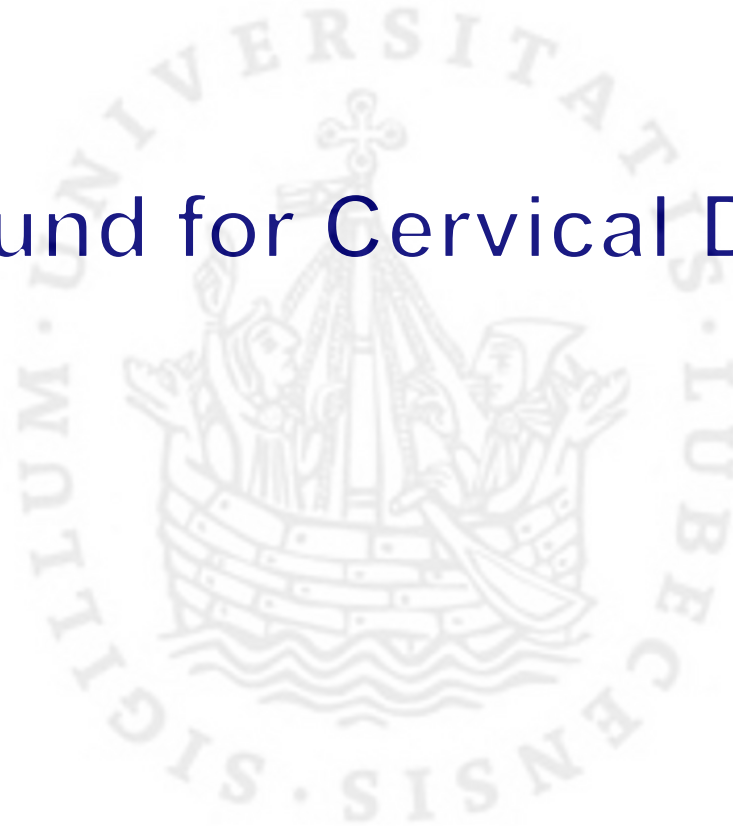
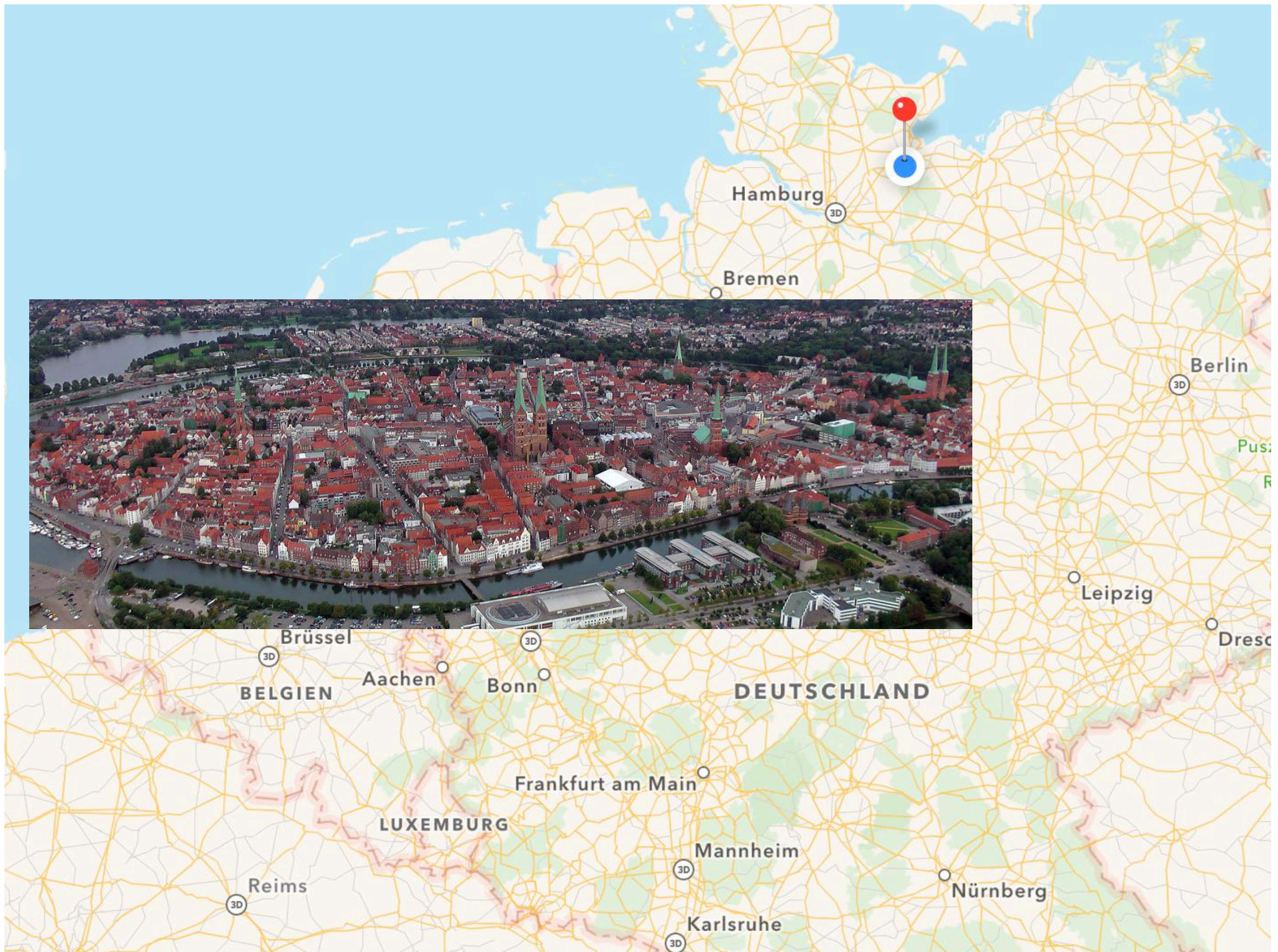


Ultrasound for Cervical Dystonia





- Ultrasound for guided injection
 - Ultrasound for diagnostic in cervical dystonia
-

Question 1:

- Are you using ultrasound in diagnostic or treatment of dystonia?
 - Yes
 - No

Question 2:

- How many dystonia patients do you treat with botulinumtoxin per week
 - 0-1
 - 2-10
 - 10-20
 - >20

- Head tremor, high age (Misra VP; *BMJ open*. 2012)
- Psychiatric disease, severe dystonic syndrom (Skogseid; *Eur J Neurol*. 2007)
- Side effects, high dosage, number of other treatments, neuroleptics (Ferreira; *Movement Disord*. 2013)

- Wrong pattern
- Change of Injector
- Deep muscles involved
- Reproductively of the injection protocol
 - Standardising of treatment

TABLE 2 | Optimization of BoNT treatment for CD.

What is the recommended initial dose for treatment of CD with abobotulinumtoxinA?	500 IU (although other dosages might be used)	A
What is the recommended initial dose for treatment of CD with incobotulinumtoxinA?	120 IU	B
What is the recommended initial dose for treatment of CD with onabotulinumtoxinA?	No recommendation	U
What is the recommended initial dose for treatment of CD with rimabotulinumtoxinB?	2,500 or 5,000 IU 10,000 IU	B A
Can prior polymyographic EMG (pEMG) and EMG guidance improve the treatment outcome in treatment-naïve patients?	Yes	A
Can prior pEMG and EMG guidance improve the treatment outcome in patients with deterioration of treatment effect?	Yes	C
Are multiple-points injections per muscle more effective than single-point injections?	Yes	U
Can additional physiotherapy improve the effect of BoNT treatment?	No (motor improvement as measured by TWSTRS or Tsui score) Yes (disability and pain and prolongs the effect of BoNT)	C U

BoNT, botulinum neurotoxin; CD, cervical dystonia; EMG, electromyography; TWSTRS, Toronto Western Spasmodic Torticollis Rating Scale.

TABLE 4 | Side effects and contraindications of BoNT treatment for CD.

What is the most effective to avoid dysphagia?	The additional use of ultrasound may lessen recurrent dysphagia	U
What is the most effective strategy in case of neck muscles paresis?	The use of a soft collar can relieve the symptoms of neck extensor muscles paresis	U
What is the most effective strategy to prevent injection pain?	Skin cooling or local application of anesthetic cream reduce injection pain	U
Is BoNT treatment safe during pregnancy and lactation?	BoNT treatment during pregnancy and lactation is not recommended and should be avoided whenever possible	U
Is BoNT treatment safe for CD patients who use anticoagulants?	The risk of hematoma following BoNT treatment by concomitant use of coumarin derivatives is low	U
Is BoNT treatment safe for CD patients with concomitant neurological comorbidities?	Patients with concomitant impairment of neuromuscular transmission may experience clinical deterioration after BoNT treatment, although in selected cases treatment might be safe and beneficial	U

BoNT, botulinum neurotoxin; CD, cervical dystonia.

