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Estudi ecogràfic i inducció del part, G Albaiges

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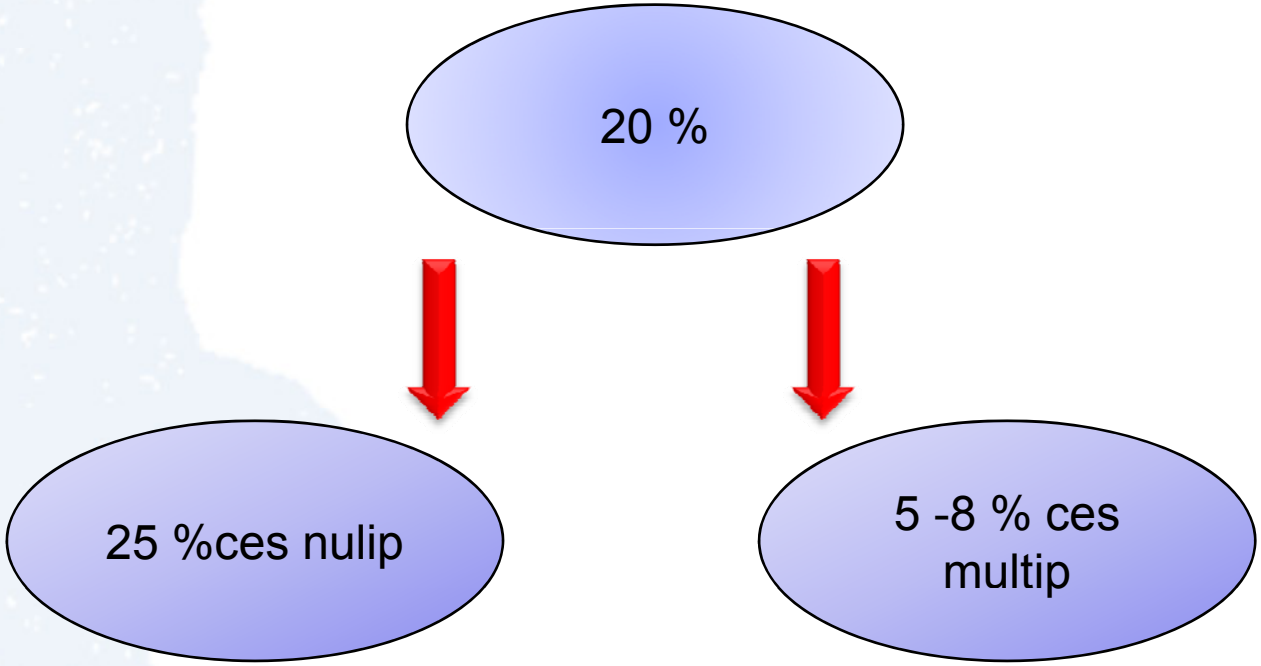
Inducció del part



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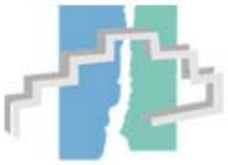
Problemes en les definicions



Resultats primaris	Metodologia inducció	Test positiu
Part vaginal < 24h	Prostaglandines (règims)	Punt de tall Bishop
Part vaginal	Oxitocina	Tipus de Bishop
Cesària (indicació)	Dilatació mecànica	Punt de tall CL
Fase activa de part	Estimulació mugró	Altres paràmetres eco

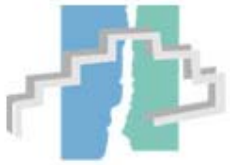
¡¡¡% nulipares i % cesària¡¡¡

Bishop, 1964

- **Basic requirements:**
  - **Multiparity**
  - **Pregnancy >36 weeks**
  - **Vertex**
  - **Normal previous and present obstetric history**
  - **Advance knowledge and permission of the patients**
  - **After these criteria met, apply the pelvic score: ≥9 (noted dilation most important)**

PELVIC SCORE				
Cm	0	1 - 2	3 - 4	5 - 6
DILATATION	0	1	2	3
%	0-30	40-50	60-70	80
EFFACEMENT	0	1	2	3
	-3	-2	-1 0	+1 +2
STATION	0	1	2	3
	Firm	Medium	Soft	
CONSISTENCY	0	1	2	
	Post.	Mid.	Ant.	
POSITION	0	1	2	

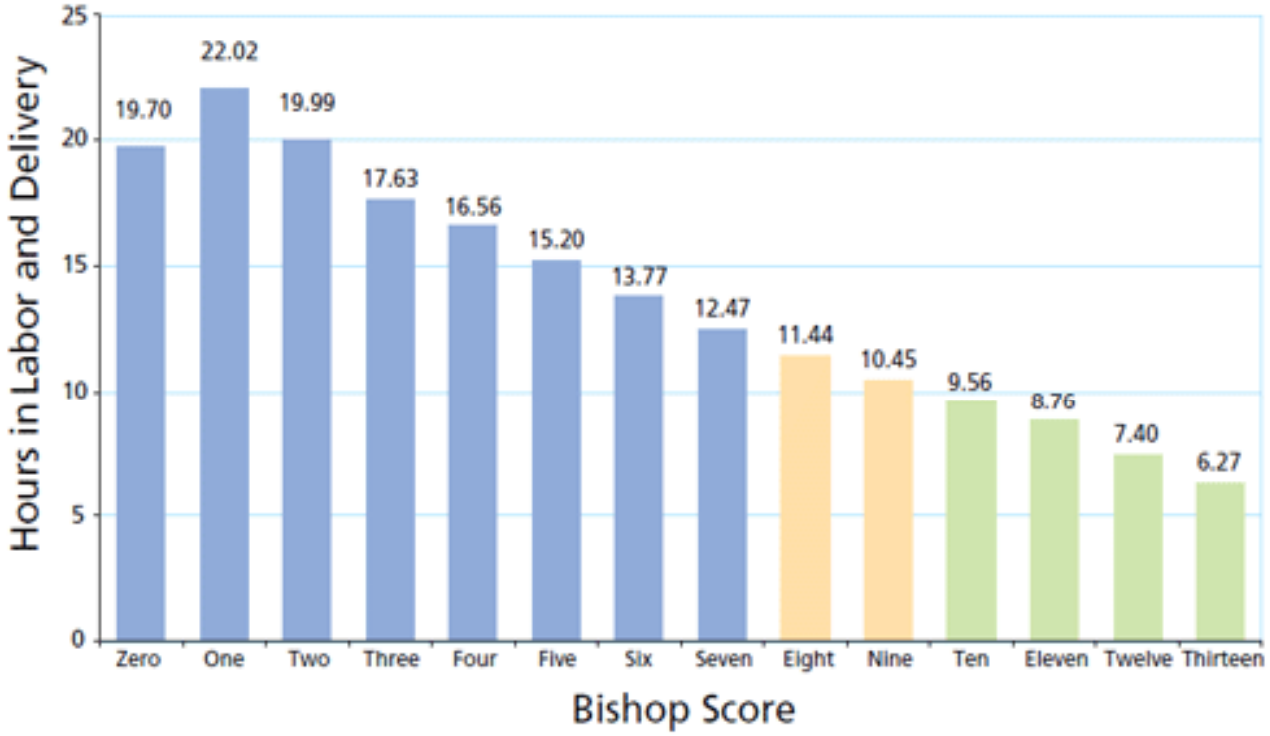
Fig. 1. Method of pelvic scoring



Average Hours in Labor & Delivery By Bishop Score

Elective Inductions in First-Time Moms 2001-2006

(Data from 6,721 Intermountain Healthcare patients)



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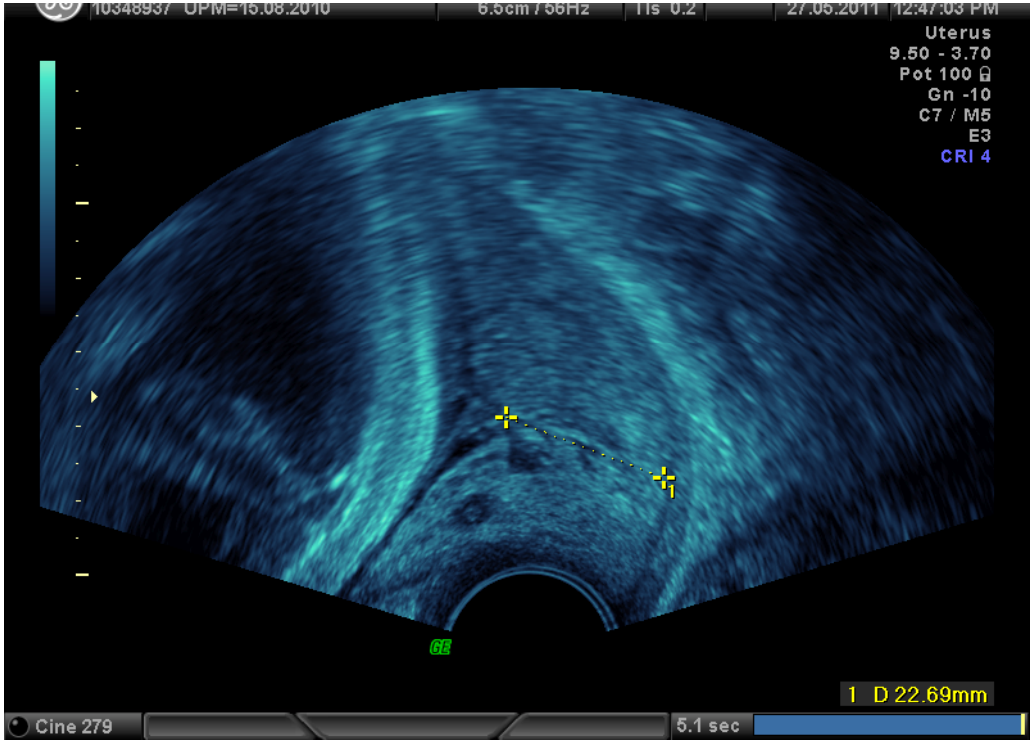
Cervix- eco TV

- Alternativa a la exploració digital,
  - Reproduible
  - Fàcil d'aprendre
  - Documentable per comparar
  - Canvis en OCI



