Gesundheit
kommt von Herzen.

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US-guided interventions in low back pain

ESRA Winter Week 2023

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Intensive Care and Pain Therapy
Sacred Heart of Jesus Hospital, **Vienna, Austria**


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■ PAIN AND REGIONAL ANESTHESIA

Anesthesiology 2004; 100:1242–8

Ultrasound-guided Lumbar Facet Nerve Block

A Sonoanatomic Study of a New Methodologic Approach

Manfred Greher, M.D., Gisela Scharbert, M.D.,* Lars P. Kamolz, M.D.,† Harald Beck, M.D.,‡ Burkhard Gustorff, M.D.,§ Lukas Kirchmair, M.D.,‖ Stephan Kapral, M.D.#*

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No conflict of interest

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„First they ignore you, then they laugh at you, then they fight you, then you win.“

Mahatma Gandhi

Low back pain:
Life time prevalence in 1st word countries:

60-85%

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Pain Practice, Volume 15, Issue 1, 2015 12–21

Table 1. Lumbar zygapophysial joint pain. Summary of consensuated indicators

Pain induced by pressing on the ipsilateral paravertebral zygapophysial joint or transverse process
Pain does not get worse with trunk flexion
Pain gets worse with trunk extension
Unilateral paravertebral muscular spasm on the affected joint
If referred to lower limb, the pain is above the knee
Absence of radicular pattern

Table 5. Lumbosacral radicular pain. Summary of consensus indicators

To attribute the pain etiology to a MRI-diagnosed disk hernia, there must be a clinical correlation with the symptoms
Patient often reports paresthesias in the affected dermatome
The dermatome distribution points to the affected nerve root, although there are anatomical variations. The most consistent dermatome is S1
Canal stenosis pain typically increases when walking and improves immediately with trunk flexion
Diagnosis of lumbosacral radicular pain seems to be justified when the patient reports radicular pain in 1 lower limb, combined with 1 or more positive neurological test indicating nerve root irritation or neurological deficit

Table 4. Myofascial pain

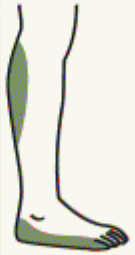
Quadratus lumborum muscle

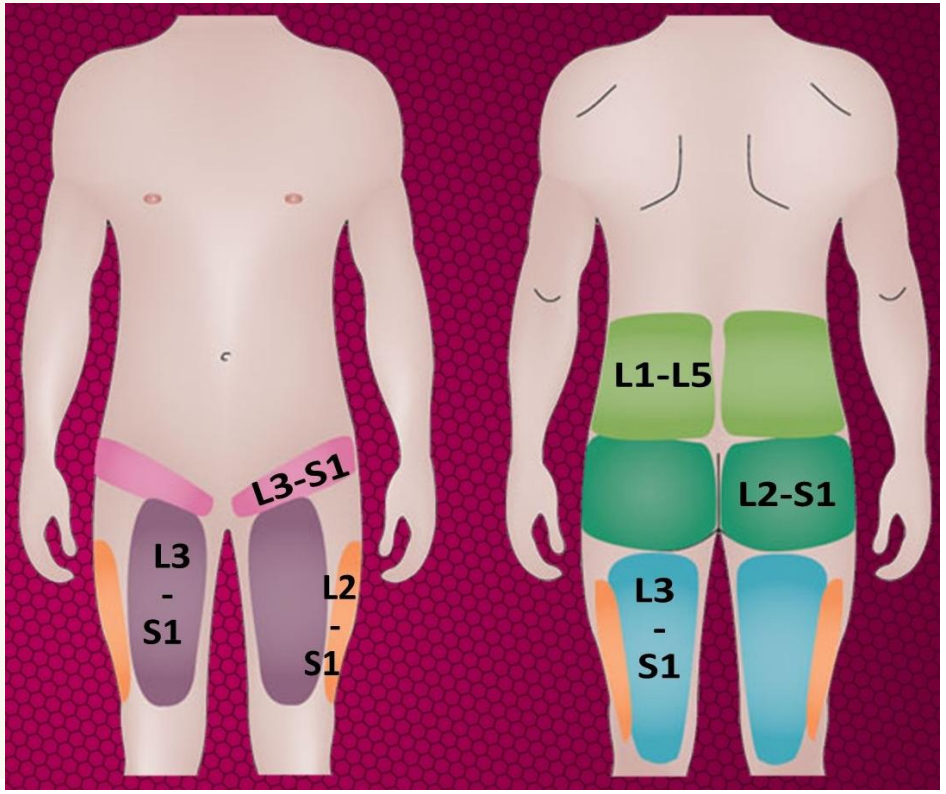
. Summary of consensus indicators

Painful palpation below the last rib and 5 cm away from the L1 transverse process, with pain referred to the iliac crest
Low back pain when walking, sitting, and even laying down
Pain increases with postural changes in bed
Low back pain during active stretching and lateral tilting
Painful palpation of a trigger point at the level of L4 vertebral body, 1 or 2 cm above the iliac crest, with pain referred to greater trochanter

Referred pain

Figure 1. Testing for lumbar nerve root compromise.

Nerve root	L4	L5	S1
Pain			
Numbness			
Motor weakness	Extension of quadriceps.	Dorsilflexion of great toe and foot.	Plantar flexion of great toe and foot.
Screening exam	Squat & rise.	Heel walking.	Walking on toes.
Reflexes	Knee jerk diminished.	None reliable.	Ankle jerk diminished.



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Target specific US-guided interventions in low back pain

Selective periradicular infiltration (Transforaminal epidural?)
Translaminar epidural
Caudal epidural block
Medial branch block
Facet joint block
Sacroiliac joint block
Piriformis infiltration
Intramuscular infiltration (Quadratus lumborum)
Superior cluneal nerve block

Greher et al., Anesthesiology 2004

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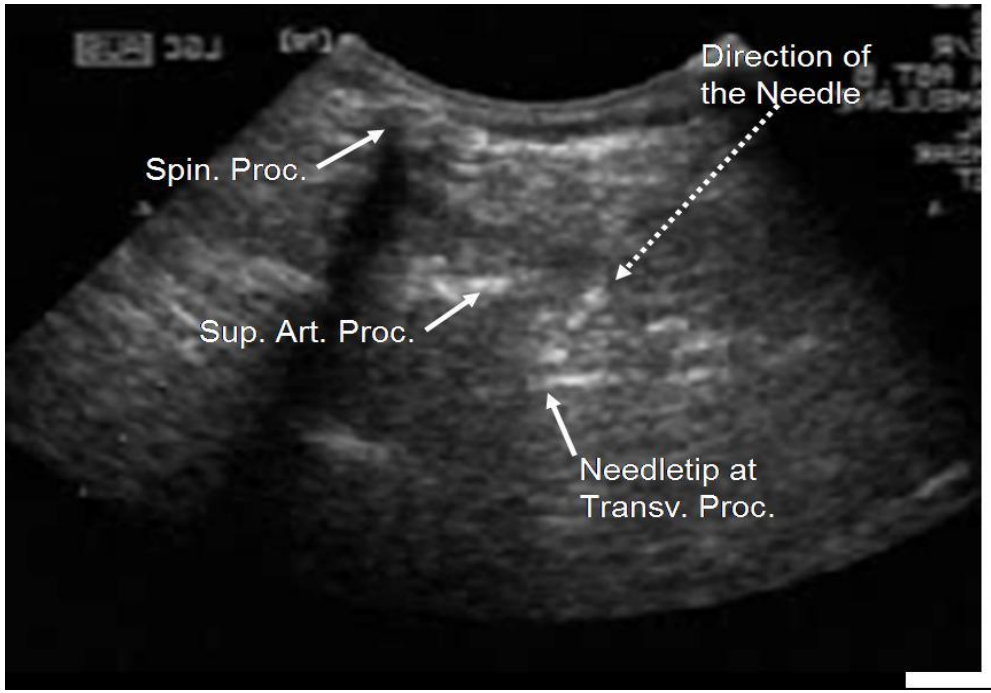

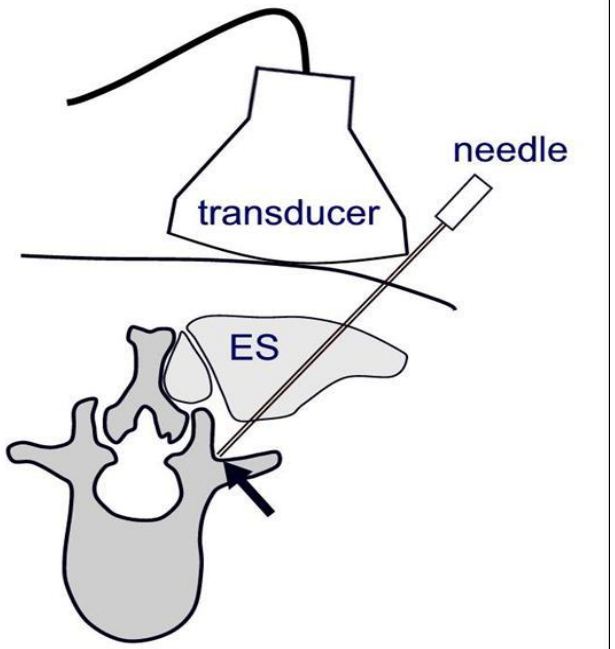

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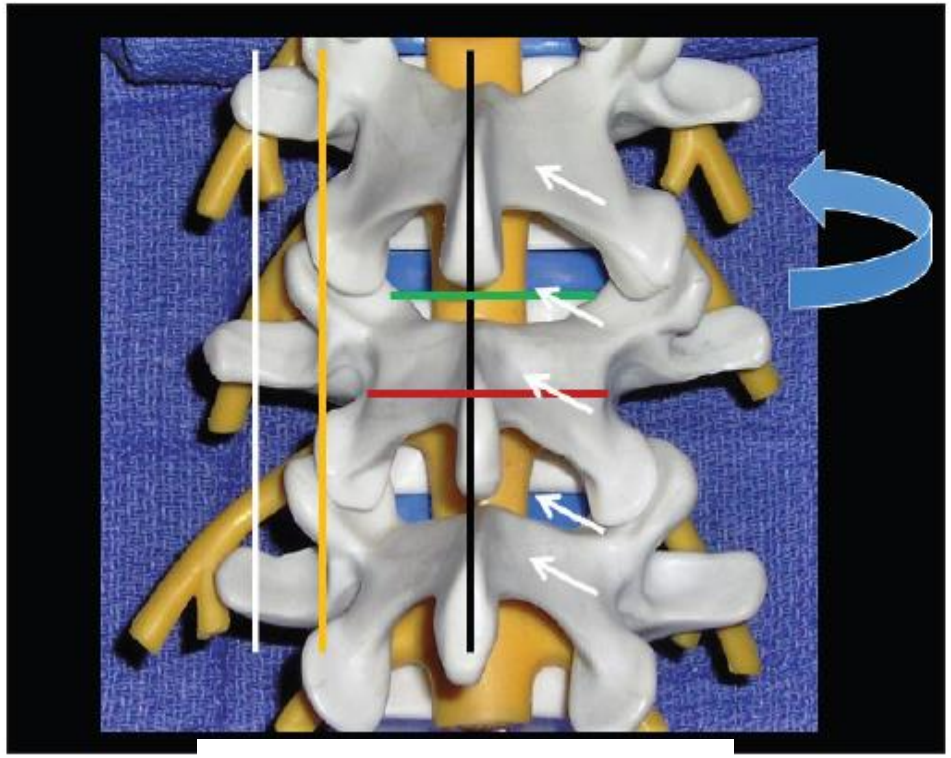
Figure 1. Seven sonographic views of the lumbar spine. The white line indicates the parasagittal transverse process view; yellow line, parasagittal articular process view; black line, midline spinous process view; green line, transverse interlaminar view; and red line, transverse spinous process view. White arrows indicate the direction of scanning to obtain the parasagittal oblique laminar view; and curved blue arrow, tilting of the transducer in the paravertebral space to obtain the transverse oblique foraminal view. All images and videos are reproduced with permission from Pain Diagnostics and Care, LLC.



J Ultrasound Med 2013; 32:1109–1116

Standard Planes

Lumbar ultrasound: longitudinal midline

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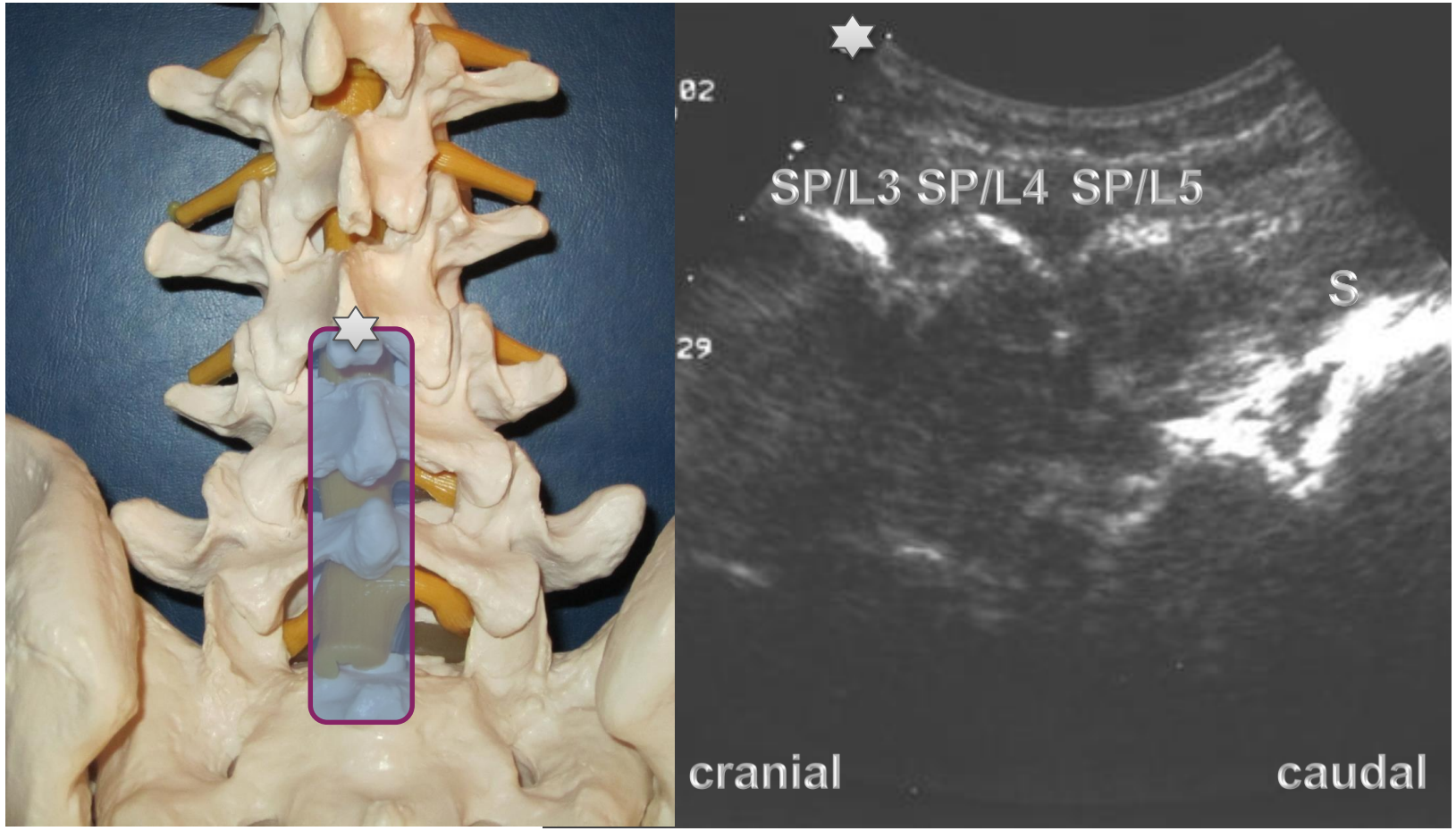

Lumbar ultrasound: paramedian sagittal facet joint

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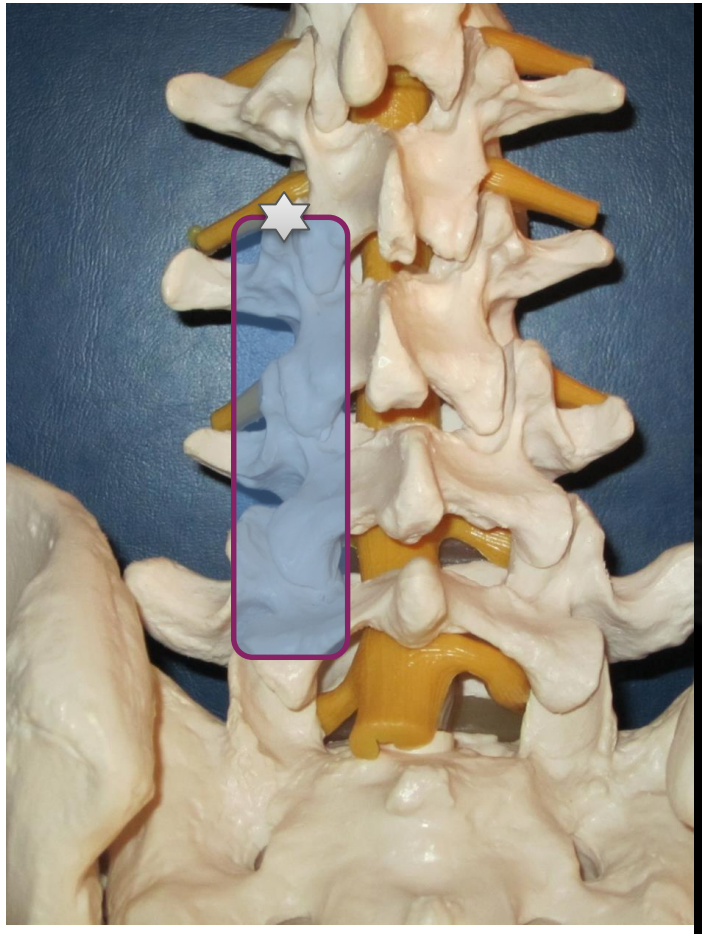

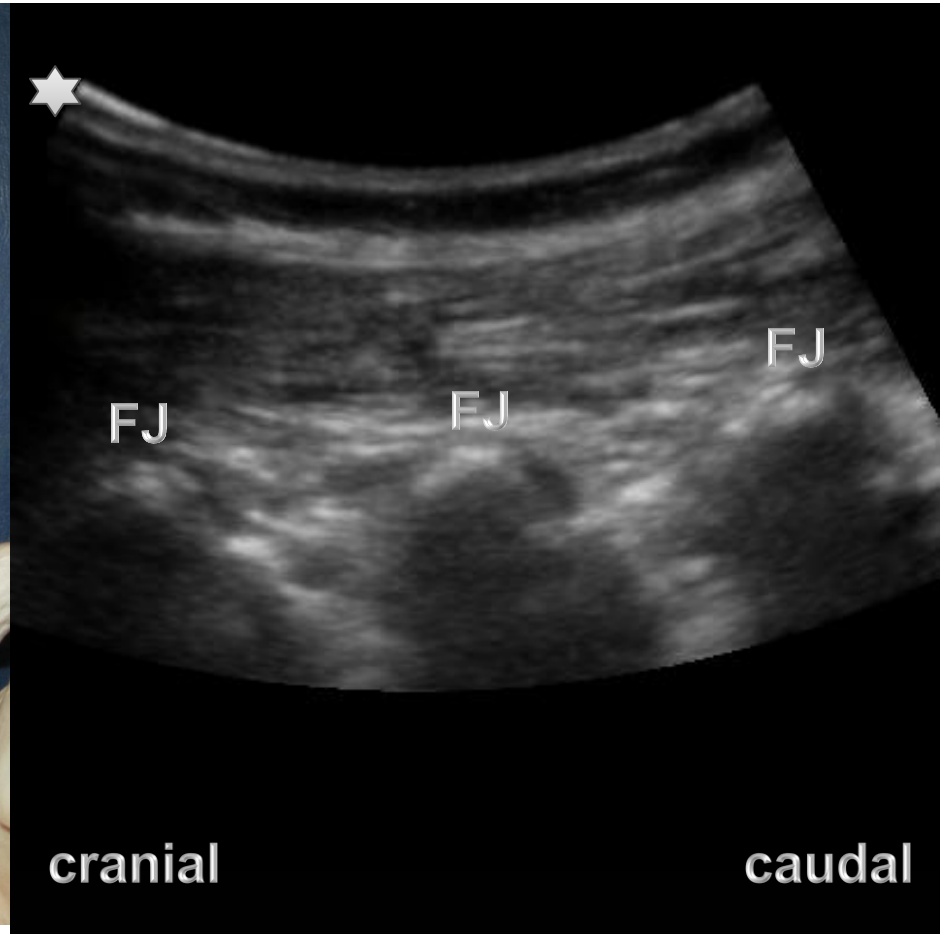

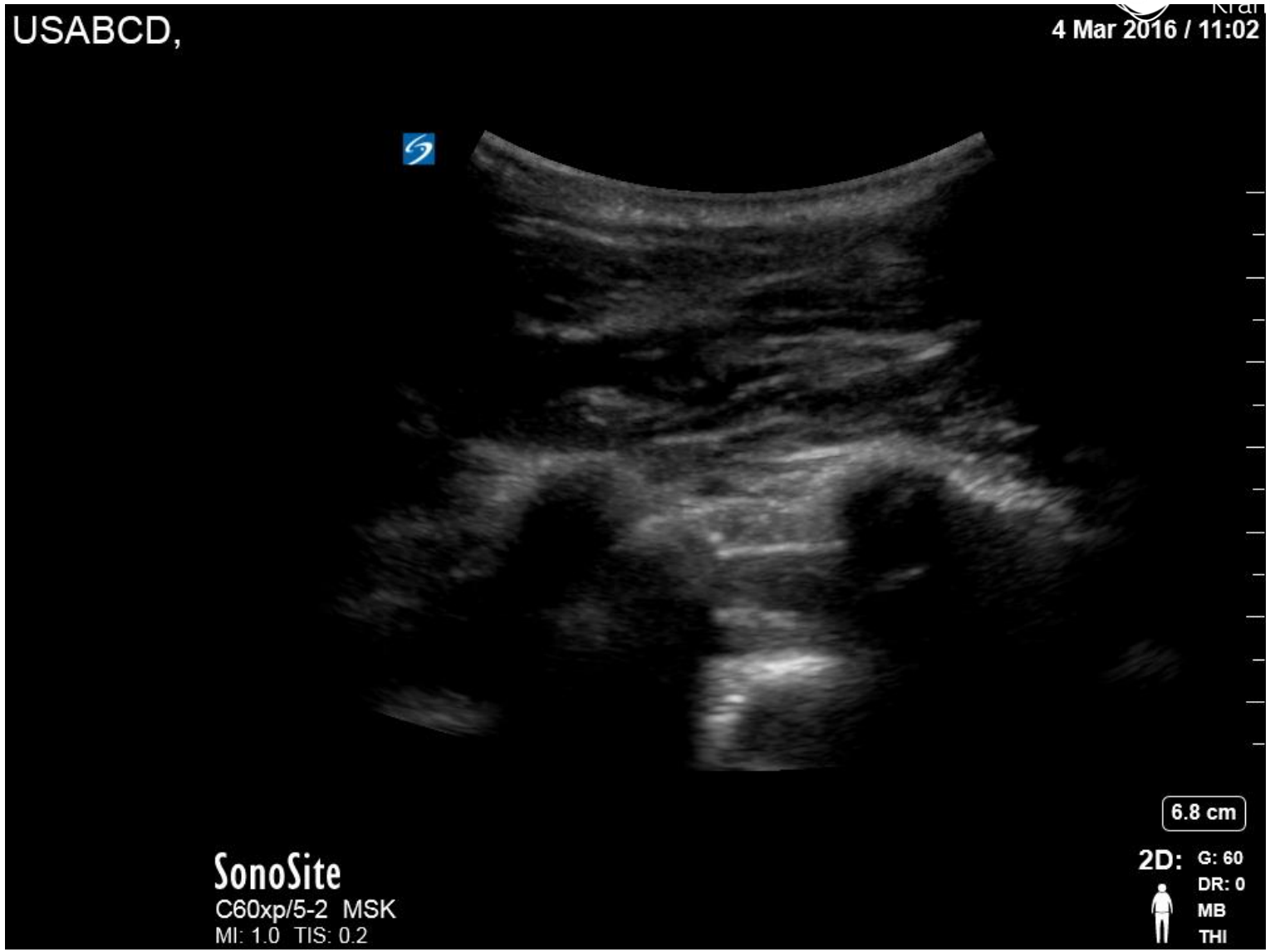
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4 Mar 2016 / 11:02
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C60xp/5-2 MSK
MI: 1.0 TIS: 0.2
2D:
G: 60
DR: 0
MB
THI

