

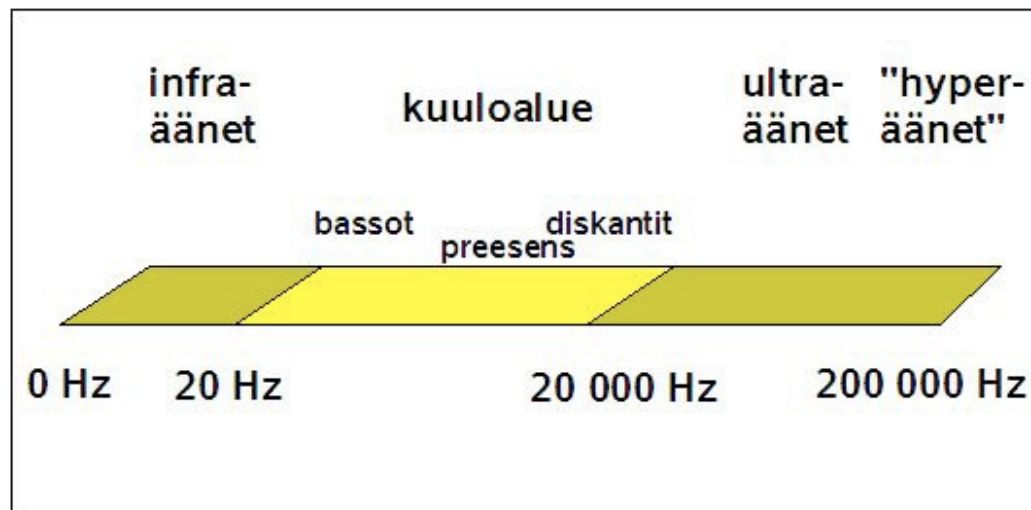
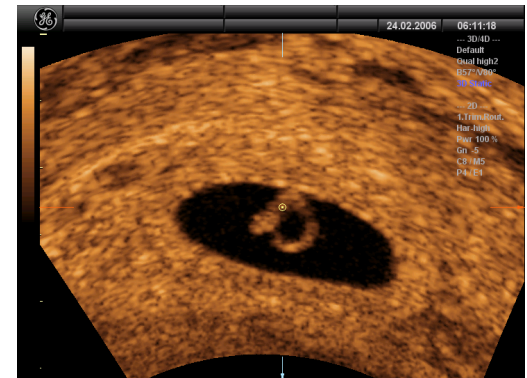
Dopplerin / 3D UÄ:n hyödyntäminen hedelmällisyyden arvioimisessa ja hoidossa

Reproendopäivät Helsinki 17.-18.2.2011

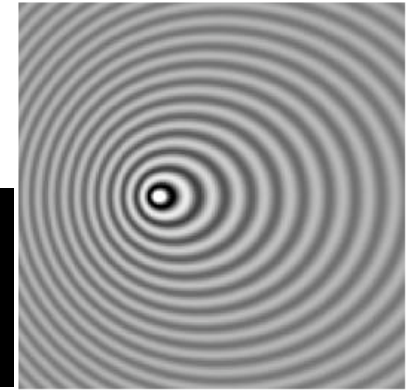
Ilkka Järvelä, OYS

Äänen taajuus

- Taajuuden yksikkö on $1/s = 1$ hertsi (Hz)
- Kuulotaajuus 20-20 000 Hz
- Ultraäänen taajuus $> 20\ 000$ Hz



Doppler



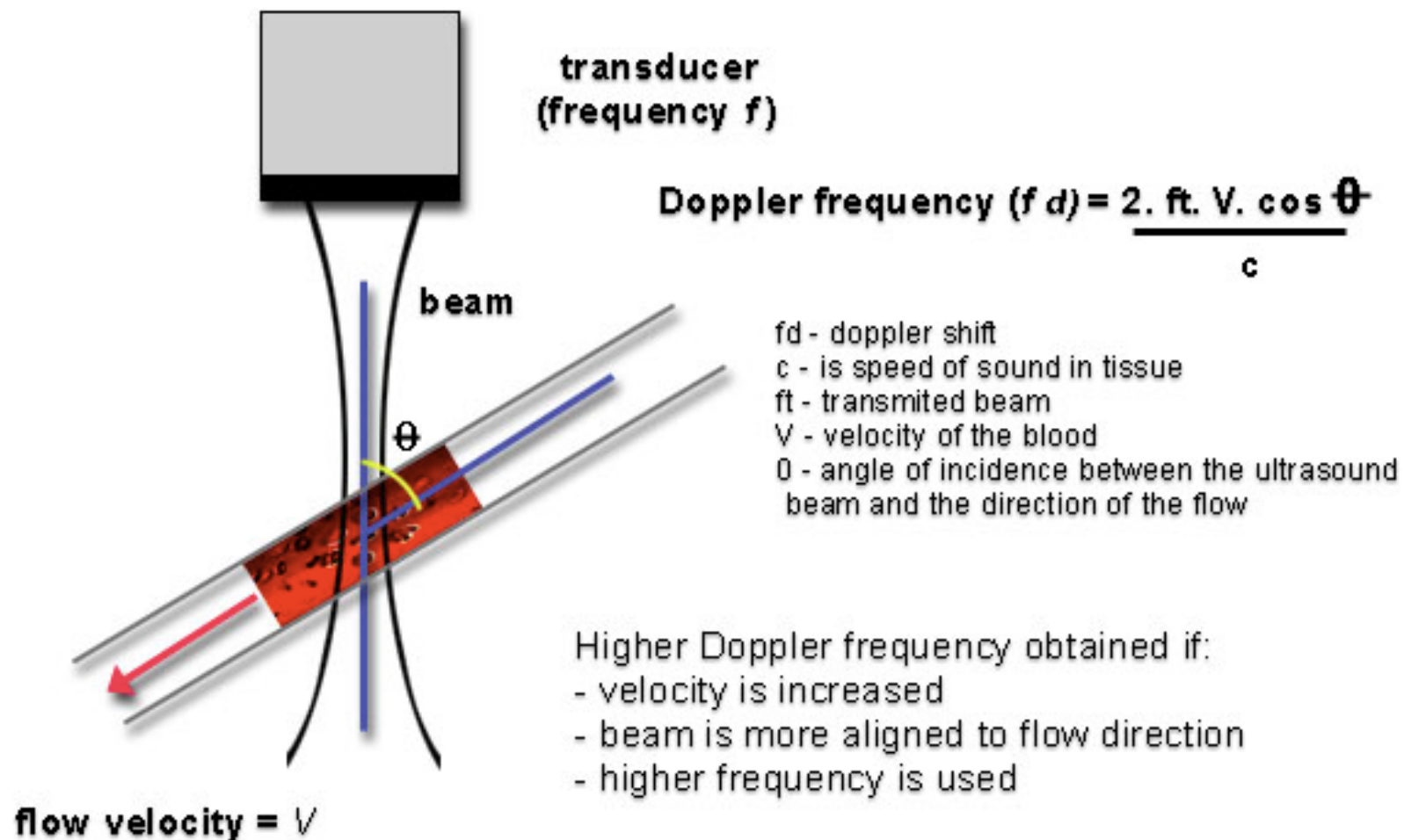
- Aaltoliikkeen taajuudessa tapahtuva näennäinen muutos, joka johtuu lähteen ja havaitsijan liikkeestä toisiinsa nähden
 - Lähestyvä kohde, taajuus suurenee
 - Loittoneva kohde, taajuus pienenee

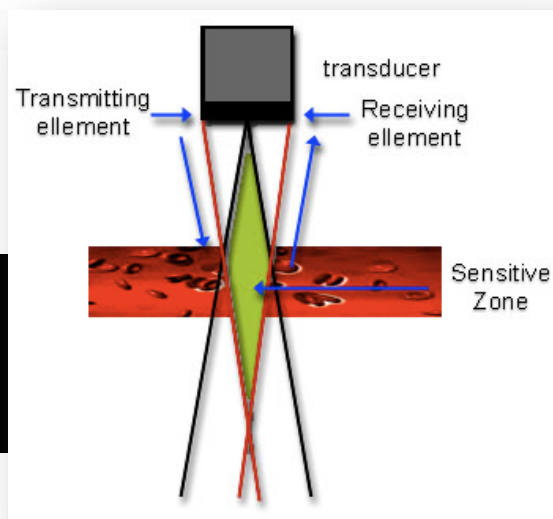


Doppler shift

- ▣ Punasolujen virtaus saa aikaan taajuuseron lähetetyn ja vastaanotetun pulssin välillä
 - ▣ 100Hz – 11 kHz
- ▣ Riippuvainen
 - ▣ Veren virtausnopeudesta (10 – 100 cm/s)
 - ▣ Ultraäänen ja verisuonen välisestä kulmasta
 - ▣ Laitteen toimintataajuudesta

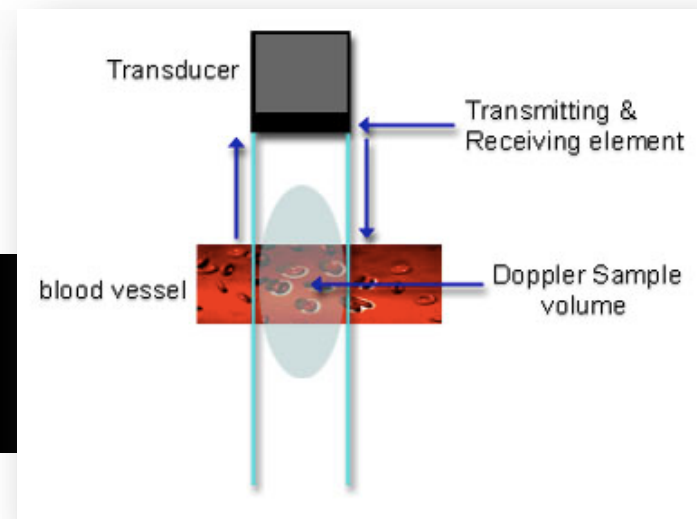
Doppler shift





Jatkuva Doppler

- Eri kiteet lähettävät ja vastaanottavat ääntä jatkuva-aikaisesti
- Antureiden keilat kohtaavat halutulla syvyydellä
- Nopean virtauksen mittaaminen, kaikki liike mikä sattuu keilaan
 - ▣ Sikiön aortta, läppävuodot



Pulsoiva Doppler

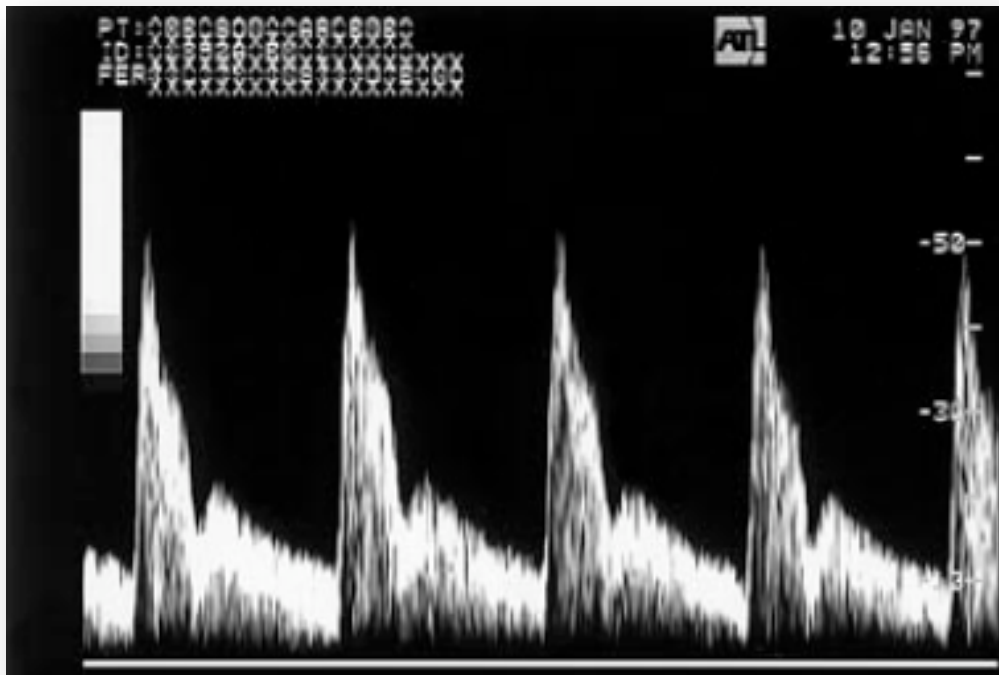
- Sama kide lähettää ja vastaanottaa
- Valitaan kaiun vastaanottoaika halutun syvyyden mukaan
 - ▣ Sample volume, muutettavissa
- Kulmaa voi korjata
- Color Doppler + reaaliaikainen B-kuva

Doppler-shift

- ▣ Soveltuu vain liikkuvien kohteiden tutkimiseen
- ▣ 3 käytännön sovellutusta
 - ▣ Doppler spektri (velocity waveform)
 - ▣ Väri Doppler (Color Doppler)
 - ▣ Power Doppler

Doppler spektri

- Doppler velocity waveform
 - Veren virtausnopeuden muutokset yhden sydämen lyönnin aikana



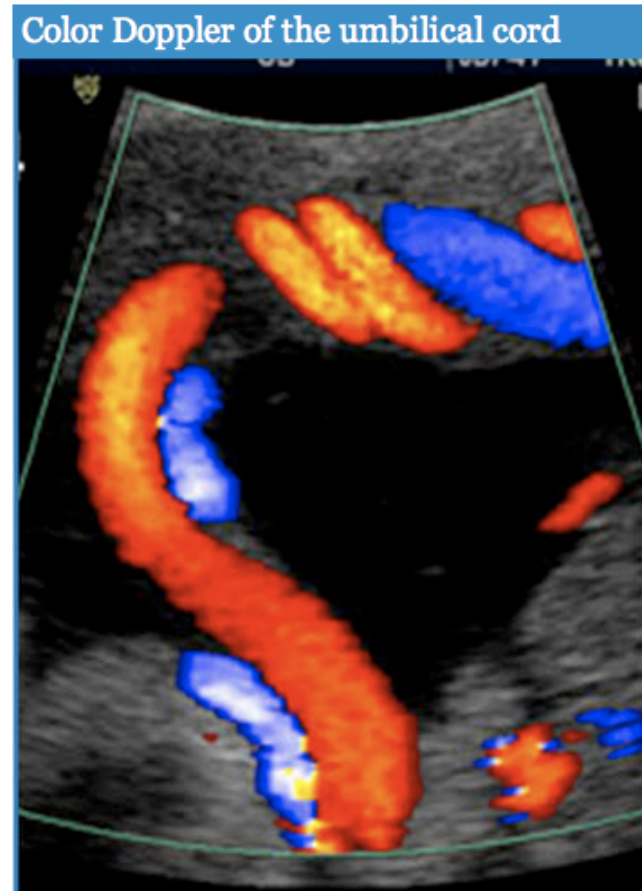
Väri Doppler

Punainen kohden
anturia tuleva
virtaus

Taajuus kasvaa

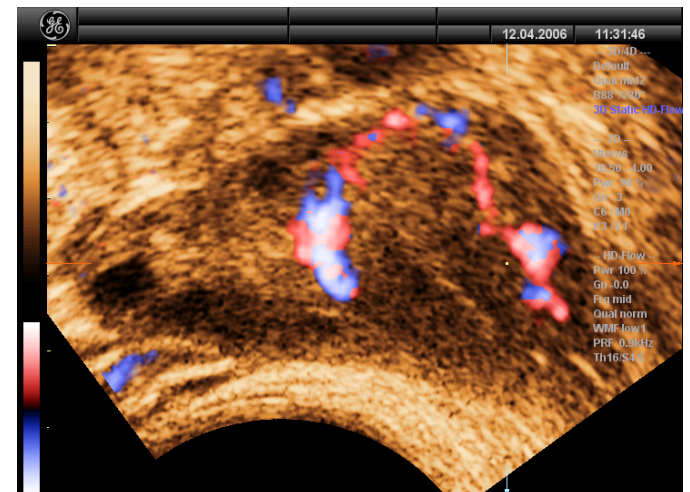
Sininen anturista
poispäin menevä
virtaus

Taajuus pienenee



Doppler-signaali ilman nopeus-tai suuntainformaatiota

High definition flow: power
doppler missä myös
suuntainformaatio



Doppler virtauksen analyysi

- ▣ Spektrin (velocity waveform) analyysi
- ▣ Resistanssi indeksit
- ▣ Virtaustilavuus (flow volume) tai virtausnopeus (velocity)

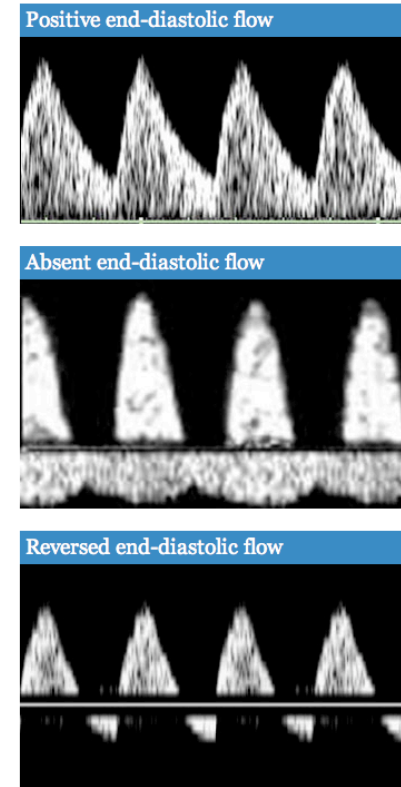
Spektri Doppler

Jatkuva diastolinen virtaus

Diastolinen virtaus puuttuu

Diastolinen virtaus
retrogradinen

II ja III trimesteri, a. uterina
ja a. umbilicalis, sikiön
aortta



Resistanssi indeksit

- ▣ RI = resistance index
- ▣ PI = pulsatility index
- ▣ S/D Ratio
 - ▣ S = peak systolic velocity
 - ▣ D = end diastolic velocity

