

Implementation of Ultrasound Screening in Osteopathic Education

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Summary

- Methods of Ultrasound Screening
- Implementation of Ultrasound Screening in Osteopathic Education and Clinical Training
- Implementation of Ultrasound Screening in Teaching Osteopathic Testing Procedures
- Implementation of Ultrasound Screening in Osteopathic Research

Methods of Ultrasound Screening

Davide Bongiorno

US screening can be a valid educational support even for those who are not familiar with US imaging

Its value is mainly offered by the *in vivo* visualization of organs and structures commonly treated by clinicians

The *in vivo* observation of tissues (before and after a technique is applied) may reinforce the confidence that clinicians have on their own **palpatory skill** and **intention** as well as on the **effectiveness** that their intervention might produce



My work-place :)



Portable US device



The international reference for
standard procedure of US examination



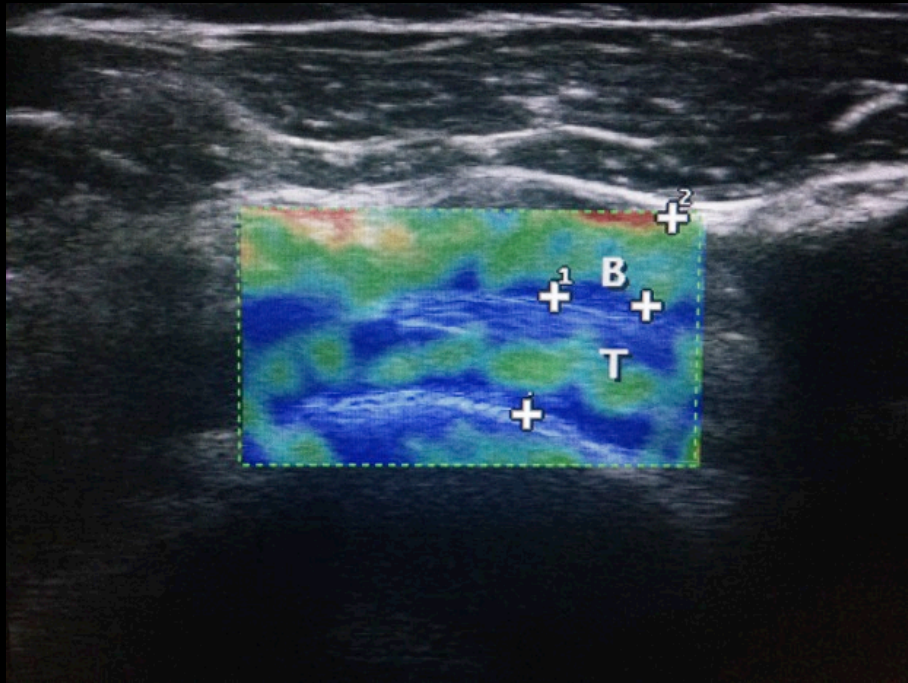
Linear Probe



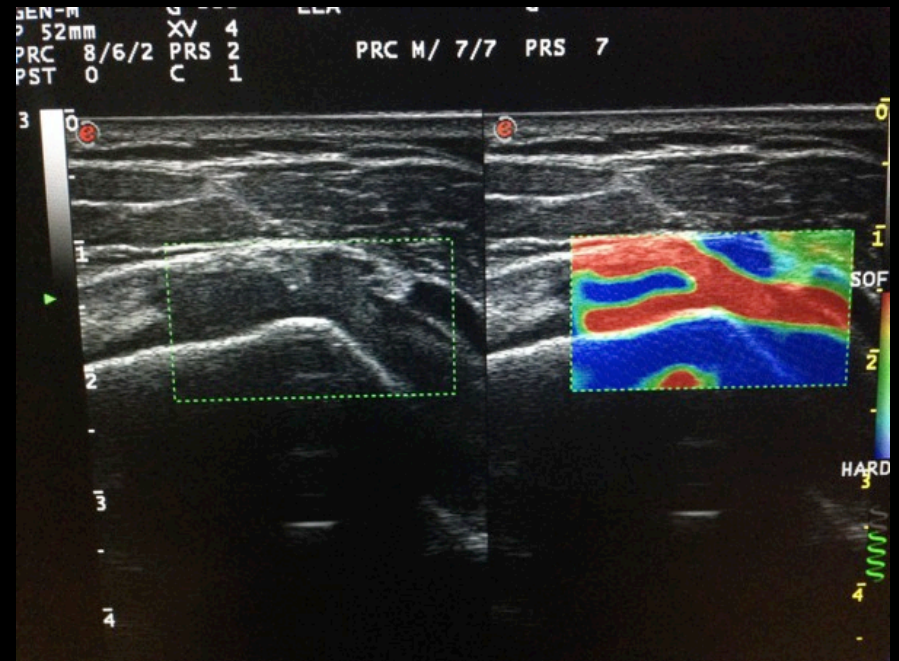
Convex Probe



Endocavity Probe



Sonoelastography

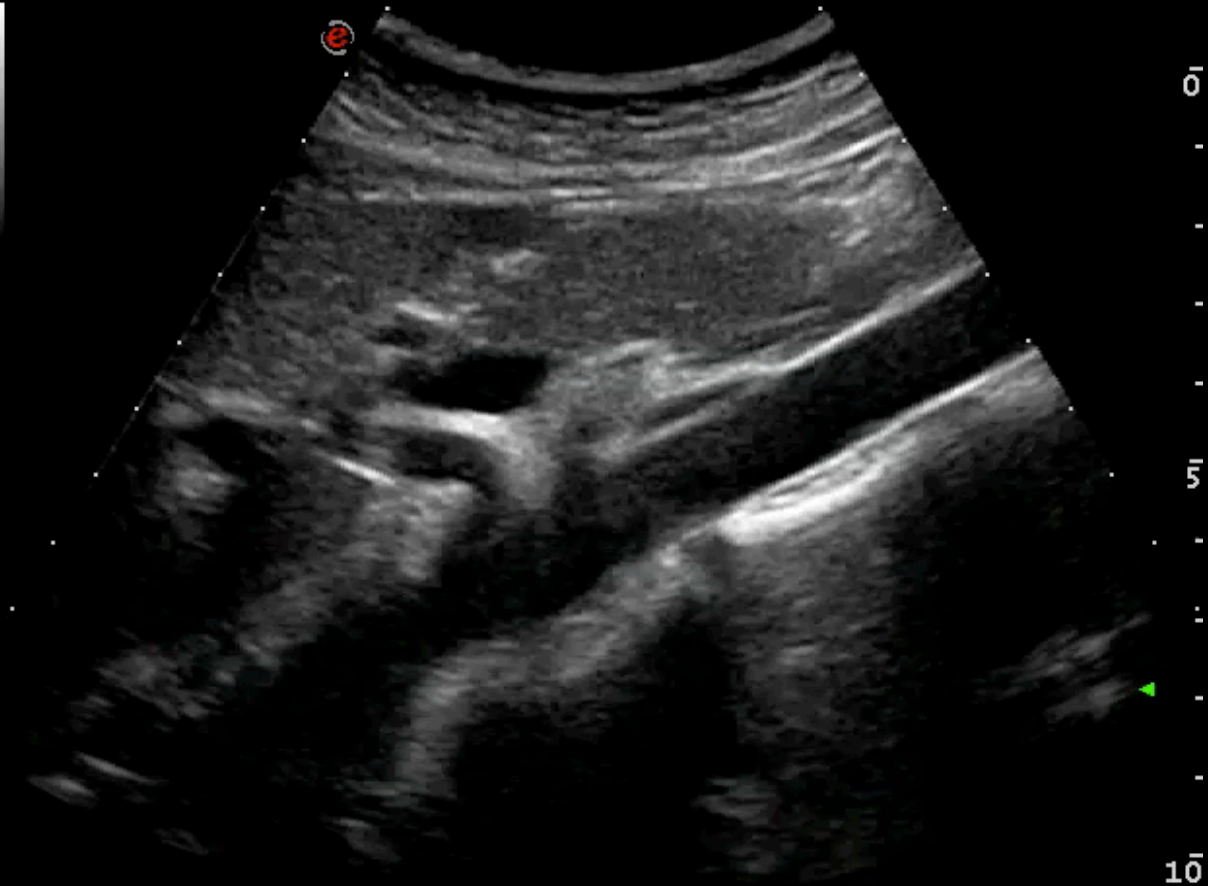


Elastosonography



B RIS-A G ---
TEI P 108mm XV 3
PRC 10/8/1 PRS 6+
PST 0 C 0

1 8
ADDOME B CA541



B-mode real time evaluation of the A.A. and its branches
(coeliac trunk and superior mesenteric artery)

R-----



B RIS-A G ---
TEI P 138mm XV 3
PRC 10/8/1 PRS 6+
PST 0 C 0

1 ADDOME B 8 CA541



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Portal vein flow - grey mapping

Limits

- **Tissue-related:** the property of some body structures makes them inaccessible to US screening (skull, colon...)
- **Method-related:** the possibility of scanning all planes prevents any standardization of distance measurements
- **Examiner-related:** because of human margins of error, it is almost impossible to reproduce two images, PRE and POST, in the same plane and angulation
- **Patient-related:** position, breathing, tissue mobility, viscoelastic changes are all variables that might influence US screening

Counterindications

No absolute contraindications to US imaging are known and supported by evidence

...assuming that it is appropriately applied...(A.L.A.R.A.)