The Accuracy of Needle Placement in Extremity Muscles: A Blinded Study

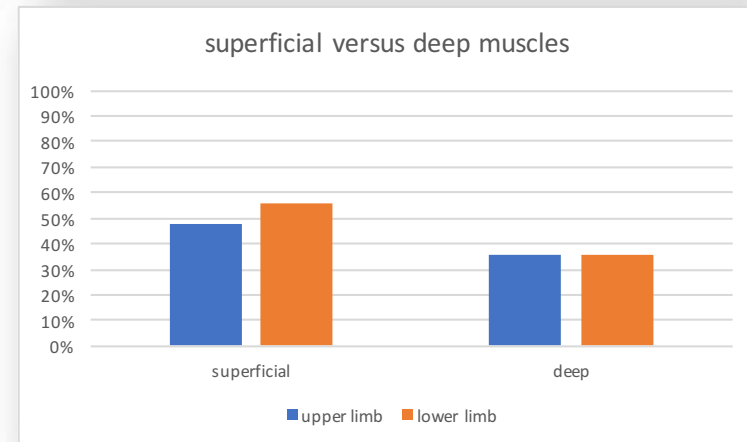
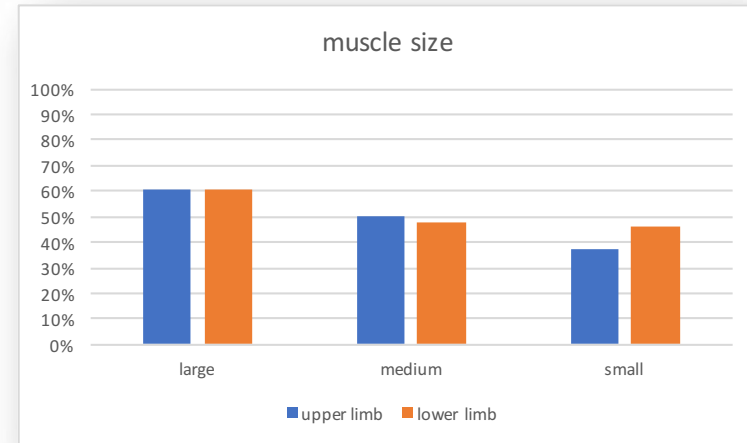
Craig Goodmurphy, Anthony Chiodo,† and Andrew Haig†*

Method:

Cadaver study

Injection using manual
needle placement.

Checking accuracy by
performing a dissection of
the calf muscles.



METHODS:

5 preselected women with subsequent dysphagia after electromyography-guided injections (N=98).
 Injections performed with ultrasound (N=27)
 Effects on swallowing examined.

ELIMINATION OF DYSPHAGIA USING ULTRASOUND GUIDANCE FOR BOTULINUM TOXIN INJECTIONS IN CERVICAL DYSTONIA

JUSTIN S. HONG, MD, GEETA G. SATHE, MD, CHRISTIAN NIYONKURU, MS, and MICHAEL C. MUNIN, MD

Department of Physical Medicine and Rehabilitation, University of Pittsburgh School of Medicine, 201 Kaufmann Building, 3471 Fifth Avenue, Pittsburgh, Pennsylvania 15213, USA

Accepted 3 April 2012

Muscle Nerve **46**: 535–539, 2012

RESULTS:

Dysphagia rate

- EMG: 34.7%
- US plus EMG: guidance: 0%

Injection Details

Subject	Number of injections			Average total dose \pm SD (units)		Average SCM dose \pm SD (units)		Dysphagia (severe)	
	EMG	U/S	Total	EMG	U/S	EMG	U/S	EMG	U/S
1	15	5	20	236.3 \pm 17.1	198.0 \pm 14.8	98.7 \pm 13.9	41 \pm 2.2	6 (6)	0
2	23	7	30	234.3 \pm 49.1	200.0 \pm 0.0	80.9 \pm 23.8	65.7 \pm 4.5	6 (2)	0
3	26	4	30	13,666.7* \pm 2084.5	200.0 \pm 0.0	91.8 \pm 11.7	50 \pm 20	11 (0)	0
				283.2 \pm 23.4					
4	5	5	10	200.0 \pm 0.0	200.0 \pm 0.0	56 \pm 6.5	47 \pm 2.7	2 (0)	0
5	2	6	8	200.0 \pm 0.0	200.0 \pm 0.0	55 \pm 7.1	67.5 \pm 8.2	1 (0)	0

Accuracy of Intramuscular Injection of Botulinum
Toxin A in Juvenile Cerebral Palsy

*A Comparison Between Manual Needle Placement and Placement
Guided by Electrical Stimulation*

Terence Y. P. Chin, MBBS, Gary R. Nattrass, MD, FRCS(C), FRACS,*
Paulo Selber, MD, SBOT (Br), FRACS,* and H. Kerr Graham, MD, FRCS (Ed), FRACS*†‡*

Method:

- Manual placement
- Electrostimulation

Target rates:

Gastrocnemius/Soleus 75%

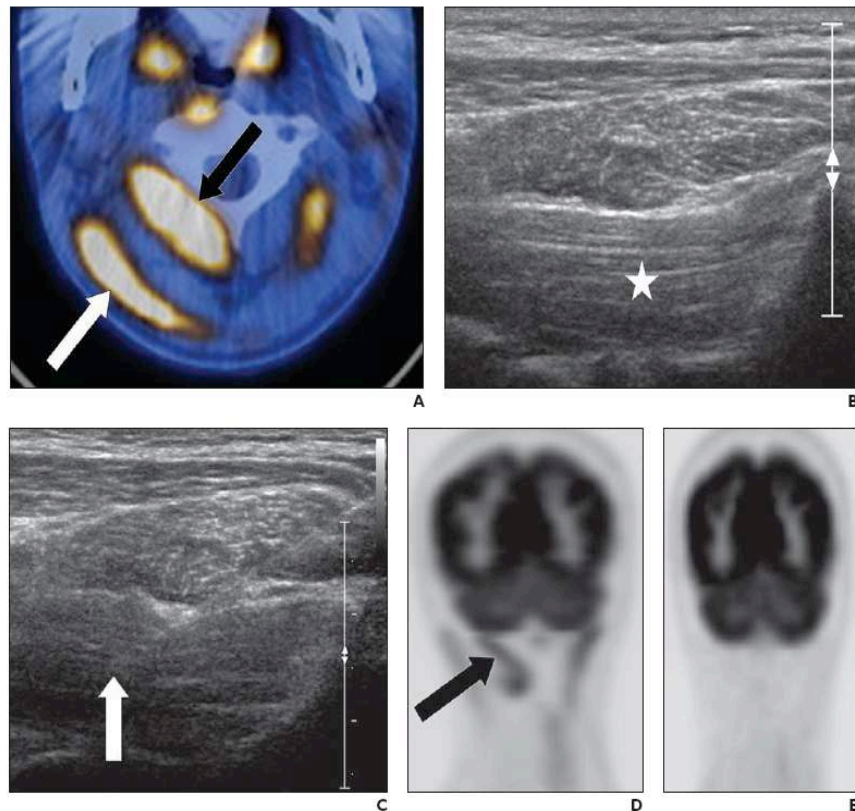
Adductors 67%

Hamstrings 46%

Tibialis posterior 11%

Biceps brachii 62%

Forearm and hand muscles 13%-35%



Initial Experience with Imaging-Guided Intramuscular Botulinum Toxin Injection in Patients with Idiopathic Cervical Dystonia

In Ho Lee¹
Young Cheol Yoon¹
Duk Hyun Sung²
Jong Won Kwon¹
Jee Young Jung¹

OBJECTIVE. The objective of our study was to present our initial experiences of imaging-guided intramuscular botulinum toxin (BTX) injection in patients with idiopathic cervical dystonia.