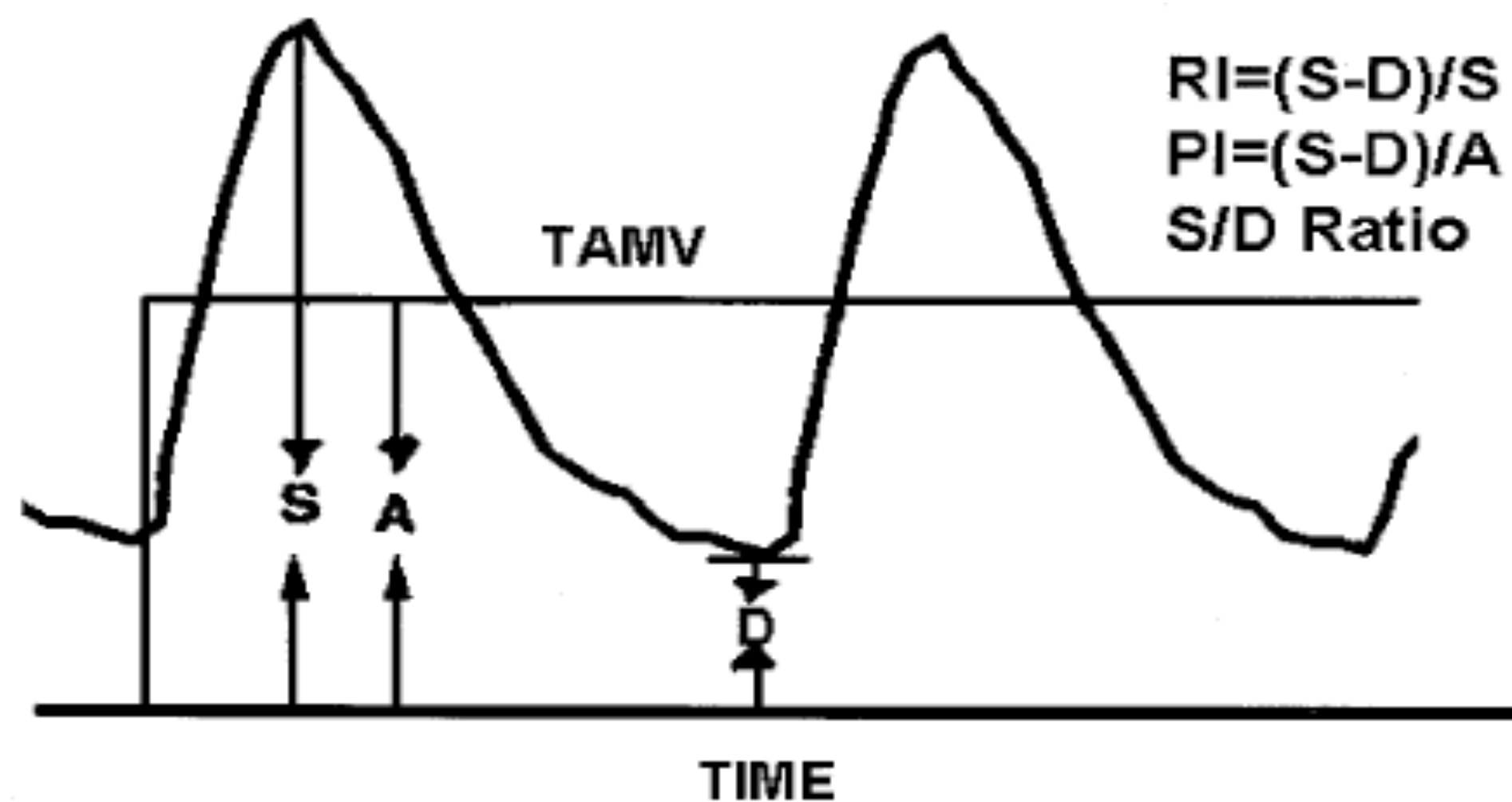


Figure 5. Common resistance indices: (S) peak systolic velocity, (D) end diastolic velocity, (A) time averaged maximum velocity. RI = resistance index, $(S - D)/S$; PI = pulsatility index, $(S - D)/A$; S/D ratio, S/D . TAMV = time averaged maximum velocity.

Resistanssi indeksit

- ▣ Riippumattomia kulmasta
- ▣ Epäsuoria mittareita verenvirtauksesta
 - ▣ Mittaavat verenvirtaus impedanssia mittauskohdasta eteenpäin (?)
- ▣ Yhteys elimen perfuusioon?

Virtaustilavuus (flow volume)

- ▣ Flow volume
 - ▣ $Vol = Vel \times A$
 - ▣ Vol = flow volume
 - ▣ Vel = time averaged mean velocity throughout the cardiac cycle
 - ▣ A = cross-sectional area of the vessel, $A = \pi \times r^2$
- ▣ Riippuu kulmasta ja verisuonen läpimitasta
- ▣ Tarkin mittari virtauksesta, mutta vaikea toteuttaa

Virtausnopeus (flow velocity)

- Time averaged maximum velocity TAMV (V_{max})
- Peak systolic flow PSV
- Minimum diastolic velocity MDV

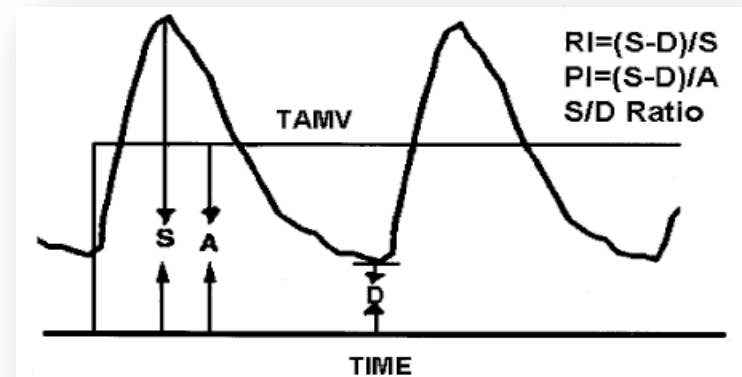


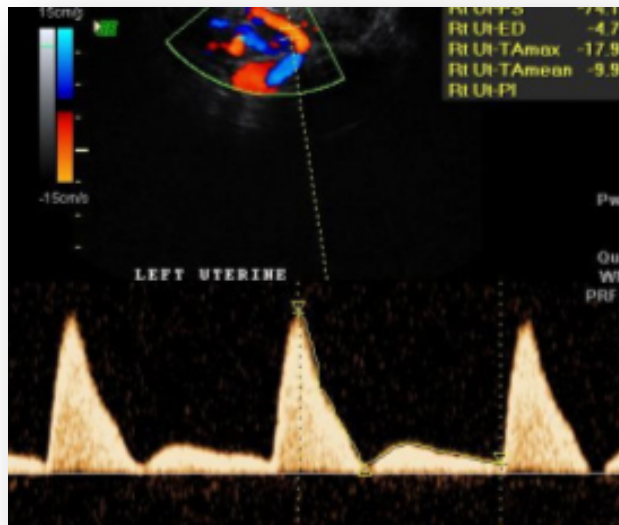
Figure 5. Common resistance indices: (S) peak systolic velocity, (D) end diastolic velocity, (A) time averaged maximum velocity. RI = resistance index, $(S - D)/S$; PI = pulsatility index, $(S - D)/A$; S/D ratio, S/D . TAMV = time averaged maximum velocity.

- Kulmasta riippuvaisia, hankala toistaa, eivät kuvaa sykkeen aikaista kokonaisvirtausta

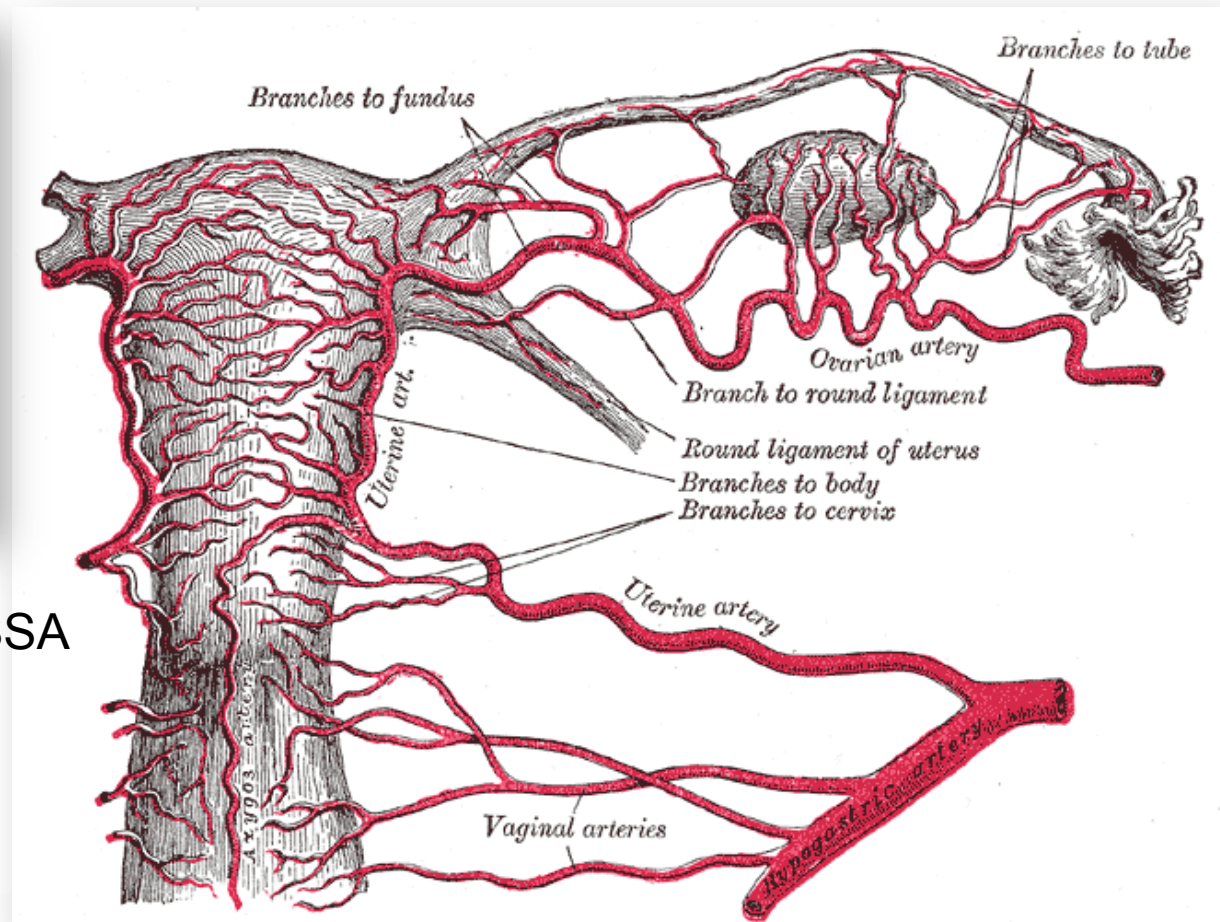
Endometriumien reseptiivisyys

- ▣ UÄ-mittarit
 - ▣ paksuus (2D) tai tilavuus (3D)
 - ▣ rakenne ja kaikuisuus
 - ▣ verenvirtaus
 - ▣ **color Doppler, 2D**
 - ▣ **uterinat**
 - ▣ power Doppler, 3D
 - ▣ endometrium
 - ▣ subendometrium

Merkitys alkion siirron onnistumiseen?



VIRTAUS KOHTUVALTIMOSSA



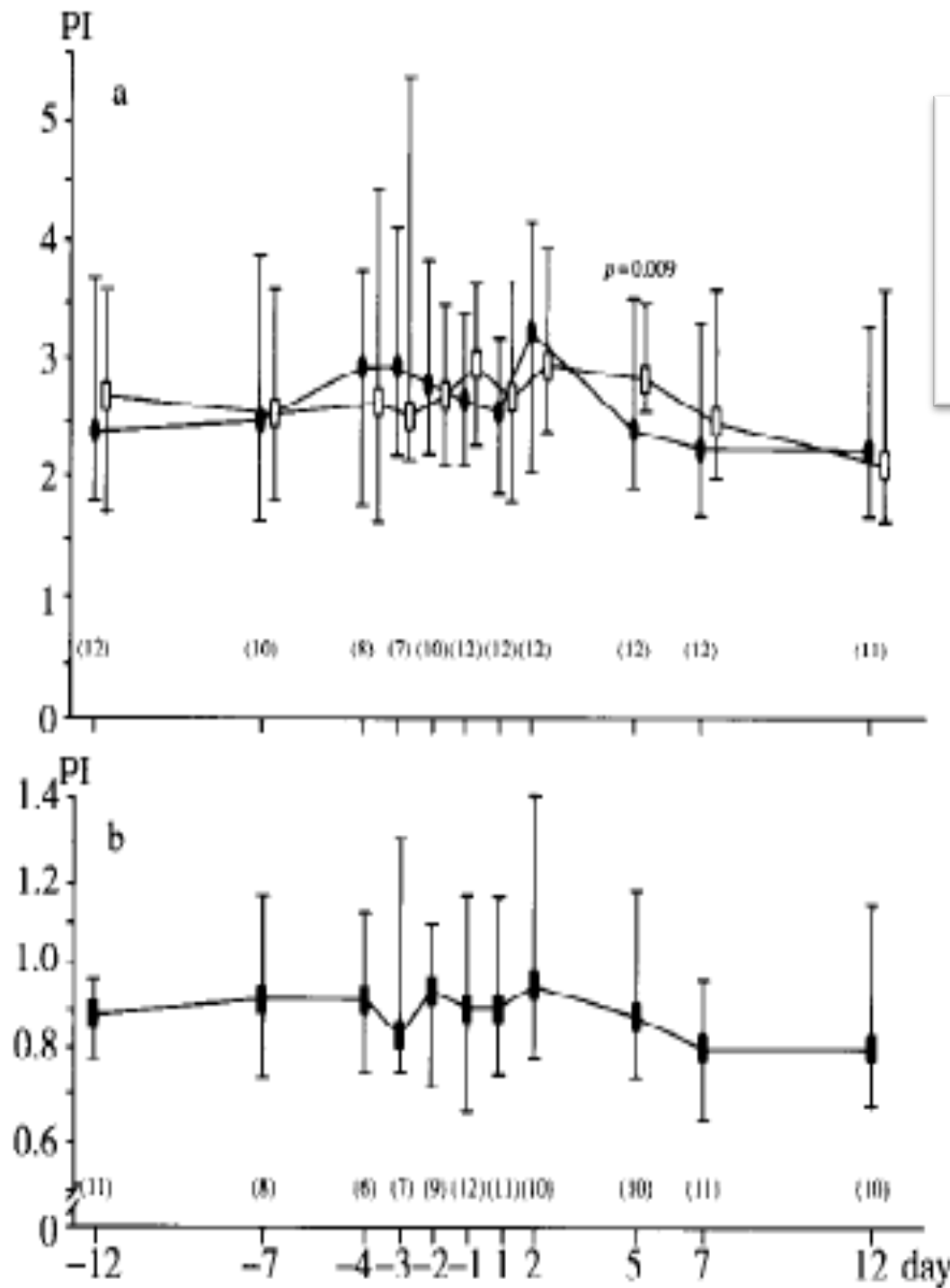
Blood flow velocity in the uterine and ovarian arteries during the normal menstrual cycle

