Herz-Jesu
Krankenhaus Wien

Ultraschall in der Schmerztherapie Kurs C 2024

Manfred Greher

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Fluoroscopy: relying on shadow of bones

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Ultrasound Imaging for Stellate Ganglion Block: Direct Visualization of Puncture Site and Local Anesthetic Spread

A Pilot Study

Stephan Kapral, M.D., Peter Krafft, M.D., Max Gosch, M.D., Dominik Fleischmann, M.D.,* and Christian Weinstabl, M.D.

326 Regional Anesthesia Vol. 20 No. 4 July–August 1995

Table 1. Quality Scores of Stellate Ganglion Block for Both Groups 10 Minutes After the Administration of Local Anesthetic Solution*

Quality Score	Number of Patients			
	Group A		Group B	
	Vasodilation	Horner's syndrome	Vasodilation	Horner's syndrome
0	1	2	0	0
I	11	10	12	12
II	0	0	0	0

*Group A, blind technique; group B, imaging technique.

Table 2. Quality Scores of Stellate Ganglion Block for Both Groups 30 Minutes After the Administration of Local Anesthetic Solution*

Quality Score	Number of Patients			
	Group A		Group B	
	Vasodilation	Horner's syndrome	Vasodilation	Horner's syndrome
0	0	1	0	0
I	9	10	8	8
II	3	1	4	4

*Group A, blind technique; group B, imaging technique.

Anesthesiology 2003; 99:250–1

Is Regional Anesthesia Simply an Exercise in Applied Sonoanatomy?

Aiming at Higher Frequencies of Ultrasonographic Imaging

1997

Manfred Greher, M.D.* **Stephan Kapral, M.D.** *University of Vienna, Vienna General Hospital, Vienna, Austria. manfred.greher@univie.ac.at

Stellate Ganglion Block

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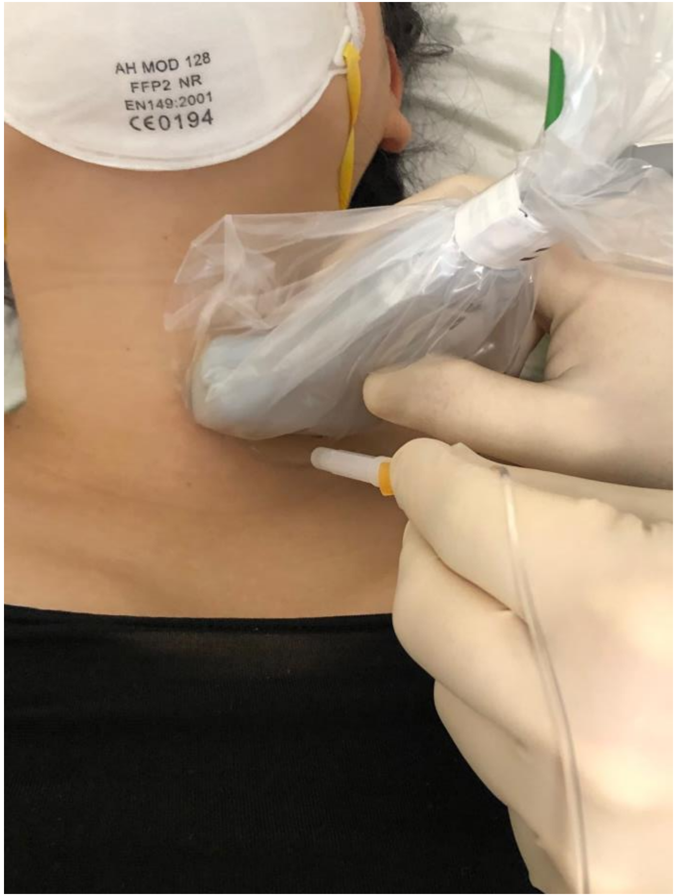

Easter morning 1900: 5^{th} Ave, New York City. Spot the automobile.

Source: US National Archives.

Easter morning 1913: 5th Ave, New York City.
Spot the horse.

Source: George Grantham Bain Collection.

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enhaus Wien

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

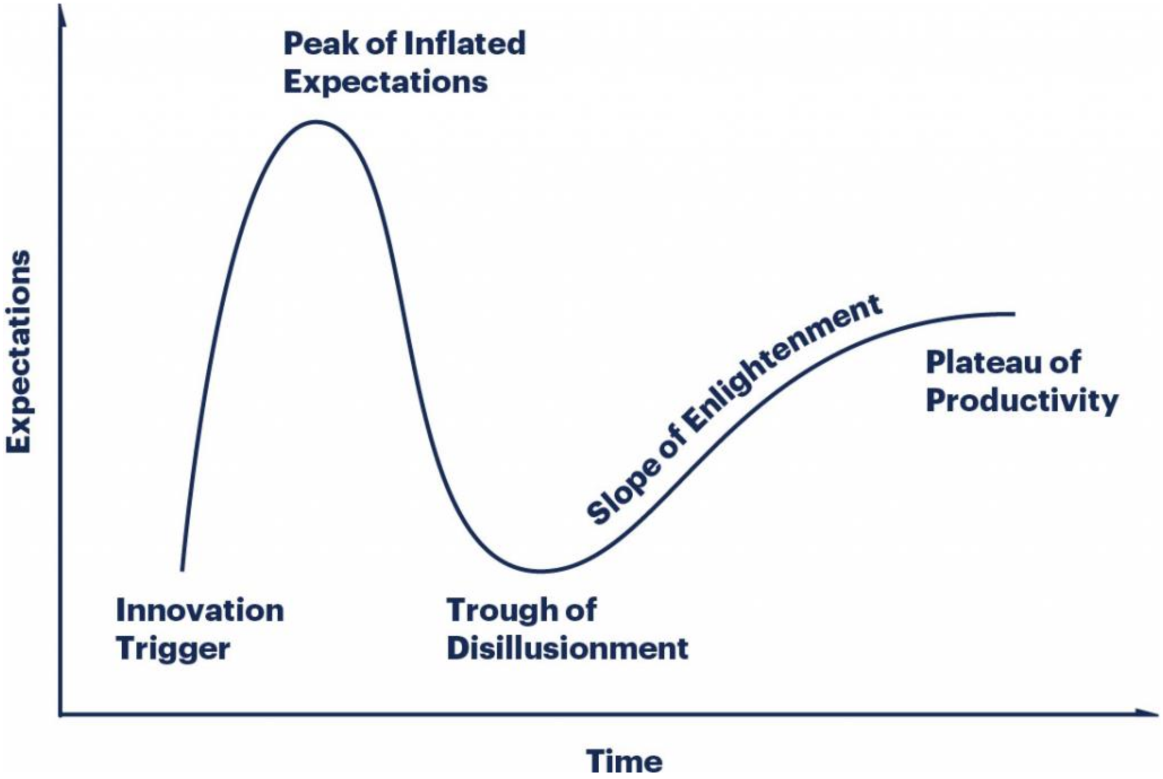
Daring discourse, RAPM Oct 21

The role for regional anesthesia in medical emergencies during deep space flight

Julia Scarpa,[1] Christopher L Wu [1,2]

ABSTRACT
As humanity presses the boundaries of space exploration and prepares for long-term interplanetary travel, including to Mars, advanced planning for the safety and health of the crewmembers requires a multidisciplinary approach. In particular, in the event of a survivable medical emergency requiring an interventional procedure or prolonged pain management, such as traumatic limb injury or rib fracture, anesthetic protocols that are both safe and straightforward to execute must be in place. In this daring discourse, we discuss particular considerations related to the use of regional techniques in space and present the rationale that regional anesthesia techniques may be the safest option in many medical emergencies encountered during prolonged space flight.

Gartner Hype Cycle © gartner.de



Ultrasound has transformed the practice of regional anaesthesia and has the potential to be of significant benefit in pain medicine.

Ultrasound can improve safety, predictability and accuracy of some diagnostic and therapeutic procedures (e.g. stellate ganglion blocks, peripheral nerve blocks, intra-articular injections).

ULTRASOUND IS NOT SUITABLE FOR TRANSFORAMINAL EPIDURAL INJECTION IN EITHER THE CERVICAL OR LUMBAR SPINE.

ADVANTAGES OF ULTRASOUND IN PAIN MEDICINE

The potential advantages of using ultrasound for interventional pain medicine include:-

- Improved safety and specificity.
- Absence of ionising radiation.
- Improved visibility and resolution.
- The ability to define anatomy and anatomical variation of nerves, vessels, soft tissues, and bone surfaces.
- Appreciation of depth.
- Real time visualisation of needle and injected fluid in relation to the target.
- Portability.
- Relative low cost (compared to fluoroscopy, CT, MRI).
- Ultrasound can assist diagnosis of musculoskeletal pain syndromes (e.g. tendinopathies, peripheral nerve injury, entrapment neuropathies).

Simpson, Krol, et al.

The Lancet 2004

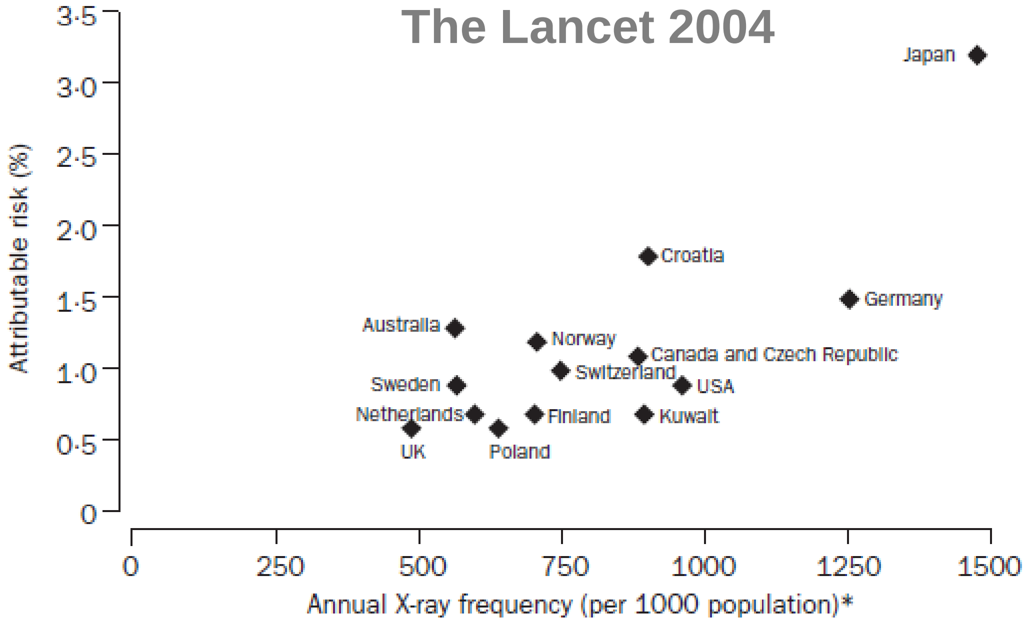


Figure 3: **Risk of cancer attributable to diagnostic X-ray exposures versus annual X-ray frequency**

*Taken from worldwide survey.[1]

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Risk of cancer from diagnostic X-rays: estimates for the UK and 14 other countries

Amy Berrington de González, Sarah Darby

	Cases of radiation-induced cancer per year*			Cases per million examinations*
	Males	Females	Total	
X-ray type				
Abdomen	16	15	31	30
Barium meal	5	6	11	40
Barium enema	27	28	55	170
Chest	1	3	4	1
Coronary angiography	13	28	41	280
CT scan	31	39	70	60
Cerebral angiography	1	1	2	180
Hip or pelvis	28	24	52	30
Lumbar spine	23	16	39	40
Screening mammography	..	8	8	8
Thoracic spine	2	4	6	20
Each other type	<10	<10	<20	..

*Includes only nine cancer sites listed in Table 2. Detailed estimation of number of radiation-induced cases for all cancers is not possible, since estimates of organ-specific doses are not available for other cancers.

Table 3: **Estimated number of radiation-induced cases of cancer per year in the UK by type of X-ray**

Diagnostic X-rays and cumulative cancer risk for 15 countries

	Annual X-rays per 1000*	Males		Females		Total	
		Attributable risk (%)	Cases cancer per year	Attributable risk (%)	Cases cancer per year	Attributable risk (%)	Cases cancer per year
Country							
Australia	565	1·2	204	1·5	227	1·3	431
Canada	892	1·1	406	1·0	378	1·1	784
Croatia	903	1·5	66	2·2	103	1·8	169
Czech Republic	883	0·9	67	1·2	105	1·1	172
Finland	704	0·7	20	0·7	30	0·7	50
Germany	1254	1·3	963	1·7	1086	1·5	2049
Japan†	1477	2·9	3724	3·8	3863	3·2	7587
Kuwait	896	0·7	25	0·6	15	0·7	40
Netherlands	600	0·7	100	0·7	108	0·7	208
Norway	708	1·3	28	1·1	49	1·2	77
Poland	641	0·5	99	0·7	192	0·6	291
Sweden	568	1·1	91	0·8	71	0·9	162
Switzerland	750	1·0	93	1·0	80	1·0	173
UK	489	0·6	341	0·6	359	0·6	700
USA	962	0·9	2573	1·0	3122	0·9	5695

*Taken from worldwide survey.[1] †Estimates assume annual frequency of CT examinations in Japan was equal to that for all health-care level 1 countries. However, number of CT scanners per million population in Japan is 3·7 times that for all health-care level 1 countries. If this number is reflected in annual frequency of CT examinations, then for Japan estimated annual number of X-rays per 1000 increases to 1573 and the attributable risk increases to 4·4%, corresponding to 9905 cases of cancer per year.

