Sonografisch gesteuerte Infiltrationen an der HWS
?

SAMM Kongress 2018

Dr. Martin Legat

Disclosure

No Conflicts of Interest

Interventionen

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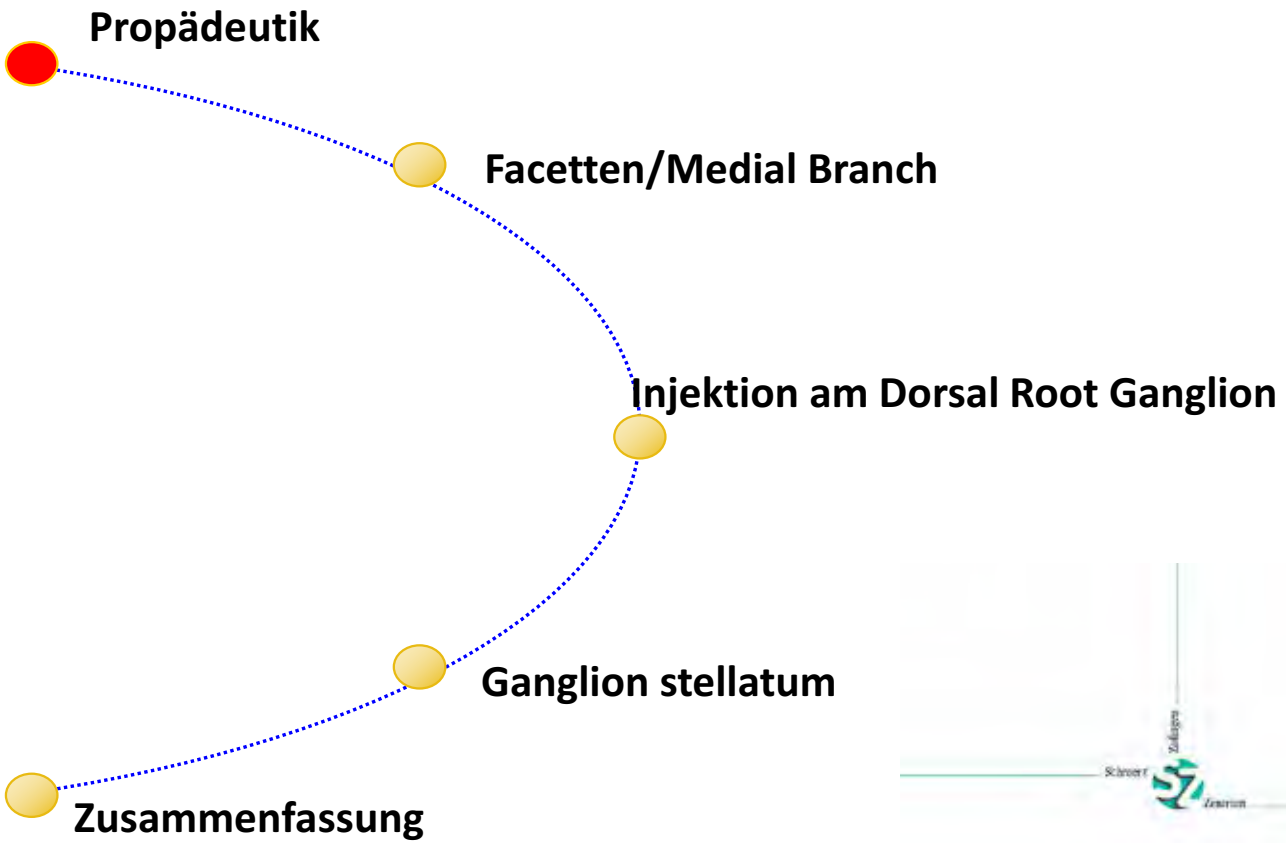

Propädeutik

Propädeutik

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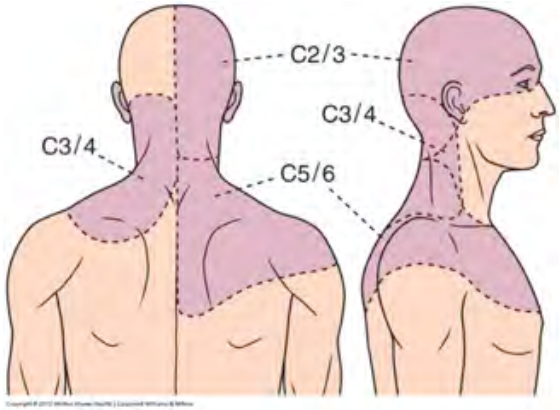
Typische Ausstrahlung bei intraartikulärer Injektion



Dwyer A, Aprill C, Bogduk N.:

Cervical zygapophyseal joint painpatternerns I: a study in normal volunteers.

Spine1990.

Aprill C, DwyerA, Bogduk N.:

Cervical zygapophyseal joint pain patterns II: a clinical evaluation.Spine 1990.

Propädeutik

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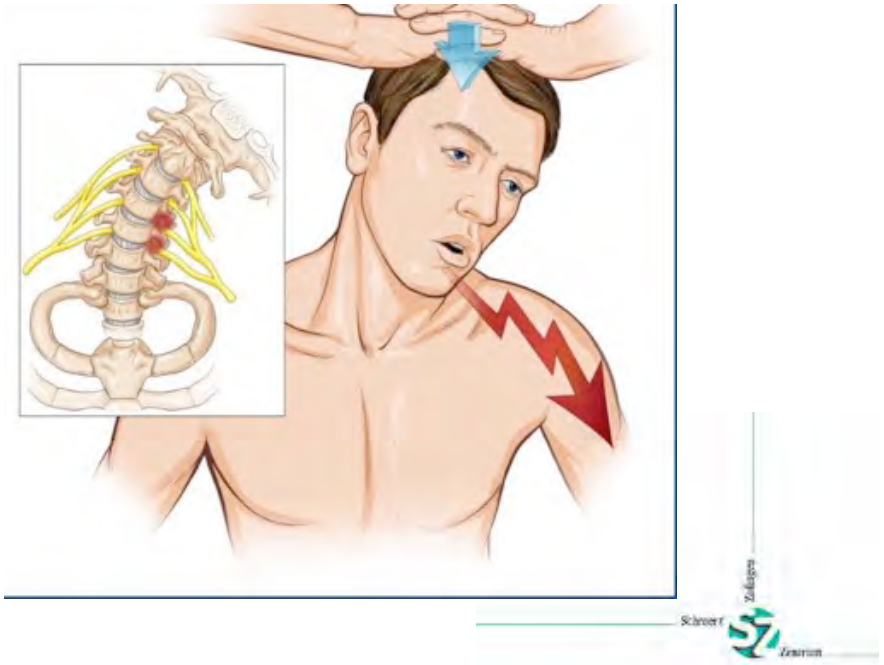
Der Spurling Test

Spurling Test ohne Reklination
-Sensitivität 50%
-Spezifität 93%
Spurling Test mit Reklination
-Sensitivität 93%
-Spezifität 95%
(Shabat et. Al. "The Correlation between Spurling Test and Imaging Studies in Detecting Cervical Radiculopathy". Journal of Neuroimaging 2011)



Propädeutik

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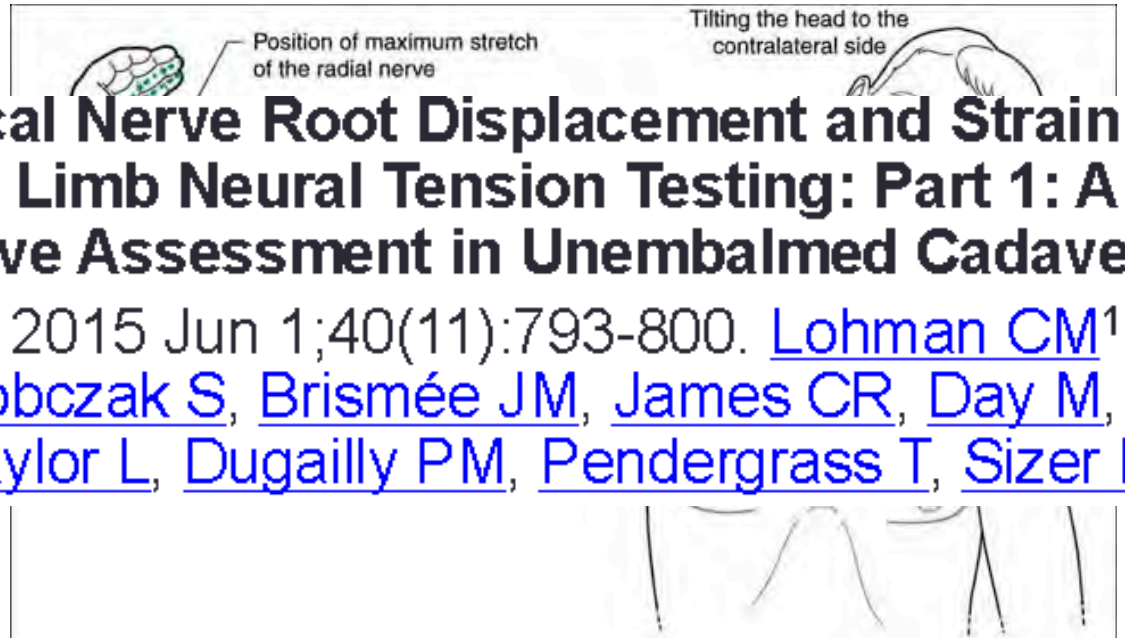
Der Upper Limb Tension Test – Der Lasegue der HWS

(„Elvey´s Test“ 1979, Butler 1991)



Cervical Nerve Root Displacement and Strain During Upper Limb Neural Tension Testing: Part 1: A Minimally Invasive Assessment in Unembalmed Cadavers.

Spine. 2015 Jun 1;40(11):793-800. Lohman CM[1], Gilbert KK, Sobczak S, Brismée JM, James CR, Day M, Smith MP, Taylor L, Dugailly PM, Pendergrass T, Sizer PJ.