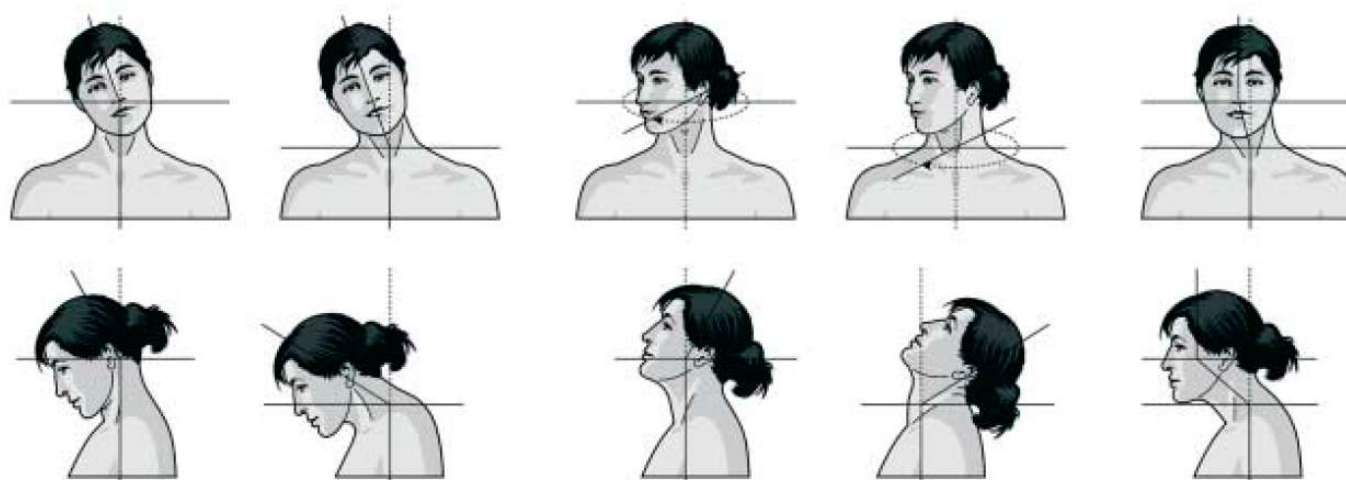
CONCLUSION. Imaging-guided BTX injection is a useful treatment technique in patients with idiopathic cervical dystonia when target muscles are located deeply or an injection must be delivered to a focal muscle area.

AJR:192, April 2009

Patient No.	Tsui Score			TWSTRS Score								
	Initial	4-wk Follow-Up	Reduction Rate ^a	Severity Subscale			Disability Subscale			Pain Subscale		
				Initial	4-wk Follow-Up	Reduction Rate ^a	Initial	4-wk Follow-Up	Reduction Rate ^a	Initial	4-wk Follow-Up	Reduction Rate ^a
1	9	0	1.00	19	0	1.00	21	0	1.00	NA	NA	NA
2	14	3	0.79	23	3	0.87	20	9	0.55	NA	NA	NA
3	7	2	0.71	20	8	0.60	17	3	0.82	NA	NA	NA
4	15	1	0.93	19	6	0.68	24	15	0.38	17	5.5	0.68
5	14	2	0.86	18	6	0.67	23	9	0.61	14	6.5	0.54
6	10	1	0.90	15	3	0.80	9	5	0.44	13.75	8.25	0.4
7	17	2	0.88	28	11	0.61	28	11	0.61	16.75	9.00	0.46
8	8	1	0.88	18	5	0.72	18	4	0.78	4.00	3.25	0.19
Average	11.75	1.50	0.87	20.00	5.25	0.74	20.00	7.00	0.65	13.10	6.50	0.45
SD	3.69	0.93	0.09	3.93	3.37	0.14	5.66	4.87	0.21	4.74	2.04	0.16

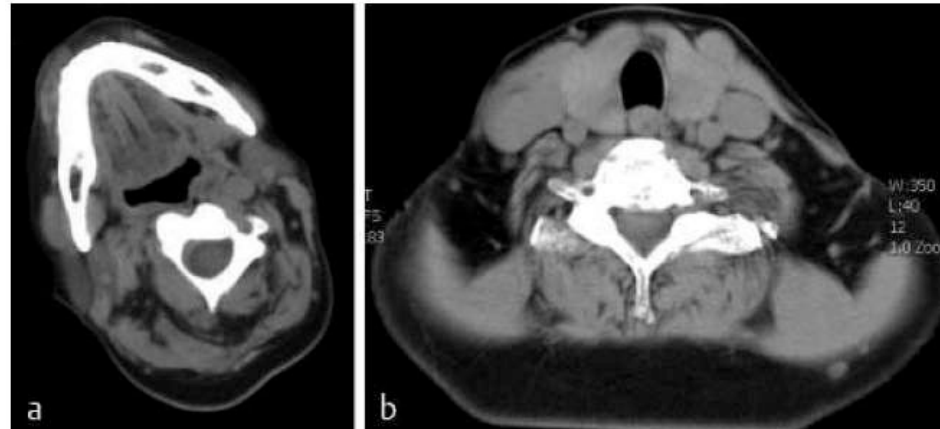
Note—TWSTRS indicates Toronto Western Spasmodic Torticollis Rating Scale [22]. NA indicates not available.

^aScore reduction rate: (pretreatment score - posttreatment score) / pretreatment score.

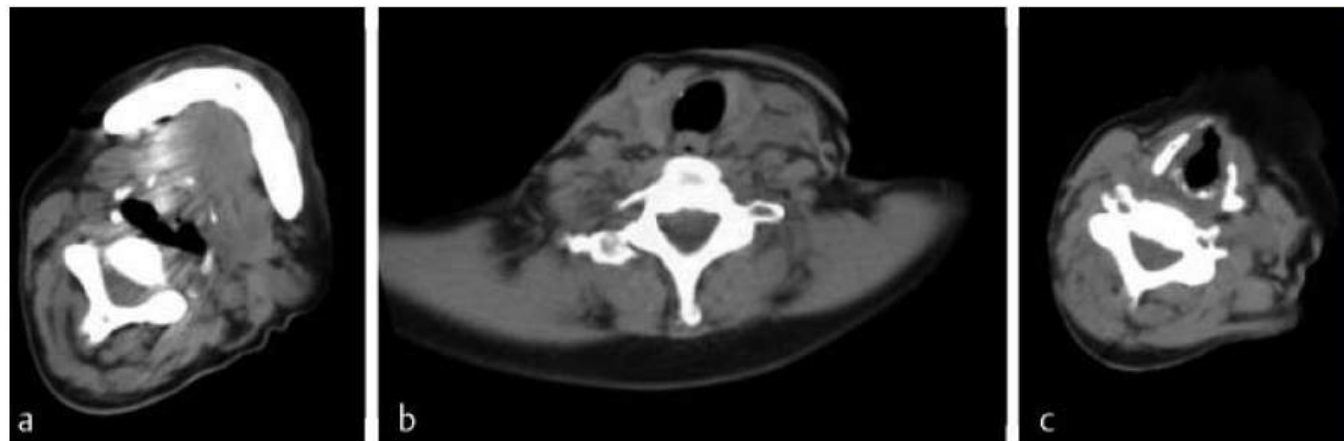


Reichel G et al. Zur Phänomenologie der... Fortschr Neurol Psychiat 2009;

