

Ultrasound of the Temporal Arteries Technique, Pitfalls, Pathology



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Disclosures Wolfgang Schmidt

Speaker / Contracted Research for

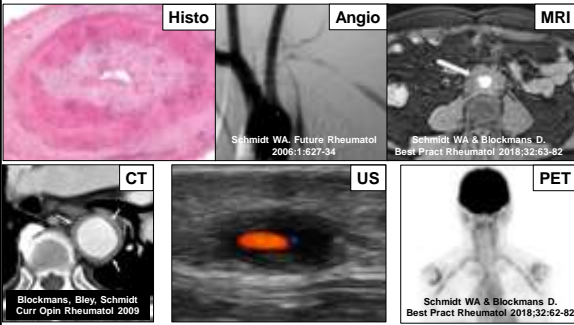
Consulting fees:
Chugai, GSK, Novartis, Roche, Sanofi

Speaker's bureau:
Chugai, Novartis, Roche, Sanofi

Research - Principle investigator for trials:
GSK, Novartis, Sanofi

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A Suspected Diagnosis of LVV Must be Confirmed



Histo Schmidt WA. Future Rheumatol 2006;1:627-34

Angio


MRI Schmidt WA & Blockmans D. Best Pract Rheumatol 2010;32:53-62

CT Blockmans, Bley, Schmidt. Curr Opin Rheumatol 2009

US

PET Schmidt WA & Blockmans D. Best Pract Rheumatol 2018;32:62-82

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LOE 1 | LOA 9.7 EULAR Reco 3 

- Suspected predominantly cranial GCA:
- First choice: US of temporal & axillary arteries
- Non-compressible halo sign

Ultrasound vs. clinical diagnosis: 8 studies
pSens 77%, pSpec 96% → LR + 19, LR - 0.2
Duftner C, et al. RMD Open 2018;4:e000612

Expert reliability in patients: κ 0.76-0.91
Video reliability sonographer = pathologist
Schäfer VS, et al. J Rheumatol 2018;45:1289-95
Luqmani R, et al. Health Technol Assess 2016;20:1-238

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US / TAB Vs. Diagnosis at 100 Months

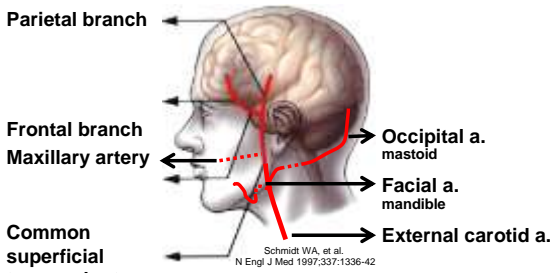
	Kappa	Remarks
US vs TAB at Baseline	0.4	More US +
TAB vs Diagnosis at 100 weeks	0.4	
US vs Diagnosis at 100 weeks	0.8	

→ **Suspect any 'unconfirmed GCA'**

Mukhtyar C, et al. Clin Rheumatol 2019 Oct 1 [Epub]

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Cranial Giant Cell Arteritis



Parietal branch

Frontal branch

Maxillary artery

Common superficial temporal artery

Occipital a. mastoid

Facial a. mandible

External carotid a.

Schmidt WA, et al. N Engl J Med 1997;337:1336-42

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First Standard Scan

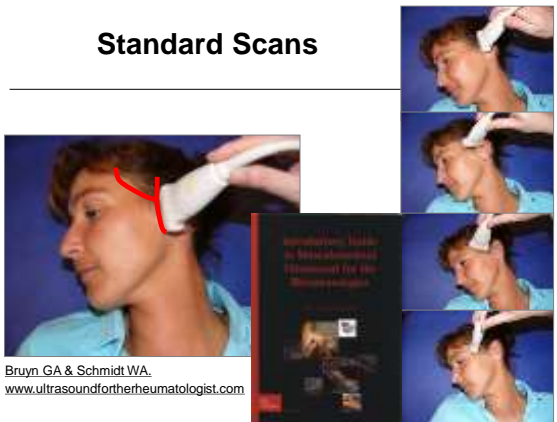
- Age \geq 50 years?
- Sudden onset of symptoms?
- New bilateral persistent headache?
- Jaw claudication?
- Amaurosis (fugax), diplopia?
- Malaise, low grade fever, night sweats?
- Weight loss?
- Shoulder / pelvic girdle pain?