Table 6: **Frequency of diagnostic X-rays per 1000 population, percentage of cumulative cancer risk to age 75 years attributable to diagnostic X-rays, and number of radiation-induced cases of cancer per year for 15 countries**

Portable handheld (wireless) pocket ultrasound

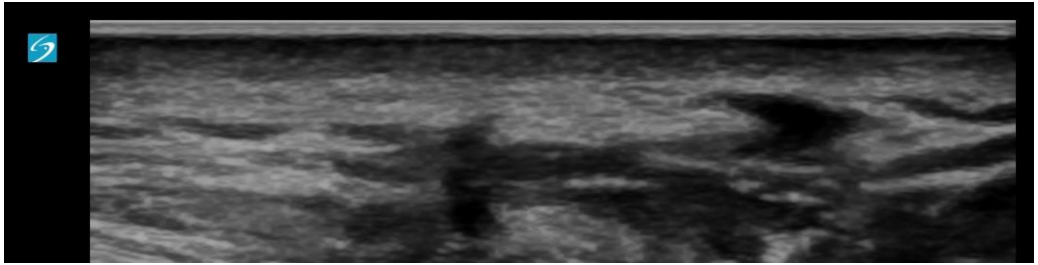
2024

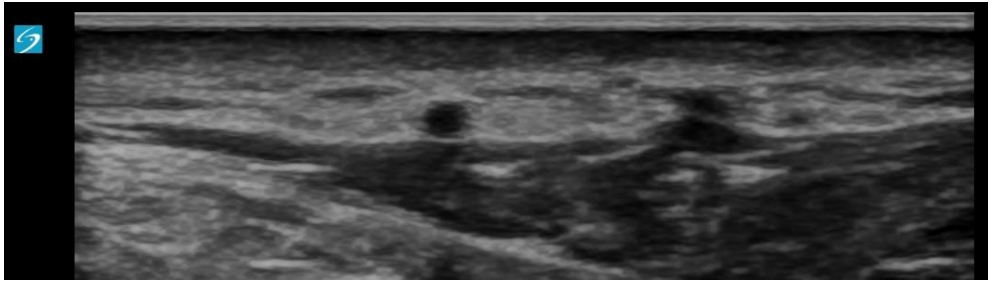
Kinder im traditionellen Gewand mit Dr. Yasmin Endlich (l.); Nadeltechniktraining am blauen Phantom mit Dr. Keno Temo, Oberärztin im Port Moresby General Hospital (r.)

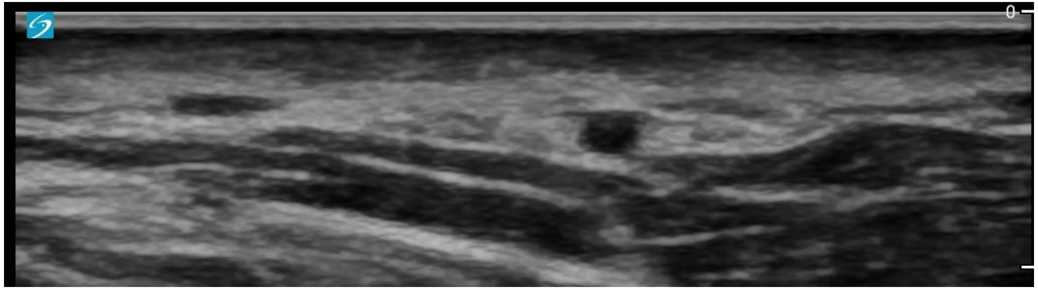
Wissenstransfer vom Herz-Jesu Krankenhaus nach Papua Neuguinea

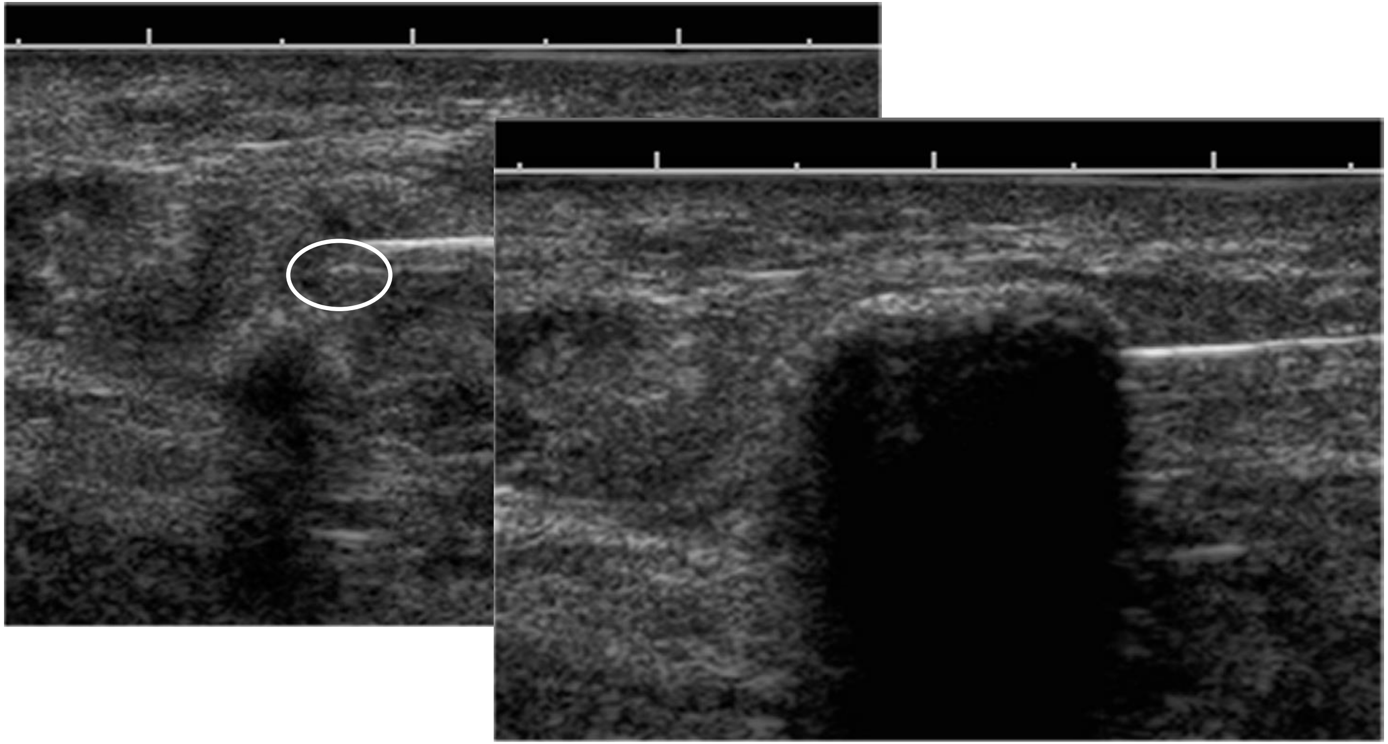
M. Greher

Greater auricular nerve









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Medicine®

Observational Study

OPEN

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

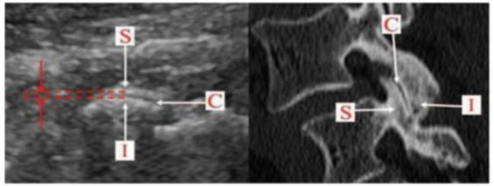

Figure 5. Pictures of abnormal facet joint on the parasagittal plane. Notes: In the left sonogram, S indicates superior articular process, I indicates inferior articular process, and C indicates articular cartilage. The articular cartilage turns thinner obviously and joint space turns narrow. The right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

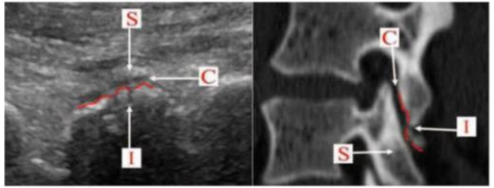

Figure 6. Pictures of abnormal facet joint on the parasagittal plane. Notes: In the left sonogram, S indicates superior articular process, I indicates inferior articular process, and C indicates articular cartilage. The bone of the inferior articular process is destroyed, so the continuity of articular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

M. Greher 2024

DISADVANTAGES OF ULTRASOUND IN PAIN MEDICINE

Disadvantages of using ultrasound include:-

- Lack of evidence to demonstrate superiority with respect to the efficacy and outcomes of already established techniques.
- Limited application in spinal injections and unsuitable for some interventions.
- Access to training and availability of equipment.
- More difficult working under sterile conditions.
- Presence of image artefacts (artefacts are present on every ultrasound image).
- Loss of image resolution with increasing depth of target.
- Inability to entirely exclude vascular uptake.
- Inability to see beyond bone and air.
- Ultrasound in obese patients (depth) and elderly patients (degenerative changes) is challenging.
- Difficulty visualising the needle at increasing depth.
- Difficulty with image storage (medico-legal documentation).

Simpson, Krol, et al.

Nisolle et al. BMC Anesthesiology (2023) 23:76
https://doi.org/10.1186/s12871-023-02029-9

BMC Anesthesiology

RESEARCH

Open Access

Comparison of the effectiveness of ultrasound-guided versus fluoroscopy-guided medial lumbar bundle branch block on pain related to lumbar facet joints: a multicenter randomized controlled non-inferiority study

Marie-Laure Nisolle[1,2*†], Djamal Ghoundiwal[1,2†], Edgard Engelman[3], Walid El Founas[2], Jonathan Gouwy[4], Emmanuel Guntz[4], Panayota Kapessidou[2†] and Turgay Tuna[1†]

Abstract

Background The aim of this multicenter randomized interventional prospective study was to compare the ultrasound (US)-guided lumbar medial branch block (LMBB) with the fluoroscopy (FS)-guided LMBB in terms of analgesic efficacy and disability in the setting of the treatment of pain arising from the lumbar facet joints (LFJ).

Methods Fifty adults with a "LFJ" syndrome were randomized into two groups: in group FS, fluoroscopic-guidance was used to block the medial branch at three lumbar levels (L3-L4, L4-L5 and L5-S1); in group US, same blocks were performed under ultrasound. Needle transverse approach was used with both techniques. Effects of these procedures were assessed with a Visual Analogue Pain Scale (VAPS), the Oswestry Disability Index (ODI) and the Duke's Activity Status Index (DASI) scale, before the treatment, 1 week and 1 month after. Hospital Anxiety and Depression Scale (HADS) score was also collected before the procedure. Analysis of variance, one (for non-inferiority) and two-sided Mann-Whitney tests and Chi-square tests were performed.

Results LMBB under US-guidance was not inferior to FS-guidance ($P = 0.047$) in terms of VAPS, ODI and DASI at 1 week and 1 month. Duration of techniques and HADS were similar between groups ($=0.34$; $p = 0.59$).

Conclusions The medial lumbar bundle branch block under ultrasound-guidance is not inferior to the fluoroscopy-guidance procedure in effectively alleviating pain arising from the facet joints. Considering that this ultrasound

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

ULTRASOUND IN PAIN MEDICINE (SWOT ANALYSIS)

STRENGTHS	• Avoids exposure to ionising radiation • Selectivity and precision • Portability • Economics
WEAKNESS	• Increased training and anatomical knowledge required • Inter-observer variation • Obesity and artefacts • Reduced needle visibility with increasing depth • Difficult aseptic technique
OPPORTUNITY	• Less contraindications (e.g. pregnancy) • Better understanding of pain syndromes (diagnosis and treatment) • Imaging and interventions can be performed in the clinic setting • Widespread availability • Developing technology (fusion imaging)
THREATS	• Complications by inexperienced practitioners • Poor documentation and image storage • Misuse/overuse of techniques • Potential infection risks

Simpson, Krol, et al.

COMPARING THE USE OF FLUOROSCOPY VERSUS ULTRASOUND FOR PAIN INTERVENTIONS

INTERVENTION	FLUOROSCOPY	ULTRASOUND
SPINAL INJECTIONS		
Cervical MBB/FJI	++	++
Cervical transforaminal	++ (DSI)	-
Lumbar MBB	++	+
Lumbar FJI	++	++
Lumbar transforaminal	++ (DSI)	-
SI Joint/caudal epidural	++	++
SYMPATHETIC BLOCKS		
Stellate	?	++
Coeliac	++	+
Lumbar	++	+
Hypogastric	++	+
MUSCULOSKELETAL		
Peripheral nerves	-	++
Trigger point/intramuscular	-/+	++
Bursae/ligaments	-	++
Tendon	-	++
Joint injections	++	++
Functional assessment	-	++

++ = Strongly indicated
+ = Indicated
- = Not indicated/used
? = Historical use. May be superseded by ultrasound

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Simpson, Krol, et al.