- sensitivity of 97 percent and a specificity of 22 percent (Rubinstein et. al. 2007)

Interventionen

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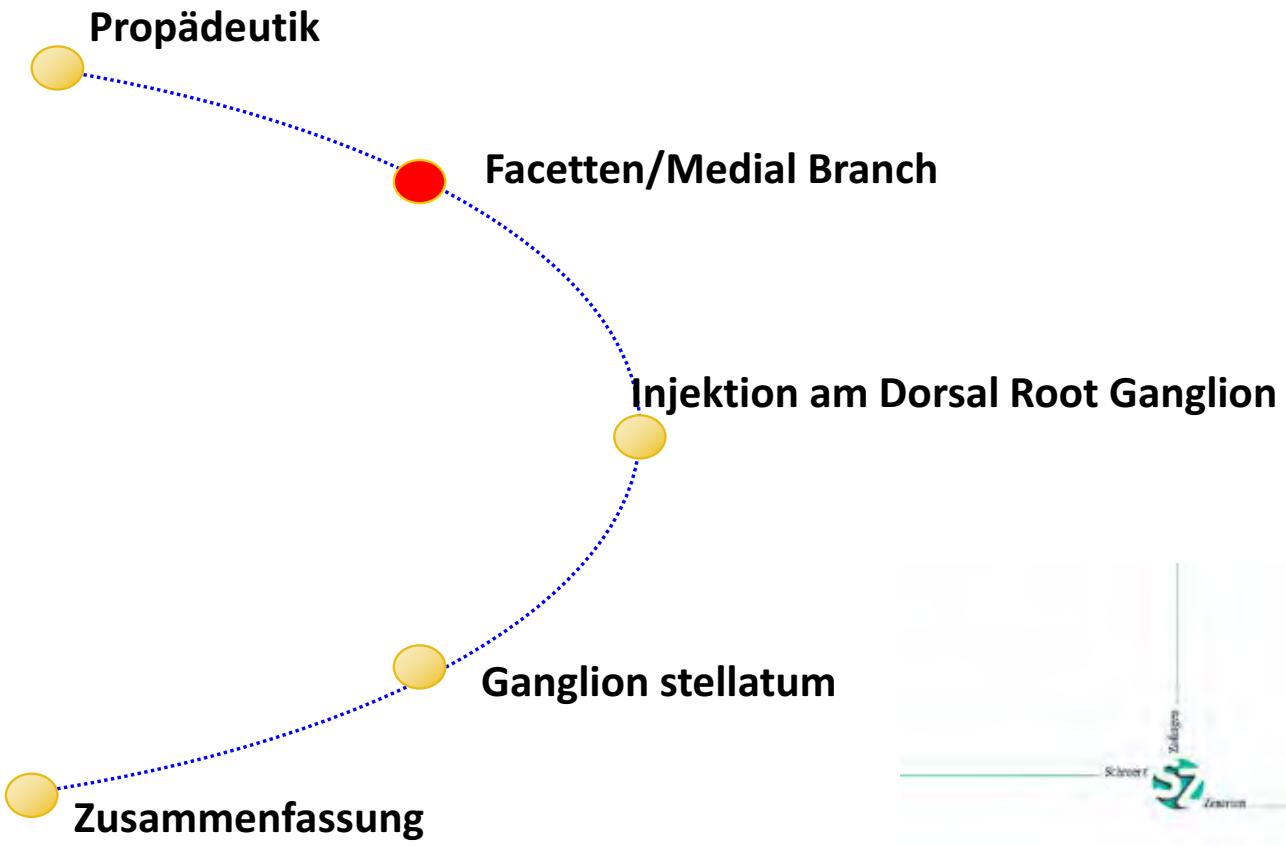

Höhenlokalisation

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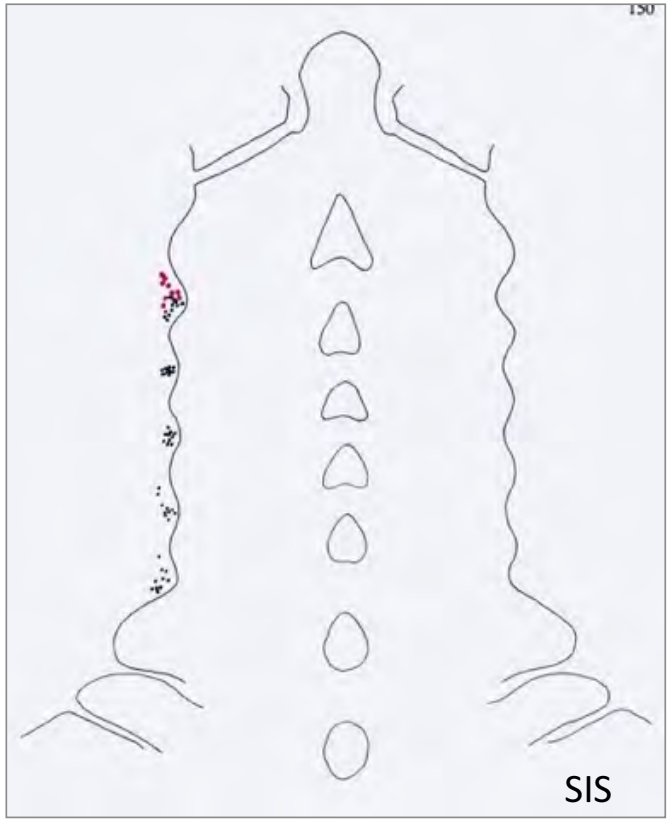

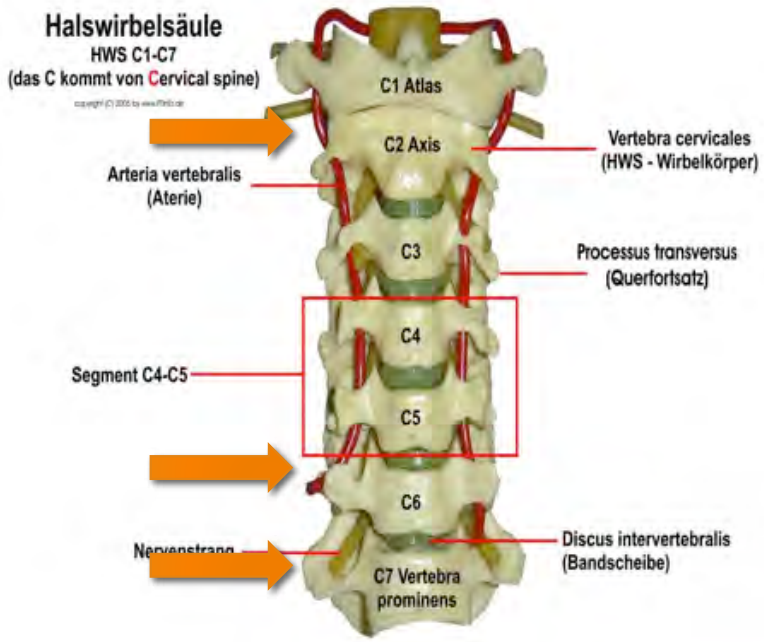

Höhenlokalisation

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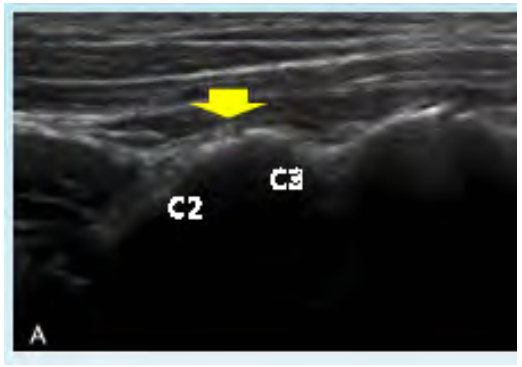
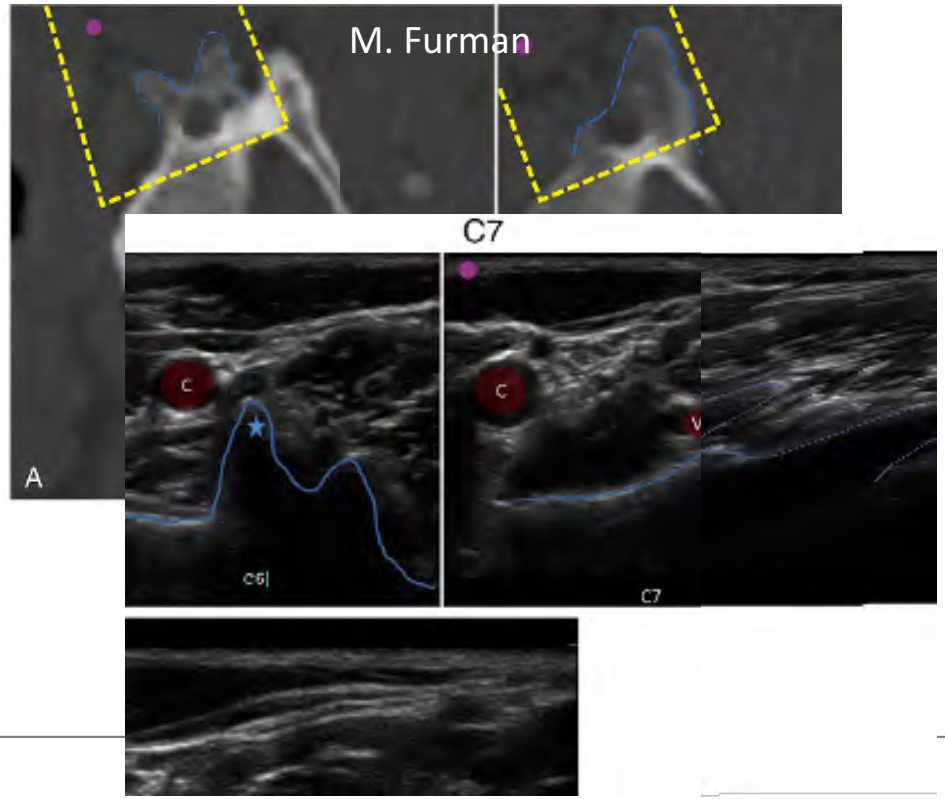
Lokalisation C2