Caution is recommended for the use of Echo-Doppler evaluation during the first 10 wks of pregnancy



The cost of an US device
may range from a

minimum of about € 15.000

to an average of € 35.000

up to about € 150.000

Most common US machine brands:
ESAOTE, Toshiba, General Electric, Aloka, Hitachi

Implementation of Ultrasound Screening in Osteopathic Education and Clinical Training

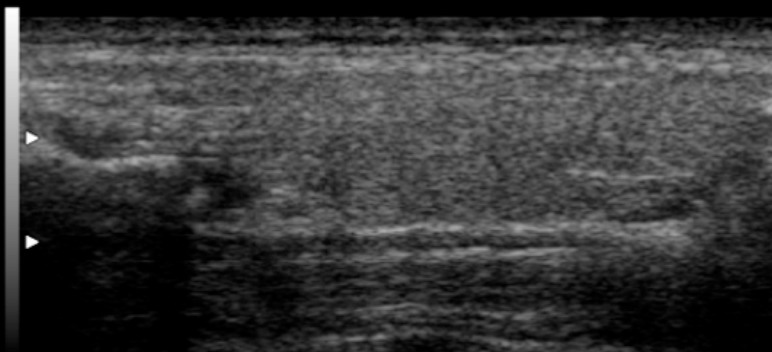
Davide Bongiorno

HITACHI CENTRO RAD. LISSONESE
FR:24

P:H

23-NOV-05 12:02:01

-04



No.55/155

BG:27 75/3/1/0/A/5/3

L53

10M

TIROIDE

40mm

1 Review

2 SPD;

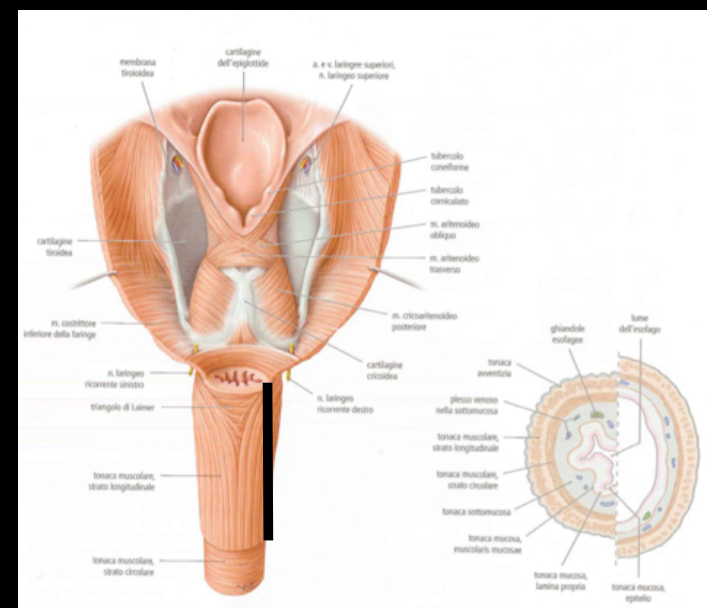
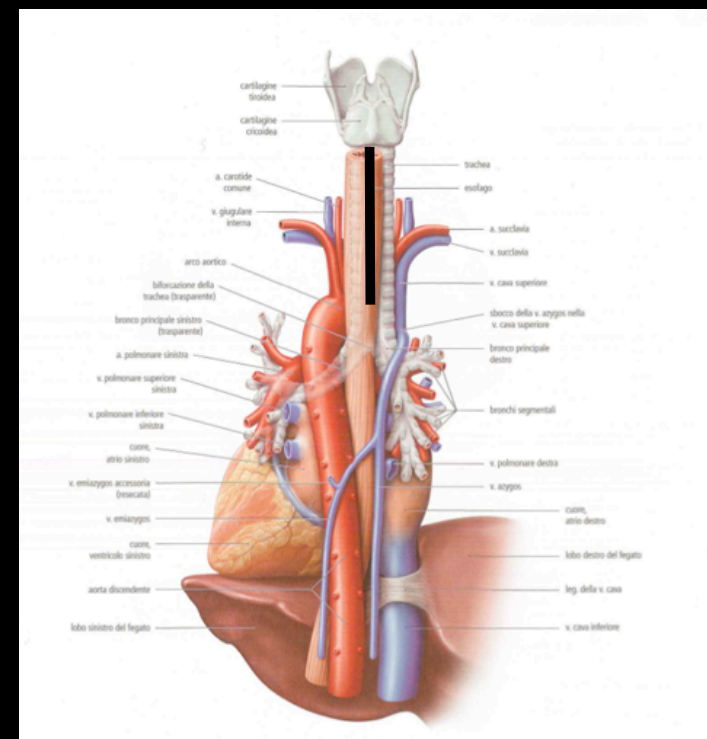
3 ODM

4

5 Ratio-Area

6 Area-E

7 Ratio-Dis



HITACHI CENTRO RAD. LISSONESE
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P:H

