¿Cómo evaluar el cérvix. Longitud o índice de consistencia cervical?

XVI Congreso Nacional de Obstetricia y Ginecología,
La Habana Octubre 2016

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**Octubre de 2016
La Habana Cuba**

Cedifetal
UNIDAD MATERNO FETAL

CLÍNICA
LA ASUNCIÓN
LOS AYUDAMOS A NACER, LOS CUIDAMOS DURANTE TODA SU VIDA.

Evaluación del cérvix:
Longitud o Índice de Consistencia

Agenda

- INTRODUCCIÓN:
  - Importancia
  - Casos clínicos

- PREVENCIÓN

- PREDICCIÓN:
  - Longitud del cérvix
  - Índice de Consistencia Cervical

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¿En relación al parto prematuro las cosas han cambiado en los últimos 20 años?

Casos clínicos

- Síndrome de parto prematuro

Caso # 1.

ID: Y.L
22 años,
EG: 24,2 semanas
Antecedentes:
-G3 A2 <u>ultima perdida de 20 sem</u>
-Doble sistema colector
-Infección de vías urinarias en primer trimestre.
-Refiere actividad uterina irregular
-Cervicometria 27 mm
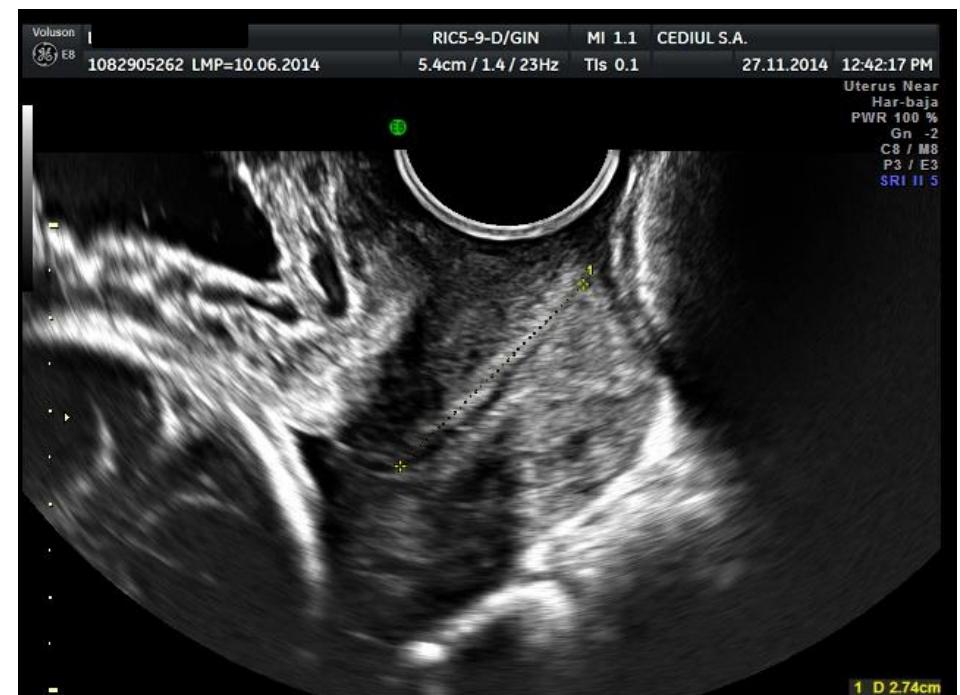
Cervicometria: 2,74 cm

¿Cuál seria el manejo indicado?

Caso # 2

ID: Z.A

28 años

-Embarazo actual 22 sem

-Actvidad uterina regular de 8 horas

-Cervix 5 mm

-Sludge

-PCR 48

-CH: Leucocitos 16820

Antecedentes:

G5A3PP1 V0

PP 23 semanas, con muerte neonatal temprana.
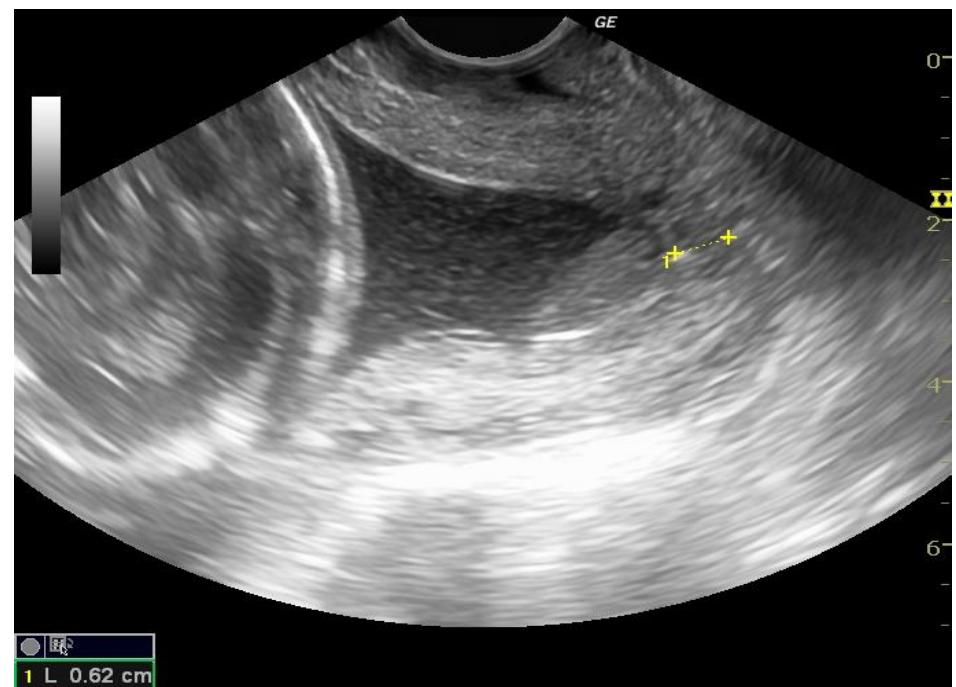
¿Cuál seria el manejo indicado?