Lokalisation C6

Lokalisation C7



Facetten/Medial Branch

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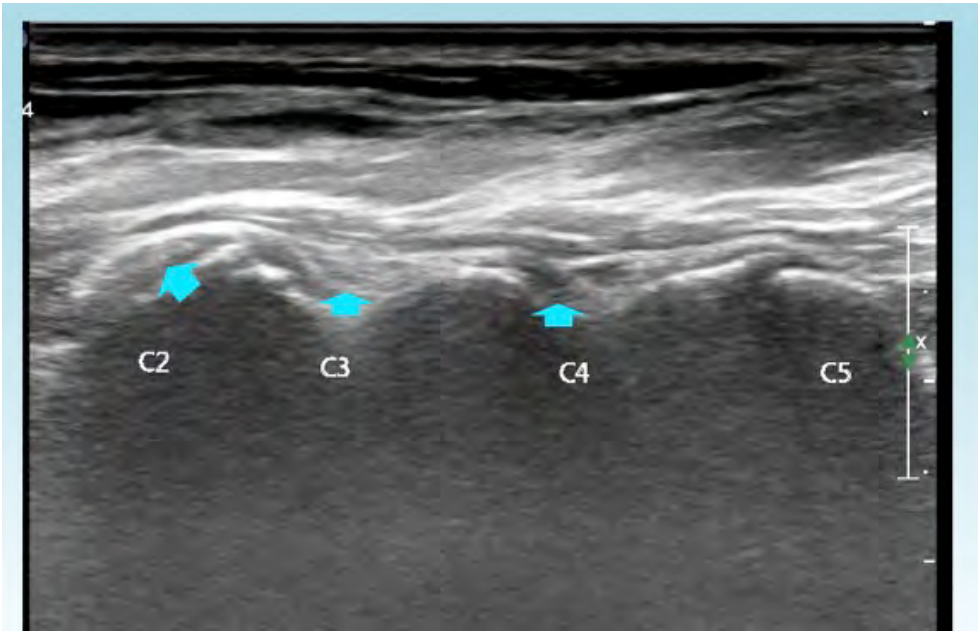

Longitudinal (Orientierung)

Transversal Facette i.a.

Facetten/Medial Branch

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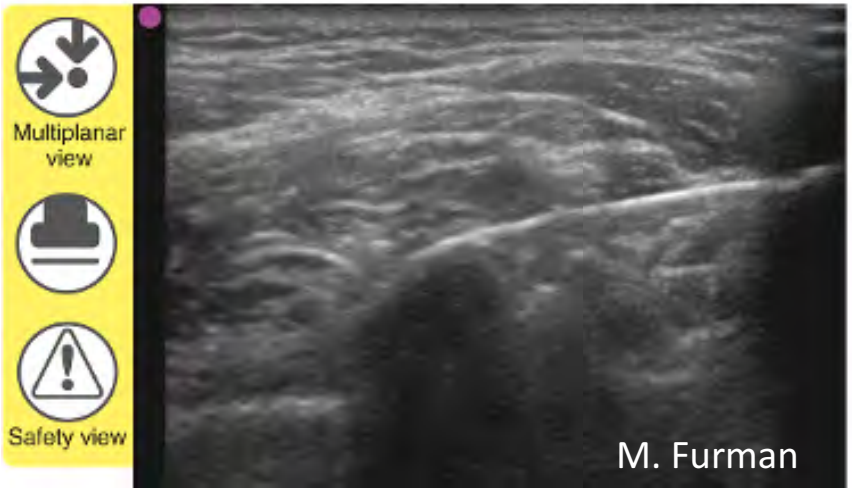
Technik



Bilder und Technik n. M. Furman
Atlas of Image - Guided Spinal Prozedures

Facetten/Medial Branch

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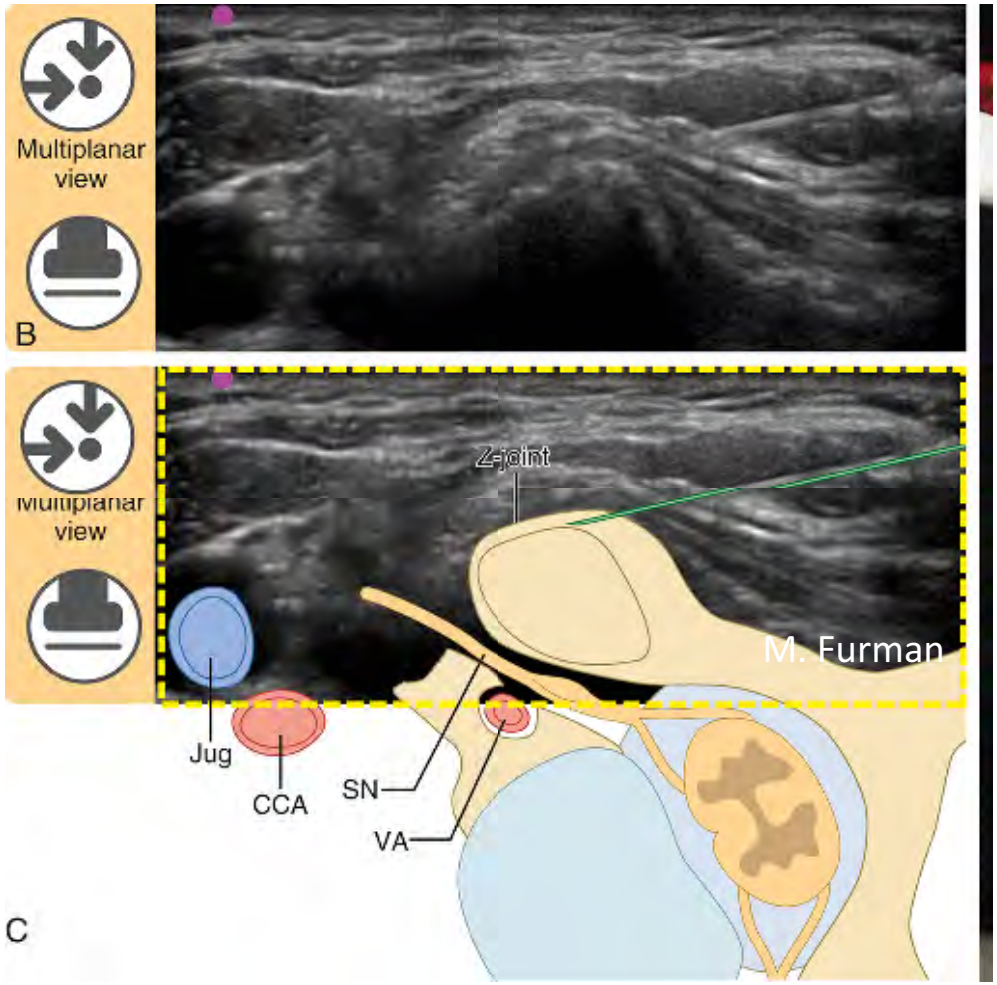

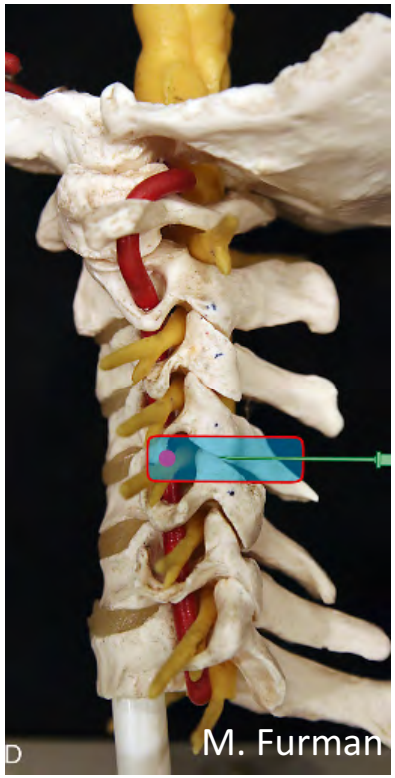

Technik

Bilder und Technik n.
M. Furman
Atlas of Image – Guided Spinal Prozedures

Facetten/Medial Branch

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PAIN MEDICINE

Accuracy of Ultrasound-guided Nerve Blocks of the Cervical Zygapophysial Joints

Andreas Siegenthaler, M.D.,* Sabine Mlekusch, M.D.,† Sven Trelle, M.D.,‡
Juerg Schliessbach, M.D.,† Michele Curatolo, M.D., Ph.D.,§ Urs Eichenberger, M.D., Ph.D.‖

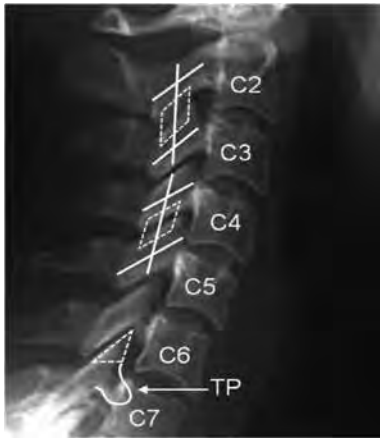
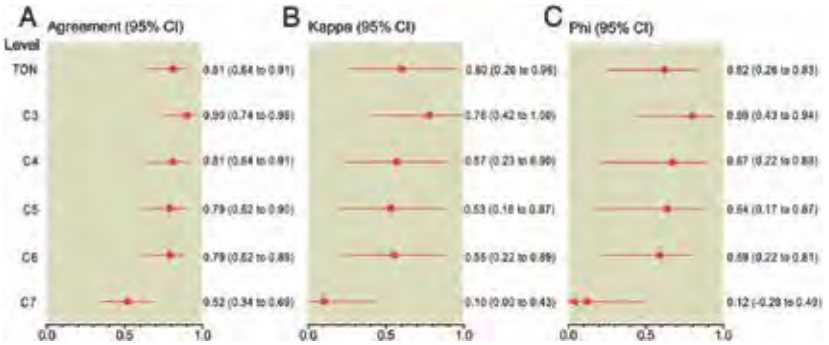


Fig. 2. Definition of the different target areas: (1) Third occipital nerve block: Needle tips located within the dashed parallelogram at the level C2–3 were classified as correctly placed. (2) Medial branch blocks C3–C6: Needle tips located within the dashed parallelogram (example shown here: level C4–5) were classified as correctly placed. (3) Medial branch block C7: Needle tips located within the dashed triangle were classified as correctly placed. TP = transverse process C7.

