

Pragmatic use of US in intraarticular and periarticular procedures

Plovdiv, 13. January 2018

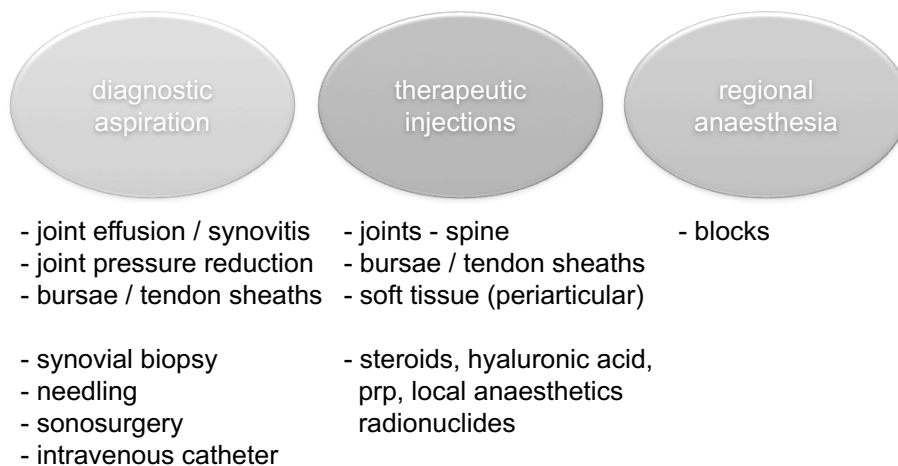
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D'Agostino, Best Practice and Research Clinical Rheumatology 2013
Tamborini G, Krebs A. Praxis (Bern 1994). 2013 Apr 10;102(8):457-64
Tamborini G, Backhaus M, Schmidt W, Ziswiler HR. Z Rheumatol 2013; 72(1):889-901

background - accuracy

52% of conventional landmark guided „blind“ joint injections are not placed correctly

37% of subacromial and glenohumeral joint injections are e accurately placed

Jones et al. BMJ 1993;308: 1329-30; Naredo et al. J Rheumatol. 2004;31:2.
Eustace JA, Brophy DP, Gibney RP, Breshnihan B, FitzGerald O. Ann Rheum Dis 1997;56:59–63.
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advantages and value of ultrasound-guided interventions in clinical practice

- accuracy – inject exactly your target (safe and successful aspiration)
- change the decision for injection
- guidance for localization of synovial biopsy
- decreased discomfort (reduction in injection pain)
- efficacy (increased responder rate, therapeutic duration)
- safety increased (anatomy, doppler: no intravascular injection)
- no radiation
- inexpensive: reduction in cost/patient/year
- rapid
- well accepted by patients

D. P. Fessell, et al. AJR 2000; 174:1353-1362
Sibbitt WL Jr et al. J Rheumatol. 2009 , Wilmer J Rheumatology 2011, Naredo E et al. J Rheumatol. 2004
Bruyn GAW, Best Practice & Res Clin Rheumatol 2009 , D'Agostina et al. ARD 2005
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American Medical Society for Sports Medicine (AMSSM) position statement: interventional musculoskeletal ultrasound in sports medicine

Finnoff JT, et al. *Br J Sports Med* 2015;49:151. doi:10.1136/bjsports-2014-094219

Table 9 Soft tissue injection efficacy

	Level of evidence				
	Level 1	Level 2	Level 3	Level 4	Level 5
SA-SD bursa	–	4 studies: USGIs are more efficacious than LMGI ^{54 87 103 121} 1 study: USGI produces more pain relief with local anaesthetic injection than LMGI ¹⁰⁰ 1 study: USGI more efficacious than LMGI in some but not all outcome measures ⁵¹ 1 study: USGI more efficacious than oral steroids in some but not all outcome measures ⁵² 1 study: accurate injections are more efficacious than inaccurate injections ⁹³ 2 studies: accurate injections no more efficacious than inaccurate injections ^{91 105}	–	–	–
Rotator cuff	–	–	–	1 study: USG lavage and aspiration of calcific tendinopathy is efficacious ¹²⁴	–

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low accuracy of „blind“ palpation-guided injections

- successful aspiration – 32% of joints
 - > shoulder 25%
 - > knee 40%
 - > ankle 20%
- needle positioning – 59% of joints, – 32% tendon sheaths

US guidance in joint and tendon sheath → 96-100%
US guidance in synovial biopsies → 90%