Caso # 3

ID: D.O

34 años

-Embarazo actual 12.4 sem

-Tamizaje de primer trimestre test combinado 1:730

-Tamizaje de preeclampsia <34 sem 1:123

-**Antecedentes:**

G0A0P0 V0

Pregunta si tiene riesgo de Pp porque una compañera de trabajo tuvo un parto prematuro a las 26 sem y perdió en bebé.

Lcx: 38 mm (12,4 semanas)

¿Cuál seria el manejo indicado?

Predicción del parto prematuro:

¿Que hay de nuevo?

- ¿Dónde estamos?

- ¿Para donde vamos?

El parto prematuro: problema no resuelto

Principal causa de morbi mortalidad perinatal

Government Statistical Service for the Department of Health.NHS Maternity Statistics, England: 2002–2003. Department of Health: London. http://www.dh.gov.uk
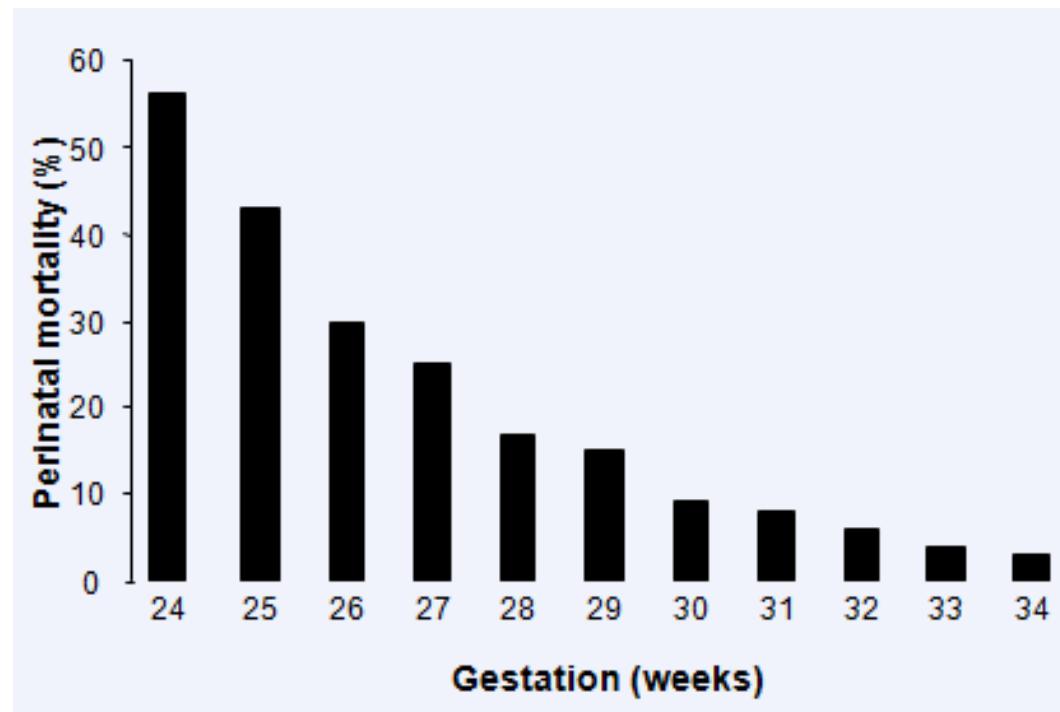
# El problema: 12'799.000 pp/año
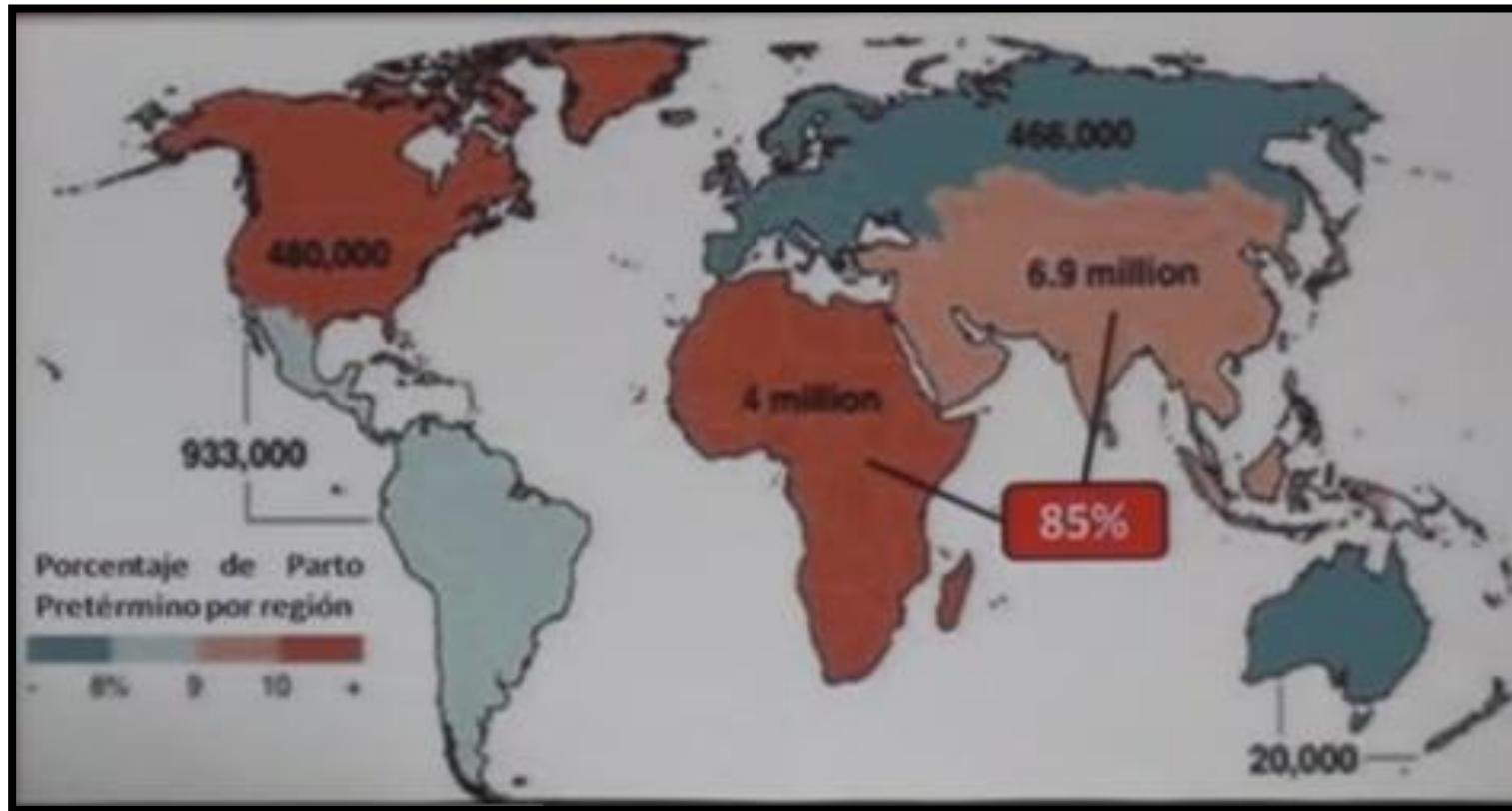
8'000.000 mueren antes del primer año