P. Sladkevicius, L. Valentin and K. Maršál

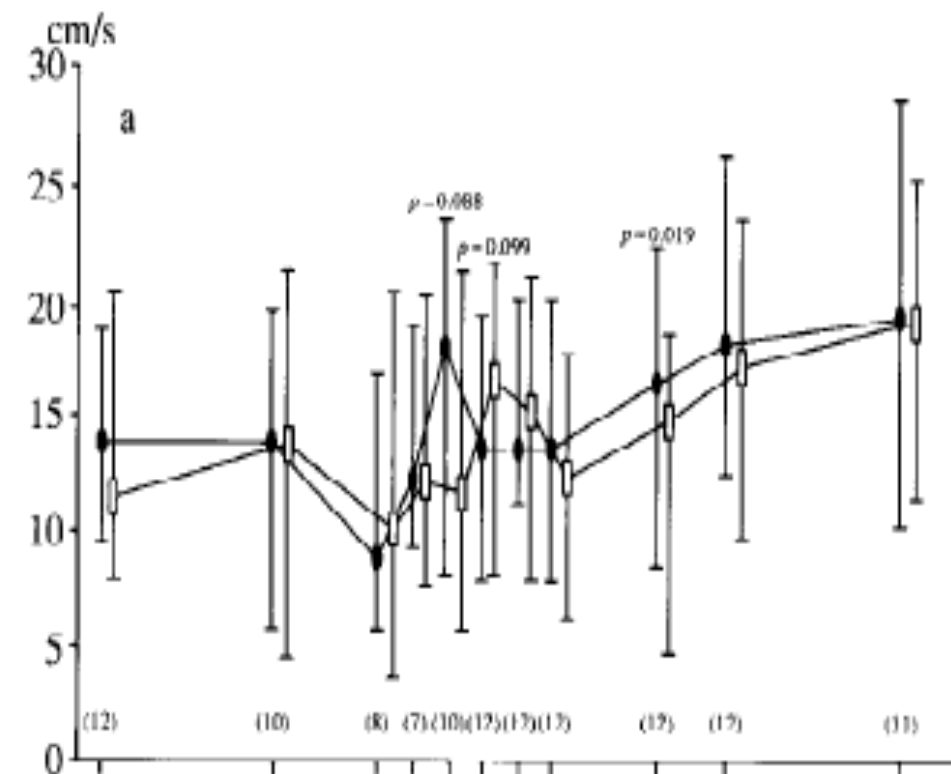
a. uterina

$$PI = (S - D) / \text{tam} \times v$$

subendometrial artery



TAMXV

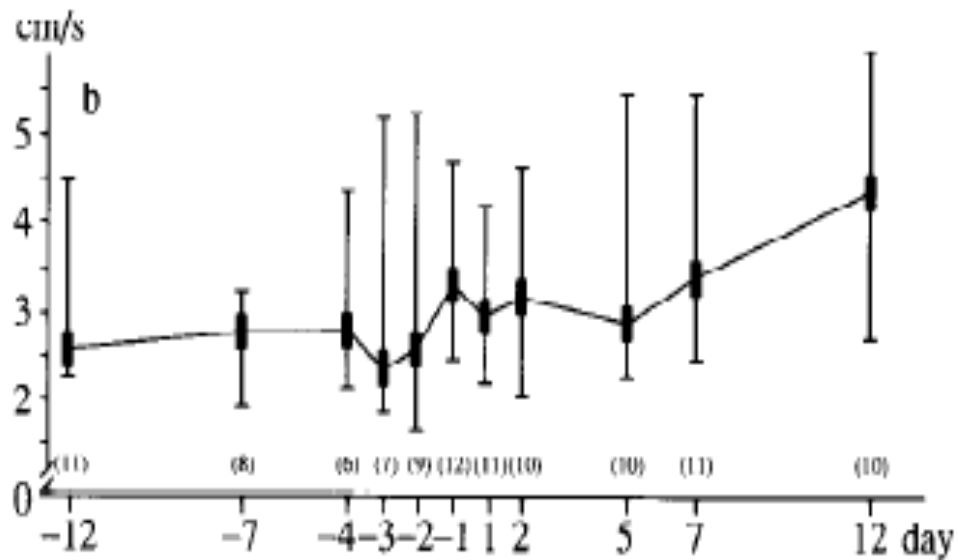


Ultrasound Obstet. Gynecol. 3 (1993) 199-208

Blood flow velocity in the uterine and ovarian arteries during the normal menstrual cycle

P. Sladkevicius, L. Valentin and K. Maršál

a. uterina



subendometrial artery

A. Uterina Doppler ja raskaus

□ ERO

- Steer et al 1992
 - 82 IVF
 - ET
 - Ei RASKAUKSIA KUN $PI > 3$
- Favre et al 1993
 - 198 IVF
 - ET
 - Ei RASKAUKSIA KUN $PI > 3.55$
- Cacciatore et al 1996
 - 200 IVF
 - ET
 - PR 41%, $PI < 3$
 - PR 15%, $PI > 3$
 - PR 10%, $PI > 3.5$
- Tekay et al 1996
 - 25 IVF, 32 FTE
 - ET
 - Ei raskauksia kun diastolinen virtaus poissa
- Levi-Setti et al 1995
 - 87 IVF
 - hCG day
 - PR 42%, $PI < 3$
 - PR 24%, $PI > 3$

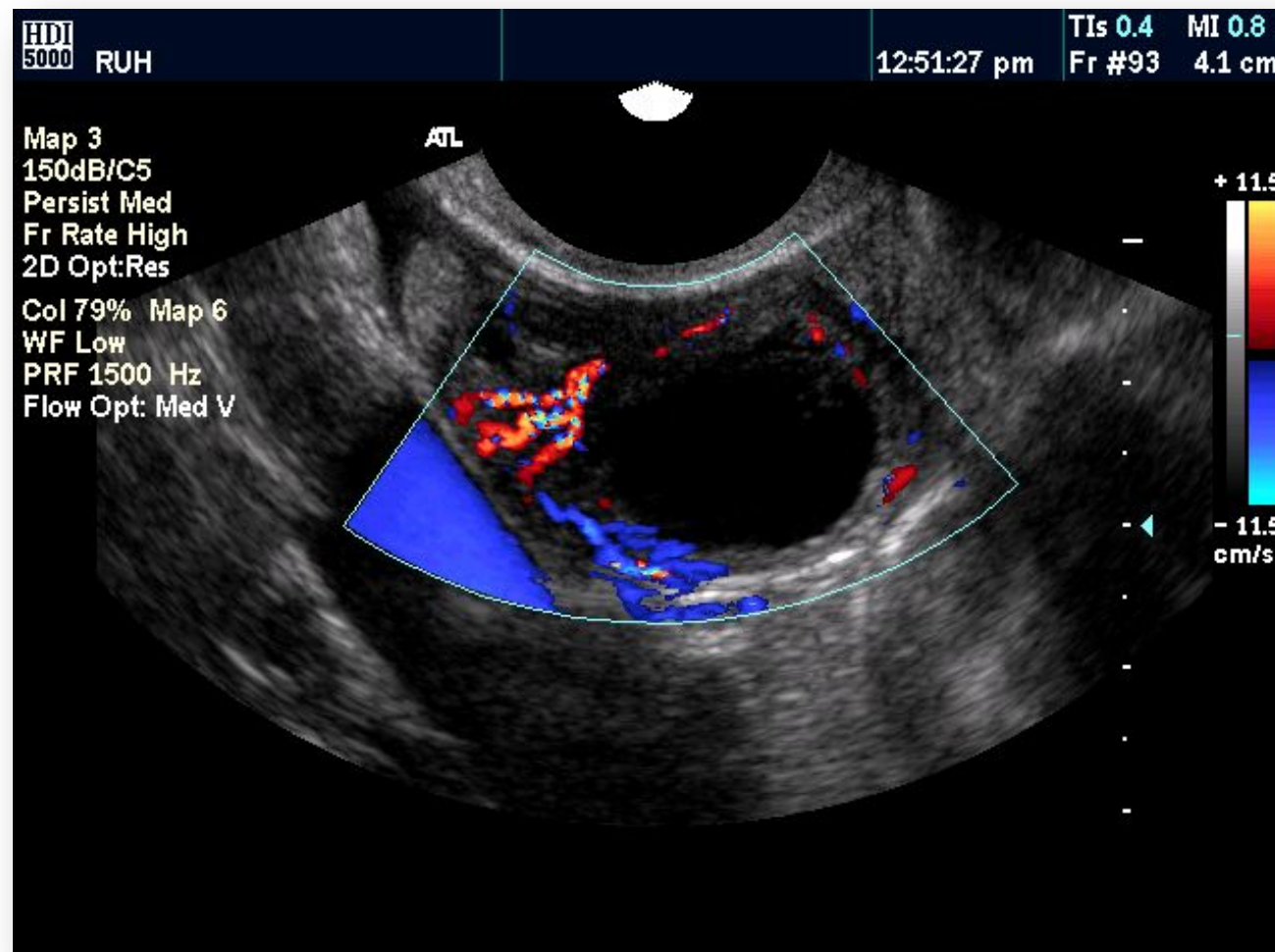
□ EI EROA

- Zaidi et al 1996
 - 139 IVF
 - hCG day
 - pregnant 2.5 vs non-pregnant 2.6
- Ng EH et al 2006
 - 451 IVF
 - OPU
 - $PI 2.03$ vs 2.04 NS
- Hoozemans et al 2008
 - 83 IVF
 - Not pregnant 42, ongoing pregnancy 30, biochemical pregnancy 11
 - Days: DRS, hCG, OPU, ET, hCG +7-9, preg test

A. ut doppler flow ja IVF

- ▣ hoitosyklin ennuste huono, jos
 - ▣ $PI > 3-4$ ennen alkion siirtoa
 - ▣ absent end-diastolic flow
 - ▣ riittämätön vaskularisaatio/perfuusio kohdussa

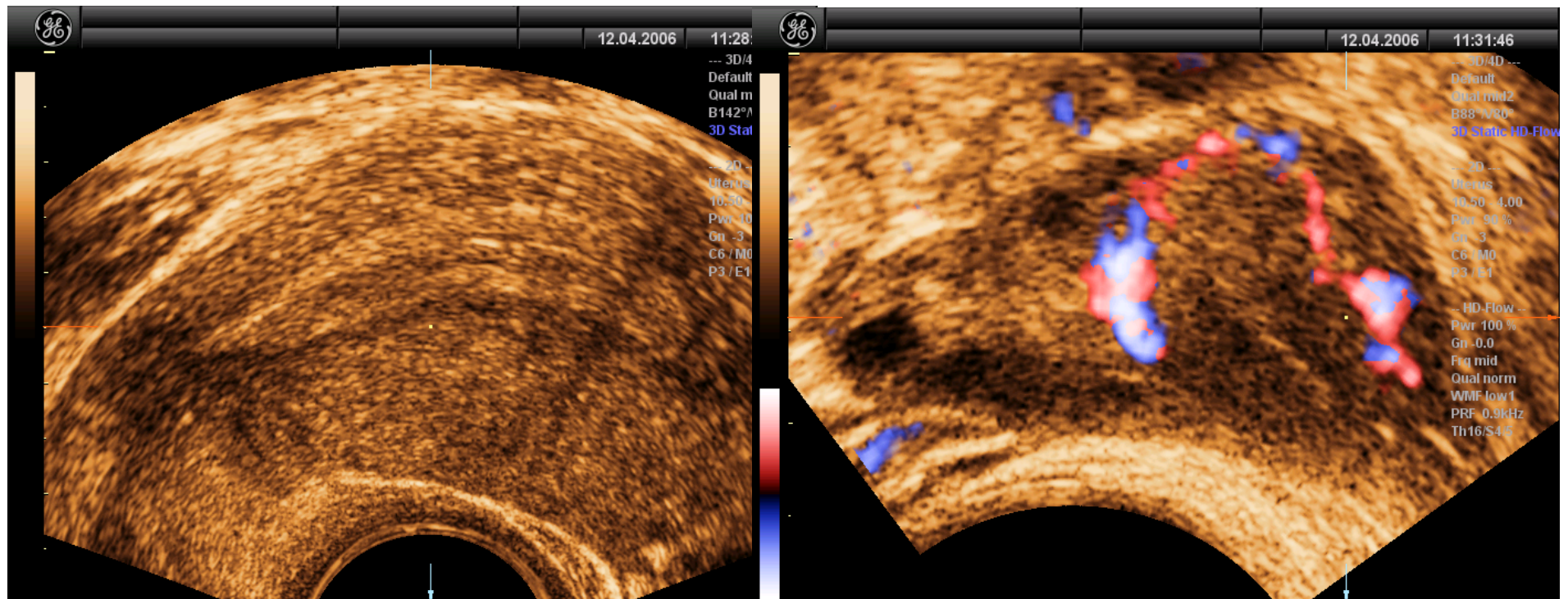
Perifollikulaarinen verenvirtaus?



Perifolikulaarinen verenvirtaus

- ▣ perifollicular blood flow correlates with
 - ▣ oocyte recovery (Nargund et al 1996)
 - ▣ PSV 10 cm/s; before hCG/OPU
 - ▣ oocyte development potential (van Blerkom et al 1997)
 - ▣ embryos with multinucleated blastomeres are derived predominantly from severely hypoxic follicles
 - ▣ embryo quality (Chui et al 1997)
 - ▣ power Doppler; implantation potential increased
 - ▣ pregnancy rate (Coulam et al 1999, Bhal et al 1999)
 - ▣ PSV 10 cm/s, grade of vascularity; before hCG

CORPUS LUTEUM



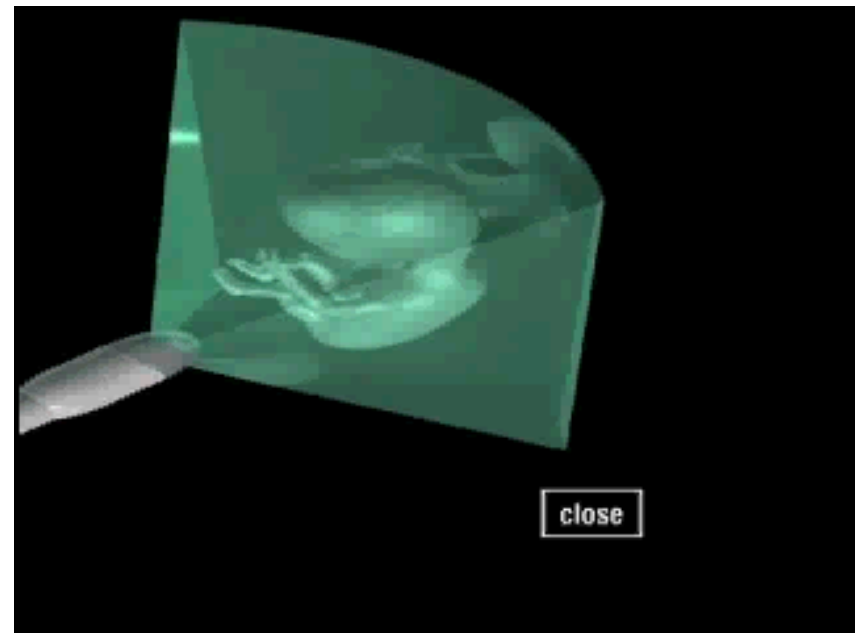
3-D ultraääni

Mitä on 3-D UÄ?

- ▣ 3-D kuva muodostuu vierekkäisistä 2-D leikkeistä
- ▣ kuvan laatu ei muutu 2-D:hen verrattuna
- ▣ kuvauskulma kohteeseen valitaan samalla tavoin kuin 2-D:ssä
- ▣ jos 2-D kuva on huono, samoin on 3-D

Kuvaus

- kohteen valinta ja kuvaus kuin 2-D:lla
- uä-anturin pää mekaaninen, pyyhkäisee uä-sektorin kohteen yli



Mitä hyötyä 3-D:stä?

- ▣ 3-ulotteinen ulträäni-tallenne
 - ▣ tarkastelu jälkikäteen, konsultointi
 - ▣ vertailu seurannassa
- ▣ erisuuntaiset leikkeet (tomografia)
- ▣ pinnan kuvaus

Tiedoston tallennus

- ▣ tallenne
 - ▣ UÄ-laitteen kovalevyllä
 - ▣ DICOM-yhteydellä kuva-arkistoon
 - ▣ CD/DVD:lle, ulkoiselle kovalevyllä

Opinion

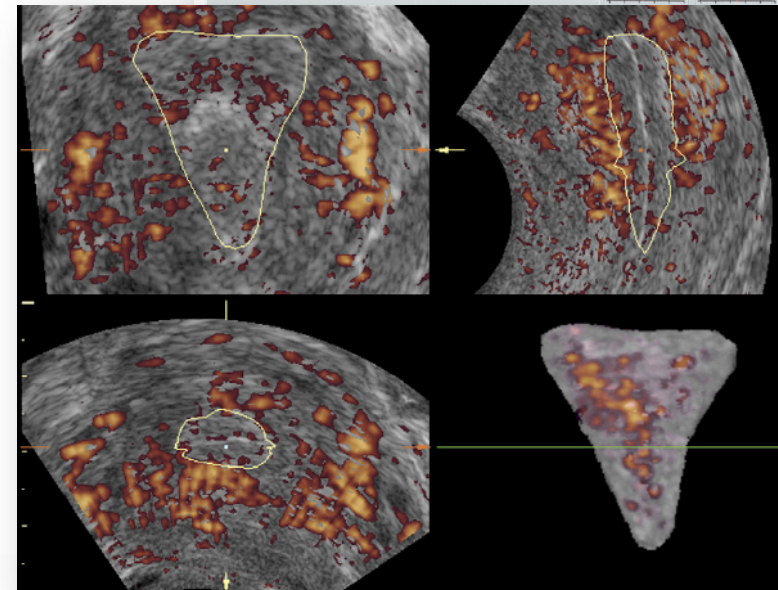
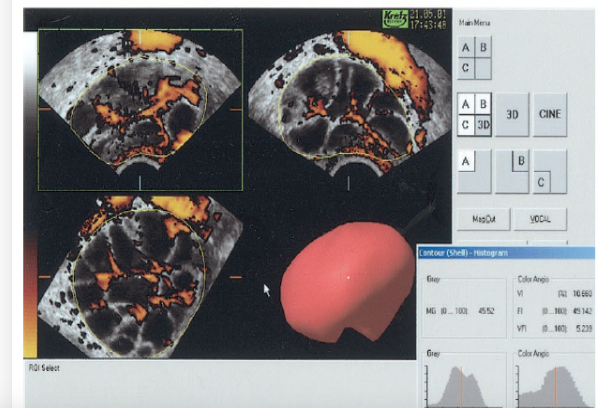
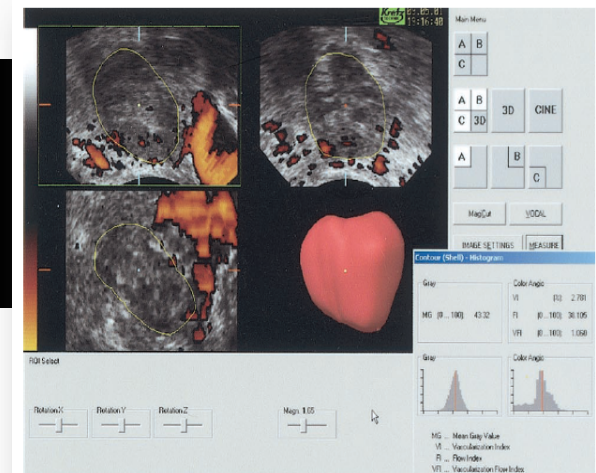
Three-dimensional ultrasound