„It´s tough to make predictions, especially about the future….“

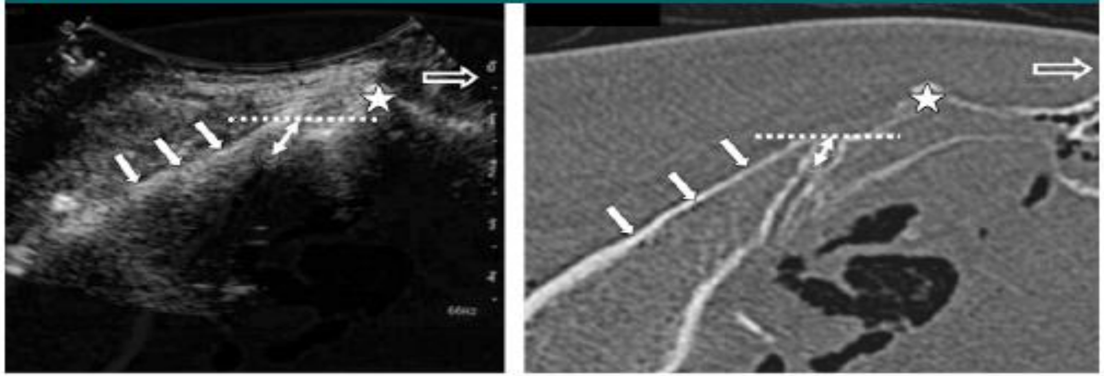
Yogi Berra, baseball-playing philosopher

Fusion of Real-time US with CT Images to Guide Sacroiliac Joint Injection in Vitro and in Vivo[1]

Radiology: Volume 256: Number 2—August 2010 ▪ *radiology.rsna.org*

Andrea S. Klauser, MD
Tobias De Zordo, MD
Gudrun M. Feuchtner, MD
Gabriel Djedovic, MD
Rosa Bellmann Weiler, MD
Ralph Faschingbauer, MD
Michael Schirmer, MD
Bernhard Moriggl, MD

Figure 3



a. b.

Figure 3: **(a)** US image with fused CT data superimposed in a cadaveric specimen and **(b)** corresponding CT image show intraarticular positioning of an ROI. The distance between bony entrance to the sacroiliac joint (dotted line) and intraarticular ROI can be measured (double arrow). After needle insertion into the hypoechoic cleft with real-time US guidance, the measurement reflects how much more the needle should be introduced to reach the intraarticular space. Open arrow = direction to the spinous process (not shown), solid arrows = dorsal cortical line of iliac bone, ★ = left median sacral crest.

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HiFu
High intensity focused ultrasound

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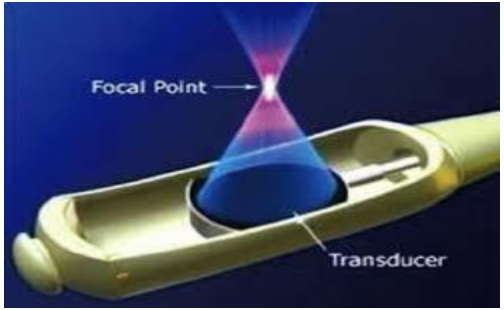


US-guided percut. nervestimulation

Herz-Jesu Krankenhaus Wien

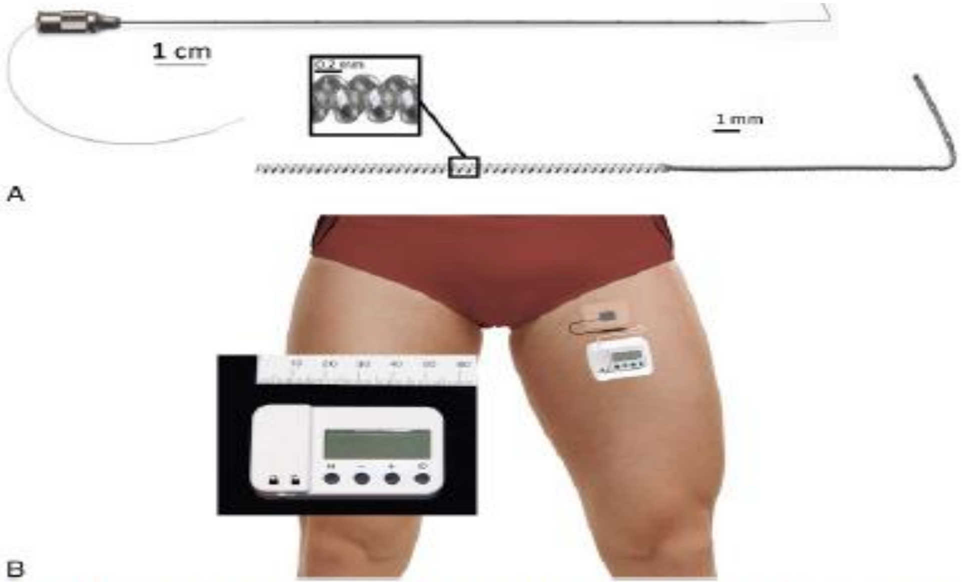
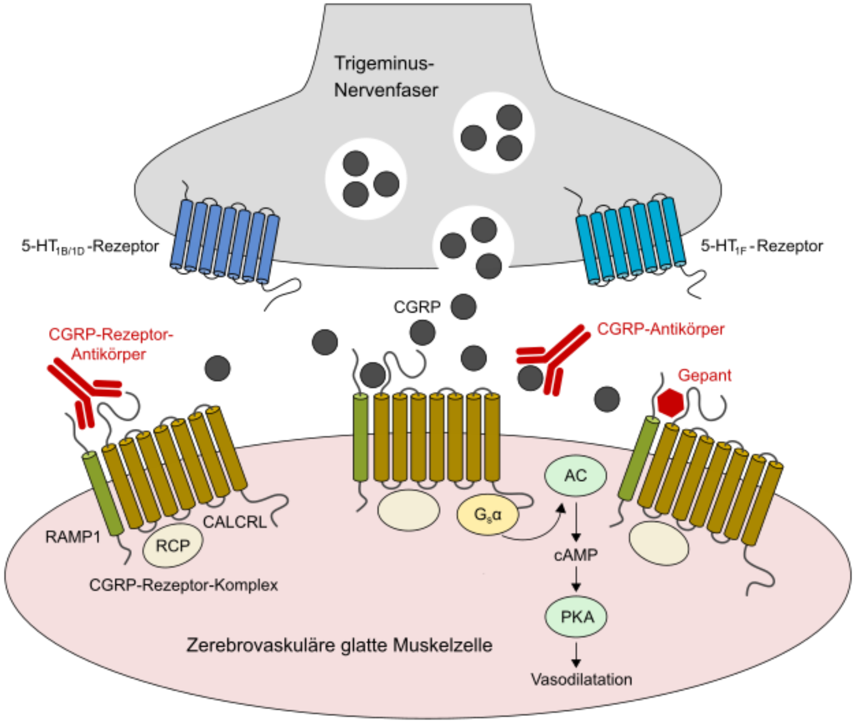


FIGURE 1. The PNS equipment used for this study: A 12.5-cm, 20-gauge needle with a preloaded helically coiled monopolar insulated electrical lead (A; MicroLead, SPR Therapeutics, Inc; illustration used with permission from B.M.I.) and a stimulator attached to the surface return electrode (B; SPR Therapeutics, Inc; illustration used with permission from B.M.I.). The power source (battery) for the pulse generator is integrated into the white surface return electrode pad.

Migräne und CGRP

Herz-Jesu Krankenhaus Wien



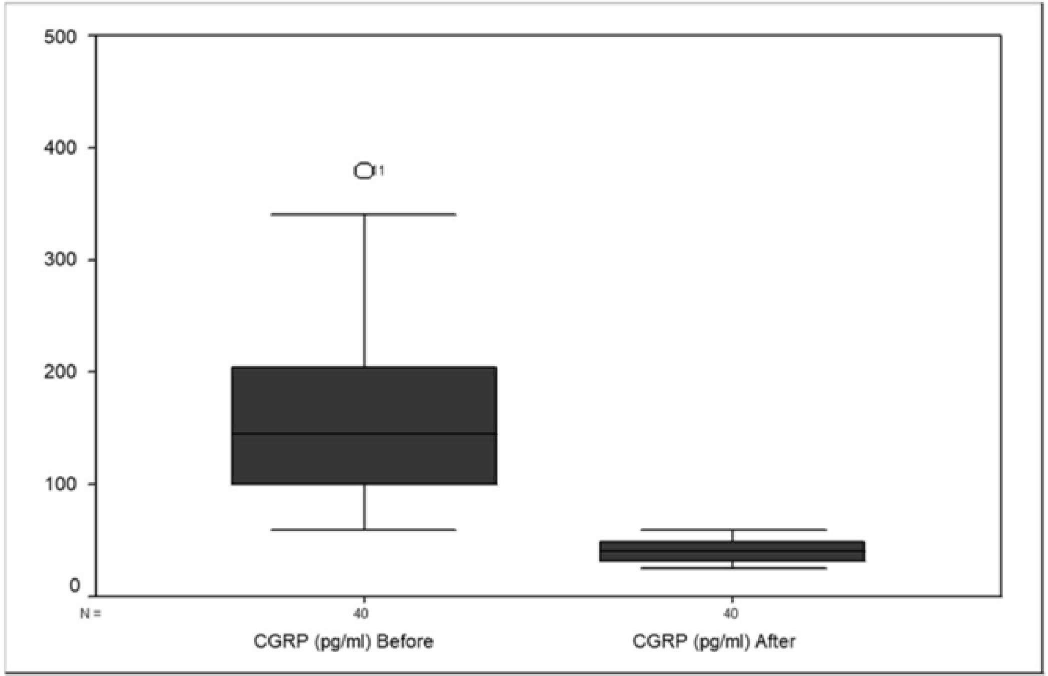
Grafik: wikipedia

- Monoklonale AK (s.c.):
  - Erenumab (Aimovig)
  - Galcanezumab (Emgality)
  - Fremanezumab (Ajovy)
  - Eptinezumap (Vypepti)
- CGRP-Rezeptorantagonisten/ Gepante:
  - Atogepant
  - Rimegepant (Vydura)
  - Ubrogepant

CGRP-Spiegel vor und nach Behandlung

Herz-Jesu Krankenhaus Wien

Neurol. Int. **2022**, *14*



Neurol. Int. **2022**, *14*

Article

Serum CGRP Changes following Ultrasound-Guided Bilateral Greater-Occipital-Nerve Block

Abdelrahman Abbas, Ramez Moustafa *, Ali Shalash, Mahmoud Haroun, Randa Amin, Sherien Borham, Ahmed Elsadek and Shahinaz Helmy

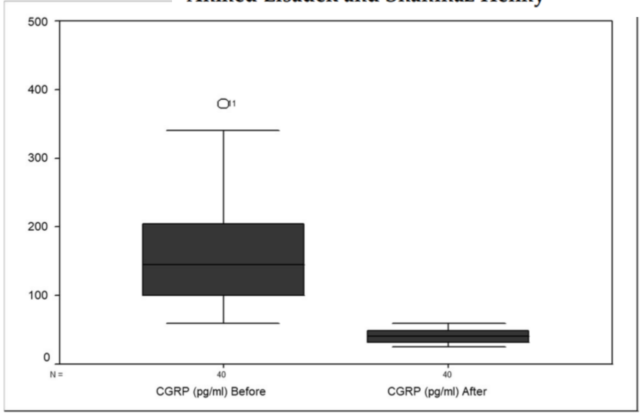


Figure 2. Box plot for interictal CGRP levels in chronic-migraine patients before and after GONB (n = 40).

Table 2. Interictal CGRP levels before and after GONB and its difference among response groups.

		Median	IQR	Kruskal-Wallis Test	
				X^2	p-Value
CGRP (pg/mL) Before	No Response	310	262.5–350	11.839	0.003 *
	Poor Response	135	100–200		
	Good Response	140	80–150		
CGRP (pg/mL) After	No Response	44	38.75–50	1.099	0.577
	Poor Response	41	31–45.75		
	Good Response	36	32.25–50		

* Means p value is significant.

Reduktion der Kopfschmerztage

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Krankenhaus Wien

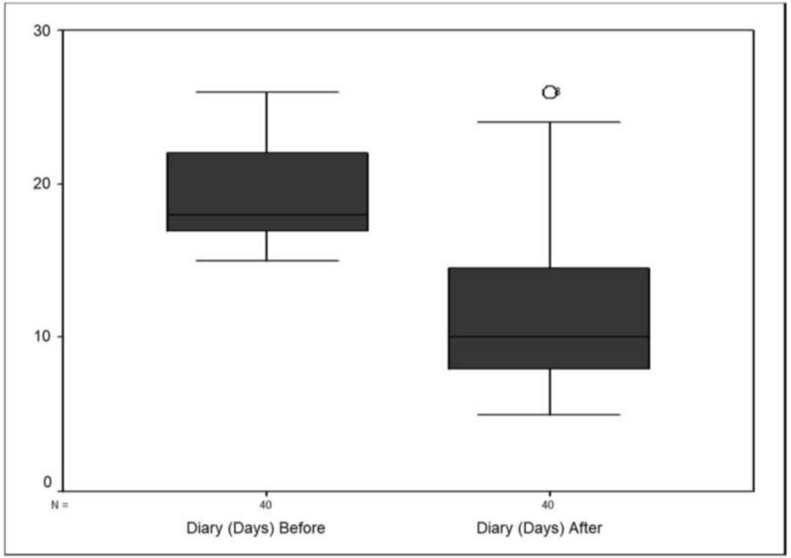


Figure 1. Box plot showing reduction in headache days after GONB (n = 40).