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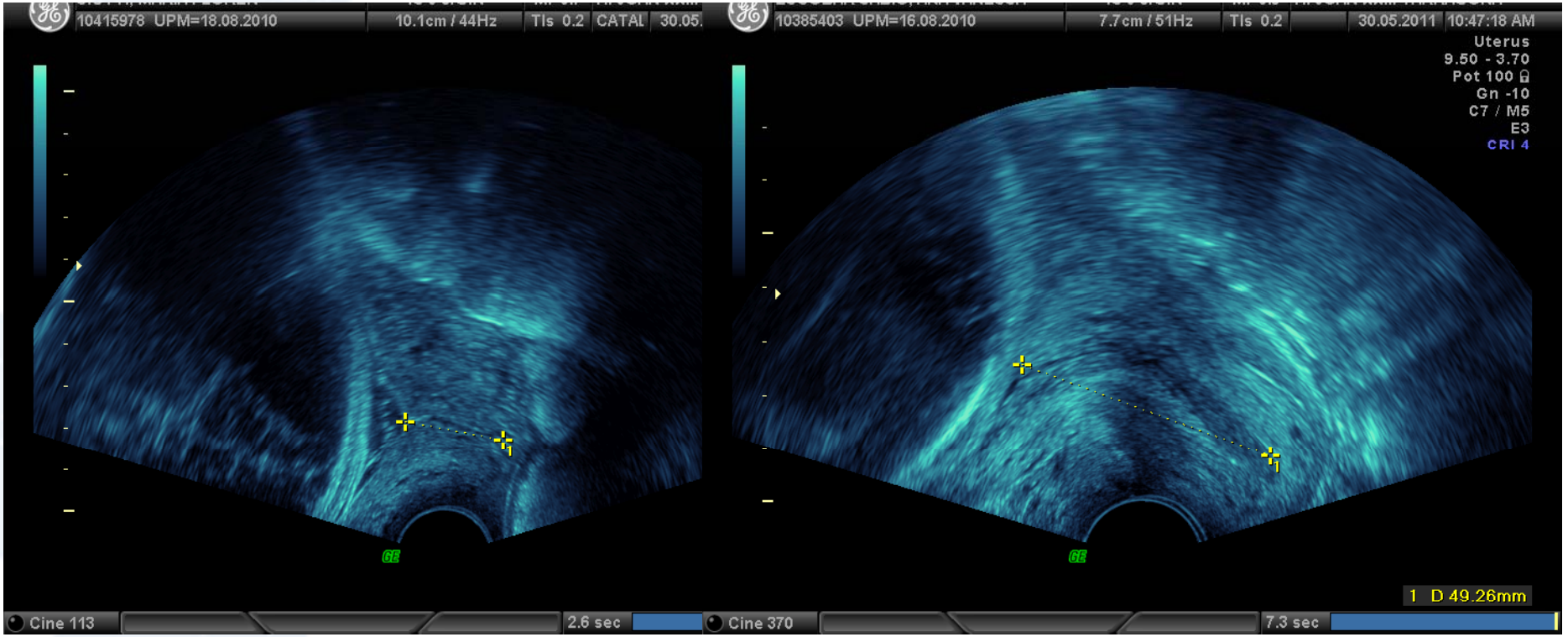

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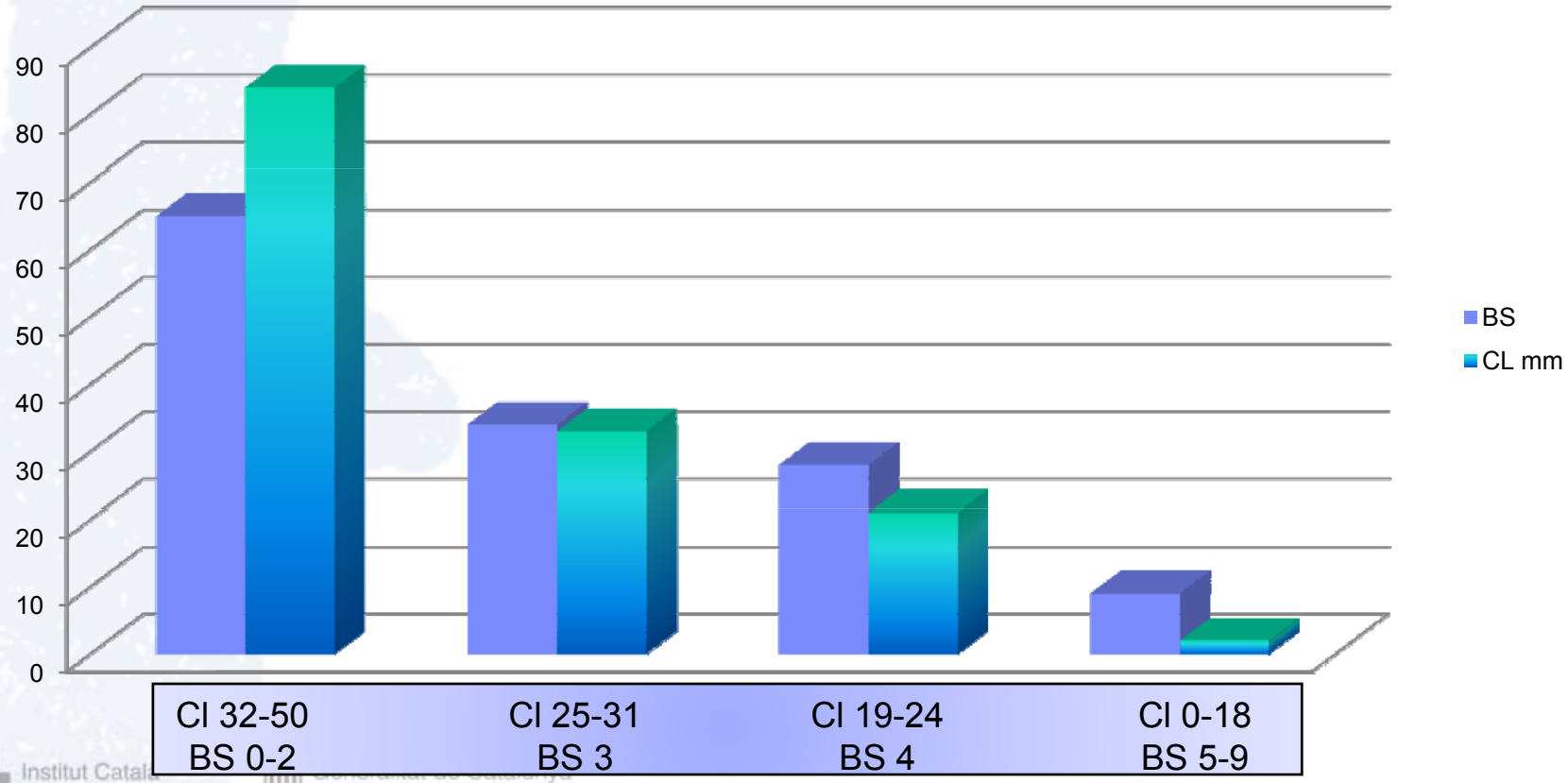
% no part en 24 h. per quartils



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Pandis et al. Ultrasound Obstet Gynecol 2001; ***18: 623–628***

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Part vaginal <24 h

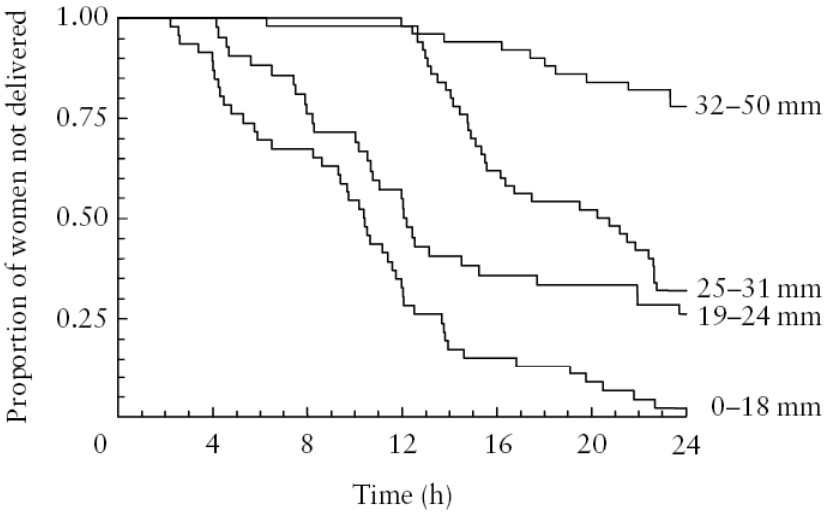

Figure 6 Kaplan–Meier survival curve estimates of proportions not delivering within 24 h, by quartiles of cervical length.

Cesaria

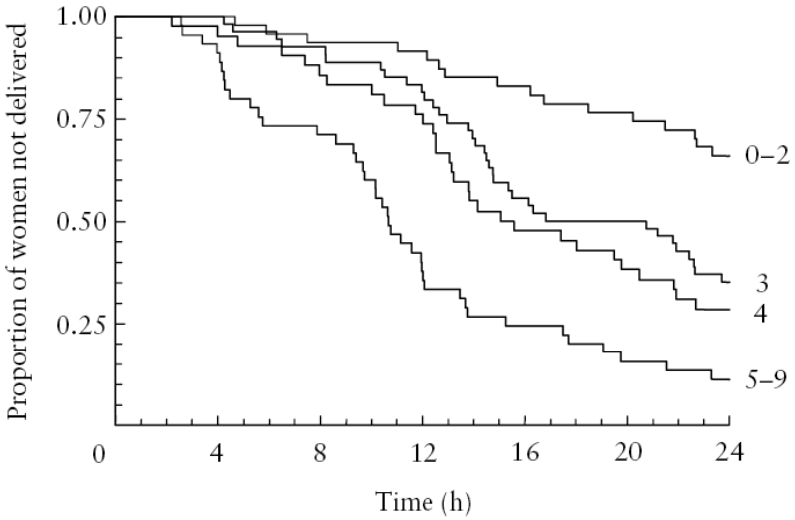

Figure 3 Kaplan–Meier survival curve estimates of proportions not delivering within 24 h, by quartiles of Bishop score.

Pandis et al.Ultrasound Obstet Gynecol 2001; ***18: 623–628***

“succesful induction”

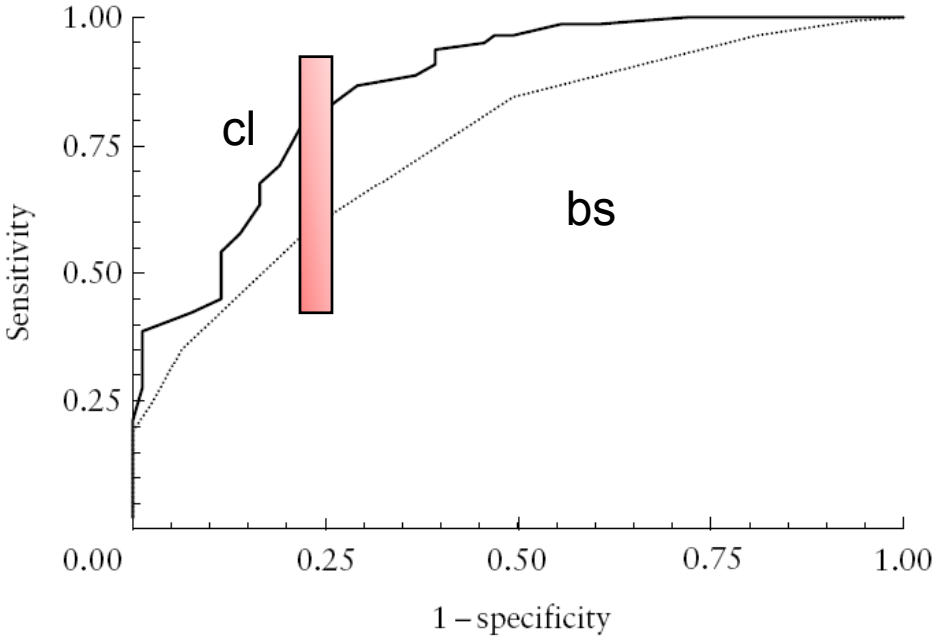

Figure 8 Receiver-operating characteristic curves for the two methods of assessment: sonographically measured cervical length (solid line) and Bishop score (dotted line).