Balint P, *J Rheumatol* 2002) , Raza K, *Rheumatol* 2003)
 Zinbafod, *Hand Surg* 1998) , Koski AM, *Ann Rheum Dis* 2005www.irheuma.com

accuracy of injections using conventional arthrocentesis

29-100%

- Jones 1993, BMJ
- Eustace 1997, AARD
- Partington 1998, J Shoulder Elbow Surg
- Bliddal 1999, ARD
- Yamakado 2002, Arthroscopy
- Jackson 2002, J Bone Joint Surg Am.
- Esenyel 2003, Acta Orthop Traumatol Turc.
- Bisbinas 2006, Knee Surg Sports Traumatol Arthrosc
- Koski JM 2006, Clin Exp Rheumatol
- Lopes 2008, Rheumatology

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improved clinical outcome of accurate needle placement

shoulder

- Eustace et al. Ann Rheum Dis ,1997
- Farin et al. Skeletal Radiology, 1996
- Naredo et a. J Rheumatol, 2004

de Quervain tenosynovitis

- Zingas et al. J Hand Surg, 1998

wrist joint

- Koski J. Scand J Rheumatol , 2001

finger joints

- Raza K. et al. Rheumatology , 2003

knee

- Sibbitt et al J Rheumatol, 2009

heel

- Cunnane et al. Semin Arthritis Rheum, 1996

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contraindications

absolute:

- systemic or local infection in progress
- allergic reactions to disinfectants (iodine) and local anesthetics

relative:

- diabetes
- hypertension
- anti-coagulant or anti-aggregation drugs
- glaucoma
- previous corticosteroid injection
- prosthesis
- planned operation
- no informed consent
- fracture

Molini L et al Journal of Ultrasound (2012) 15, 61e68
 Tamborini G, Krebs A. Praxis (Bern 1994). 2013 Apr 10;102(8):www.rheuma.com
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setting - material

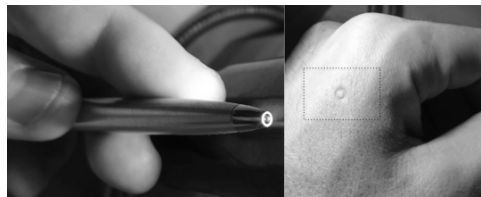
- aseptic technique
- hygienic environment
- (sterile) gloves
- sterile gauze
- (sterile gel)
- (sterile cover of us probe)
- (surgical mask)
- skin disinfectant
- sterile needles / syringes

Mandi P et al , Rheumatology 2012
 Tamborini G, Krebs A. Praxis (Bern 1994). 2013 Apr 10;102(8):www.rheuma.com
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techniques

indirect technique (prerecorded visualization)

- > pre-interventional US examination
- > skin surface markings, assessment of depth



Balint P, J Rheumatol 2002) , Raza K, Rheumatol 2003)
 Zinbarg A, Hand Surg 1998) , Koski AM, Ann Rheum Dis 2005 www.irheuma.com
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techniques

direct technique (in plane, out of plane)

- > real-time visualisation of needle
- > useful in „difficult regions“, neurovascular bundles
- > both hands coordination

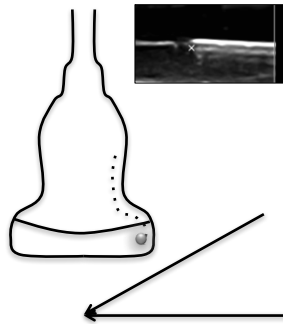


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 Bruford A, Schmidt WA, Best Practice & Res Clin Rheumatol 2009 www.irheuma.com