Fig. 1. Sonoanatomy of the cervical zygapophysial joint region cut in a longitudinal cranio-caudal plane. *Facet joint cleft. Bony target (*arrowhead*) for medial branch block (*i.e.*, the "groove" between two facet joints).



Facetten/Medial Branch

International Journal of Physical Medicine & Rehabilitation

Thonnagith et al., Int J Phys Med Rehabil 2016, 4:2
DOI: 10.4172/2329-9096.1000329

Review Open Access

Ultrasound-Guided Cervical Medial Branch Blocks: A Technical Review

Atikun Thonnagith[1*], Maria Francisca Elgueta[2], Pornpan Chalermkitpanit[1], De QH Tran[3] and Roderick J Finlayson[3]

[1]*Department of Anesthesiology, Chulalongkorn University, Bangkok, Thailand*

[2]*Department of Anesthesiology, Pontifical Catholic University of Chile, Santiago, Chile*

[3]*Department of Anesthesia, Alan Edwards Pain Centre, Montreal General Hospital, McGill University, Montreal, Quebec, Canada*

[*]**Corresponding author:** Atikun Thonnagith, Department of Anesthesiology, King Chulalongkorn Memorial Hospital, Faculty of Medicine, Chulalongkorn University, 1873 Rama 4 Road, Pathumwan, Bangkok, Thailand, Fax: 6622564294; E-mail: Atikun.T@chula.ac.th

Received date: March 16, 2016; **Accepted date:** April 11, 2016; **Published date:** April 18, 2016

Authors (year)	Study design	Results	Comments
Eichenberger et al.	10 blocks in 14 volunteers, ultrasound guided visualization and injection of third occipital nerve; fluoroscopic confirmation of needle position	Third occipital nerve visualized in 27/28 (96%); 23/28 correct needle placement (82%)	Median third occipital nerve diameter 2 mm; third occipital nerve blocked in 90%
Siegenthaler et al.	Ultrasound-guided cervical medial branch block; 60 volunteers; 180 block; 0.2 ml of contrast dye injected; fluoroscopic confirmation	180 needles placed; 73 needles purposely misplaced based on study design; 82/107 needles placed correctly (77% accuracy rate); 90/107 contrast dye reached bony target (84% success rate)	Level tested third occipital nerve to C7 medial branch; no adverse events reported; low accuracy at C7
Finlayson et al.	2-phase study; 53 patients; 163 blocks; 0.3 ml of 1:1 local anesthetic and contrast dye injected	Phase 1:80.9% of needles placed correctly; phase 2: contrast covered appropriate area in 94.5%	Levels investigated C3-C6 medial branches
Finlayson et al.	Randomized controlled trial;40 patients randomized to fluoro- or ultrasound-guided third occipital nerve block	Ultrasound guidance associated with shorter procedure time (212.8 vs 396.5 s) and fewer needle passes (2 vs 4); no intergroup difference in preblock and postblock pain scores. Similar success rates (95-100%)	US-guided technique associated with superior outcomes; vascular breach occurred with fluoro-guided technique in 10%; third occipital nerve identified in 80% of US-guided procedure; no adverse events occurred with US-guided technique
Finlayson et al.	Prospective cohort; biplanar ultrasound-guided C5-C6 MBB; 40 patients, 0.3 ml of 1:1 local anesthetic and contrast dye injected; fluoroscopic confirmation	100% and 97.5% appropriate contrast distribution at C5 and C6	Visualized blood vessels crossing C6 articular pillar in 30% of cases
Finlayson et al.	Randomized comparison between ultrasound- vs fluoroscopic-guided C7 medial branch block; 50 patients	US-guidance associated to shorter performance time (233.6 vs 390 s) and fewer needle passes (2 vs 4); similar success rate; no intergroup difference in preblock and postblock pain scores	Blood vessels overlying target area and circumvented during needle insertion in 40% in the USG group; 20% intravascular and 4% intraarticular spread in fluoroscopic-guidance vs none in US

Facetten/Medial Branch

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Studien Finleyson 2013,2014, 2015
3. Occipitalnerv:
Primary outcome: Performancezeit: US (212s) vs. FS (392s)
Secondary outcome: Erfolgsrate: ähnlich zwischen 95 -100%

C2-C3 Medial branch:
Erfolgsrate: 100%

C4 Medial branch:
Erfolgsrate: 97%

C5 Medial branch:
Erfolgsrate: 93%

C6 Medial branch:
Erfolgsrate: 84%

C7 Medial branch:
Performancezeit: US (233s) vs. FS (390s)
Erfolgsrate: 84%

Interventionen

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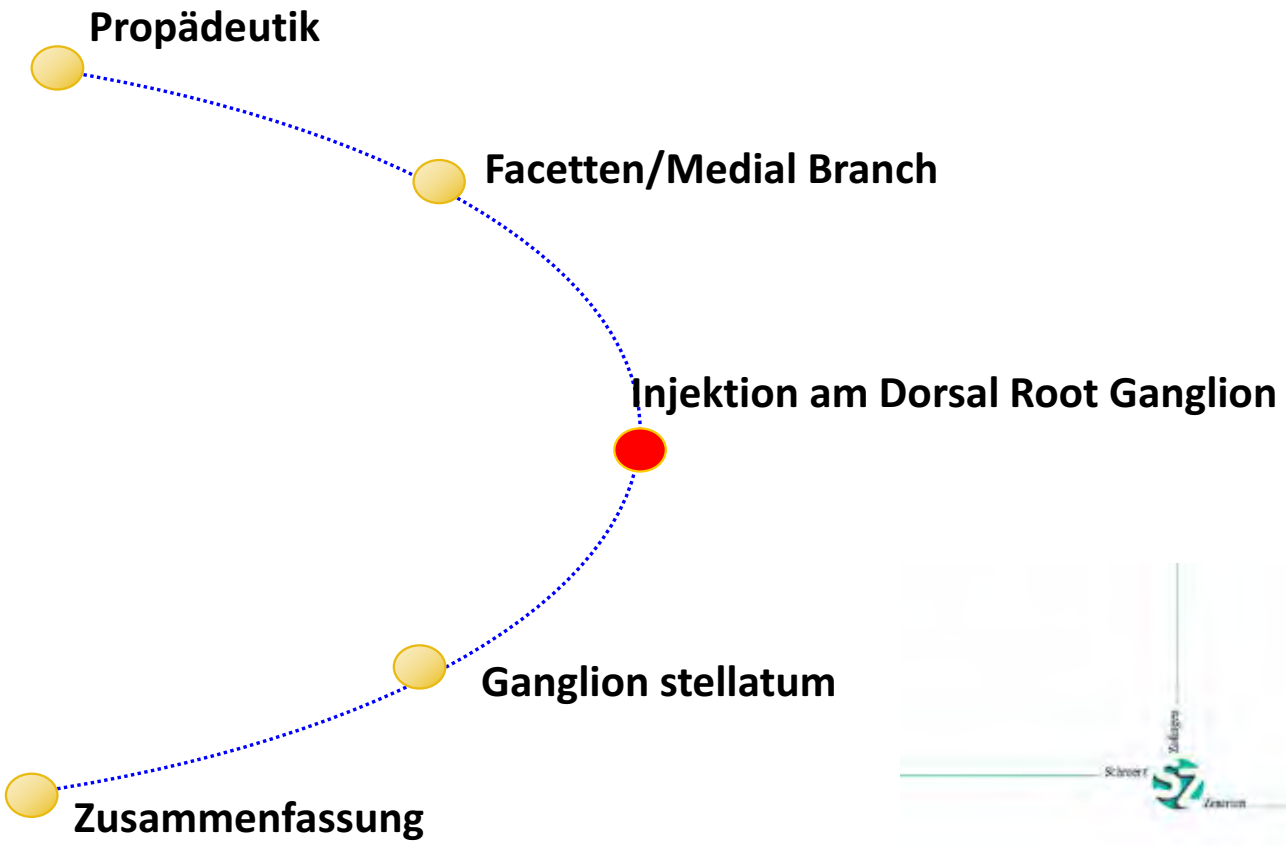