20 % diferencia a mateixa tasa de falsos posit

Pandis et al. Ultrasound Obstet Gynecol 2001; ***18: 623–628***

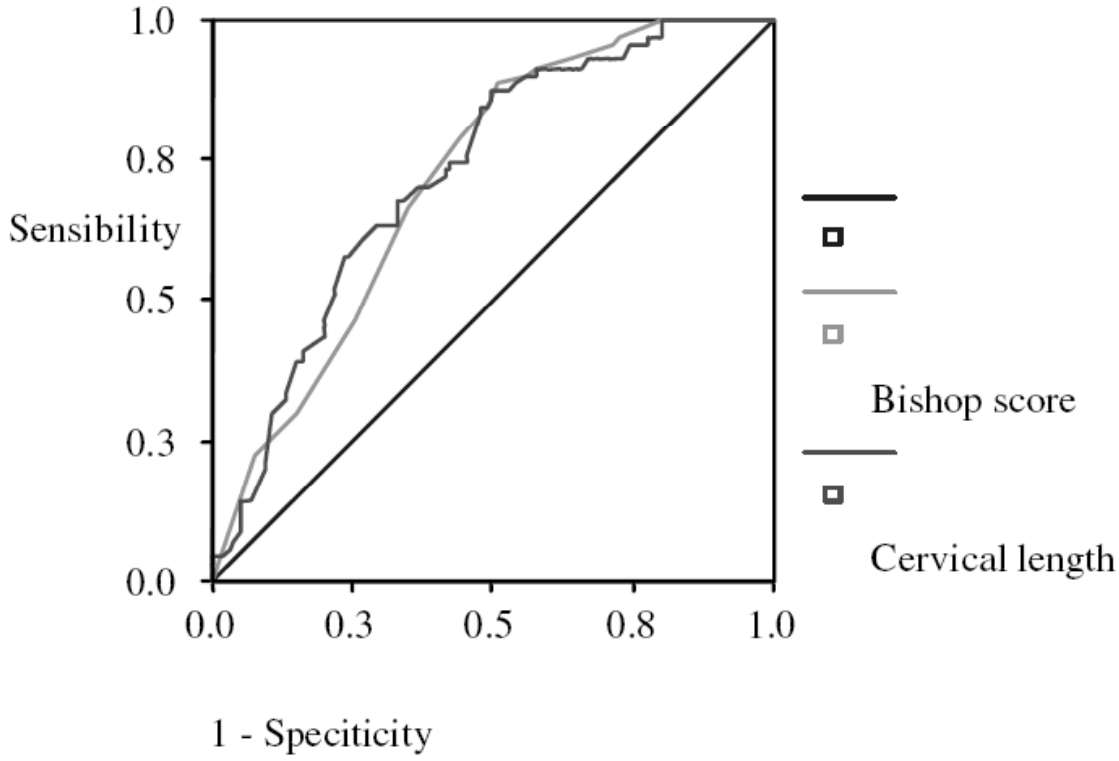

Fig. 1. Receiver-operating characteristic curves.

AUC 0,71 VS 0,72 NO SIGN

Bueno et al. Acta Obstet Gynecol Scand 84 (2005)

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VARIABLE	OR	CUT OFF POINTS	SUCCESS RATE (DEL<24H)
CL	1,089	<16,5 16.5-27 >27	91,3% 65 % 48,28 %
BS	0,75	0 1-4 >4	34,48% 59,46 % 81,08 %
PARITAT	6,85		

Bueno et al. Acta Obstet Gynecol Scand 84 (2005)

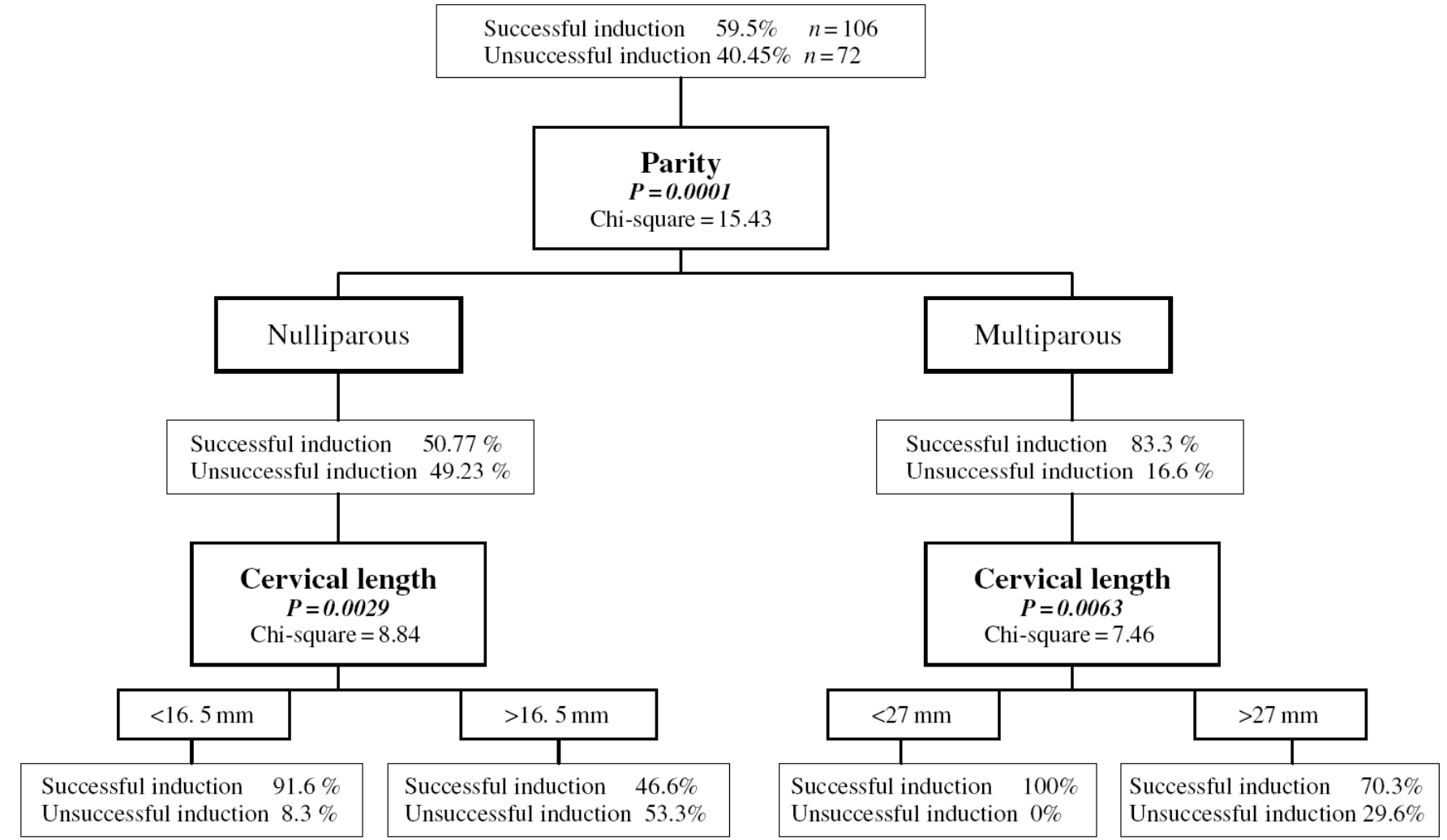

Fig. 2. Analysis of decision according to parity and cervical length.

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Bueno et al. Acta Obstet Gynecol Scand 84 (2005)

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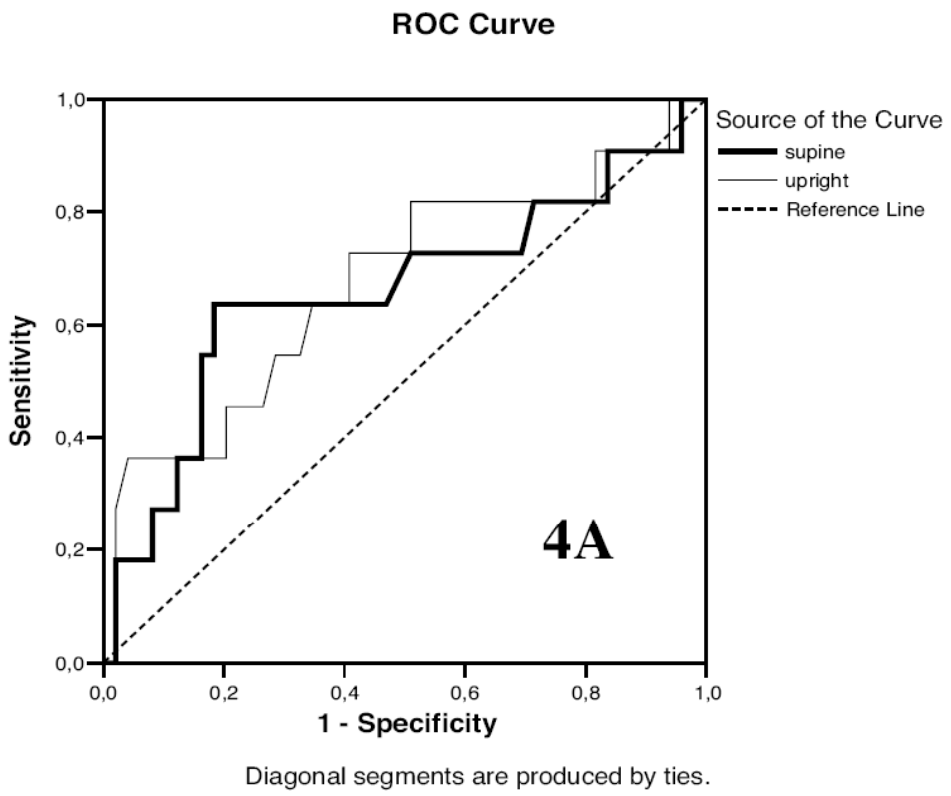
Posició i cèrvix



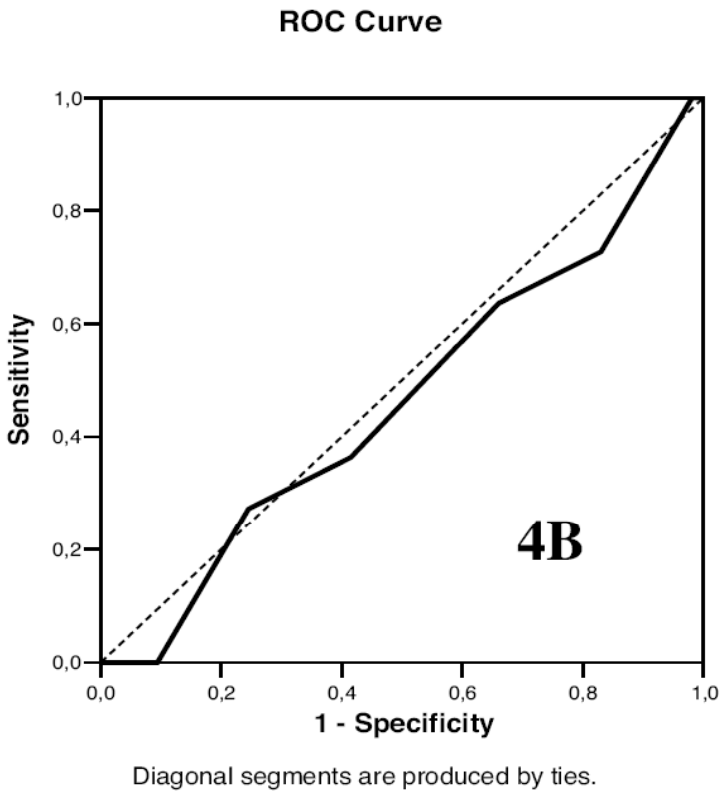


Figure 4: ROC curves of the CL in supine and upright position (4A) and Bishop Score (4B) for the risk of a caesarean section due to failure of progress.

