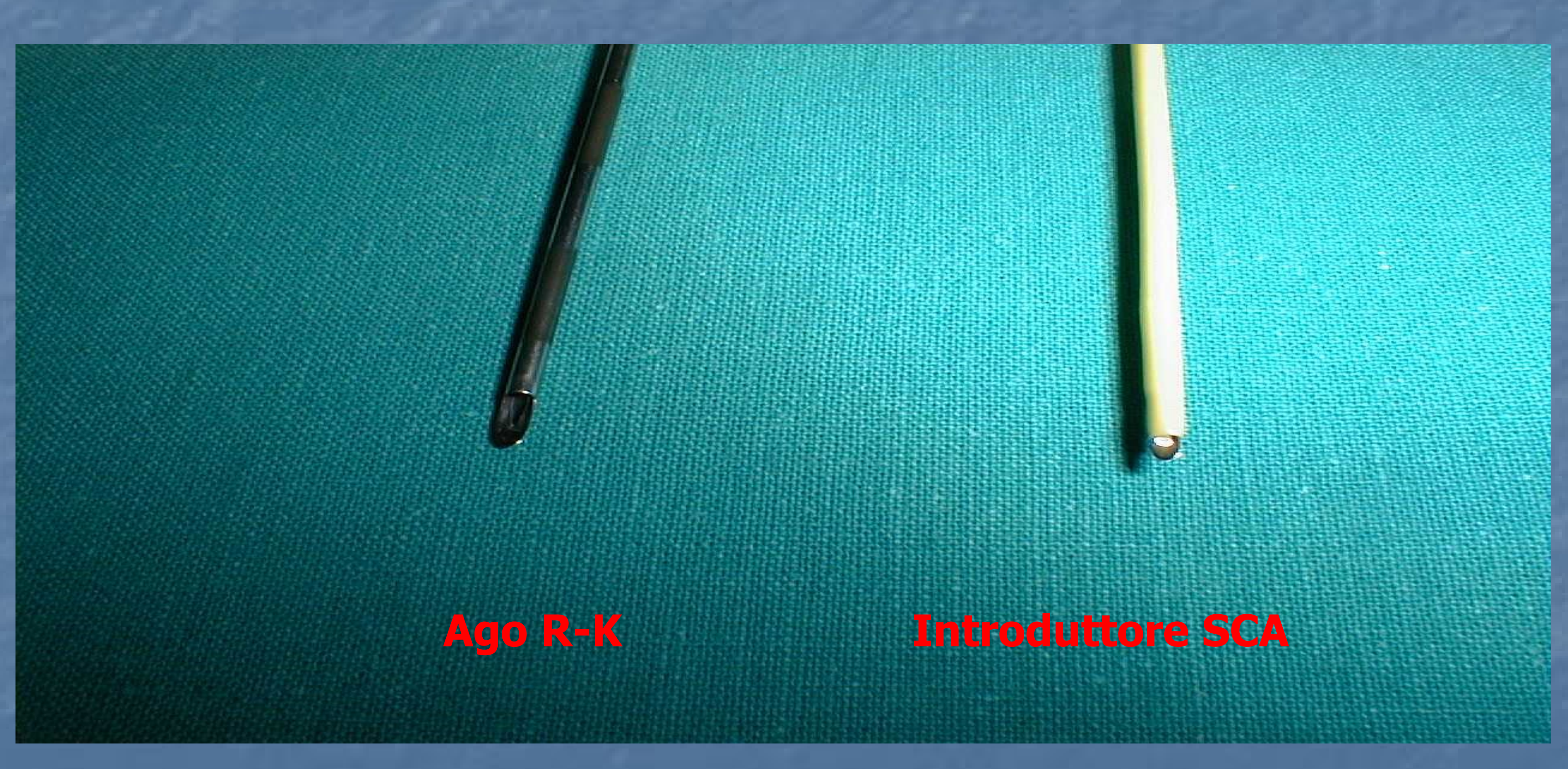
PERIDUROLISI

POSSIBILI COMPLICANZE

- Ematoma
- Ipotensione transitoria
- Intorpidimento delle estremità
- Disfunzione sfinterica
- Disfunzioni sessuali
- Infezione
- Paralisi (blocco subaracnoideo)
- Cefalea
- Possibile rottura di catetere