Lumbar ultrasound: paramedian sagittal transverse process

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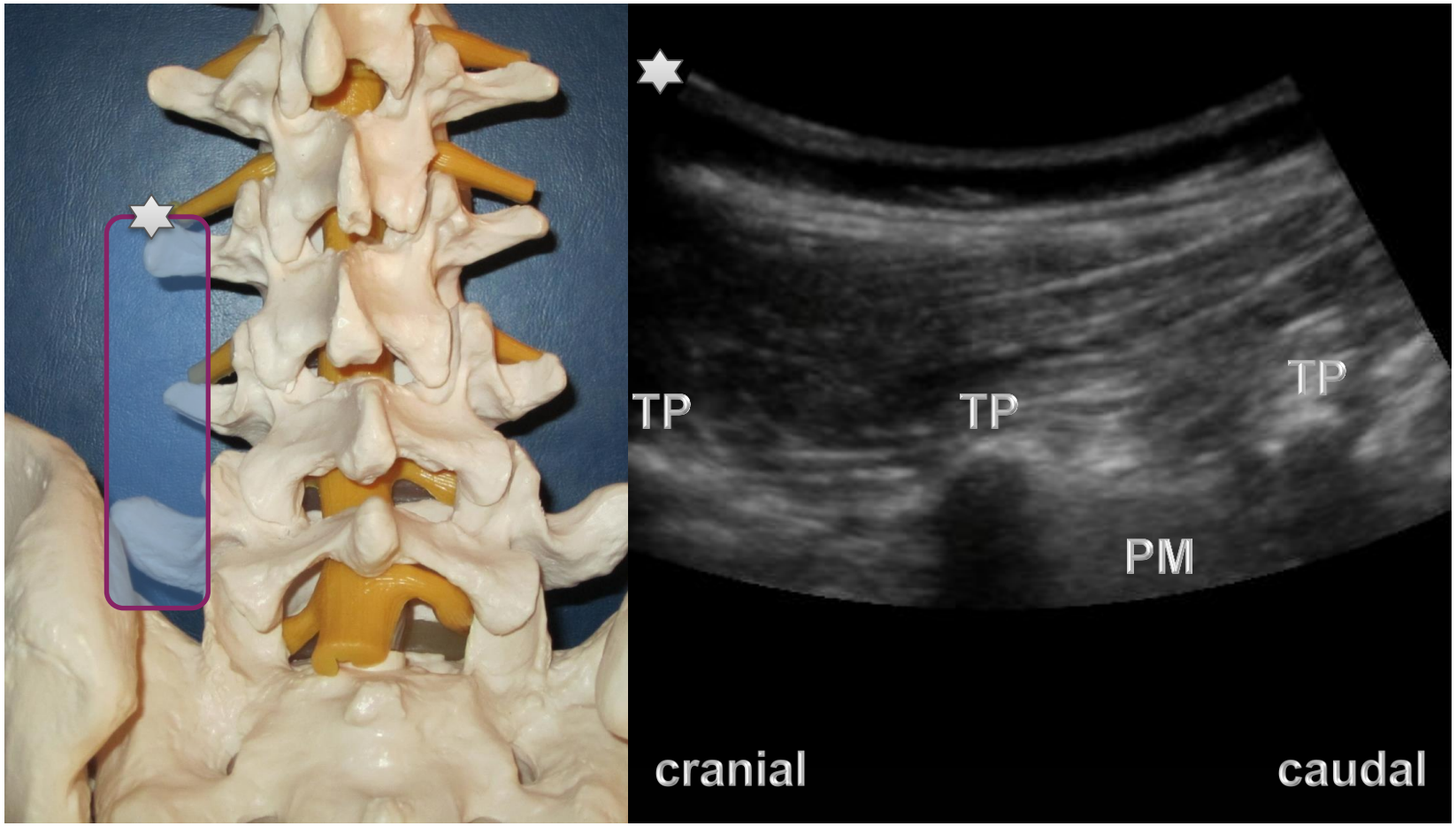

Lumbar ultrasound: transverse spinous process

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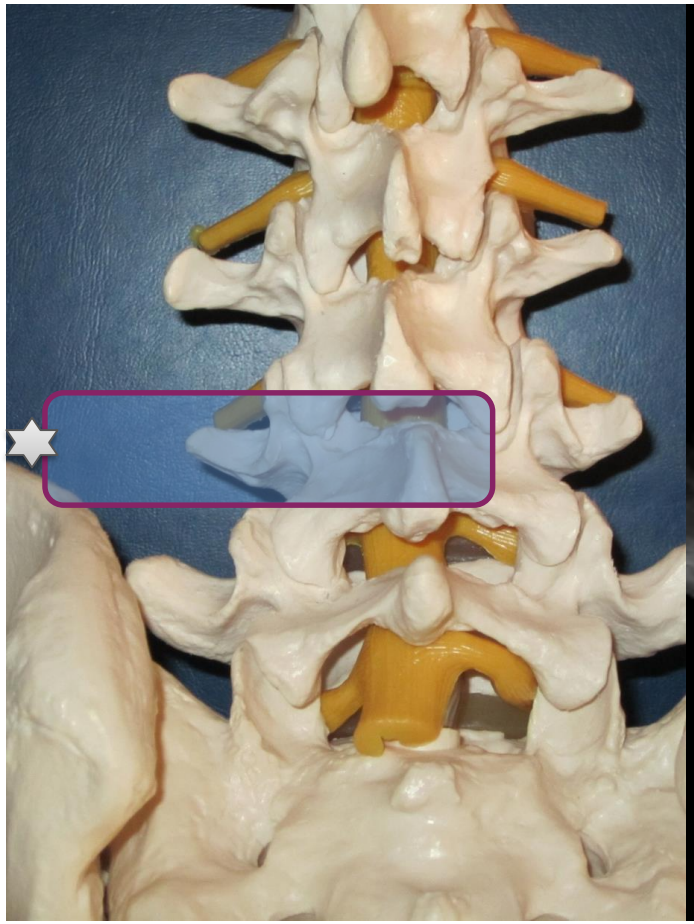

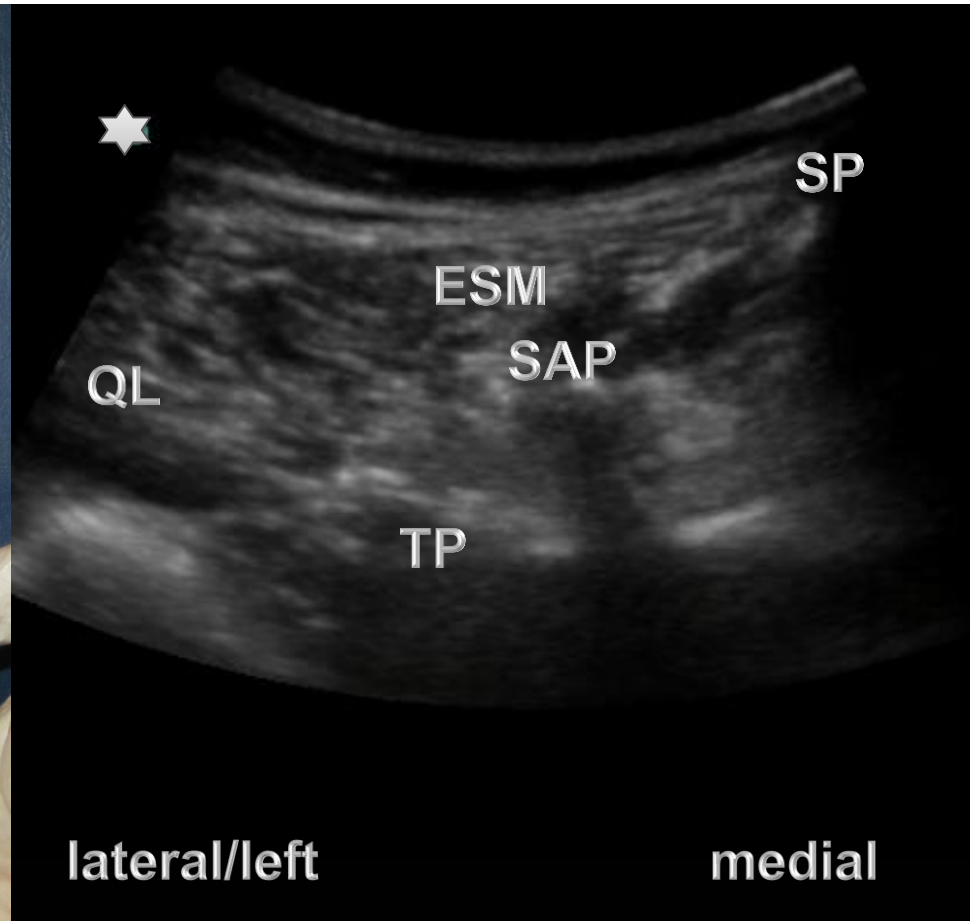

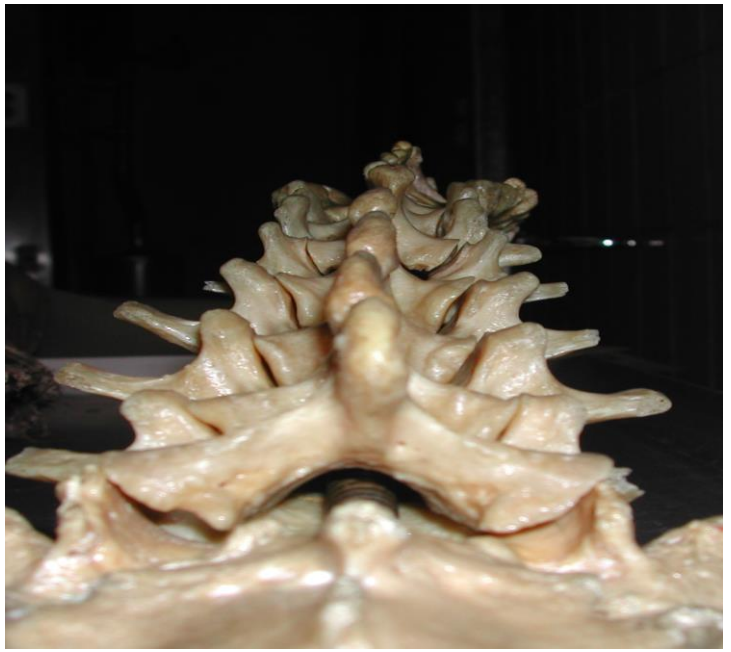

Lumbar ultrasound: transverse facet joint

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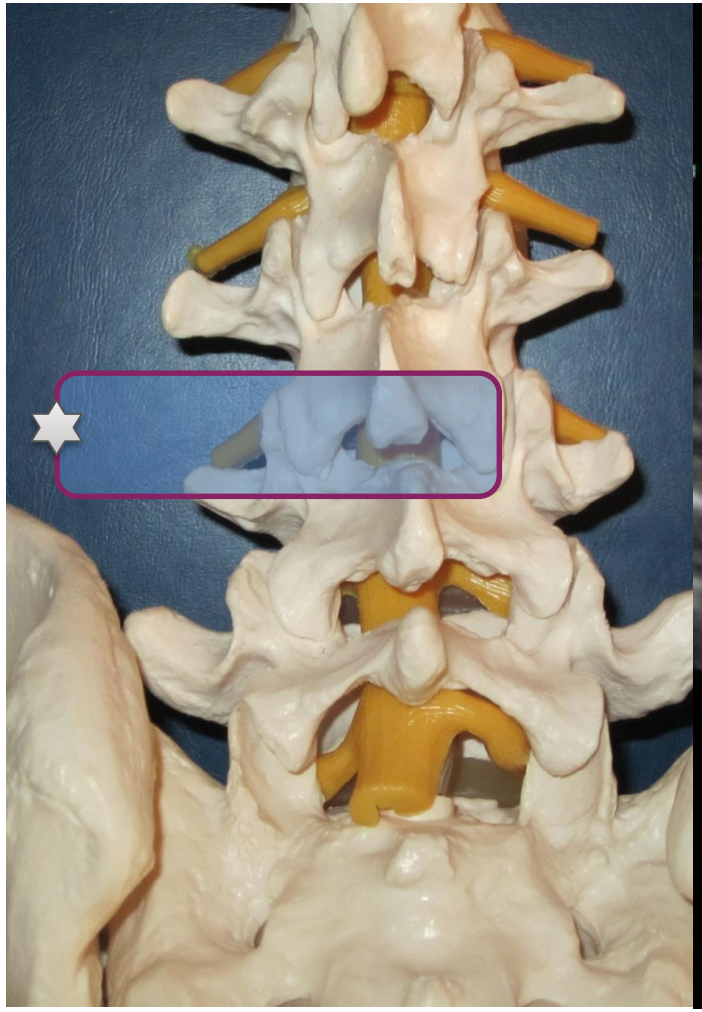

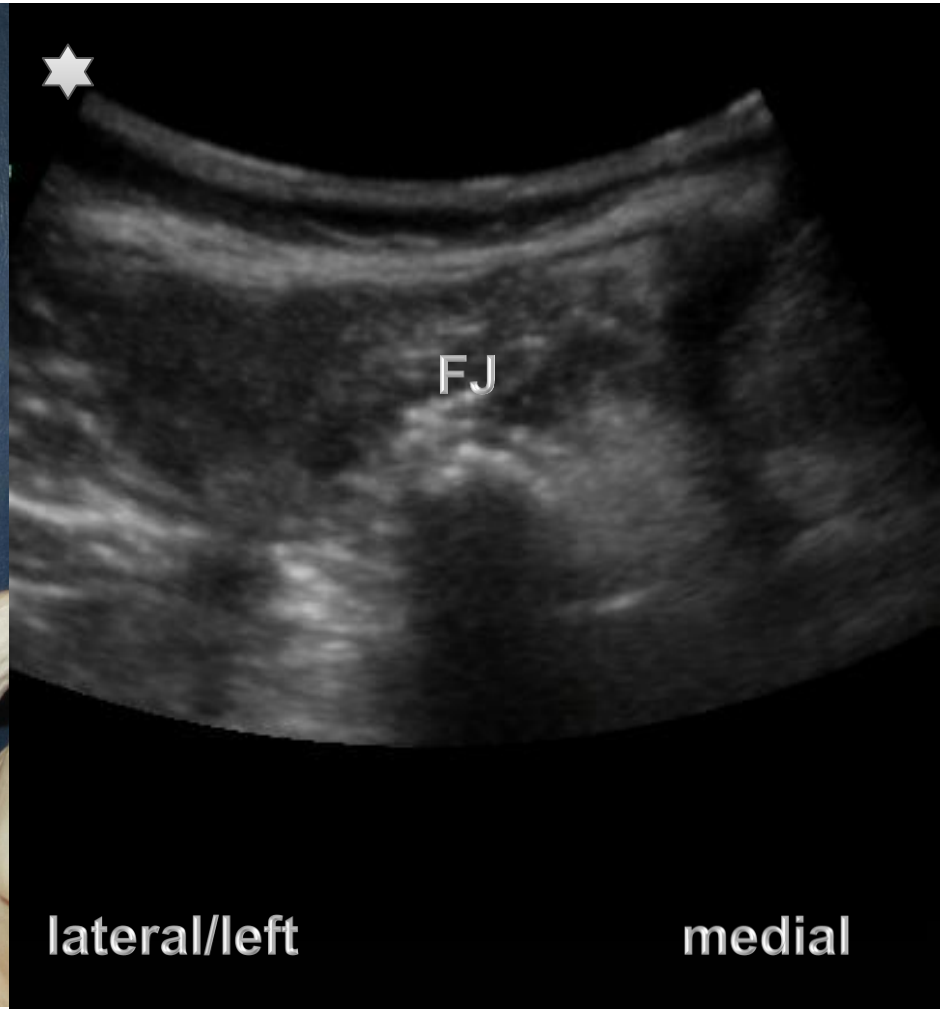

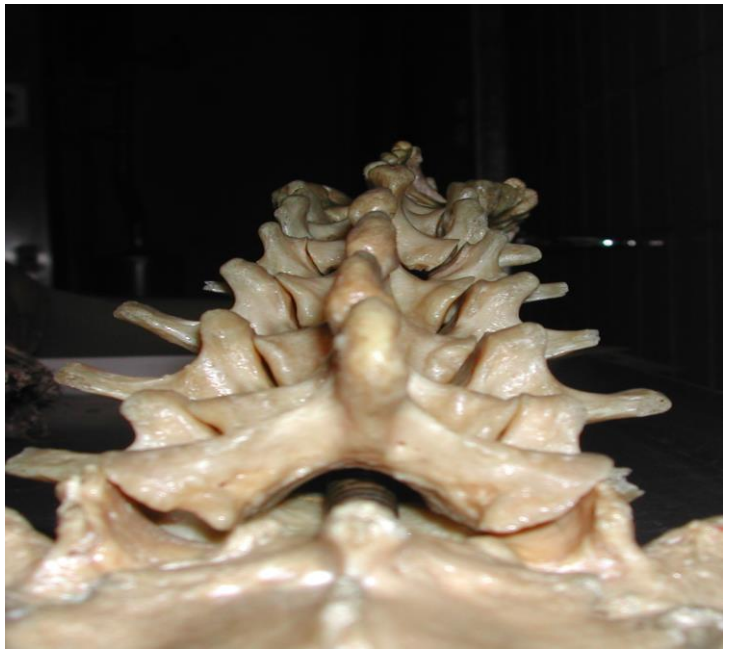

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Lumbar ultrasound: transverse interlaminar, foraminal

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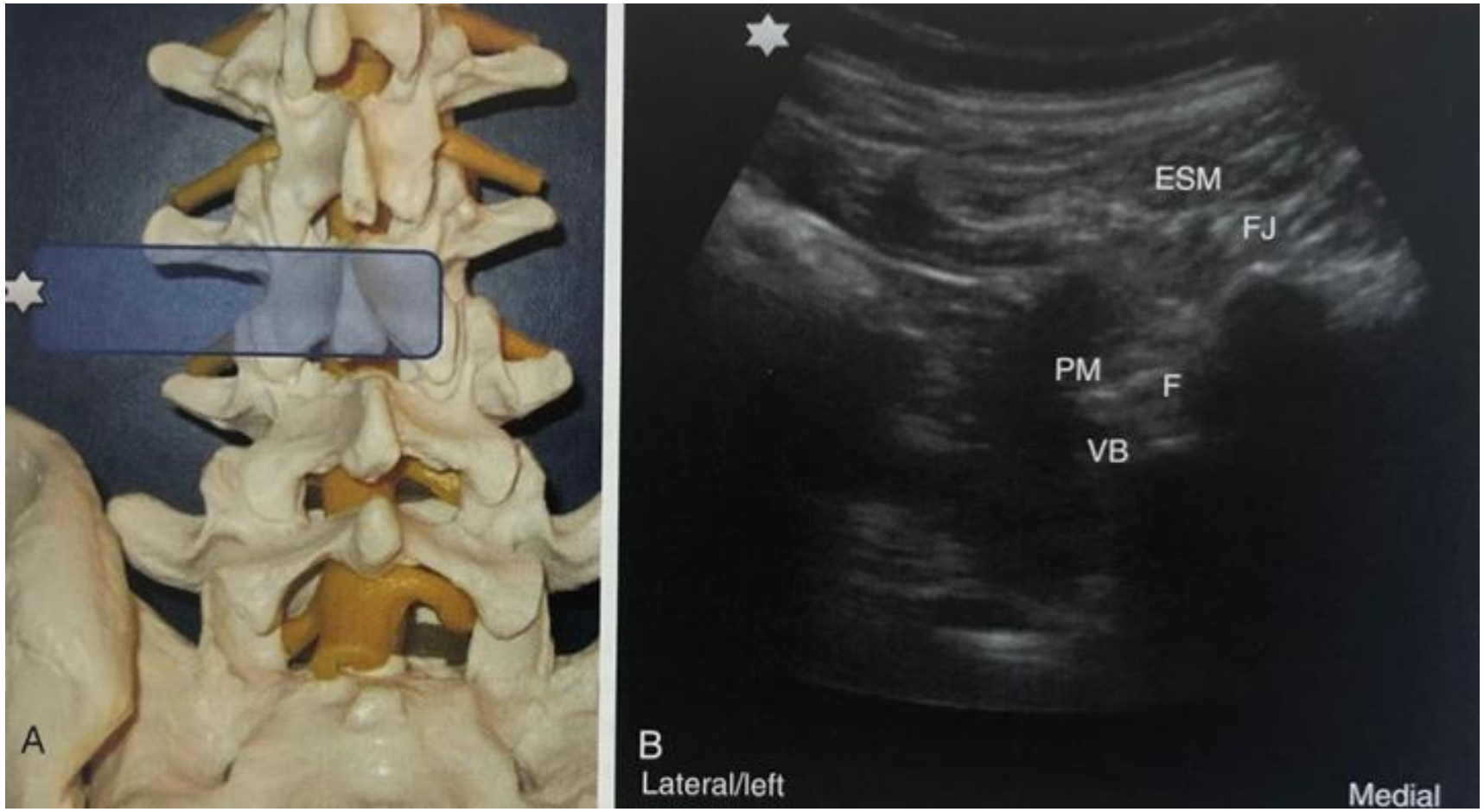

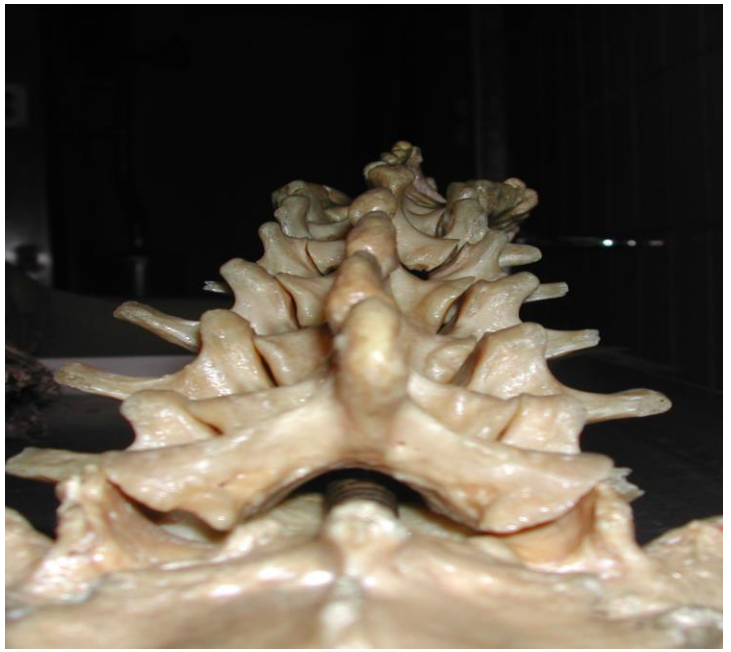

Facet joint derived pain: Common pain referral areas

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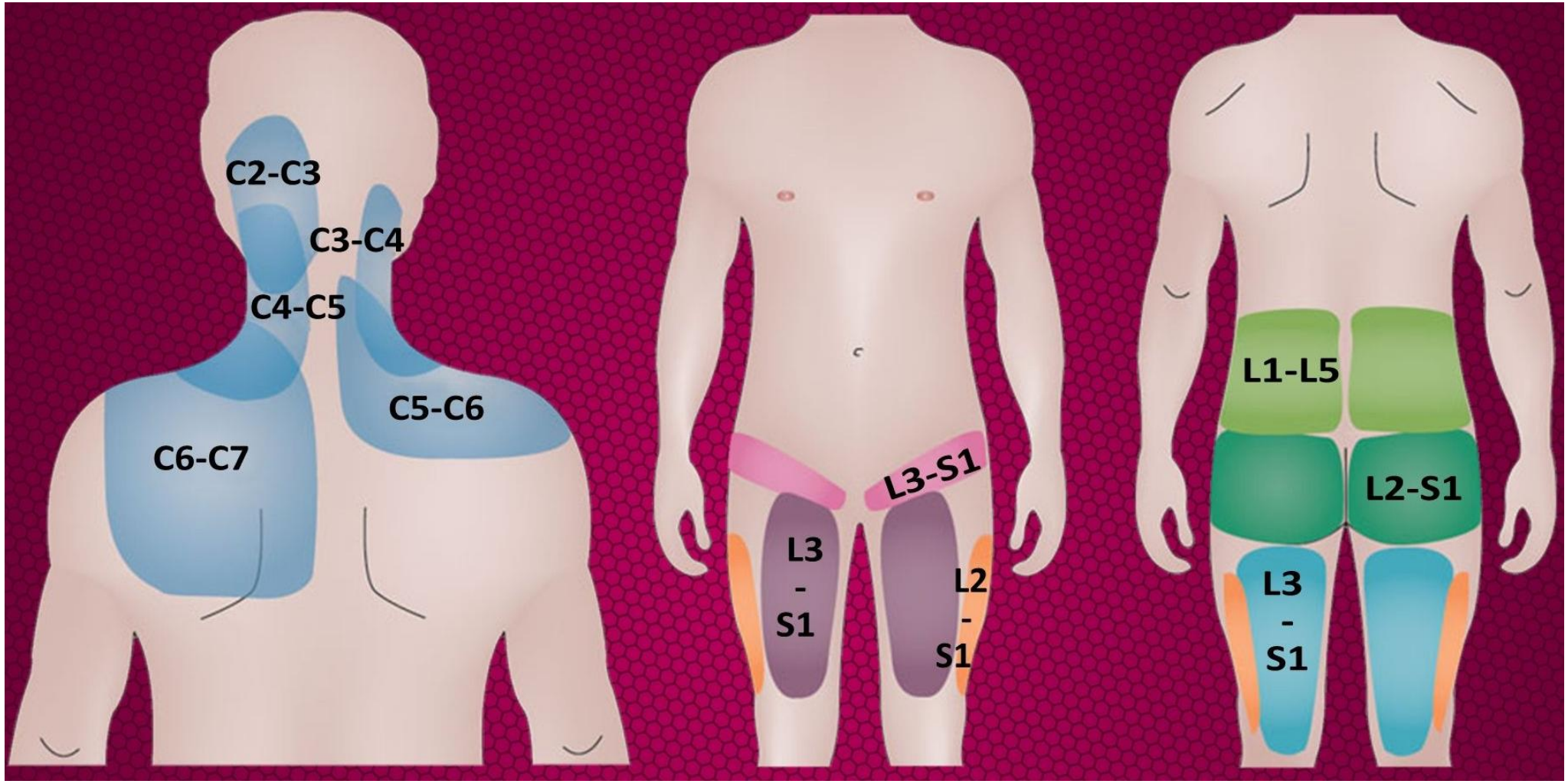