Meijer et al. Ultrasound Obstet Gynecol 2009; ***33: 213–220.***

Table III: Prediction of the outcome after labour induction
Cervical length (CL) versus Bishop Score (BS)

Success = Vaginal delivery					
	Sample size	CL Level of sign. OR (95% CI)	BS Level of sign. OR (95% CI)	Sens/Spec/PPV/NPV (Area Under the Curve)	Best predictor
Paterson-Brown 1991	50	n.s.	P=0.02	BS: 47/ 100 /100 /23	BS
Ware 2000	77	P<0.01 3.57†	n.s.		CL
Chandra 2001	122	n.s.	P<0.01 2.98 (1.71;5.20)	BS: 40/ 96/ 97/ 29	BS
Gabriel 2002	179	P<0.01	n.s.		CL
Rane 2003	382	P<0.01 1.13 (1.08;1.19)	n.s.	CL: (0.76) BS: (0.68)	CL
Daskalakis 2006	137	P<0.01	P=0.24	CL: (0.74) BS: (0.50)	CL
Peregrine 2006	267	P<0.01 1.07 (1.04;1.11)	n.s.		CL
Elghorori 2006	104	P<0.01 11.1†(2.4;50.0)	n.s.	CL: 62/ 100 (0.84) BS: 23/ 88 (0.50)	CL
Meijer 2007 (present study)	*73*	*1.07 (0.98;1.17)* *1.14 (1.02;1.27)*	*0.99 (0.64;1.58)*	*CL: (0.66/0.68)* *BS: (0.46)*	*CL upright*

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Success = Vaginal delivery < 24 hours					
	Sample size	CL Level of sign. OR (95% CI)	BS Level of sign. OR (95% CI)	Sens/Spec/PPV/NPV (Area Under the Curve)	Best predictor
Gonen 1998	86	P<0.01	P<0.01	CL: 59/ 78/ 82/ 53 BS: 65/ 78/ 83/ 57	Similar
Pandis 2001	240	P<0.01 1.10 (1.06;1.12)	P=0.07 1.14 (0.99;1.31)		CL
Reis 2003	111	P<0.01	P<0.01	CL: 43/ 74/ 79/ 36 BS: 84/ 68/ 86/ 66	BS
Rane 2004	604	P<0.01 1.22 (1.18;1.28)	P<0.01 1.63 (1.47;1.81)	CL: 89/ 75 (0.89) BS: 68/ 75 (0.78)	CL
Bueno 2005	196	P<0.01 1.06 (1.02;1.11)	P<0.01 1.33 (1.14;1.59)	CL: (0.72) BS: (0.73)	Similar

† per cm CL n.s. = not significant OR=Odds Ratio

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Validació externa de models predictius.

- Peregrine *et al. includes maternal height, BMI, parity* and cervical length as the predictors of Cesarean delivery.
- In this model the risk for Cesarean delivery is calculated as
- 100*/(1 + exp{−[5.7311175 + (risk score/14.1)]}), where* the risk score is: +43 for nulliparity, +26 for BMI ≥30,+1 for each mm of cervical length and −1 for each cm of
- maternal height
- Rane *et al. includes five prognostic* variables: cervical length, parity, BMI, gestational age and aternal age.
- In this model the risk for Cesarean section was predicted by the following: risk (%) = (odds/1+odds)×100, where odds = eY and Y = 1.4404 + (0.0841 × cervical length in mm) − (1.3834 × (1 for parous women, 0 for ullipara)) + (0.6125 × (1 for BMI ≥30, 0 for BMI<*30)) − (0.1314 × gestational age in weeks) + (0.039 × maternal age in years).*

- *Verhoeven et al.. Ultrasound Obstet Gynecol 2009;* ***34: 316–321.***

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Validació externa models predictius

We included 240 women in the study, of whom 27 (11%) had Cesarean delivery.
The capacity of cervical length in the prediction of Cesarean delivery was limited.
In our study population, both prediction models overestimated the risk of Cesarean delivery.
Calibration was better for the Peregrine et al. model than for the Rane et al. model, and the two models had areas under the ROC curve of 0.76 and 0.67, respectively.

***Conclusion : Current models that predict the occurrence** of Cesarean section after induction of labor have only a moderate predictive capacity when applied within a Dutch practice.*

- *Verhoeven et al.. Ultrasound Obstet Gynecol 2009;* ***34: 316–321.***

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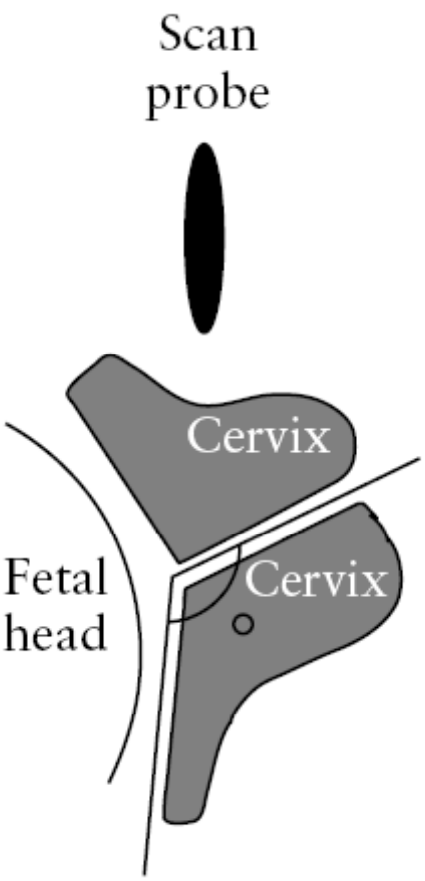
Metaanalisi Hartfield.

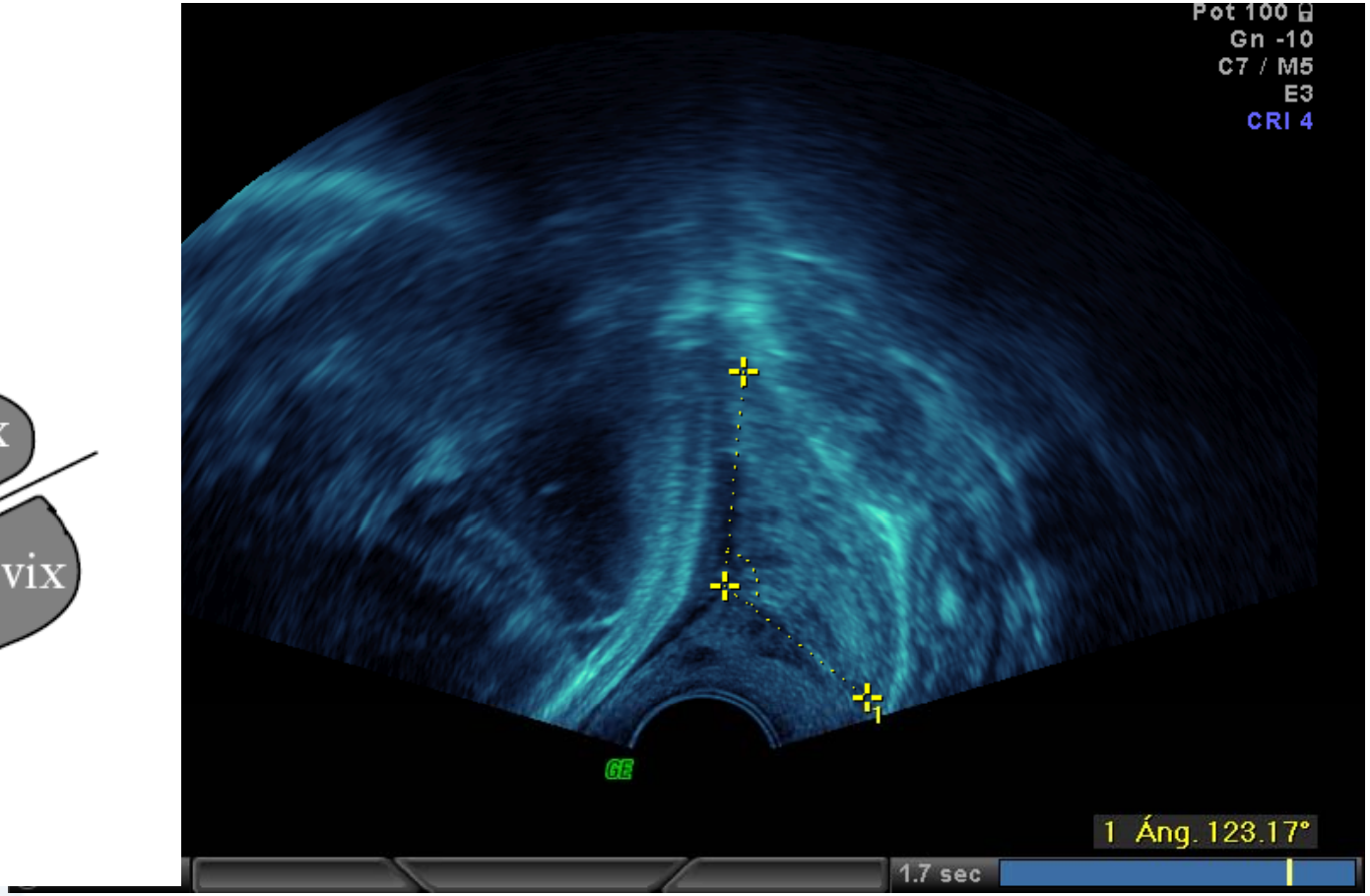
Study	Date	Country	N	Cervical length cut-off (mm)	Bishop score cut-off	Definition of successful induction	Quality Assessment of Diagnostic Accuracy Studies score
Bueno et al[28]	2005	Spain	130	16.5	—	Vaginal delivery ≤24 hr	10
Daskalakis et al[29]	2006	Greece	137	27	5	Vaginal delivery	12
Dewandeleer et al[30]	1998	France	75	30	5	Vaginal delivery	10
Elghorori et al[31]	2006	United Kingdom	104	35	3	Vaginal delivery	11
Gabriel et al[32]	2002	France	179	26	5	Vaginal delivery	11
Gonen et al[33]	1998	Israel	86	28	4	Vaginal delivery <24 hr	11
Khoury et al[34]	1997	Israel	35	30	—	Vaginal delivery	8
Mohamed et al[35]	2000	Egypt	80	30	4	Vaginal delivery	12
Novakov-Mikic et al[36]	2000	Serbia	100	30	—	Vaginal delivery <24 hours	10
Pandis et al[37]	2001	United Kingdom	221	32	4	Vaginal delivery <24 hr	11
Park et al[38]	2005	South Korea	110	28	—	Active phase (cervix >4 cm dilated) <24 hr	9
Paterson-Brown et al[39]	1991	United Kingdom	50	30	4	Vaginal delivery	10
Peregrine et al[40]	2006	United Kingdom	267	30	—	Vaginal delivery	13
Rane et al[41]	2005	United Kingdom	822	31	—	Vaginal delivery	11
Reis et al[42]	2003	Italy	111	21	—	Vaginal delivery <24 hr	11
Roman et al[43]	2004	France	106	30	4	Active phase (cervix ≥5 cm dilated)	12
Rovas et al[44]	2005	Sweden	36	—	—	Vaginal delivery <24 hr	11
Rozenberg et al[45]	2005	France	266	30	—	Vaginal delivery	13
Ware and Raynor[46]	2000	United States	77	30	—	Vaginal delivery	12
Yang et al[47]	2004	South Korea	105	32	3	Active labor <48 hr	12

Cervical length predicted successful induction (likelihood ratio of positive test,
1.66; 95% confidence interval [CI], 1.20-2.31) and failed induction (likelihood ratio of
negative test, 0.51; 95% CI, 0.39-0.67).
Cervical length did not predict any specific
outcome (eg, mode of delivery).