3D, visio vuodelta 1995

- Tarkat mitat, tilavuus
- Parempi tieto anatomiasta ja verenkierrosta
- Tarkempi tieto anomaliaista
- Ultraäänitutkimusten vakiointi
- Tutkimusaika lyhenee
 - Laitteet tehokkaammassa käytössä
 - Tutkijan aikaa säästyy
- Telemedisiina (konsultointi)

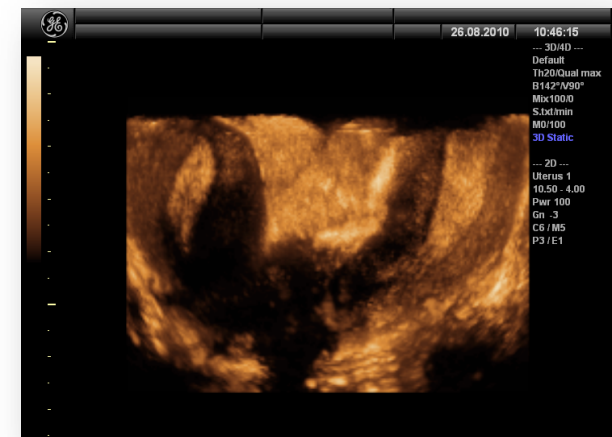
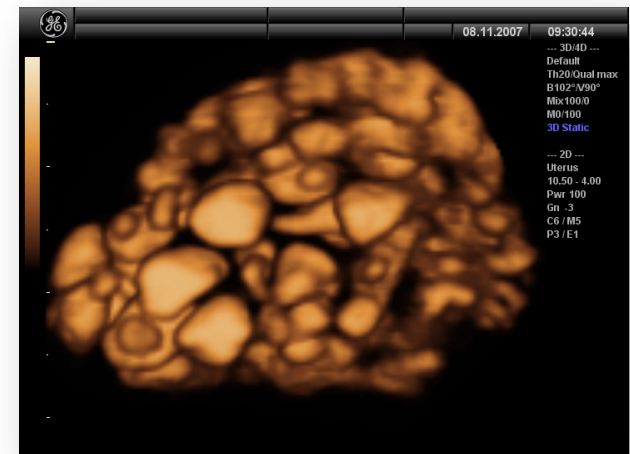
3D:n lisämahdollisuudet

- Tilavuus
- Power Doppler (PD) indeksit
 - Vascularization index VI (%)
 - PD voxels/all the voxels
 - Flow index FI
 - Keskimääräinen PD kirkkaus (0-100)
 - Vascularization flow index VFI
 - $VI \times FI$ (0-100)



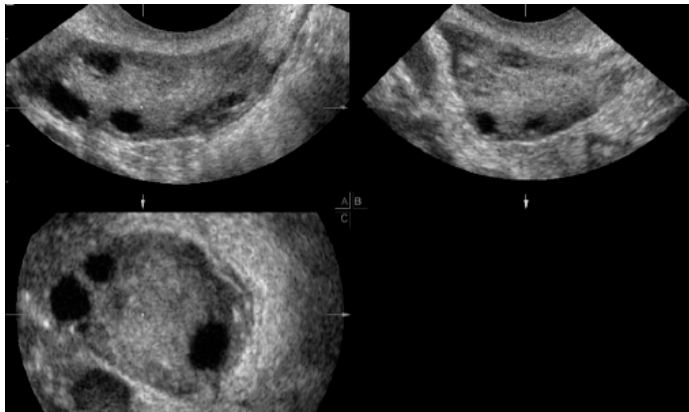
Mitä gyn-3D:llä voi tutkia?

- Munasarja
 - Kasvaimet
 - Reservi (antraalifollikkelit, tilavuus)
- Munatorvi
 - Aukiolo
 - Sakto, hydro
- Kohdun limakalvo
 - Polyypit, myomat
 - Reseptiivisyys
- Kohdun rakenne
 - Anomalia



2D vs 3D ja antraalifolikkelimäärä

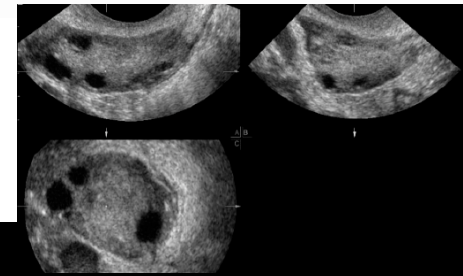
<i>Technique</i>	<i>Antral follicle count (mean $\pm$ SD)</i>		
	<i>Observer 1</i>	<i>Observer 2</i>	<i>Observers 1 & 2</i>
2D	16.36 $\pm$ 11.21	16.67 $\pm$ 12.02	16.51 $\pm$ 11.51
3D	16.47 $\pm$ 12.42	16.19 $\pm$ 11.97	16.33 $\pm$ 12.13
<i>P</i>	NS	NS	NS



Ultrasound Obstet Gynecol 2008; 31: 439–444
Published online 10 March 2008 in Wiley InterScience (www.interscience.wiley.com). DOI: 10.1002/uog.5301

Three-dimensional ultrasound improves the interobserver reliability of antral follicle counts and facilitates increased clinical work flow

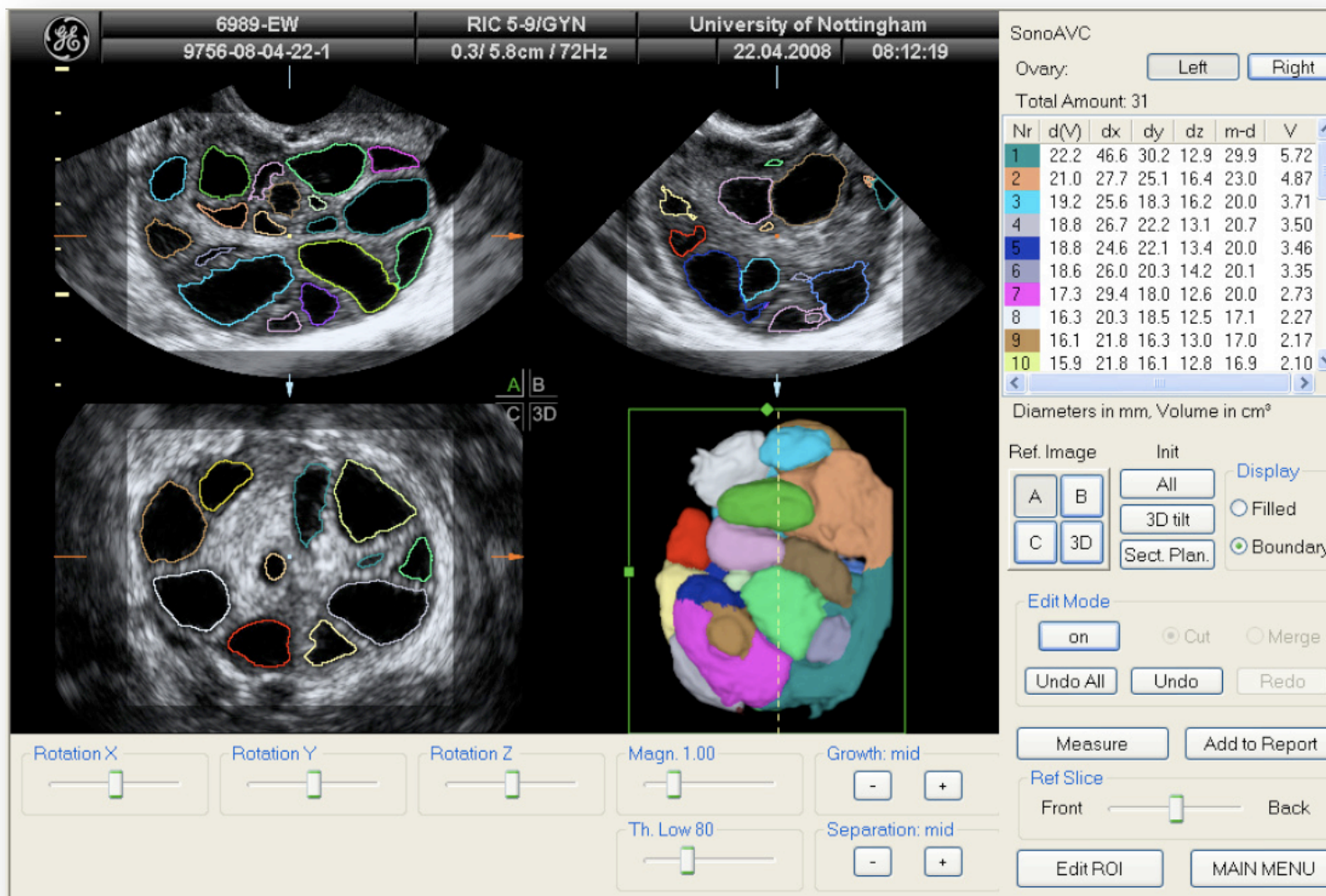
K. JAYAPRAKASAN, B. K. CAMPBELL, J. S. CLEWES, I. R. JOHNSON and N. J. RAINE-FENNING



AFC: tutkimukseen kulutettu aika

<i>Parameter</i>	<i>Time (s)</i>		
	<i>Mean</i>	<i>SD</i>	<i>Range</i>
2D ultrasound			
Time	103.1	28.6	57–179
3D ultrasound			
Time for acquisition	46.4	7.4	35–70
Time for count	192.9	67.6	86–330
Total time	239.3	71.4	121–400

Follikkelin tilavuus 3D (SonoAVC)



IVF ja munasolun keräys: SonoAVC vs 2D

TABLE 2

Comparison between SonoAVC and 2D ultrasound in relation to outcome measures of total number of stimulated follicles, oocytes retrieved, size of follicles, maturity of oocytes, fertilization rate, and embryo cleavage.

Outcome variable	2D real-time ultrasound (mean ± SD)	3D automated SonoAVC (mean ± SD)	P value
No. follicles measuring ≥10 mm	16.23 ± 8.54	17.53 ± 8.39	.55
No. follicles measuring ≥15 mm	7.47 ± 4.17	8.50 ± 3.53	.30
No. follicles measuring ≥18 mm	3.83 ± 2.82	4.37 ± 6.08	.40
Day of hCG administration	11.20 ± 1.10	11.73 ± 1.11	.06
Total no. oocytes	13.80 ± 6.95	13.40 ± 5.99	.81
No. mature oocytes	10.70 ± 6.08	11.43 ± 6.17	.64
No. fertilized oocytes	7.27 ± 4.78	7.97 ± 5.25	.59
Fertilization rate (%) (per mature oocyte)	73.86 ± 21.35	68.25 ± 22.76	.33
No. cleavage stage embryos	7.10 ± 4.87	7.47 ± 5.12	.78
Day 2 ET (%)	76.47	82.35	1.00
Day 3 ET (%)	23.53	17.64	.15
Biochemical pregnancy rate (%)	48	52	.85
Clinical pregnancy rate (%)	42	43	.93

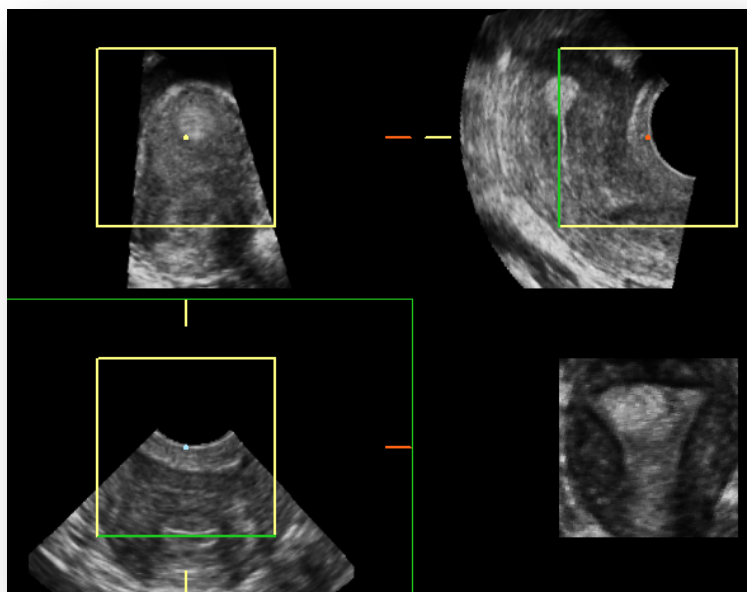
Raine-Fenning. Follicular measurement methods and IVF. Fertil Steril 2010.

Muutos kohtuontelossa, 2D HSG vs 3D HSG

- Muutos varmistettiin hysteroskopiaalla:
 - 2D HSG: sensitiivisyys 98%, PPV 95%
 - 3D HSG: sensitiivisyys 100%, PPV 92%



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A prospective study to evaluate the efficacy of two- and three-dimensional sonohysterography in women with intrauterine lesions

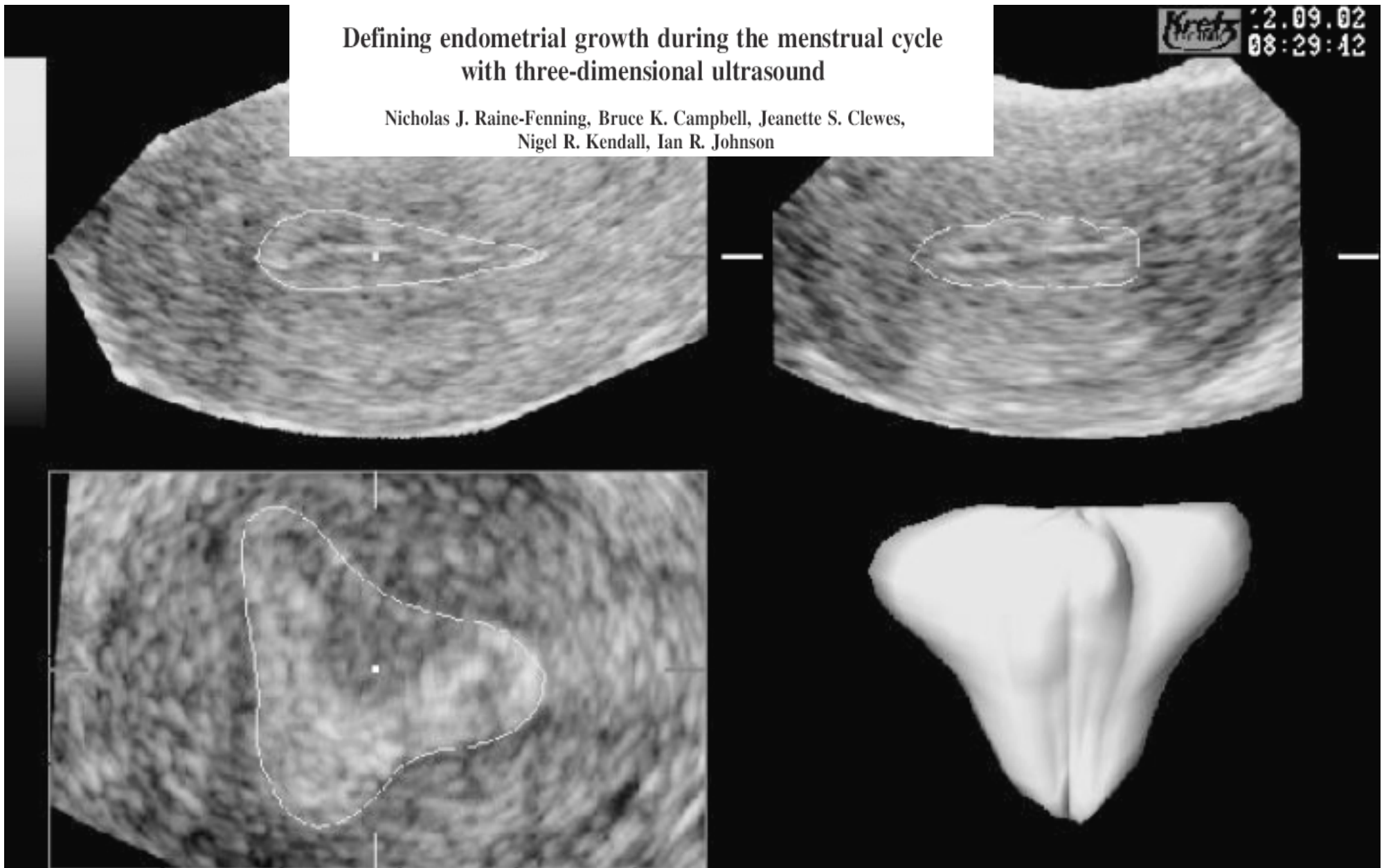
Camille Sylvestre, M.D., Tim J. Child, M.D., Togas Tulandi, M.D., and Seang Lin Tan, M.D.