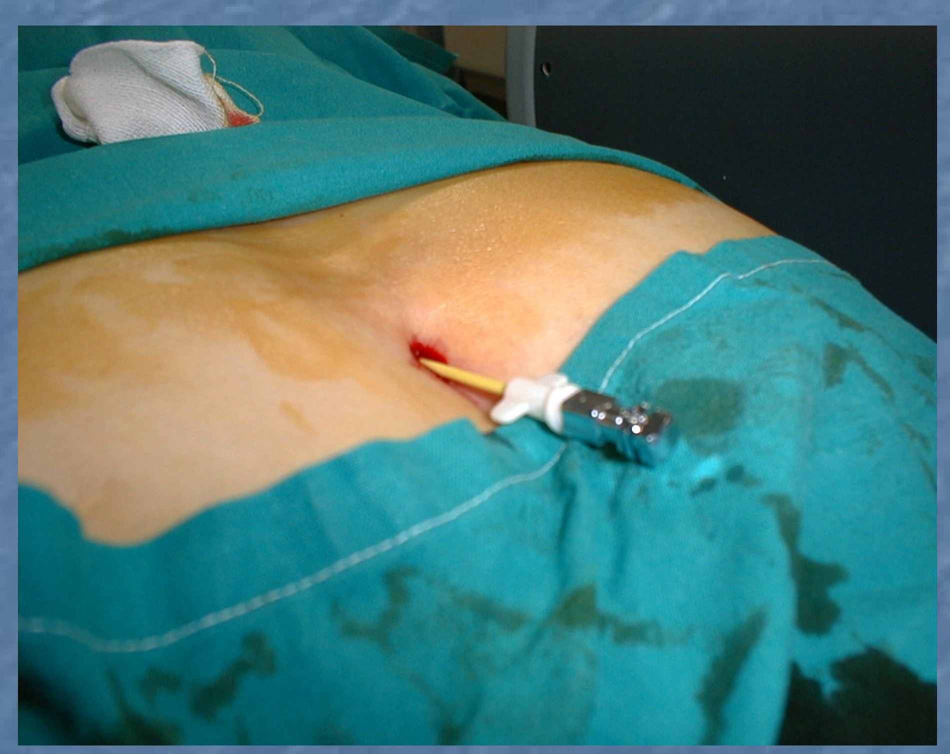
PERIDUROLISI

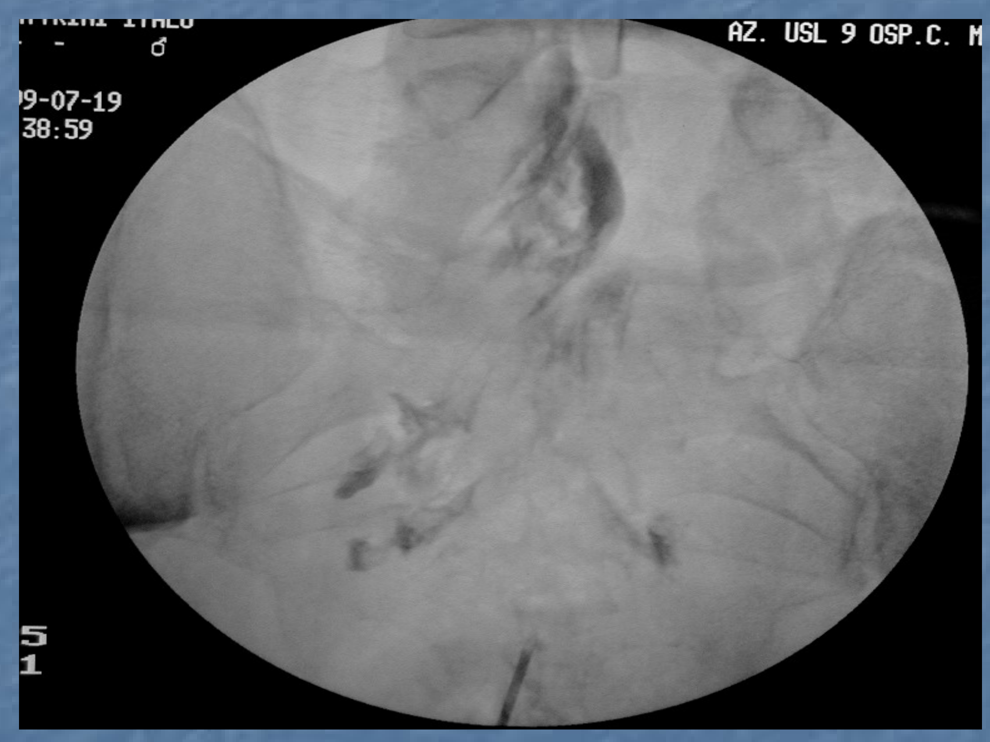
PERIDUROLISI



PERIDUROLISI

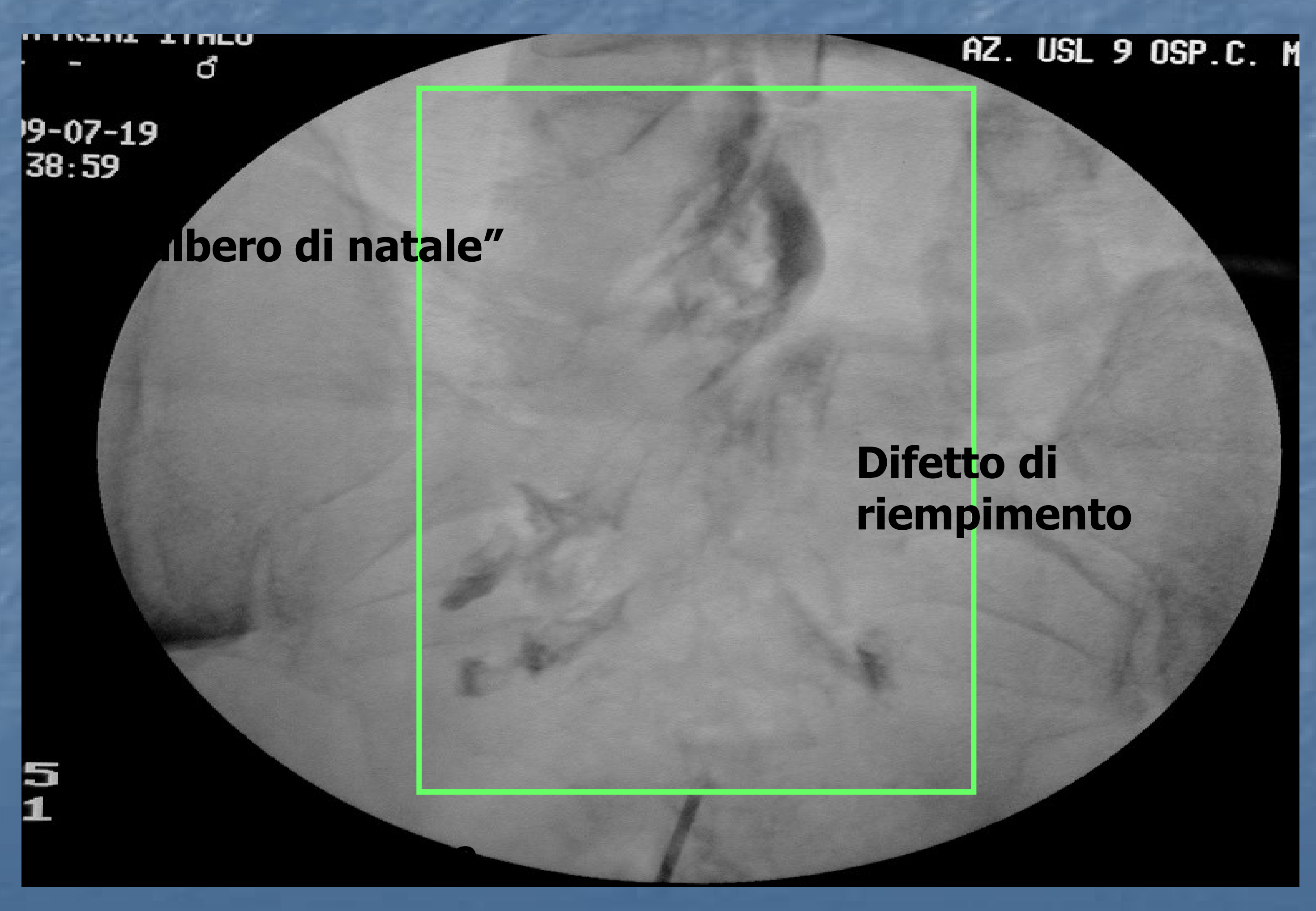
PERIDUROLISI



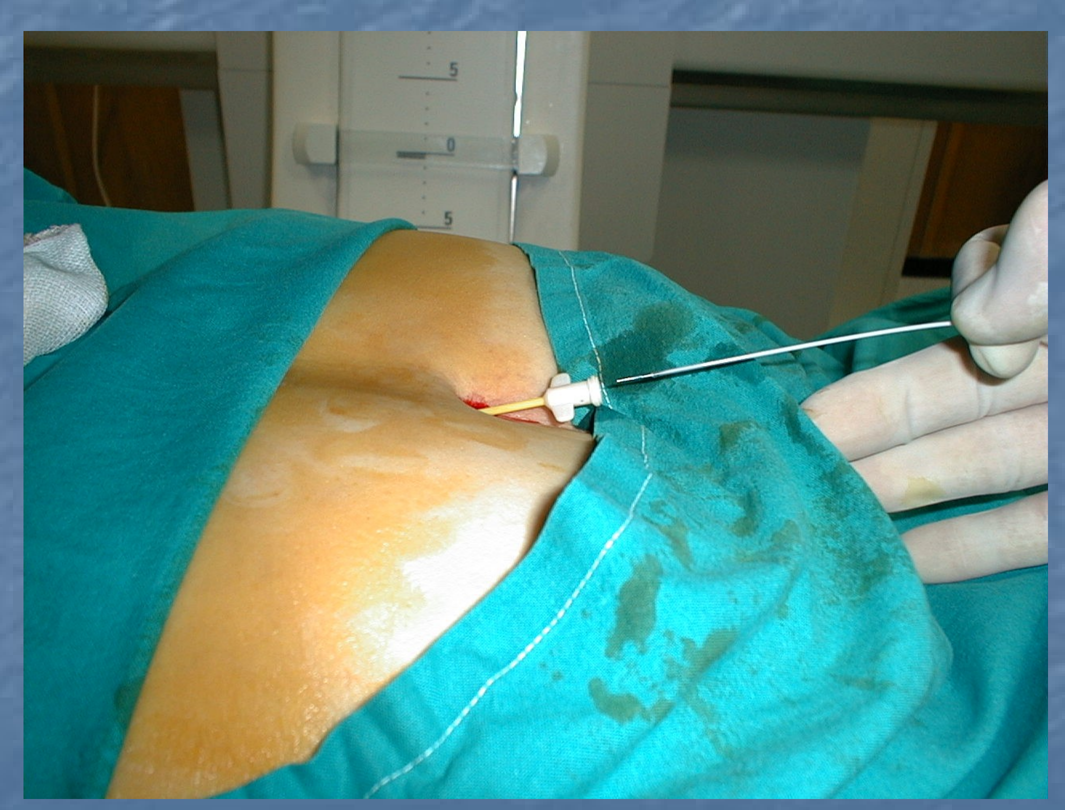


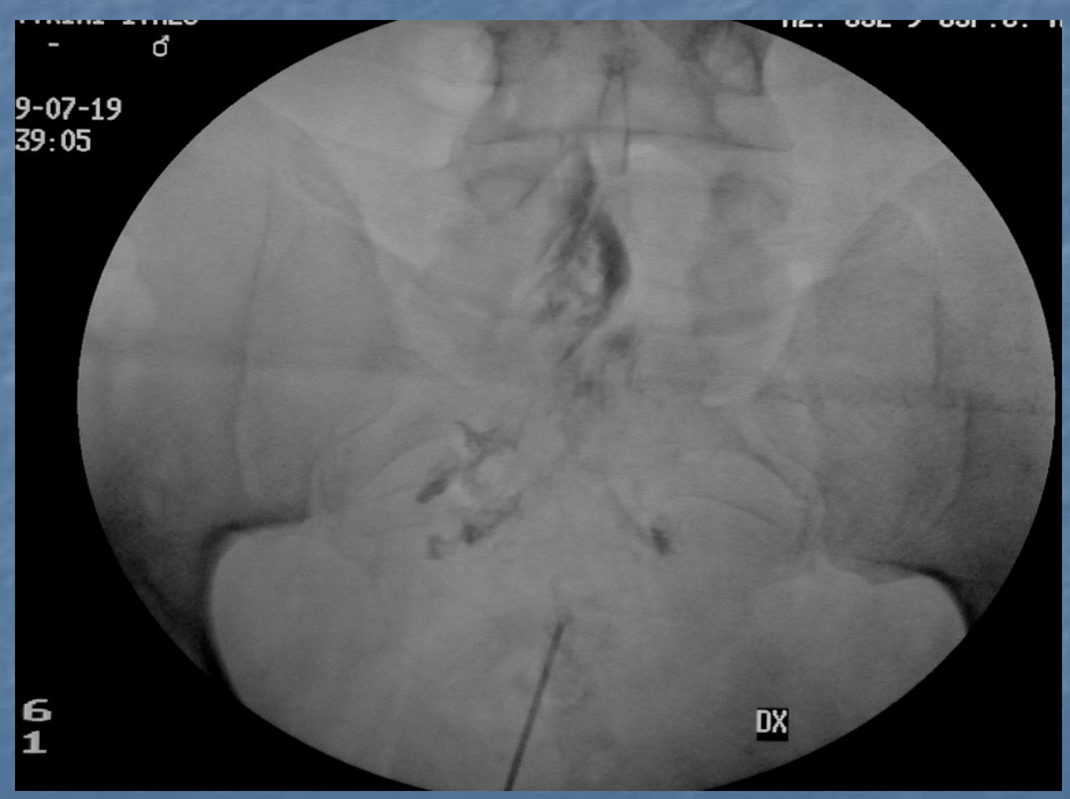
Approccio contro laterale

PERIDUROLISI



PERIDUROLISI





Progressione del catetere

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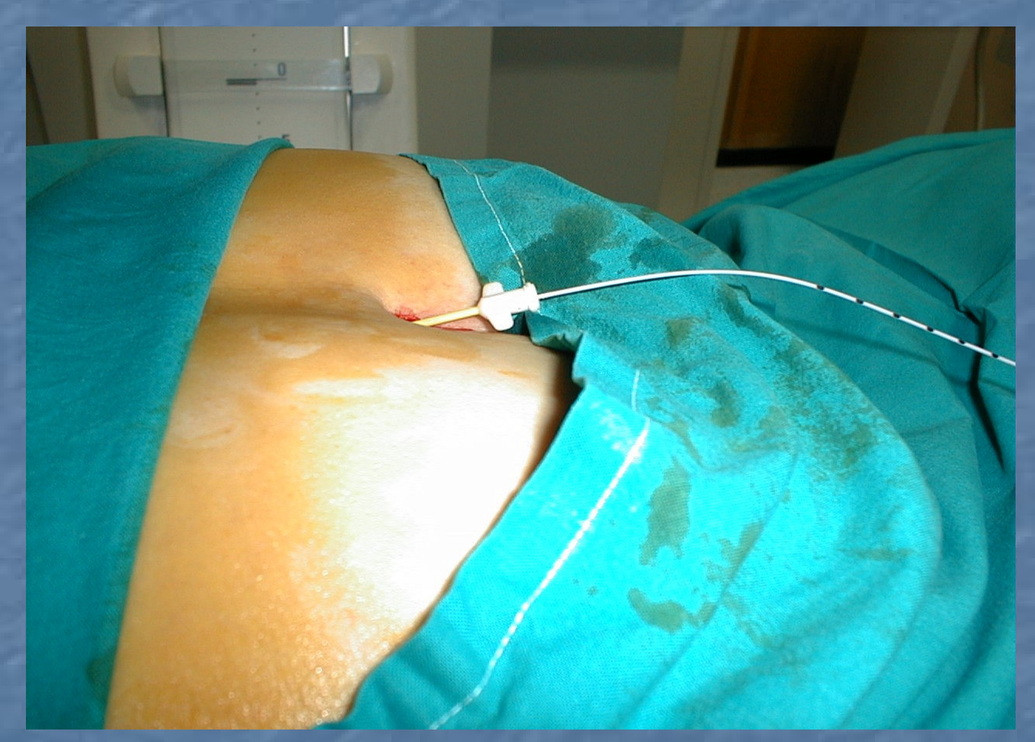