\esultats criticats per problemes metodològics

Angle posterior





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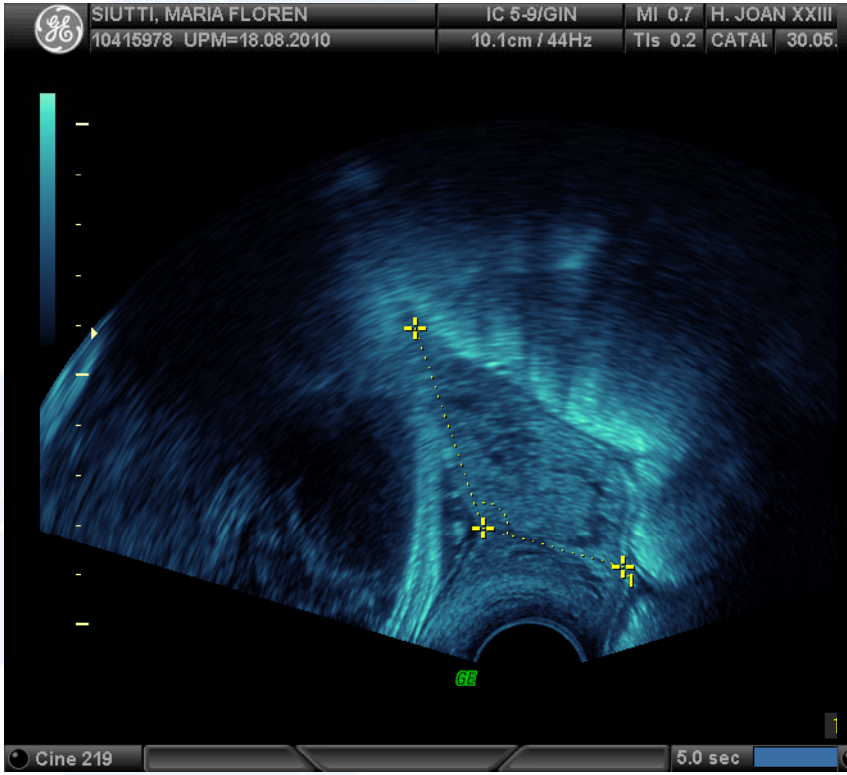

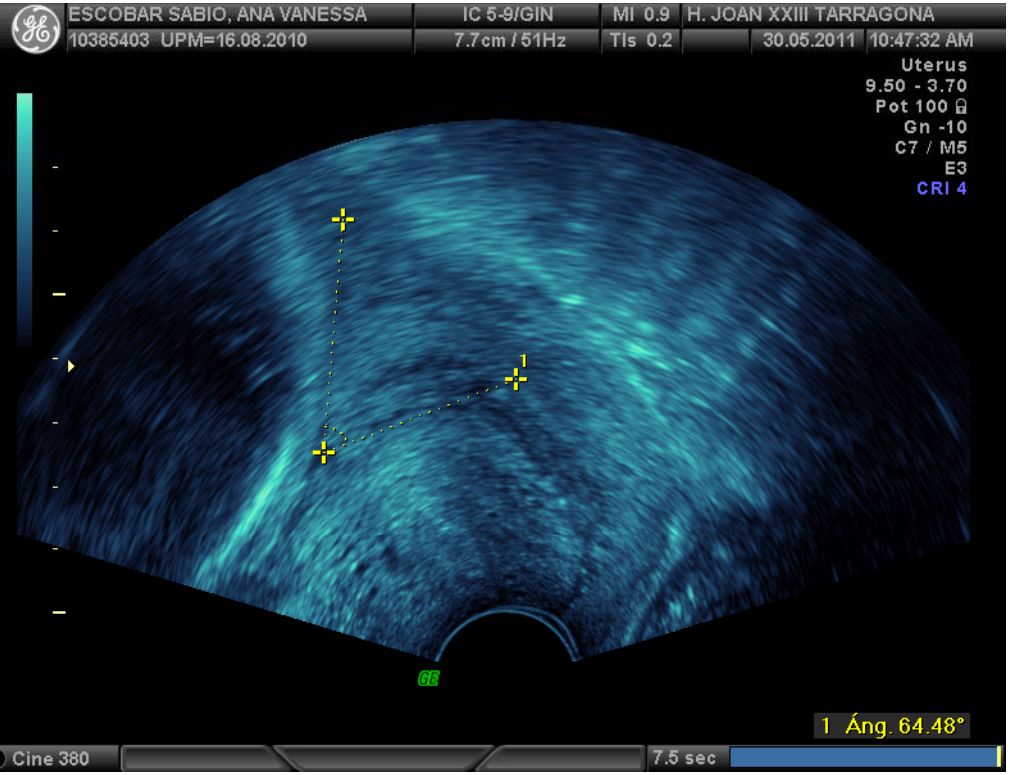

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- Model matemàtic per calcular la probabilitat individual de part vaginal en 24 h i predicció d'intèrval de inducció- part vaginal.

- Inclou:
- Caracterísitques ecogràfiques:
  - Llongitud cervical.
  - Angle posterior
  - Posició Occipuci
- Característiques maternes
  - Edat
  - BMI
  - Paritat
- Compara amb test de Bishop

Rane et al.Ultrasound Obstet Gynecol 2004; ***24: 538–549***

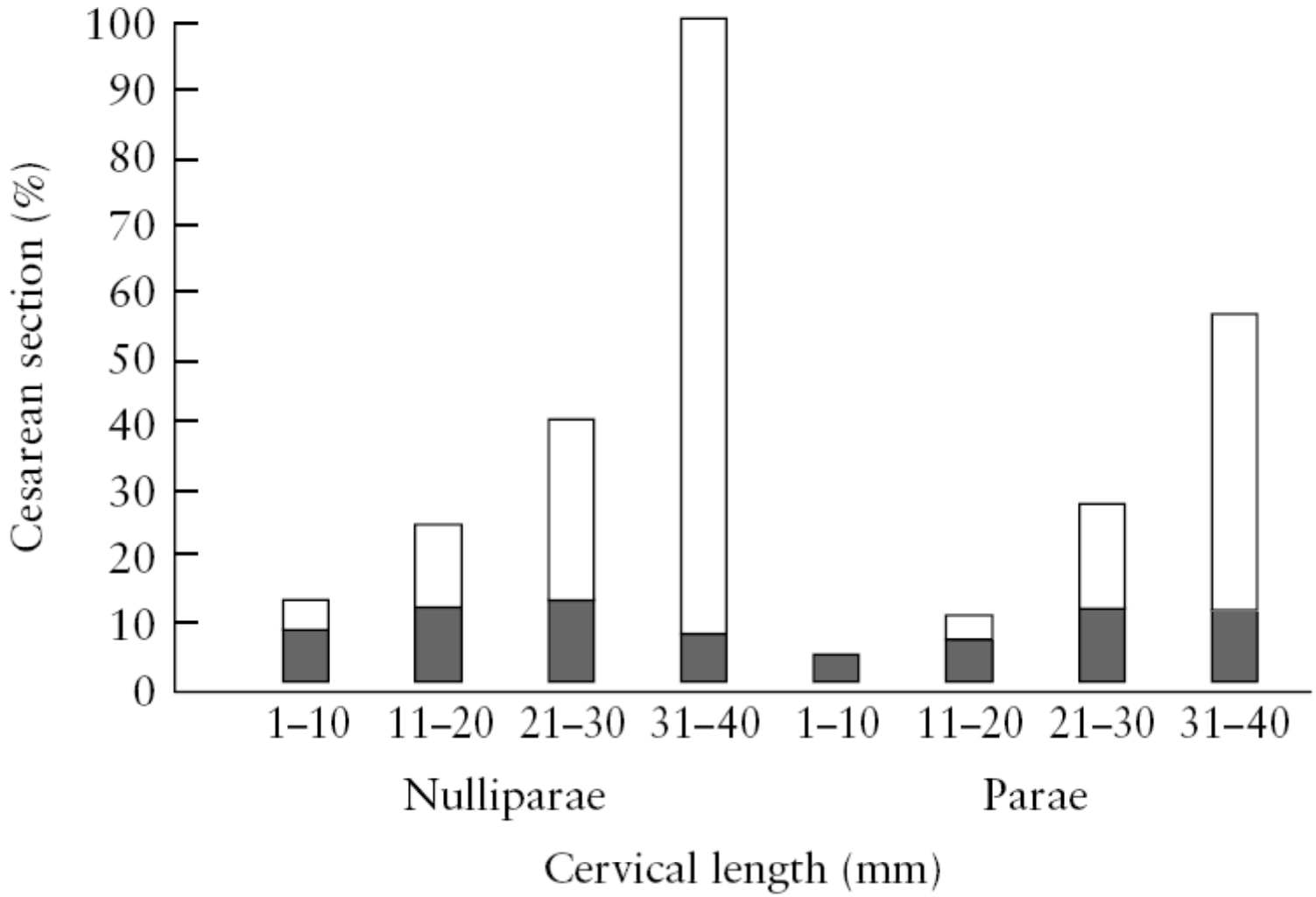

Figure 5 Association between pre-induction cervical length and the likelihood of Cesarean section for fetal distress (■) and failure to progress (□) in nulliparae and parae.

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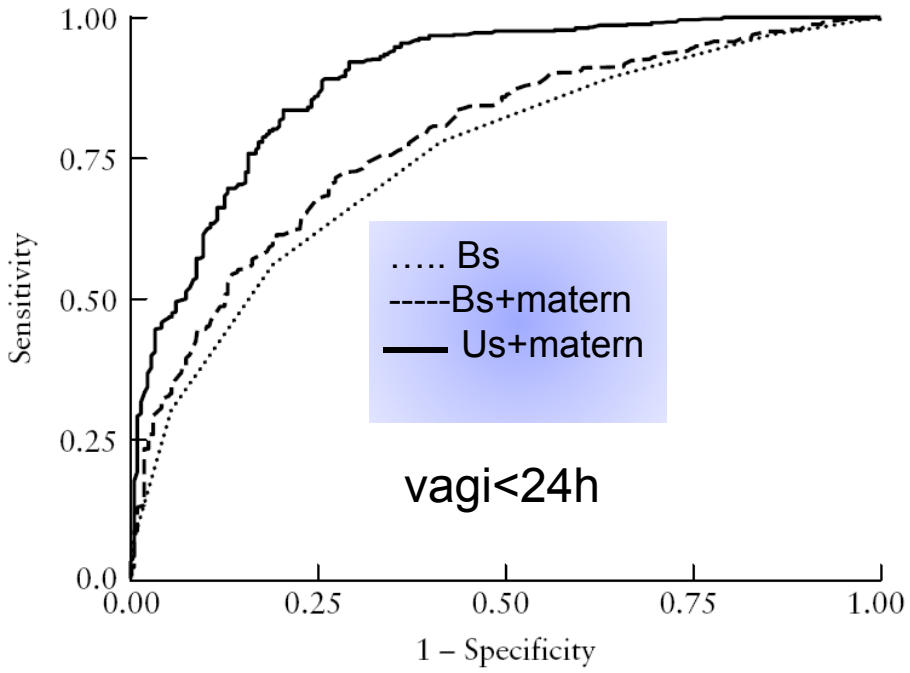

Figure 6 Receiver–operating characteristics (ROC) curves for the three methods of assessment comparing the predictions provided by the ultrasound findings with maternal characteristics (solid line), the Bishop score with maternal characteristics (dashed line) and the Bishop score alone (dotted line) for the likelihood of vaginal delivery within 24 h.