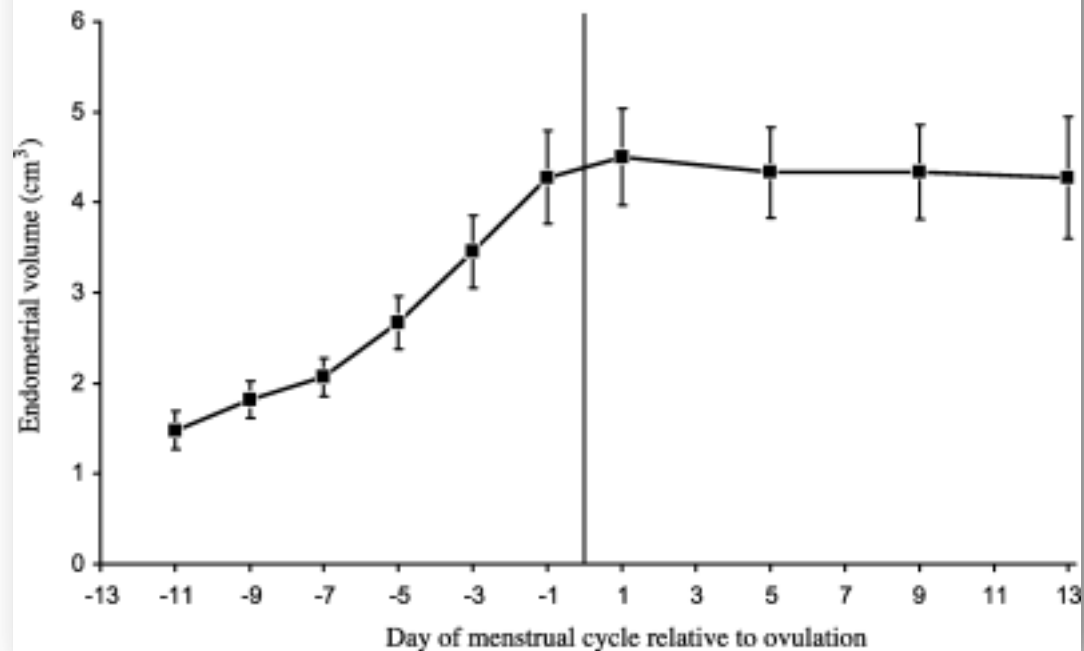
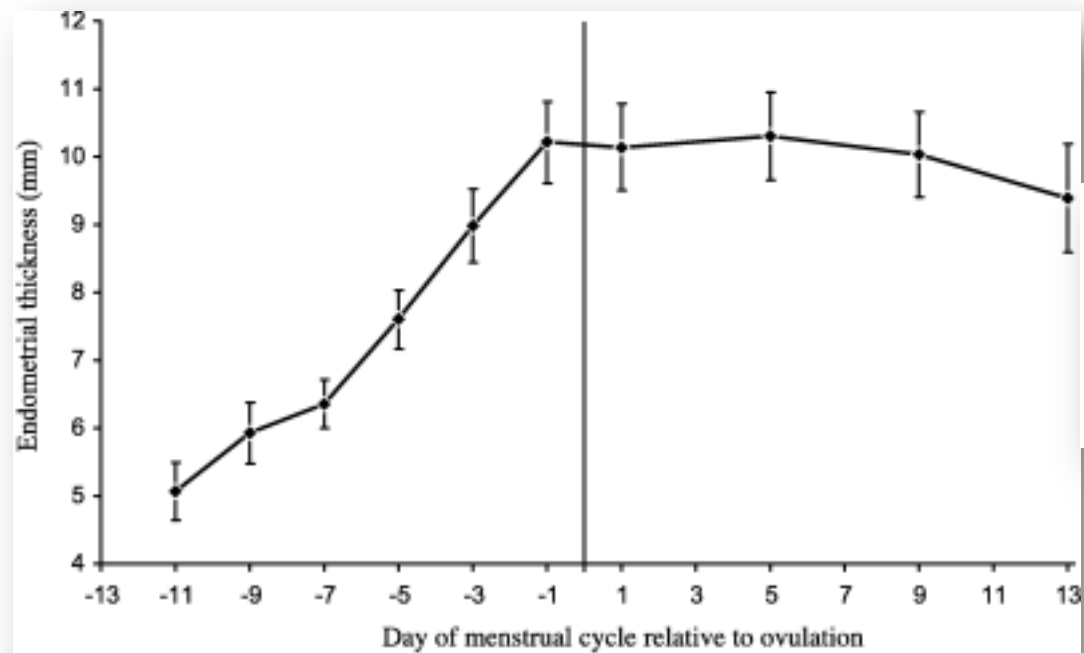
Endometriumreseptiivisyys

- ▣ UÄ-mittarit
 - ▣ paksuus (2D) tai tilavuus (3D)
 - ▣ rakenne ja kaikuisuus
 - ▣ verenvirtaus
 - ▣ color Doppler, 2D
 - ▣ uterinat
 - ▣ power Doppler, 3D
 - ▣ endometrium
 - ▣ subendometrium

Defining endometrial growth during the menstrual cycle with three-dimensional ultrasound

Nicholas J. Raine-Fenning, Bruce K. Campbell, Jeanette S. Clewes,
Nigel R. Kendall, Ian R. Johnson





BJOG: an International Journal of Obstetrics and Gynaecology
September 2004, Vol. 111, pp. 944–949

DOI: 10.1111/j.1471-0528.2004.00214.x

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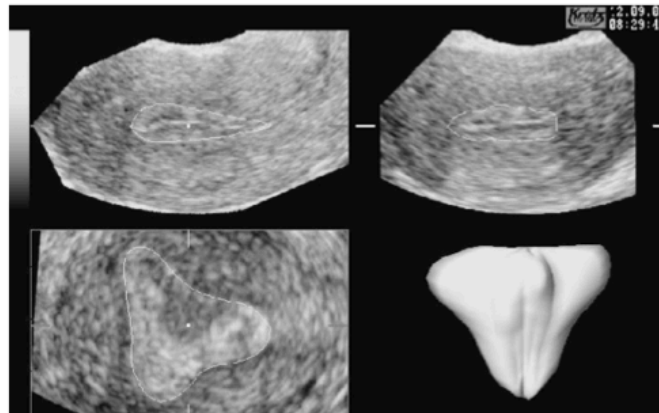
Endometrium tilavuus, 3D

ei eroa rask. vs ei-rask.

- Schild et al 1999
 - n=47
 - OPU
 - PR 31.9%
- Yaman et al 2000
 - n=65
 - ET
 - PR 32.3%
- Kupesic et al 2001
 - n=89
 - ET
 - PR 31.5%
- Järvelä et al 2005
 - n=35
 - before hCG/OPU
 - PR 37.0%
- Ng et al 2006
 - n=451
 - OPU
 - PR 20.8%

rask. > ei-rask.

- Raga et al 1999
 - n=72
 - ET
 - PR 29.2%
 - no pregnancies < 1ml
- Zollner et al 2003
 - n=125
 - ET
 - PR 27.2%
 - <2.5 ml: 9%
 - >2.5 ml: 35%
- Merce et al 2008
 - n=77
 - hCG day
 - PR 49%



Multilayered endometrium before ovulation/hCG

■ Increased PR:

- Coulam et al 1994
 - 100 FTE
 - 107 IVF
 - **99 HRT/donor embryos**
 - 99 IUI
- Serafini et al 1994
 - 102 IVF
- Zaidi et al 1995
 - 99 IVF
 - PR 35% vs 18%
- Järvelä et al 2005
 - 35 IVF
 - PR 45% vs 0%

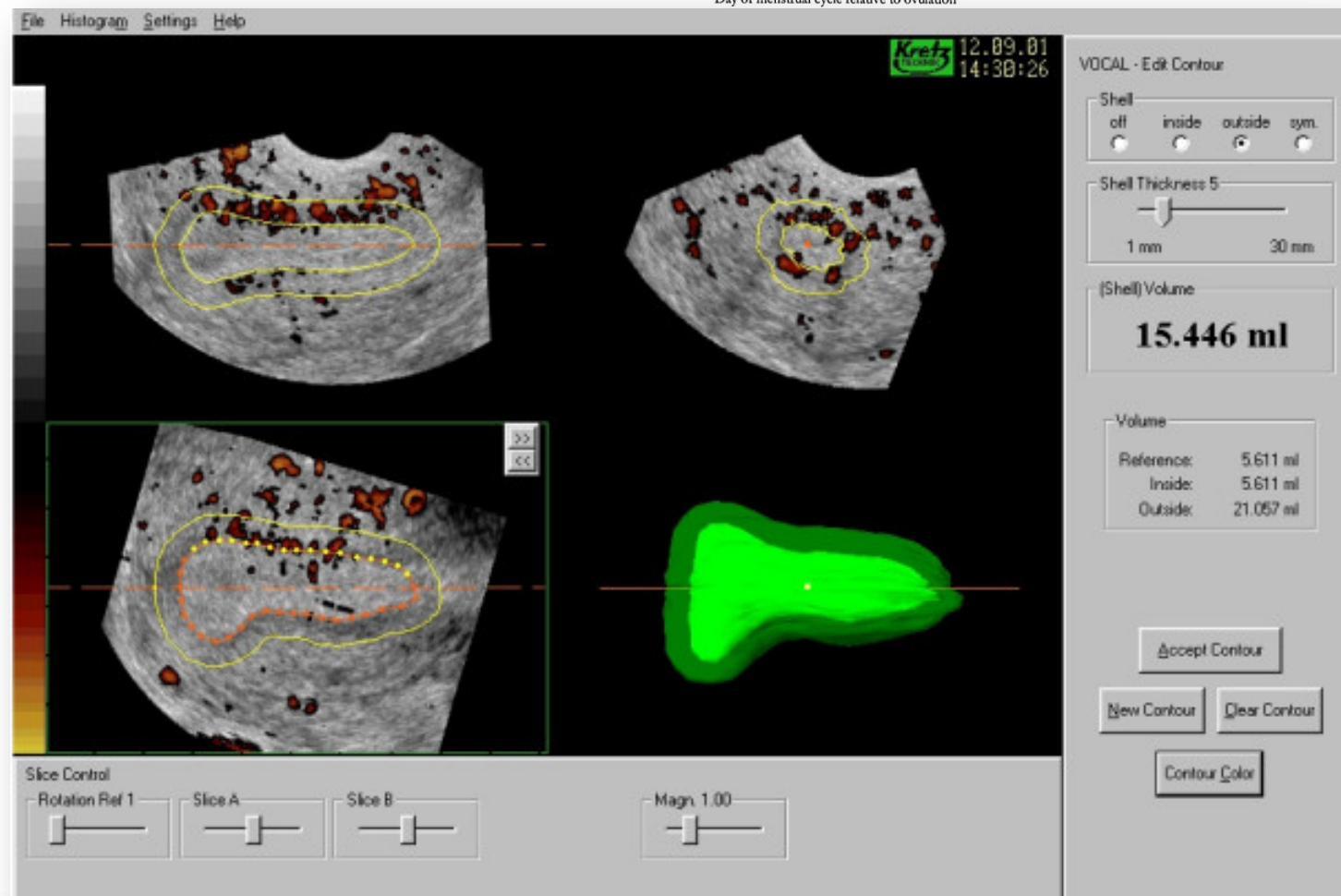
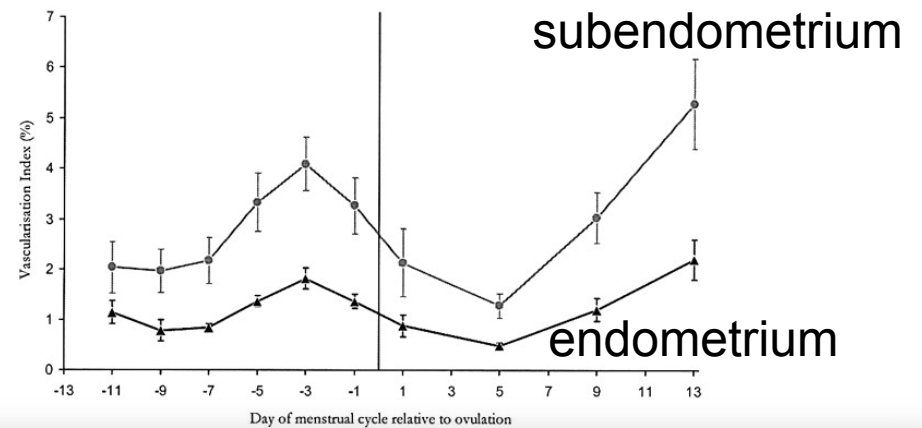


Endometrium vaskularisatio ja alkion siirto

Hum. Reprod. 2004 19:330-338

Raine-Fenning NJ

VI=vascularization index



Endometrial/subendometrial 3D power Doppler, pregnant vs non-pregnant

▣ difference

▣ Schild et al 2000

- ▣ 96 IVF cycles
- ▣ 1st day of FSH stim
- ▣ PR 20%
- ▣ higher indices in pregnant

▣ Ng et al 2006

- ▣ 451 IVF
- ▣ OPU
- ▣ PR 20.8%
- ▣ endometrial VI and VFI lower in conception cycles

▣ Merce et al 2008

- ▣ N=77 IVF
- ▣ hCG day
- ▣ PR 49%
- ▣ Endometrial indices higher in pregnant women

▣ no difference

▣ Kupesic et al 2001

- ▣ n=89 IVF
- ▣ ET day
- ▣ PR 31.5%
- ▣ No difference in endometrial VI or VFI
 - ▣ subend FI higher in pregnant

▣ Wu et al 2003

- ▣ n=54
- ▣ hCG day
- ▣ PR 50%
- ▣ No difference in endometrial indices
 - ▣ subend VFI higher in pregnant

▣ Järvelä et al 2005

- ▣ n=35
- ▣ hCG and OPU
- ▣ PR 37%
- ▣ No difference in end and subend

TABLE 2

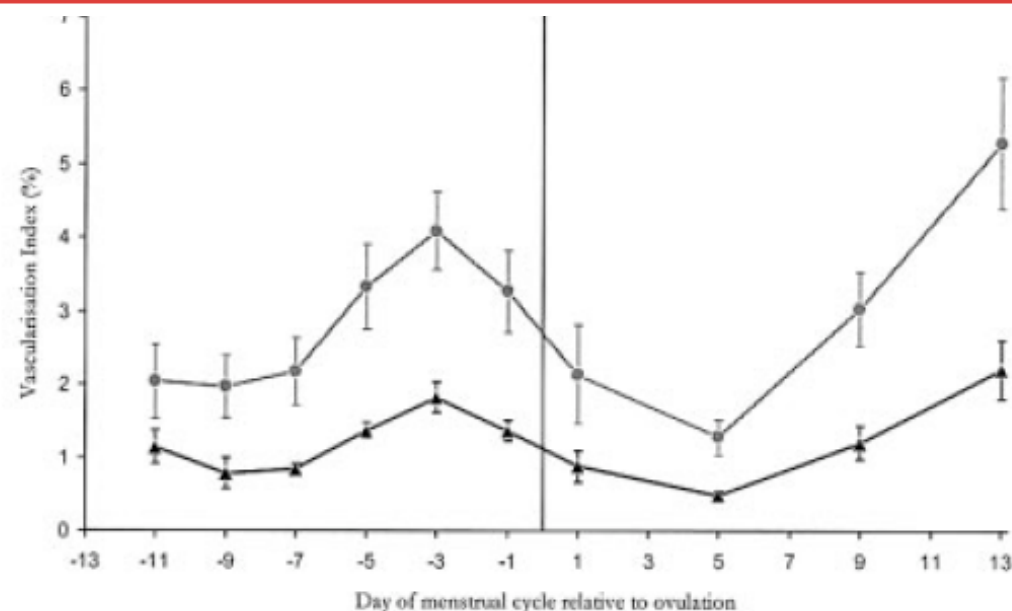
Comparison of endometrial three-dimensional ultrasound and power Doppler angiography parameters on the hCG day between pregnant and nonpregnant groups.

	Pregnant (n = 38)	Nonpregnant (n = 39)	P
Endometrial thickness (mm)	12.29 ± 2.71	12.15 ± 2.31	.810
Endometrial volume (mL) ^a	5.63 (2.67–16.64)	4.82 (2.05–9.24)	.022
Endometrial pattern (n, %)			.259
Triple line	33 (52.4)	30 (47.6)	
Non-triple line	5 (35.7)	9 (64.3)	
Vascularization index (%)	21.19 ± 8.91	16.05 ± 9.84	.019
Flow index (0–100)	28.12 ± 3.90	24.27 ± 3.71	<.001
Vascularization flow index (0–100)	6.30 ± 4.46	3.64 ± 2.75	.014

Note: Data are presented as mean ± standard deviation or n (%).

^a Median (range).

Mercé. Endometrial volume and 3D power Doppler indexes. Fertil Steril 2008.