Dorsal Root Ganglion

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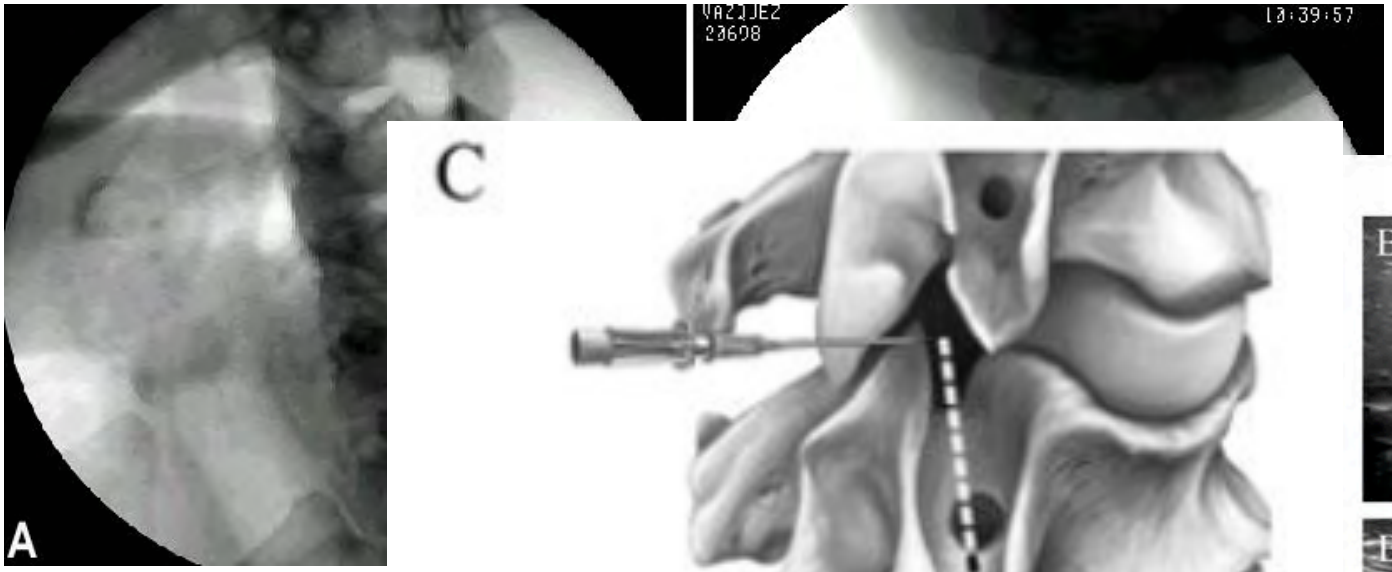

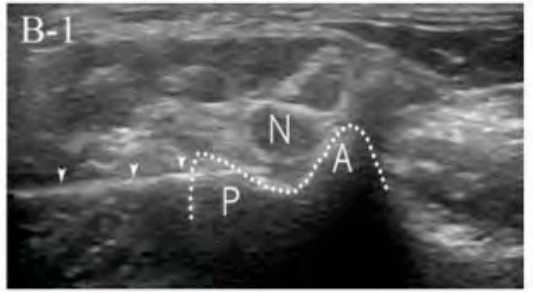

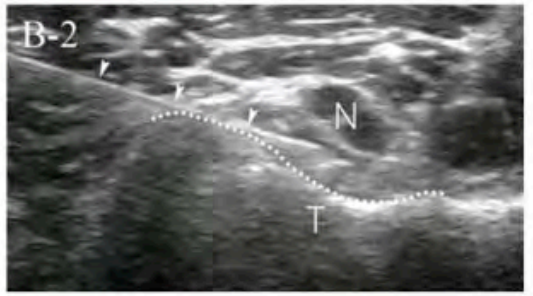

Dorsal Root Ganglion

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Technik

Dorsal Root Ganglion

ULTRASOUND ARTICLE

Ultrasound-Guided Cervical Selective Nerve Root Block

A Fluoroscopy-Controlled Feasibility Study

Samer N. Narouze, MD, MS, Amaresh Vydyanathan, MD,* Leonardo Kapural, MD, PhD,*† Daniel I. Sessler, MD,† and Nagy Mekhail, MD, PhD**

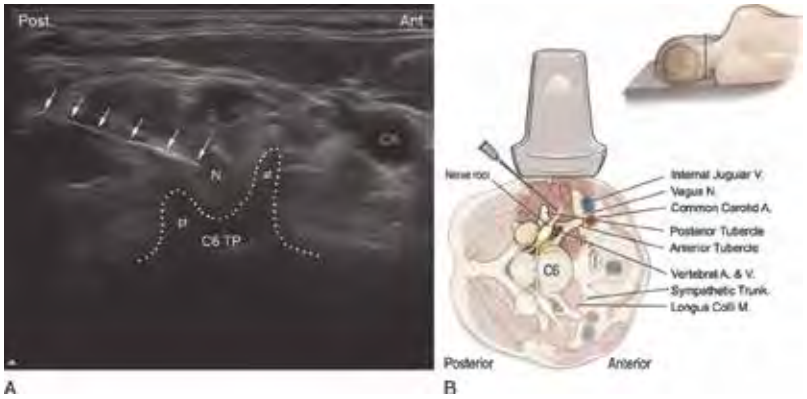

FIGURE 1. A, Axial transverse ultrasound image showing the sharp anterior tubercle (at) of the C6 transverse process (C6 TP). N indicates nerve root; CA, carotid artery; pt, posterior tubercle. Solid arrows point to the needle in place at the posterior aspect of the intervertebral foramen. B, Illustration showing the relevant anatomy at C6 level and the orientation of the ultrasound transducer.

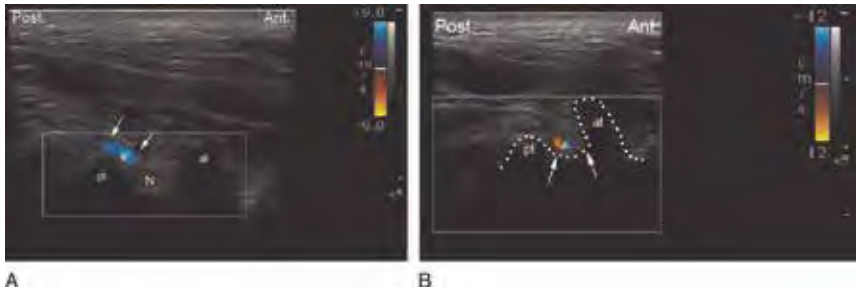

FIGURE 5. A, Axial transverse ultrasound image with color Doppler showing a small vessel at the posterior aspect of the intravertebral foramen, which continued medially into the foramen (B). at indicates anterior tubercle; pt, posterior tubercle.

FIGURE 6. Anteroposterior radiographic view showing the contrast agent delineating the dorsal root ganglion and the nerve root. No spread can be seen into the epidural space.

Dorsal Root Ganglion

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Overall therapeutic effect of US guided perineural injection

- Out of 59 patients, 46(78 %) of the patients showed overall favorable outcomes, and 13 (22%) patients showed overall unfavorable outcomes *(Sang Hoon Lee, Jin Myung Kim et al.)*
- Significat difference were not observed in NDI and VNS before, 2 weeks, and 12 weeks after the procedures between US and C-arm groups *(Haemi Jee et al*. Ultrasound-guided selective nerve root block versus fluroscopy-guided transforaminal block for the treatment of radicular pin in the lower cervical spine: A randomized, blinded, controlled study. Skeletal radiol (2012) 42:69-78)

Table 2 Comparison of VNS[a] at baseline and after the steroid injections

	Baseline	2 weeks after injection	12 weeks after injection
Ultrasound-guided approach	6.15±0.79	3.20±0.51*	2.62±0.45*
Fluoroscopy-guided approach	6.06±0.82	3.17±0.52*	2.61±0.42*

Dorsal Root Ganglion

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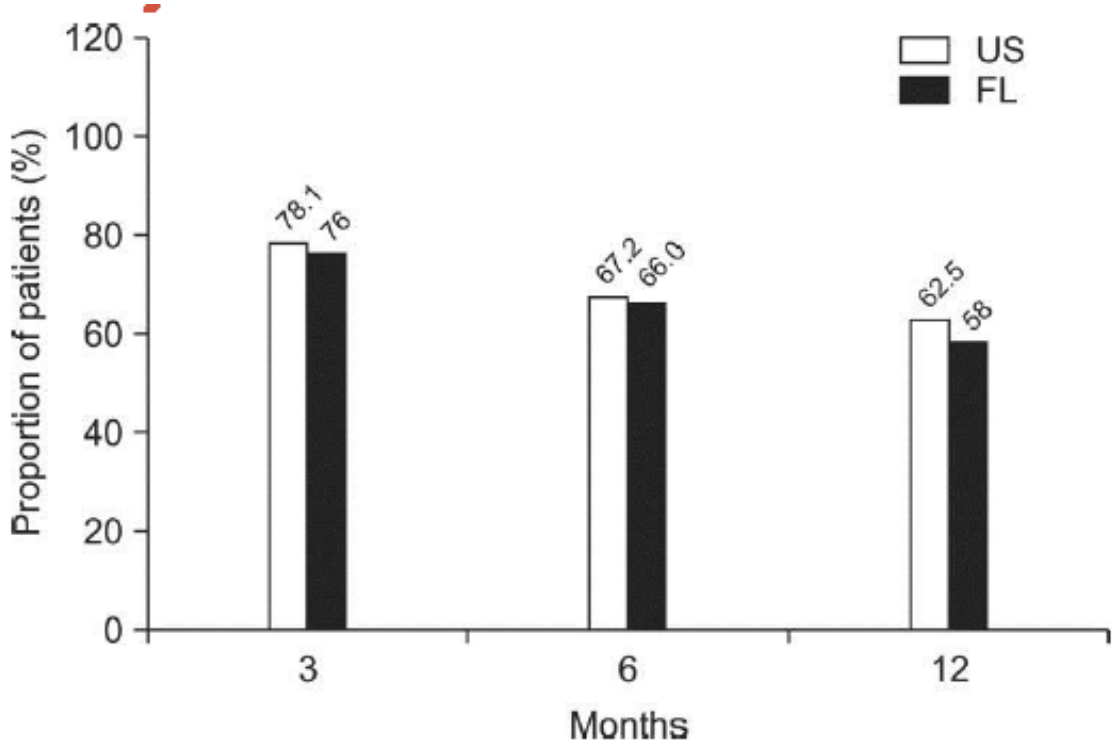

Illustration of significant pain reliefs (≥50% reduction in verbal numerical scale from baseline) and functional improvements (≥40% reduction in neck disability index from baseline). US, ultrasound; FL, fluoroscopy.
Park Y1, Ahn JK, Treatment Effects of Ultrasound Guide Selective Nerve Root Block for Lower Cervical Radicular Pain: A Retrospective Study of 1-Year Follow-up. Ann Rehabil Med. 2013 Oct;37(5):658-67.