Thirty-four patients (85%) responded to GONB and the remaining six patients (15%) did not notice any response. Sixteen patients (40%) showed a good response while eighteen patients (45%) showed poor response, and there were no side effects reported from the procedure apart from mild injection-site pain in about twenty-four patients.

neurology international

Article

Serum CGRP Changes following Ultrasound-Guided Bilateral Greater-Occipital-Nerve Block

Abdelrahman Abbas, Ramez Moustafa *, Ali Shalash, Mahmoud Haroun, Randa Amin, Sherien Borham, Ahmed Elsadek and Shahinaz Helmy

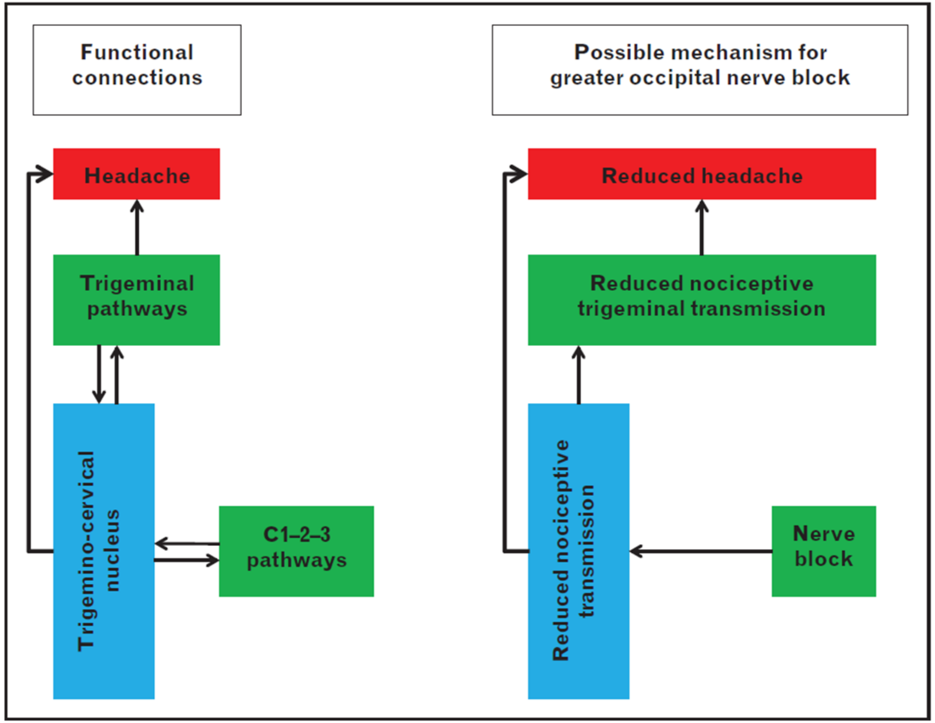
Department of Neurology, Faculty of Medicine, Ain Shams University, 12th Abbassiya Street, Cairo 08080, Egypt
* Correspondence: ramezm@msn.com

Abstract: Background: Calcitonin-gene-related peptide (CGRP) and CGRP receptors are expressed in trigeminal nerve cells, and treatments targeting CGRP are effective in migraines. For headaches that do not respond to pharmacological treatment, minimally invasive techniques such as greater-occipital-nerve block (GONB) can help relieve the pain and reduce the frequency of headaches. Our study assessed the efficacy of ultrasound-guided greater-occipital-nerve block (USgGONB) in chronic migraines (CM) and its relationship to serum CGRP levels. Methods: Forty chronic migraineurs who underwent bilateral USgGONB using 40 mg triamcinolone and 1 mL lidocaine were recruited and interictal serum CGRP samples were collected immediately before and one month after GONB. The clinical response was evaluated using headache diaries before and one month after USgGONB. The patient response was determined after USgGONB according to the reduction in headache days as a good responder (>50% reduction), poor responder (<50%) or non-responder. Results: Monthly headache days after GONB showed a significant reduction (median, 10 days; range, 8–14.7) compared to before the block (median, 18 days; range, 17–22; $p < 0.001$). Across all patients, interictal serum CGRP levels after USgGONB were significantly lower than before the block (median, 40 pg/mL (range, 25–60) vs. 145 pg/mL (range, 60–380) ($p = 0.001$). The pre-treatment interictal CGRP levels showed a significant difference ($p = 0.003$), as their levels in non-responders (median, 310 pg/mL; interquartile range, 262–350) were significantly higher than those seen in responders, whether poor responders (median, 135 pg/mL; interquartile range, 100–200 pg/mL) or good responders (median, 140 pg/mL; interquartile range, 80–150 pg/mL). Conclusion: the study showed the beneficial effect of USgGONB in chronic migraines that was associated with lowering interictal CGRP levels, implying a potential role for CGRP in the mechanism of action of GONB in CM, and the interictal CGRP level may be used as a predictor for the response to GONB.

Citation: Abbas, A.; Moustafa, R.; Shalash, A.; Haroun, M.; Amin, R.; Borham, S.; Elsadek, A.; Helmy, S. Serum CGRP Changes following Ultrasound-Guided Bilateral Greater-Occipital-Nerve Block. *Neurol. Int.* **2022**, *14*, 199–206. https://doi.org/10.3390/neurolint14010016

Trigemino-cervicaler Komplex

Herz-Jesu Krankenhaus Wien



Curatolo M, Curr Opin Anesth 2016

Herz-Jesu Krankenhaus Wien

Original research

Greater occipital nerve block modulates nociceptive signals within the trigeminocervical complex

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JH and JM contributed equally.

Received 18 February 2021
Accepted 28 June 2021

ABSTRACT

Introduction The pharmacological block of the greater occipital nerve has been proven effective in numerous headache and facial pain syndromes. This clinical effect supports the hypothesis of a strong functional interaction between the occipital and trigeminal nerves which has been proposed in neurophysiological in vivo experiments in rodents. Although it is likely that the interaction has to occur in the central nervous system, the exact site and the mechanisms of the interaction remain largely unknown.

Methods Focusing on these questions we investigated in a double-blind, placebo-controlled, randomised study the influence of an occipital nerve block with lidocaine 1% on neuronal activation in the trigeminocervical complex using high-resolution functional magnetic resonance on a 3T scanner. In order to investigate potential clinical effects on the trigeminal nerve, we further performed quantitative sensory testing and analysed a potential shift in thermal detection and pain thresholds.

Results The pharmacological block of the greater occipital nerve induced an occipital anaesthesia ipsilateral to the block. Functional imaging revealed that the occipital injection of lidocaine but not placebo significantly reduced nociceptive trigeminal activation.

Conclusions These data suggest that the functional inhibition of the occipital nerve block on trigeminal nociceptive activity is likely to occur at the C2 level where the occipital nerve enters the trigeminocervical complex and converges on the same central nuclei before the signal crosses the midline at that level and is then transmitted to higher processing centres.

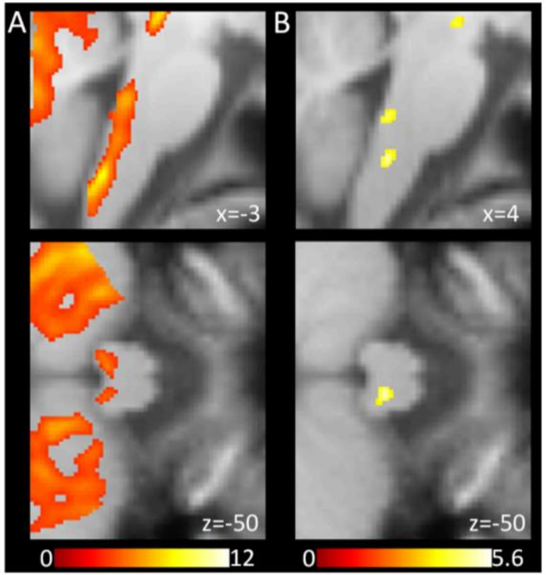

Figure 4 Activation of the spinal trigeminal nuclei in response to a nociceptive trigeminal stimulus (A) and its alteration after performing a block of the greater occipital nerve with lidocaine (B). Subfigure (A) shows the results for the main effect at a visualisation threshold of $p<0.001$ (uncorrected), while (B) displays results for the contrast placebo <lidocaine at the same threshold. Coordinates of the sagittal planes (top) were chosen for the individual peak voxel and for the transverse planes at the height of the lidocaine effect (bottom). T-values are colour-coded.

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REVISTA BRASILEIRA DE ANESTESIOLOGIA

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SCIENTIFIC ARTICLE

Bilateral greater occipital nerve block for treatment of post-dural puncture headache after caesarean operations

CrossMark

Esra Uyar Türkyilmaz[a,*], Nuray Camgöz Eryilmaz[a], Nihan Aydin Güzey[a], Özlem Moraloğlu[b]

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Received 3 December 2014; accepted 23 March 2015
Available online 21 January 2016

KEYWORDS
Post-dural puncture headache;
Caesarean operations;
GON block

Abstract
Background: Post-dural puncture headache (PDPH) is an important complication of neuroaxial anesthesia and more frequently noted in pregnant women. The pain is described as severe, disturbing and its location is usually fronto-occipital. The conservative treatment of PDPH consists of bed rest, fluid theraphy, analgesics and caffeine. Epidural blood patch is gold standard theraphy but it is an invasive method. The greater occipital nerve (GON) is formed of sensory fibers that originate in the C2 and C3 segments of the spinal cord and it is the main sensory nerve of the occipital region. GON blockage has been used for the treatment of many kinds of headache. The aim of this retrospective study is to present the results of PDPH treated with GON block over 1 year period in our institute.
Methods: 16 patients who had been diagnosed to have PDPH, and performed GON block after caesarean operations were included in the study. GON blocks were performed as the first treatment directly after diagnose of the PDPH with levobupivacaine and dexamethasone.
Results: The mean VAS score of the patients was 8.75 (±0.93) before the block; 3.87 (±1.78) 10 min after the block; 1.18 (±2.04) 2 h after the block and 2.13 (±1.64) 24 h after the block. No adverse effects were observed.
Conclusions: Treatment of PDPH with GON block seems to be a minimal invasive, easy and effective method especially after caesarean operations. A GON block may be considered before the application of a blood patch.

Herz-Jesu Krankenhaus Wien

Open Access

Original Article

Ultrasound-guided bilateral greater occipital nerve block for the treatment of post-dural puncture headache

Fethi Akyol[1], Orhan Binici[2], Ufuk Kuyrukluyildiz[3], Guldane Karabakan[4]

ABSTRACT
Background and Objective: Post-dural puncture headache (PDPH) is one of the complications frequently observed after spinal or epidural anesthesia with dural penetration. For PDPH patients who do not respond to conservative medical treatment, alternative treatments such as bilateral occipital nerve block should be considered. In this study the efficacy of bilateral occipital nerve block was retrospectively evaluated in patients with post-dural puncture headache.
Methods: Ultrasound-guided bilateral occipital nerve block was administrated in 21 patients who developed PDPH after spinal anesthesia, but did not respond to conservative medical treatment within 48 hours between January 2012 and February 2014. The study was conducted at Erzincan University Faculty of Medicine Gazi Mengucek Education and Research Hospital
Results: Mean Visual Analog Scale (VAS) pain scores at 10 minutes and 6, 10, 15 and 24 hours after the block were significantly improved compared to the patients with a pre-block VAS score between 4 and 6 as well as patients with a pre-block VAS score between 7 and 9 (p<0.01). After 24 hours of the block applied, VAS pain score dropped to 1 for all 12 patients who had a pre-block VAS score between 4 and 6. Whereas, VAS score decreased to 2 at 24 hours after the block in only one of the patients with a pre-block VAS between 7 and 9. For the patients with a pre-block VAS score between 7 and 9, there was no significant improvement in the mean VAS score 24 hours after the block.
Conclusions: For patients with PDPH and a pre-block VAS score between 4 and 6 who do not respond to conservative medical treatment, an ultrasound-guided bilateral occipital nerve block may be effective.