23-NOV-05 12:15:23

033

CARDIAS

No.64/181

BG:15 75/23/0/-6/3

C514

dTHI-R

ADDOME 3

85mm

Review

2 SPD;

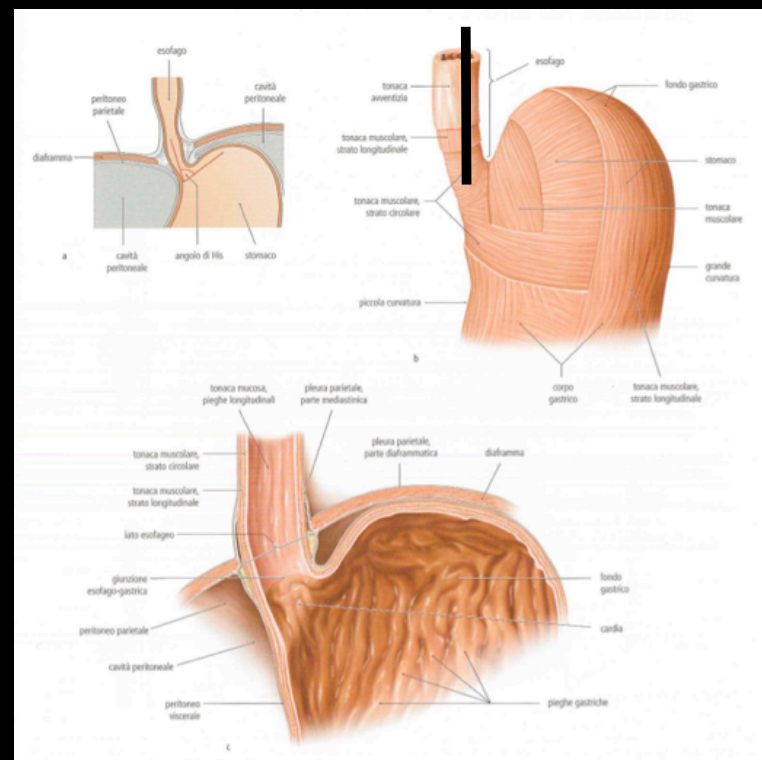
3 ODM

4

5 Fetal Para.

6 Ratio-Area

7 Volume





No.184/268

BG:26 80/2/2/0/A/5/4

U533L 7.5M

T. RETTALE

50mm

1 Review

2 SPD;

3 ODM

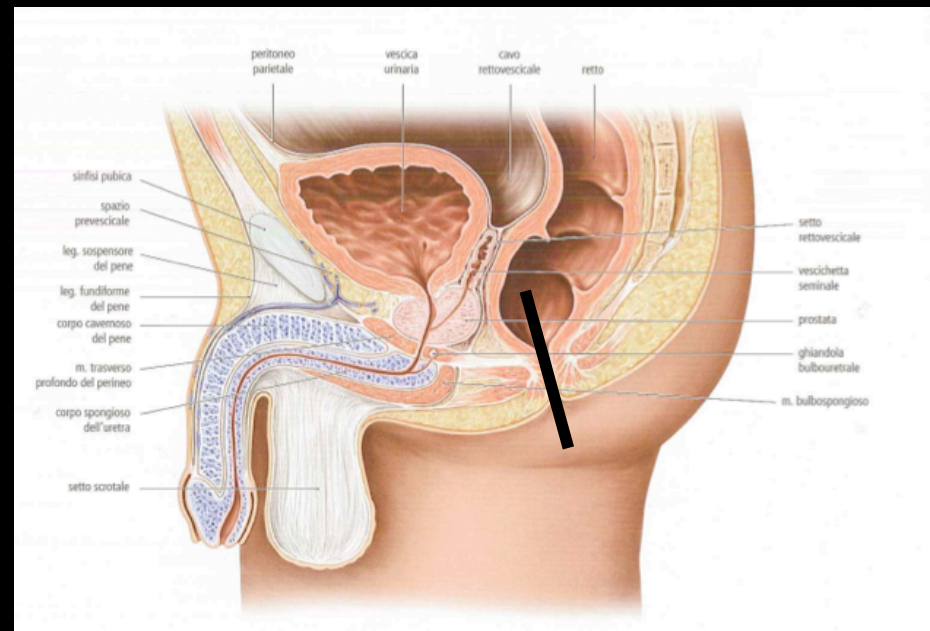
4



5 Urology

6 Area-E

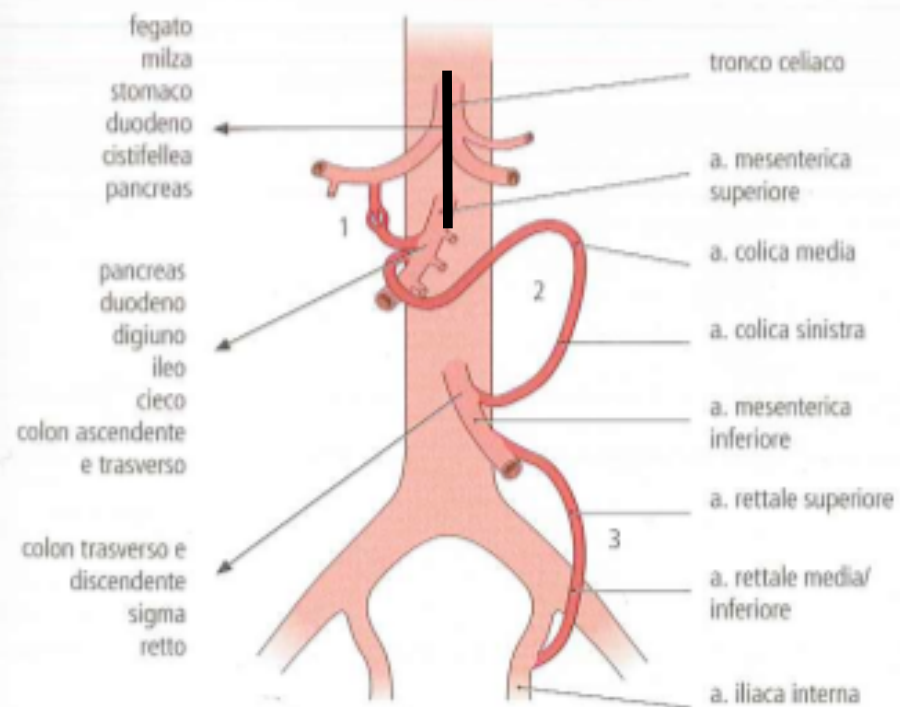
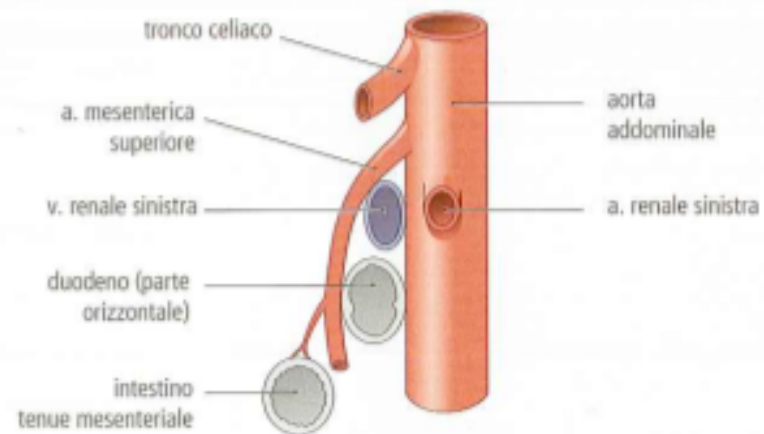
7 Volume

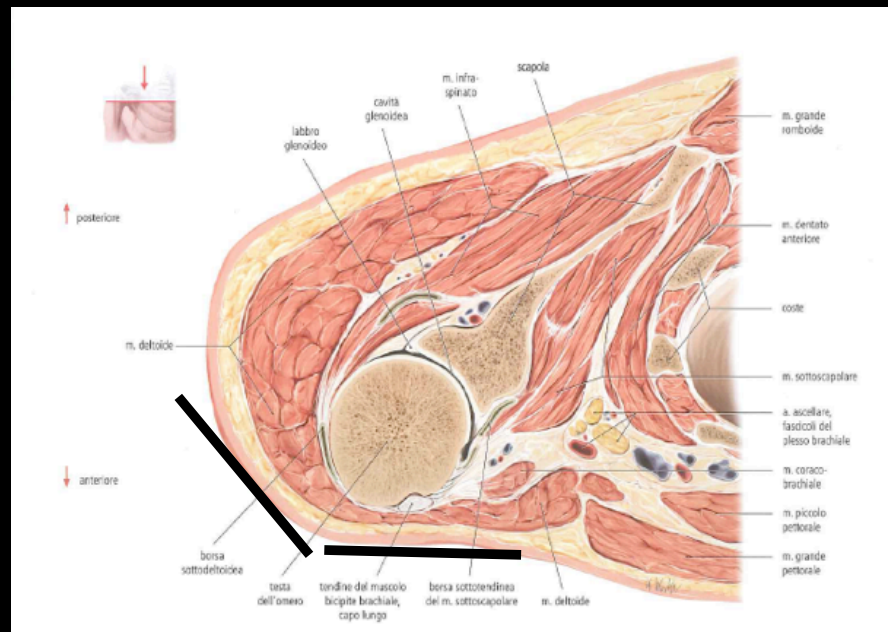
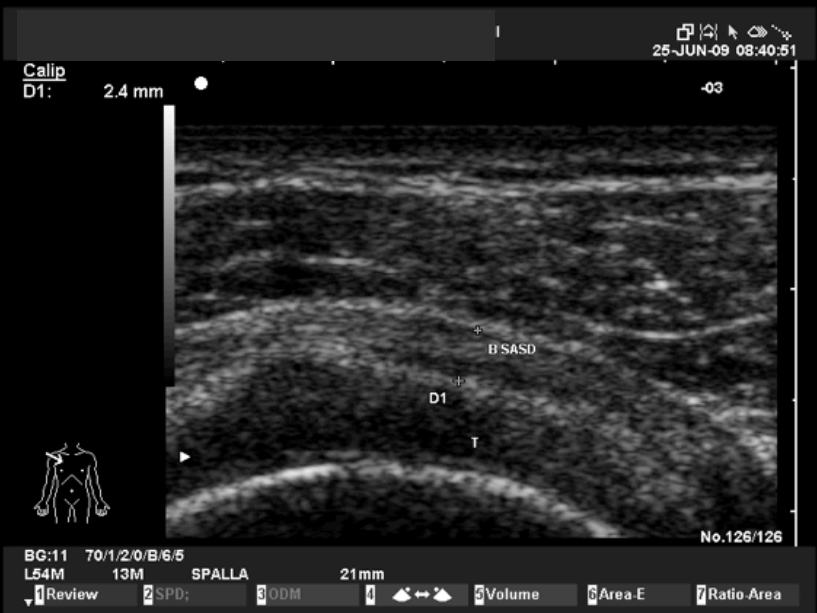
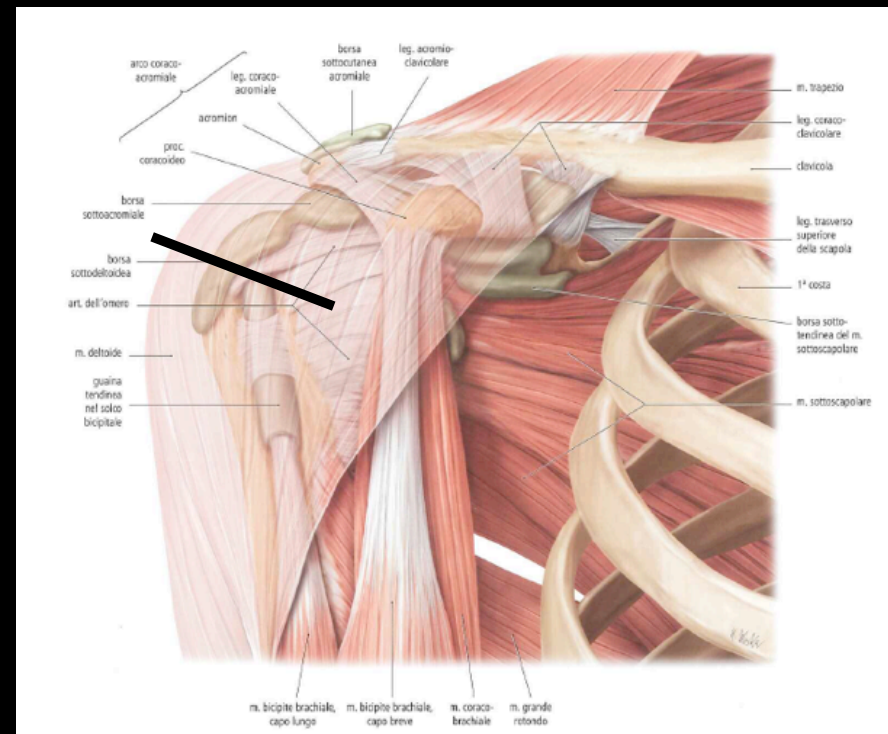
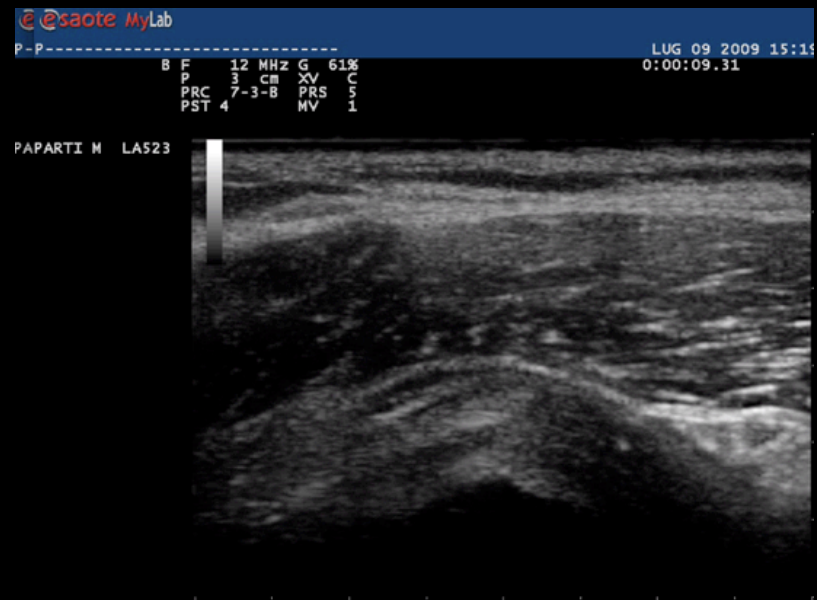