Dorsal Root Ganglion

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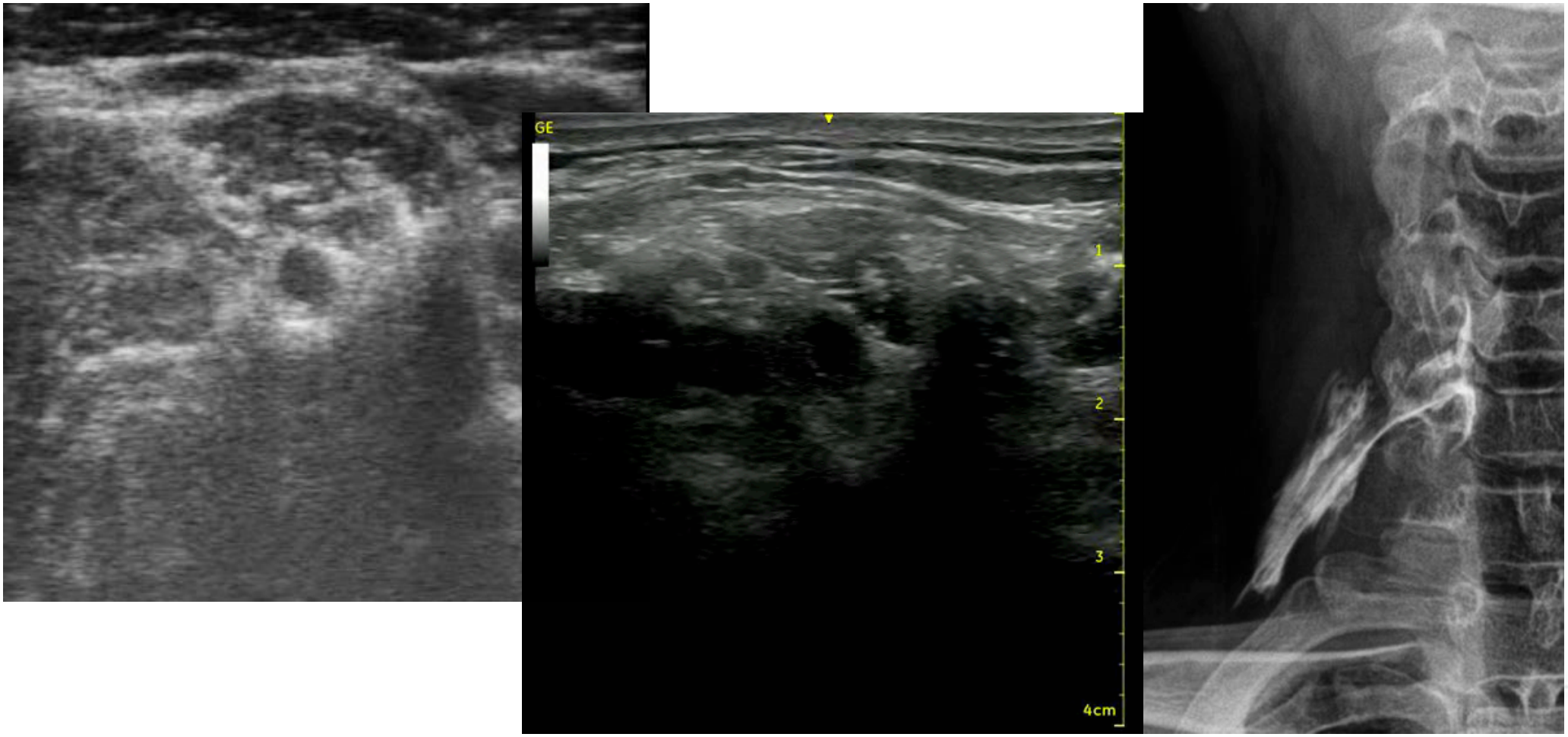

Dorsal Root Ganglion

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Outcome Groups	Classifications	Pre-NRS	Post-NRS	Difference in NRS	PPPR	*P*-Value	95% CI Lower Bound	95% CI Upper Bound
Outcome vs degree of penetration	Periradicular (N = 31)	6.8	3.0	3.8 ± 0.2	55.7	<0.001	3.3	4.2
	Pararadicular (N = 25)	6.8	2.7	4.1 ± 0.3	60.6	<0.001	3.6	4.7
	Intramuscular (N = 3)	6.3	5.3	1.0 ± 0.6	15.8	0.225	−1.5	3.5
Outcome vs dye spread pattern	Medial (N = 31)	6.8	3.1	3.7 ± 0.3	54.8	<0.001	3.2	4.2
	Lateral (N = 20)	7.0	2.4	4.6 ± 0.2	65.5	<0.001	4.2	4.9
	Extraforaminal (N = 8)	6.3	4.1	2.13 ± 0.4	33.9	<0.01	1.2	3.0
Outcome vs ultrasonographic images	Crescent (N = 39)	6.9	2.7					
	Perineural protruding (N = 17)	6.7	3.2					
	Intramuscular (N = 3)	6.3	5.3					

CI = confidence interval; NRS = numerical rating scale; PPPR = postproced post-NRS)/(pre-NRS) × 100.

Spread pattern

Medial foraminal: pre 6.8 → post 3.1
Lateral foraminal: pre 7.0 → post 2.8
Extraforaminal : pre 6.3 → post 4,1

Dorsal Root Ganglion

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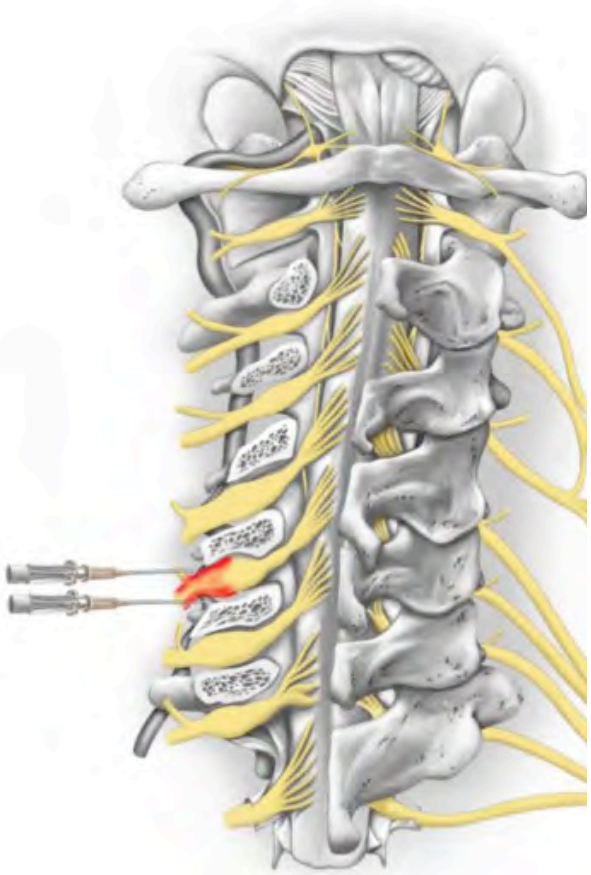