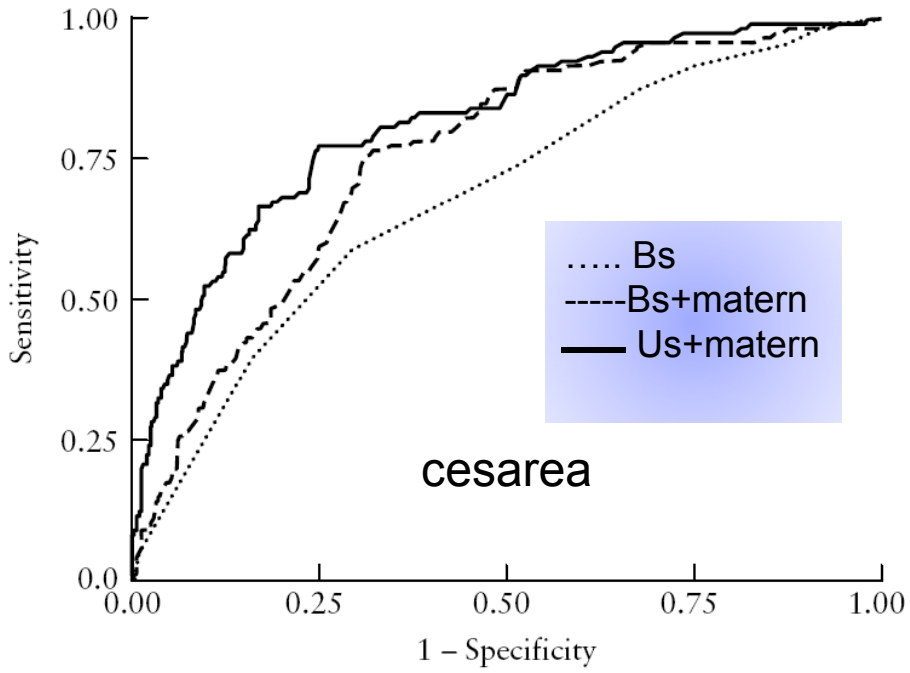

Figure 7 Receiver–operating characteristics (ROC) curves for the three methods of assessment comparing the predictions provided by the ultrasound findings with maternal characteristics (solid line), the Bishop score with maternal characteristics (dashed line) and the Bishop score alone (dotted line), for the likelihood of Cesarean section.

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Rane et al.Ultrasound Obstet Gynecol 2004; ***24: 538–549***

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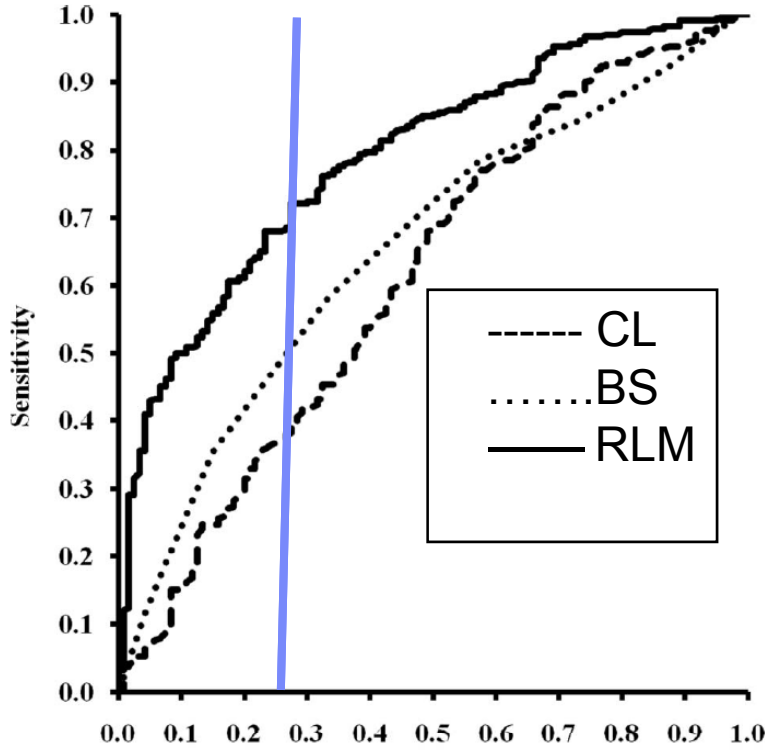

SENSIBILITAT	
CL 37,1 %	20,4 mm
BS 46,8 %	6
RLM 68 %	0,7

Cheung et al. The Journal of Maternal-Fetal and Neonatal Medicine, Dec 2010;23(12): 1406–1412

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Paràmetres ecogràfics i bioquímics.

		Univariate analysis			Multivariate analysis	
Variable	OR	95%CI	p	AOR	95%CI	p
In nulliparae						
Maternal height < 150 cm	0.16	0.05–0.58	0.005	0.16	0.04–0.62	0.008
Posterior cervical angle >120 Transvaginal cervical length	2.27 0.60	1.30–397 0.44–0.79	0.004 <0.0001	1.84 0.64	1.02–3.32 0.47–0.87	0.044 0.004
In Multiparae						
Bishop score		Not applicable		1.79	1.24–2.57	0.002

Among nulliparae: loge (odds) ¼1.49 – 0.448 (transvaginal cervical length in cm) – 1.813 (0 for height _150 cm, 1 for height <150 cm) þ0.609 (0 for posterior cervical angle < 1208, 1 for posterior cervical angle _1208); among multiparae: loge (odds) ¼0.581 – 0.141(Bishop Score).

Cheung et al. The Journal of Maternal-Fetal and Neonatal Medicine, Dec 2010;23(12): 1406–1412

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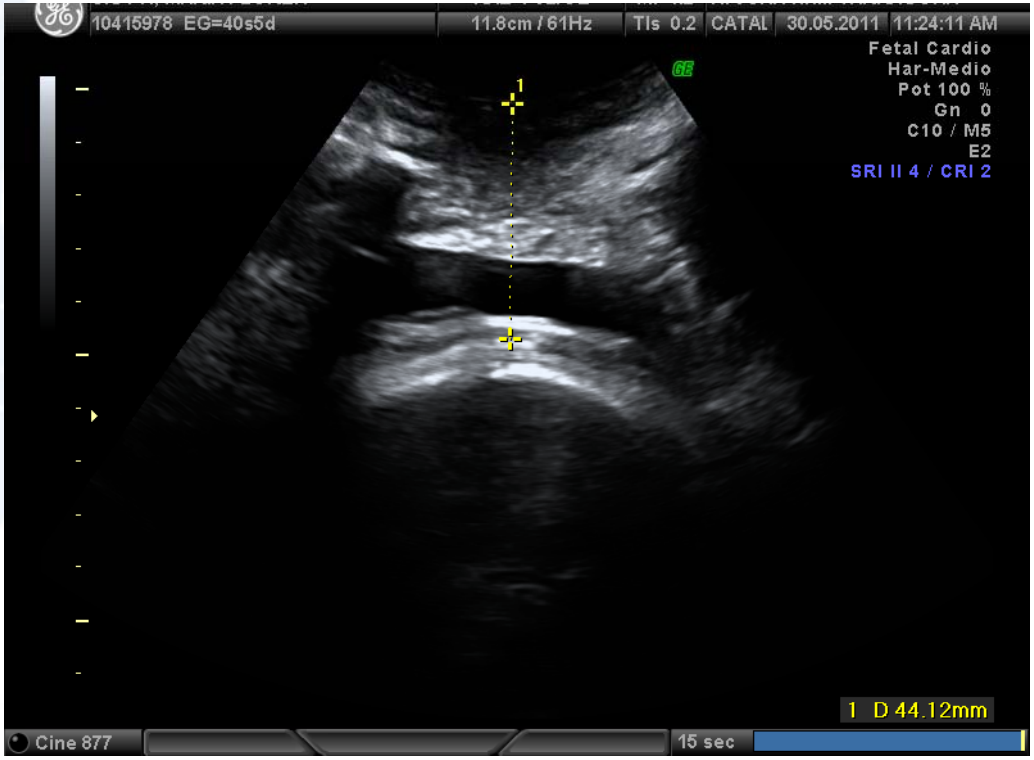
Distància calota-periné



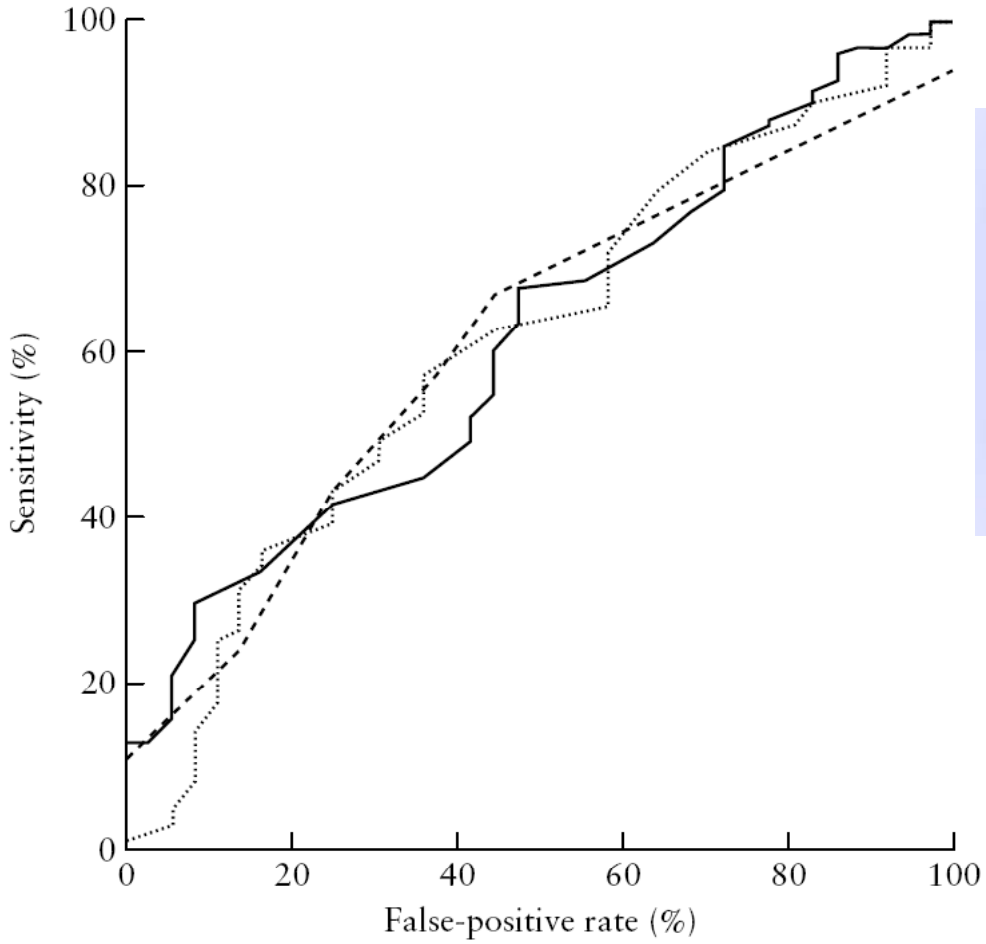


Figure 1 Receiver–operating characteristics curves for fetal head–perineum distance (——), cervical length (·····) and Bishop score (- - - -) in predicting a vaginal delivery.