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BG:22 75/1/1/0/-6/3
C514 dTHI-R ADDOME B 125mm
1 2 3 4 5 6 7

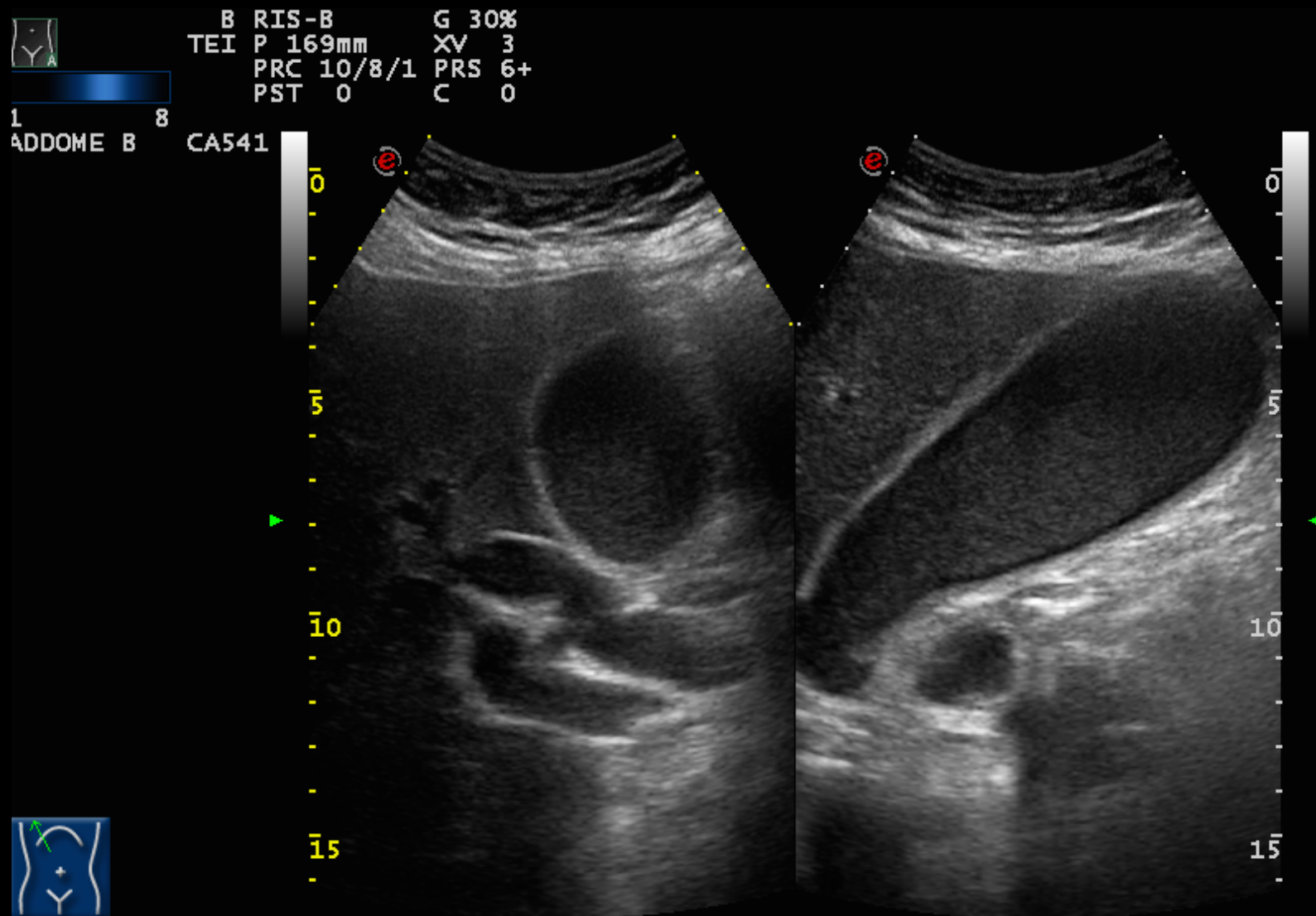




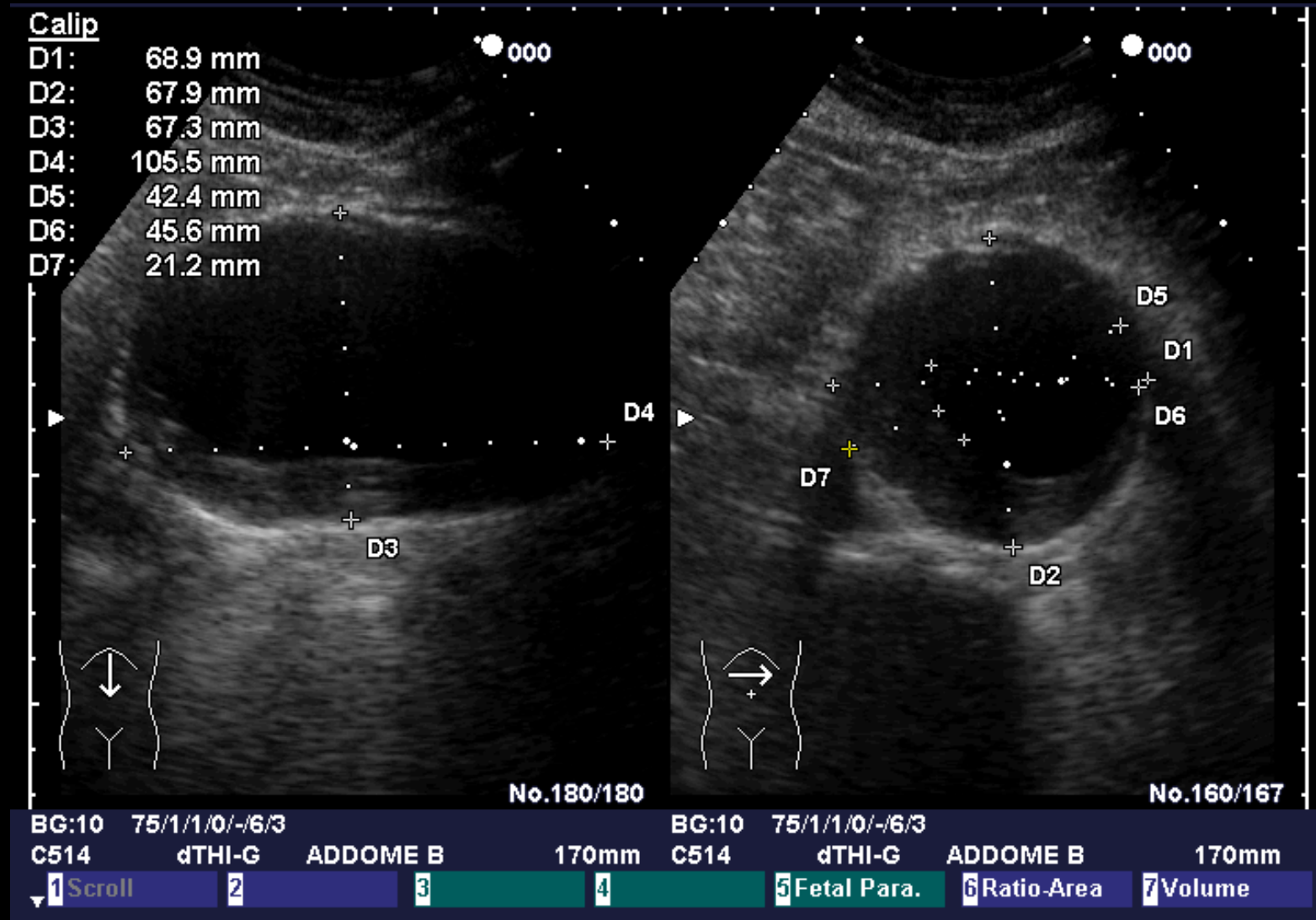
Second-year osteopathic students can attain a sufficient degree of proficiency in limited ultrasonographic technique for identification of anatomic structures and pathologic conditions