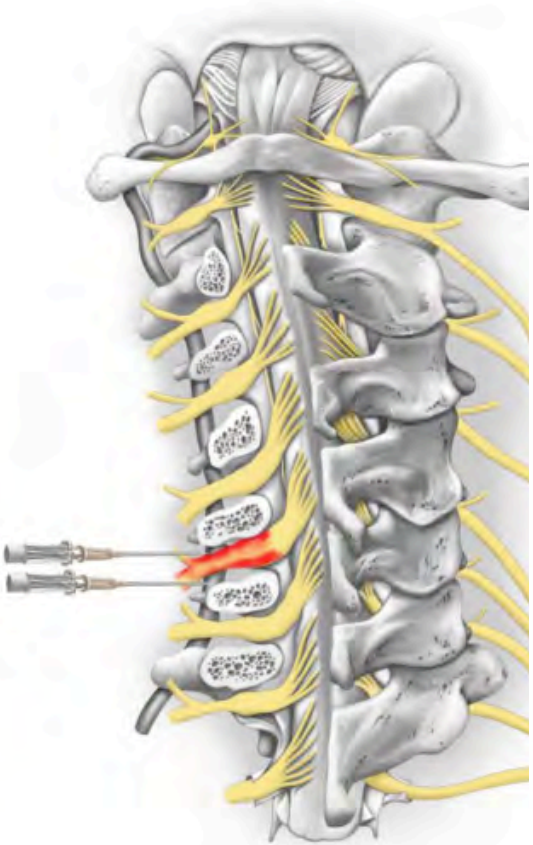

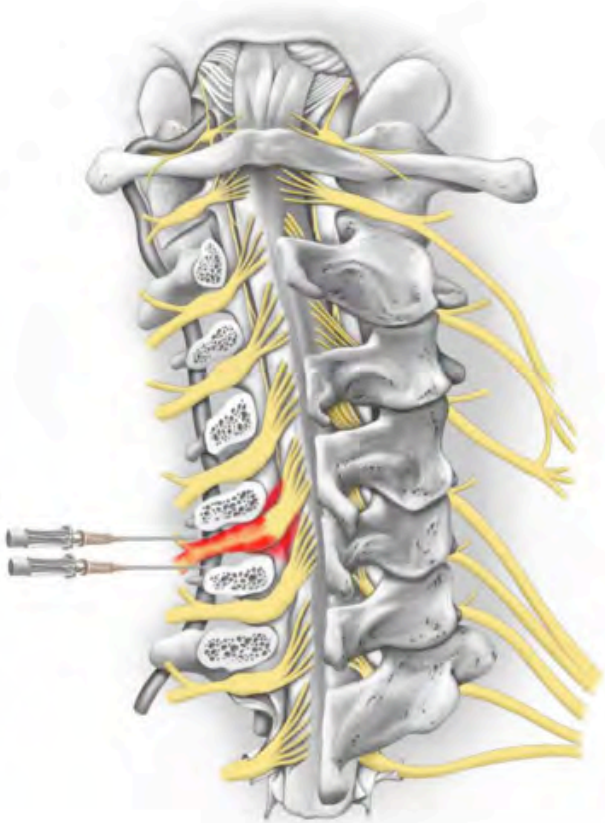

Interventionen

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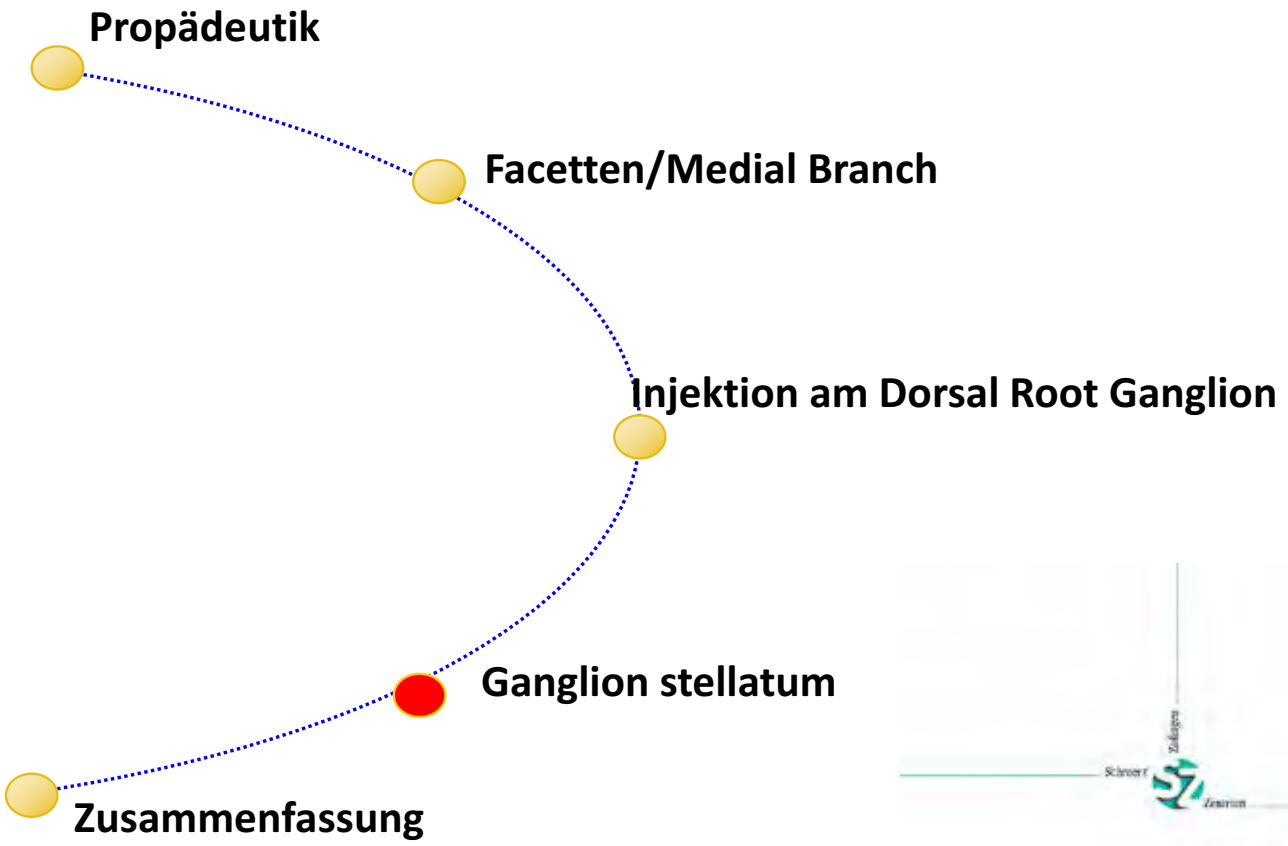

Ganglion stellatum

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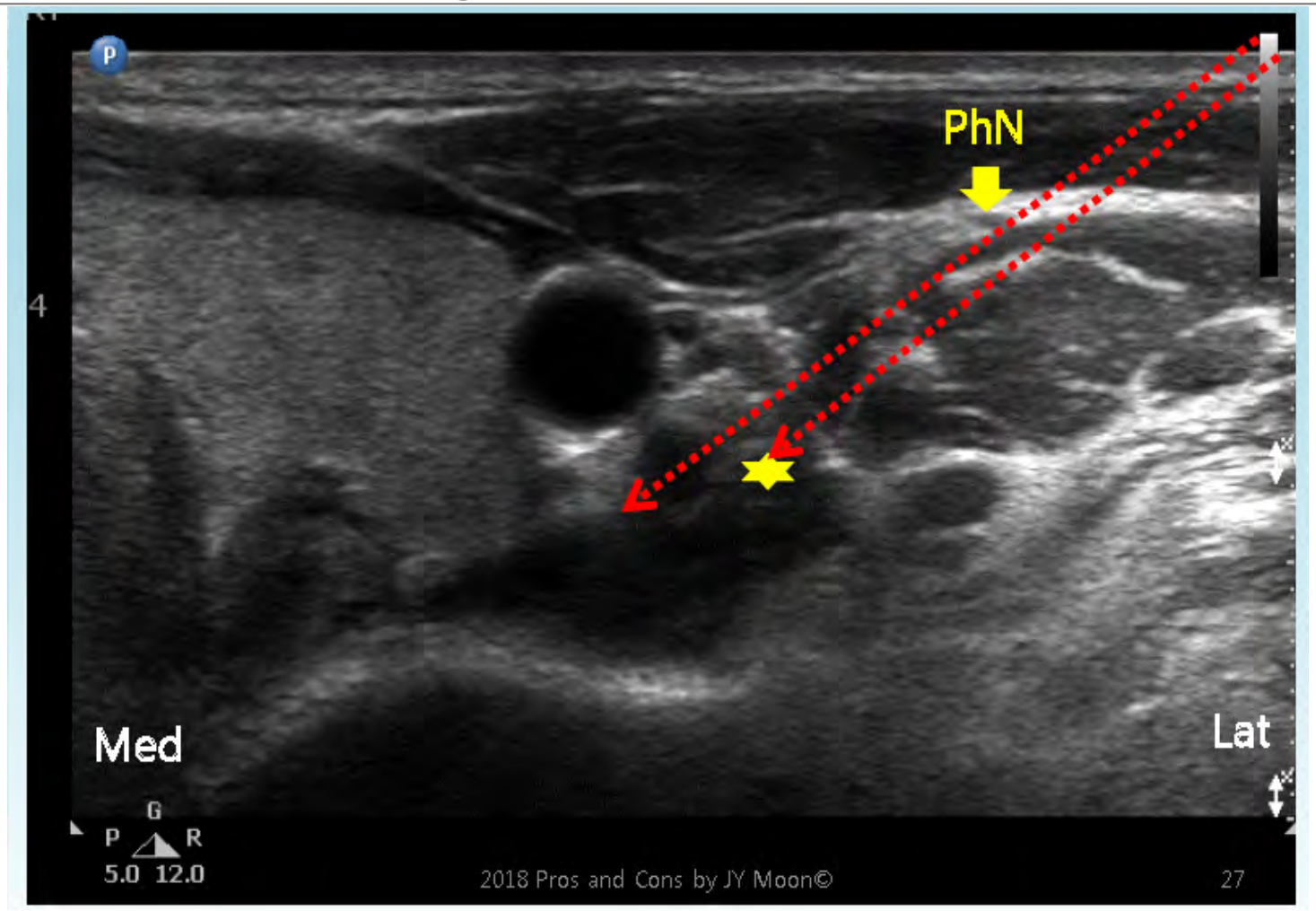

Ganglion stellatum

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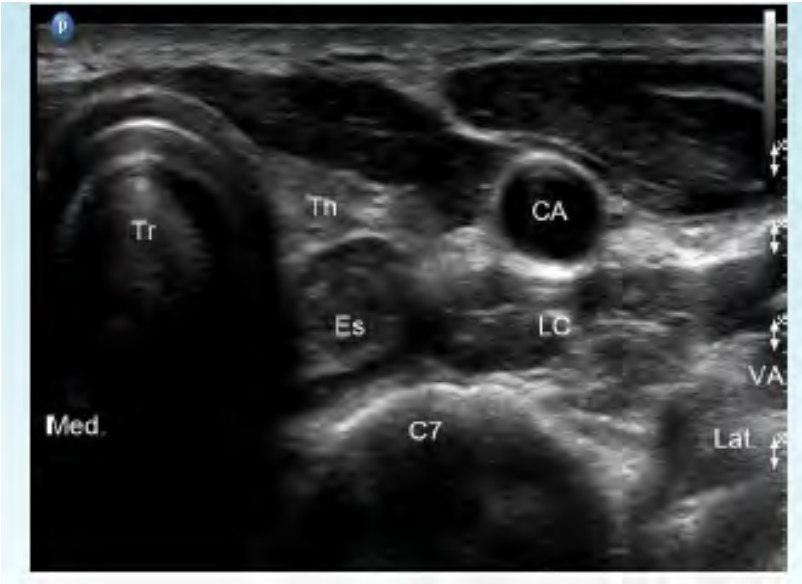
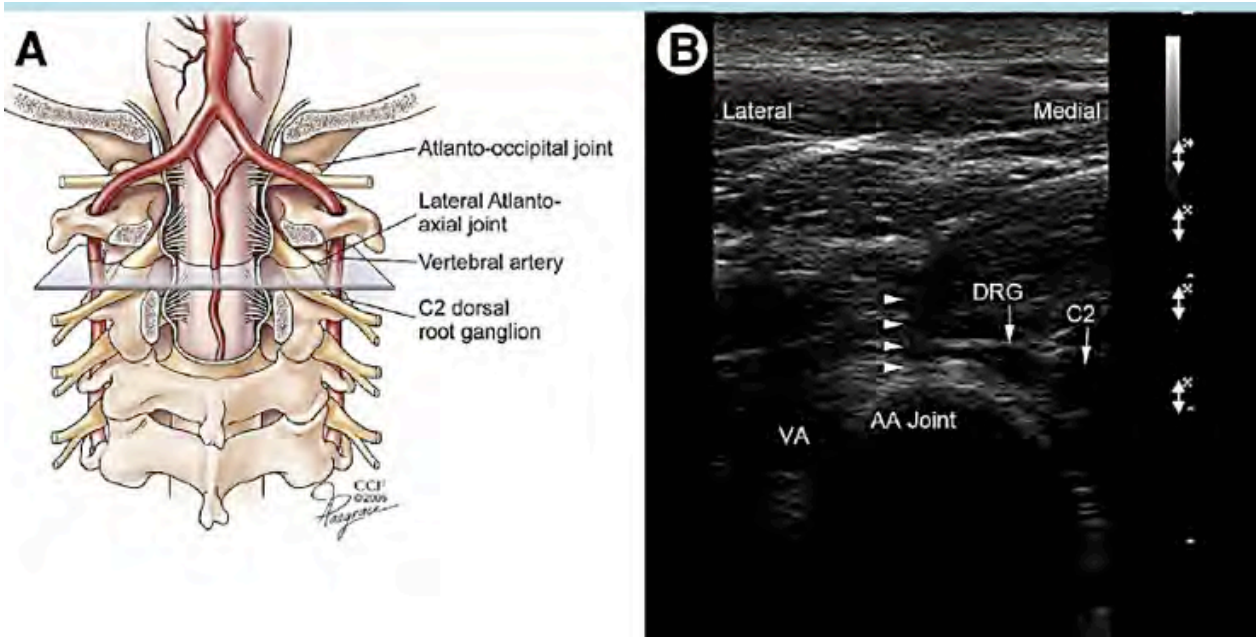