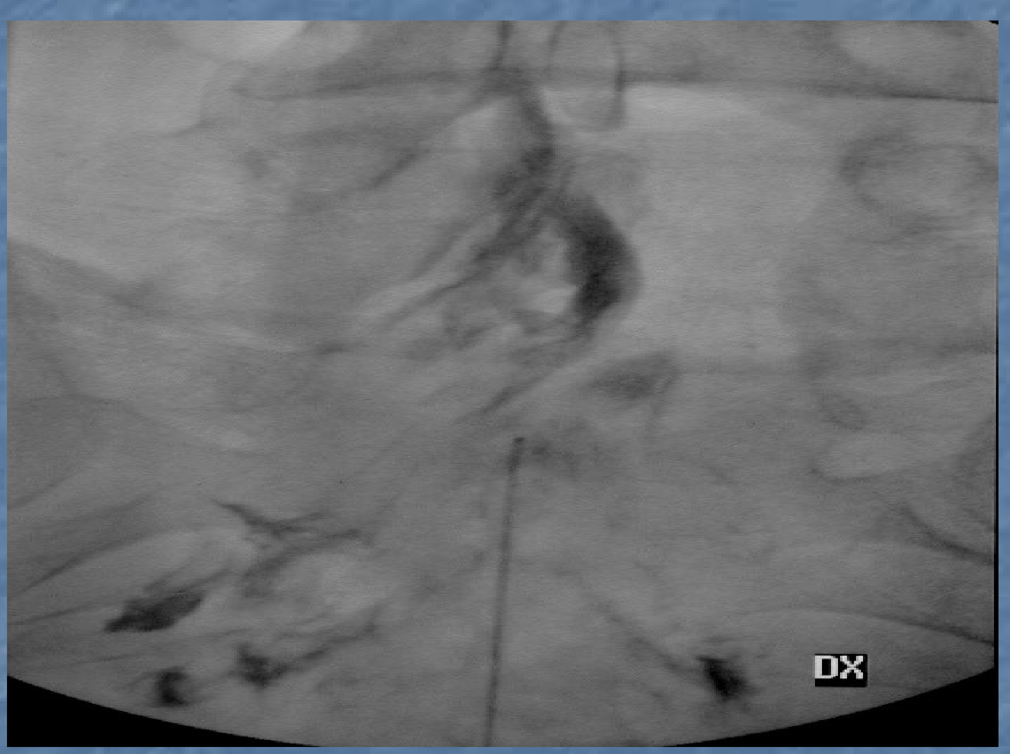

punta del catetere in posizione corretta

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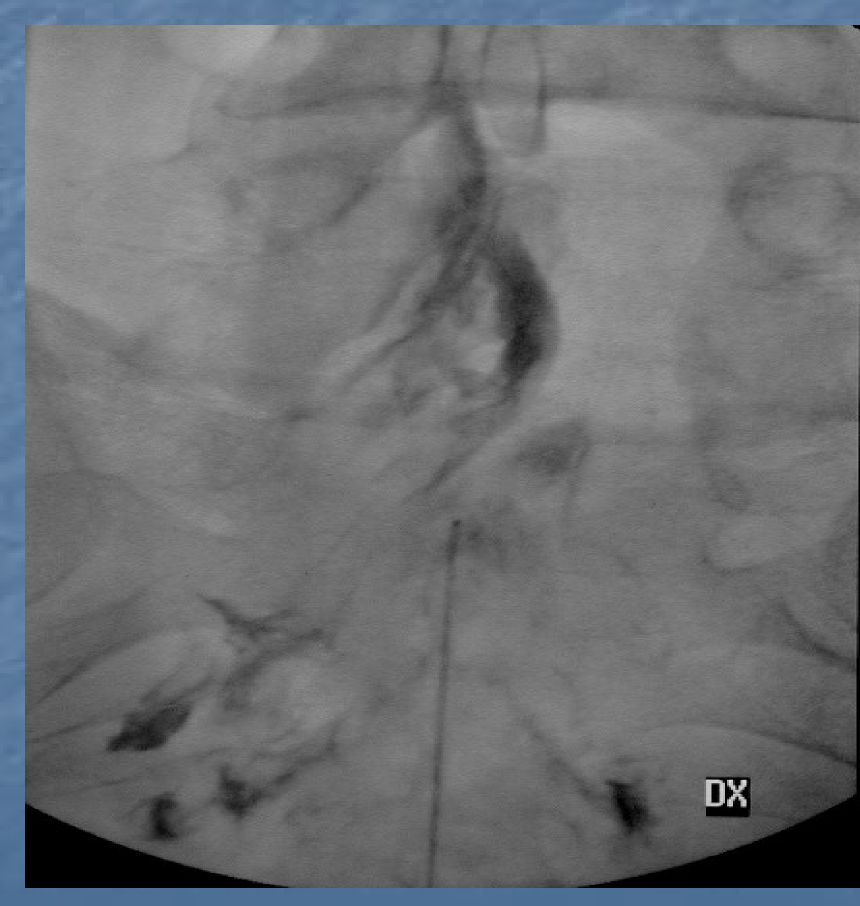
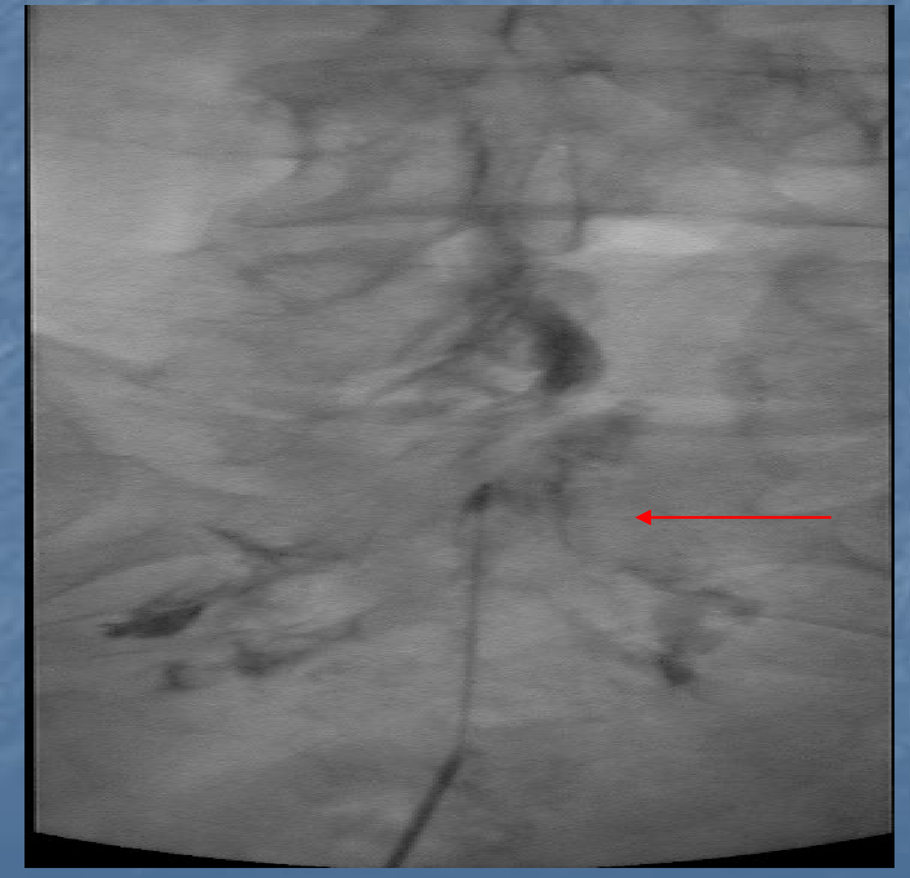


Immagine prima della lisi



Opacizzazione della radice dopo 20′

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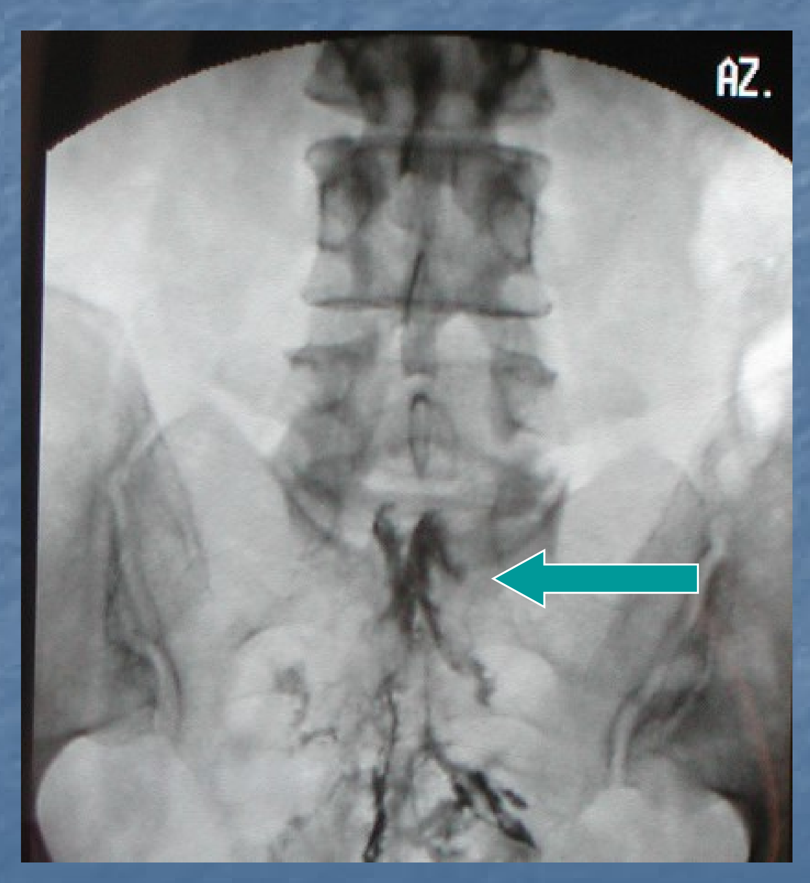

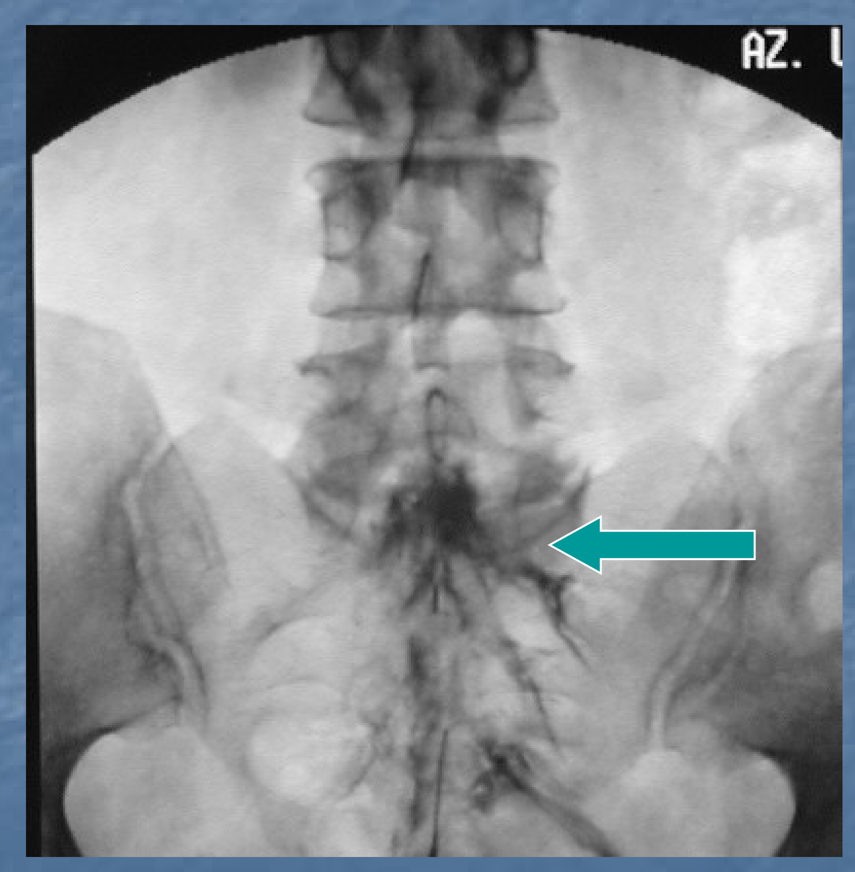

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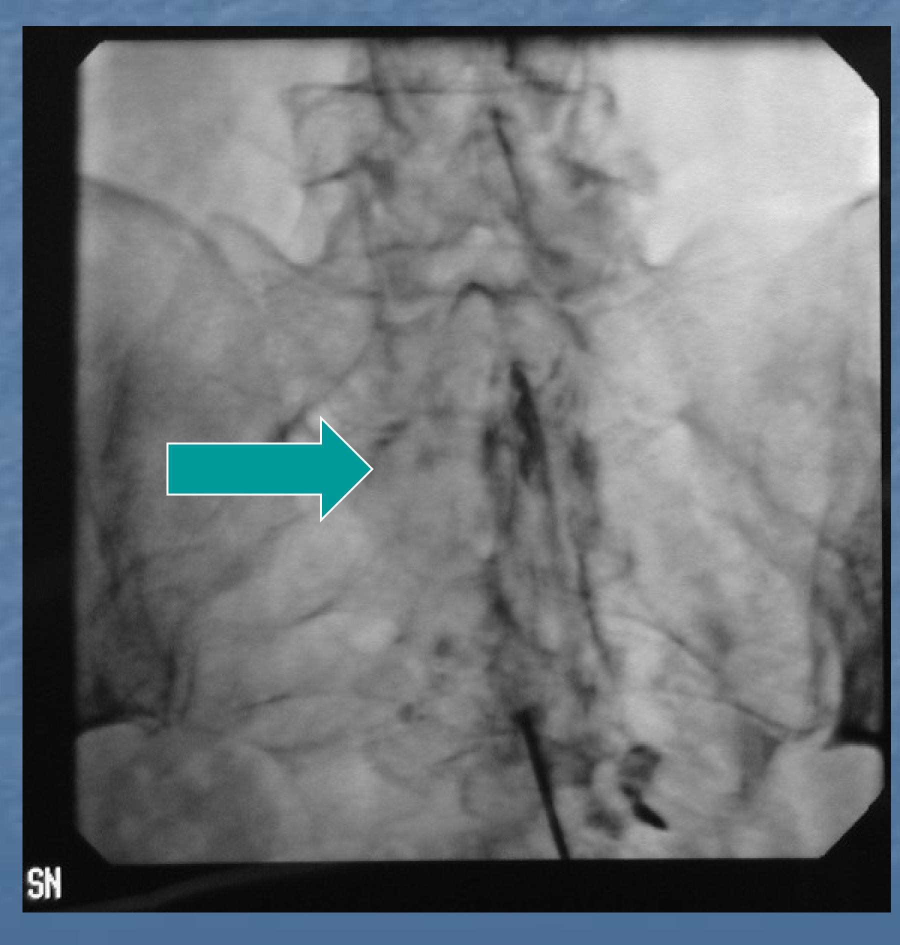