Palpation

CRP & ESR

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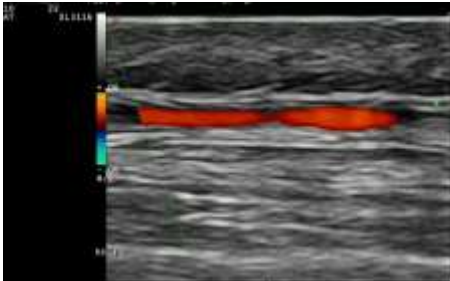
Standard Scans



Bruyn GA & Schmidt WA.
www.ultrasoundfortherheumatologist.com

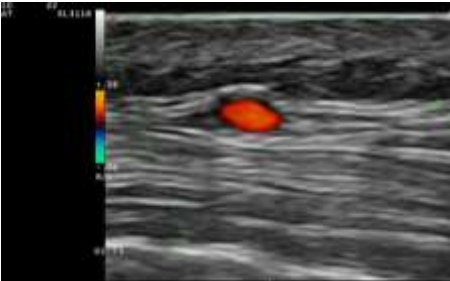
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Normal Ramus Longitudinal



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Normal Ramus Transverse



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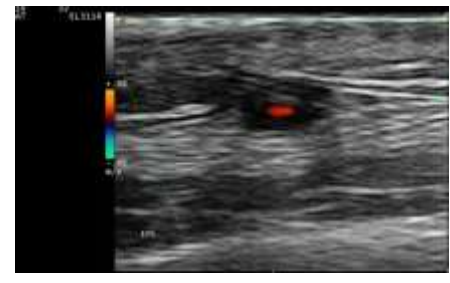
Temporal Arteritis: Longitudinal Scan



Schmidt WA, et al. Lancet 1995;345:866 / N Engl J Med 1997;337:1336-42

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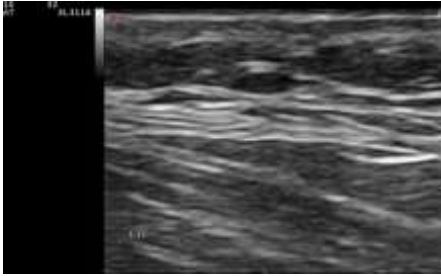
‘Halo’ & Compression Sign



Schmidt WA, et al. Lancet 1995;345:866 / N Engl J Med 1997;337:1336-42
Aschwanden M, et al. Ultraschall in Med 2013;34:47-50

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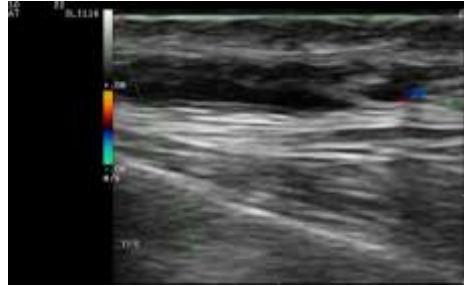
Compression of Normal Temporal Artery



Aschwanden M, et al. Ultraschall in Med 2013;34:47-50

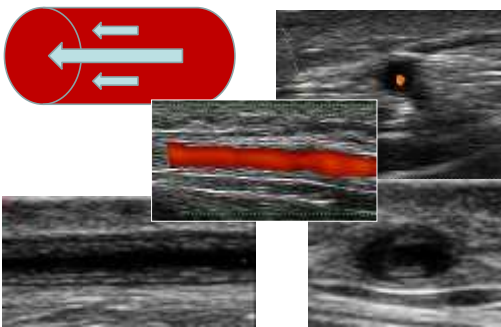
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Occlusion



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Pitfall 1: False halo due to low peripheral flow velocity



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Intima – Media Thickness

40 Acute GCA patients		Parietal branch		N: 0.20 mm	P: 0.50 mm
40 Controls (age 72 ± 9)				Cut-off: 0.29 mm	
				97.2% - 98.7% - 99.3%	
Frontal branch	N: 0.19 mm	P: 0.54 mm			
	Cut-off: 0.34 mm				
				Sens, Spec, CC: 100%	
Cut-off: 0.34 mm					
De Miguel E, et al. Rheumatology 2018		Common superf. temp. a.		N: 0.23 mm	P: 0.65 mm
				Cut-off: 0.42 mm	
				Sens, Spec, CC: 100%	
				CC: Correctly classified	
Cut-off: 0.35 mm					
Czihal M, et al. Clin Exp Rheumatol 2017		Axillary artery		N: 0.59 mm	P: 1.72 mm
				Cut-off: 1.0 mm	
				Sens, Spec, CC: 100%	
Schäfer VS, et al. Rheumatology 2017;56:1479-83					

Schmidt WA, et al. NEJM 1997;337:1336-42

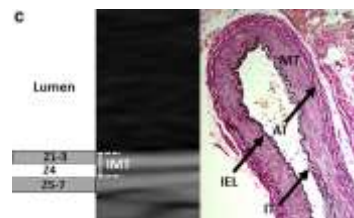
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Ultrasound Resolution Temporal Artery Ultrasound

Frequency	Axial Resolution (estimated)	Application
15 MHz	180 µm	Eular Minimum
18 MHz	140 µm	Rheumatology
22 MHz	100 µm (0.1 mm)	(Rheumatology)
50 MHz	50 µm	Dermatology etc.
70 MHz	30 µm	Dermatology etc.