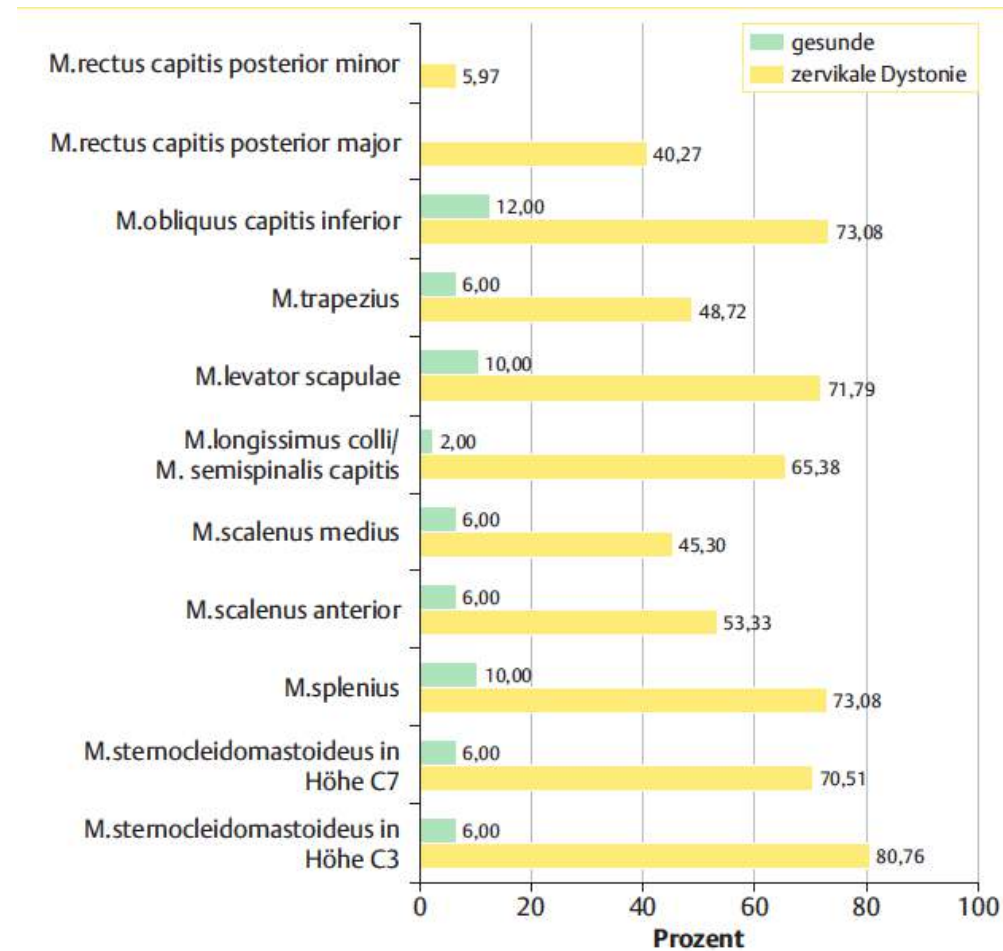
Torticaput



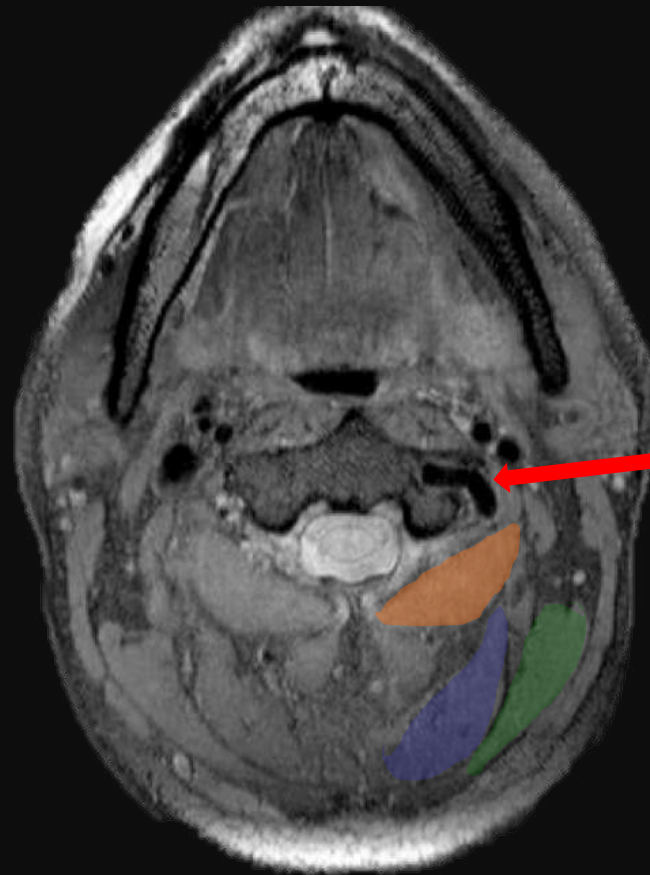
Torticollis



Reichel G et al. Zur Phänomenologie der... Fortschr Neurol Psychiat 2009

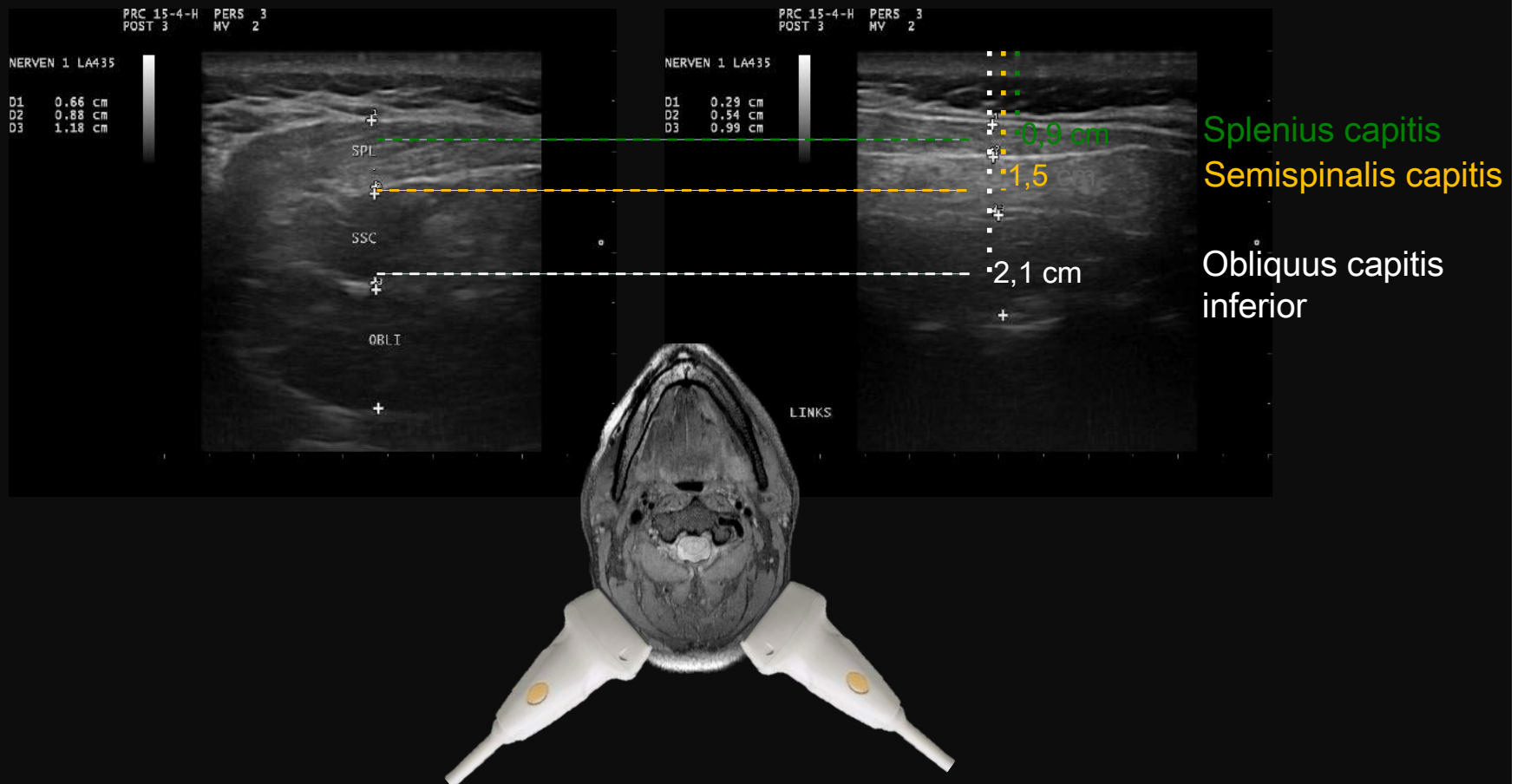


Reichel G et al. Zur Phänomenologie der... Fortschr Neurol Psychiat 2009

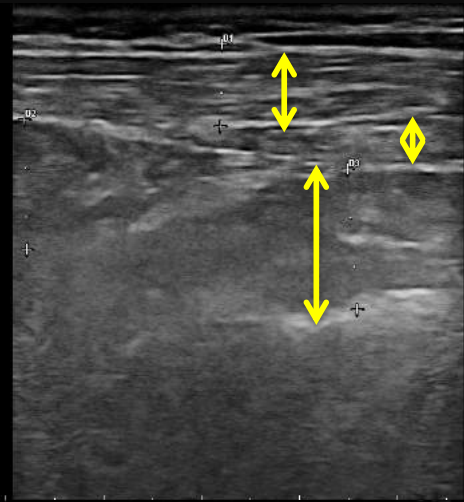
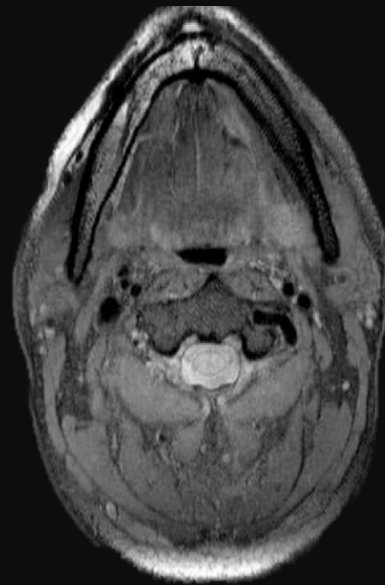
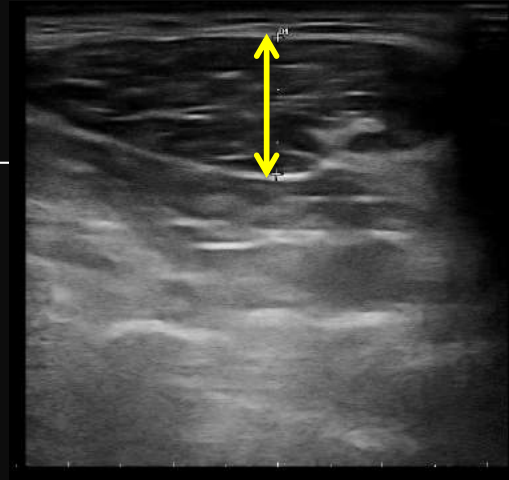
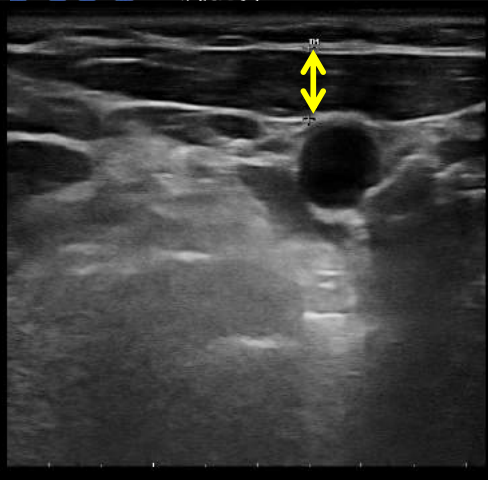