Parto prematuro:
Un problema de salud mundial

- Principal causa de morbimortalidad en países en desarrollo.
- Especialmente si el parto tiene lugar antes de las 34 semanas.
- Representa un costo astronómico para la salud publica.
- Es sin duda el problema más importante de la obstetricia moderna.

Stuard Campbell universal cervical-length screening and vaginal progesterone prevents early preterm births, reduces neonatal morbidity and is cost saving: doing nothing is no longer an option Ultrasound Obstet Gynecol 2011; 38: 1–9

Parto prematuro: Fisiopatología

Lesión

Contracciones uterinas

Dilatación cervical

Ruptura de membranas

Romero R, Dey SK, Fisher SJ. Preterm labor: one syndrome, many causes. Science 2014 Aug 15;345(6198):760-5.
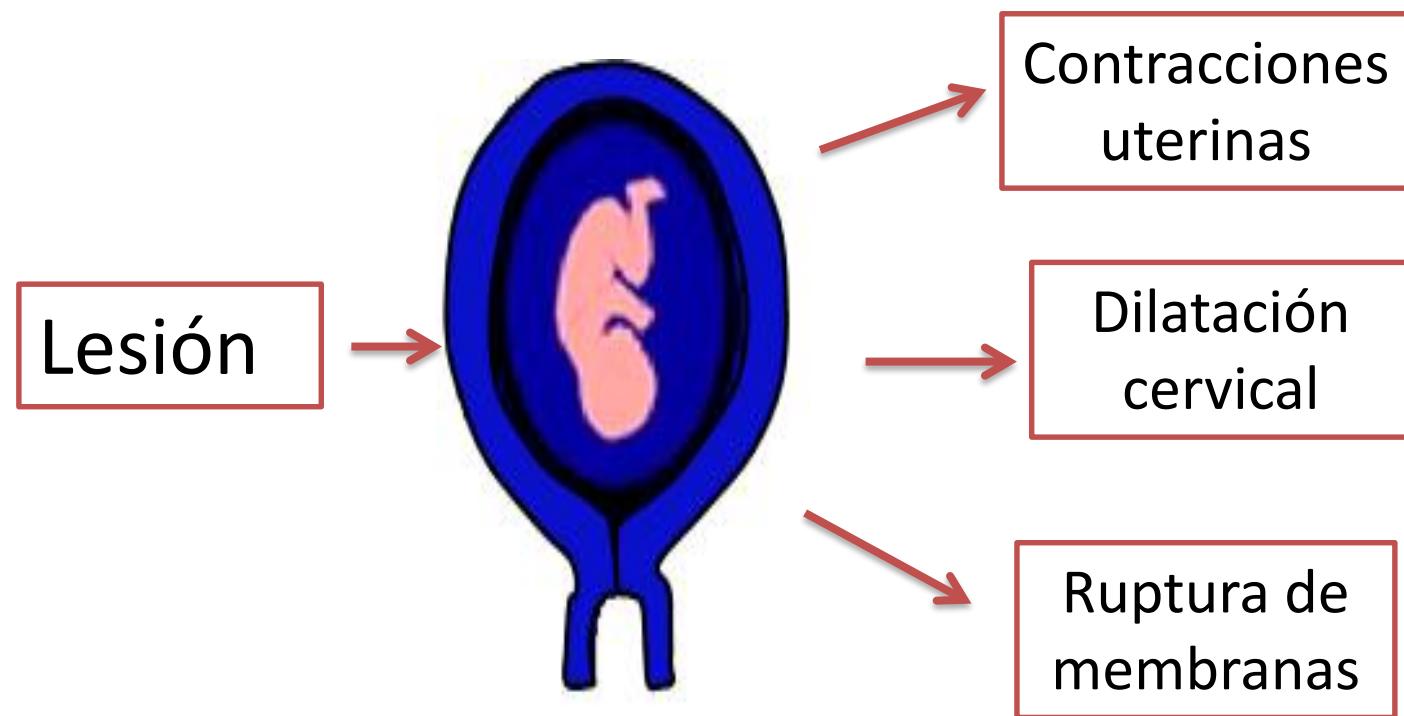
Parto prematuro: Fisiopatología

REVIEW

Preterm labor: One syndrome, many causes

Roberto Romero,[1,2,3]* Sudhansu K. Dey,[4] Susan J. Fisher[5]

Romero R, Dey SK, Fisher SJ. Preterm labor: one syndrome, many causes. Science 2014 Aug 15;345(6198):760-5.