Bildwandler gegen Sonografie

- In ca. 10% der Fälle läuft die Arterteria vertabralis exponiert an C6.
- Die Art. und Ven. thyroid. inferior können Ursache für ein retrophyaryngeales Hämatom sein.
- Der Oesophagus kann gut dargestellt werden, insbesondere bei Eingriffen von links.

Andere

AA - Gelenk



Andere

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AA - Gelenk

The Longitudinal Effectiveness of Lateral Atlantoaxial Intra-articular Steroid Injection in the Treatment of Cervicogenic Headache

Pain Med. 2007;8(2):184-188

Samer N. Narouze, MD, MSc,* Jose Casanova, MD, PhD,† and Nagy Mekhail, MD, Phl

	FL-guided AA block	US-guided AA block
Procedure time	< 5 min	> 10 min
Intraarticular injection	Yes	No

Interventionen

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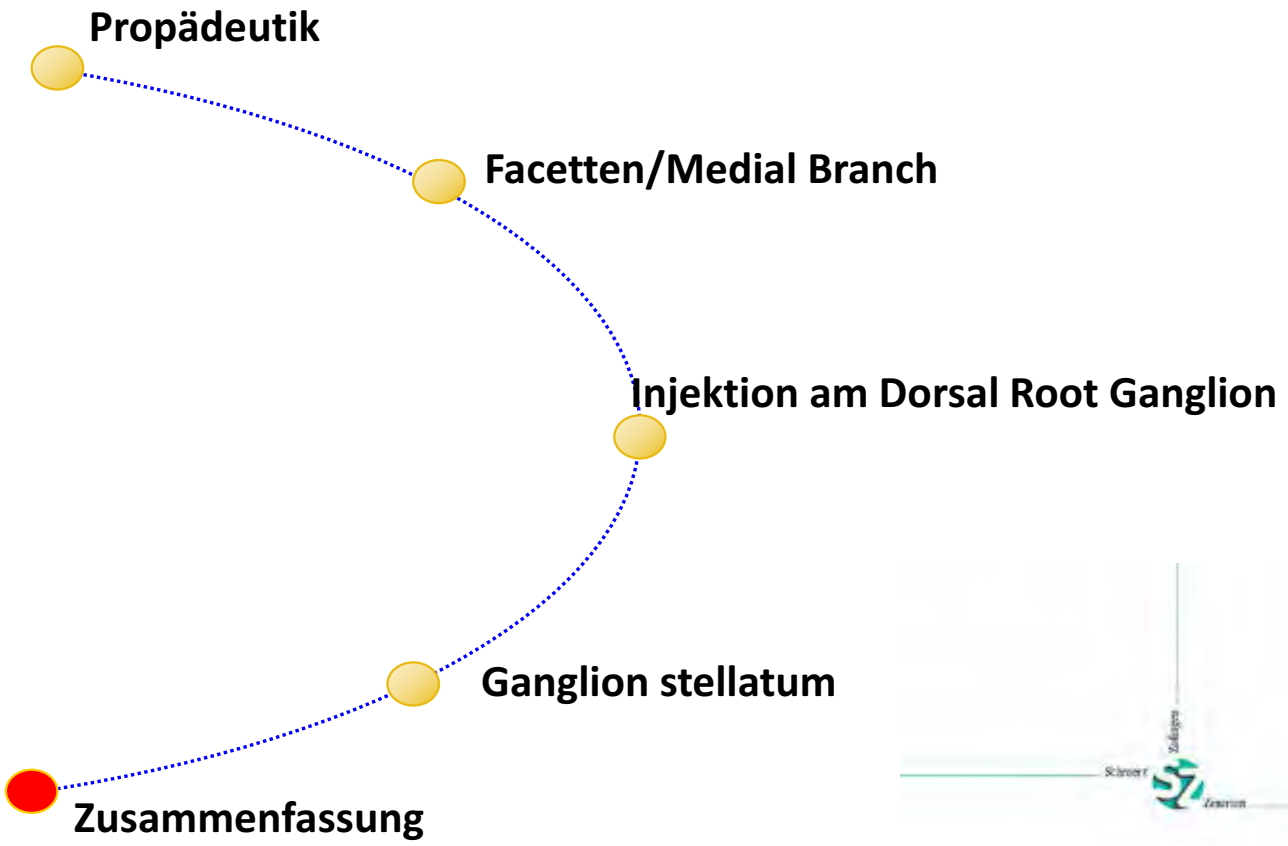

Injektionen Sonografie cervical

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US besser als BV	**US ebenbürtig BV**
3. Occiptalnerv Block Medial Branch Block C3- C6	Nervenwurzelblockade C5- C7
Medial Branch Block C7	

Injektionen Sonografie cervical

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Pro/Contra

Pros	**Contras**
Ganglion stellatum	Atlantoaxialgelenkblock
3. Occiptalnerv Block	Cervicale interlaminäre epidurale Blockade?
Medial Branch Block	Diskographie
Cervicale Facettengelenksblockade	
Cervicale Nervenwurzelblockade	

Sonografie kann die Performance und Sicherheit an der Halswirbelsäule verbessern.
Aber die Sonografie kann eine intravenöse Injektion nicht vermeiden.
Wenn die Zielstruktur tiefer liegt oder nahe eines knöchernen Schallschattens ist die Fluoroskopie notwendig.

Injektionen Sonografie cervical

IGOST Interdisziplinäre Gesellschaft für orthopädische/ unfallchirurgische und allgemeine Schmerztherapie

Vorsicht

Journal of Medical Imaging and Radiation Oncology 59 (2015) 571–577

MEDICAL IMAGING—ORIGINAL ARTICLE

Ropivacaine and dexamethasone: a potentially dangerous combination for therapeutic pain injections

Trevor William Watkins,[1,2] Simon Dupre[2,3] and John R

1 Department of Medical Imaging, Princess Alexandra Hospital, Brisbane,
2 Department of Medical Imaging, Nambour General Hospital, Nambour,
3 University of Queensland, Brisbane, Queensland, Australia

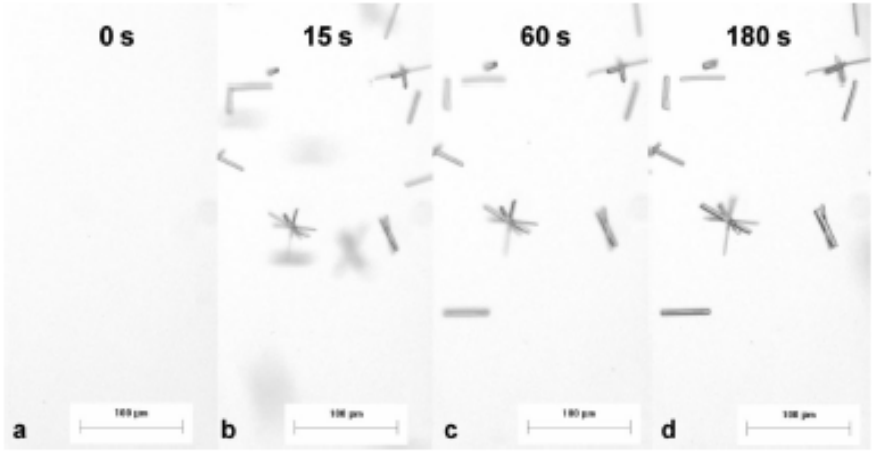
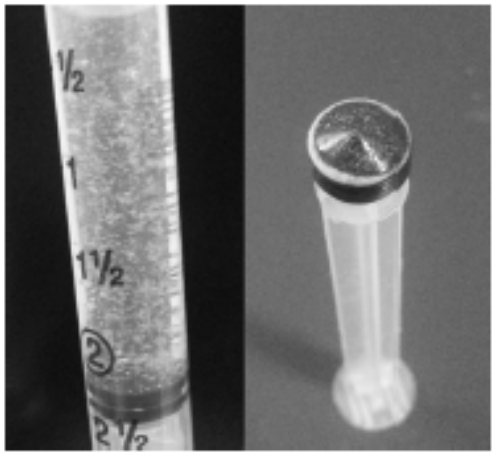


Fig. 1. [illegible] demonstrating progressive crystallization of ropivacaine 0.75% and dexamethasone 10 mg/mL combination over time: (a) t = 0 s; (b) t = 15 s; (c) t = 60 s; (d) t = 180 s.



Vielen Dank für Ihre Aufmerksamkeit

Glück und Schmerzlosigkeit müssen wir dankbar annehmen und genießen, nie aber fordern.

Alexander von Humboldt