A. vertebralis

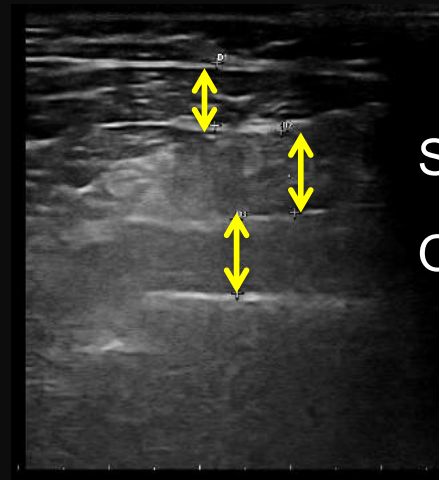
Obliquus capitis
inferior
Semispinalis
capitis
Splenius capitis



Sternocleidomastoide



Splenius capitis
Semispinalis capitis
Obliquus capitis inferior

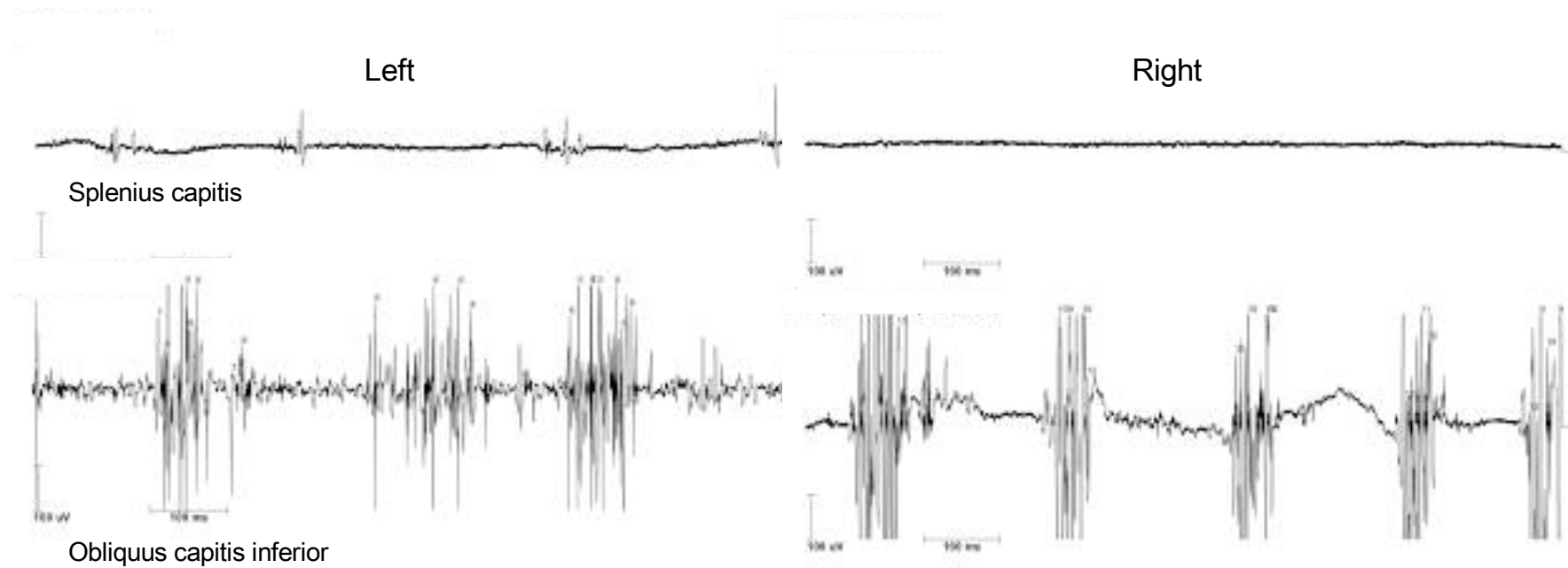


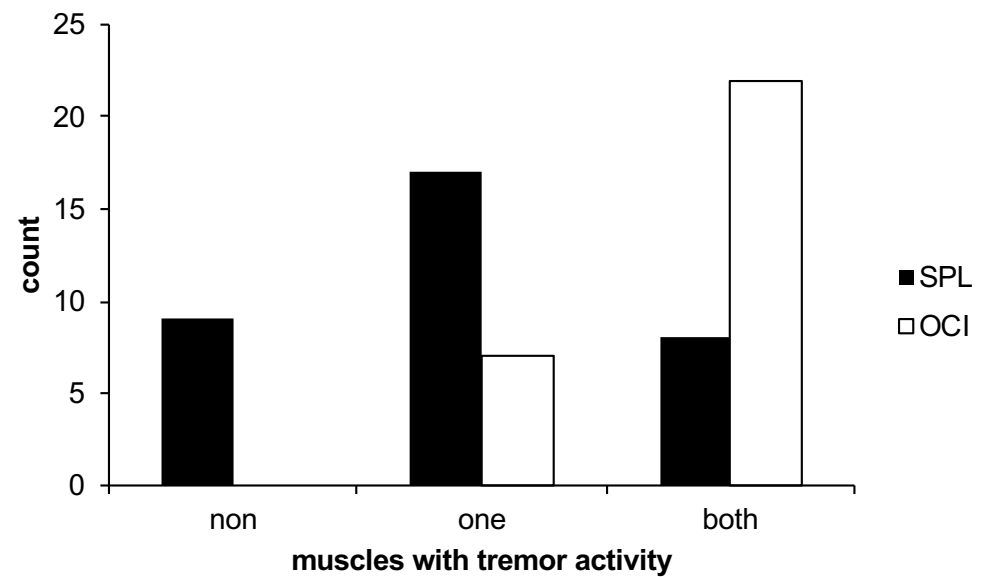
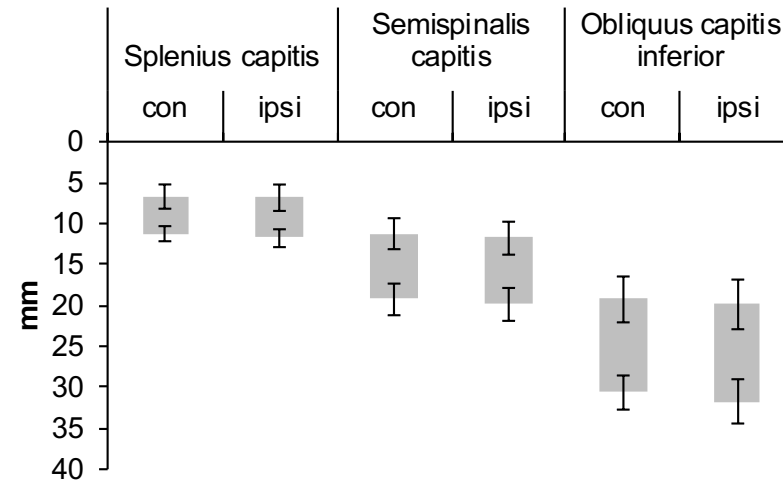
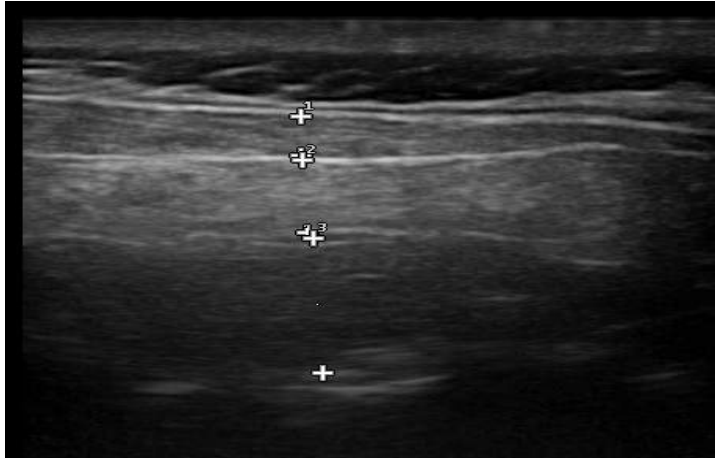
Trapezius