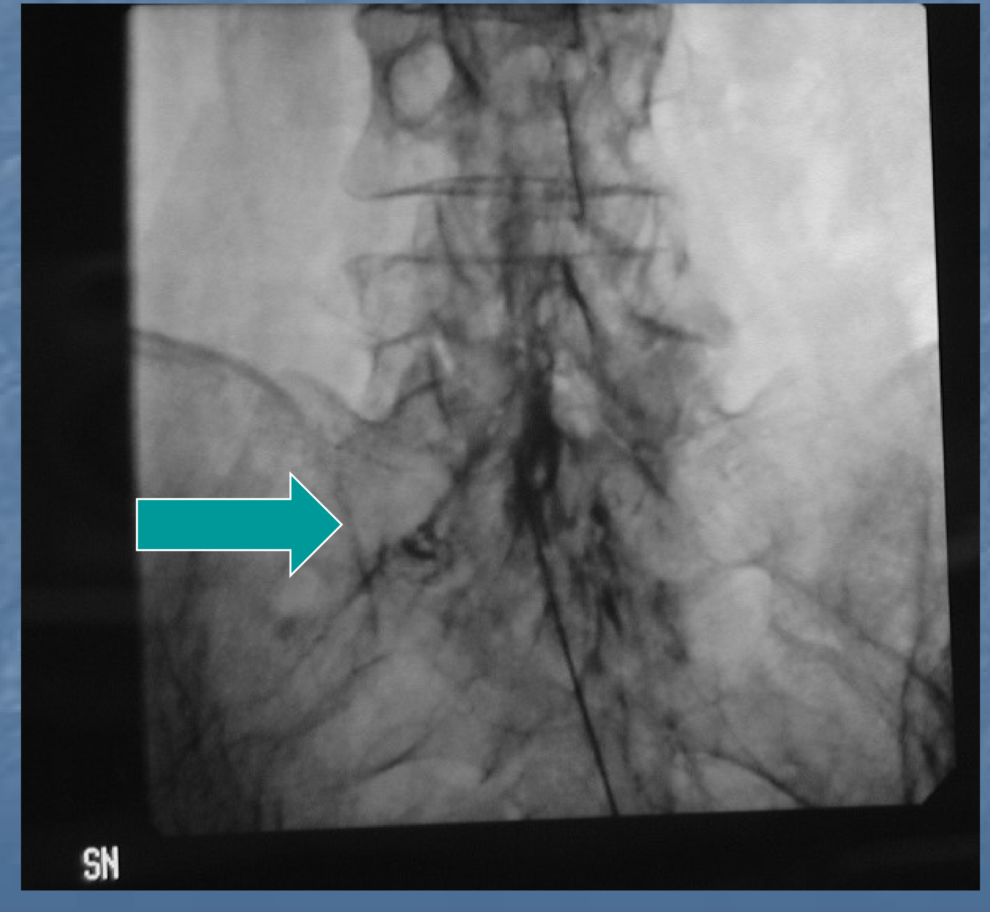

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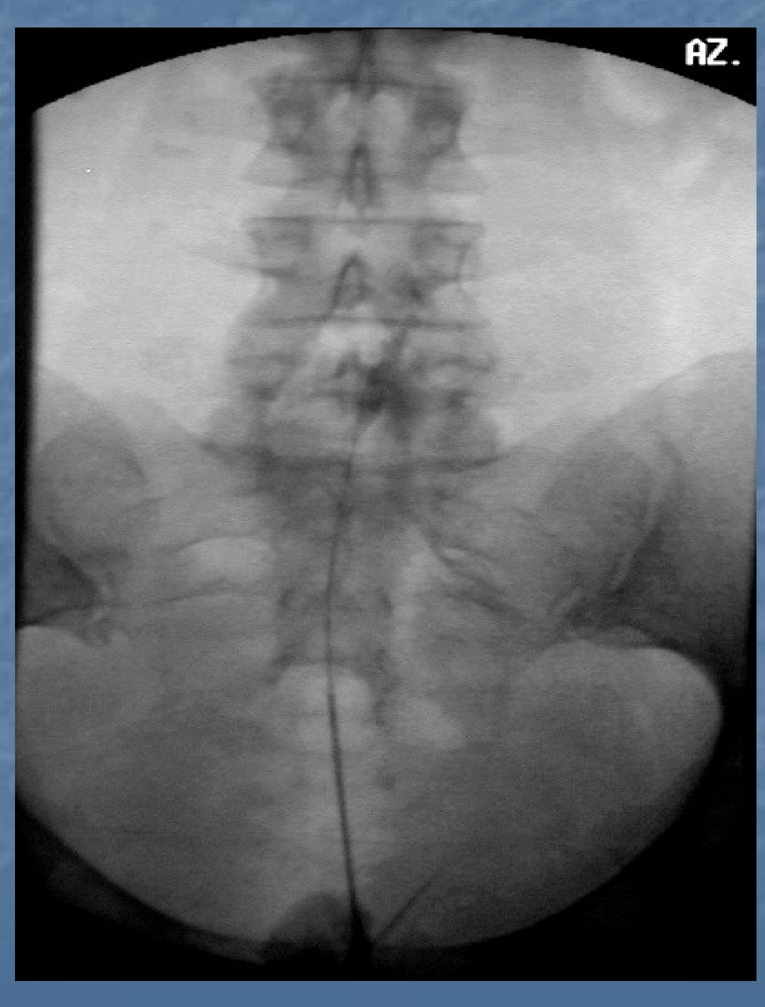

Questioni aperte:

- Precisazione algoritmo indicazioni
- Costo/beneficio
- Complicanze
- Affinamento procedura
- Efficacia e persistenza dei risultati nel tempo

Grazie per l’attenzione

Oswestry Disability Index 2.1a – Versione Italiana (ODI-I)

Monticone M, Baiardi P, Ferrari S, Foti C, Mugnai R, Pillastrini P, Vanti C, Zanoli G.

Spine 2009; 34(19): 2090–2095

Indice di disabilità di Oswestry

Questo questionario è stato elaborato per darci delle informazioni su quanto i suoi problemi alla schiena (o alla gamba) influenzino la sua capacità di cavarsela nella vita di tutti i giorni. La preghiamo di rispondere a tutte le domande del questionario. Faccia una crocetta su una sola casella per ciascuna domanda, scegliendo quella che più si avvicina a come si sente oggi.

Sezione 1 - Intensità del dolore

- Al momento non ho dolore.
- Al momento il dolore è molto lieve.
- Al momento il dolore è di media intensità.
- Al momento il dolore è abbastanza forte.
- Al momento il dolore è molto forte.
- Al momento il dolore è il massimo immaginabile.

Sezione 2 - Cura personale (lavarsi, vestirsi, ecc.)

- Riesco a prendermi cura di me stesso/a normalmente senza sentire più dolore del solito.
- Riesco a prendermi cura di me stesso/a normalmente ma mi fa molto male.
- Mi fa male prendermi cura di me stesso/a e sono lento/a e prudente.
- Ho bisogno di un po' di aiuto ma riesco per lo più a prendermi cura di me stesso/a.
- Ho bisogno di aiuto ogni giorno in quasi tutti gli aspetti della cura di me stesso/a.
- Non mi vesto, mi lavo con difficoltà e sto a letto.

Sezione 3 - Alzare pesi

- Riesco a sollevare oggetti pesanti senza sentire più dolore del solito.
- Riesco a sollevare oggetti pesanti ma sentendo più dolore del solito.
- Il dolore mi impedisce di sollevare oggetti pesanti da terra, ma ci riesco se sono posizionati in maniera opportuna, per esempio su un tavolo.
- Il dolore mi impedisce di sollevare oggetti pesanti, ma riesco a sollevare oggetti leggeri o di medio peso se sono posizionati in maniera opportuna.
- Riesco a sollevare solo oggetti molto leggeri.
- Non riesco a sollevare o trasportare assolutamente niente.

Sezione 4 - Camminare

- Il dolore non mi impedisce di percorrere qualsiasi distanza a piedi.
- Il dolore mi impedisce di camminare per più di un chilometro.
- Il dolore mi impedisce di camminare per più di 500 metri.
- Il dolore mi impedisce di camminare per più di 100 metri.
- Riesco a camminare solo con un bastone o delle stampelle.
- Sto per lo più a letto e mi trascino per arrivare in bagno.

Sezione 5 - Stare seduto/a

- Riesco a stare seduto/a su qualsiasi sedia per tutto il tempo che mi va.
- Riesco a stare seduto/a sulla mia sedia preferita per tutto il tempo che mi va.
- Il dolore mi impedisce di stare seduto/a per più di 1 ora.
- Il dolore mi impedisce di stare seduto/a per più di mezzora.
- Il dolore mi impedisce di stare seduto/a per più di 10 minuti.
- Il dolore mi impedisce del tutto di stare seduto/a.

Sezione 6 - Stare in piedi

- Riesco a stare in piedi per tutto il tempo che mi va senza sentire più dolore del solito.
- Riesco a stare in piedi per tutto il tempo che mi va, ma sentendo più dolore del solito.
- Il dolore mi impedisce di stare in piedi per più di 1 ora.
- Il dolore mi impedisce di stare in piedi per più di mezzora.
- Il dolore mi impedisce di stare in piedi per più di 10 minuti.
- Il dolore mi impedisce del tutto di stare in piedi.

Sezione 7 - Dormire

- Il mio sonno non viene mai disturbato dal dolore.
- Il mio sonno viene disturbato ogni tanto dal dolore.
- A causa del dolore dormo meno di 6 ore.
- A causa del dolore dormo meno di 4 ore.
- A causa del dolore dormo meno di 2 ore.
- Il dolore mi impedisce del tutto di dormire.

Sezione 8 - Vita sessuale (se pertinente)

- La mia vita sessuale è normale e non mi provoca più dolore del solito.
- La mia vita sessuale è normale, ma mi provoca più dolore del solito.
- La mia vita sessuale è quasi normale, ma mi provoca molto dolore.
- La mia vita sessuale è fortemente limitata dal dolore.
- La mia vita sessuale è quasi inesistente a causa del dolore.
- Il dolore mi impedisce del tutto di avere una vita sessuale.

Sezione 9 – Vita sociale

- La mia vita sociale è normale e non mi provoca più dolore del solito.
- Le mia vita sociale è normale, ma aumenta il livello di dolore.
- Il dolore non ha effetti significativi sulla mia vita sociale, a parte il fatto di limitare alcuni dei miei interessi che richiedono più energia (ad esempio sport, ecc.).
- Il dolore limita la mia vita sociale e non esco così spesso come al solito.
- Il dolore limita la mia vita sociale alla mia abitazione.
- Non ho vita sociale a causa del dolore.

Sezione 10 - Viaggiare

- Riesco a viaggiare in ogni luogo senza dolore.
- Riesco a viaggiare in ogni luogo, ma sentendo più dolore del solito.
- Mi fa male, ma riesco a viaggiare per più di due ore.
- Il dolore mi limita a viaggi che durano meno di un'ora.
- Il dolore mi limita a viaggi brevi e necessari che durano meno di 30 minuti.
- Il dolore mi impedisce di viaggiare, tranne che per fare le mie cure.

Punteggio: ....

Oswestry Disability Index 2.1a – Versione Italiana (ODI-I)
Monticone M, Baiardi P, Ferrari S, Foti C, Mugnai R, Pillastrini P, Vanti C, Zanoli G.
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- Il dolore mi impedisce del tutto di stare seduto/a.

Verheijen *et al. BMC Neurology* (2019) 19:216
https://doi.org/10.1186/s12883-019-1445-9

BMC Neurology

STUDY PROTOCOL **Open Access**

Transforaminal epidural injection versus continued conservative care in acute sciatica (TEIAS trial): study protocol for a randomized controlled trial

Eduard Verheijen[1*], Alexander G. Munts[2], Oscar van Haagen[3], Dirk de Vries[4], Olaf Dekkers[5], Wilbert van den Hout[6] and Carmen Vleggeert-Lankamp[7]

Discussion: Adequate conservative treatment in the acute phase of sciatica is lacking, particularly for patients with severe symptoms. Focusing on effectiveness, cost-effectiveness and predictive capability on patient outcome of TEI will produce useful information allowing for more lucid decision making in the conservative treatment of sciatica in the acute phase.

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Patient Selection

- Lumbar HNP on scan with a +SLR < 45 degrees, and 7/10 or > neuropathic pain.
- Chronic and acute patients, mean duration of symptoms 96 weeks. Moderate to severe disability on Roland-Morris and SF-36
- Excluded severe motor deficit, substance abuse Hx, or inability to comply with the study.