10 hours of instruction in ultrasonographic techniques + 40 hours of training of organ-specific ultrasonographic scans (2-hour sessions during 20 weeks)

Syperda VA, Trivedi PN, Melo LC, Freeman ML, Ledermann EJ, Smith TM, Alben JO, Oct 2008.
Ultrasonography in preclinical education: a pilot study. J Am Osteopath Assoc. 108(10):601-5



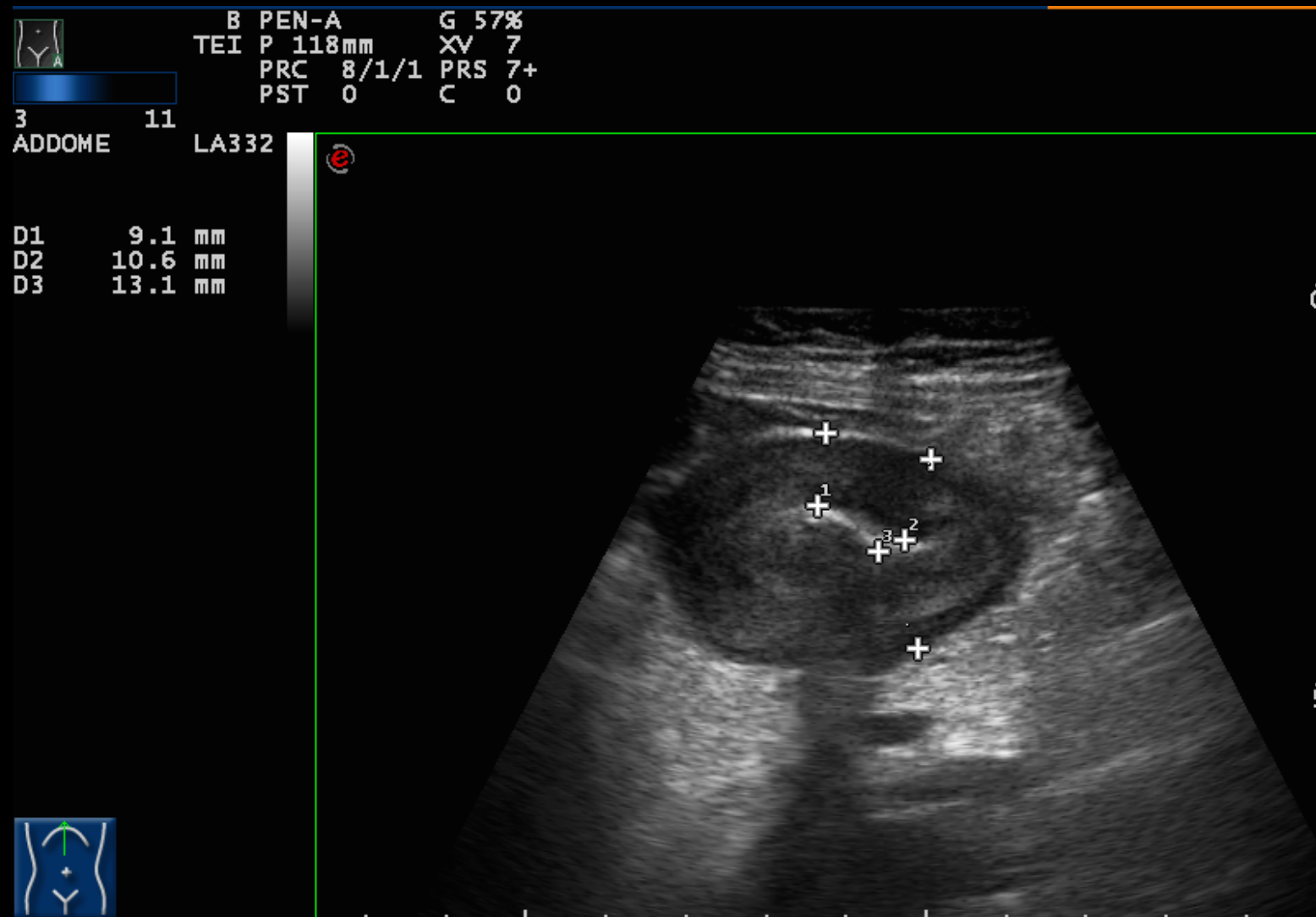
Acute Cholecystitis



Abdominal Aortic Aneurysm



Complete Rupture of the Supraspinatus Tendon



Gastric Neoplasia

Implementation of Ultrasound Screening in Teaching Osteopathic Testing Procedures

Paolo Tozzi

Osteopathic students seem to enter the curriculum with a more positive attitude to bodily contact

First year students of osteopathy have shown a better acceptability for physical examination than third year students of medicine

Consorti F, Mancuso R, Piccolo A, Consorti G, Zurlo J, Aug 2013. Evaluation of the acceptability of Peer Physical Examination (PPE) in medical and osteopathic students: a cross sectional survey. BMC Med Educ 22;13:111

Intra-examiner agreement ranged between:

- less-than-chance to substantial for the SILA ($K_g=0.21$)
- slight to moderate for the PSIS ($K_g=0.33$) and the SS ($K_g=0.24$)
- with 50% significant beyond the 0.05 level

It was greater than inter-examiner agreement:

- PSIS $K_g=0.04$; SILA $K_g=0.08$; SS $K_g=0.07$, significant at the 0.01 level

O'Haire C, Gibbons P, Feb 2000. Inter-examiner and intra-examiner agreement for assessing sacroiliac anatomical landmarks using palpation and observation: pilot study. Man Ther 5(1):13-20

It was requested to locate the PSIS in a model for 9 consecutive times, while a hidden 5 mm heel wedge was used to alter the height of the PSIS (which was hidden from the examiners)

All three groups produced Fk results below 0.4 (0.025-0.065), indicating poor inter-examiner reliability

Sutton C, Nono L, Johnston RG, Thomson OP, Apr 2013. The effects of experience on the inter-reliability of osteopaths to detect changes in posterior superior iliac spine levels using a hidden heel wedge. J Bodyw Mov Ther 17(2):143-50

Inter-examiner agreement of findings from osteopathic testing procedures appears to depend on:

- general clinical experience
- specific experience with the testing procedures (Beal and Patriquin, 1995)

and to be improved by consensus training (Degenhardt et al, 2005)

Beal MC, Patriquin DA, Feb 1995. Interexaminer agreement on palpatory diagnosis and patient self-assessment of disability: a pilot study. J Am Osteopath Assoc 95(2):97-100, 103-6

Degenhardt BF, Snider KT, Snider EJ, Johnson JC, Oct 2005. Interobserver reliability of osteopathic palpatory diagnostic tests of the lumbar spine: improvements from consensus training. J Am Osteopath Assoc 105(10):465-73



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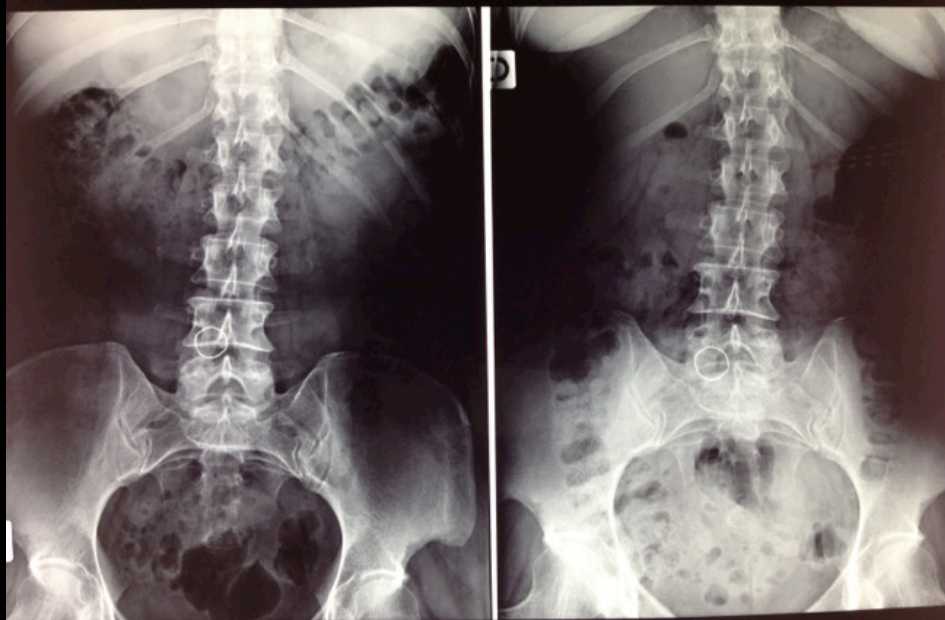
ADDOME B 8