Síndrome de parto prematuro
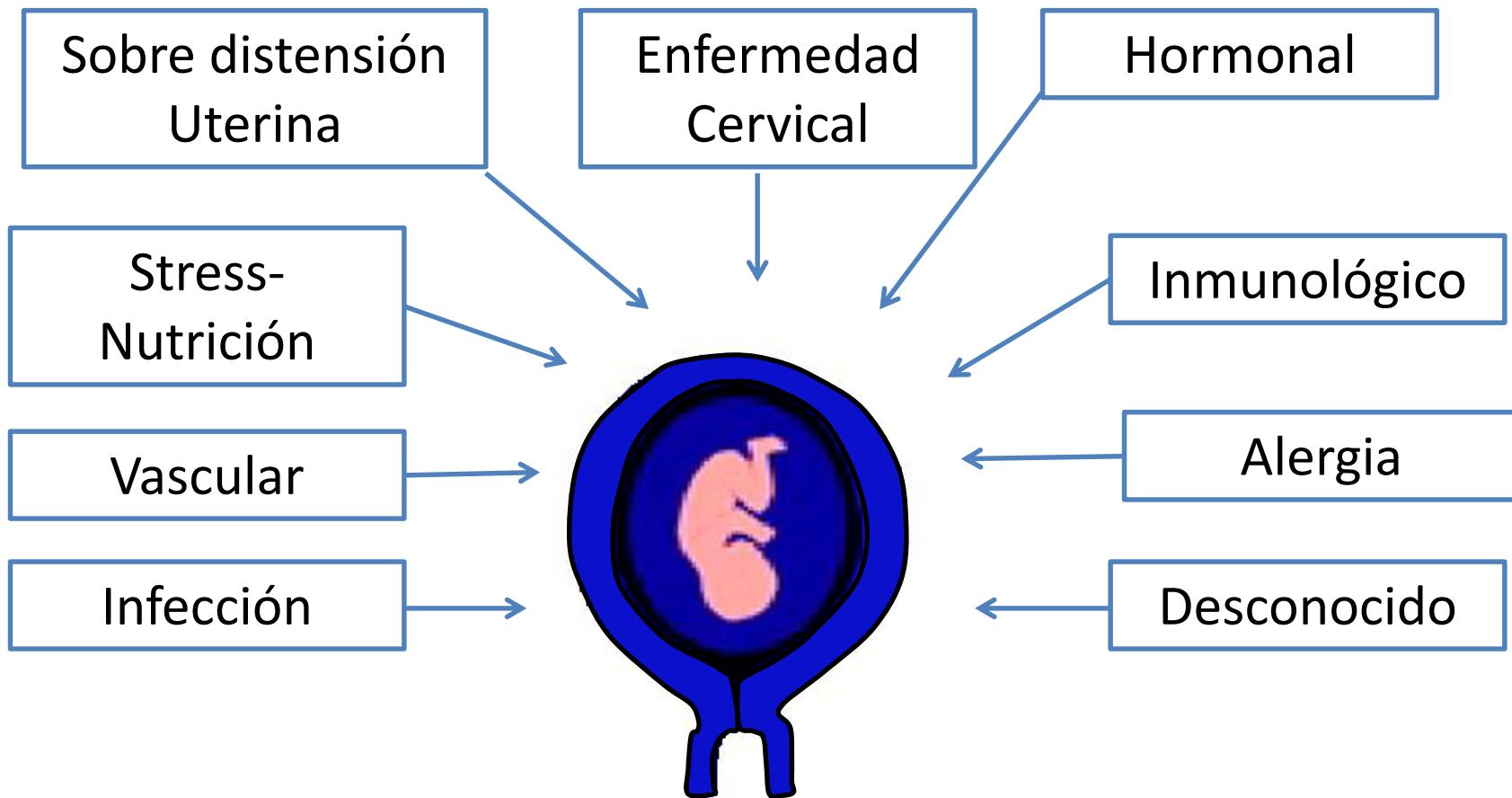
Sobre distensión Uterina

Enfermedad Cervical

Hormonal

Stress-Nutrición

Inmunológico

Vascular

Alergia

Infección

Desconocido

Romero R, Dey SK, Fisher SJ. Preterm labor: one syndrome, many causes. Science 2014 Aug 15;345(6198):760-5.

Implicaciones

- El parto prematuro no es una sola enfermedad.

- Un único test no puede predecir todos los casos de parto prematuro.

- Un único tratamiento no puede prevenir todos los casos de parto pretérmino.

Romero R, Dey SK, Fisher SJ. Preterm labor: one syndrome, many causes. Science 2014 Aug 15;345(6198):760-5.