- The response to transforaminal injection of steroids is primarily affected by the nature of the disc herniation responsible for the pain.
- The success rate of a single transforaminal injection of steroids rises to 75% in patients with lesser degrees of nerve root compression, but is only 26% in patients with high grade compression.

Predictors of a Favorable Response to Transforaminal Injection of Steroids in Patients with Lumbar Radicular Pain Due to Disc Herniation
Ghahreman et al, Pain Med. online: 3 MAY 2011 | DOI: 10.1111/j.1526-4637.2011.01116.x

Risks and Complications

Transforaminal injection of steroids is potentially hazardous if not performed meticulously and by physicians who are experts in fluoroscopically guided spinal interventions.
Spinal cord injury can occur if injection into a medullary artery is not recognized during the injection of contrast medium, and if particulate steroids are injected into that artery.
Infarction is felt do to intravascular injection of particulate steroids blocking arterioles and causing ischemia

Results

- Patients who classified as improved were relieved of > 50% their pain and were restored to normal or near normal function, and reduced their need for other health care interventions to simple exercises or over the counter medications.
- All patients who had previously required opioids ceased opioids.
- No difference in the acute versus chronic patients outcomes

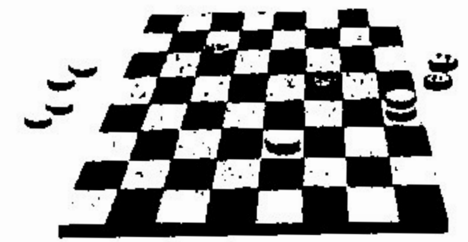
Trattamento

Modalità di approccio possibile

AD IMBUTO

Conoscendo solo una modalità antalgica,
si tende a trattare con quella modalità
tutte le forme patologiche
che si presentano alla nostra osservazion

Trattamento
Approccio corretto



A SCACCHIERA

Nella lotta contro il dolore dobbiamo conoscere il maggior numero di modalità antalgiche (le nostre pedine), il maggior numero di quadri patologici algici attraverso la diagnostica differenziale (l'avversario), calando tutto nel contesto (la scacchiera)

"It is not the drug that is dangerous,
it is the man behind the syringe!"

Sir Robert R. Macintosh

Algologia, *s.f.* ramo della botanica che studia le alghe. Comp. di *alga* e *-logia.*

Algologo, *s.m.* studioso di algologia.

DIZIONARIO GARZANTI DELLA LINGUA ITALIANA

LE ADERENZE EPIDURALI LOMBARI

Dr. Giambattista Villa
Humanitas Gavazzeni Bergamo
24 Settembre 2011

LE PROCEDURE ANTALGICHE MININVASIVE NEL DOLORE RACHIDEO

Dr G. Villa
Humanitas Gavazzeni Bg
13 Novembre 2010

ClinicalEvaluationof PercutaneousCaudalEpiduralAdhesiolysis WiththeRaczTechniqueforLowBackPainDuetoContainedDisc Herniation

ArmanTaheri,1 AliRezaKhajenasiri,2 NaderAliNazemianYazdi,1,* SaeidSafari,3 JavadSadeghi,1 and MaryamHatami1
Objectives:Theauthorsevaluatedtheeffectivenessof percutaneousepiduraladhesiolysis(PEA)inpatientswithlowbackpaindue tocontaineddischerniation. Patients and Methods: Twenty patients with low back pain due to contained disc herniation underwent PEA treatment with the Racztechnique. Thepatientswereevaluatedforpainscore,medicationintake,significantpainrelief,andcomplications. Results: At three days, one month, three months, and six months after PEA compared to pre-PEA evaluations, the pain scores and medicationintakeweresignificantlydecreased. Significantpainrelief declinedfrom95% atthreedaysto75% atsixmonths. Conclusions: PEAforlowbackpainduetocontaineddischerniationisasafeandeffectiveprocedure. Therefore,itmaybeconsideredasanoptionfortreatmentbeforeinvasiveoperationsareperformed.

Open Access Original Article

DOI: 10.7759/cureus.723

Role of Epidural Injections to Prevent Surgical Intervention in Patients with Chronic Sciatica: A Systematic Review and Meta-Analysis

Adnan Bashir Bhatti [1], Sunny Kim [2]

1. Medical Director of Clinical Research, Spine Surgery, Tristate Brain and Spine Institute, United States
2. Spine Surgery, Tristate Brain and Spine Institute

REVIEW ARTICLE

A comprehensive review of pulsed radiofrequency in the treatment of pain associated with different spinal conditions

[1]GIANCARLO FACCHINI, MD, [1]PAOLO SPINNATO, MD, [2]GIUSEPPE GUGLIELMI, MD, [1]UGO ALBISINNI, MD and [1]ALBERTO BAZZOCCHI, MD, PhD

[1]Department of Radiology, Scientific Institute Rizzoli Orthopaedic Institute, Bologna, Italy
[2]Department of Radiology, Scientific Institute Hospital "Casa Sollievo della Sofferenza", San Giovanni Rotondo, Italy

IL NOSTRO CENTRO (2016)

- 325 trattamenti di PRF per via transforaminale
- 85 trattamenti di PRF e CRF su nervi periferici
- 13 trattamenti di PRF con catetere polifunzionale
- 30 trattamenti di decompressione discale

	PRF TRANSFORAMINALE ·	PRF e CRF SU NERVI PERIFERICI	DECOMPRESSIONI DISCALI	TOTALE
ANNO 2106	338	85	30	453
ANNO 2021	696	64	32	792
ANNO 9/2022	505	59	27	591

International Journal of
Environmental Research and Public Health

Review

Epidural Steroid Injections for Low Back Pain: A Narrative Review

Massimiliano Carassiti [1,*], Giuseppe Pascarella [1], Alessandro Strumia [1], Fabrizio Russo [2], Giuseppe Francesco Papalia [2], Rita Cataldo [1], Francesca Gargano [1], Fabio Costa [1], Michelangelo Pierri [3], Francesca De Tommasi [4], Carlo Massaroni [4], Emiliano Schena [4] and Felice Eugenio Agrò [1]

Int. J. Environ. Res. Public Health **2022**, *19*, 231.

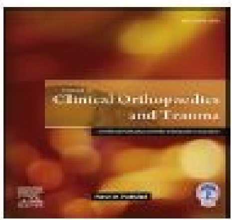
Abstract: Low back pain represents a significant socioeconomic burden. Several nonsurgical medical treatments have been proposed for the treatment of this disabling condition. Epidural steroid injections (ESIs) are commonly used to treat lumbosacral radicular pain and to avoid surgery. Even though it is still not clear which type of conservative intervention is superior, several studies have proved that ESIs are able to increase patients' quality of life, relieve lumbosacral radicular pain and finally, reduce or delay more invasive interventions, such as spinal surgery. The aim of this narrative review is to analyze the mechanism of action of ESIs in patients affected by low back pain and investigate their current application in treating this widespread pathology.

Journal of Clinical Orthopaedics and Trauma 11 (2020) 802–809

Contents lists available at ScienceDirect

Journal of Clinical Orthopaedics and Trauma

journal homepage: www.elsevier.com/locate/jcot



Role of transforaminal epidural injections or selective nerve root blocks in the management of lumbar radicular syndrome - A narrative, evidence-based review

Vibhu Krishnan Viswanathan [a], Rishi Mugesh Kanna [a, *], H. Francis Farhadi [b]

Results: Our search identified 539 articles. All articles discussing alternate procedures, LTFIS in other pathologies, diagnostic roles of LTFIS, not pertaining to concerned questions, in non-English language and duplicate articles were excluded. Review articles, randomised controlled trials or level 1 studies were given preference. Overall, 108 articles were included. Being a focussed narrative review, further screening [Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) or Methodological Index for non-randomized studies (MINORS) criteria] was not performed to select articles. Based on the evidence, LTFIS is an effective and useful treatment modality. It is offered to patients with lumbar disc herniation (LDH) presenting with persistent, unilateral, radiculopathy after a course of conservative measures for around 6 weeks' duration. It has been reported to yield better results than caudal or interluminal epidural injections. The anti-inflammatory and nociceptive signal stabilization actions of steroids, as well as mechanical effects of washout of inflammatory mediators and neural lysis contribute to its efficacy. The three different approaches include sub-pedicular, retro-neural and retro-discal. The procedure is performed under image guidance using a water-soluble contrast under fluoroscopy. The four described radiculogram patterns include "arm", "arrow", "linear" and "splash". Computerised tomography, ultrasonography and magnetic resonance imaging are other modalities, which may be helpful in performing LTFIS. The use of particulate versus non-particulate steroids is controversial.

Conclusion: The overall success rate of SNRB is reported to be 76–88%. The majority of benefits are observed during immediate and early post-injection period. Clinical factors including duration and severity of symptoms, and radiological factors like presence of osteophytes, location, size and type of disc prolapse influence outcomes. The radiculogram "splash" pattern is associated with poor outcomes.

173 patients received interlaminar epidural steroid injections and 126 patients received transforaminal epidural steroid injections. All of the patients were regularly followed up for 12 months using a verbal numeric rating scale. Magnetic resonance imaging findings, complications, verbal numeric rating scale, and satisfaction scores were recorded.

Significant differences between the two groups according to verbal numeric rating scale and satisfaction scores were not observed ($p > 0.05$). There were no major complications; however, the interlaminar epidural steroid injections group had 22 (12.7%) minor complications, and the transforaminal epidural steroid injections group had 12 (9.5%) minor complications.

This study showed that interlaminar epidural steroid injections can be as effective as transforaminal epidural steroid injections when performed at the nearest level of lumbar pathology using fluoroscopy in 12-month intervals.

Comparison of transforaminal and interlaminar epidural steroid injections for the treatment of chronic lumbar pain

Brazilian Journal of Anesthesiology (English Edition)Volume 67, Issue 1, January–February 2017, Pages 21–27

Table 4 Repeated injections for lumbar epidural steroid injections.

	Single injection	First repeated injections	Second repeated injections	Total injections
TFESI				
One level	26/26	16/32	–	42/58
Two level	70/140	11/44	4/24	85/208
ILESI				
One level	130/130	40/80	3/9	173/219

Data are presented as patient number/injection number.
ILESI, interlaminar epidural steroid injections; TFESI, transforaminal epidural steroid injections.

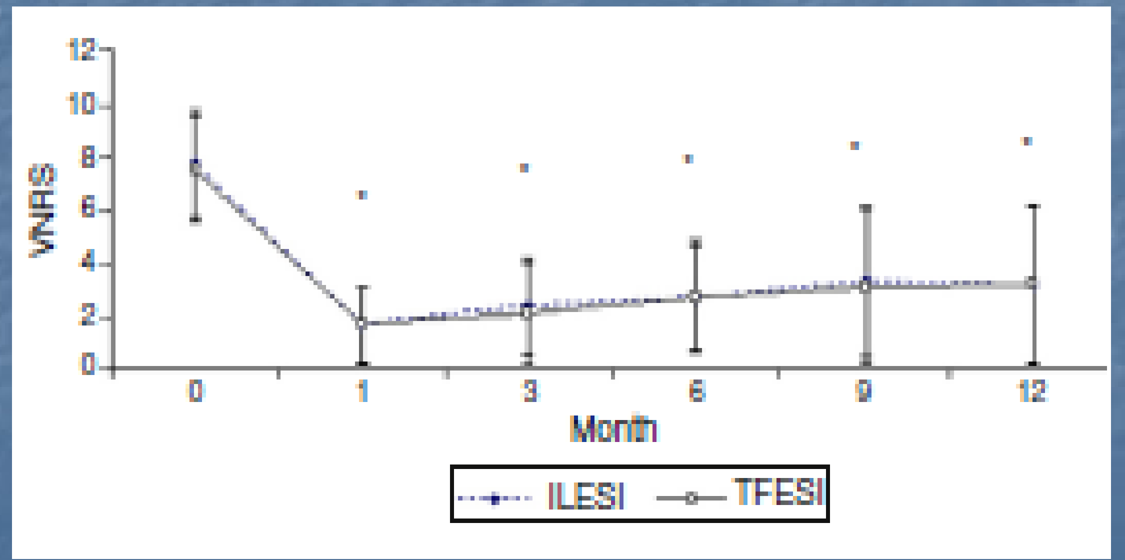


Table 5 Distribution of complications for ILESI and TFESI.