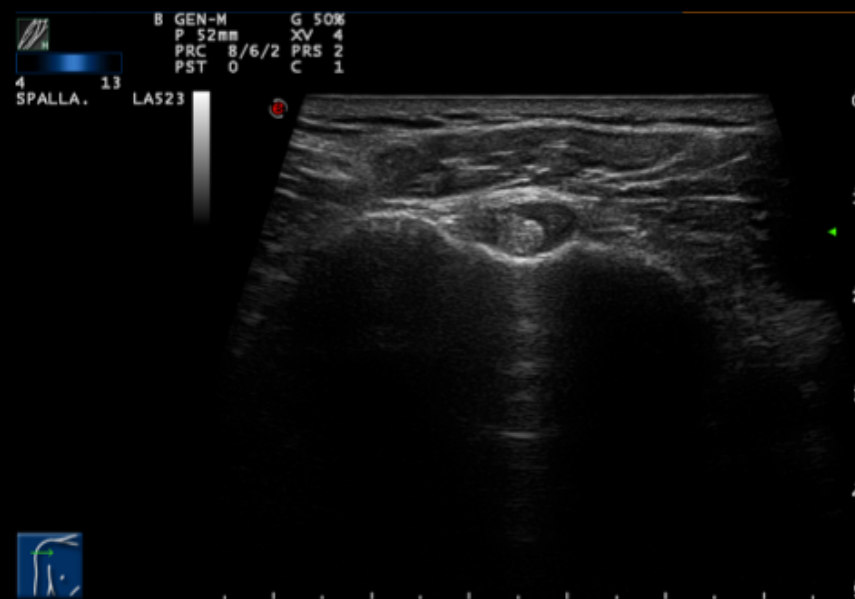
B RIS-A G 33%
TEI P 169mm XV 3
PRC 10/8/1 PRS 6+
PST 0 C 0

CA541



D



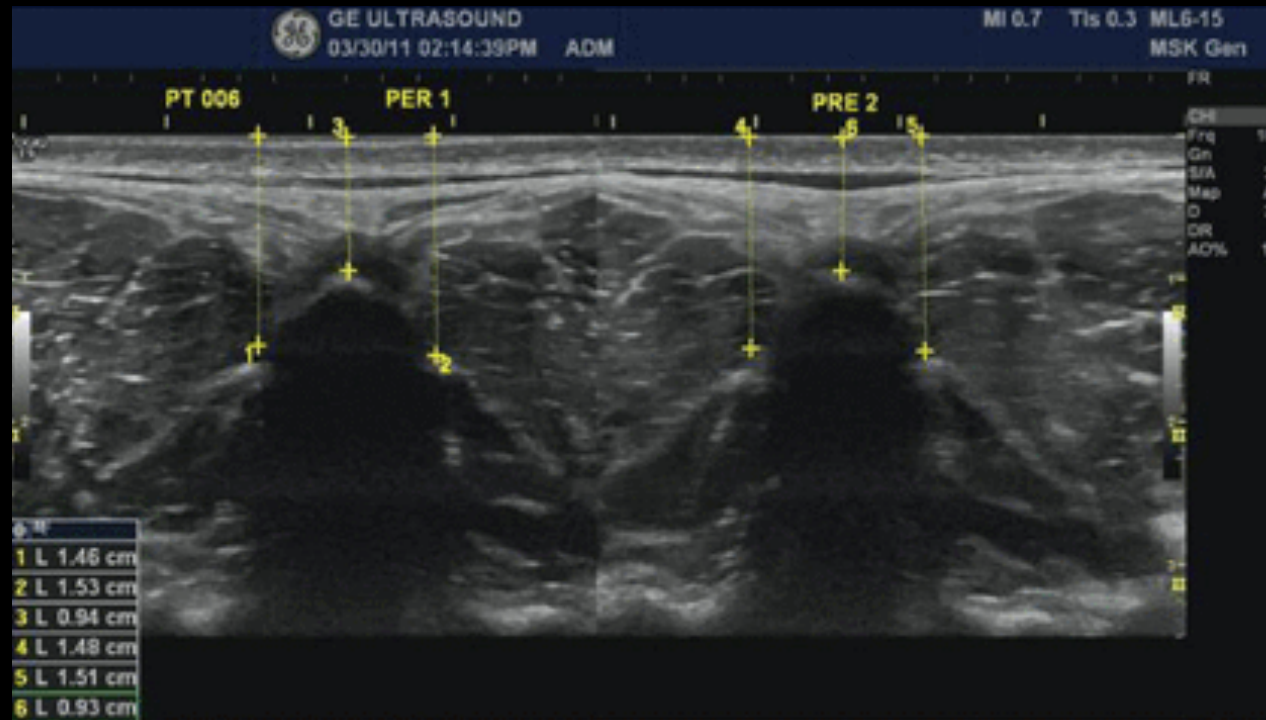




www.davidebongiorno.com/il-blog-fusae

Implementation of Ultrasound Screening in Osteopathic Research

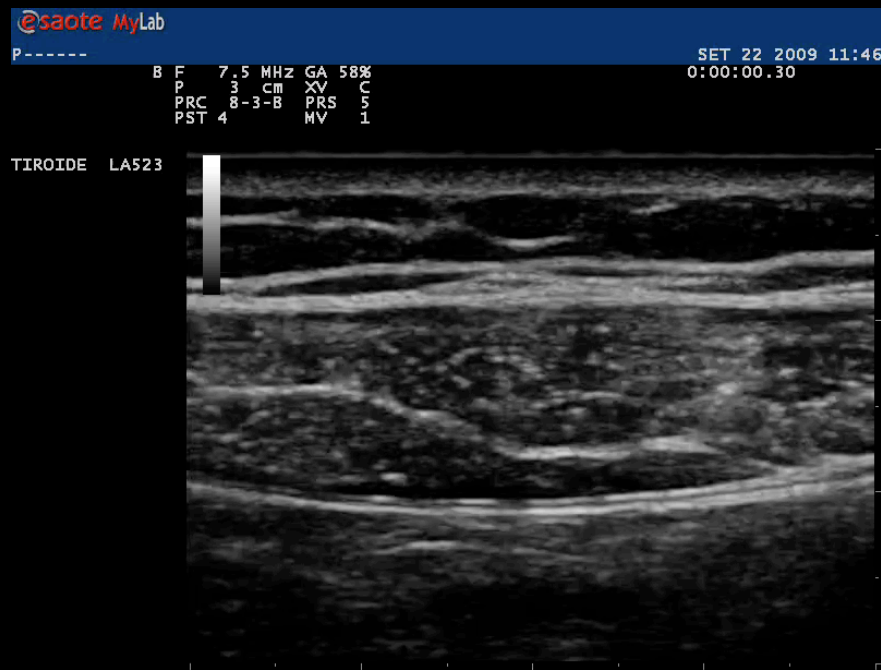
Paolo Tozzi



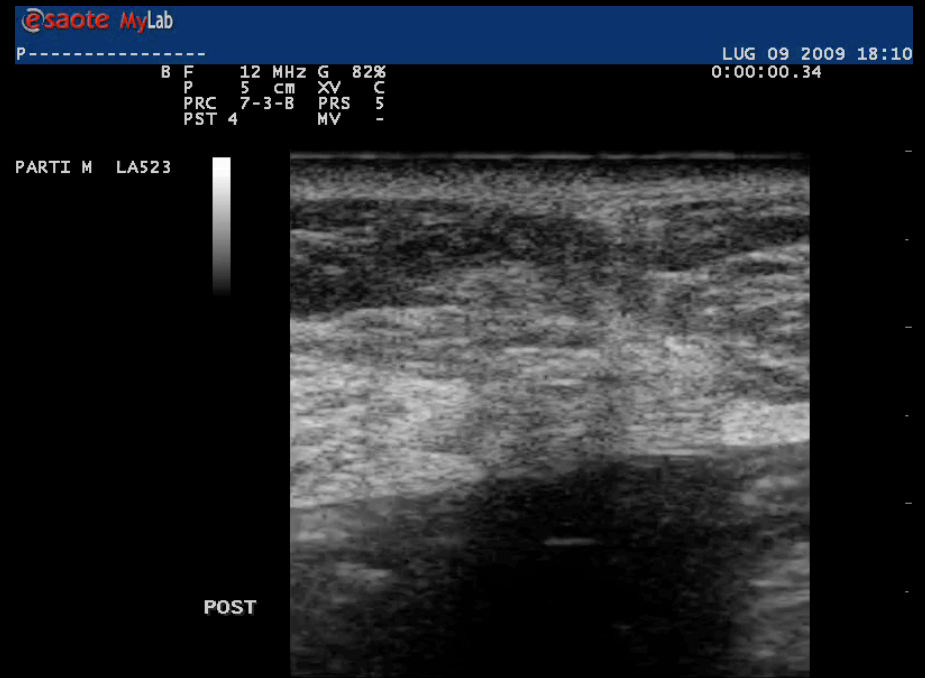
Ultrasonography is a reliable instrument for the assessment and quantification of somatic dysfunction in the lumbar spine pre and post treatment, showing a high correlation (Pearson c.c. = 0.997) with the findings from palpatory examination