Analogia con acidentes de transito
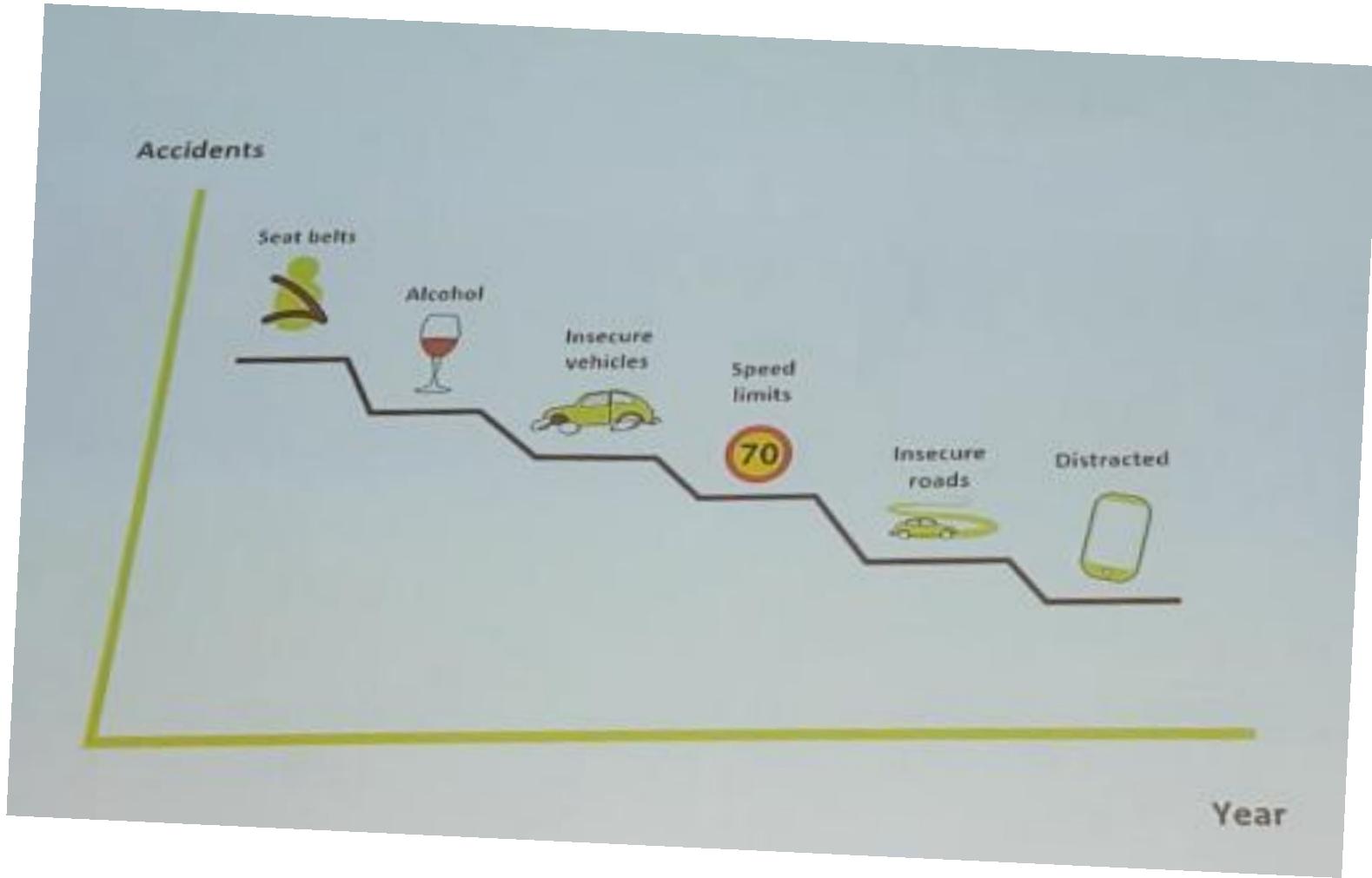
Síndrome de parto prematuro

Parto pretérmino (<37 w)
7-12% de todas las gestaciones

Espontáneo (PPE)
25% RPM   40% membranas intactas

Yatrogénico
35% condiciones maternas/fetales

Extremo 0.2% | Severo 0.8% | Moderato 1% | Tardío 2%

<28 | 28-31 | 32-33 | 34-36

Infección

"Estilo de vida"

Idiopático
(con cervix corto / normal)

interacción M-F ineficiente
(asoc. complicaciones gestación)
polimorfismos/mutaciones
(raza - malformaciones)