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Anesthesiology 2004; 101:1195–1200

Ultrasound-guided Lumbar Facet Nerve Block

Accuracy of a New Technique Confirmed by Computed Tomography

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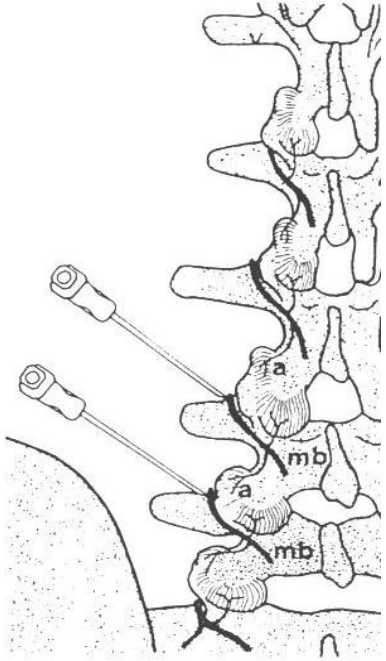
Lumbar Medial Branch Block:

Indications:

Facet joint mediated pain diagnosis (therapy)

Anatomy:

Facet joint is innervated by 2 medial branches (posterior rami)
Medial branch is located at the cranial end of transverse process
at transition to superior articular process; L5 dorsal ramus is different



Tips & Tricks:

Curvilinear transducer, IP transverse, 0.5-1ml of LA
Echogenic needle is useful
Always check in second plane (sagital)

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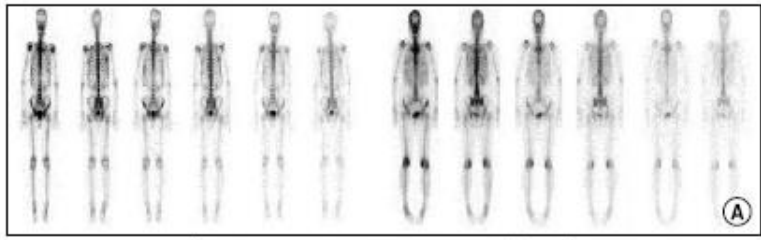
KJP The Korean Journal of Pain
| Original Article |
Korean J Pain 2011 June; Vol. 24, No. 2: 81-86
pISSN 2005-9159 eISSN 2093-0569
DOI : 10.3344/kjp.2011.24.2.81

Value of Bone Scintigraphy and Single Photon Emission Computed Tomography (SPECT) in Lumbar Facet Disease and Prediction of Short-term Outcome of Ultrasound Guided Medial Branch Block with Bone SPECT

Department of Anesthesiology and Pain Medicine, Asan Medical Center, University of Ulsan, College of Medicine, Seoul, Korea

Won Uk Koh, MD, Sung Hoon Kim, MD, Bo Young Hwang, MD, Woo Jong Choi, MD, Jun Gul Song, MD, Jeong Hun Suh, MD, Jeong Gill Leem, MD, and Jin Woo Shin, MD



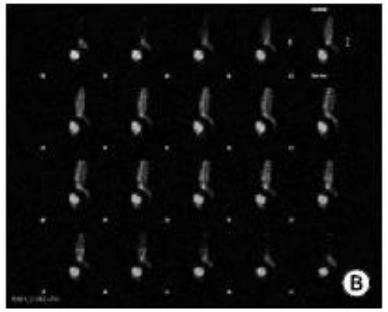


Table 2. Sensitivity, Specificity of SPECT

Patient (n = 33)	2nd week (n = 33)	4th week (n = 33)
Sensitivity	0.96	1.0
TP/(TP + FN)	24/(24 + 1)	22/(22 + 0)
Specificity	0.5	0.45
TN/(TN + FP)	4/(4 + 4)	5/(6 + 5)

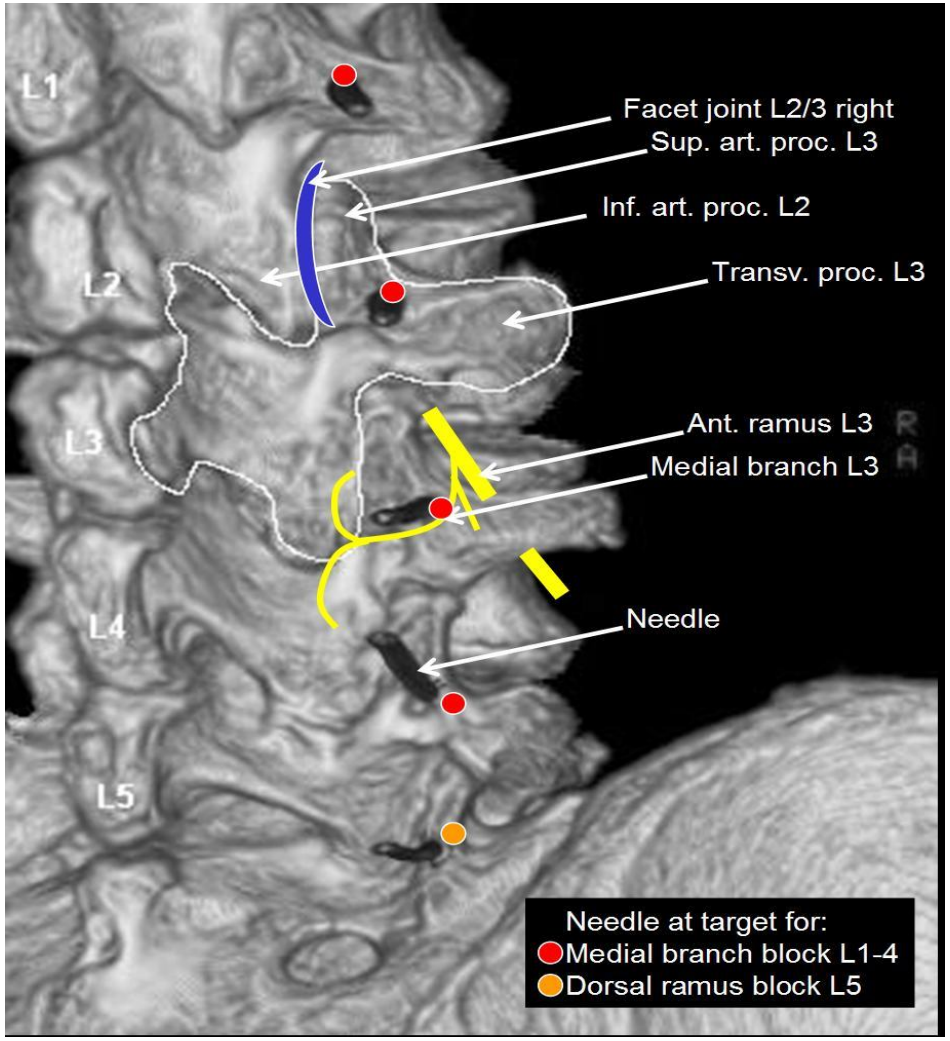
TP: true positive, FN: false negative, TN: true negative, FP: false positive.

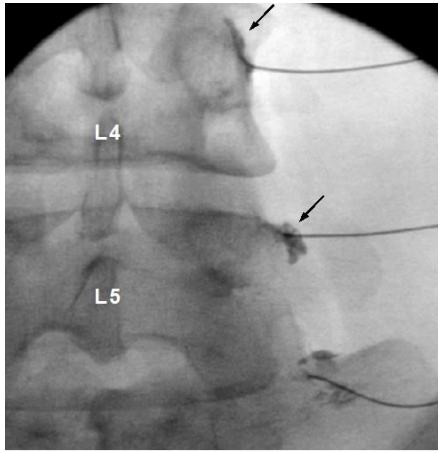
Reg Anesth Pain Med. 2015 Jul-Aug;40(4):376-83.

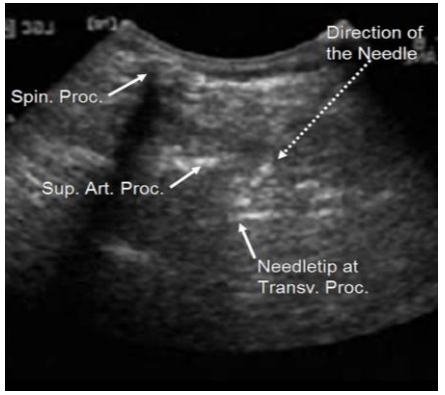
Medial Branch Blocks or Intra-Articular Injections as a Prognostic Tool Before Lumbar Facet Radiofrequency Denervation: A Multicenter, Case-Control Study.

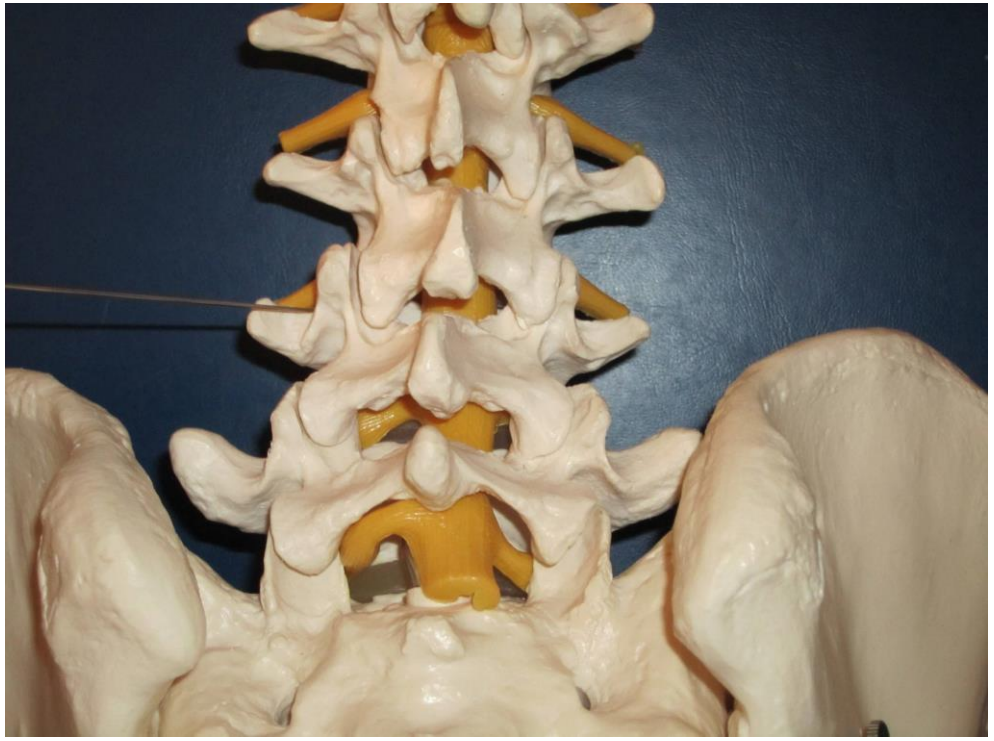
Cohen SP[1], Moon JY, Brummett CM, White RL, Larkin TM.

CONCLUSIONS:
When used as a prognostic tool before lumbar facet radiofrequency, MBB may be associated with a higher success rate than IA injections. Our results should be confirmed by large, prospective, randomized studies.









- **Lumbar facet joint pain is frequent and can only be diagnosed by specific test blocks!**

Lumbar Medial Branch Block:

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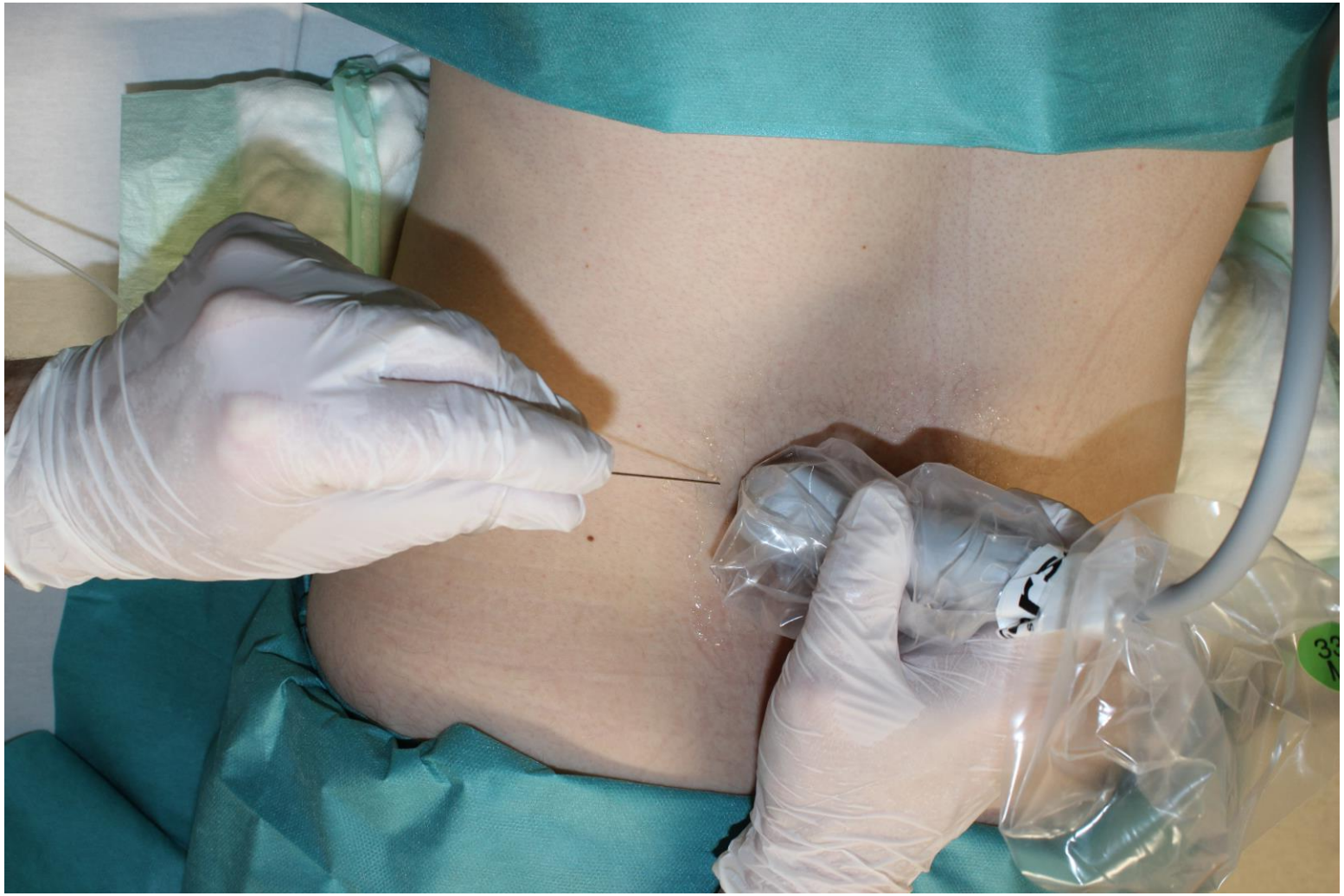
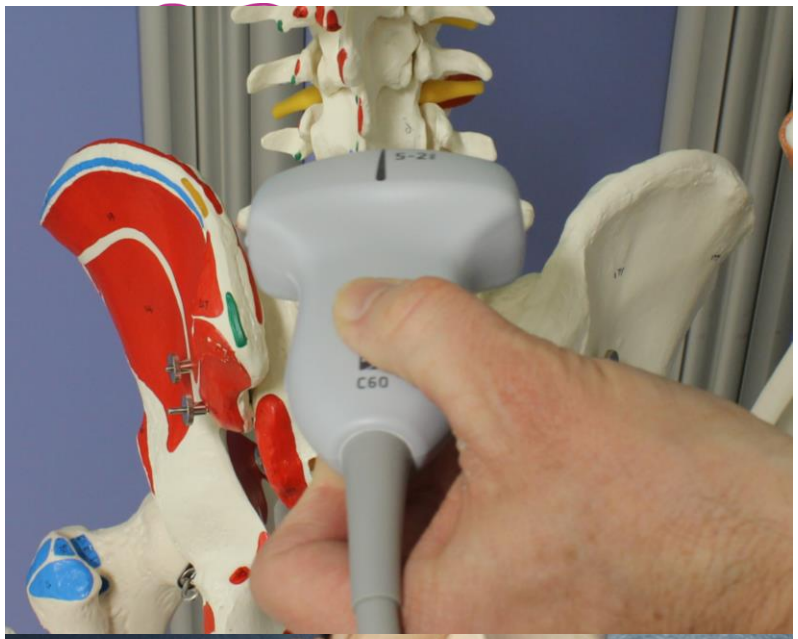
Lumbar Medial Branch Block:





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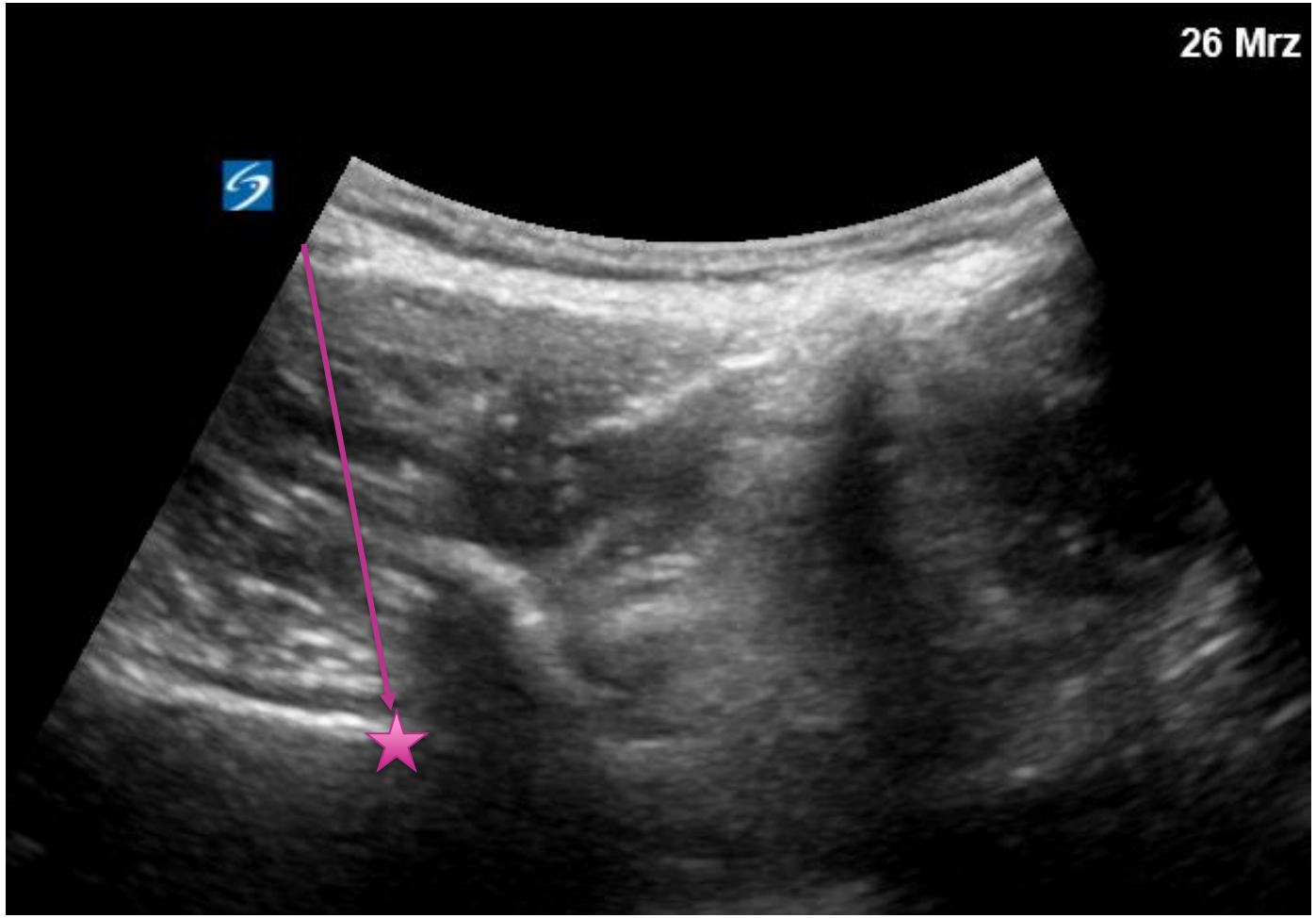
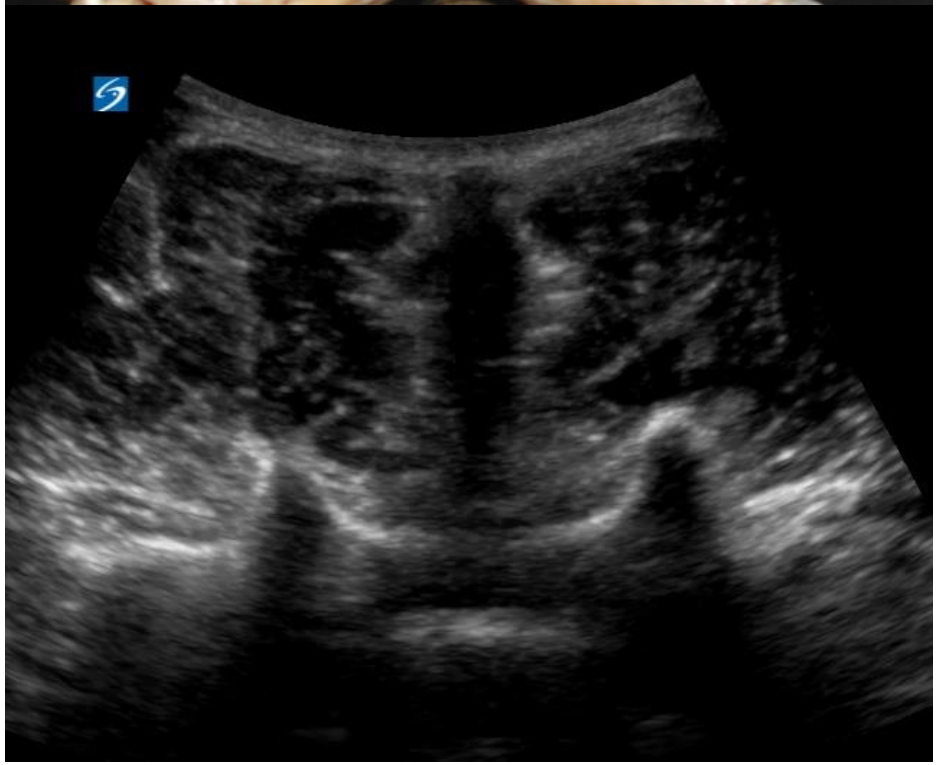
Lumbar Medial Branch Block:



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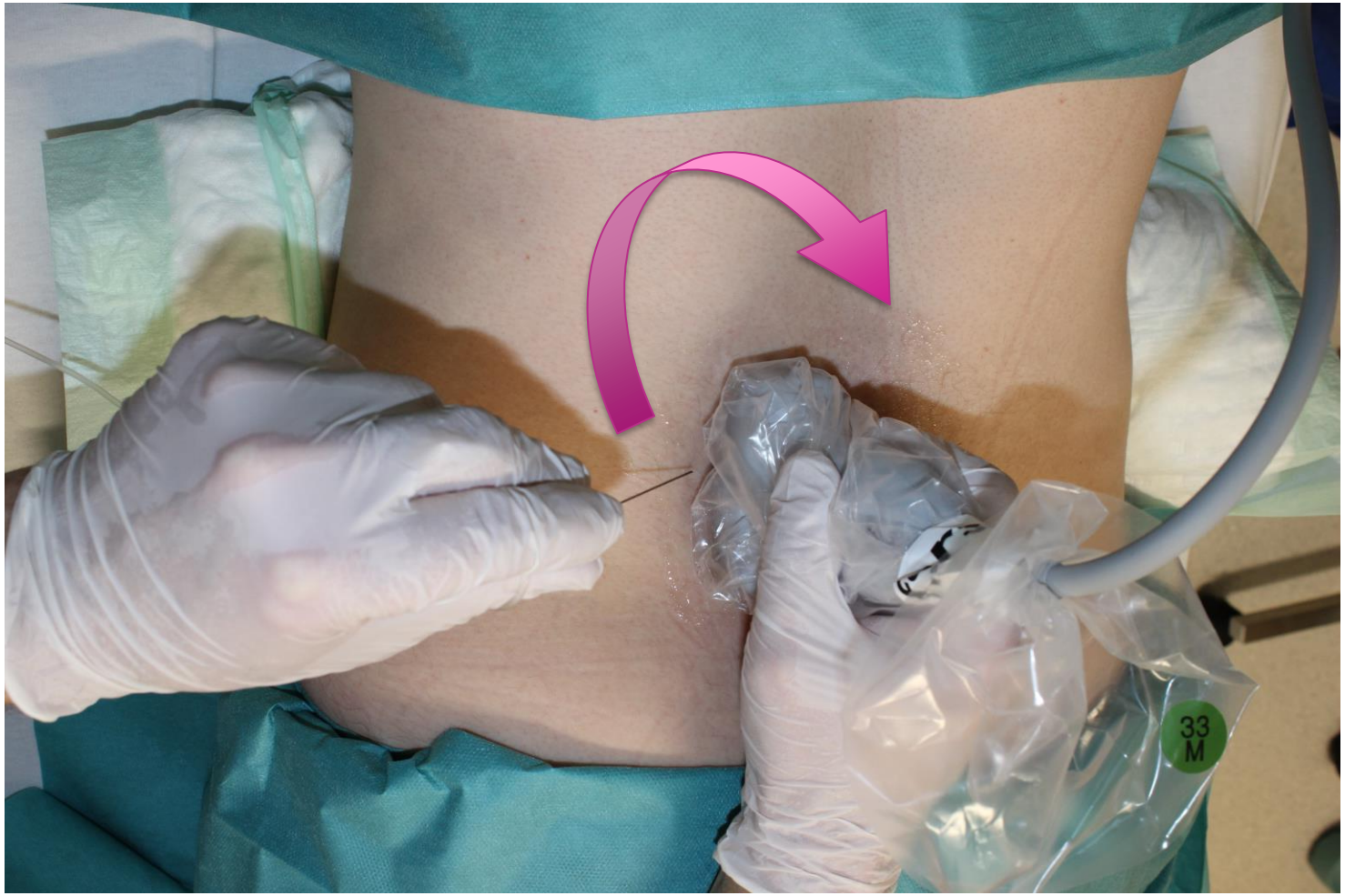
Lumbar Medial Branch Block:



Lumbar Medial Branch Block:

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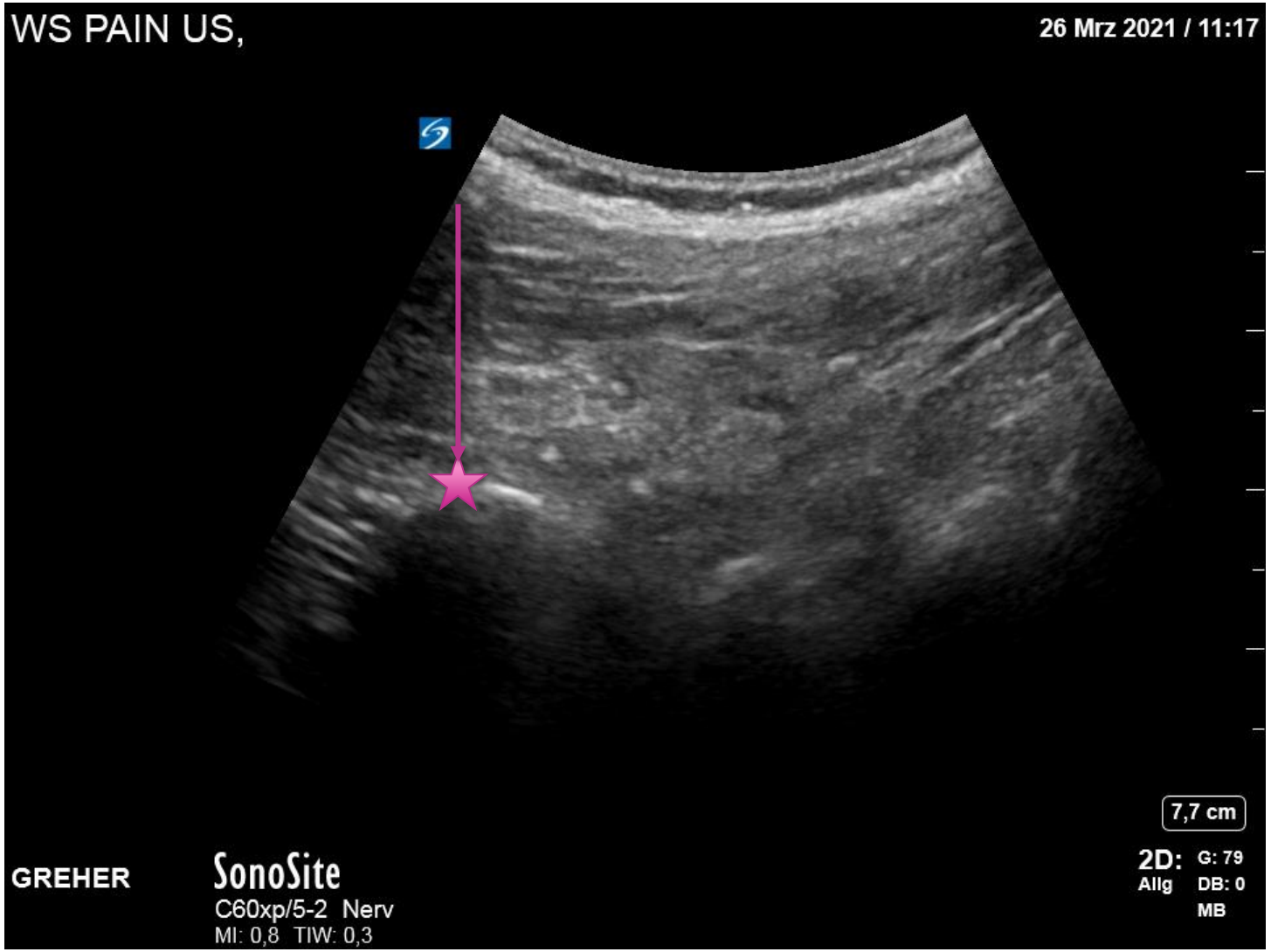

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Anesthesiology 2004; 101:1195–1200

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- 50 US guided punctures, 5 cadavers, L1-5

Results: **Forty-five of 50 needle tips were located at the exact target point. The remaining 5 were within 5 mm of the target. In 47 of 50 cases, the applied contrast dye reached the groove where the nerve is located, corresponding to a simulated block success rate of 94% (95% confidence interval, 84–98%). Seven of 50 cases showed paraforaminal spread, 5 of 50 showed epidural spread, and 2 of 50 showed intravascular spread. Despite the aberrant distribution, all of these approaches were successful, as indicated by contrast dye at the target point. Abnormal contrast spread was equally distributed among all lumbar levels. Contrast traces along the needle channels were frequently observed.**

- Simulated block success rate of 94%

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Asian Spine Journal Vol. 6, No. 3, pp 163~167, 2012
http://dx.doi.org/10.4184/asj.2012.6.3.163

The Validation of Ultrasound-Guided Lumbar Facet Nerve Blocks as Confirmed by Fluoroscopy

Heunguyn Jung, Seonghun Jeon, Sangho Ahn, Minwook Kim, Yongsoo Choi

Department of Orthopaedic Surgery, Kwangju Christian Hospital, Gwangju, Korea

Methods: Ultrasound-guided facet nerve block was done in 95 segments for 50 patients with chronic back pain by facet arthropathy. After the surface landmarks of the spinous process and iliac crest line were confirmed, longitudinal facet views were obtained by a curved array transducer to identify the different spinal segments. The spinous process and facet joint with transverse process were delineated by transverse sonograms at each level and the target point for the block was defined as lying on the upper edge of the transverse process. The needle was inserted toward the target point. After a contrast injection, the placement of the needle and contrast was checked by fluoroscopy.

Results: Eighty-seven segments (91.6%) could be guided successfully to the right facet nerve block by using ultrasound. After fluoroscopic control, 8 needles had to be corrected because of problems with other segments (3 cases) and lamina placements (5 cases). For the 42 patients who underwent successful block by ultrasound, however, the mean visual analogue score for back pain was improved from 6.2 ± 0.9 before the block to 4.0 ± 1.0 after the block ($p = 0.001$).

Conclusions: Ultrasound-guided longitudinal facet view and the surface landmarks of the spinous process and iliac crest line seems to be a promising guidance technique for the lumbar facet nerve block technique.

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Ultrasound versus fluoroscopy-guided medial branch block for the treatment of lower lumbar facet joint pain

A retrospective comparative study

Seung Hoon Han, MD, PhD[a], Ki Deok Park, MD, PhD[b], Kyoung Rai Cho, MD, PhD[c], Yongbum Park, MD[d,*]

Han et al. Medicine (2017) 96:16

Table 2

Comparison of verbal numeric pain scale (VNS) and Oswestry Disability Index (ODI) from baseline to 1, 3, and 6 months after the last injection.

		Baseline	1-mo	3-mo	6-mo
VNS	Ultrasound	6.35 ± 0.94	2.66 ± 1.62*	2.66 ± 1.66*	2.86 ± 1.60*
	fluoroscopy	6.57 ± 0.84	2.88 ± 2.02*	2.77 ± 1.82*	2.80 ± 1.79*
ODI	Ultrasound	30.25 ± 3.87	15.71 ± 6.96*	15.42 ± 5.74*	15.91 ± 6.04*
	fluoroscopy	31.08 ± 4.88	15.88 ± 7.55*	14.76 ± 5.65*	16.00 ± 6.91*

Values are mean ± standard deviation.

ODI = Oswestry Disability Index, VNS = verbal numeric pain scale.

* $P < .05$: Comparison before and after the injection.

Ultrasound-Guided Lumbar Medial-Branch Block: A Clinical Study With Fluoroscopy Control

Jae-Kwang Shim, M.D., Jin-Cheon Moon, M.D., Kyung-Bong Yoon, M.D., Won-Oak Kim, M.D., and Duck-Mi Yoon, M.D.

Background and Objectives: For diagnostic lumbar medial-branch blocks, fluoroscopic guidance is considered mandatory, but this technique comes with radiation exposure. The clinical feasibility of the ultrasound-guided lumbar medial-branch block has been demonstrated. We evaluated the success rate and validity of this new method by use of fluoroscopy controls in patients previously diagnosed with lumbar facet joint–mediated pain.

Methods: In 20 patients, 101 lumbar medial-branch blocks were performed under ultrasound guidance. The target point was the groove at the cephalad margin of the transverse process adjacent to the superior articular process. C-arm fluoroscopy was performed afterward to confirm the needle position. Pain scores were assessed by use of visual analog scale (VAS 0 to 100).

Results: All 101 needles were placed in the correct lumbar segment. Ninety-six of the 101 needletips were in the correct position with a success rate of 95%. Two needles were associated with intravascular spread of the contrast dye. VAS score was reduced from 52 to 16 after the block.

Conclusions: Ultrasound-guided lumbar medial-branch blocks can be performed with a high success rate. However, to be completely independent from fluoroscopy controls, this technique requires further studies regarding the detection of intravascular spread. *Reg Anesth Pain Med 2006;31:451-454.*

Success rate of ultrasound-guided lumbar facet nerve blocks

94% successful needle placement

Greher et al, Anesthesiology 2004

95% correct needle placement

Shim et al, Reg Anesth Pain Manag 2006

62%, BMI > 30

Rauch et al, Reg Anesth Pain Med 2009

92% correct needle placement

Jung et al, Asian Spine J 2012

RAPM 2015, L5 dorsal ramus

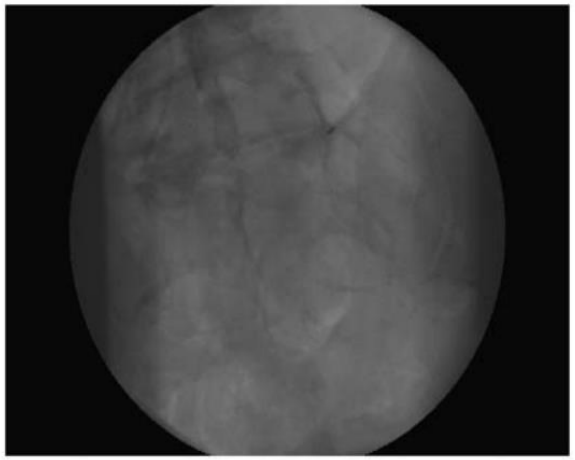


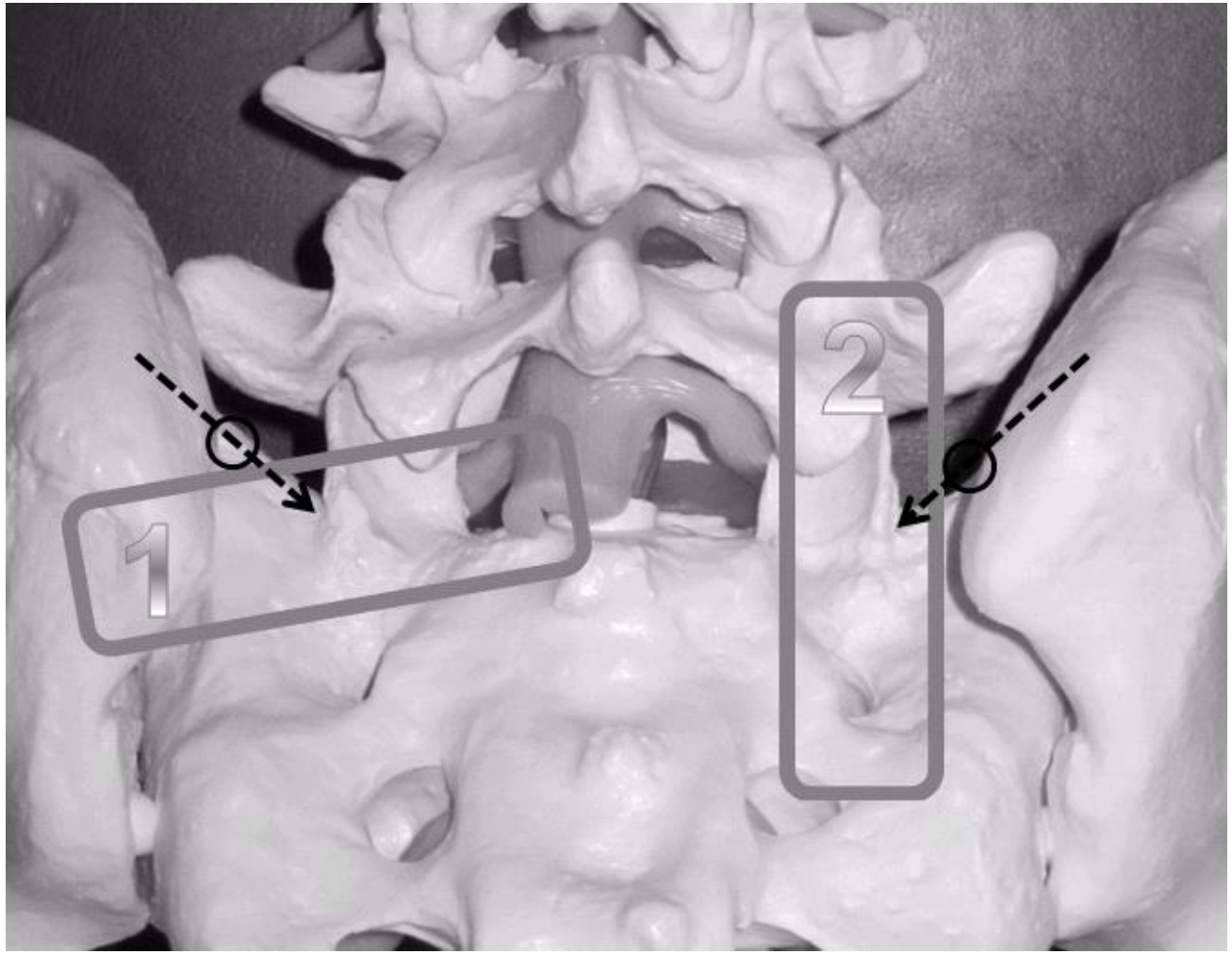
FIGURE 5. Fluoroscopic tunnel vision image of the needle at the target for the right L5 dorsal ramus block.

IMAGING ARTICLE

Ultrasound-Guided Approach for L5 Dorsal Ramus Block and Fluoroscopic Evaluation in Unpreselected Cadavers

Manfred Greher, MD, MBA, Bernhard Moriggl, MD, PhD, FIACA,† Philip W.H. Peng, MBBS, FRCPC,‡ Cristina E. Minella, MD,§ Michela Zacchino, MD,|| and Urs Eichenberger, MD#*

80% success rate in unpreselected cadavers
100% success rate without significant spondylolisthesis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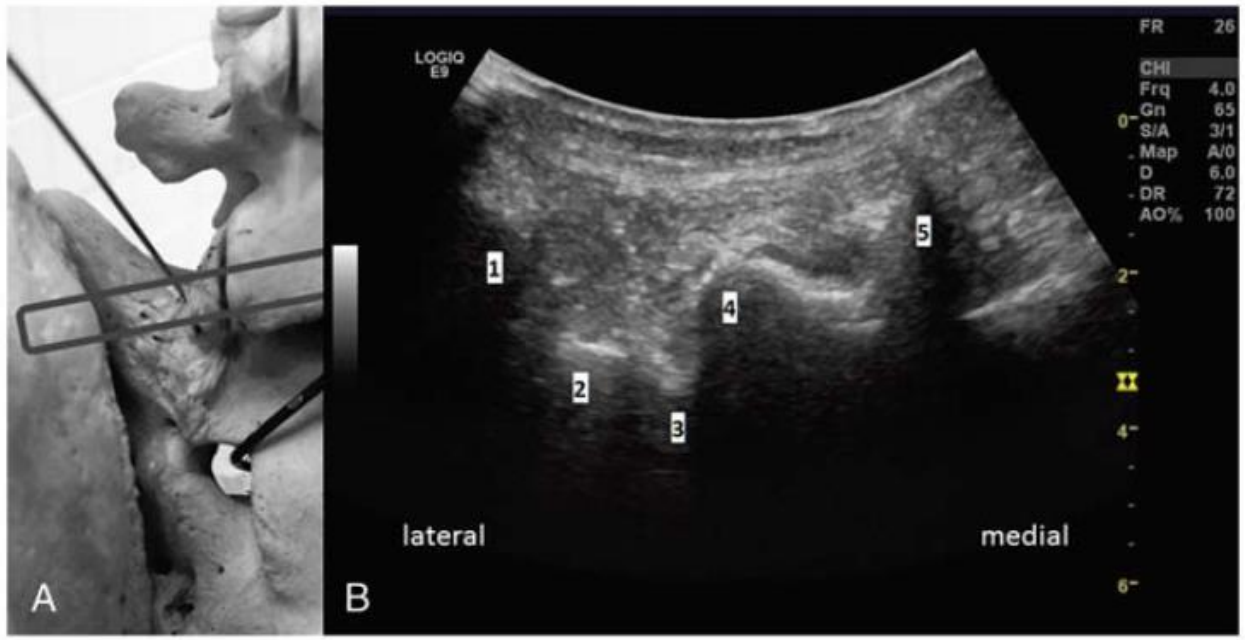


FIGURE 2. Rotated cross-axis view (medial is more cranial than lateral) with the needle at the target inserted in an oblique out-of-plane technique relative to the ultrasound probe. Panel A shows the transducer orientation as a gray rectangle in a bone model, whereas B is the respective ultrasound image. From lateral to medial: 1, iliac crest; 2, sacral ala; 3, needle tip; 4, L5/S1 facet joint; 5, L5 spinous process.