KEY WORDS: Greater occipital nerve, Post-dural pain headache, Ultrasound.

doi: http://dx.doi.org/10.12669/pjms.311.5759

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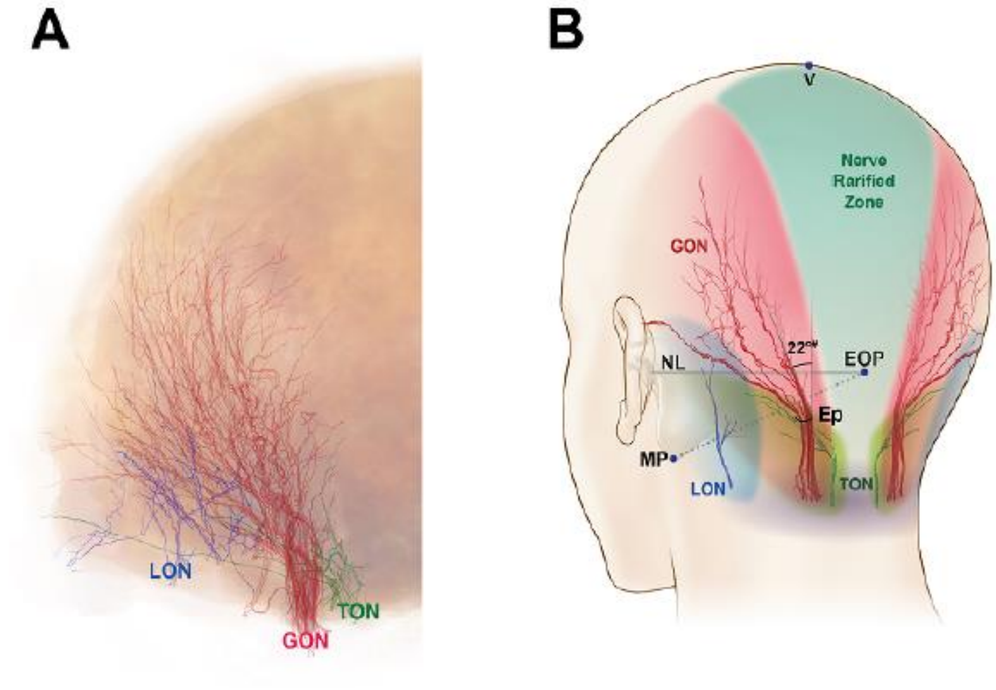
Nervus occipitalis major GON (und minor LON)

Herz-Jesu Krankenhaus Wien

Journal of Pain Research 2018:11 2023–2031



Sonographic visualization and ultrasound-guided blockade of the greater occipital nerve: a comparison of two selective techniques confirmed by anatomical dissection

M. Greher[1]*, B. Moriggl[2], M. Curatolo[4], L. Kirchmair[3] and U. Eichenberger[4]

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**Corresponding author. E-mail: manfred.greher@kh-herzjesu.at*

Herz-Jesu Krankenhaus Wien

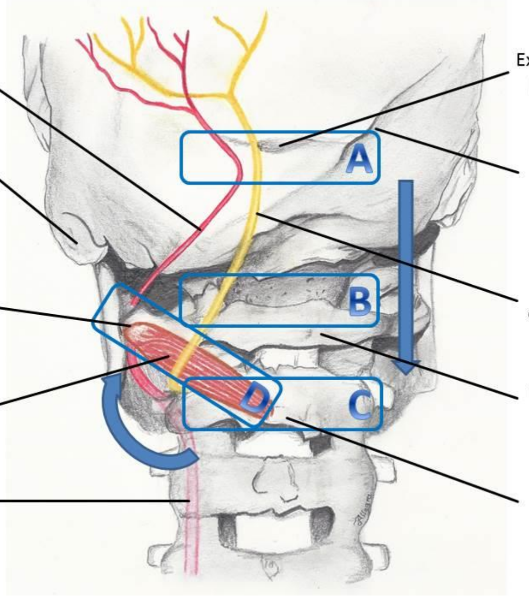
Background. Local anaesthetic blocks of the greater occipital nerve (GON) are frequently performed in different types of headache, but no selective approaches exist. Our cadaver study compares the sonographic visibility of the nerve and the accuracy and specificity of ultrasound-guided injections at two different sites.

Methods. After sonographic measurements in 10 embalmed cadavers, 20 ultrasound-guided injections of the GON were performed with 0.1 ml of dye at the classical site (superior nuchal line) followed by 20 at a newly described site more proximal (C2, superficial to the obliquus capitis inferior muscle). The spread of dye and coloration of nerve were evaluated by dissection.

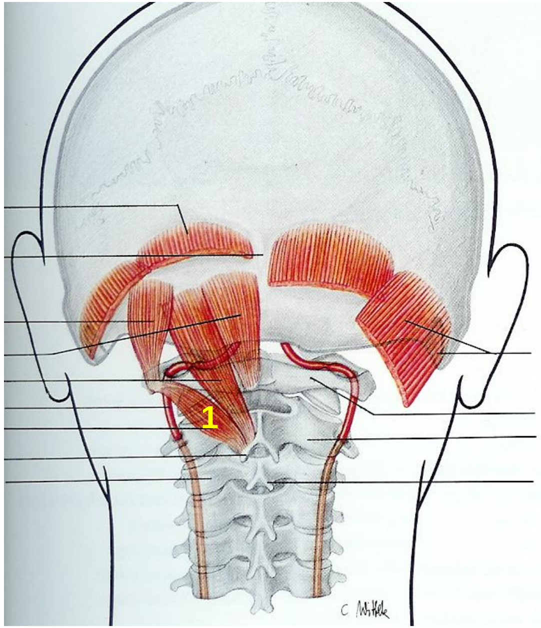
Results. The median sonographic diameter of the GON was 4.2×1.4 mm at the classical and 4.0×1.8 mm at the new site. The nerves were found at a median depth of 8 and 17.5 mm, respectively. In 16 of 20 in the classical approach and 20 of 20 in the new approach, the nerve was successfully coloured with the dye. This corresponds to a block success rate of 80% (95% confidence interval: 58–93%) *vs* 100% (95% confidence interval: 86–100%), which is statistically significant (McNemar's test, P=0.002).

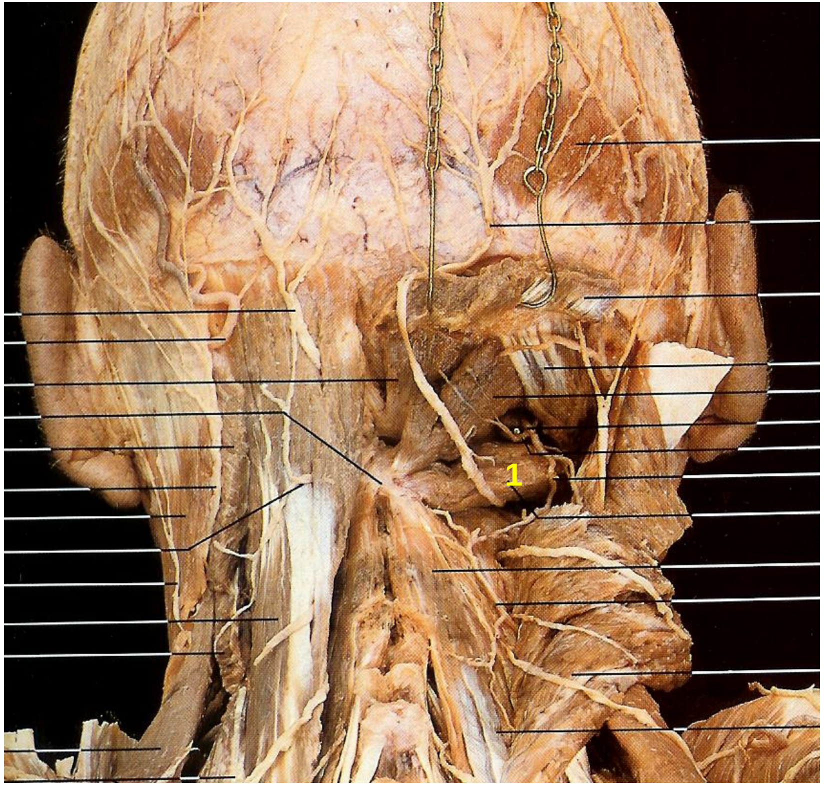
Conclusions. Our findings confirm that the GON can be visualized using ultrasound both at the level of the superior nuchal line and C2. This newly described approach superficial to the obliquus capitis inferior muscle has a higher success rate and should allow a more precise blockade of the nerve.

Br J Anaesth 2010

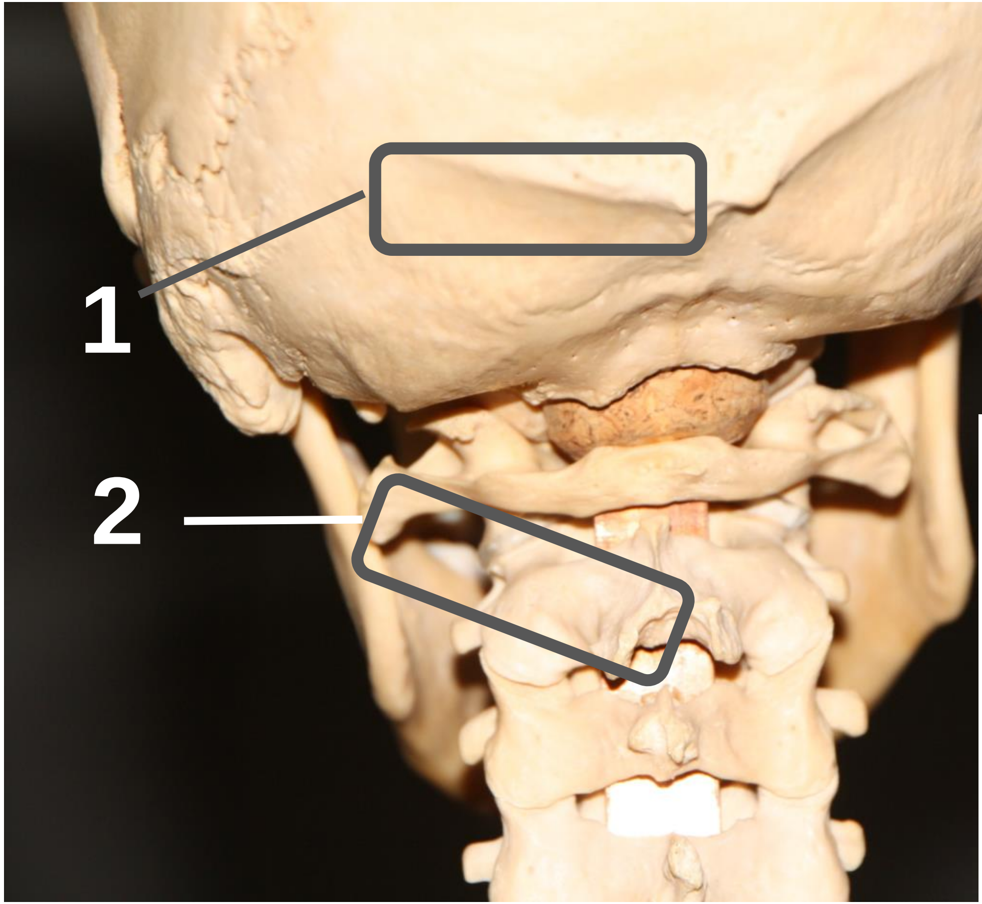


GON





1 = M. obliquus capitis inferior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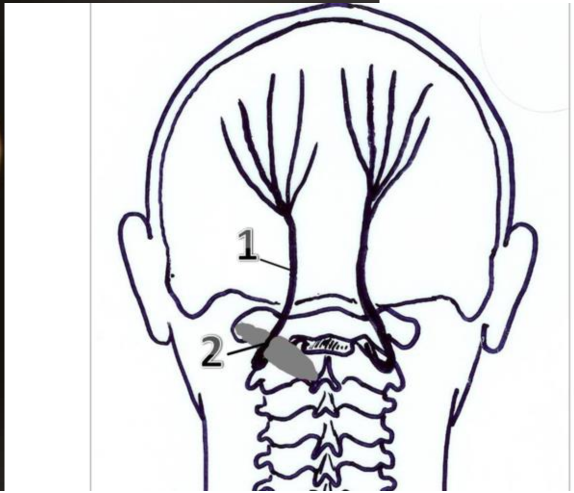

1
2

GON-Block:
Egal wo und ob mit Ultraschall?

Objectives:

The purpose of this single center, prospective randomized controlled trial was to compare clinical outcomes between an ultrasound-guided greater occipital nerve block (GONB) at the C2 vertebral level versus landmark-based GONB at the superior nuchal line.

Methods:

Patients with occipital neuralgia or cervicogenic headache were randomized to receive either a landmark-based GONB with sham ultrasound at the superior nuchal line or ultrasound-guided GONB at the C2 vertebral level with blinding of patients and data analysis investigators. Clinical outcomes were assessed at 30 minutes, 2 weeks, and 4 weeks postinjection.

Results:

Thirty-two patients were recruited with 16 participants in each group. Despite randomization, the ultrasound-guided GONB group reported higher numeric rating scale (NRS) scores at baseline. Those in the ultrasound-guided GONB group had a significant decrease in NRS from baseline compared with the landmark-based GONB group at 30 minutes (change of NRS of 4.0 vs. 2.0) and 4-week time points (change of NRS of 2.5 vs. −0.5). Both groups were found to have significant decreases in Headache Impact Test-6. The ultrasound-guided GONB had significant improvements in NRS, severe headache days, and analgesic use at 4 weeks when compared with baseline. No serious adverse events occurred in either group.

Conclusions:

Ultrasound-guided GONBs may provide superior pain reduction at 4 weeks when compared with landmark-based GONBs for patients with occipital neuralgia or cervicogenic headache.