Multiple
(sobredistensión)
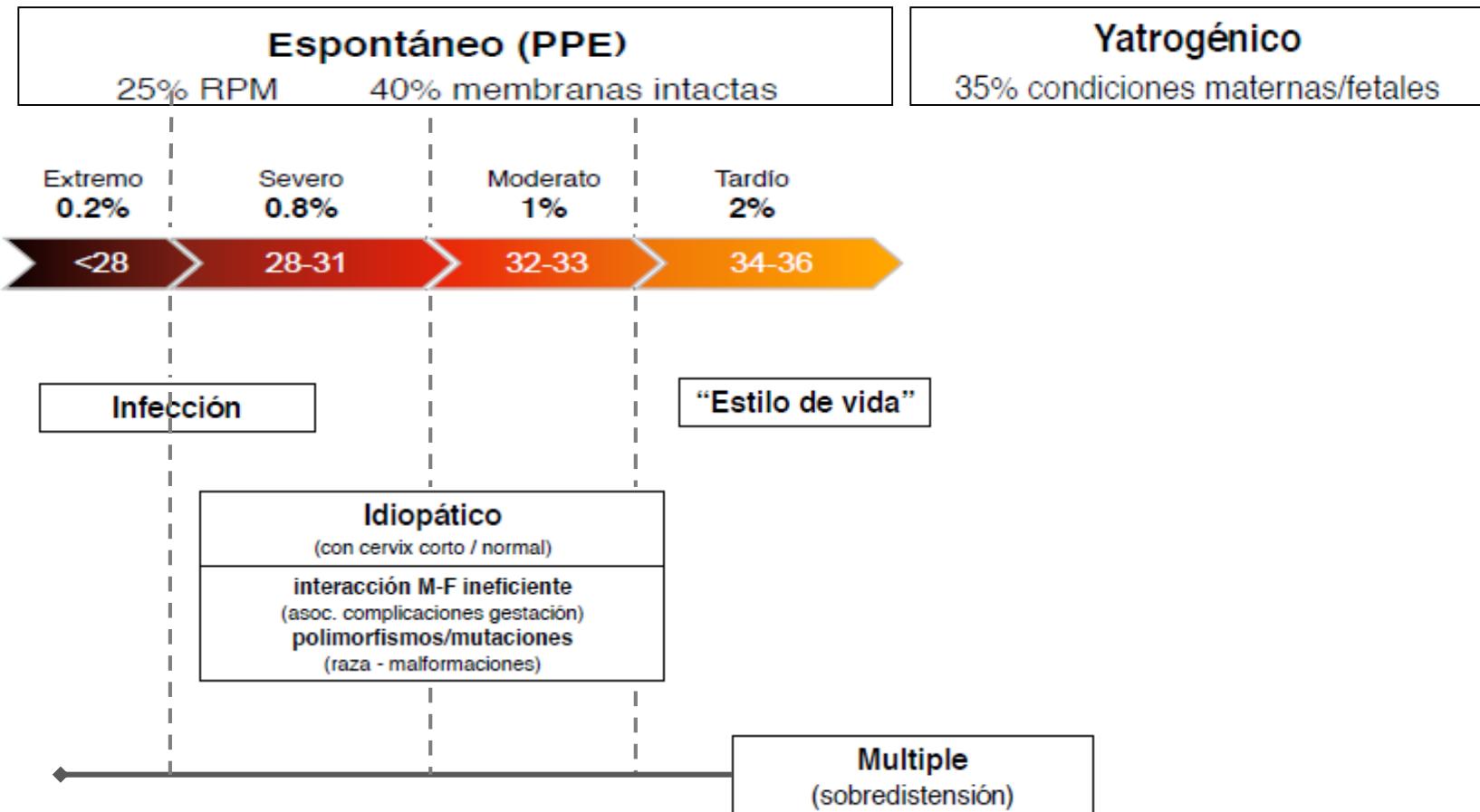
Parto prematuro: factores de riesgo

Número de antecedentes

1 antecedente:	15%
2 antecedentes:	41%
3 antecedentes:	67%

Último antecedente
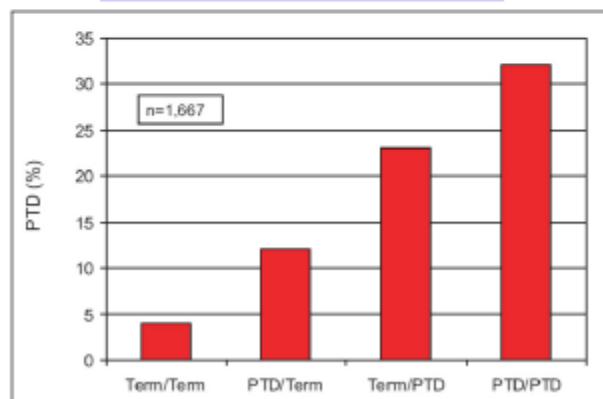
Severidad de los antecedentes

Si < 35 semanas: RR 3-5

Si < 32 semanas: RR 6

Si < 28 semanas: RR 10

Si < 17 semanas: no incremento

Spong CY, Obstet Gynecol 2007; 110:405-15.

Mercer BM, Macpherson CA, Goldenberg RL, et al. Are women with recurrent spontaneous preterm births different from those without such history?. Am J Obstet Gynecol 2006 Apr;194(4):1176-84; discussion 1184-5

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Parto prematuro: Prevención
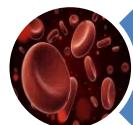
Manejo de la anemia. Riesgo aumentado Hb < 9.5 gr/dl

Screening de Bacteriuria asintomática mediante urocultivo

Evitar consumo de tabaco

Periodo intergenésico > 12 meses
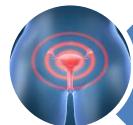
Tratamiento oral de la vaginosis bacteriana antes de la semana 20 para prevenir RPM.

Prevención de entidades clínicas asociadas a PP por indicación médica: Uso de ASA en prevención de preeclampsia y RCIU.