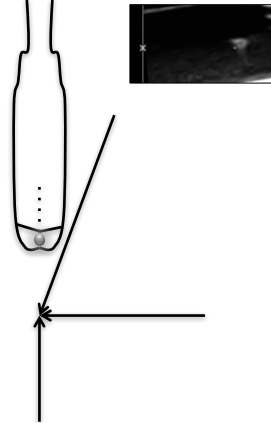
techniques

direct technique

in plane



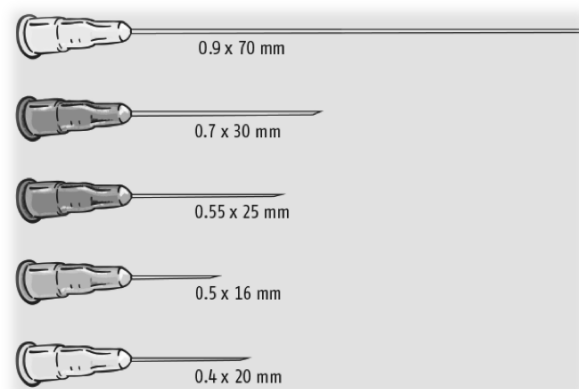
out of plane



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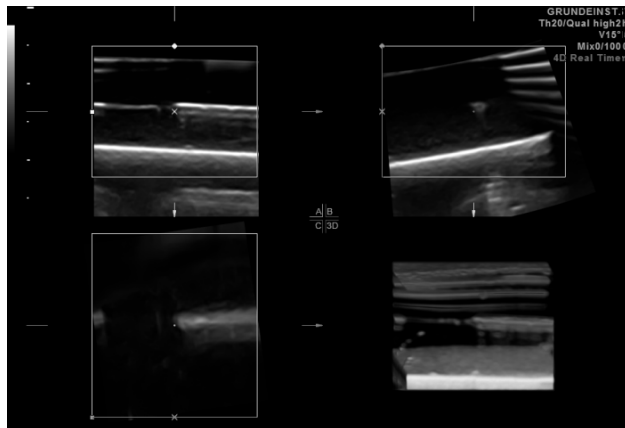
equipement

- > sterile/aseptic conditions
- > needle



DeZordo T, Eur J Radiol 2009
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technique



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sacroiliac joint



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epidural injection trough sacral hiatus - sacral block

- accuracy: 96% (Blanchais 2010)
- efficiency: no difference compared to fluoroscopy guided injections (Park 2013)
- safety!: doppler: no intravascular injection (Yoon 2005)

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www.irheuma.com**epidural injection trough sacral hiatus - sacral block**

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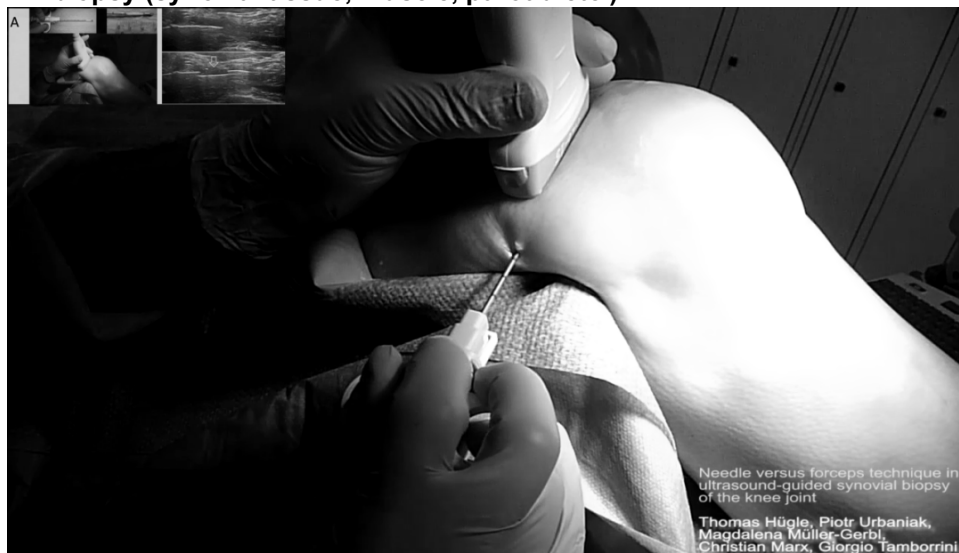
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Tamborini G et al, Infiltrationen peripherer Gelenke 2017 ISBN 9783741267086

biopsy (synovial tissue, muscle, parotid etc.)

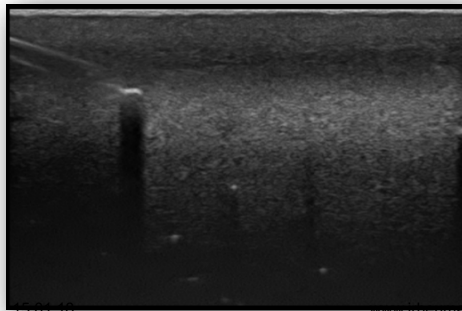


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training

- sonoanatomy – sonopathology
- know your machine and the probes
- steering or virtual convex
- needle guidance software
- curved array probes
- doppler
- beep-system – sensor needle



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