	ILESI ($n=173$)	TFESI ($n=126$)
Dural puncture	4 (2.31%)	3 (2.38%)[a]
Post dural puncture headache	1 (0.57%)	–
Subdural block	3 (1.73%)	3 (1.59%)
Transient increased pain	3 (1.73%)	3 (2.38%)
Transient paresthesia	8 (4.62%)	3 (2.38%)
Hiccup	1 (0.57%)	–
Menstrual irregularities	1 (0.57%)	–
Vasovagal reaction	1 (0.57%)	–
Total	22 (12.7%)	12 (9.5%)

ILESI, interlaminar lumbar epidural steroid injection; TFESI, transforaminal epidural steroid injection.
Data are given n (%).
[a] The contrast agent were intrathecal spread in three patients who dural puncture.

Publications from the past ten years (2006-2016) were considered, and all studies selected were in the English language only.
A total of 19 papers meeting the eligibility criteria.
Pain scores, functional disability scores, and surgical rates were assessed from the included studies.
The Oswestry Disability Index (ODI) and Roland Morris Disability Questionnaire (RMDQ) scales were used
Significant improvement in the pain scores and functional disability scores were observed. Additionally, greater than 80% of the patients suffering from chronic sciatica caused by LDH could successfully prevent surgical intervention after EI treatment with or without steroids.

Role of Epidural Injections to Prevent Surgical Intervention in Patients with Chronic Sciatica: A Systematic Review and Meta-Analysis

2016 Bhatti et al. Cureus 8(8): e723. DOI 10.7759/cureus.723

STEROIDI EPIDURALI

Inizio nel 1900 a Parigi

Alternativa all’ intervento chirurgico

Negli USA dal 1998 al 2005 + 121% (> 1 milione nel mondo)

PERIDUROLISI

- One day lumbar epidural adhesiolysis and hypertonic saline neurolysis in treatment of chronic low back pain: a randomized, double-blind trial Manchikanti 2004
- Percutaneus epidural neuroplasty:prospective evaluation of 0.9% NaCl versus 10% NaCl with or without hyaluronidase Heavner 1999
- Epidural neuroplasty versus physioterapy to relieve pain in patients with sciatica: a prospective randomized blinded clinical trial Veihelmann 2006
- A comparative effectiveness evaluation of percutaneus adhesiolysis and epidural steroid injections in managing lumbar post surgery syndrome: a randomized, equivalence controlled trial Manchikanti 2009
- The preliminary results of a comparative effectiveness evaluation of adhesiolysis and caudal epidural injection in managing chronic low back pain secondary to spinal stenosis:a randomized, equivalence controlled trial Manchikanti 2009

RESULTS OF PUBLISHED RANDOMIZED TRIALS OF PERCUTANEUS LYSIS OF LUMBAR EPIDURAL ADHESION

(A critical review of the American Pain Society Clinical Practice Guidelines for interventional techiques: part 2. Therapeutic interventions. Manchikanti 2010)

Study	Study Characteristics	Partecipants	PR < 3 mos	PR 3 mos	PR 6 mos	PR 12 mos
Manchikanti et al 2004	RA,DB	G1=25(C) G2=25(T) G3=25(T)	G1=33% G2=64% G3=72%	G1=0% G2=64% G3=72%	G1=0% G2=60% G3=72%	G1=0% G2=60% G3=72%
Heavner et al 1999	RA,DB	59	83%	49%	43%	49%
Veihelmann et al 2006	RA	99	SI	SI	SI	SI
Manchikanti et al 2009	RA,DB	C=60 T=60	90%VS 35%	90%VS 35%	85%VS 18%	73%VS 12%
Manchikanti et al 2009	RA,DB	C=25 T=25	80%VS 28%	80%VS 28%	80%VS 12%	76%VS 4%

This study reviewed 169 patients
The spread of contrast from the neural foramen to a nerve root was called contrast run off
This study lacked a control group, and the patients were not classified by their diagnosed disease, such as spinal stenosis, herniated nucleus pulposus, and post-spinal surgery syndrome.
Cervical epidural neuroplasty with a contrast runoff pattern had a higher success rate. Contrast runoff should be observed during neuroplasty, even in the presence of foraminal stenosis.

Contrast Runoff Correlates with the Clinical Outcome of Cervical Epidural Neuroplasty Using a Racz Catheter

Yun-Joung Han, MD, Myoung No Lee, MD, Min Ji Cho, MD, Hue Jung Park, MD, PhD, Dong Eon Moon, MD, PhD, and Young Hoon Kim, MD, PhD

Pain Physician 2016; 19:E1035-E1040 • ISSN 2150-1149

Table 2. *Relationship between contrast spread pattern and outcome of procedure.*

	1 month		3 months		6 months		12 months	
	Fail	Success	Fail	Success	Fail	Success	Fail	Success
No contrast runoff	28 (70%)	12 (30%)	28 (70%)	12 (30%)	30 (75%)	10 (25%)	30 (75%)	10 (25%)
Contrast runoff	33 (25.6%)	96 (74.4%)	32 (24.8%)	97 (75.2%)	43 (33.3%)	86 (66.7%)	50 (38.8%)	79 (61.2%)
P	< 0.001*		< 0.001*		< 0.001*		< 0.001*	

*Indicates significant difference.

A total of 303 patients with back pain
The purpose of this study was to compare clinical outcomes between the ventral and dorsal positions of the catheter tip during lumbar PEN procedures using a retrospective review series.
In this short-term follow-up study, the effects of lumbar PEN on VAS scores were different according to the position of the catheter tip in patients with single-level lumbar disc herniation. Better outcomes in the Ventral group may have been achieved by more localized treatment with a selective block in the epidural space closer to the dorsal root ganglion and ventral aspect of the nerve root.

The Catheter Tip Position and Effects of Percutaneous Epidural Neuroplasty in Patients with Lumbar Disc Disease During 6-Months of Follow-up

Chang Hyun Oh, MD1, Gyu Yeul Ji, MD, Pyung Goo Cho, MD, Won-Seok Choi, MD, Dong Ah Shin, MD, PhD, Keung Nyun Kim, MD, PhD, and Hyun-ah Kang, MS

Pain Physician 2014; 17:E599-E608 • ISSN 2150-1149

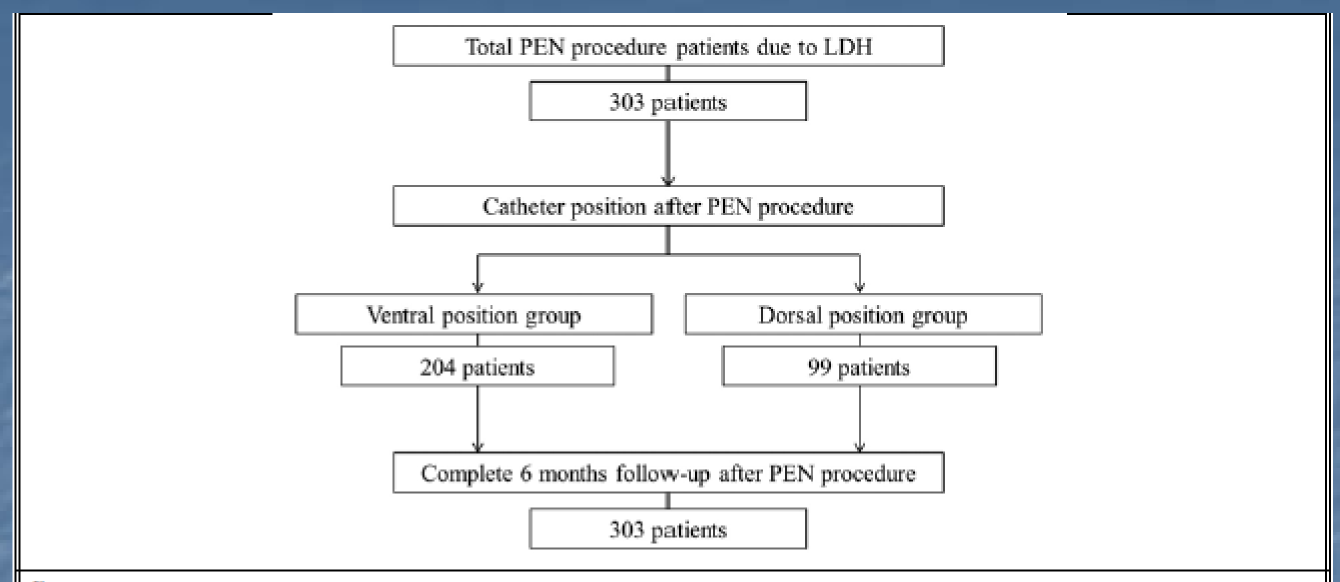


Fig. 2. *Flowchart of the groups according to the final catheter position after PEN due to LDH.*

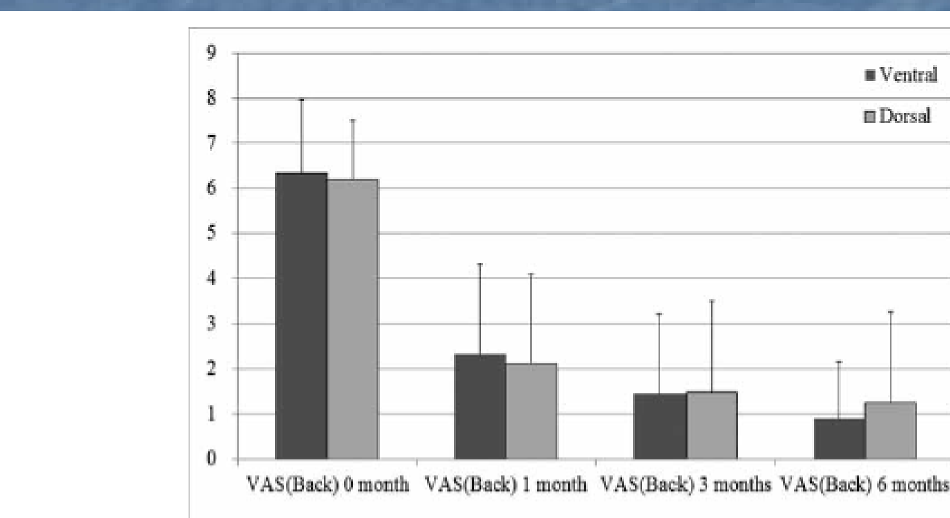


Fig. 3. *Comparison of VAS (back) scores between those with lumbar PEN with a ventral-positioned and a dorsal-positioned catheter pre-procedure and at 1, 3, and 6 months after treatment; no statistical differences were observed during the follow-up period.*

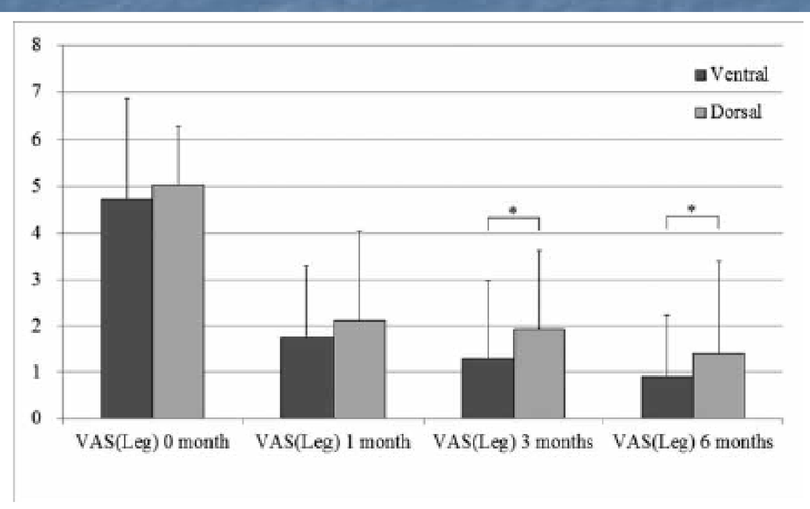


Fig. 4. *Comparison of VAS (leg) scores between those with lumbar PEN with a ventral-positioned and a dorsal-positioned catheter pre-procedure and at 1, 3, and 6 months after treatment; * statistically significant differences were observed at 3 (P = 0.002) and 6 months (P = 0.010) after treatment.*

Twenty patients (2012 – 2014)
At three days, one month, three months, and six months after PEA (percutaneous epidural adhesiolysis) compared to pre-PEA evaluations, the pain scores and medication intake were significantly decreased. Significant painrelief declined from 95% at three days to75% at six months.
PEA for low back pain due to contained disc herniation is a safe and effectiv eprocedure. Therefore,it may be considered as an option for treatment before invasive operation are performed

Clinical Evaluation of Percutaneous Caudal Epidural Adhesiolysis With the Racz Technique forLow Back Pain Due to Contained Disc Herniation

ArmanTaheri, AliRezaKhajenasiri, NaderAliNazemianYazdi, SaeidSafari, JavadSadeghi, and MaryamHatami

Anesth Pain Med. 2016June; 6(3): e26749.