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-

Importancia

Predicción

Importancia

Predicción

↓
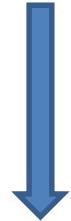
Prevención

Importancia

Evaluación ecográfica del cérvix
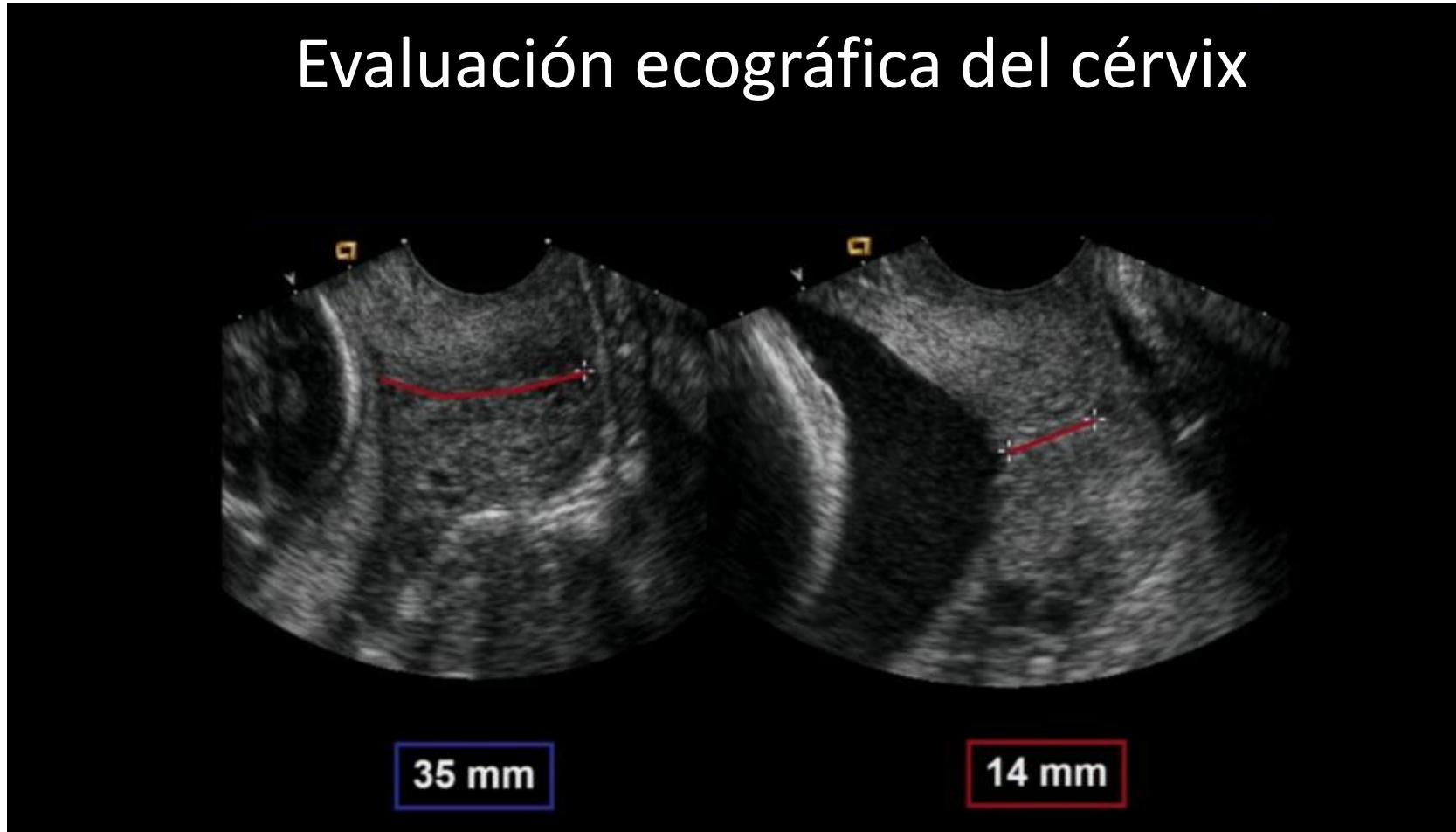
35 mm   14 mm
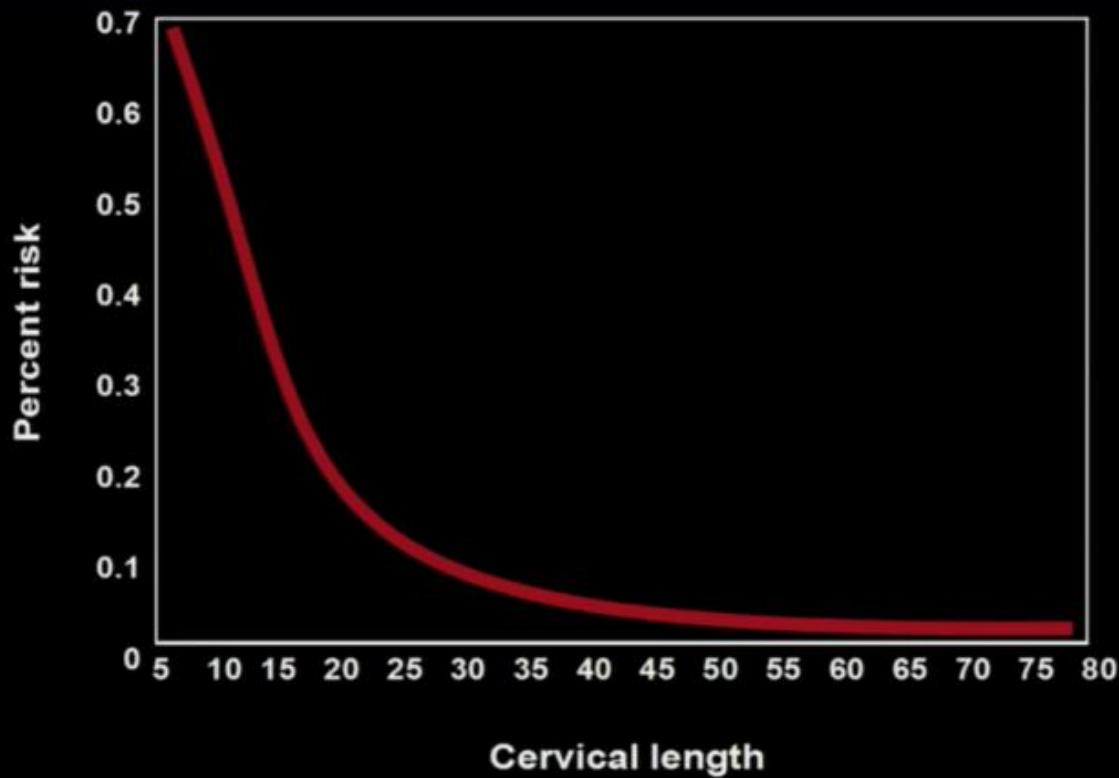
Importancia

Importancia

Cérvix corto

Defecto congénito

Lesión quirúrgica (Conización)