Ng EH 2006, 451 IVF cycles

Table II. Comparison of uterine pulsatility index (PI) and uterine resistance index (RI), endometrial and subendometrial three-dimensional power Doppler indices between non-pregnant and pregnant patients

	Non-pregnant (<i>n</i> = 357)	Pregnant (<i>n</i> = 94)	<i>P</i>
Endometrial thickness (mm)	11.8 (9.9–13.5)	11.6 (9.5–13.7)	NS
Endometrial volume (cm ³)	4.93 (3.70–6.45)	4.73 (3.32–6.89)	NS
Endometrial pattern [<i>n</i> (%)]			NS
Multilayered	346 (96.9)	91 (96.8)	
Non-multilayered	11 (3.1)	3 (3.2)	
Uterine PI	2.03 (1.78–2.40)	2.04 (1.70–2.33)	NS
Uterine RI	0.84 (0.80–0.88)	0.82 (0.77–0.87)	0.047
Endometrial VI (%)	1.138 (0.283–2.652)	0.707 (0.300–1.778)	0.039
Endometrial FI (0–100)	22.867 (20.852–25.100)	22.797 (20.952–24.977)	NS
Endometrial VFI (0–100)	0.266 (0.062–0.631)	0.161 (0.063–0.427)	0.047
Subendometrial VI (%)	2.023 (0.617–4.733)	1.738 (0.674–3.569)	NS
Subendometrial FI (0–100)	23.980 (21.783–25.964)	24.118 (21.953–25.929)	NS
Subendometrial VFI (0–100)	0.489 (0.141–1.242)	0.438 (0.140–1.014)	NS

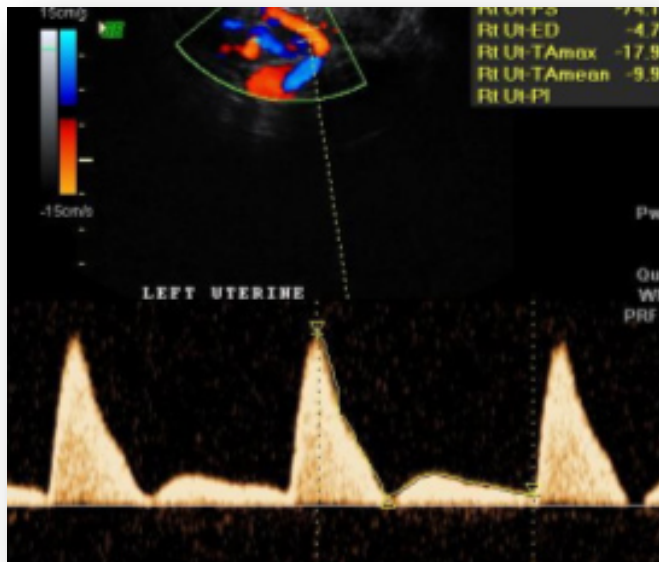
Data given as median (interquartile range) unless otherwise specified.

VI = vascularization index; FI = flow index; VFI = vascularization flow index; NS = not significant.

Doppler shift ja 3D vaskularisatsioon

- A. Uterina Doppler shift

- PI, RI



- Endometrium ja subendometrium flow

- VI

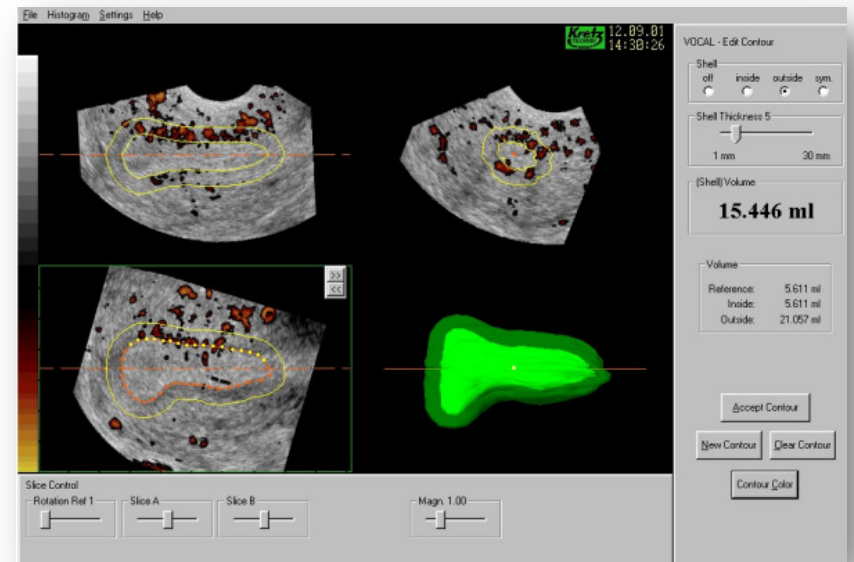


TABLE 2

Comparison of uterine PI, uterine RI, endometrial and subendometrial 3D power Doppler indices between patients with RI <0.95 and ≥ 0.95 during stimulated cycles (n = 475).

Parameters	<0.95 (n = 451)	≥ 0.95 (n = 24)
Endometrial thickness (mm)	11.8 (10.0–13.5)	11.7 (9.0–14.7)
Endometrial volume (cm ³)	4.81 (3.61–6.49)	4.08 (3.11–5.38)
Endometrial pattern ^a		
Multilayered	436 (96.7)	22 (91.7)
Nonmultilayered	15 (3.3)	2 (8.3)
Uterine PI	2.01 (1.76–2.30)	3.10 ^b (2.95–3.63)
Uterine RI	0.83 (0.79–0.87)	0.98 ^b (0.96–1.00)
Endometrial VI (%)	0.973 (0.291–2.297)	0.730 (0.131–1.855)
Endometrial FI (0–100)	22.746 (20.915–25.023)	22.745 (20.570–23.658)
Endometrial VFI (0–100)	0.235 (0.063–0.578)	0.170 (0.027–0.394)
Subendometrial VI (%)	1.884 (0.677–4.684)	1.108 ^c (0.231–2.923)
Subendometrial FI (0–100)	23.828 (21.674–25.886)	23.726 (21.548–25.520)
Subendometrial VFI (0–100)	0.462 (0.149–1.150)	0.254 ^c (0.056–0.764)

Note: Data given as median (interquartile range).

^a Data given as number (%).

^b $P < .001$ by Mann-Whitney U test.

^c $P = .02$ by Mann-Whitney U test.

Ng. Uterine and endometrial blood flow. Fertil Steril 2006.

TABLE 2

Comparison of uterine PI, uterine RI, endometrial and subendometrial 3D power Doppler indices between patients with RI <0.95 and ≥ 0.95 during stimulated cycles (n = 475).

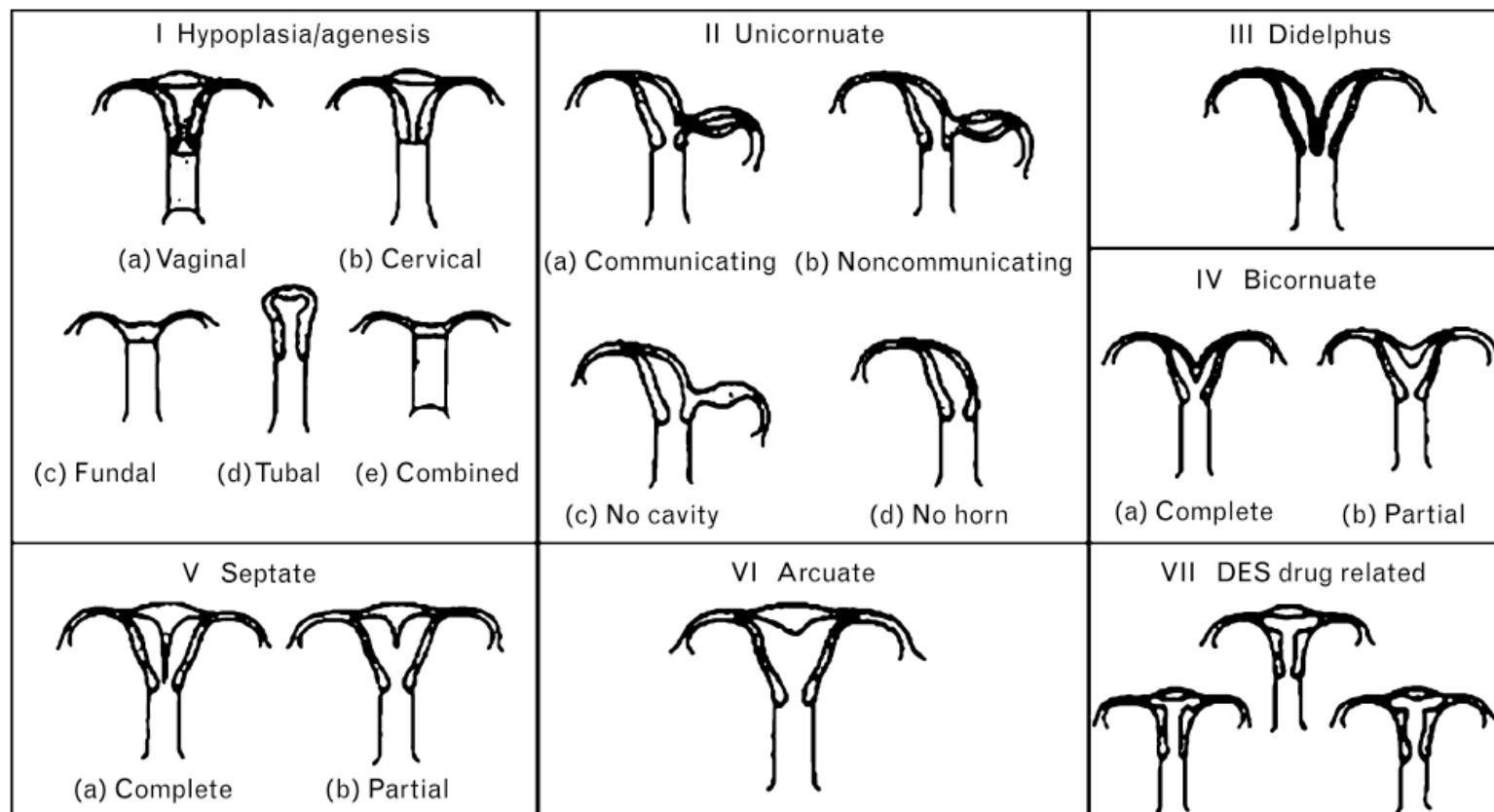
Parameters	<0.95 (n = 451)	≥ 0.95 (n = 24)
Endometrial thickness (mm)	11.8 (10.0–13.5)	11.7 (9.0–14.7)
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Notes: Data given as median (interquartile range).

In conclusion, uterine blood flow is a poor reflection of subendometrial blood flow during stimulated and natural cycles, and its measurement cannot reflect endometrial blood flow during stimulated cycles.

Kohtuanomaliat

Figure 1 American Society for Reproductive Medicine classification system for müllerian anomalies



DES, diethylstilbestrol. Reproduced from [9].

Kohtuanomaliat, esiintyvyys

- Fertiili populaatio: 6.7%
- Infertiili populaatio: 7.3%
 - Korkea insidenssi uterusseptoja
- Toistuvat keskenmenot: 16.7%

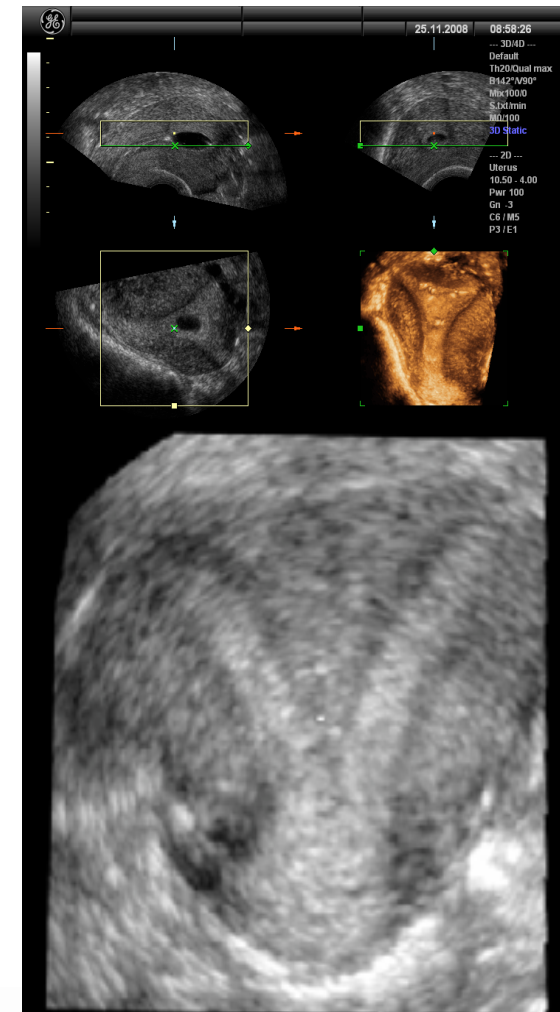
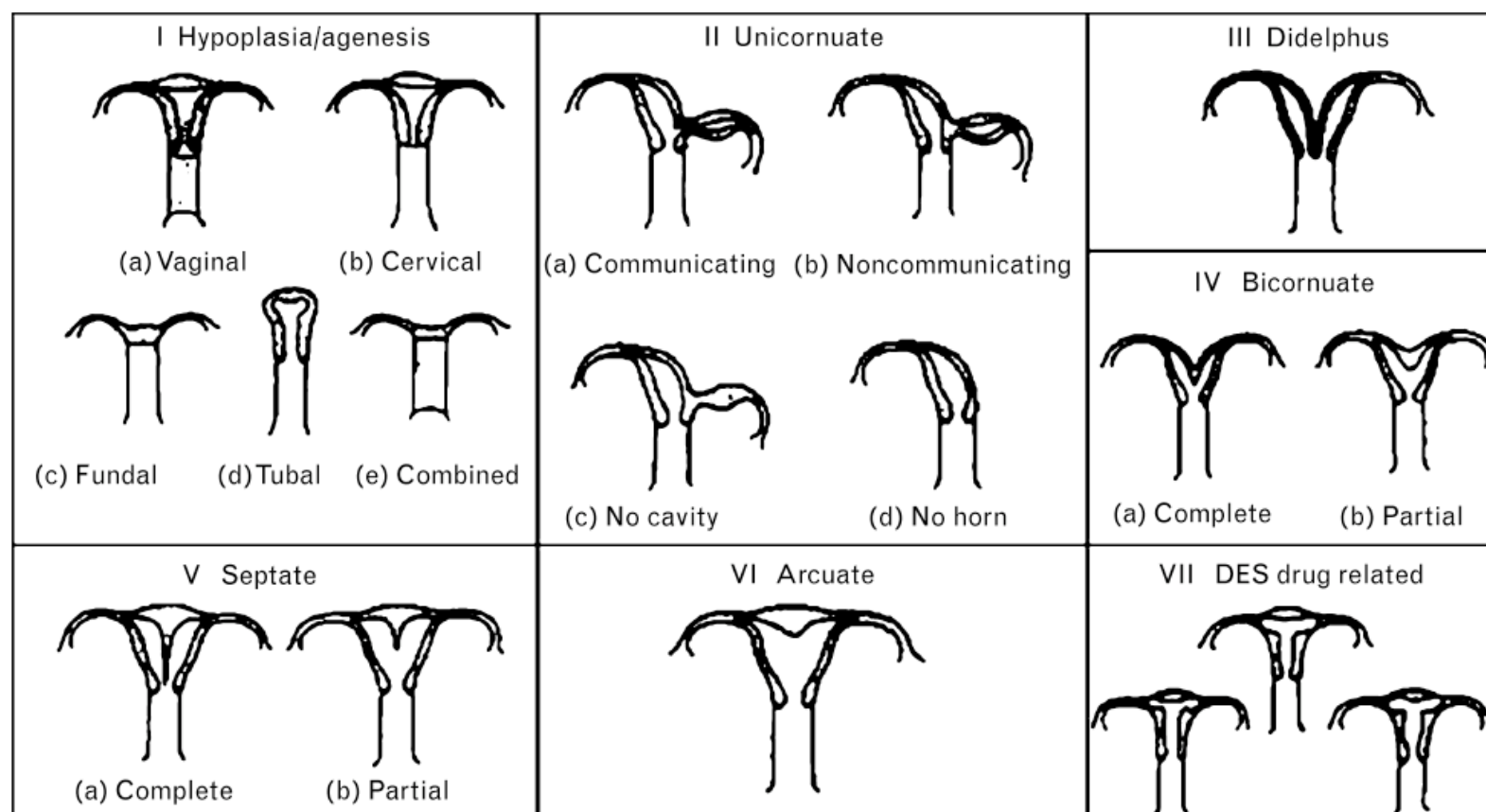


Table 1 Reproductive outcomes in women with congenital uterine anomalies

Uterine anomaly	Number of studies	Number of patients	Number of pregnancies	Abortion rate	Preterm birth rate	Term delivery rate	Live birth rate
Unicornuate	11	151	260	36.5	16.2	44.6	54.2
Didelphys	8	114	152	32.2	28.3	36.2	55.9
Bicornuate	4	261	627	36	23	40.6	55.2
Septate	4	198	499	44.3	22.4	33.1	50.1
Arcuate	3	102	241	25.7	7.5	62.7	66

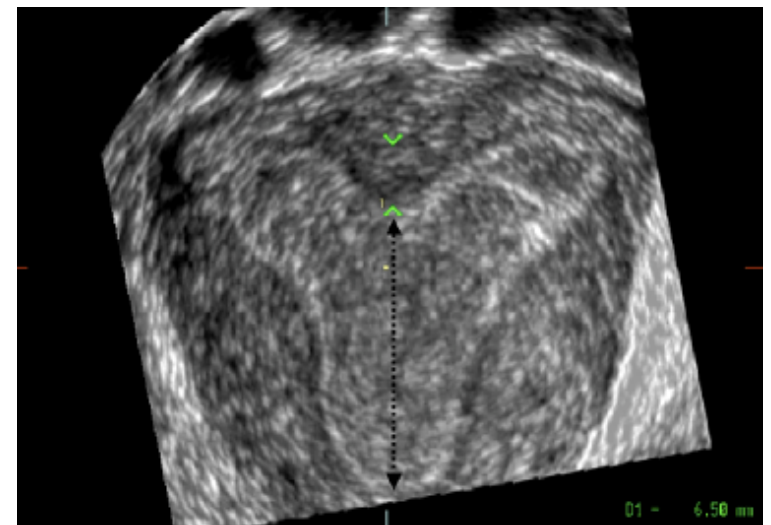
Rates are averaged and presented as a percentage. Data from Grimbizis *et al.* [4].