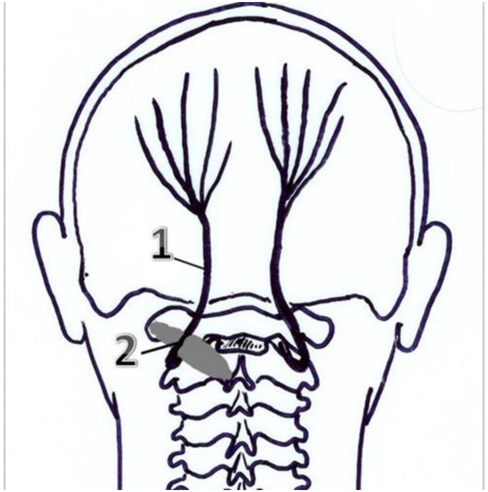
Comparative Effectiveness of Landmark-guided Greater Occipital Nerve (GON) Block at the Superior Nuchal Line Versus Ultrasound-guided GON Block at the Level of C2

A Randomized Clinical Trial (RCT)

Kissoon, Narayan R. MD[*,†]; O'Brien, Travis G. MD[‡]; Bendel, Markus A. MD[*]; Eldrige, Jason S. MD[§]; Hagedorn, Jonathan M. MD[*]; Mauck, William D. MD[*]; Moeschler, Susan M. MD[*]; Olatoye, Oludare O. MD[*]; Pittelkow, Thomas P. DO, MPH[*]; Watson, James C. MD[*,†]; Pingree, Matthew J. MD[*]

Author Information

The Clinical Journal of Pain 38(4):p 271-278, April 2022. | *DOI:* 10.1097/AJP.0000000000001023



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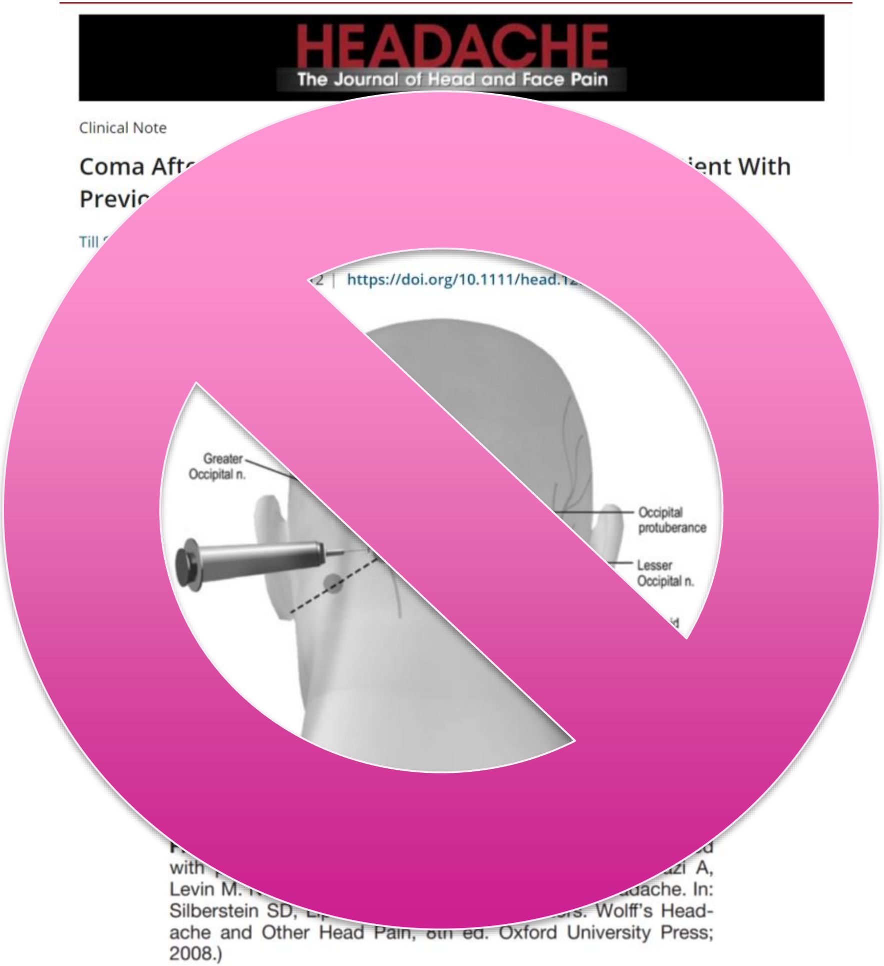
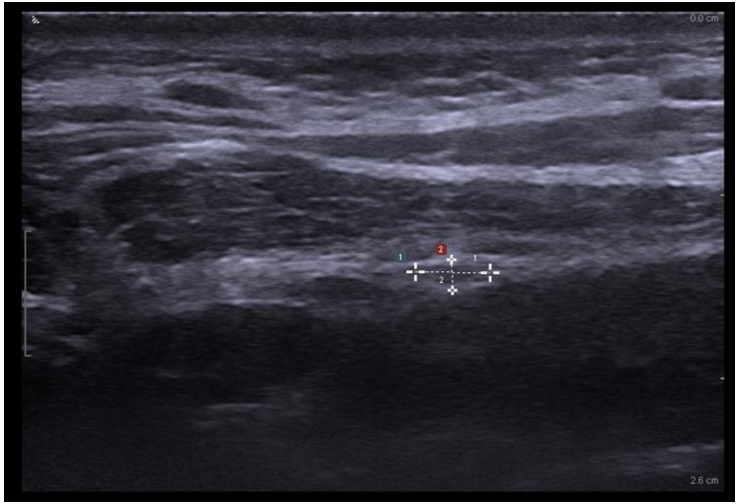
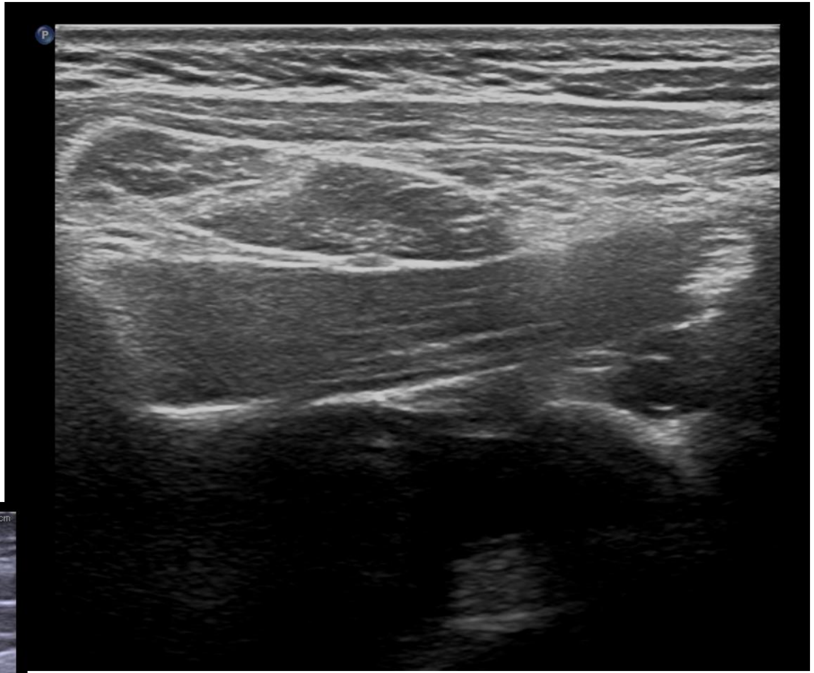
Vorteile
Ultraschall-gezielter Verfahren

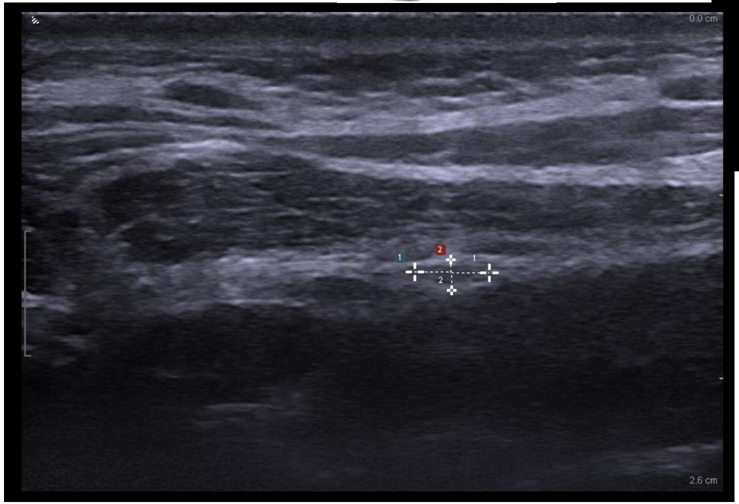


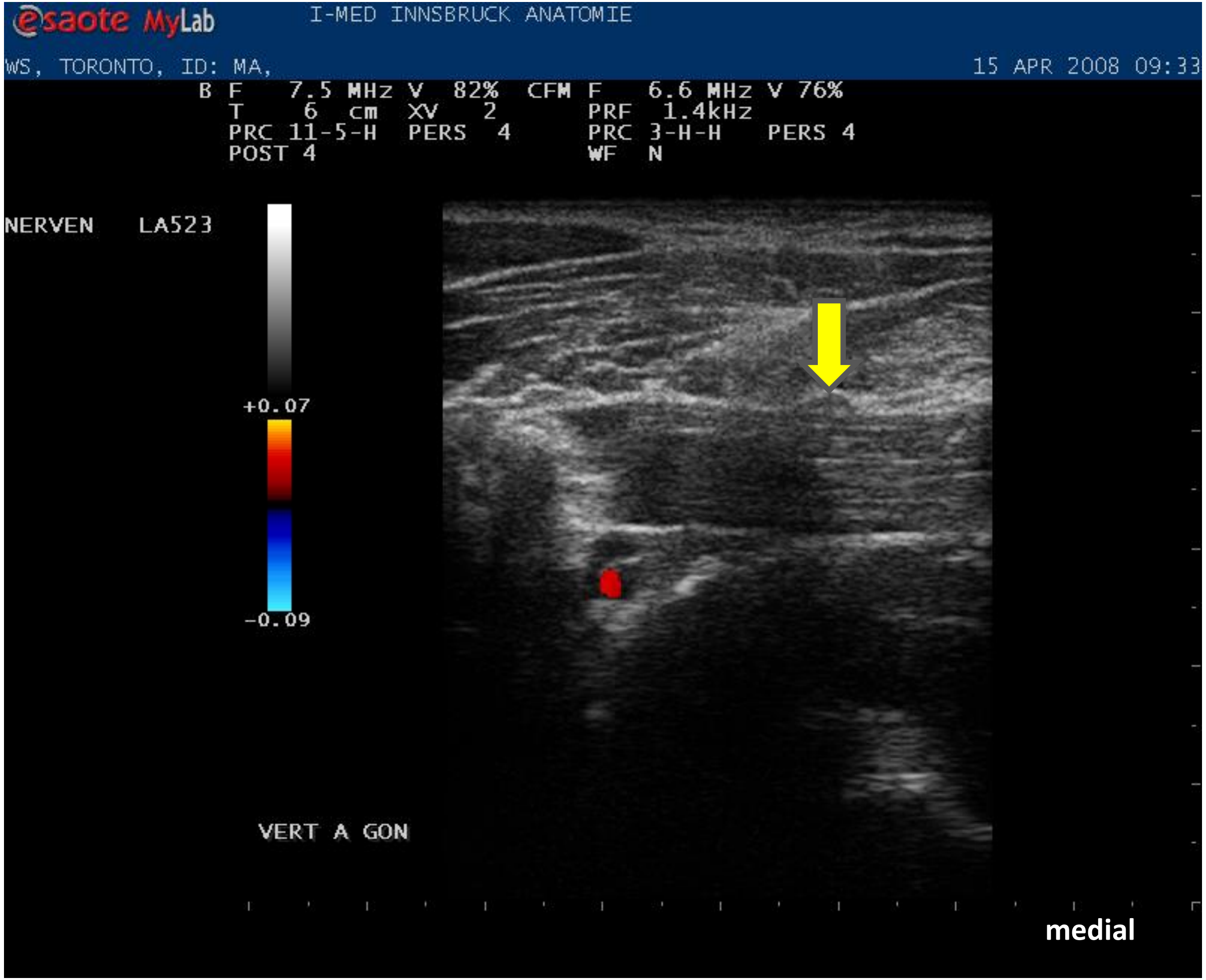



0
1
2
CINE
84
2.9 cm
L12-3
Nerve
MI: 1.5 TIS: 0.1
Secma
2D: G: 71
Res DR: 0
MB
THI

GON







M. Greher 2023

Herz-Jesu
Krankenhaus Wien

Ganglion stellatum Blockade

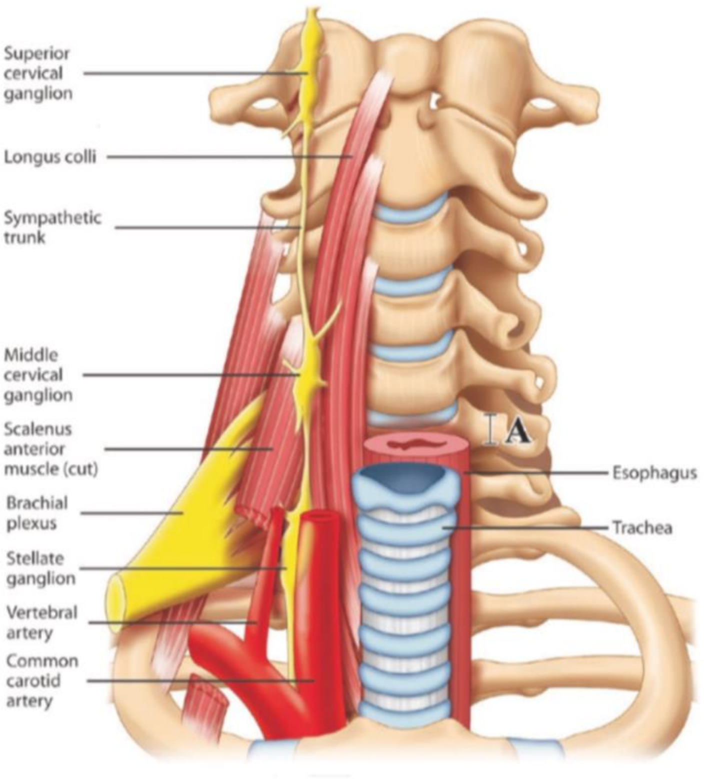
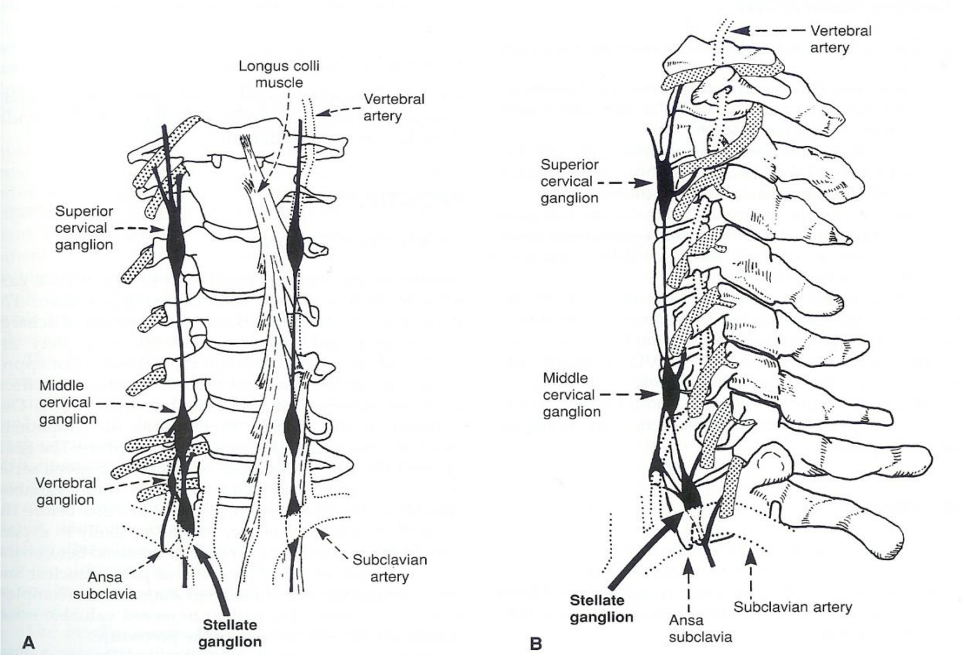