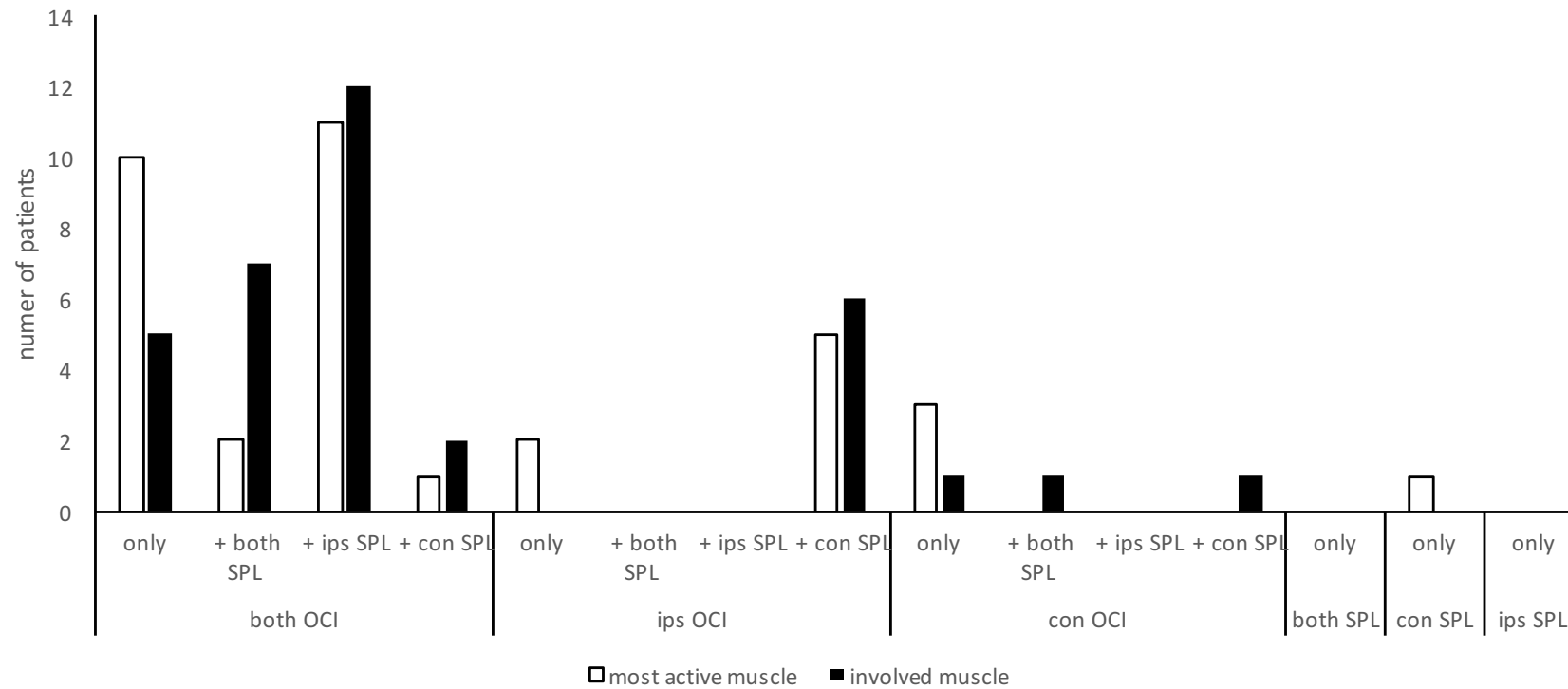
Question 3:

- What is the most involved muscle in dystonic horizontal head tremor (no-no-tremor)
 - Splenius capitis
 - Semispinalis capitis
 - Sternocleidomastoid
 - Levator scapulae
 - Trapezius
 - Obliquus capitis inferior
-