Figure 1 American Society for Reproductive Medicine classification system for müllerian anomalies

DES, diethylstilbestrol. Reproduced from [9].

Diagnostiikka

- Korpusten määrä
- Funduksen malli
- Kornut
- Väliseinän olemassaolo, pituus
- Portioiden määrä
- Vaginan väliseinä



Sotirios H. Saravelos^{1,3}, Karen A. Cocksedge¹ and Tin-Chiu Li^{1,2}

Prevalence and diagnosis of congenital uterine anomalies in women with reproductive failure: a critical appraisal

- ▣ Laparoscopia ja hysteroscopia
 - ▣ Standardi, mahdollistaa toimenpiteet
 - ▣ Invasiivinen
- ▣ Sonohysterografia ja 3D-UÄ
 - ▣ noninvasiivinen
- ▣ MRI
 - ▣ Tutkimuksia ei vielä riittävästi
- ▣ Hysterosalpingografia ja 2D-UÄ
 - ▣ Matalin diagnostinen tarkkuus



31.03.2009

12:54:07

--- 3D/4D ---

Default

Th20/Qual max

B142°/V90°

Mix100/0

S.txt/min

M0/100

3D Static

--- 2D ---

Uterus

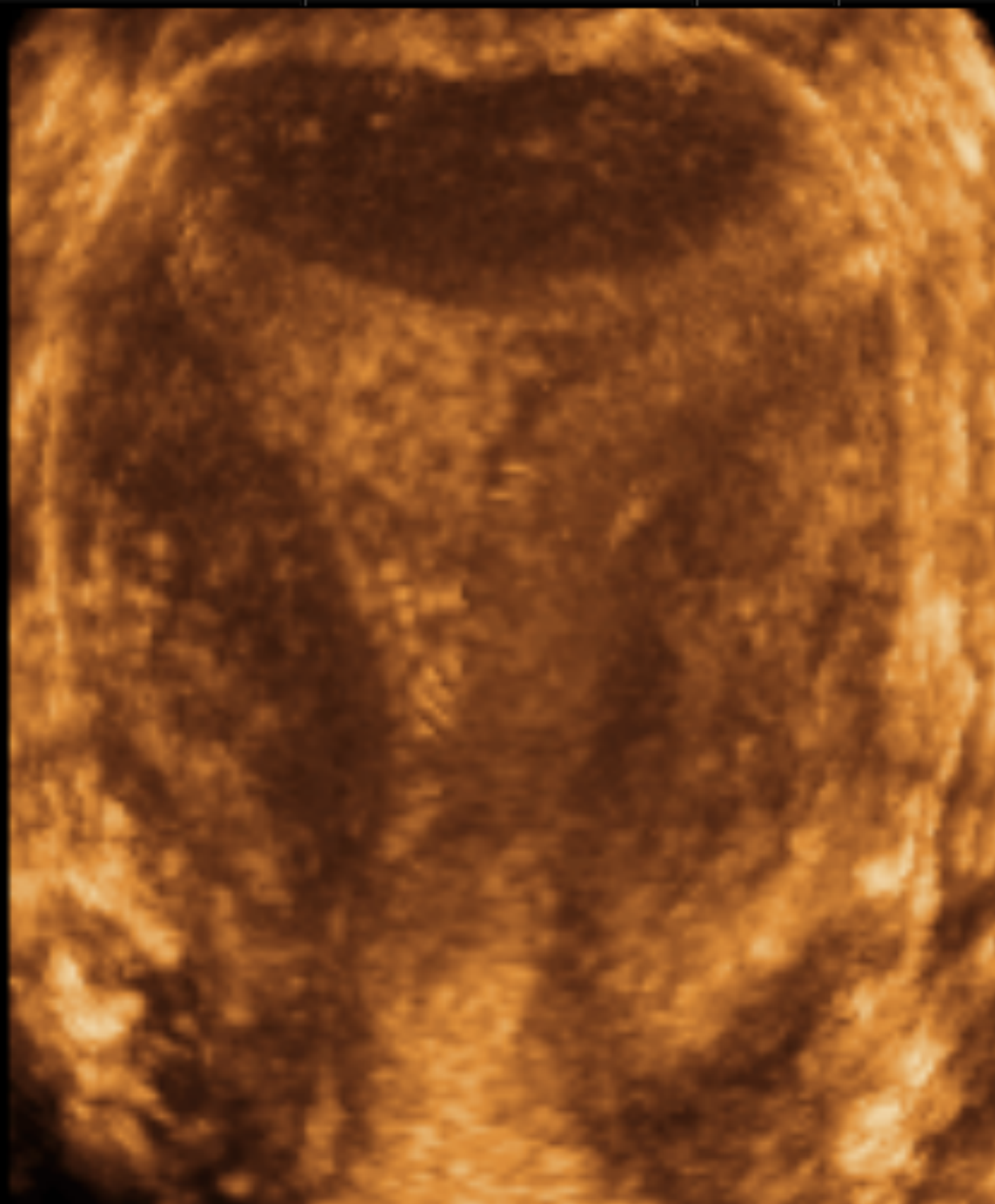
10.50 - 4.00

Pwr 100

Gn -3

C6 / M5

P3 / E1





08.06.2010

12:05:46

--- 3D/4D ---

Default

Th20/Qual max

B134°/V90°

Mix100/0

S.txt/min

M0/100

3D Static

--- 2D ---

Uterus 1

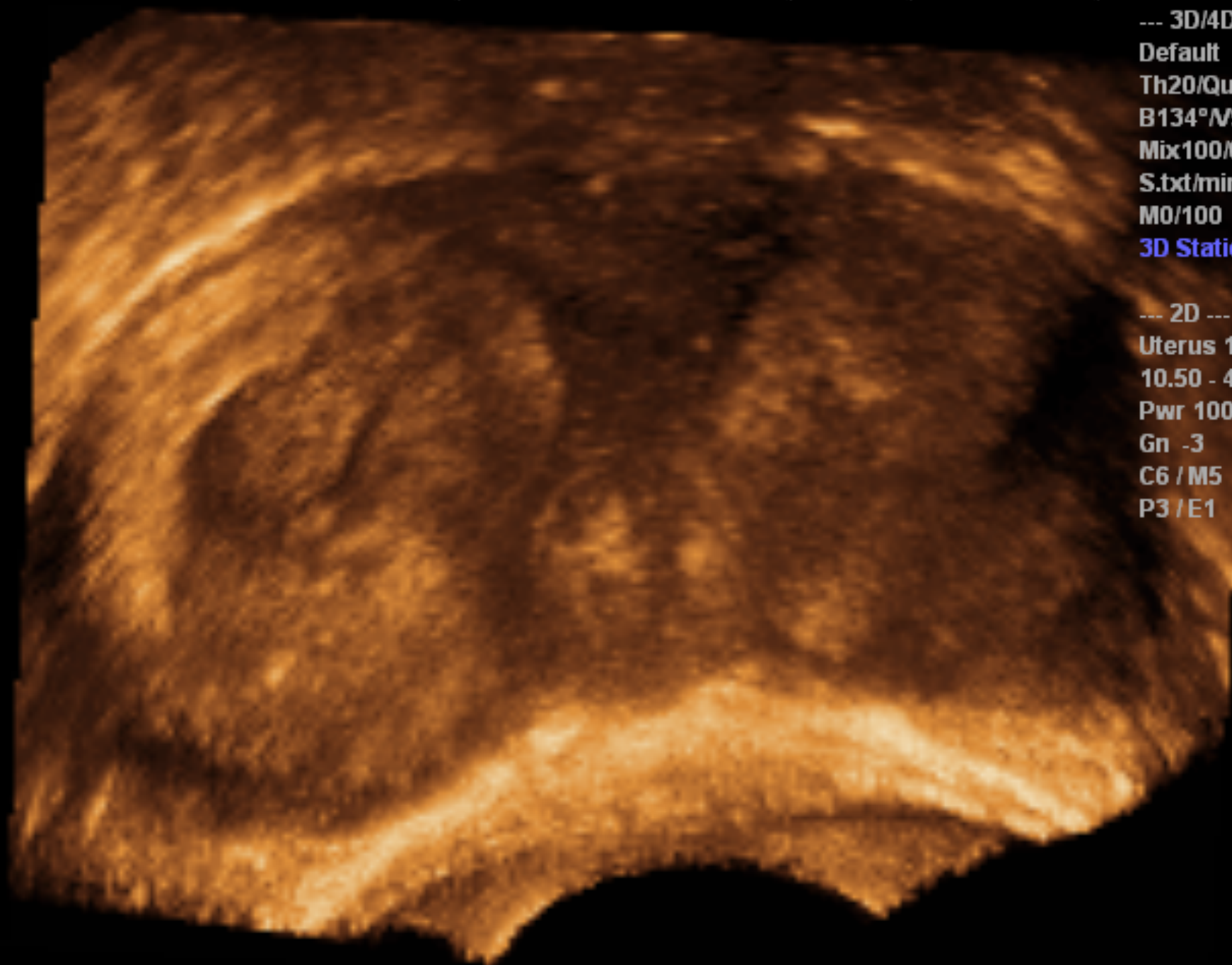
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Pwr 100

Gn -3

C6 / M5

P3 / E1





08.06.2010

12:07:14



--- 3D/4D ---

Default

Th15/Qual max

B55°/V90°

Mix100/0

S.txt/min

M100/93

3D Static

--- 2D ---

Uterus 1

10.50 - 4.00

Pwr 100

Gn -3

C6 / M5

P3 / E1

CRL

CRL 0.77cm
GA 6w5d



26.08.2010

10:46:15

--- 3D/4D ---

Default

Th20/Qual max

B142°/V90°

Mix100/0

S.txt/min

M0/100

3D Static

--- 2D ---

Uterus 1

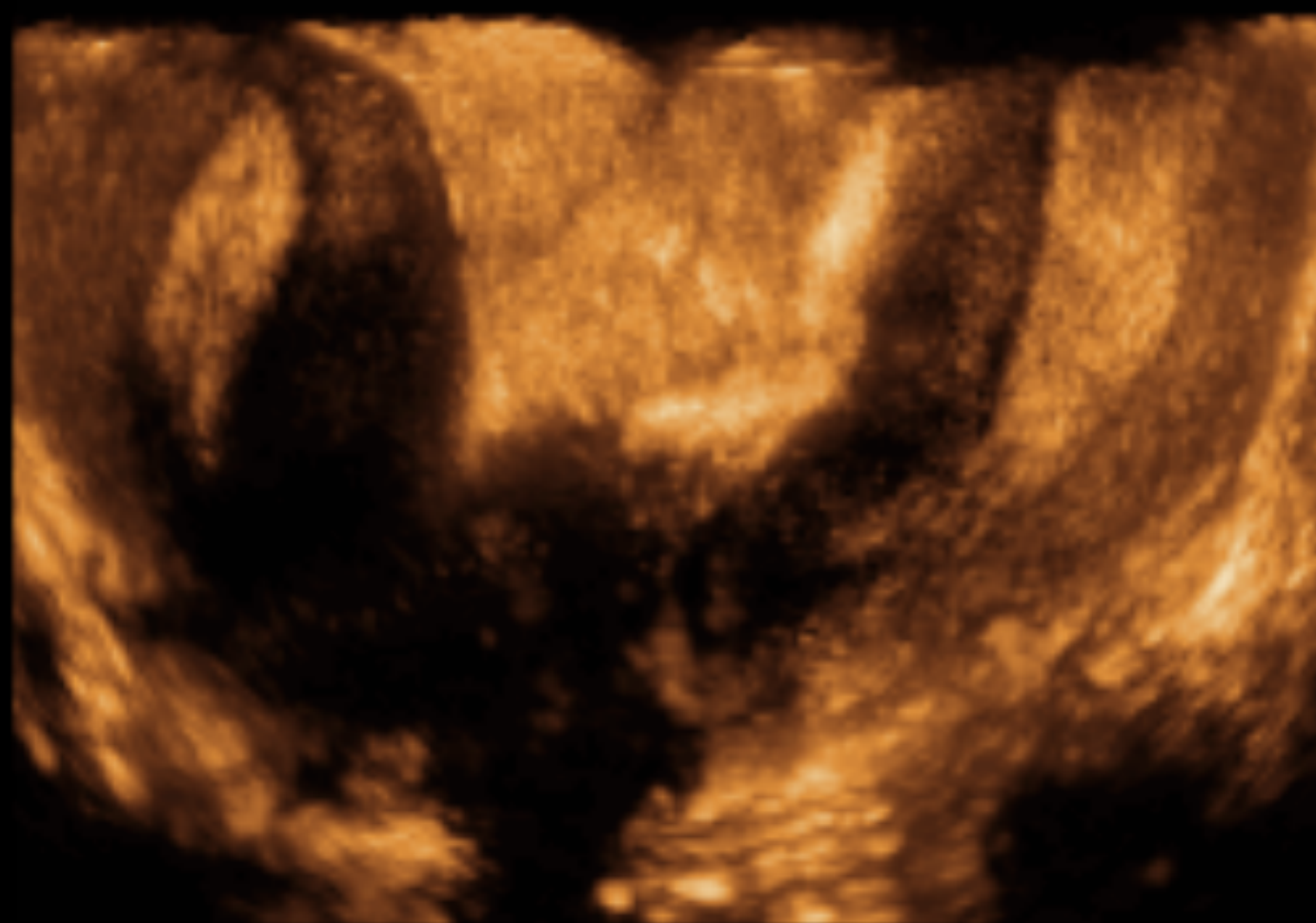
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Pwr 100

Gn -3

C6 / M5

P3 / E1



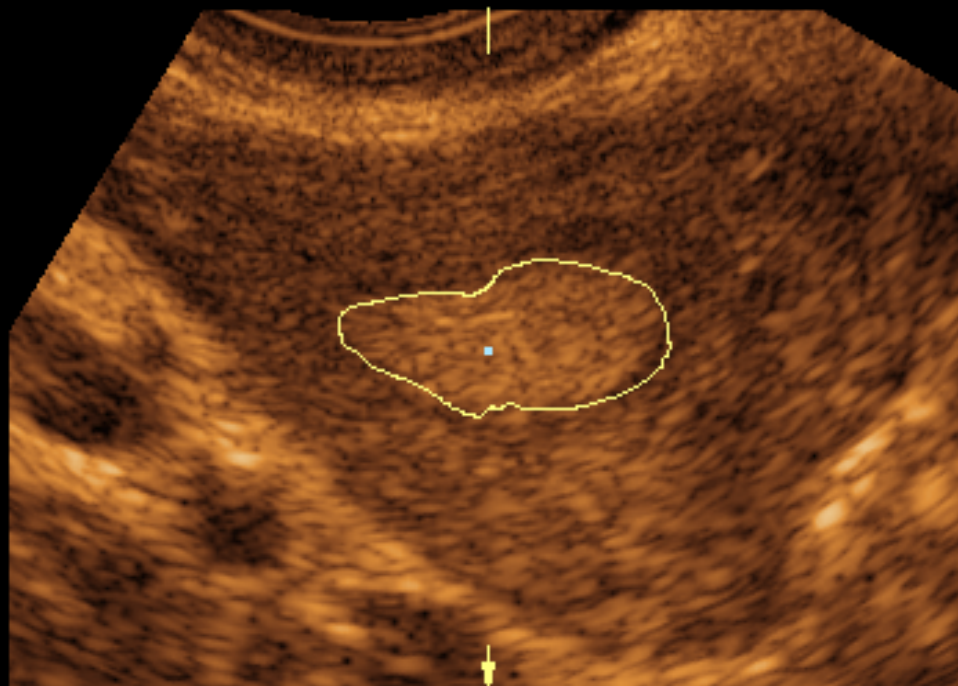
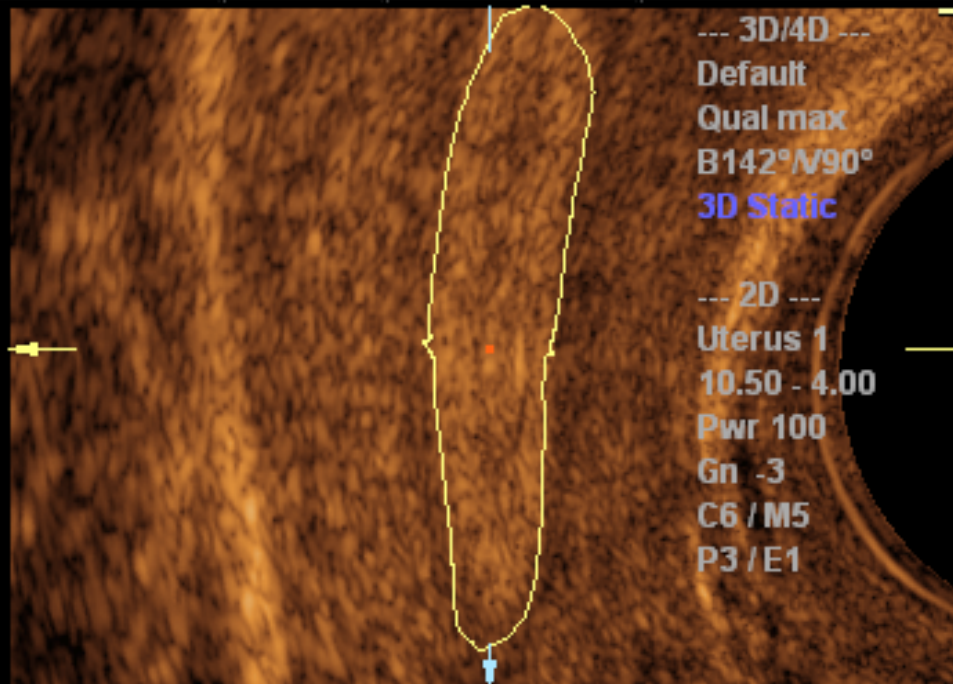
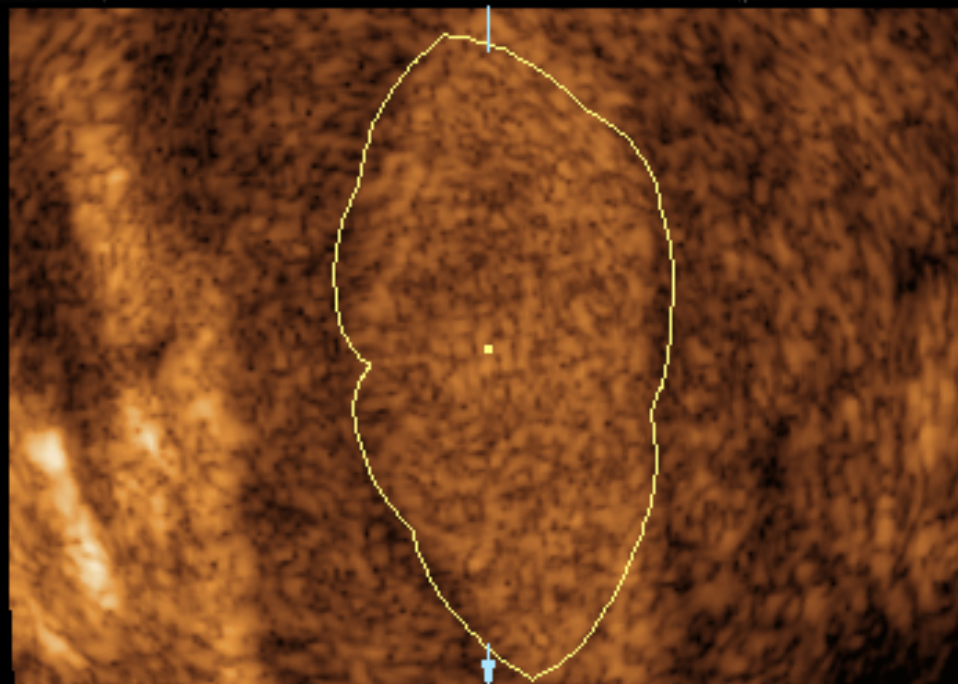