Fig. 3.1 Anatomy of cervical sympathetic chain. (Reprint with permission from Philip Peng Educational Series)



Ultrasound Imaging for Stellate Ganglion Block: Direct Visualization of Puncture Site and Local Anesthetic Spread

A Pilot Study

Stephan Kapral, M.D., Peter Krafft, M.D., Max Gosch, M.D., Dominik Fleischmann, M.D.,* and Christian Weinstabl, M.D.

326 Regional Anesthesia Vol. 20 No. 4 July–August 1995

Table 1. Quality Scores of Stellate Ganglion Block for Both Groups 10 Minutes After the Administration of Local Anesthetic Solution*

	Number of Patients			
	Group A		Group B	
Quality Score	Vasodilation	Horner's syndrome	Vasodilation	Horner's syndrome
0	1	2	0	0
I	11	10	12	12
II	0	0	0	0

*Group A, blind technique; group B, imaging technique.

Table 2. Quality Scores of Stellate Ganglion Block for Both Groups 30 Minutes After the Administration of Local Anesthetic Solution*

	Number of Patients			
	Group A		Group B	
Quality Score	Vasodilation	Horner's syndrome	Vasodilation	Horner's syndrome
0	0	1	0	0
I	9	10	8	8
II	3	1	4	4

*Group A, blind technique; group B, imaging technique.

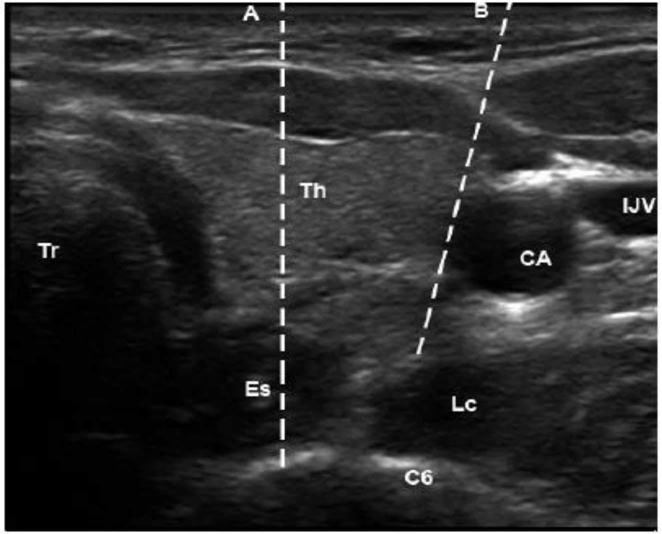
-Pain Physician 2007; 10:747-752 • ISSN 1533-3159

Herz-Jesu Krankenhaus Wien

Technical Report

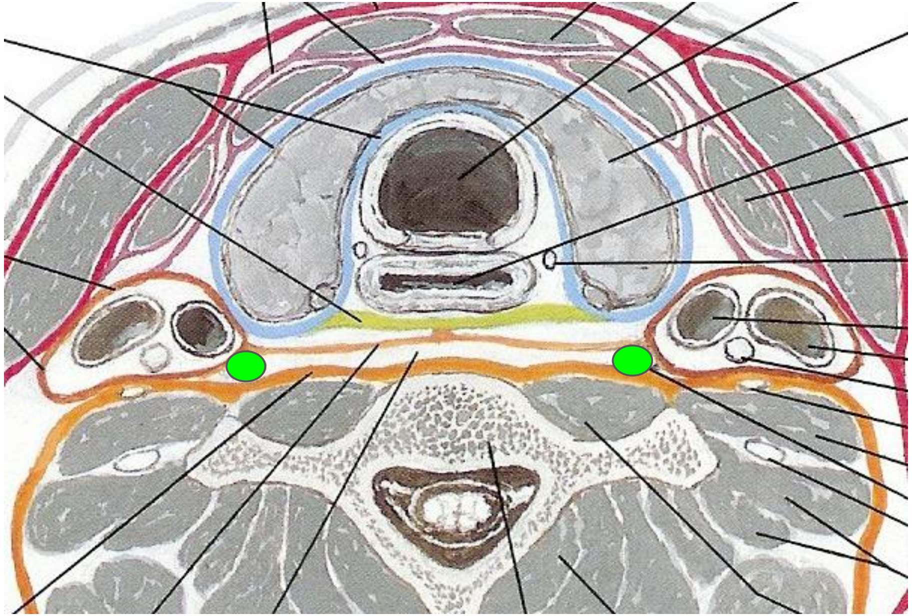
Ultrasound-guided Stellate Ganglion Block Successfully Prevented Esophageal Puncture

Samer Narouze, MD, Amaresh Vydyanathan, MD, and Nilesh Patel, MD



Ultrasound-guided stellate ganglion block may improve the safety of the procedure by direct visualization of the related anatomical structures and accordingly the risk of thyroid gland and vessels, vertebral artery, or esophagus injury may be minimized. Also ultrasound guidance will allow direct monitoring of the spread of the LA and hence complications like RLN palsy, intrathecal, epidural, or intravascular spread may be minimized as well.

Richtige Schichte:
Prävertebrale Faszie über dem M. longus colli



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OOP medial der Carotis

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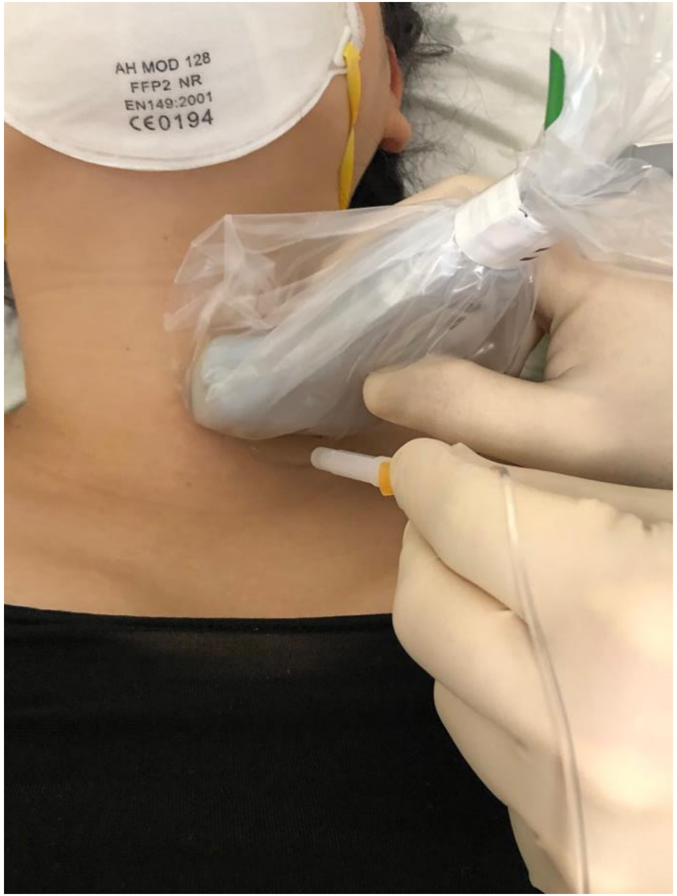

Horner Syndrom:
Ptosis, Myosis, Enophthalmus

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CRPS 1: Morbus Sudeck

Randomized Trial

Effect of Early Stellate Ganglion Blockade for Facial Pain from Acute Herpes Zoster and Incidence of Postherpetic Neuralgia

Mohamed Y. Makharita, MD[1], Yasser Mohamed Amr, MD[2], and Youssef El-Bayoumy, MD[1]

Pain Physician: November/December 2012; 15:467-474

Table 1. *Demographic data and patient's outcome in the studied groups. Values are in mean ±SD and in number (%). Group 1: placebo group. Group 2: stellate ganglion block group.*

Groups	Group 1 (n=30)	Group 2 (n=31)	*P* value
Age (years)	59.6 ± 3.2	60.6±2.2	0.14
Sex (male/ female)	14/16	13/18	0.71
Side (right/ left)	16/14	17/14	0.91
Incidence of PHN			
3 months	8/30 (26.7%)	2/31* (6.5%)	0.043
6 months	4/30 (13.3%)	0/31 * (0 %)	0.035
Patient Satisfaction Score			
3 months	2.2 ± 1.3	2.8 ± 1.1*	0.03
6 months	2.4 ± 0.5	3 ± 0.0*	0.004
Time of first block (days)	5.17 ± 0.8	6.26 ± 0.6	0.63
Duration of pain (days)	43.6 ± 28.7	23.8 ± 18*	0.002

* Significant when compared to the other group

Table 2. *Visual Analogue Score in the studied groups. Values are in mean ± SD. Group 1: placebo group. Group 2: stellate ganglion block group.*

	Basal	1 week	2 weeks	3 weeks	4 weeks	6 weeks	2 months	3 months	6 months
Group1	7.1 ± 1.1	4.7 ± 1.1	3.8 ± 1.3	2.8 ± 1.8	1.8 ± 2	1.1 ± 1.9	1.1 ± 1.9	1.1 ± 1.8	0.4 ± 1.1
Group2	7 ± 0.9	2.9 ± 0.6*	1.7 ± 0.8*	0.7 ± 1*	0.1 ± 0.6*	0.2 ± 0.7*	0.2 ± 0.5*	0.13 ± 0.5*	0 ± 0*
P value	0.79	< 0.001	< 0.001	< 0.001	< 0.001	0.014	0.015	0.007	0.042

* Significant when compared to the other group

KJP The Korean Journal of Pain | Review Article |

Korean J Pain 2017 January; Vol. 30, No. 1: 3-17
pISSN 2005-9159 eISSN 2093-0569
https://doi.org/10.3344/kjp.2017.30.1.3

Effects of applying nerve blocks to prevent postherpetic neuralgia in patients with acute herpes zoster: a systematic review and meta-analysis

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[2]Department of Anesthesiology and Pain Medicine, Asan Medical Center, University of Ulsan College of Medicine, Seoul,
[3]Department of Anesthesiology and Pain Medicine, Kangwon National University Hospital, Chuncheon, Korea

Hyun Jung Kim[1,*], Hyeong Sik Ahn[1,*], Jae Young Lee[2], Seong Soo Choi[2], Yu Seon Cheong[3], Koo Kwon[2], Syn Hae Yoon[2], and Jeong Gill Leem[2]

Background: Postherpetic neuralgia (PHN) is a common and painful complication of acute herpes zoster. In some cases, it is refractory to medical treatment. Preventing its occurrence is an important issue. We hypothesized that applying nerve blocks during the acute phase of herpes zoster could reduce PHN incidence by attenuating central sensitization and minimizing nerve damage and the anti-inflammatory effects of local anesthetics and steroids.

Methods: This systematic review and meta-analysis evaluates the efficacy of using nerve blocks to prevent PHN. We searched the MEDLINE, EMBASE, Cochrane Library, ClinicalTrials.gov and KoreaMed databases without language restrictions on April, 30 2014. We included all randomized controlled trials performed within 3 weeks after the onset of herpes zoster in order to compare nerve blocks vs active placebo and standard therapy.

Results: Nine trials were included in this systematic review and meta-analysis. Nerve blocks reduced the duration of herpes zoster-related pain and PHN incidence of at 3, 6, and 12 months after final intervention. Stellate ganglion block and single epidural injection did not achieve positive outcomes, but administering paravertebral blockage and continuous/repeated epidural blocks reduced PHN incidence at 3 months. None of the included trials reported clinically meaningful serious adverse events.