Shaw KA, Dougherty JJ, Treffer KD, Glaros AG, Dec 2012. Establishing the content validity of palpatory examination for the assessment of the lumbar spine using ultrasonography: a pilot study. J Am Osteopath Assoc 112(12):775-82

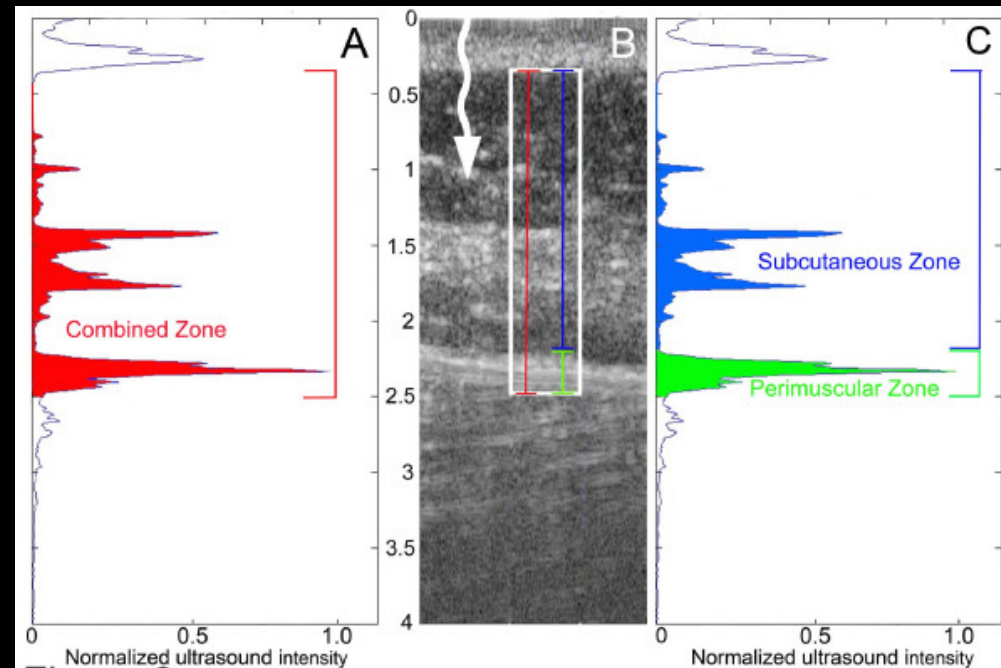
Subcutaneous Abdominal Fascia layers



Asymptomatic



Symptomatic



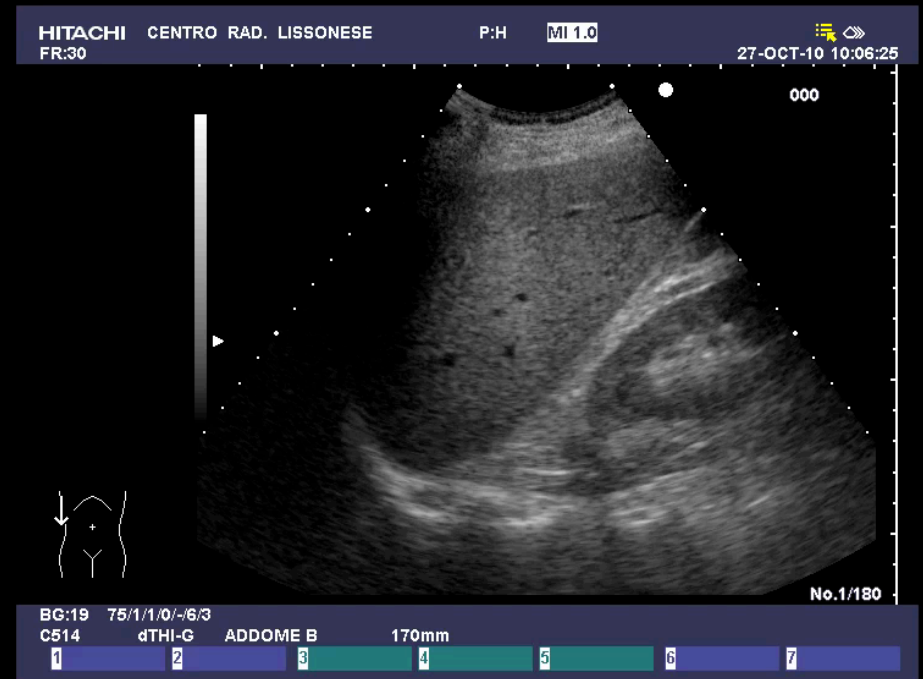
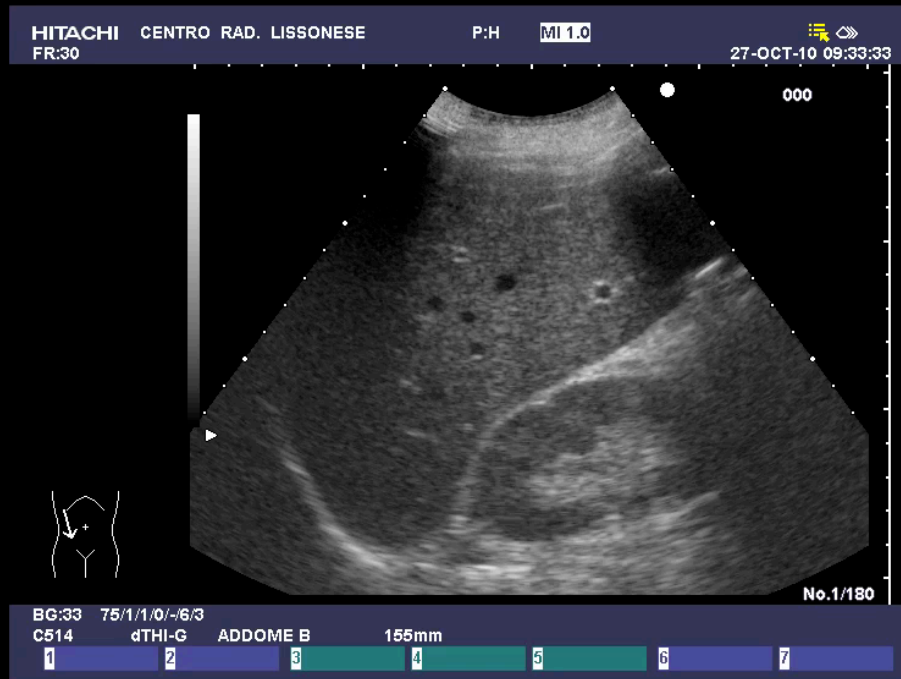
An US-based comparison of subcutaneous and perimuscular connective tissues forming the superficial and deep TLF, showed a 25% greater perimuscular connective tissue thickness and echogenicity in people with LBP, who expressed less relative tissue motion between the deep and superficial connective tissue of the back than the pain-free control group (Langevin et al 2009)

Langevin HM, Stevens-Tuttle D, Fox JR, Badger GJ, Bouffard NA, Krag MH, Wu J, Henry SM, Dec 2009.

Ultrasound evidence of altered lumbar connective tissue structure in human subjects with chronic low back pain. BMC Musculoskelet Disord 3;10:151

People with non-specific LBP presents a significant reduced range of right kidney mobility, comparing with that measured in asymptomatic subjects

OFT has shown to be an effective manual approach to improve or restore kidney mobility and reduce pain perception over a short term duration in people with non-specific LBP



Tozzi, P, Bongiorno D, Vitturini C, Jul 2012. Low back pain and kidney mobility: local osteopathic fascial manipulation decreases pain perception and improves renal mobility. J Bodyw Mov Ther 16(3):381-91

Pain pattern in people suffering of non-specific NP or LBP has been demonstrated to be reduced together with an improvement of the range and quality of surrounding fascial sliding motion after osteopathic fascial techniques are applied in situ