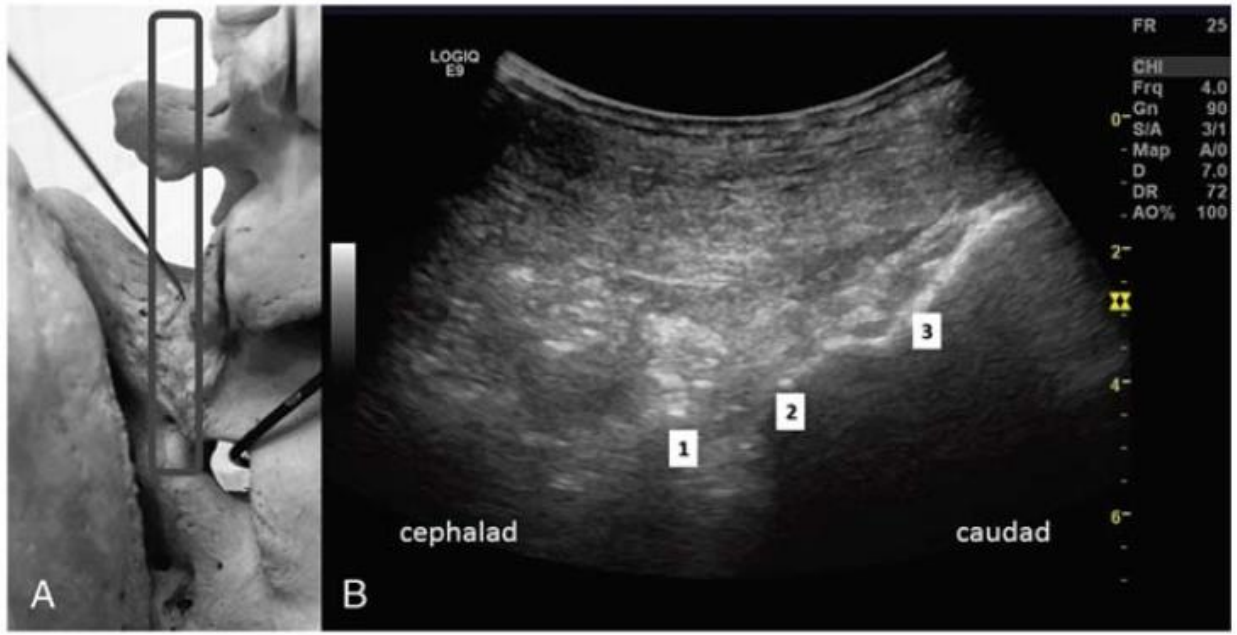
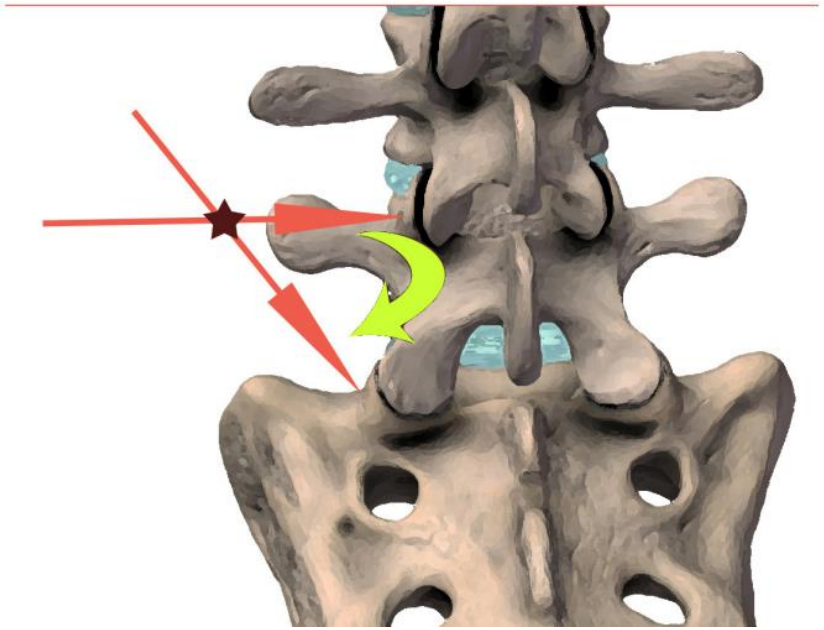
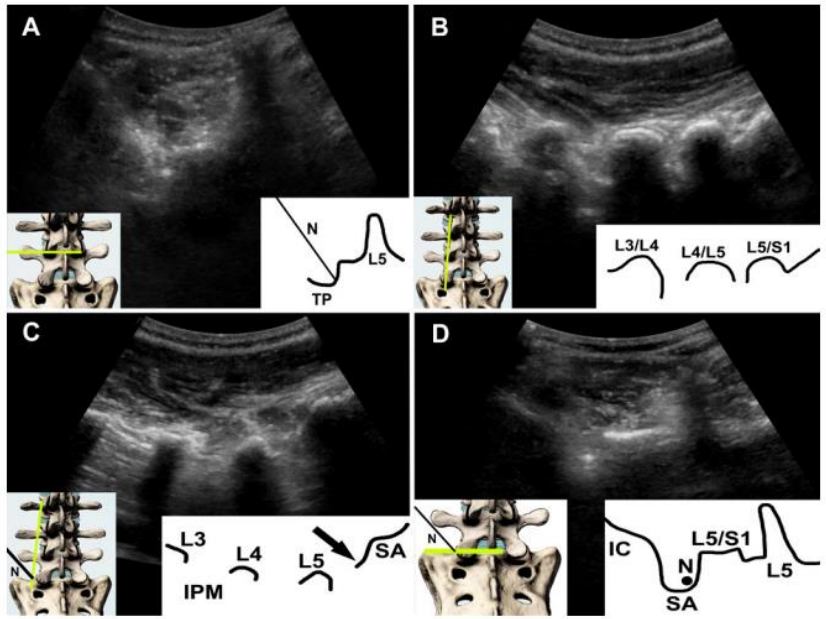


FIGURE 3. Paramedian sagittal transverse process view with the needle at the target inserted in an oblique out-of-plane technique relative to the ultrasound probe. Panel A shows the transducer orientation as a gray rectangle in a bone model, whereas B is the respective ultrasound image. From cranial to caudal: 1, L5 transverse process; 2, needle tip; 3, sacrum.



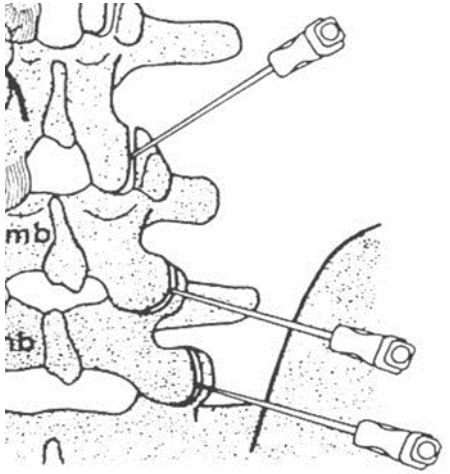


Results A total of 100 patients had a USG block and 15 patients (13%) were excluded because of poor landmark visibility. The latter group presented a significantly higher body mass index (38.90±7.50 vs 26.31±4.25 kg/m^2, p=0.004). A total of five failures were noted (95% success rate), this included three patients with transitional anatomy in whom needles were placed at the wrong level and two cases of incomplete contrast coverage possibly related to the partial intravascular injection. Performance time was 153.93±41.56 s and the median number of needle passes was 2 (range 4). No significant complications were noted.

Conclusion The pivot technique provides a reliable approach for USG L5 DR ramus blocks.

Etheridge J-PB, *et al*. *Reg Anesth Pain Med* 2020;**45**:176–179. doi:10.1136/rapm-2019-100783

Lumbar Facet Joint Injection:



Indications:

Facet joint mediated pain therapy (diagnosis)
Accurately and effectively done with US (periarticular)

Anatomy:

Opening of joint space is frequently visible
No clinical difference between periarticular/intraarticular

Tips & Tricks:

Curvilinear scanner, IP transverse, 1-2ml of LA (+steroid)
Echogenic needle is useful
Multiple joints from IP sagital with only one skin puncture

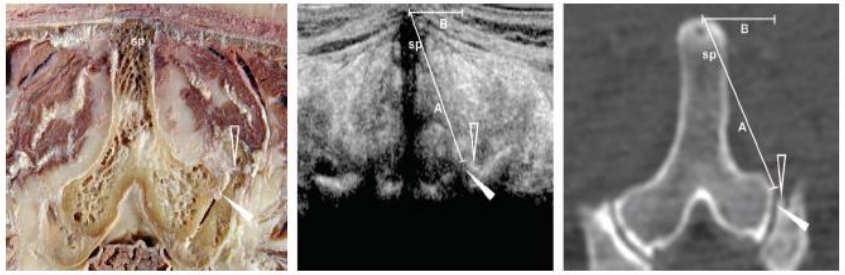


Figure 3. Axial transverse anatomical, ultrasound and computed tomography image of the facet joint at level L4-5. Depth (A) indicates the distance from the middle of the tip of the spinous process to the reference point, lateral distance (B) was defined as the horizontal distance from the middle of the tip of the spinous process to the reference point (perpendicular to the spinous process). sp = spinal process, closed arrow = joint space, open arrow = bone fragment with lateral facet.

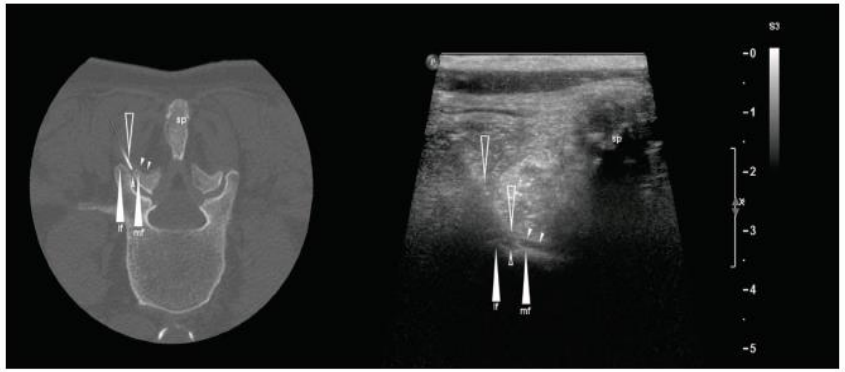
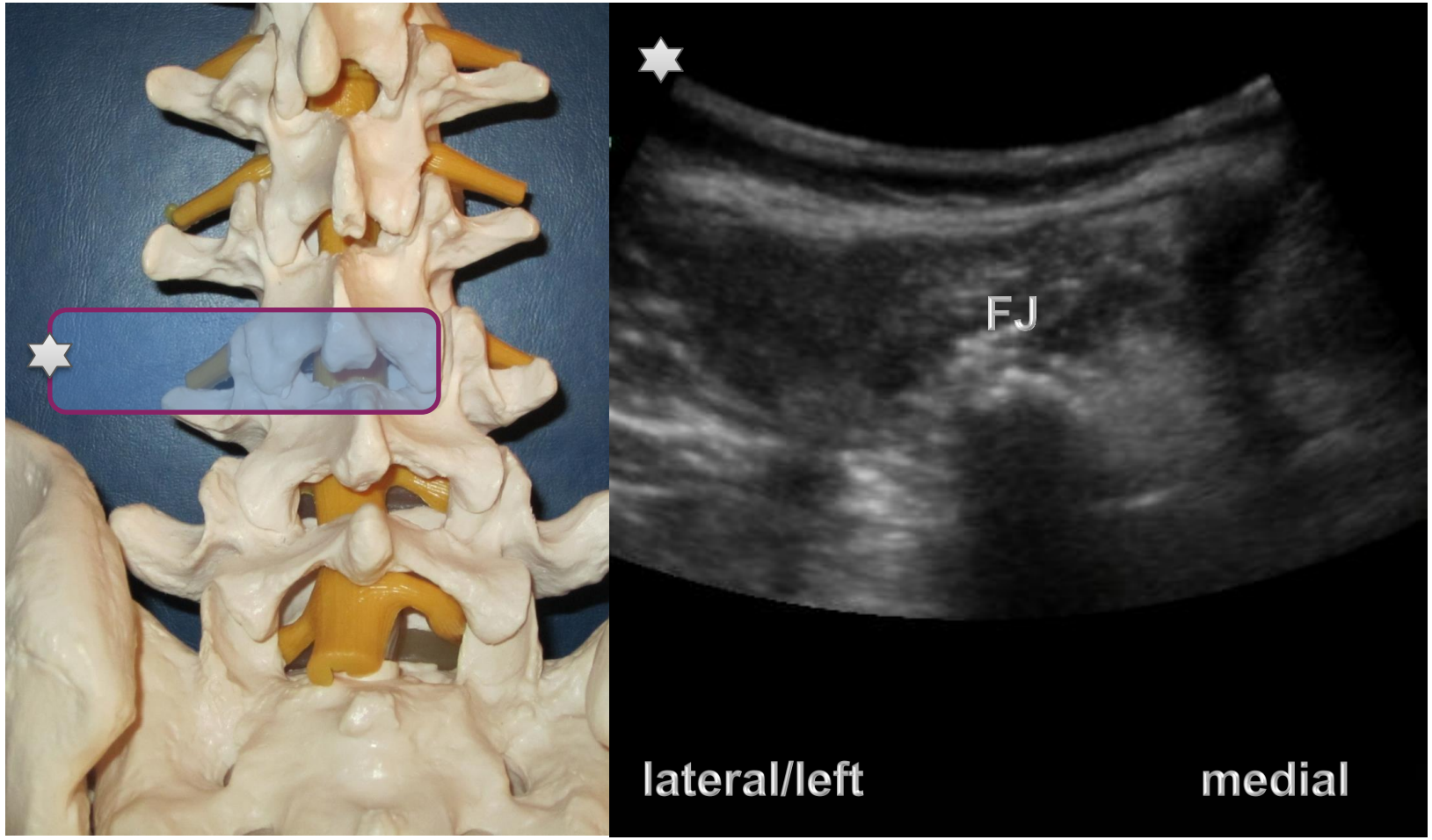
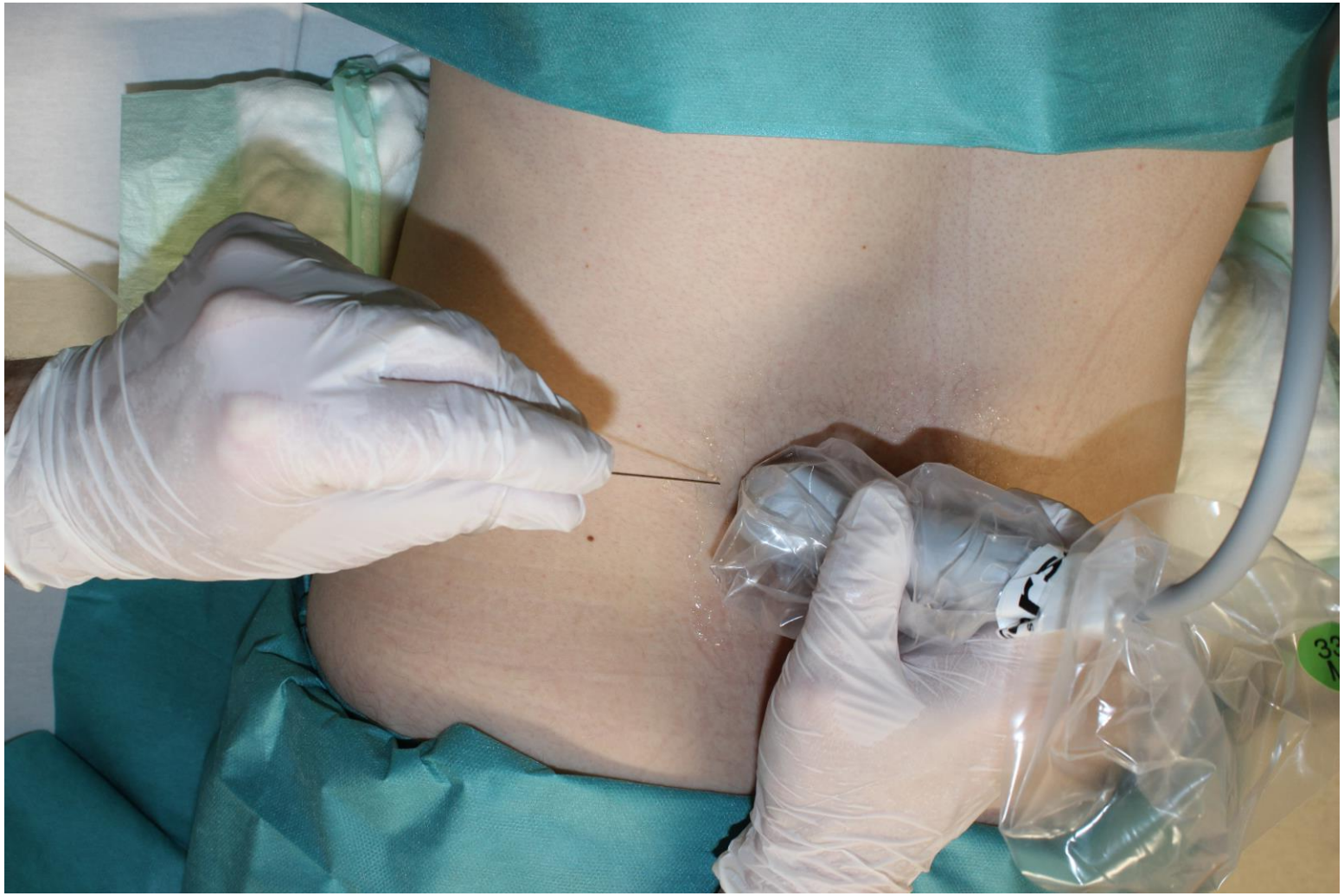
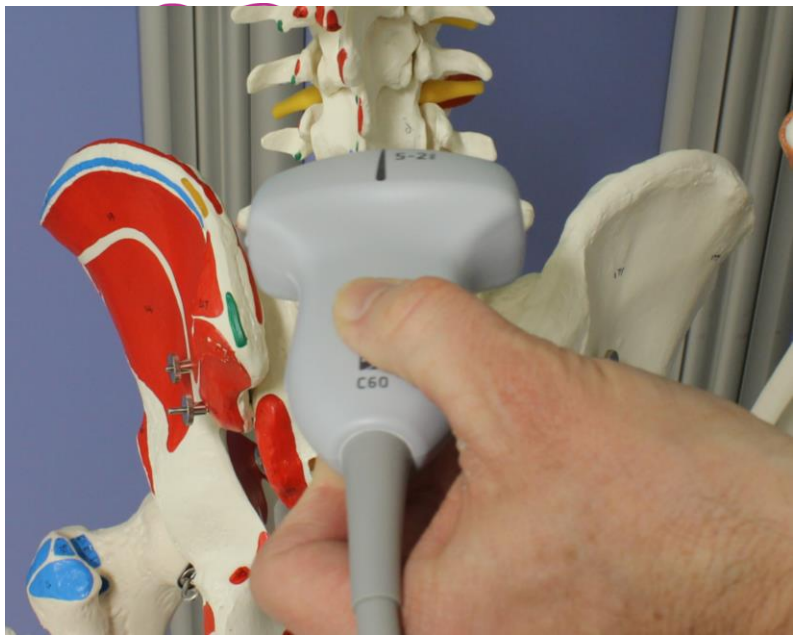


Figure 4. Axial transverse computed tomography and corresponding ultrasound image demonstrating the needle placement within the facet joint. sp = spinal process, mf = medial facet, lf = lateral facet, big open arrow = needle, small open arrow = joint space, small closed arrow = capsule of facet joint.


FJ
lateral/left
medial

Lumbar Facet Joint Injection:





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Lumbar Facet Joint Injection:

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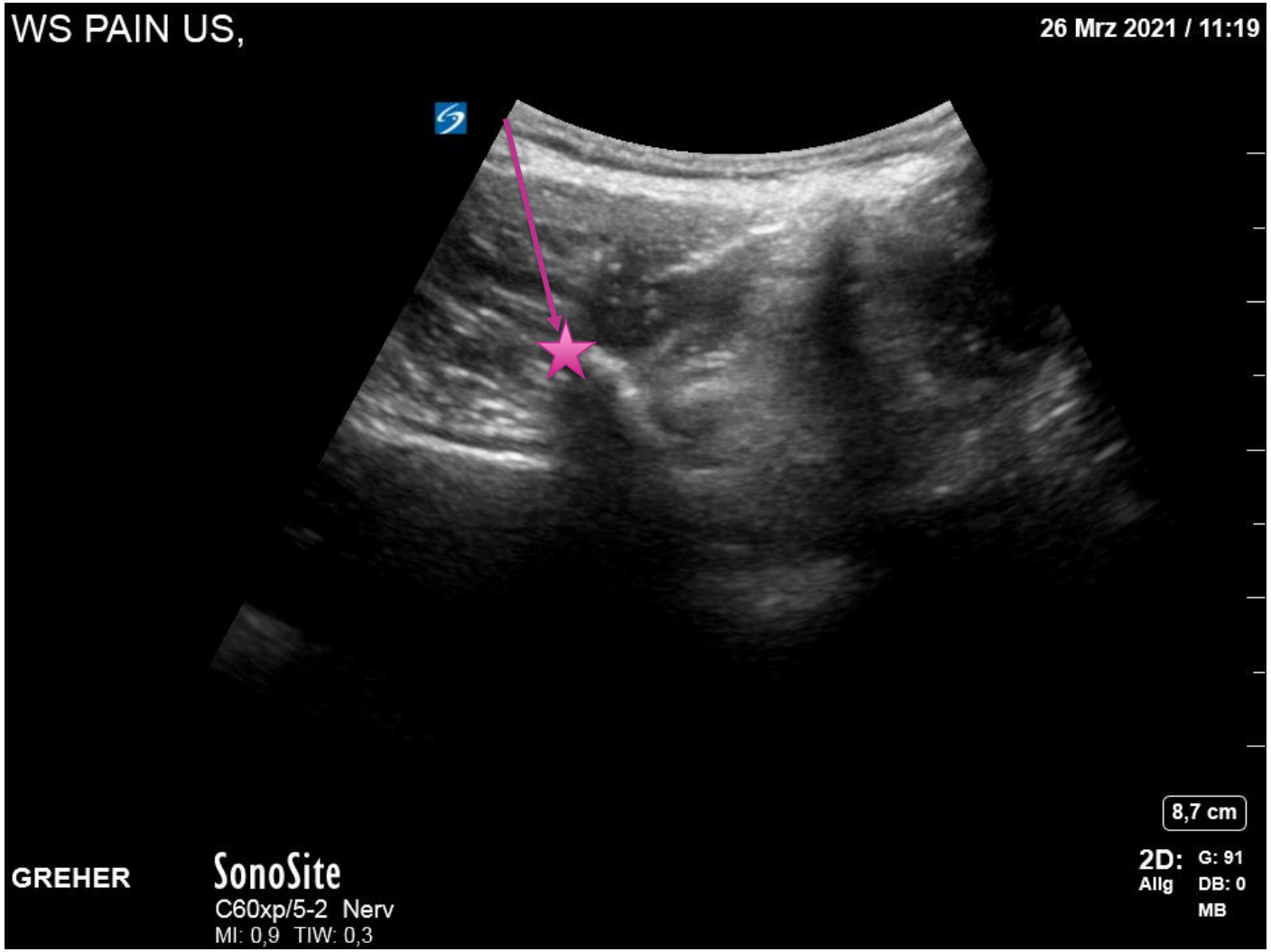
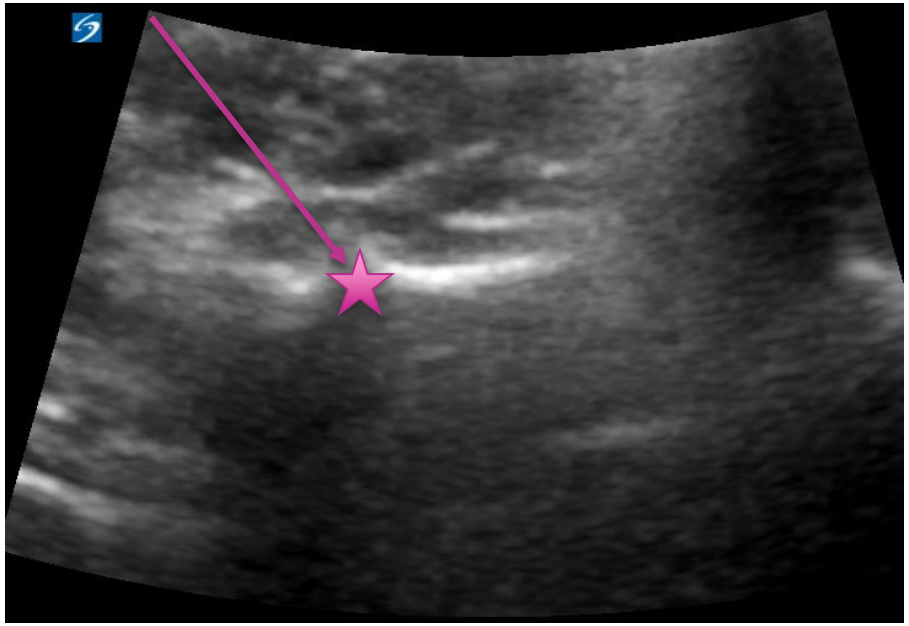
Krankenhaus Wien