26.08.2010

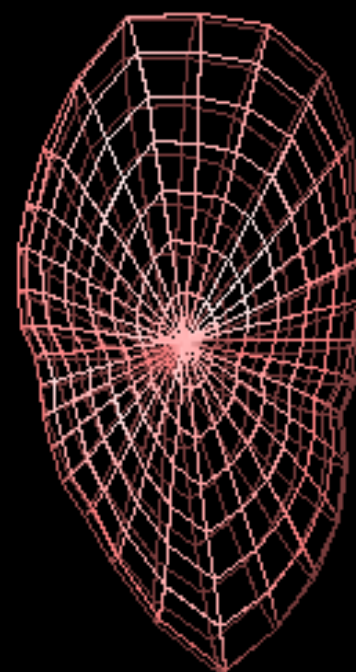
10:48:19

--- 3D/4D ---
Default
Qual max
B142°/V90°
3D Static

--- 2D ---
Uterus 1
10.50 - 4.00
Pwr 100
Gn -3
C6 / M5
P3 / E1



tilavuus
1.2 ml,
kp 21





26.08.2010

10:48:19

--- 3D/4D ---

Default

Qual max

B142°/V90°

3D Static

--- 2D ---

Uterus 1

10.50 - 4.00

Pwr 100

Gn -3

C6 / M5

P3 / E1



21.02.2008

09:29:07

--- 3D/4D ---

Default

Th20/Qual mid2

B135°/V90°

Mix100/0

S.txt/min

M0/100

3D Static

--- 2D ---

Uterus

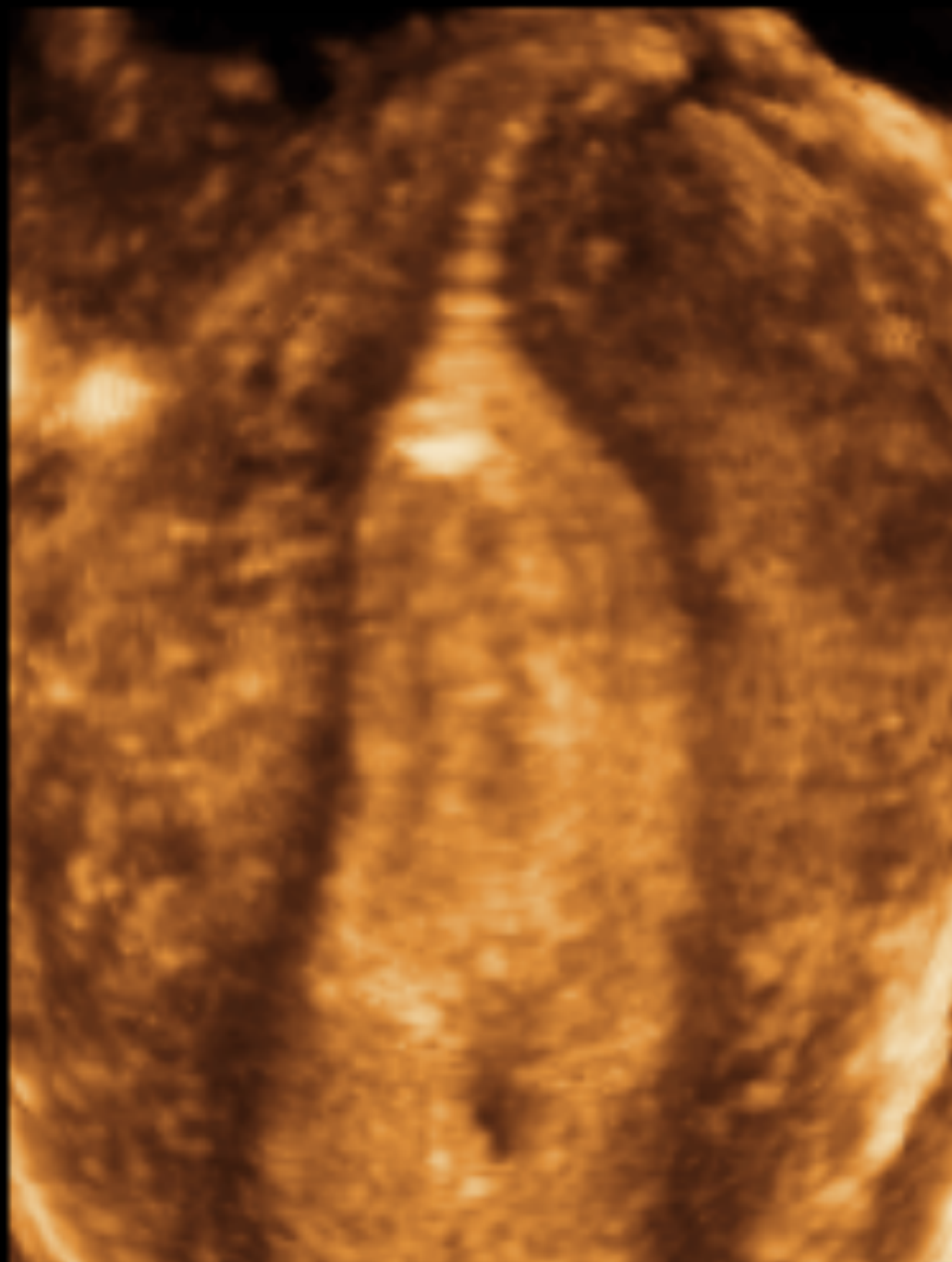
10.50 - 4.00

Pwr 100

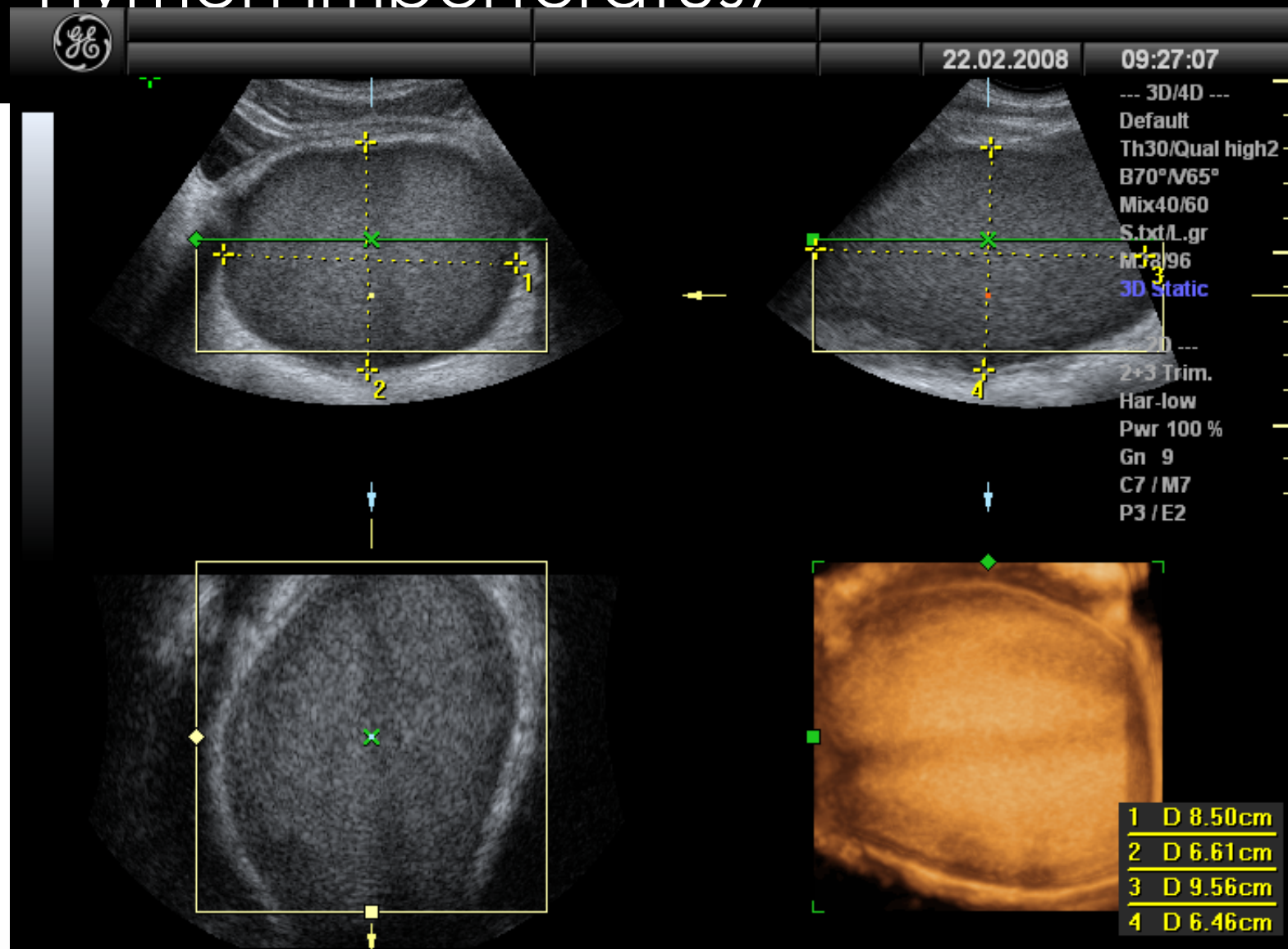
Gn -3

C6 / M5

P3 / E1

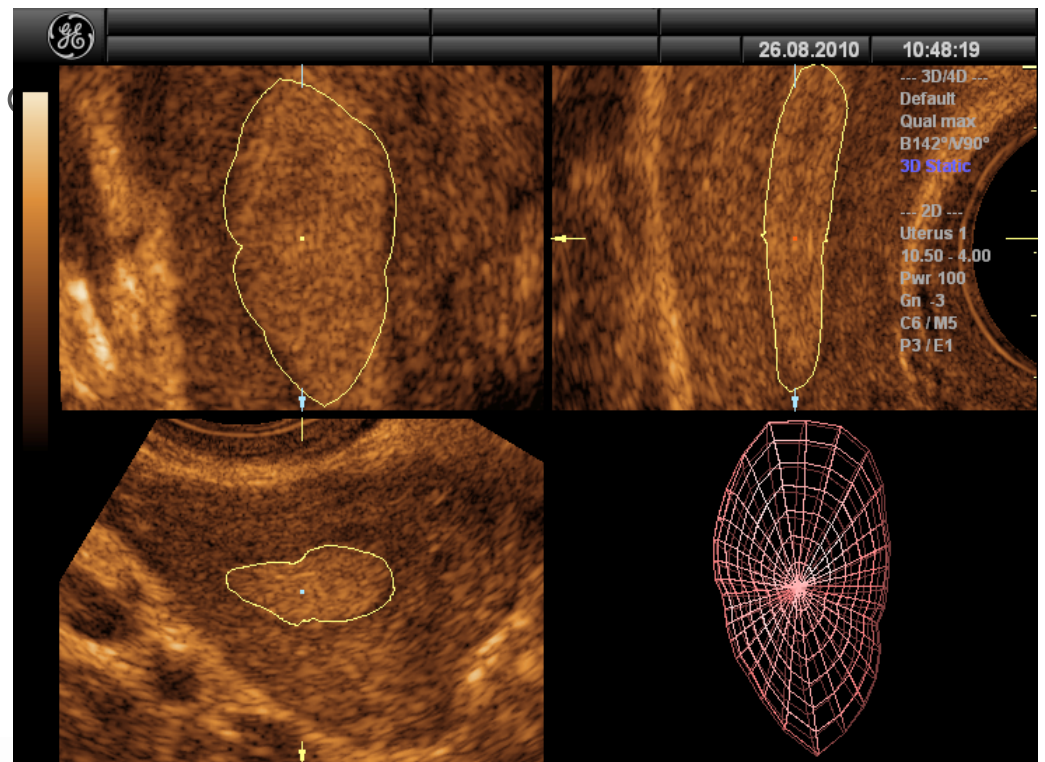
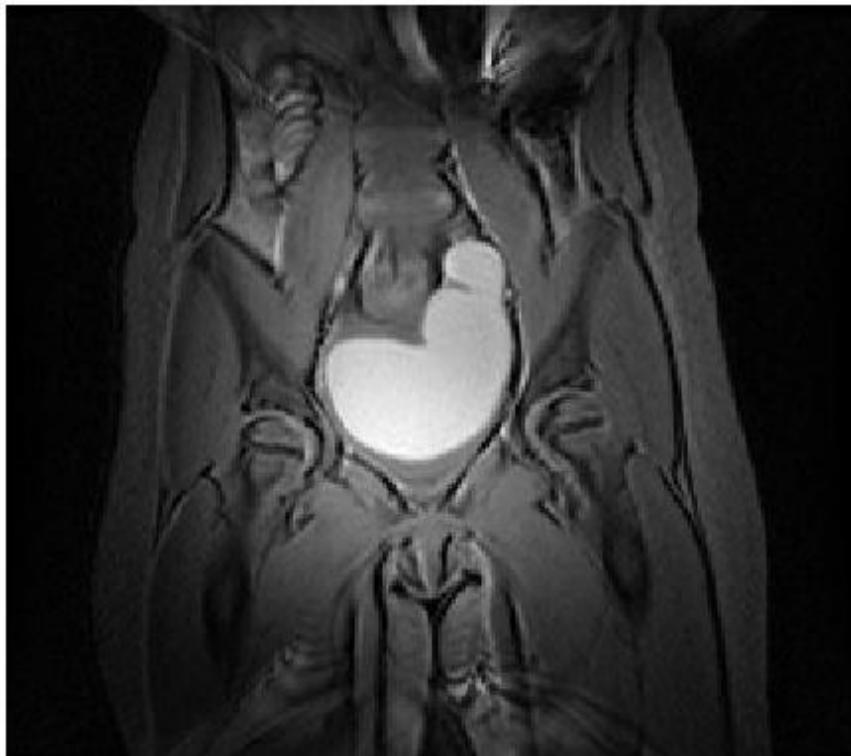


Hymen imperforatus,



3D ja anomaliat

- ▣ Jos hematometra/hematokolpos, UÄ huono
- ▣ Anatomia vääristynyt, identifiointi vaikeaa



Gynekologinen 3 D-ultraääni – onko hyötyä?

- ▣ AF
 - ▣ SonoAVC voi nopeuttaa follikkelin kartoitusta, tuskin merkitystä raskaustuloksiin
- ▣ Endometriumien reseptiivisyys
 - ▣ Tulokset ristiriitaisia; vaatii hoitopäätöksen
- ▣ Anomaliat
 - ▣ Käyttökelpoinen, mahdollistaa funduksen ja kaviteetin visualisoinnin koronaalileikkeessä

Ilkka Järvelä, sidonnaisuudet

▣ **Päätoimi**

- ▣ Erikoislääkäri, OYS, synnytys- ja naistentaudit

▣ **Sivutoimet**

- ▣ yksityislääkäri

▣ **Luottamustoimet terveydenhuollon alalla**

- ▣ Ei ole

▣ **Toiminta terveydenhuollon ohjaukseen pyrkivissä hankkeissa**

- ▣ Ei ole

▣ **Muut sidonnaisuudet**

- ▣ Ei ole.