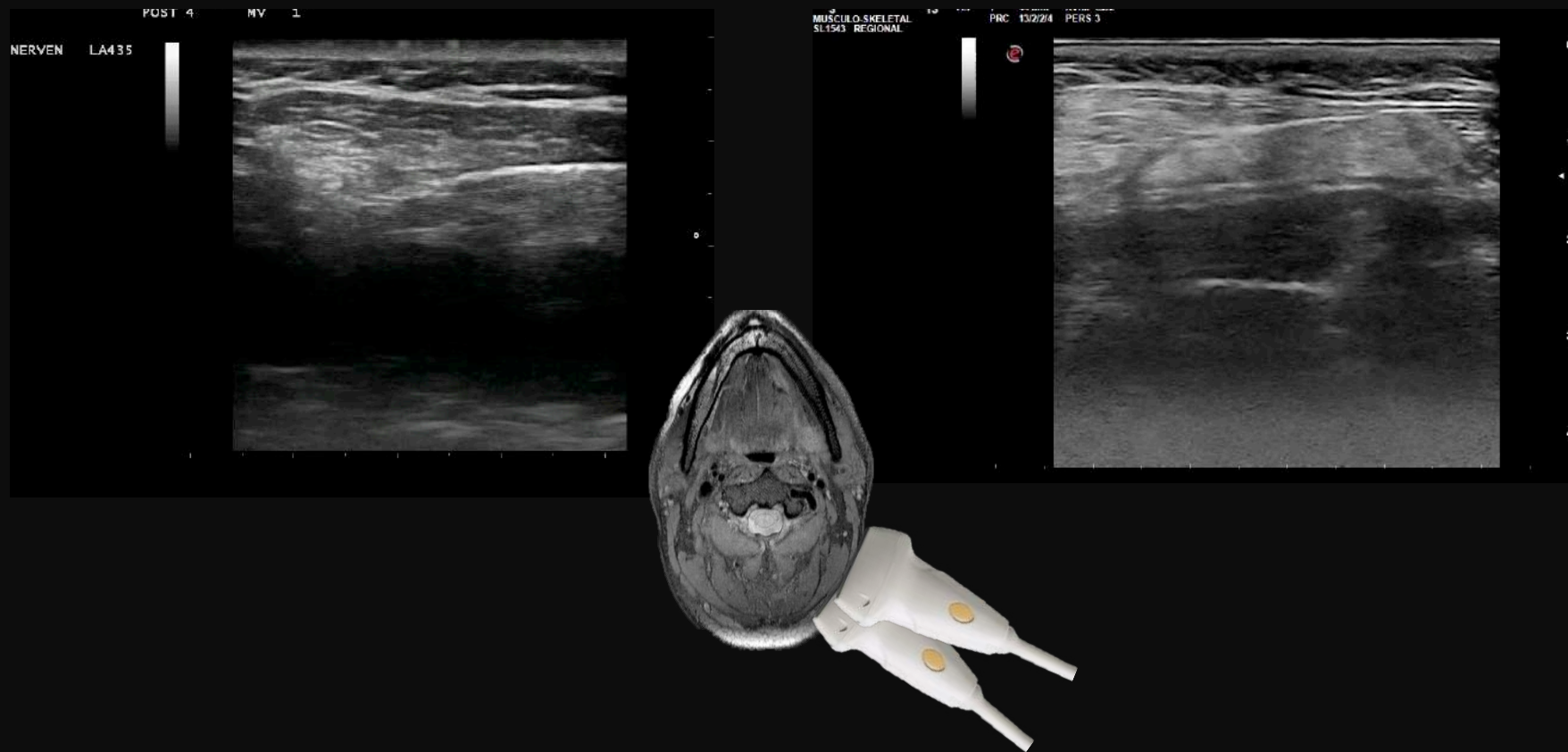




Same Presentation – Different Pattern



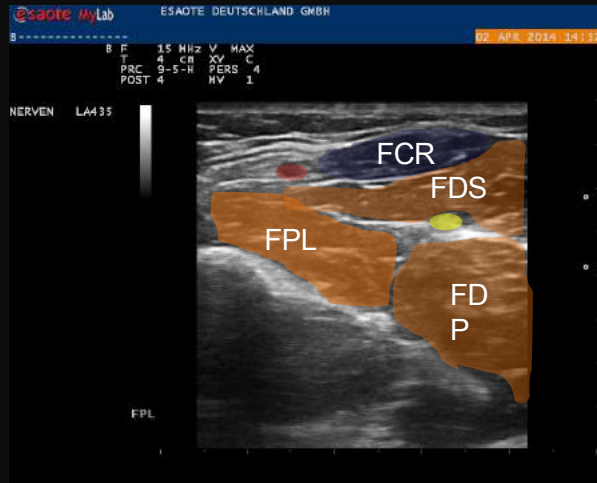
Muscle movements in Torticollis



Focal Hand Dystonia



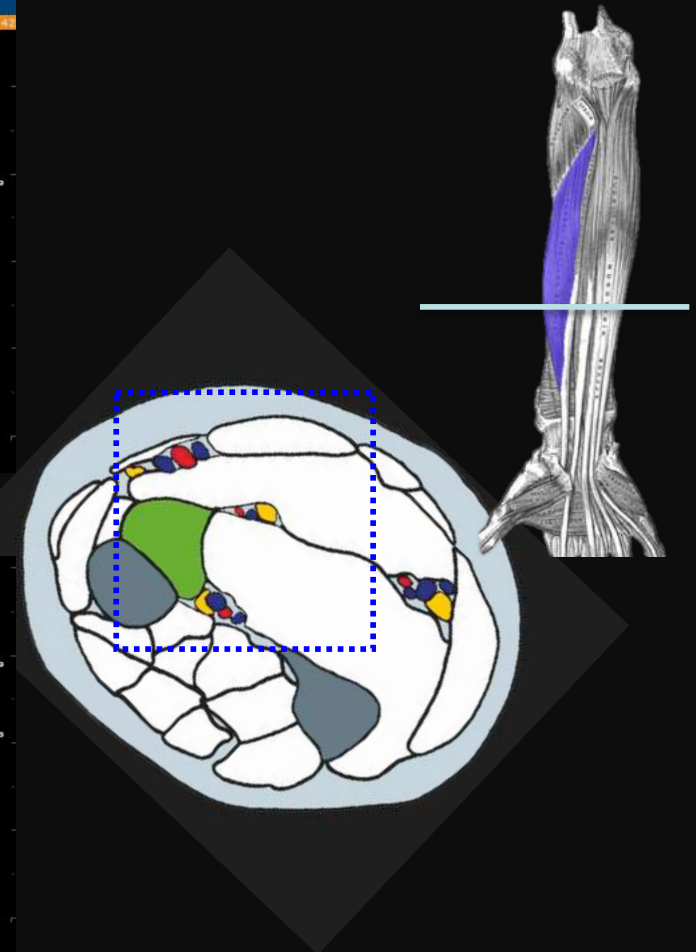
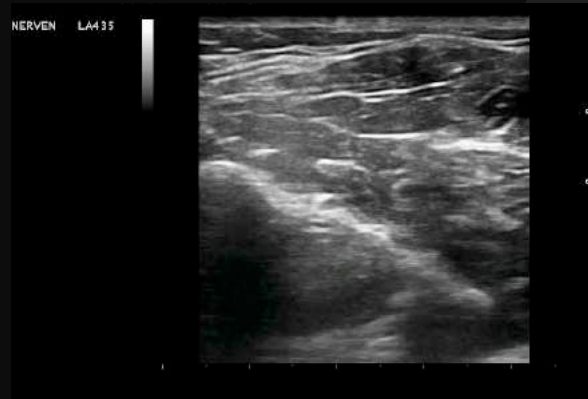
Flexor pollicis longus

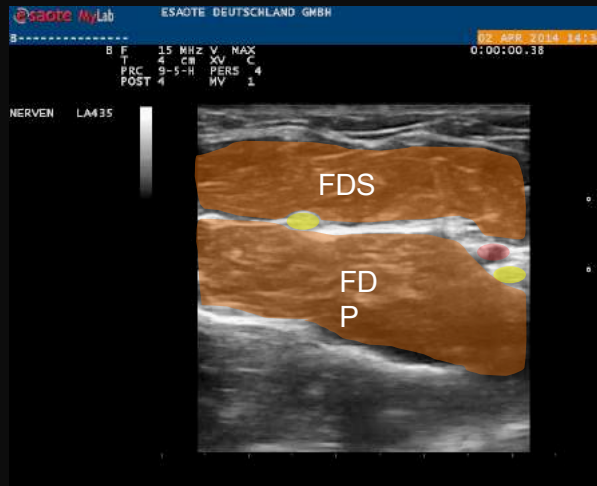


Passiv movement

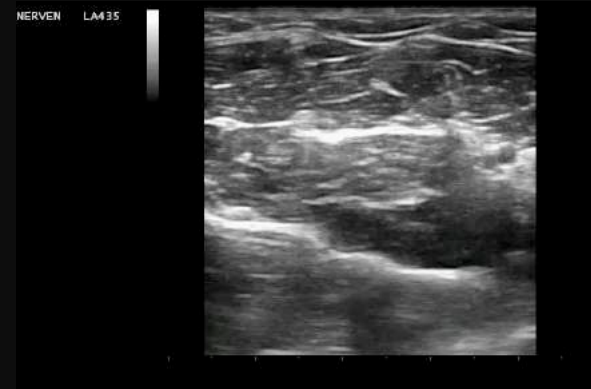


Active movement

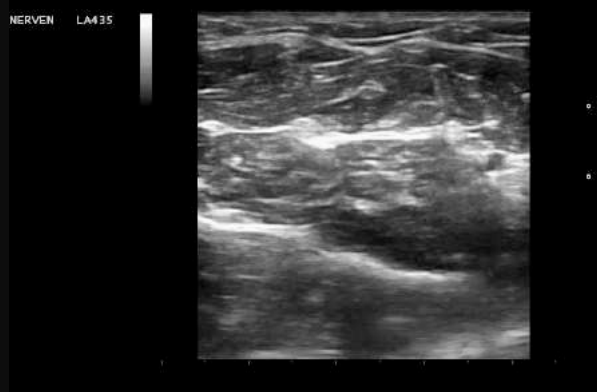




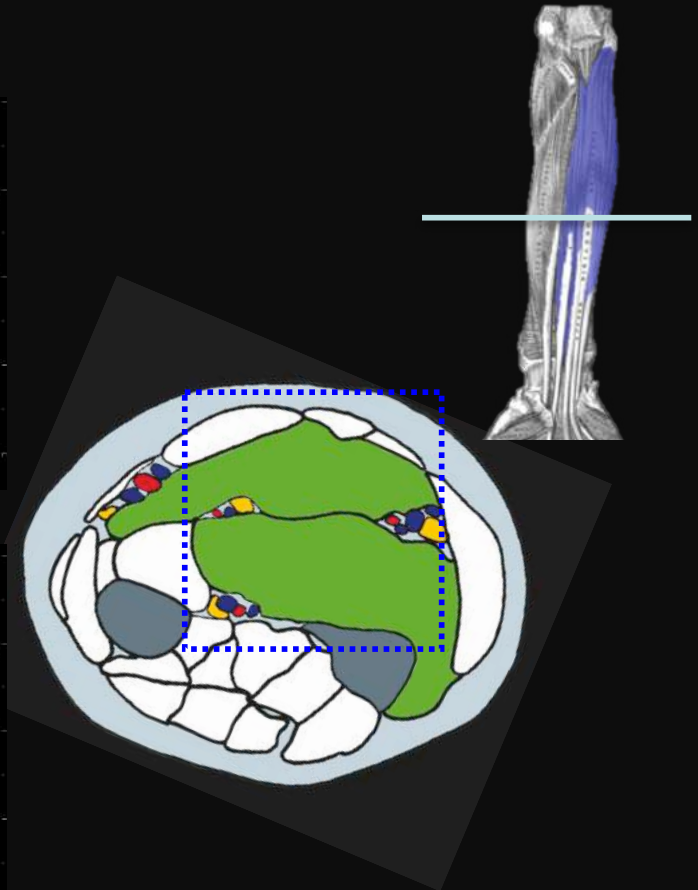
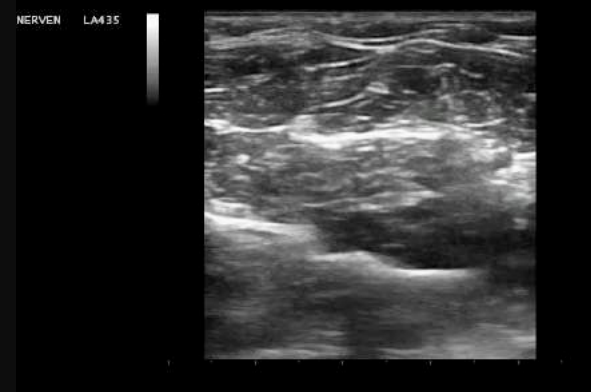
Passive movement FDS II