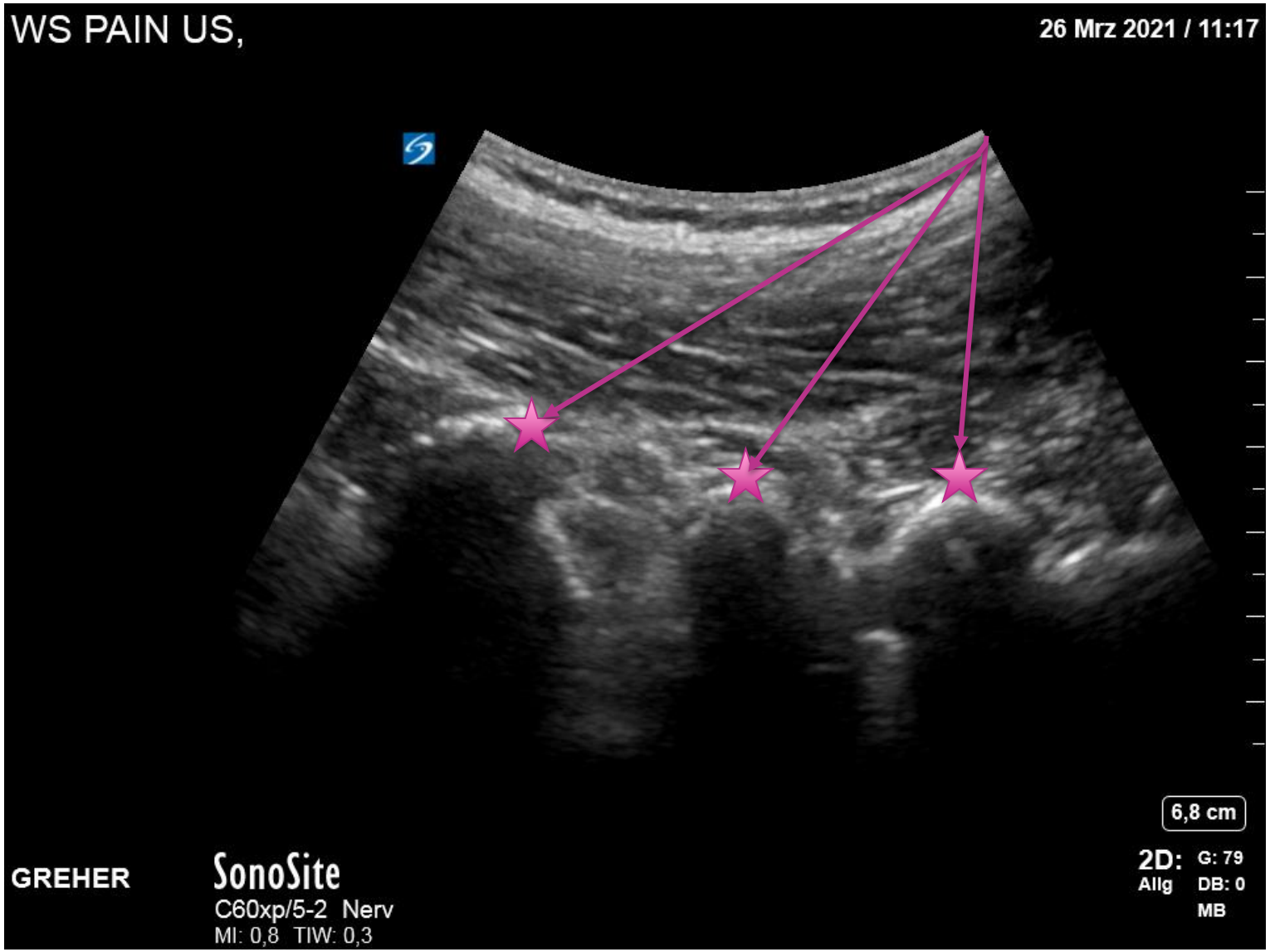


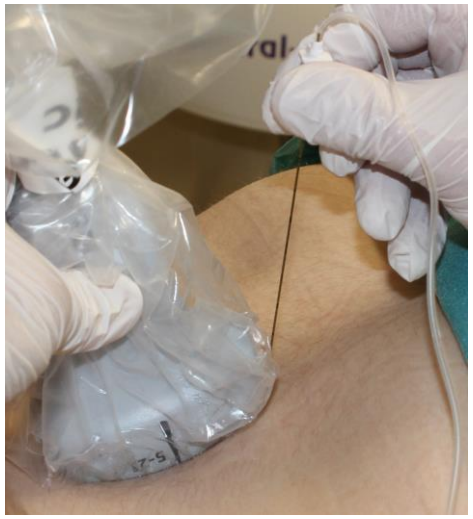


Lumbar Facet Joint Injection:

Lumbar Facet Joint Injection:

Herz-Jesu Krankenhaus Wien





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Herz
Kranke
6,0 cm
SonoSite
C60xp/5-2 MUS
MI: 0,8 TIW: 0,2
2D:
G: 76
DB: 0
MB
THI

Herz-Jesu
Krankenhaus Wien

Effectiveness of Ultrasound-Guided Versus Fluoroscopy or CT Scanning Guidance in Lumbar Facet Joint Injections in Adults With Facet Joint Syndrome: A Meta-analysis of Controlled Trials. Wu T, et al. Arch Phys Med Rehabil. 2016

103 records screened, 3 studies included
202 adults

No significant differences in
VAS scores, Modified Oswestry Disability score, procedure duration

US-guidance is feasible and eliminates radiation exposure

Selective lumbar nerve root injection

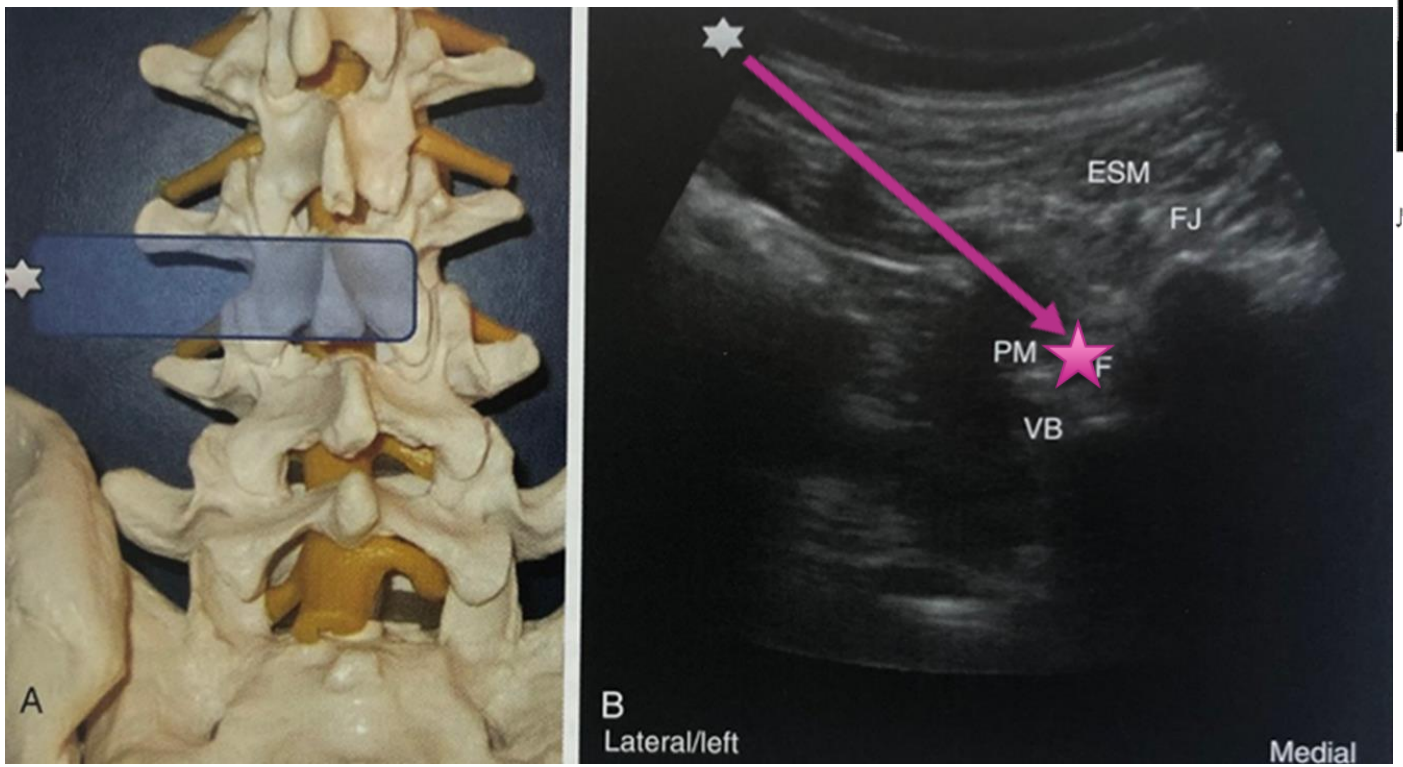
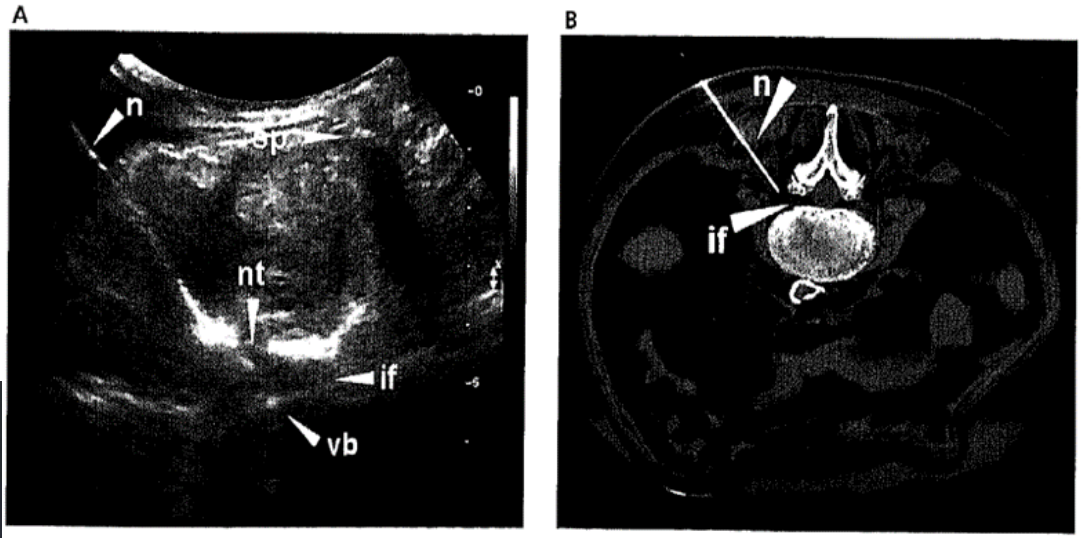


Figure 2. A, Sonographic image of periradicular infiltration showing delineation of the needle (n), needle tip (nt), tip of the spinal process (sp), intervertebral foramen (if), and vertebral body (vb). **B**, Computed tomographic image of periradicular infiltration showing delineation of the needle and intervertebral foramen.



J Ultrasound Med 2005; 24:33–38


USABCD,
SonoSite
C60xp/5-2 MSK
MI: 1.1 TIS: 0.2
9.9 cm
2D:
G: 60
DR: 0
MB
THI

MATERIALS AND METHODS: Forty adult patients were consecutively enrolled and assigned to a US or CT group. US-guided pararadicular injections were performed on a standard US device by using a broadband curved-array transducer (9–4 or 5–1 MHz). In the in-plane technique, the needle was advanced through the respective segmental intertransverse ligament. The needle tip position was verified by CT. The CT-guided approaches were performed under standardized procedures by using the CT-positioning laser function.

RESULTS: The accuracy of US-guided interventions was 90%. The mean time to final needle placement in the US group was 4.0 ± 1.8 minutes, and in the CT group, 7.6 ± 2.1 minutes. The mean radiation doses, including CT confirmation for study purposes only, were 20.3 ± 9.0 mGy cm for the US group and 42.6 ± 36.1 mGy cm for the CT group. Both groups showed the same significant pain relief ($P < .05$) without relevant "intermethodic" differences of pain relief ($P > .05$).

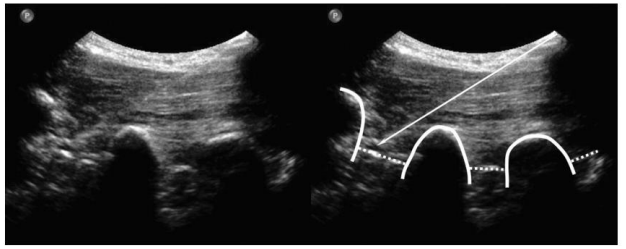


FIG 1. US sagittal paravertebral scan at the PAP: pararadicular injection at the level L2-L3 (left image) and annotated scan (right image). The thick line indicates the transverse processes; dotted lines, intertransverse ligaments; arrow, injection needle.

Ultrasound Guided Versus CT-Controlled Pararadicular Injections in the Lumbar Spine: A Prospective Randomized Clinical Trial

A. Loizides, H. Gruber, S. Peer, K. Galiano, R. Bale, and J. Obernauer

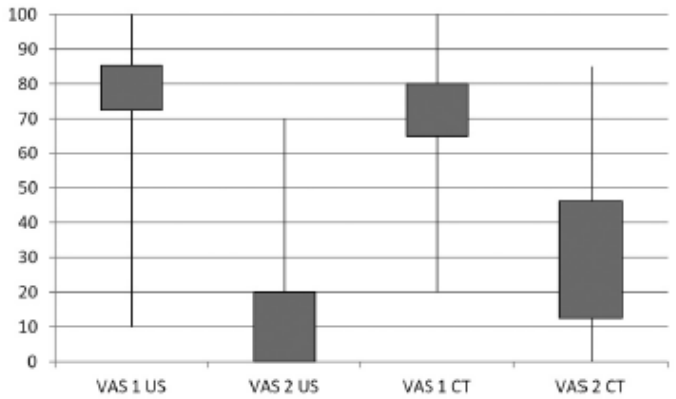


FIG 2. Boxplot of median values and SDs of pain-intensity levels indicated by the patients on the VAS. The first column of each group represents the preinterventional evaluation (VAS1), and the second column of each group shows the postinterventional pain course after 1 month (VAS2). CT indicates CT-guided interventions; US, ultrasound-guided interventions.

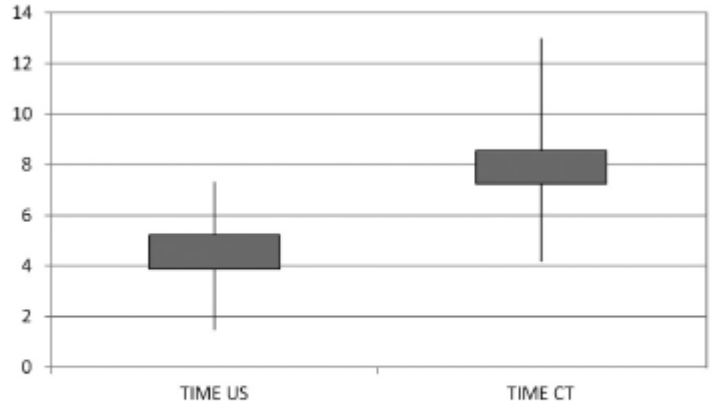


FIG 3. Boxplot of median values and SDs of procedure time. CT indicates CT-guided interventions; US, ultrasound-guided interventions.

AJNR Am J Neuroradiol 34:466–70 Feb 2013 www.ajnr.org

ASIAN SPINE JOURNAL
Clinical Study
Asian Spine J 2021;15(2):216-223 • https://doi.org/10.31616/asj.2019.0399

Check for updates

Ultrasound-Guided Lumbar Spine Injection for Axial and Radicular Pain: A Single Institution Early Experience

Matthew Tay[1,2], Shauna Christine Sim Hwei Sian[1], Chen Zhi Eow[3], Kelvin Lor Kah Ho[4], Joo Haw Ong[1], Dinesh Sirisena[1]

[1]*Sports Medicine Centre, Khoo Teck Puat Hospital, Singapore*
[2]*Department of Rehabilitation Medicine, Tan Tock Seng Hospital Rehabilitation Centre, Singapore*
[3]*Yong Loo Lin Medical School, National University of Singapore, Singapore*
[4]*Department of Orthopaedic Surgery, Khoo Teck Puat Hospital, Singapore*

Study Design: Clinical audit via retrospective review of a database.

Purpose: To report an early experience using ultrasound-guided lumbar spinal injection for axial and radicular pain in an Asian multiethnic cohort.

Overview of Literature: Ultrasound-guided spine injection therapy is a comparatively new technique in the management of axial and radicular pain from degenerative lumbar spinal conditions, which may be a reasonable alternative to conventional fluoroscopic or computed tomography-guided injection.

Methods: A retrospective review was conducted, involving all patients who underwent ultrasound-guided lumbar spine injection therapy at a single institution over 1 year. Patients were evaluated by two interventionists, who then performed standardized ultrasound-guided lumbar facet joint and pararadicular spinal injections.

Results: There were 42 patients treated at our Sports Medicine Centre; with 27 patients (64.3%) receiving facet joint injections and 18 patients (42.9%) receiving nerve root injections. The majority (90.5%) of patients experienced an improvement of >30% in pain intensity at 3 months post-injection, using the Numerical Rating Scale pain score (p<0.001); with 40 patients (95.2%) reporting a reduction in Oswestry Disability Index score (p<0.001). No complications were reported.

Conclusions: Our initial experience confirms the safety, feasibility, and effectiveness of ultrasound-guided lumbar spinal injection for the treatment of axial and radicular pain in an Asian multiethnic cohort.

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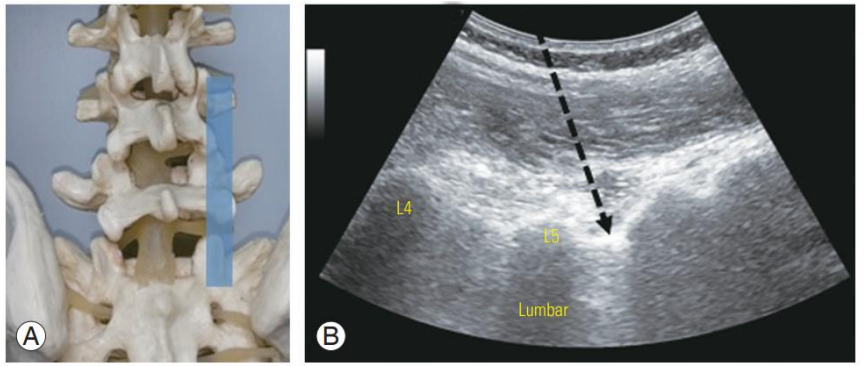

Fig. 1. (A) Spine model with intended ultrasound window. **(B)** Ultrasound view of the posterior sagittal paravertebral plane demonstrates ultrasound-guided lumbar spine pararadicular nerve root injection. The intended needle placement (arrow) is performed in an in-plane direction, with the needle tip penetrating the thin hyperechoic intertransverse ligament.

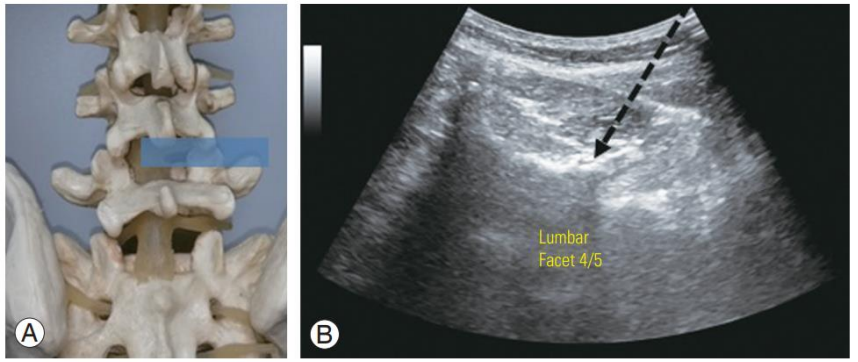

Fig. 2. (A) Spine model with intended ultrasound window. **(B)** Ultrasound view of the posterior transverse paravertebral plane demonstrates ultrasound-guided lumbar spine facet joint injection. The intended needle placement (arrow) is performed in an in-plane direction.

Clinical Study

Ultrasonography-Guided Lumbar Periradicular Injections for Unilateral Radicular Pain

Qing Wan,[1] Shaoling Wu,[1] Xiao Li,[1] Caina Lin,[1] Songjian Ke,[1] Cuicui Liu,[1] Wenjun Xin,[2] and Chao Ma[1]

[1]*Pain Treatment Centre of Department of Rehabilitation Medicine, Sun Yat-sen Memorial Hospital, Sun Yat-sen University, Guangzhou, Guangdong Province, China*
[2]*Department of Physiology and Pain Research Center, Zhongshan Medical School, Sun Yat-sen University, Guangzhou, Guangdong Province, China*

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Table 2: Procedure characteristics.

Characteristic	IP technique (n = 25)	OP technique (n = 21)	P
Patient treated, n (%)	23 (96.0)	20 (95.2)	0.567
Patient failed, n (%)	2 (4.0)	1 (4.8)	
Correct spinal segment identification, n (%)	24 (100)	20 (100)	
Accuracy of US- guided injection confirmed by CT, n (%)	22 (95.7)	19 (95.0)	0.720
VAS (SD) after injection	3.62 (0.81)	3.21 (0.90)	0.485

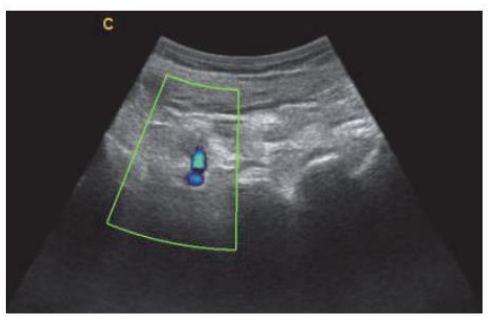

Figure 4: Longitudinal facet view was obtained and the needle was inserted approaching L4 nerve root.

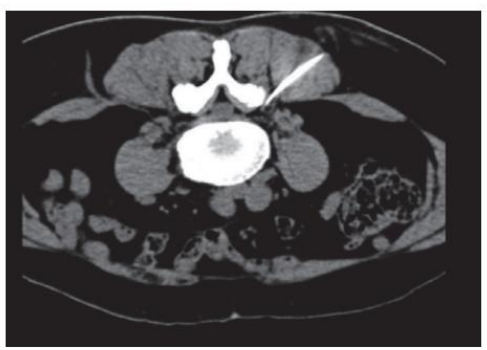

Figure 5: A representative image for confirmation of the needle pathway.

Sacroiliac Joint Injection:

Indications:
Low back/buttock pain, pseudoradicular

Anatomy:
Largest axial joint of human body
Upper level: predominantly fibrous/ligamentous
Lower level (S2): synovial, joint cleft

Tips & Tricks:
Linear or curvilinear transducer
Look for sacral foraminae, 5-10ml LA (+steroid)
Upper level: IP; S2 level: OOP/IP

M. Greher 2023

Arthritis & Rheumatism (Arthritis Care & Research)
Vol. 59, No. 11, November 15, 2008, 1618–1624
DOI 10.1002/art.24204

ORIGINAL ARTICLE

Feasibility of Ultrasound-Guided Sacroiliac Joint Injection Considering Sonoanatomic Landmarks at Two Different Levels in Cadavers and Patients

ANDREA KLAUSER,[1] TOBIAS DE ZORDO,[1] GUDRUN FEUCHTNER,[1] PETER SÖGNER,[1] MICHAEL SCHIRMER,[2] JOHANN GRUBER,[1] NORBERT SEPP,[1] AND BERNHARD MORIGGL[1]

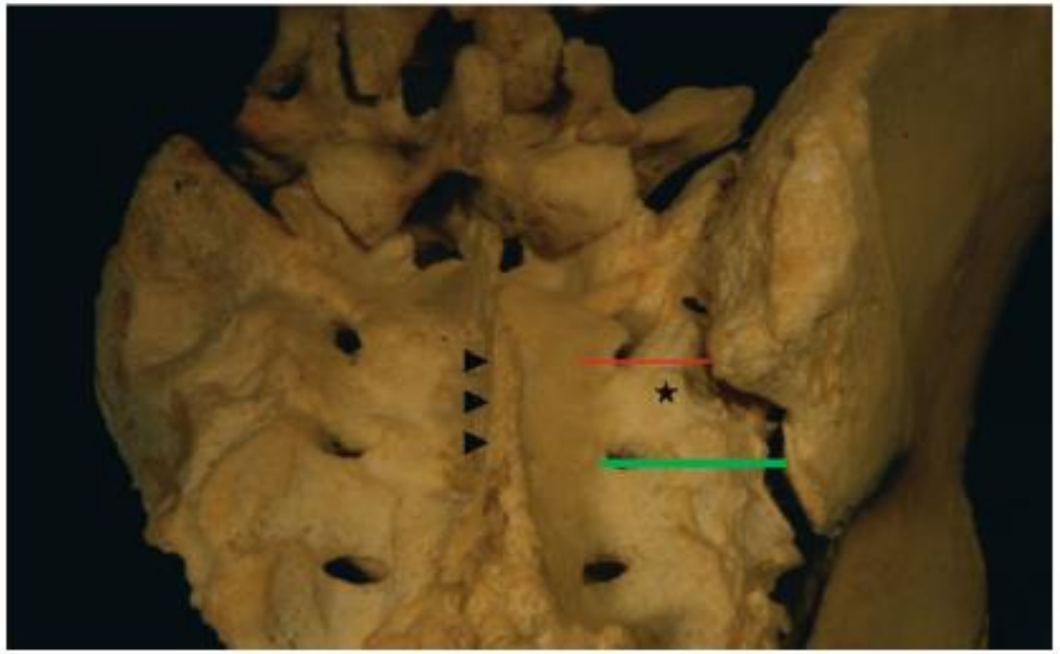

Figure 1. Bony landmarks of the sacroiliac joint. The red line shows the upper level (at the level of the posterior sacral foramen 1) and the green line shows the lower level (at the level of the posterior sacral foramen 2). Arrowheads show the median sacral crest, and the star indicates the lateral sacral crest.