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Intima – Media Thickness of Normal Temporal Artery

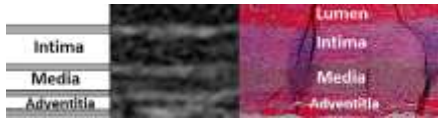


55 MHz probe (resolution 0.045 mm)

Sundholm JK, et al. Ultrasound Med Biol 2019;45(Aug):2010-18

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Intima Thickness in GCA

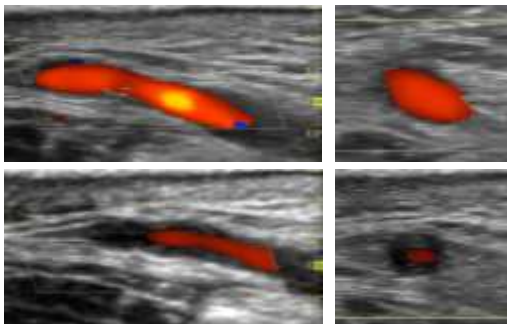


Cut-off 60 μm = 0.06 mm (Sens 98%, Spec 100%)
 Excellent correlation with histology
 from TAB of same segment 1 hour after US

Sundholm JK, et al. Ultrasound Med Biol 2019;45(Aug):2010-18

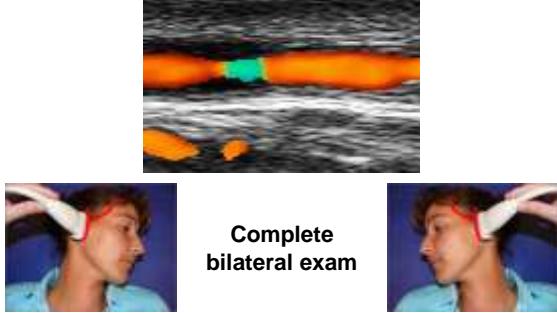
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Pitfall 2: Too Much Gain



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Pitfall 3: Skip Lesions



Complete bilateral exam

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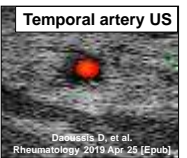
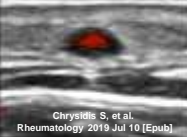

Pitfall 4: Arteriosclerosis



Irregular hyperechoic plaques
 Rare in temporal / axillary arteries
 More common in carotid / femoral arteries

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Pitfall 5: Is This Really LVV / GCA?



 ♂ 45 cANCA PR3 + GPA Schmidt WA & Blockmans D. Best Pract Rheumatol 2018;32:63-82	 ♀ 37 CRP <1 Ender Terzioglu's patient 2010 Antalya, Turkey Angiolymploid hyperplasia Kimura Disease Doensella D, et al. Rheumatology 2019 Apr 26 [Epub]
 ♀ 53 Asthma Eos \uparrow EGPA Chrystalis S, et al. Rheumatology 2019 Jul 10 [Epub]	 Amyloidosis & Multiple myeloma Molina Collada J, et al. Rheumatology 2019 May 11 [Epub]

Schmidt WA. Rheumatology 2019 Aug 23 [Epub]

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Fast Track Clinics

Appointment within 24 hrs: Clinic & Ultrasound


	Irreversible vision loss: 37% \rightarrow 9% Patil P, et al. Clin Exp Rheumatol 2015;33(2 Suppl 89):103-6
	Irreversible vision loss: 19% \rightarrow 2% Diamantopoulos AP, et al. Rheumatology 2016;55:66-70

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Fast-Track Clinic: Two Options

Rheumatologist performs structured history, clinical & ultrasound examination

Rheumatologist performs structured history and clinical examination → ultrasound specialist



William F. Swanson, MD
Co-Director, Fast Track Clinic for Giant Cell Arteritis, Division of Rheumatology, Immunology and Allergy

Paul S. Siderovych, MD
Co-Director, Fast Track Clinic for Giant Cell Arteritis, Division of Cardiovascular Medicine

Released 10, 2017

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Fast Track Clinic in Berlin-Buch

Tel. +49 30-94792-335



Irreversible vision loss

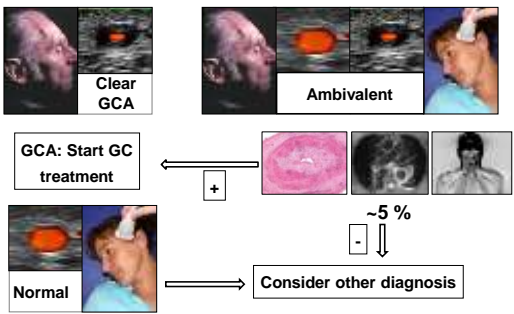
Period	N	Vision loss
1994-1996 ¹	30	27%
2004-2006 ²	62	11%
2014-2016 ³	203	8%

- Schmidt WA, et al. N Engl J Med 1997;337:1336-42
- Schmidt WA, et al. Rheumatology 2009;48:383-5
- Schmidt WA. Rheumatology 2018;57(Suppl 2):ii22-ii31



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Fast - Track GCA Clinic in Berlin-Buch



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8th International Ultrasound Workshop and Symposium in GCA, LJV & PMR

March 26-29, 2020, Southend, UK

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27th Sonography Courses: Basic, Intermediate, Advanced, Paediatric, Trainers & Euler Imaging Course




Organizers:

- Wolfgang Schmidt
- Sahra Ohrndorf
- Daniel Windschall
- Xenofon Baraliakos
- Ulf Müller-Ladner

Saturday, 30th May-Wednesday 3rd June 2020
Bad Nauheim, Germany

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