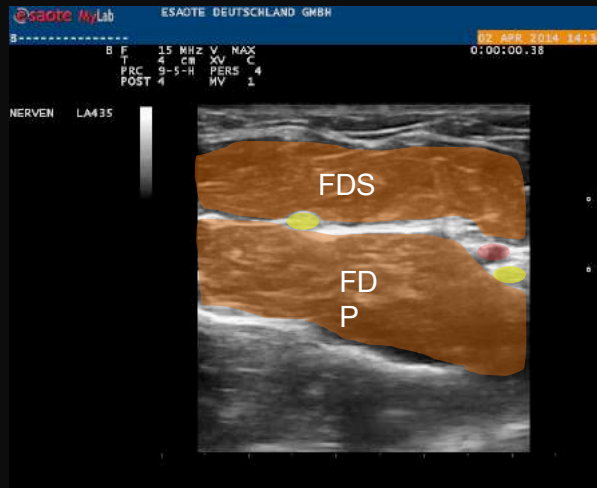


Passive movement FDP II

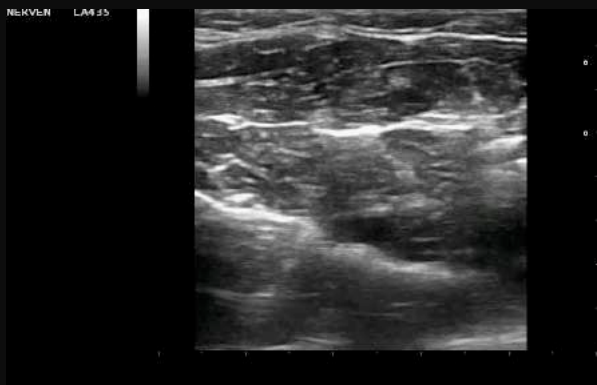


Active movement

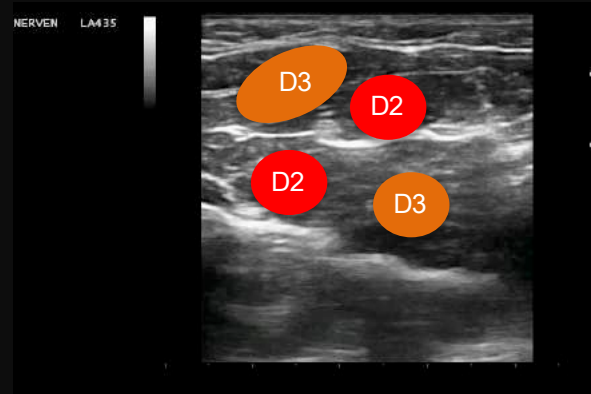




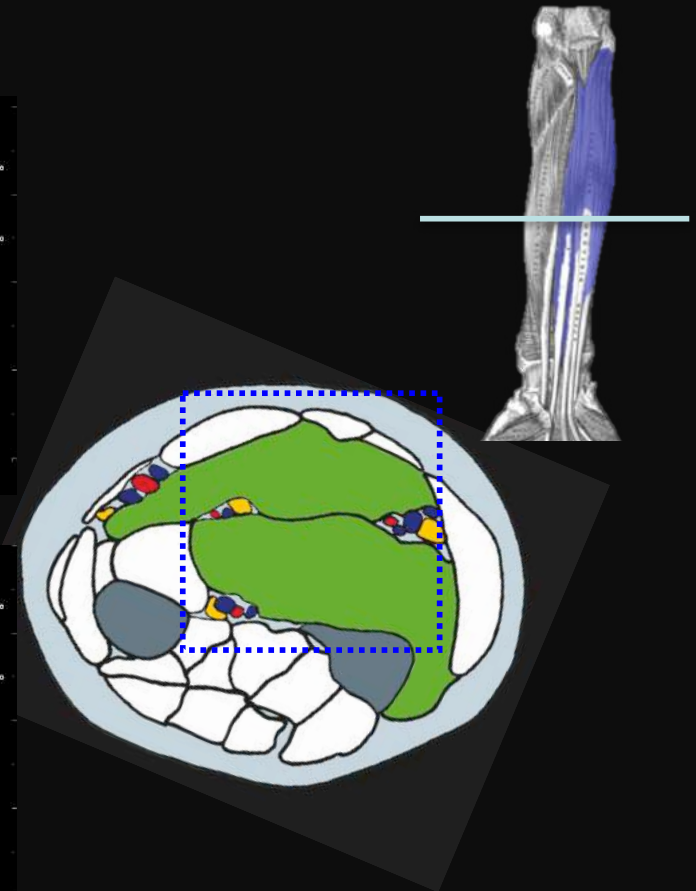
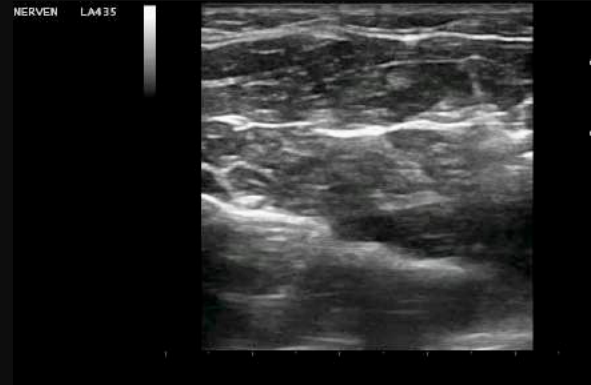
Passive movement FDP III



Passive movement FDS III



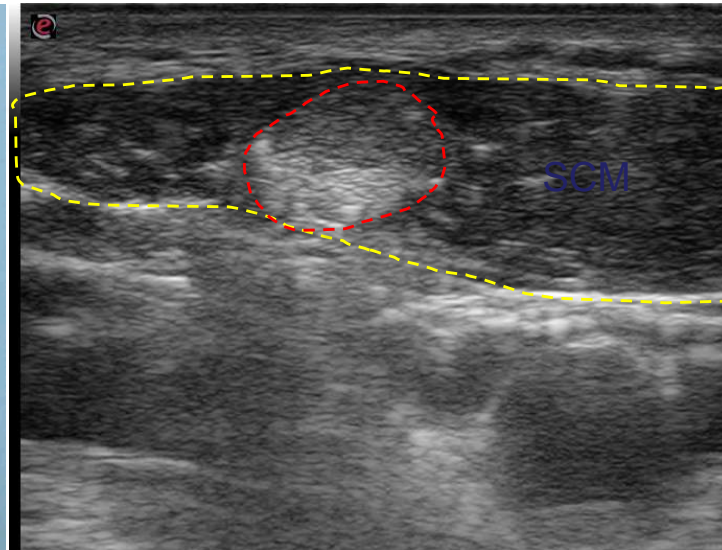
Active movement



Reduced range of motion



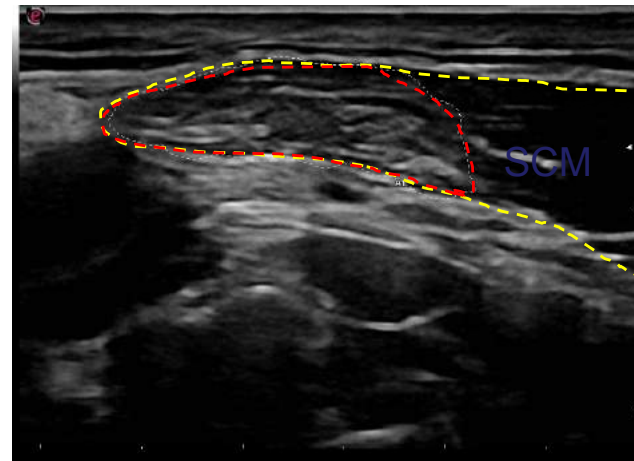
Fibrosis of the
sternocleidomastoid



Shift to the right side



Fibrosis of the
sternocleidomastoide



- Ultrasound
 - Diagnostic
 - Identification of muscle asymmetry
 - Identification of tremor (to some degree)
 - Combined approach with EMG
 - Other causes of head position anomalies
 - Therapeutic
 - Guided injection
 - Deep muscles
 - Small muscles





For regional, national and international
training in Lübeck.

Contact: tobias.baeumer@uni-luebeck.de