Sacroiliac Joint Injection (upper level):

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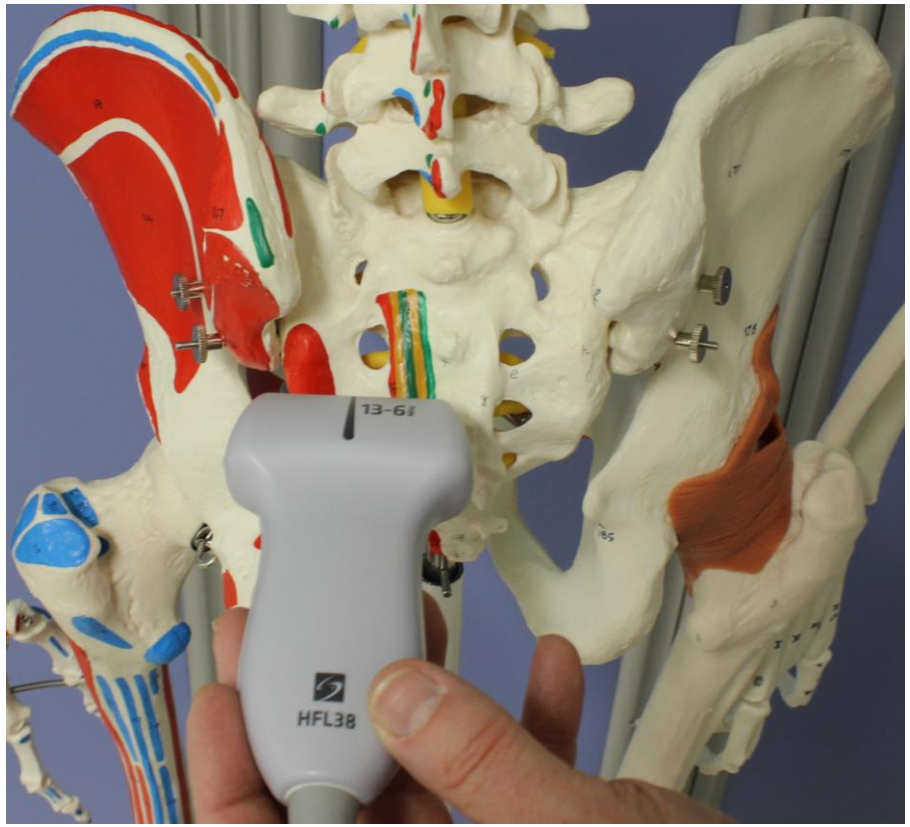
Sacroiliac Joint Injection (S2 level):



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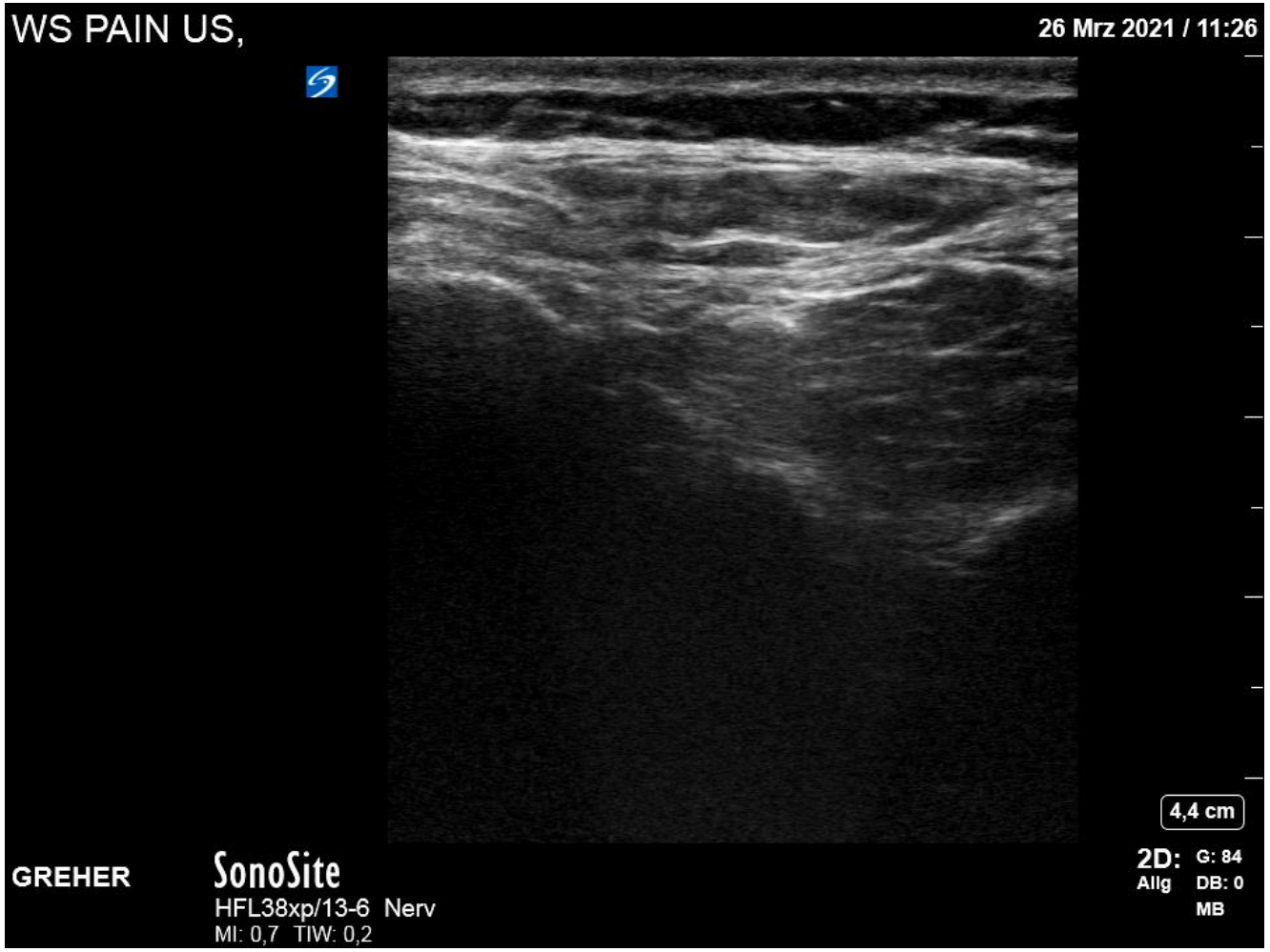
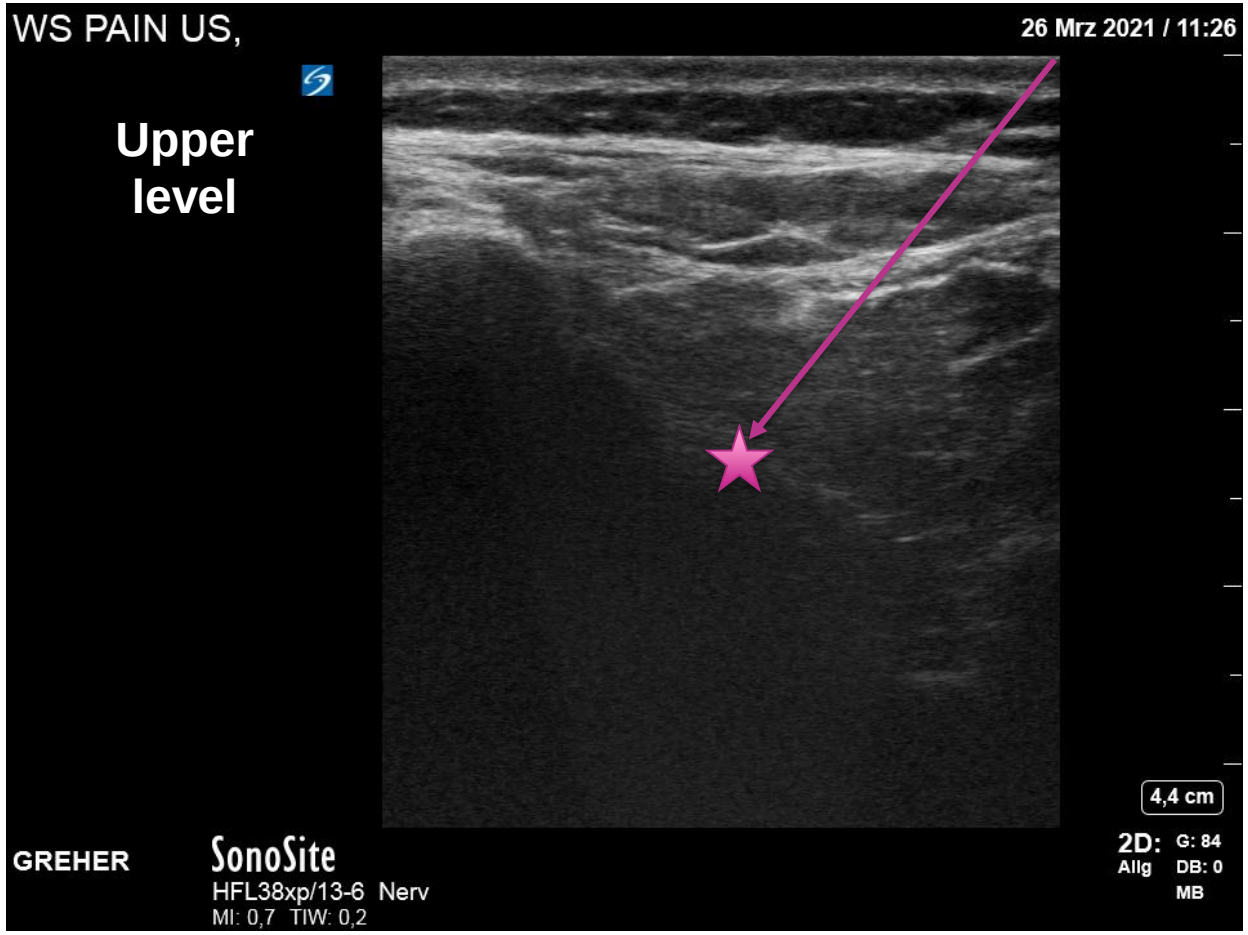
Sacroiliac Joint Injection:

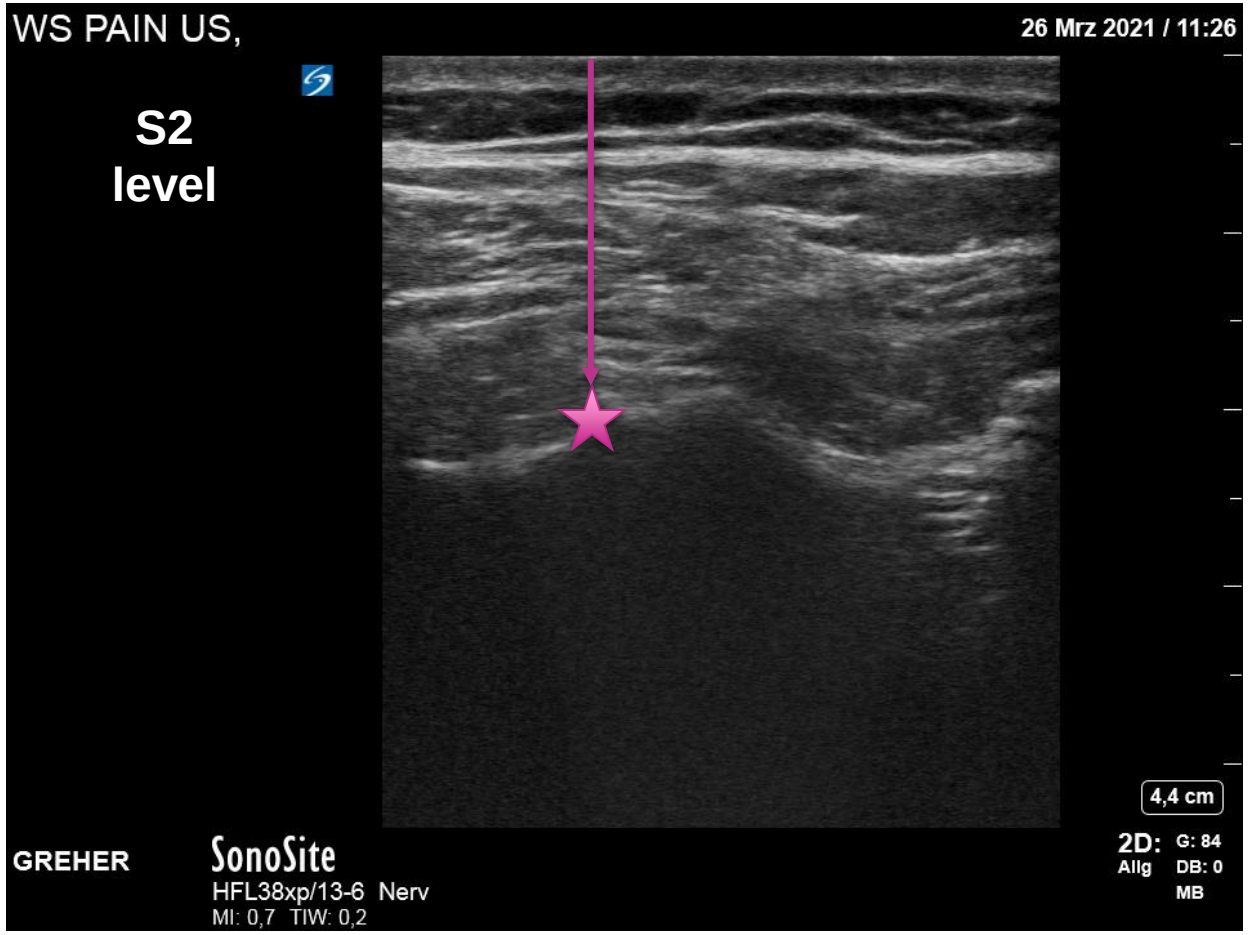
Herz-Jesu Krankenhaus Wien



Sacroiliac Joint Injection:

Herz-Jesu Krankenhaus Wien





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Piriformis Syndrome

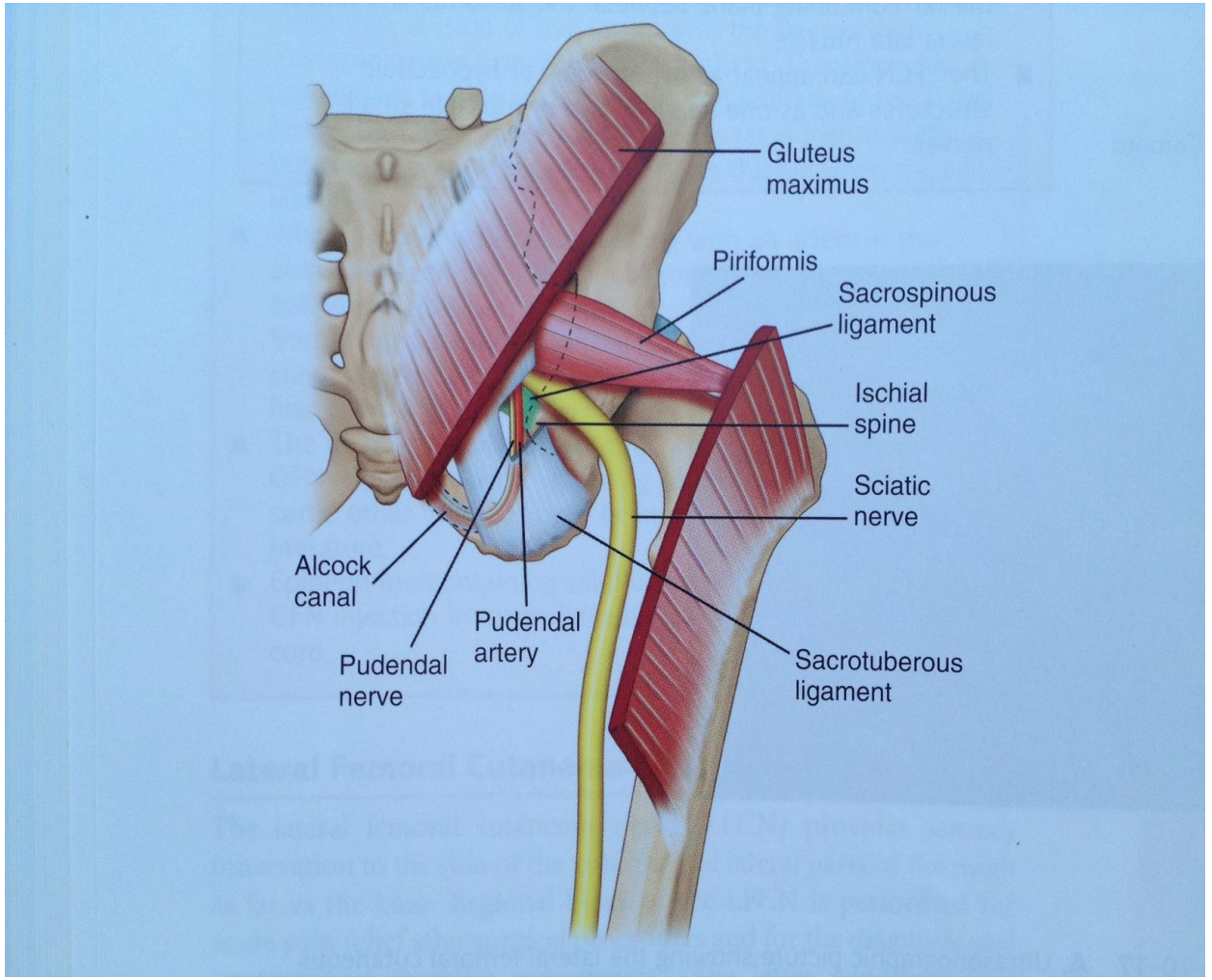

Fig. 8.1 The area of pain in patients with piriformis syndrome. (Reprinted with permission from Philip Peng Educational Series)

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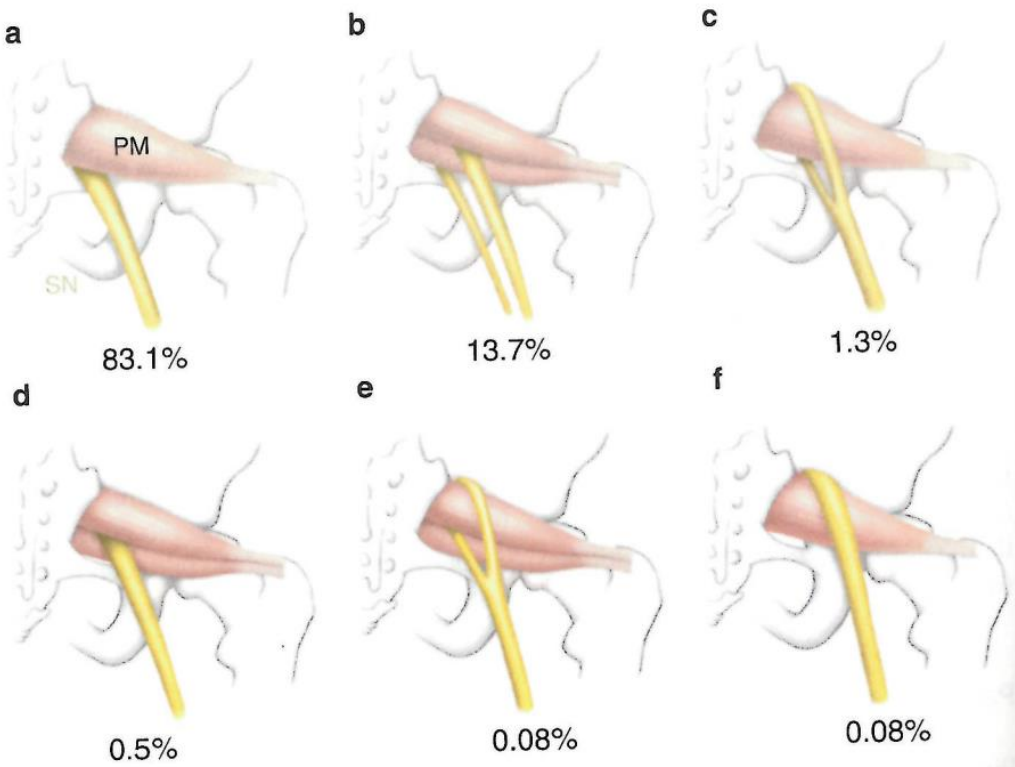

Fig. 8.3 The variation of the anatomical relationship between the piriformis muscle and sciatic nerve. The most common variation is shown in (**a**), where the sciatic nerve passes below the piriformis muscle (83%). The sciatic nerve can appear as two trunks passing between and inferior to the piriformis (**b**), superior and inferior to piriformis (**c**), or above and between the piriformis muscle (**e**). Rarely, it appears as one trunk passing between the piriformis (**d**), or superior to the piriformis muscle (**f**)

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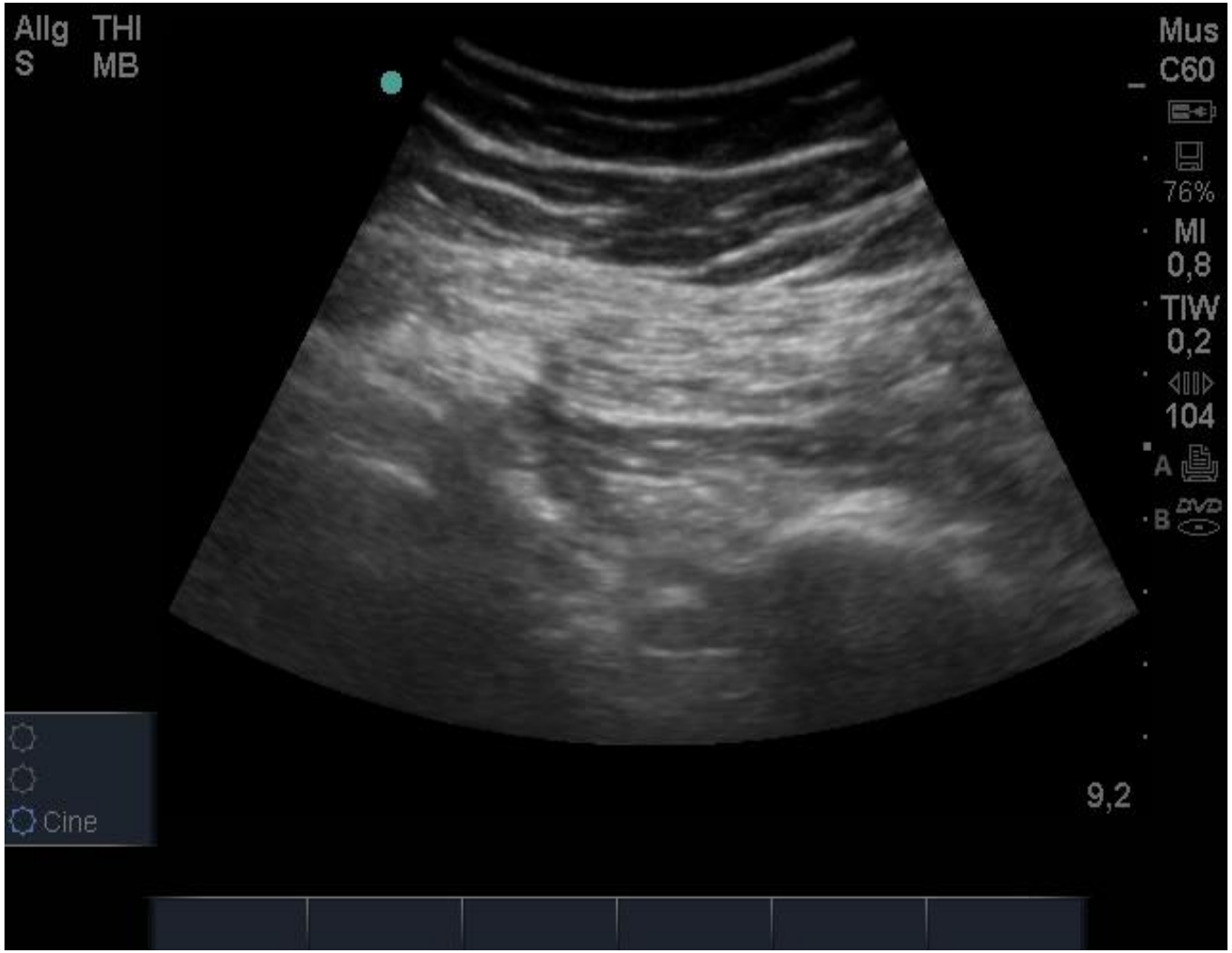