Conclusions: Applying nerve blocks during the acute phase of the herpes zoster shortens the duration of zoster-related pain, and somatic blocks (including paravertebral and repeated/continuous epidural blocks) are recommended to prevent PHN. In future studies, consensus-based PHN definitions, clinical cutoff points that define successful treatment outcomes and standardized outcome-assessment tools will be needed. (Korean J Pain 2017; 30: 3-17)

Herz-Jesu Krankenhaus Wien

Breiteste Indikationen (to be discussed!):

Sympathisch unterhaltener Schmerz (CRPS)
Postzoster Neuralgie
Persistierender idiopathischer Gesichtsschmerz
Posttraumatisches Stresssyndrom (PTSD)
Tinnitus
Hot flashes (postmenopausale „Wallungen“)
Therapierefraktäre VTs
Colitis ulcerosa
Post Covid Syndrom

Akutschmerztherapie?

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

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]

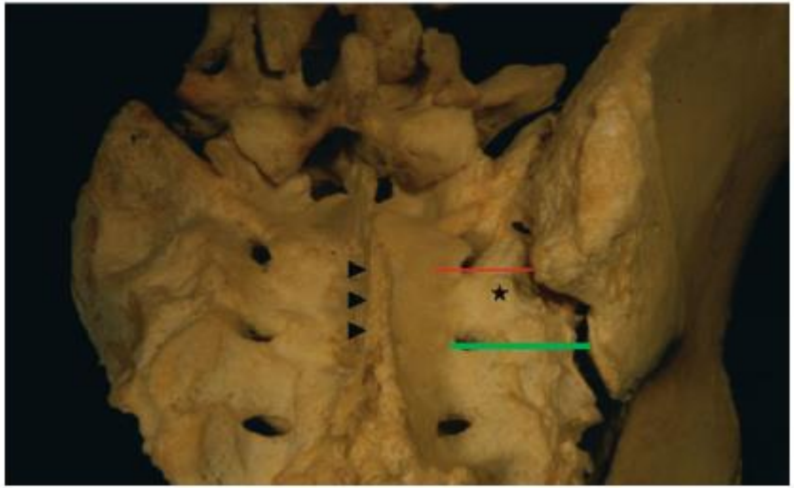
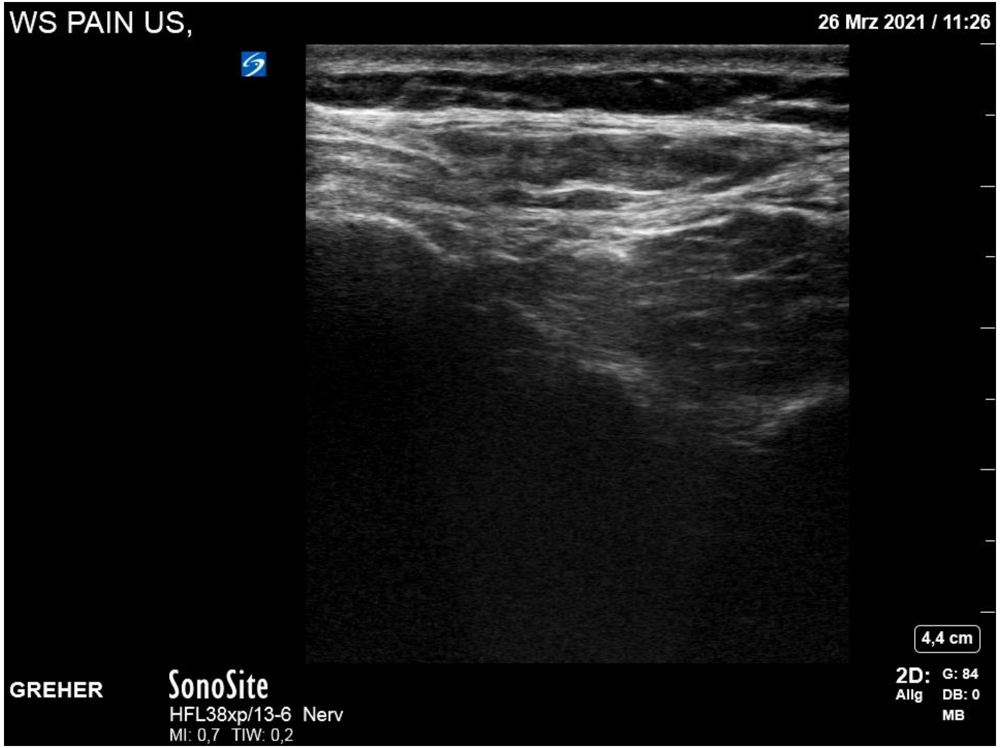


Figure 1. Bony landmarks of the sacroiliac joint. The red line shows the upper level (at the level of the posterior sacral foramen 1) and the green line shows the lower level (at the level of the posterior sacral foramen 2). Arrowheads show the median sacral crest, and the star indicates the lateral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

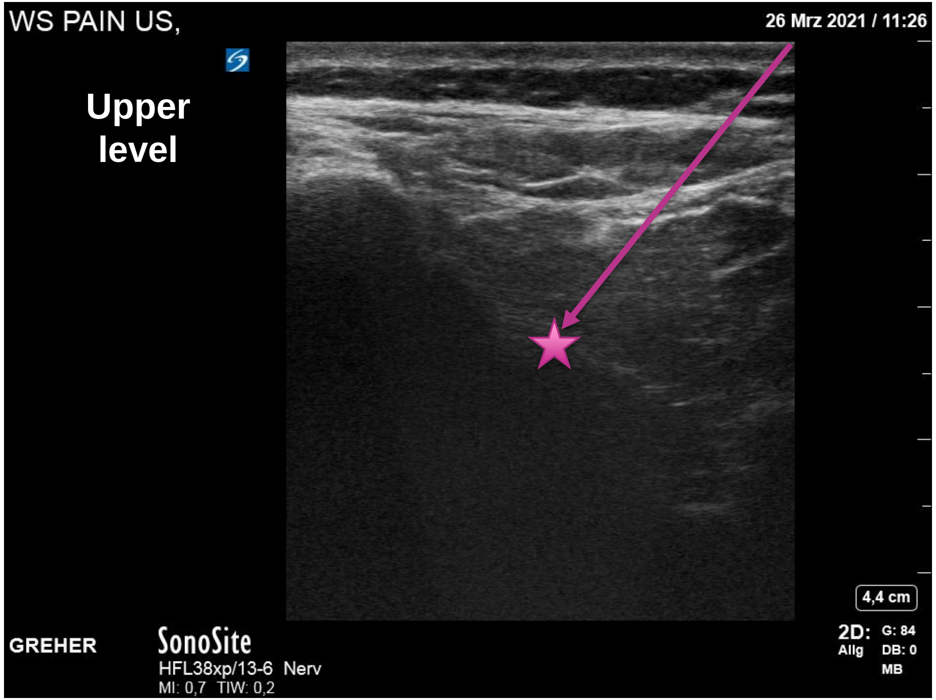
Sacroiliac Joint Injection (upper level):

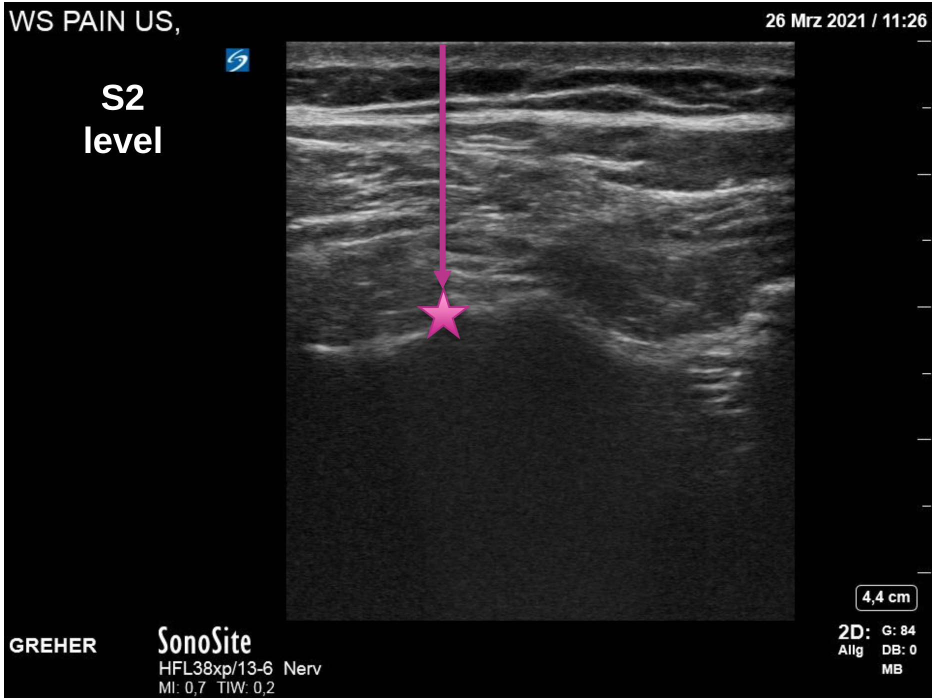
Sacroiliac Joint Injection (S2 level):

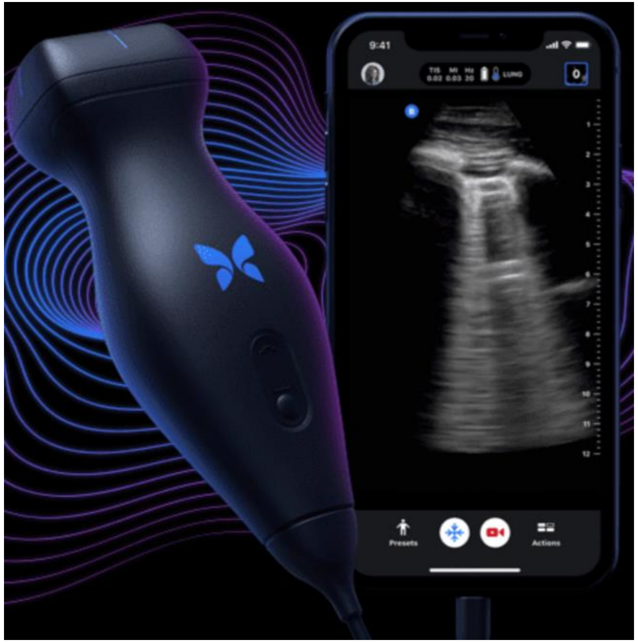
Sacroiliac Joint Injection:



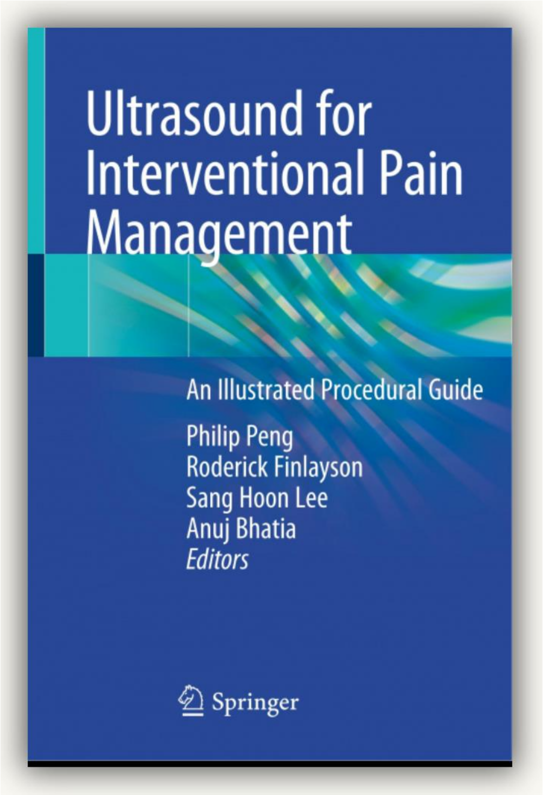
Sacroiliac Joint Injection:

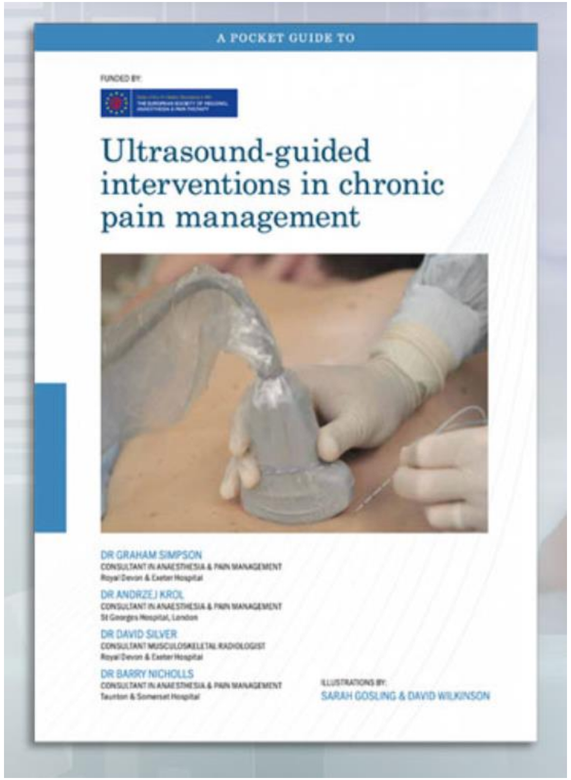






Butterfly IQ





https://www.vinzenzgruppe.at/veranstaltungen/kongresstage

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