AUC	
CALOTA-PERINE	0,61
CL	0,63
ANGLE POST	0,60
BISHOP	0,60

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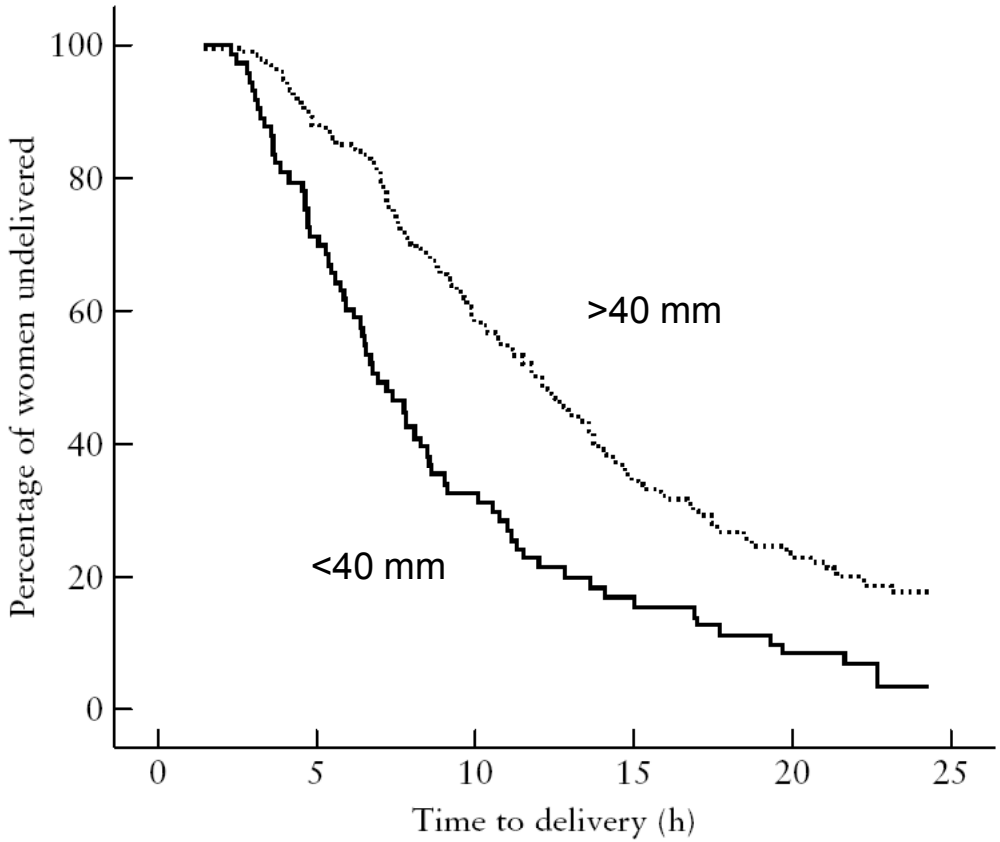
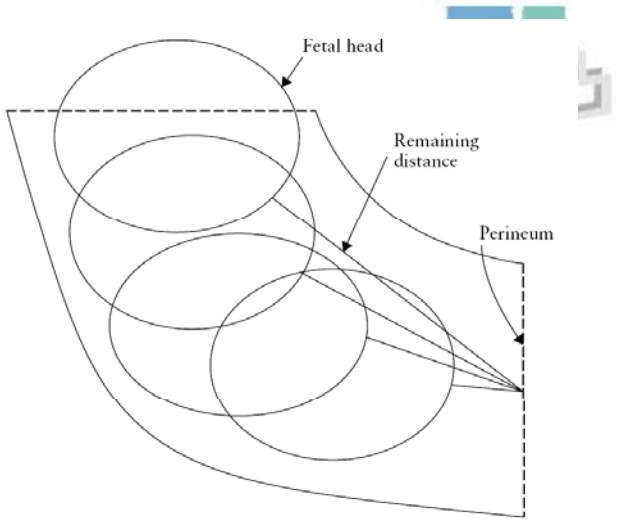


Figure 2 Kaplan–Meier estimates of proportions of women not delivered within 24 h, according to sonographically measured fetal head–perineum distance (≤ 40 mm, ——; > 40 mm, ·····). Women experiencing Cesarean section or a time to delivery > 24 h were censored. $P < 0.001$ (log rank test).



- *Twenty-four hours after induction 3% (95% CI, 0–10%) of women with a short distance and 11% (95% CI,7–17%) of women with a long distance were still in labor.*

Eggebo et al.Ultrasound Obstet Gynecol 2008; ***32: 199–204***

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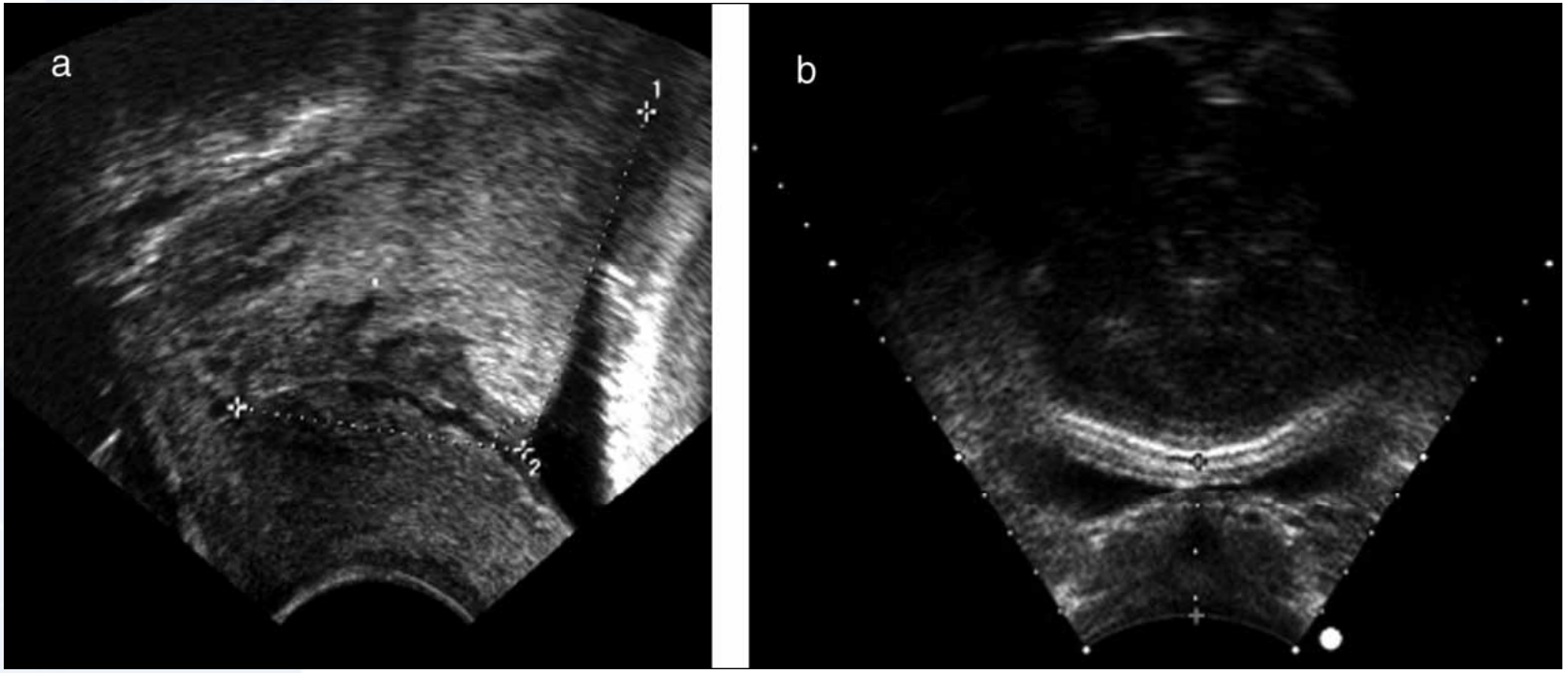
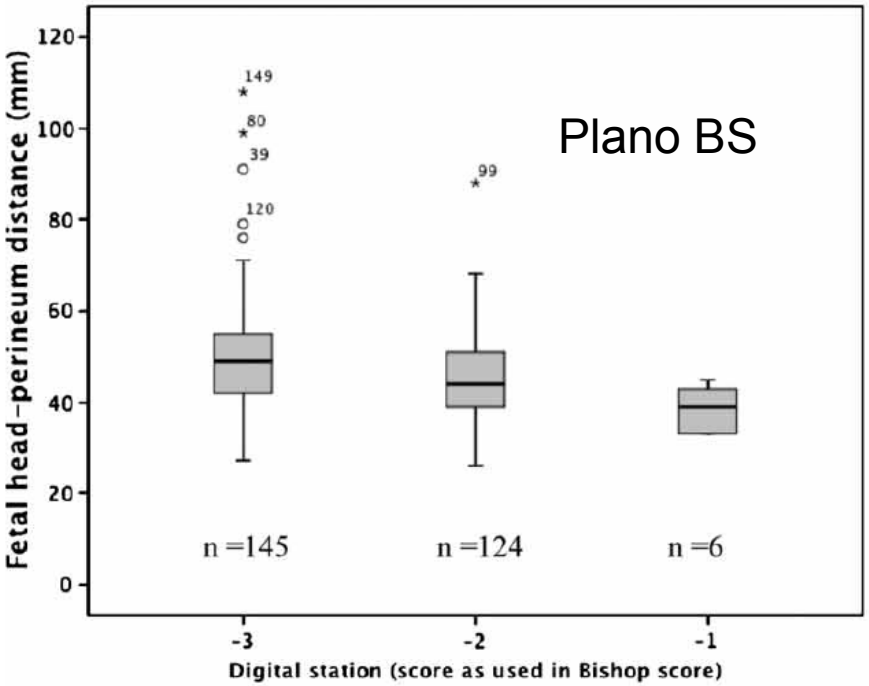
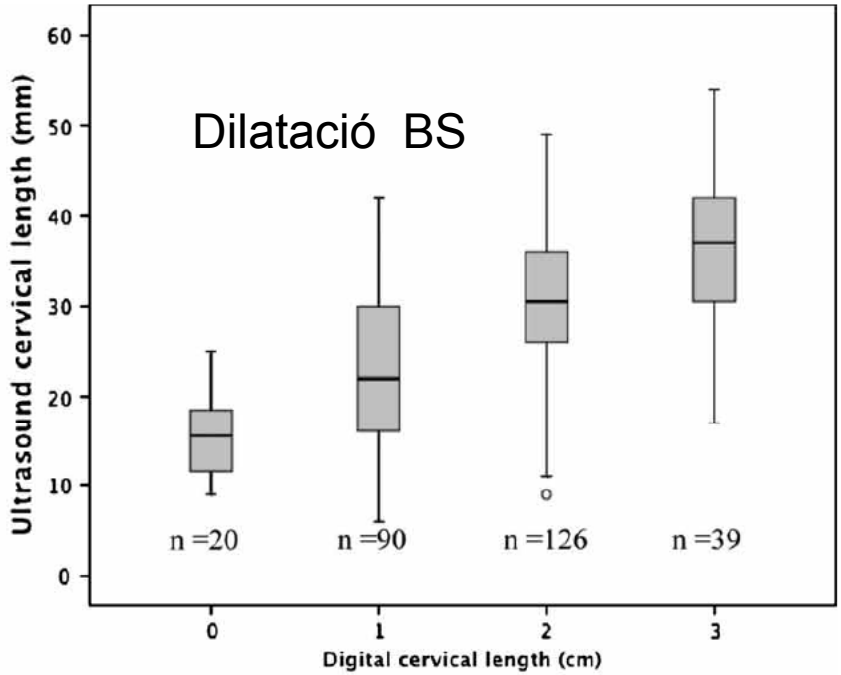


Angle posterior

Distancia Calota-perine

Eggebo et al. Acta Obstet Gynecol Scand. 2009;88(3):325-31.