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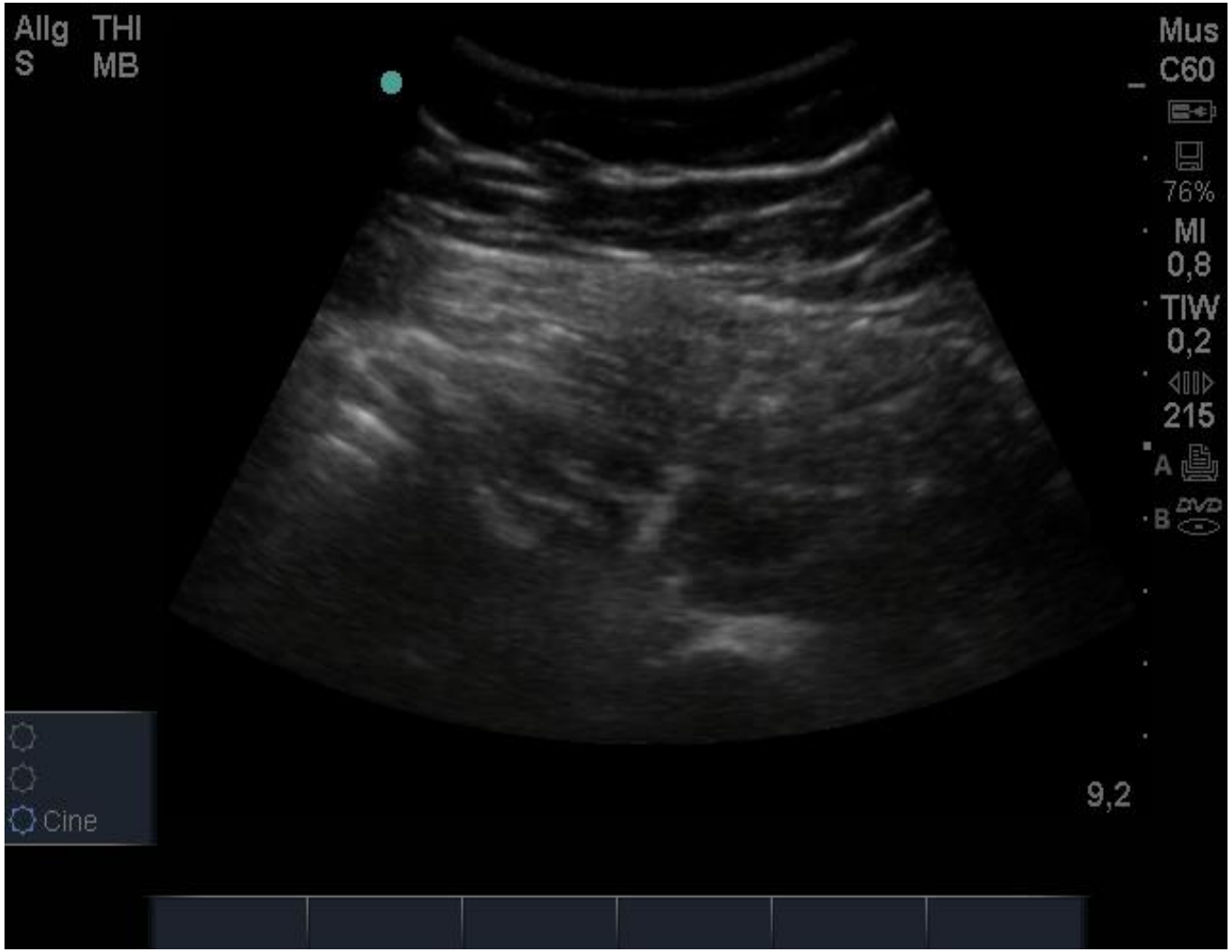
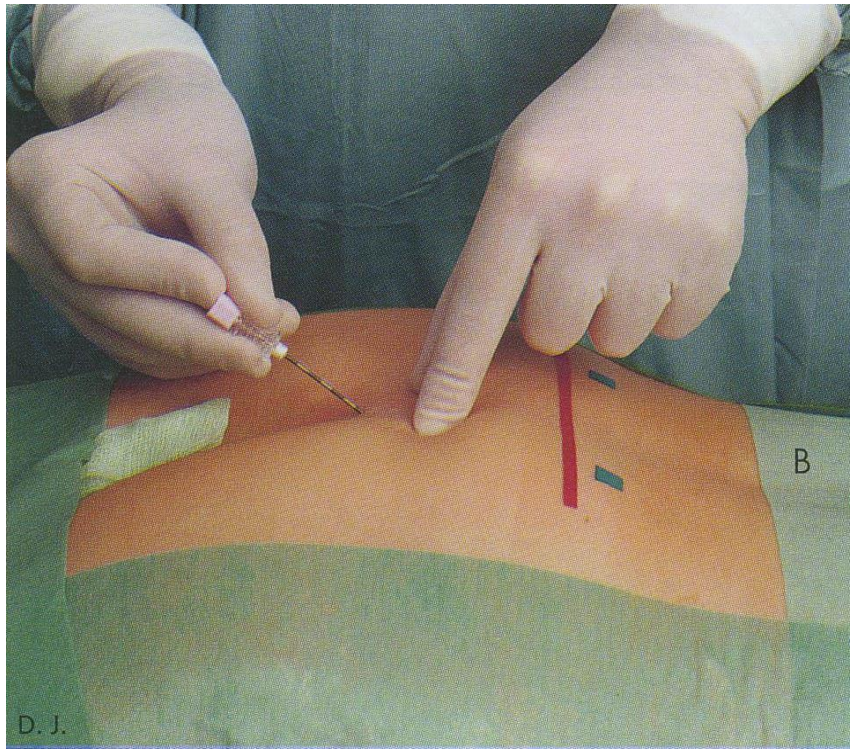
Krankenhaus Wien



Caudal Epidural



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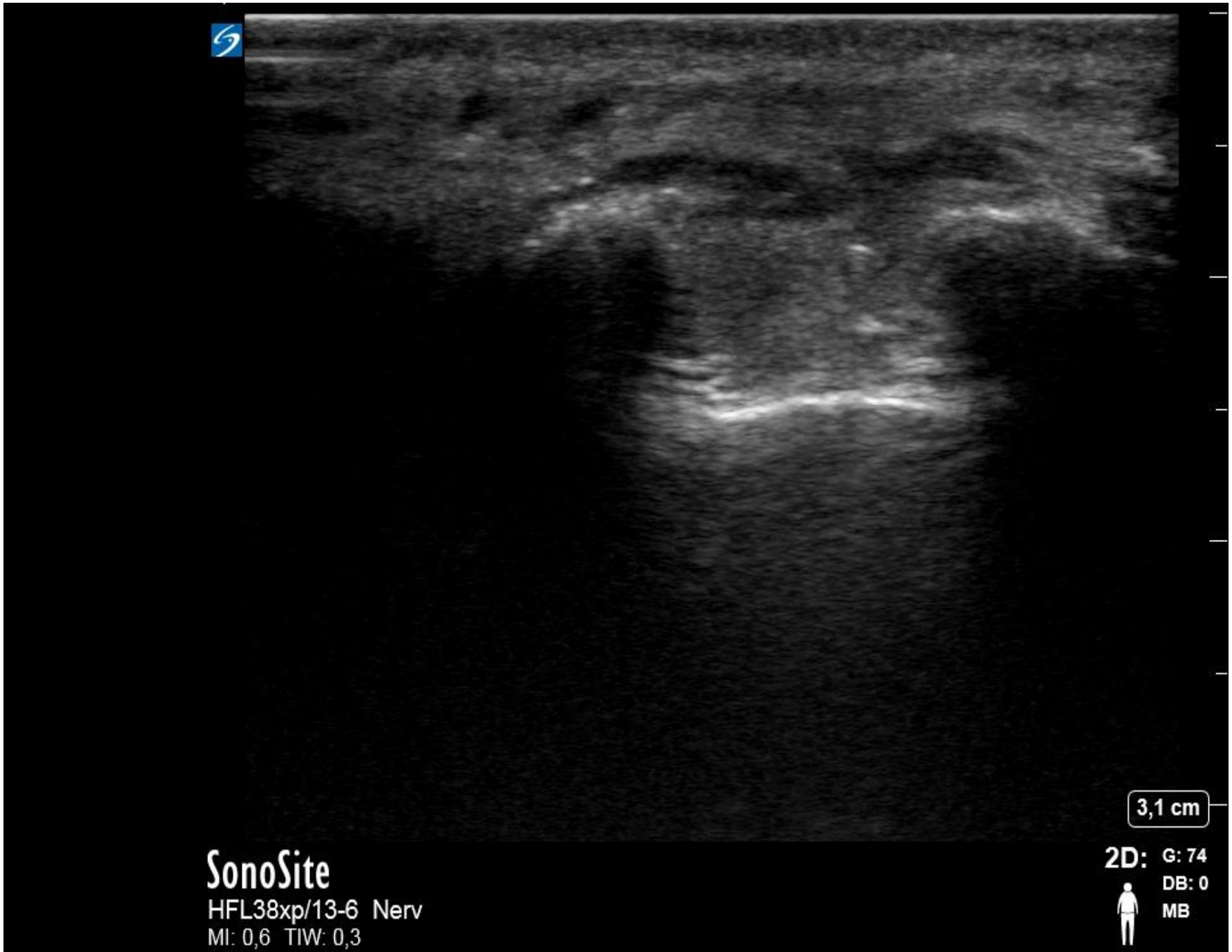

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Superior cluneal nerves:
medial, intermediate, lateral branch
(from the Th11-L4 lateral branch of dorsal roots)

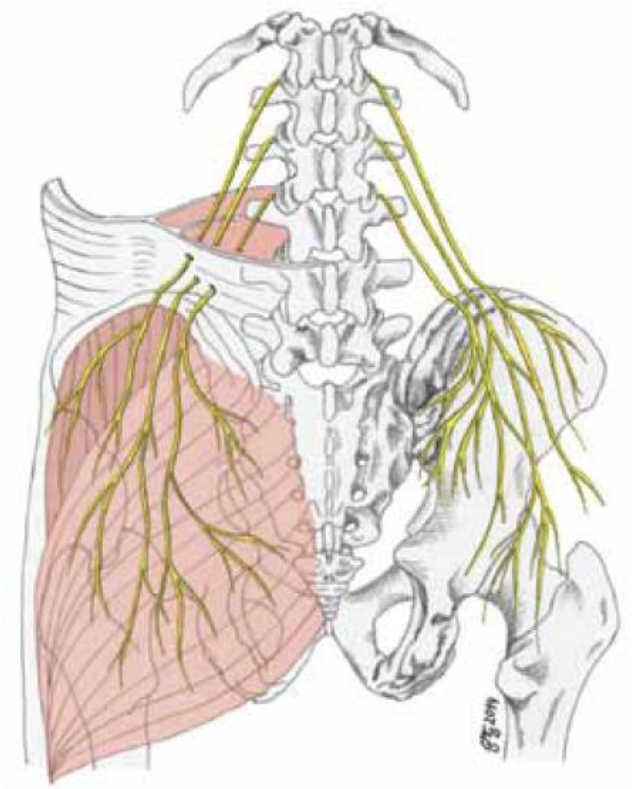
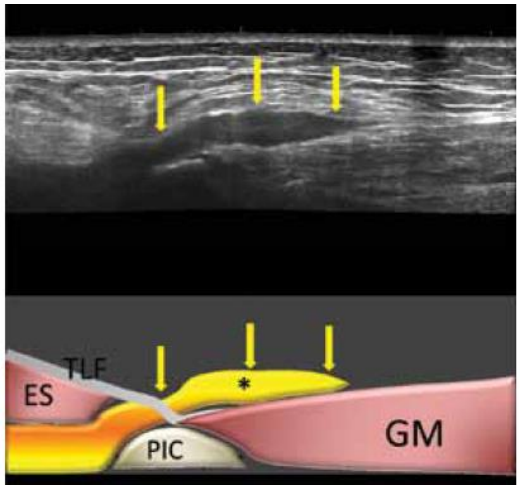


Fig. 1. *Illustration of the course of the SCN.*



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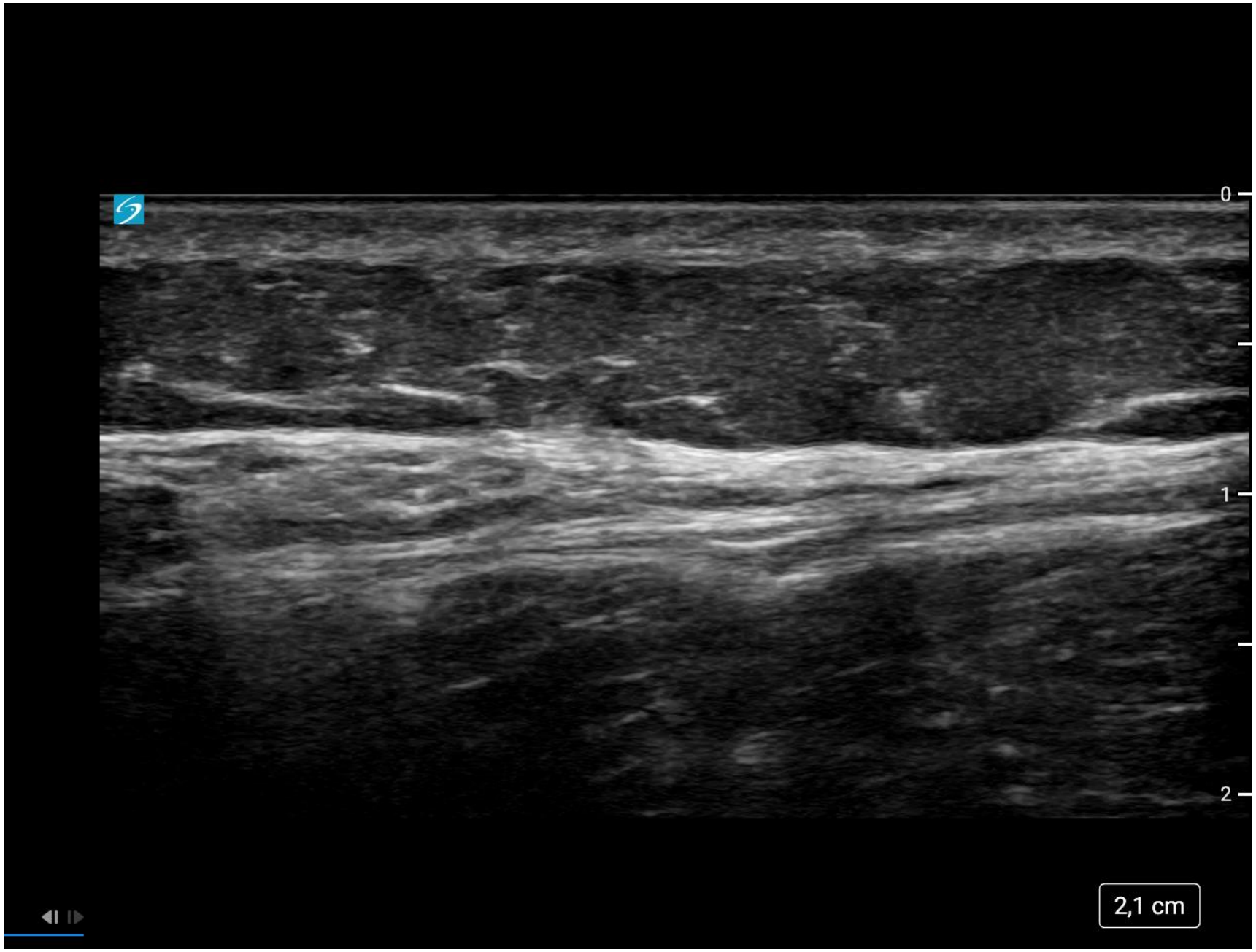
Cadaver Study

Successful Identification and Assessment of the Superior Cluneal Nerves with High-Resolution Sonography

Gerd Bodner, MD[1], Hannes Platzgummer, MD[1], Stefan Meng, MD[2],
Peter C. Brugger, MD, PhD[3], Gerlinde Maria Gruber, MD, MSc[3], and Doris Lieba-Samal, MD[4]



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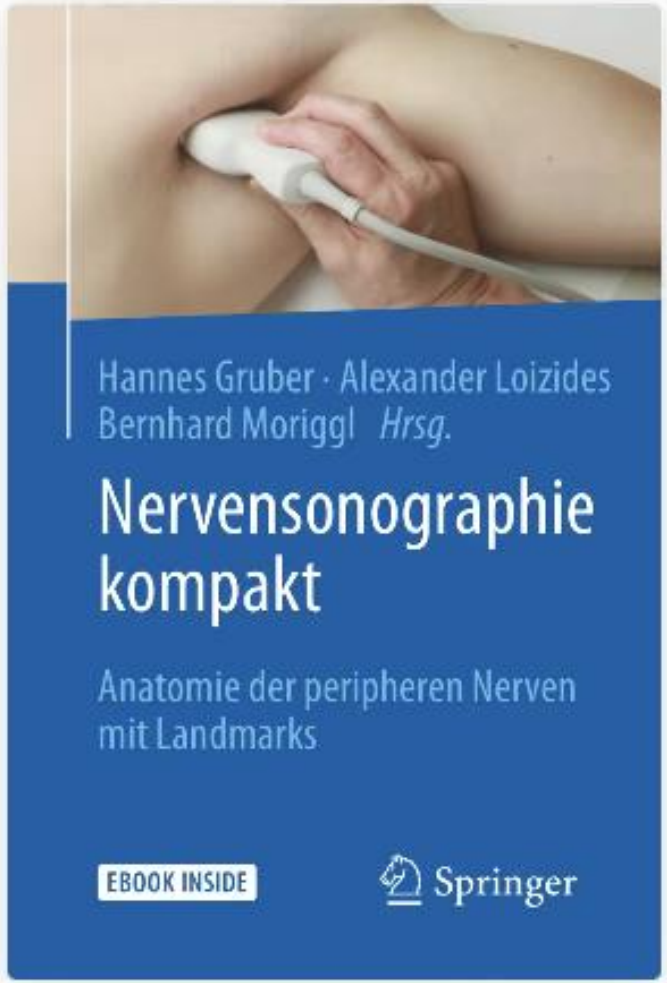
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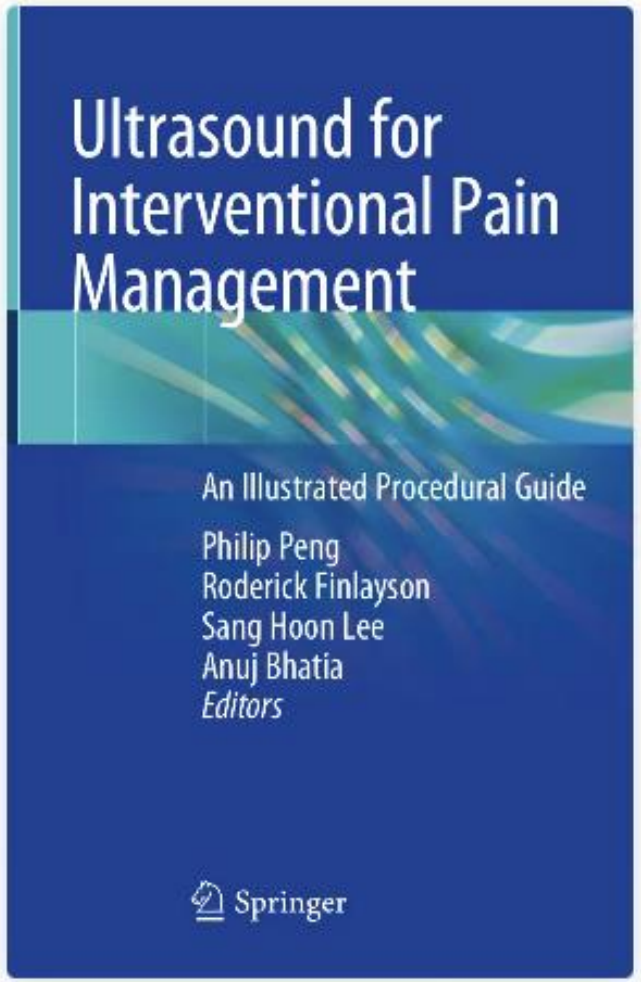
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The comparison of measurement between ultrasound and computed tomography for abnormal degenerative facet joints

A STROBE-compliant article

Wen Shi, MD[a], Dan Tian, MD[a], Da Liu, PhD[b], Jing Yin, MD[a], Ying Huang, PhD[a,*]

Abstract

Besides the study on examining facet joints of lumbar spine by ultrasound in normal population, there has not been any related report about examining normal facet joints of lumbar spine by ultrasound so far. This study was aimed to explore the feasibility of ultrasound assessment of lumber spine facet joints by comparing ultrasound measure values of normal and degenerative lumber spine facet joints, and by comparing measure values of ultrasound and computed tomography (CT) of degenerative lumber spine facet joints.

This study included 15 patients who had chronic low back pain because of degenerative change in lumbar vertebrae, and 19 volunteers who did not have low back pain or pain in the lower limb. The ultrasound measure values (height [H] and width [W]) of normal and degenerative lumber spine facet joints were compared. And the differentiation between measure values (H and W) of ultrasound and CT of degenerative lumber spine facet joints was also analyzed.

The ultrasound clearly showed abnormal facet joints lesion, which was characterized by hyperostosis on the edge of joints, bone destruction under joints, and thinner or thicker articular cartilage. There were significant differences between the ultrasound measure values of the normal (H: 1.26±0.03 cm, W: 0.18±0.01 cm) and abnormal facet joints (H: 1.43±0.05 cm, W: 0.15±0.02 cm) (all $P < .05$). However, there were no significant differences between the measure values of the ultrasound (H: 1.43±0.17 cm, W: 0.15±0.03 cm) and CT (H: 1.42±0.16, W: 0.14±0.03) of the degenerative lumber spine facet joints (all $P > .05$).

Ultrasound can clearly show the structure of facet joints of lumbar spine. It is precise and feasible to assess facet joints of lumbar spine by ultrasound. This study has important significance for the diagnosis of lumbar facet joint degeneration.

Abbreviations: H = height, MRI = magnetic resonance imaging, W = width.

Keywords: computed tomography, lumber spine facet joint, ultrasound

Figure 5. Pictures of abnormal facet joint on the parasagittal plane. Notes: In the left sonogram, S indicates superior articular process, I indicates inferior articular process, and C indicates articular cartilage. The articular cartilage turns thinner obviously and joint space turns narrow. The right picture is the corresponding CT image.

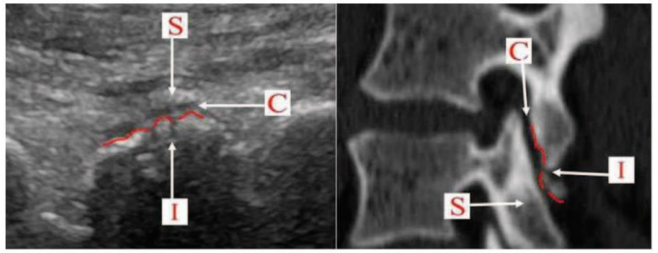

Figure 6. Pictures of abnormal facet joint on the parasagittal plane. Notes: In the left sonogram, S indicates superior articular process, I indicates inferior articular process, and C indicates articular cartilage. The bone of the inferior articular process is destroyed, so the continuity of articular surface is broken. The right picture is the corresponding CT image.


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