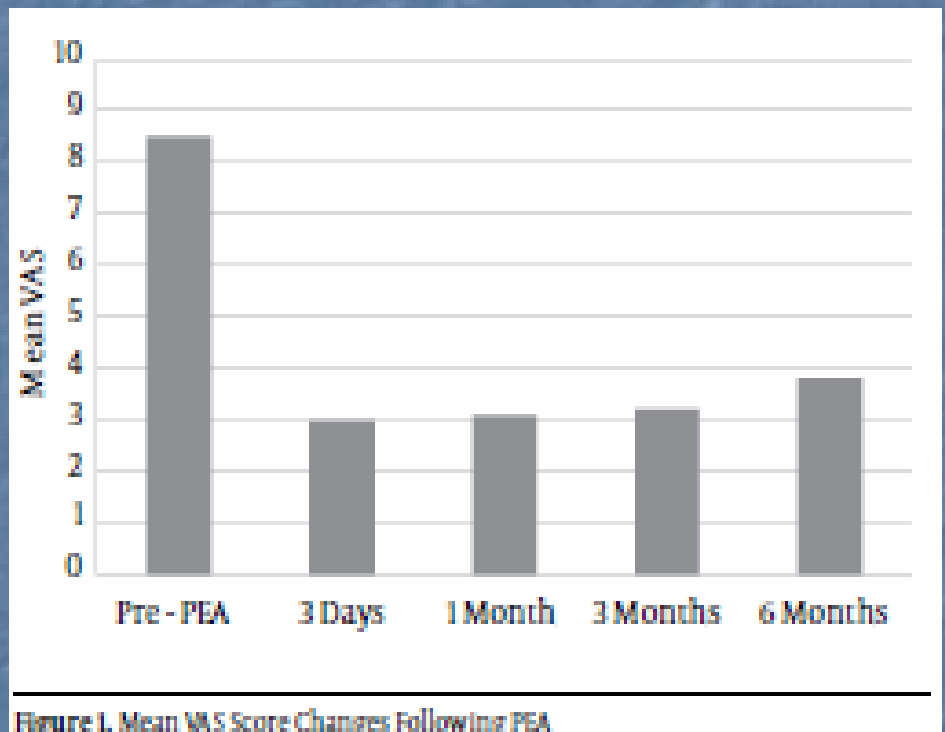


Figure 1. Mean VAS Score Changes Following PEA

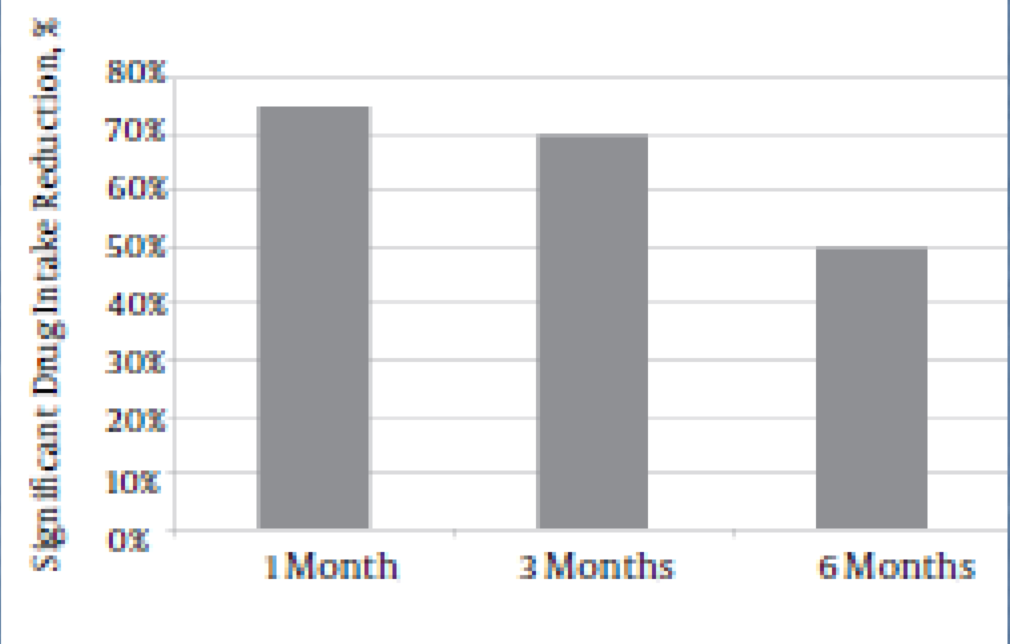


Figure 3. Percentages of Patients With Significantly Reduced Drug Intake Followin PEA

There is moderate evidence that percutaneous LOA is more effective than conventional ESI for both failed back surgery syndrome, spinal stenosis, and lumbar radiculopathy. For cervical HNP, cervical stenosis and mechanical pain not associated with nerve root involvement, the evidence is anecdotal. The benefits of LOA stem from a combination of factors to include the high volumes administered and the use of hypertonic saline. Hyaluronidase has been shown in most, but not all studies to improve treatment outcomes. Although infrequent, complications are more likely to occur after epidural LOA than after conventional epidural steroid injections.

Epidural Lysis of Adhesions

Frank Lee, David E. Jamison*, Robert W. Hurley†, and Steven P. Cohen

Korean J Pain 2014 January; Vol. 27, No. 1: 3-15

Transforaminal Epidural Steroid Injections Suggestions for future research

- Use equipotent doses of steroids with standardized volumes and additives (LA or saline)
- Large multicenter studies
- 4 groups (placebo, LA, steroids, LA + steroids)
- Pain scores at 1 w; 3 months; 12 months
- Record adverse effects
- Comparison of efficacy and safety of particulate (Methylprednisolone, Triamcinolone) and nonparticulate (Dexamethasone, Betamethasone) steroids
- Number of procedures and intervals between procedures

Anuj Bhatia Anesthesia & Analgesia March 2016 Volume 122 Number 3

TYPES OF EPIDURAL INJECTIONS

- Blind or Xray
  guided (incorrect needle placement in 30,4% of patients without fluoroscopy)
- Caudal
- Intralaminar / Interlaminar (ventral spread of the contrast in 36% of the patients)
- Transforaminal (TFE)

A systematic review utilizing the criteria established by the Agency for Healthcare Research and Quality (AHRQ) for evaluation of randomized and non-randomized trials, and criteria of Cochrane Musculoskeletal Review, There is moderate evidence for interlaminar epidurals in the cervical spine and limited evidence in the lumbar spine for long-term relief. The evidence for cervical and lumbar transforaminal epidural steroid injections is moderate for long-term improvement in managing nerve root pain. The evidence for caudal epidural steroid injections is moderate for long-term relief in managing nerve root pain and chronic low back pain.

Epidural Steroids in the Management of Chronic Spinal Pain: A Systematic Review

Salahadin Abdi, MD1, PhD, Sukdeb Datta, MD2, Andrea M. Trescot, MD3, David M. Schultz, MD4, Rajive Adlaka, MD5, Sairam L. Atluri, MD6, Howard S. Smith, MD, PhD7, and Laxmaiah Manchikanti, MD8

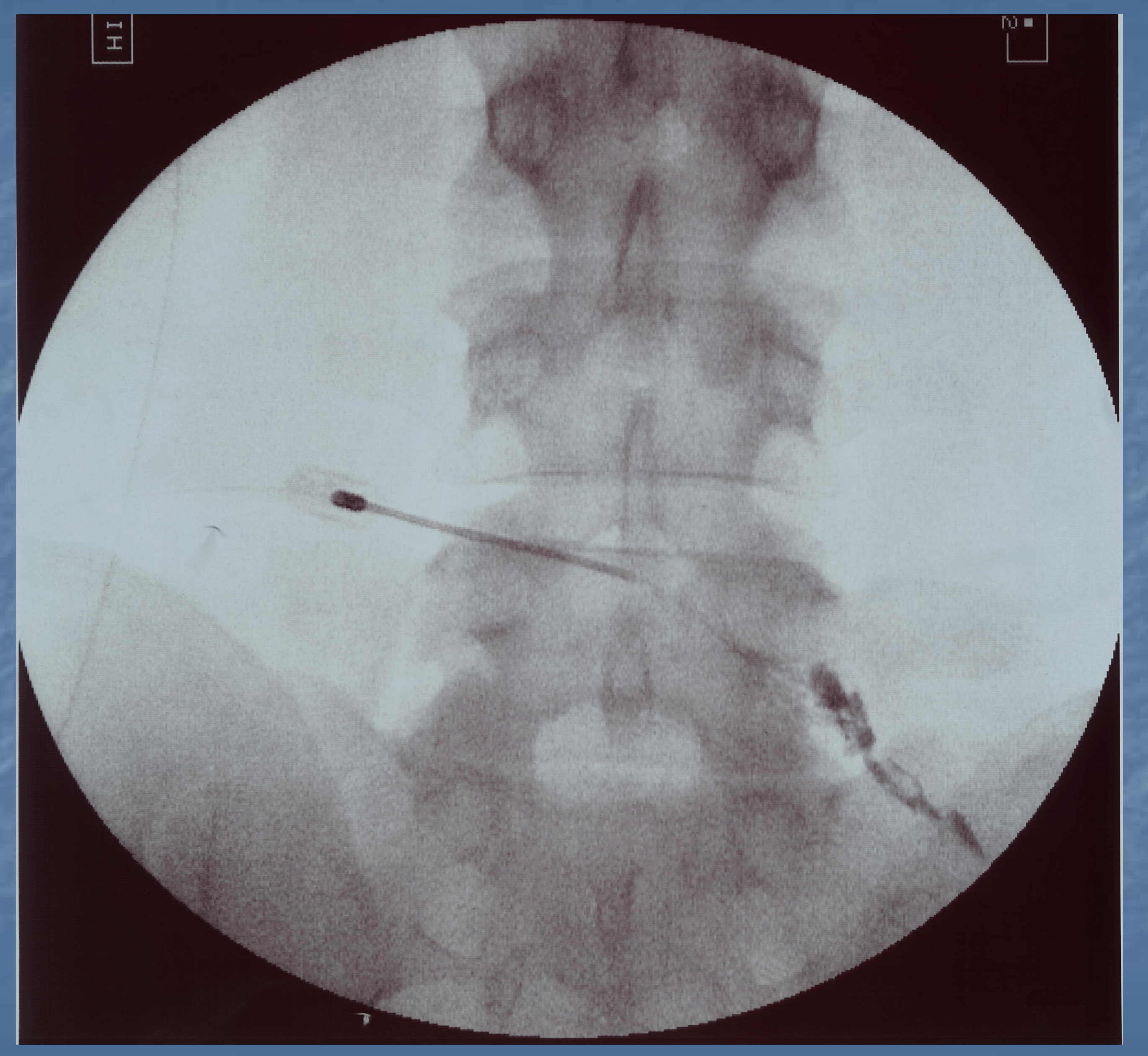
Pain Physician 2007; 10:185-212 • ISSN 1533-3159

Transforaminal Epidural Injection Conclusions

- Accesses the ventral epidural space and the epiradicular space
- Allows specific treatment of the involved root and disc herniation or stenosis
- Goal is to reduce radiculitis to facilitate rehabilitation

Il blocco peridurale "selettivo"

Consente:
di ottenere pain relief senza ipotensione arteriosa e deficit motorio



Pain Physician 2017; 20:E107-E114 • ISSN 2150-1149

Retrospective Study

Efficacy of Adjuvant 10% Hypertonic Saline in Transforaminal Epidural Steroid Injection: A Retrospective Analysis

Eun Young Joo, MD, Won Uk Koh, MD, Seong-Soo Choi, MD, PhD, Jae-Hyung Choi, MD, Ho-Soo Ahn, MD, Hye Joo Yun, MD, and Jin-Woo Shin, MD, PhD

Methods: Between January 2010 and December 2013, the medical records of 246 patients (94 in the hypertonic group, 153 in the control group) who received transforaminal epidural block were reviewed and analyzed. The hypertonic group received 10% sodium chloride solution added to lidocaine, triamcinolone, and hyaluronidase. Outcomes on pain reduction were measured using a numerical rating scale (NRS) and the responder rate at baseline, one, 3, and 6 months after procedure.