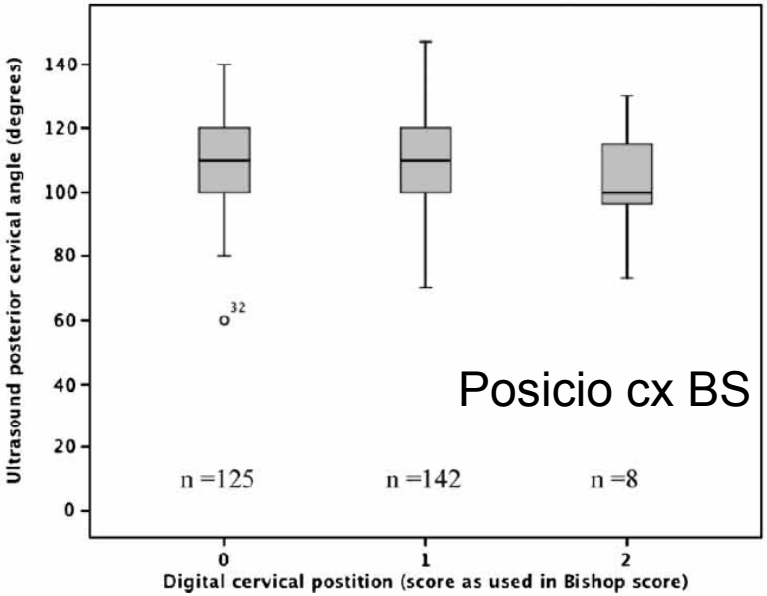


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Table I. A proposed score combining ultrasound measurements and digital assessments of cervix and fetal head descent.

Score	0	1
Ultrasound measured fetal head–perineum distance	>40 mm	≤40 mm
Ultrasound measured cervical length	>25 mm	≤25 mm
Ultrasound measured posterior cervical angle	≤90 degrees	>90 degrees
Digitally assessed dilatation	Closed cervix	Dilated cervix

Eggebo et al. Acta Obstet Gynecol Scand. 2009;88(3):325-31.

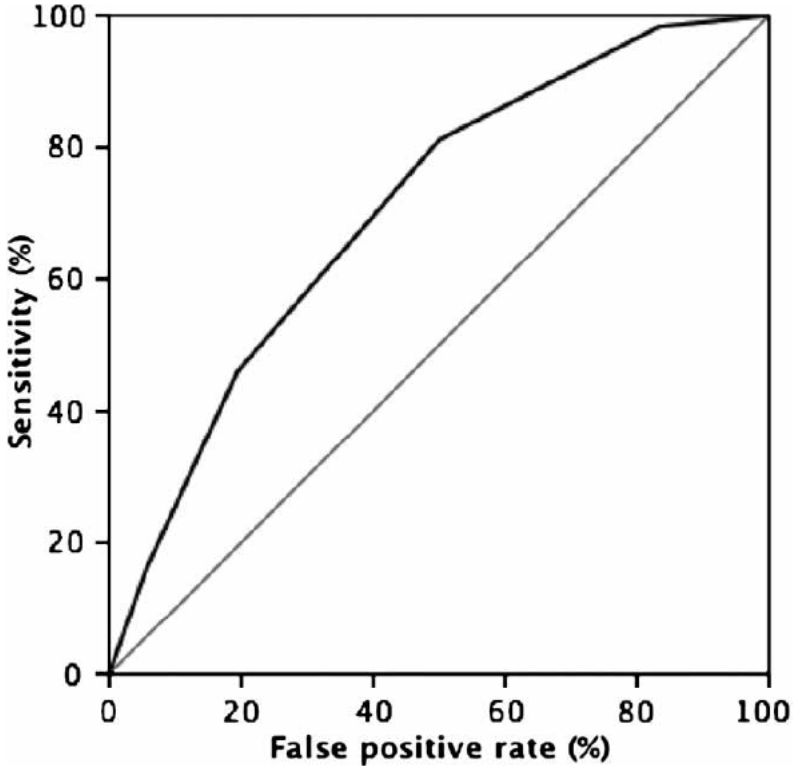

Figure 3. Successful or failed induction of labor evaluated with receiver–operating characteristics (ROC) curve for a scoring model combining ultrasound measured fetal head–perineum distance, cervical length, posterior cervical angle and digitally assessed cervical dilatation (239 vaginal and 36 cesarean deliveries).

Score combinat Eco -TV

	Sensitivity (95% CI)
Score >0	98 (96–100)
Score >1	81 (76–86)
Score >2	46 (40–53)
Score >3	16 (12–21)

Eggebo et al. Acta Obstet Gynecol Scand. 2009;88(3):325-31.

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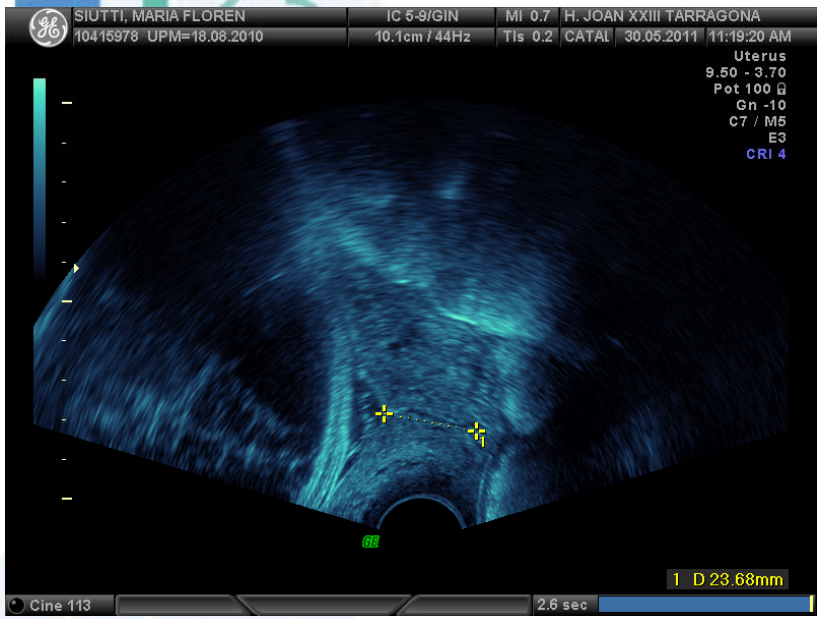

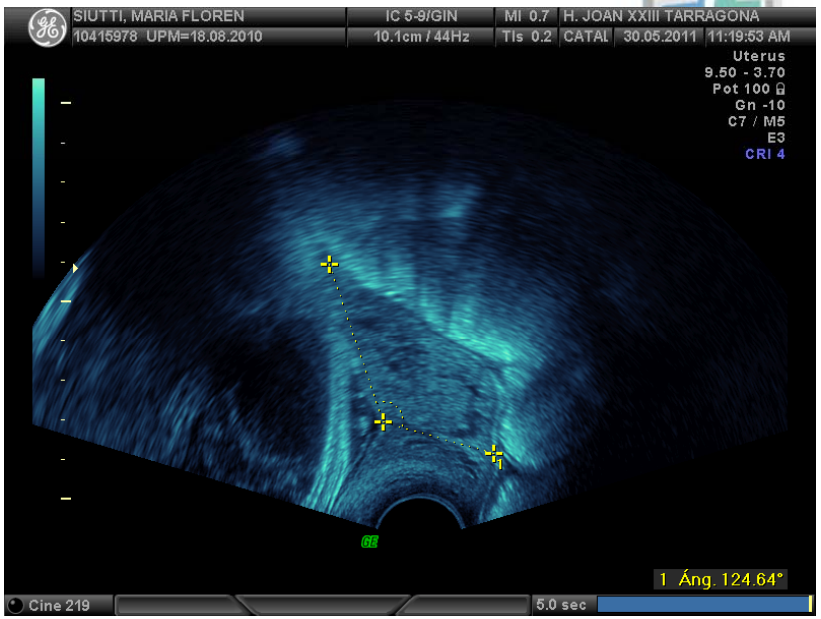

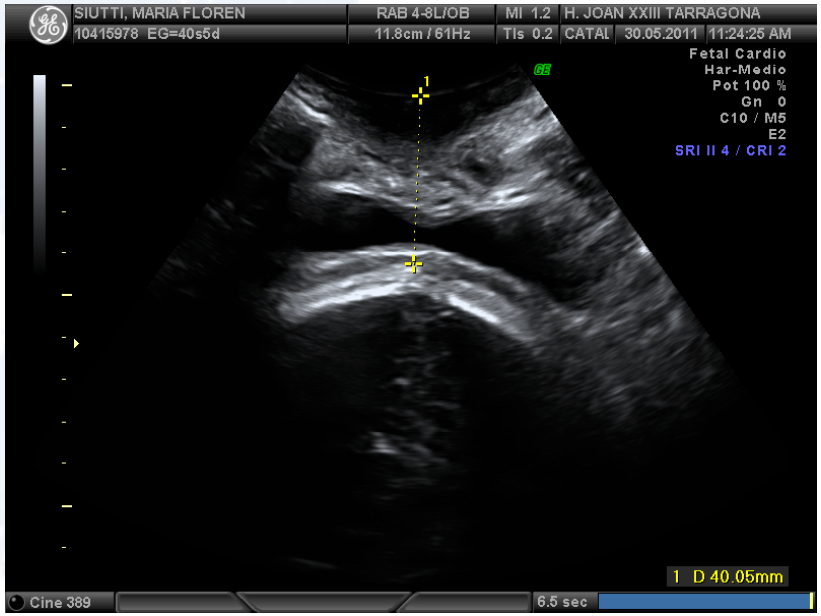

TV: dilatació cervical

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Rct Bishop vs Cl

- *While 85% of women received prostaglandin in the Bishop score group, only 50% of them did in the transvaginal ultrasound group (*P = *0.001).*
- *The interval to active phase, interval to delivery and rate of Cesarean*
- *section were similar in both groups*
- ***Menys necessitat de PGE2**.*

Bartha et. Al. Ultrasound Obstet Gynecol 2005; **25**: 155–159

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Conclusions

- Tant el test de Bishop com la llongitut cervical per ecografia tenen una capacitat de predicció de l'exit de la inducció limitada.
  - CL exit inducció
  - BS duració inducció
- La inclusió d'altres paràmetres ecogràfics millora parcialment els resultats.
- L'aplicació dels diversos models predictius en diferents poblacions no presenta els mateixos resultats.

- Els diferents punts de tall i criteris de resultat compliquen la comparació de resultats i la possible aplicació clínica.

Examinar el cérvix de forma objectiva constitueix una eina potencialment útil per el maneig de la inducció del part……