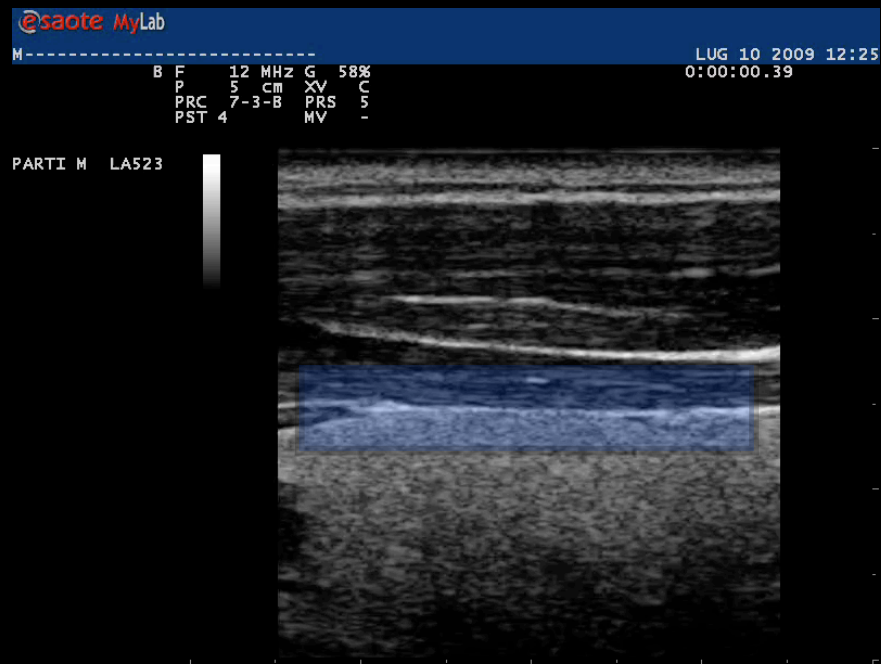
Before TTT



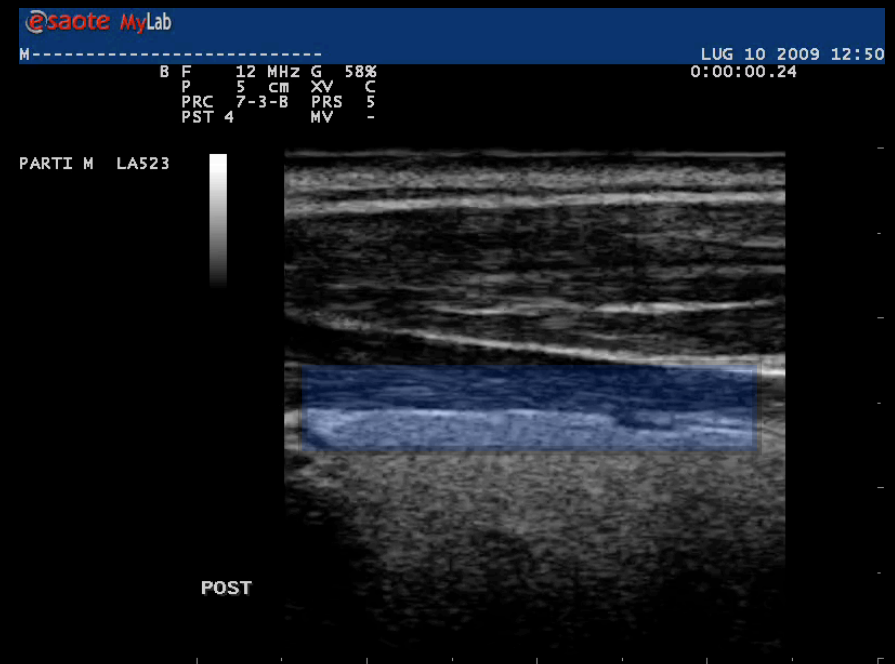
After TTT

Tozzi P, Bongiorno D, Vitturini C, Oct 2011. Fascial release effects on patients with non-specific cervical or lumbar pain, *J Bodyw Mov Ther* 15(4):405-16

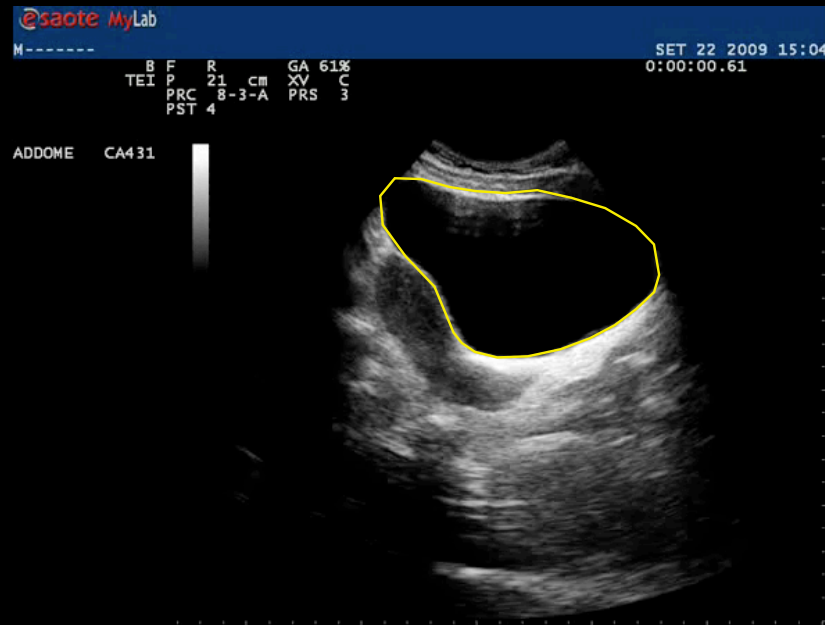
Pretracheal Fascia



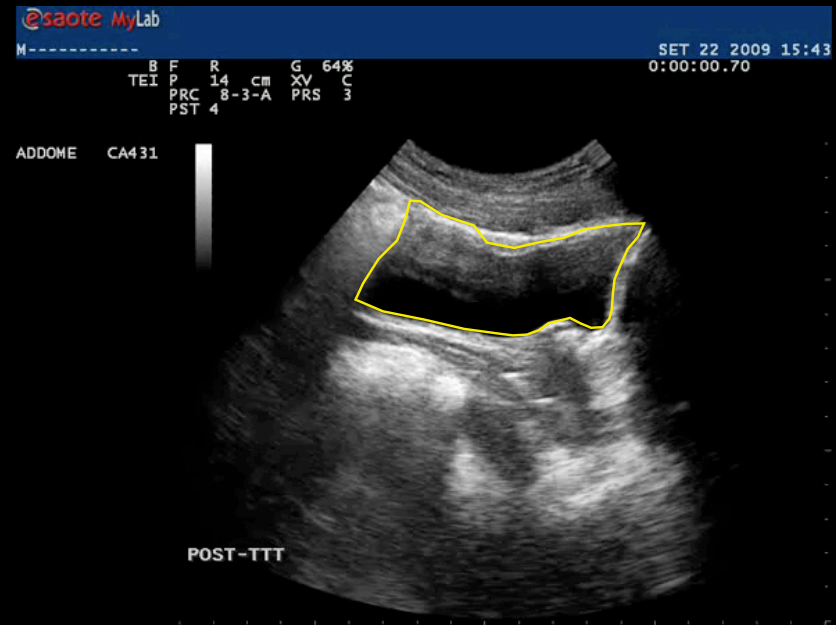
Before TTT



After TTT



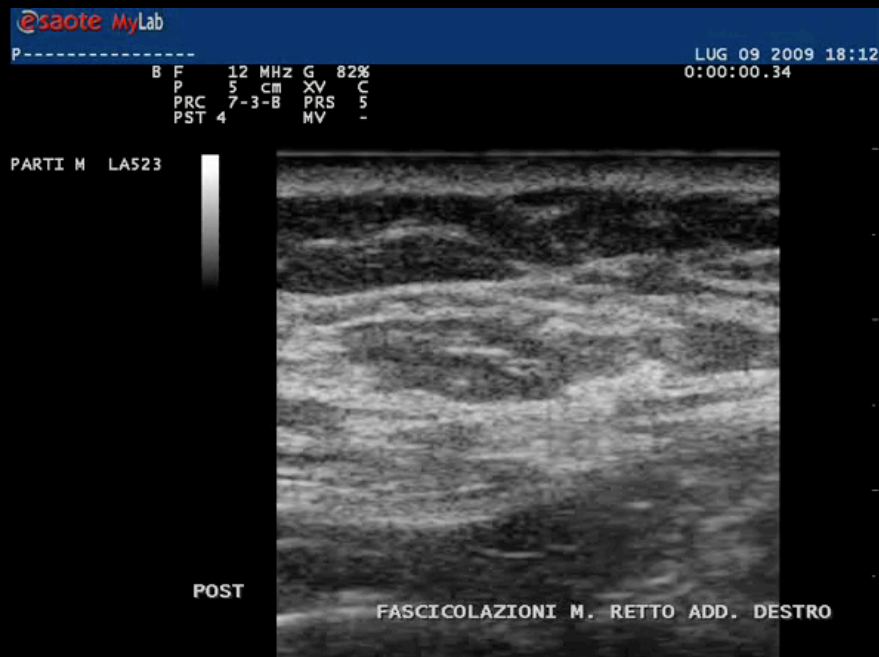
Before TTT



After TTT

Tozzi P, Bongiorno D, Vitturini C, Oct 2011. Fascial release effects on patients with non-specific cervical or lumbar pain, J Bodyw Mov Ther 15(4):405-16

A scar is considered to be active if at least one of its layers does not move in harmony with the surroundings i.e. if resistance to passive movement in at least one direction can be palpated (Lewit, 2004)



After 1st TTT



After 2nd TTT

Conclusions

- Real-time US screening is a relatively low cost, non-invasive and valid tool to evaluate the sliding motion of tissue layers in vivo
- It can be implemented in osteopathic training to guide and support students handling during testing maneuvers or adjusting techniques
- It can be implemented in post-training examination to verify students accuracy on performing specific test or techniques
- It can be implemented in osteopathic practice (and schools' clinic) to help on identifying conditions which require a primary medical intervention
- It can be used in osteopathic research (including undergraduate projects) to investigate broad areas of primary osteopathic interest such as evaluating:
- differences between normal, dysfunctional and pathological tissues; validity and reliability of osteopathic testing procedures; effectiveness of osteopathic techniques; correlation between pain pattern as perceived by the patient and tissue changes as assessed through US imaging, before and after OMT is applied

Thank You for your Attention

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