Results: The estimated difference in NRS scores from baseline throughout a 6-month follow-up period in the hypertonic group were significantly higher ($P = 0.0003$). The proportion of substantial responders (41.9% vs. 34.6% at one month, 40.9% vs. 26.8% at 3 months, and 33.3% vs. 14.4% at 6 months, respectively, $P = 0.0058$) and substantial/moderate responders (71.0% vs. 58.8% at one month, 65.6% vs. 40.4% at 3 months, and 48.4% vs. 20.3% at 6 months, respectively, $P < 0.0001$) were significantly higher in the hypertonic group. The Oswestry disability index (ODI) was not different between the groups ($P = 0.2697$).

Limitations: Retrospective design without a control group.

Conclusions: Hypertonic saline provides more superior and longer lasting pain relieving effects when added to TFEIs.

IL NOSTRO CENTRO DI TERAPIA DEL DOLORE

	PRF TRANSFORAMINALE	PRF e CRF SU NERVI PERIFERICI	DECOMPRESSIONI DISCALI	TOTALE
ANNO 2106	338	85	30	453
ANNO 2021	696	64	32	792
ANNO 9/2022	505	59	27	591

REVIEW ARTICLE

A comprehensive review of pulsed radiofrequency in the treatment of pain associated with different spinal conditions

[1]GIANCARLO FACCHINI, MD, [1]PAOLO SPINNATO, MD, [2]GIUSEPPE GUGLIELMI, MD, [1]UGO ALBISINNI, MD and [1]ALBERTO BAZZOCCHI, MD, PhD

Objective: The objective of this review was to evaluate the efficacy of pulsed radiofrequency (PRF) treatment of pain associated with different spinal conditions. The mechanisms of action and biological effects are shortly discussed to provide the scientific basis for this radiofrequency modality.

Methods: We systematically searched for clinical studies on spinal clinical conditions using PRF. We searched the MEDLINE (PubMed) database. We classified the information in one table focusing on randomized controlled trials (RCTs) and other types of studies. Date of last electronic search was October 2016.

Results: We found four RCTs that evaluated the efficacy of PRF on cervical radicular pain and five observational studies. Two trials and three observational studies were conducted in patients with facet pain. For disc-related pathology, we found one RCT with PRF applied intradiscally and three RCTs for dorsal root ganglia PRF modulation lumbosacral radicular pain. For sacroiliac joint pain, spondylolisthesis, malignancies and other minor spinal pathology, limited studies were conducted.

Conclusion: From the available evidence, the use of PRF to the dorsal root ganglion in cervical radicular pain is compelling. With regard to its lumbosacral counterpart, the use of PRF cannot be similarly advocated in view of the absence of standardization of PRF parameters, enrolment criteria and different methods in reporting results; but, the evidence is interesting. The use of PRF in lumbar facet pain was found to be less effective than conventional RF techniques. For the other different spinal conditions, we need further studies to assess the effectiveness of PRF.

Advances in knowledge: The use of PRF in lumbar facet pain was found to be less effective than conventional RF techniques. For the other different spinal conditions, we need further studies to assess the effectiveness of PRF.

Lumbar epidurals efficacy

Prospective study, serial Patients (69) with lumbar HNP and radiculopathy

- TFE injection resulted in sustained long term improvement in 75.4% of acute lumbar HNP with an average of 1.8 inj. per person
- 8o weeks follow up
- 78.7% patient satisfaction.

Lumbar TFE Corticosteriod Injections
Lutz, Arch PM&R Nov. 1998, 79 (11): 1362-6

At month 6, results where significantly better for transforaminal injection concerning; pain, daily activities, work, leisure activities, anxiety and depression, with a decline in the Roland-Morris score. In recent discal radiculalgia, the efficacy of radio-guided transforaminal epidural corticosteroid injections was significantly higher than that obtained with interspinous epidural injections.

Efficacy of transforaminal versus interspinous corticosteroid injection in discal radiculalgia – a prospective, randomised, double-blind study. Thomas E, Cyteval C, Abiad L, Picot MC, Taourel P, Blotman
F. Clin Rheumatol. 2003 Oct;22(4-5):299-304.

- Prospective randomized study
- Five treatment arms asses comparative effectiveness
- TFE with steroid and local
- TFE with local
- TFE with saline
- Deep paraspinal intramuscular injection mimicking the technique of TFE with Steroids, or IM saline.

The efficacy of transforaminal injection of
steroids for the treatment of lumbar radicular pain
Ghahreman A, Ferch R, Bogduk N. Pain Med 2010; 11:1149-1168.

Results

Percentages with greater than 50% reduction in pain

- • TFE with local anesthetic and steroid 54%
- • TFE local anesthetic only 7%
- • TFE with saline 19%
- • IM steroid 21%
- • IM saline 13%

From 1966 to December 2011
Overall, 82 lumbar interlaminar trials were identified. All non-randomized studies without fluoroscopy and randomized trials not meeting the inclusion criteria were exclude
The evidence based on this systematic review is good for lumbar epidural injections under fluoroscopy for radiculitis secondary to disc herniation with local anesthetic and steroids, fair with local anesthetic only; whereas it is fair for radiculitis secondary to spinal stenosis with local anesthetic and steroids, and fair for axial pain without disc herniation with local anesthetic with or without steroids

The Effectiveness of Lumbar Interlaminar Epidural Injections in Managing Chronic Low Back and Lower Extremity Pain

Ramsin M. Benyamin, MD1, Laxmaiah Manchikanti, MD2, Allan T. Parr, MD3, Sudhir Diwan, MD4, Vijay Singh, MD5, Frank J.E. Falco, MD6, Sukdeb Datta, MD7, Salahadin Abdi, MD, PhD8, and Joshua A. Hirsch, MD9

Pain Physician 2012; 15:E363-E404 • ISSN 2150-1149

Hypertonic saline, which has been used as an adjunct to percutaneous epidural adhesiolysis, can also be injected via a transforaminal approach in expectation of longer-lasting effects.

Between January 2010 and December 2013, the medical records of 246 patients (94 in the hypertonic group, 153 in the control group) who received transforaminal epidural block were reviewed and analyzed. The hypertonic group received 10% sodium chloride solution added to lidocaine, triamcinolone, and hyaluronidase.

Hypertonic saline provides more superior and longer lasting pain relieving effects when added to TFEIs.

Efficacy of Adjuvant 10% Hypertonic Saline in Transforaminal Epidural Steroid Injection: A Retrospective Analysis

Eun Young Joo, MD, Won Uk Koh, MD, Seong-Soo Choi, MD, PhD, Jae-Hyung Choi, MD, Ho-Soo Ahn, MD, Hye Joo Yun, MD, and Jin-Woo Shin, MD, Ph

Pain Physician 2017; 20:E107-E114 • ISSN 2150-1149

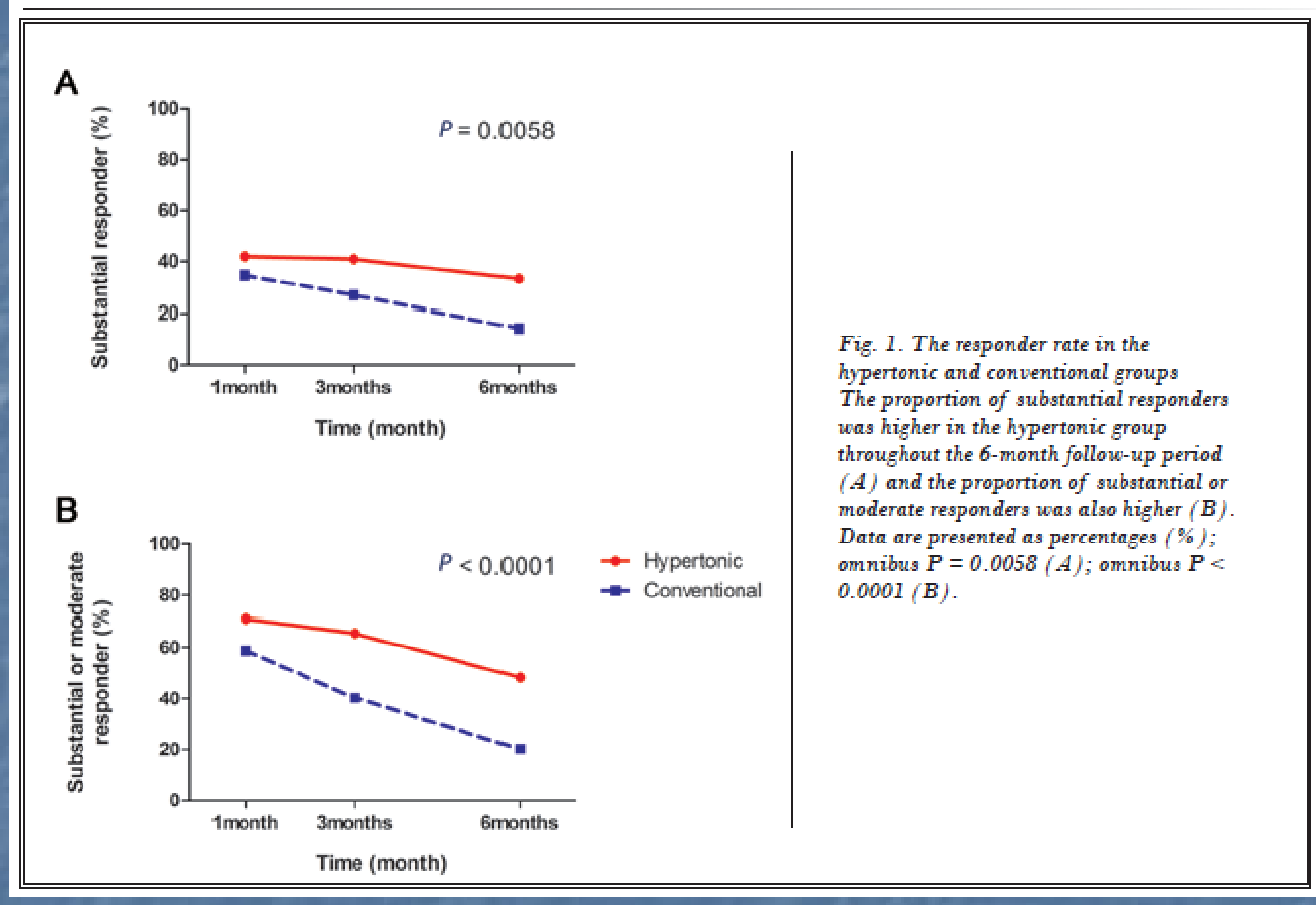


Fig. 1. The responder rate in the hypertonic and conventional groups The proportion of substantial responders was higher in the hypertonic group throughout the 6-month follow-up period (A) and the proportion of substantial or moderate responders was also higher (B). Data are presented as percentages (%); omnibus P = 0.0058 (A); omnibus P < 0.0001 (B).

Equipment Needed and Injectates:

-Sterilizing Solution
-Drapes
-Marking Pen
-Fluoroscopic Pointer (Hemostat)
-30 ga. Skin Wheel Needle
-18 ga. Introducing Cannula
-Two 3 cc Syringes
-One 5 cc Syringe
-Aspirating Needle
-Extension Tubing
-20, 22, or 25 ga. Blunt Coudé Needle w/Introducer
-Local Anesthetic (0.2% Ropivicaine)
-Steroid of choice (Dexamethasone or Triamcinalone)
-Omnipaque 240