Enfermedad cervical

Infección

Deficiencia de progesterona
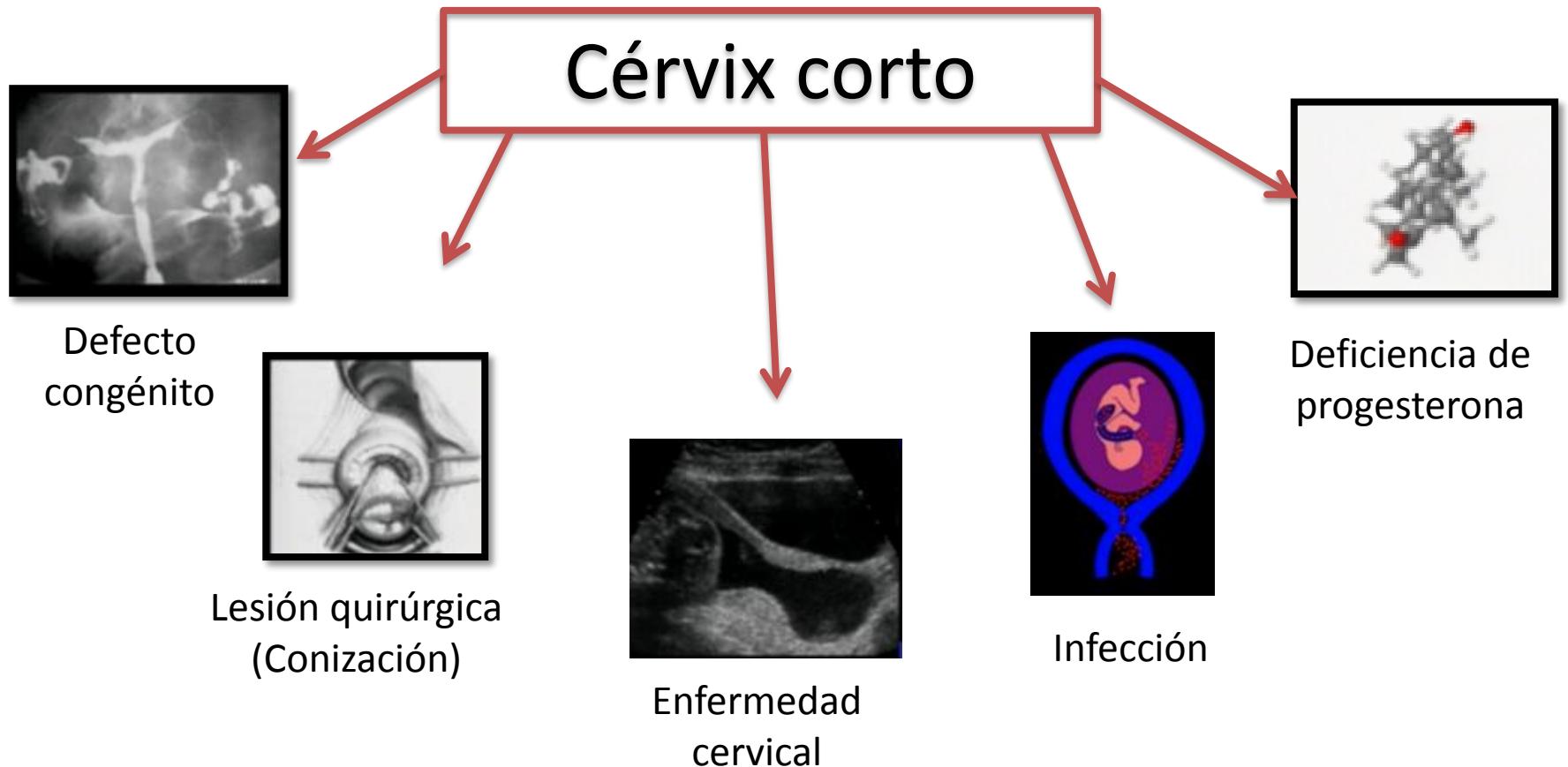
Importancia

Análisis de costo-efectividad

Ahorro $ 19 millones por cada 100.000 mujeres tamizadas

Ahorro $ 500 millones por año para el sistema de salud de USA

Werner EF, Han CS, Pettker CM, Buhimschi CS, Copel JA, Funai EF, Thung SF. Universal cervical-length screening to prevent preterm birth: a cost-effectiveness analysis. Ultrasound Obstet Gynecol. 2011 Jul;38(1):32-7.

Tamizaje en medicina

Comparison of Strategies used for Screening in Medicine

Test	Number needed to screen
Pap Smear for Cervical Cancer[1]	1140
Mammography more than 50 years[1]	
Mammography between 40 and 49 years[1]	
Prostate-specific Antigen for Prostate Cancer[2]	
Ultrasound cervical length to prevent one case of PTB < 33 weeks (<25 mm)[3]	
Ultrasound cervical length to prevent one case of neonatal morbidity/mortality (<25 mm)[3]	

1. Gates TJ, et al. Am Fam Physician 2001;63:513-22
2. Loeb S, et al. J Clin Oncol 29:464-467

Tamizaje en medicina

Comparison of Strategies used for Screening in Medicine

Test	Number needed to screen
Pap Smear for Cervical Cancer[1]	1140
Mammography more than 50 years[1]	543
Mammography between 40 and 49 years[1]	
Prostate-specific Antigen for Prostate Cancer[2]	
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Comparison of Strategies used for Screening in Medicine

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Pap Smear for Cervical Cancer[1]	1140
Mammography more than 50 years[1]	543
Mammography between 40 and 49 years[1]	3125
Prostate-specific Antigen for Prostate Cancer[2]	
Ultrasound cervical length to prevent one case of PTB < 33 weeks (<25 mm)[3]	
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Ultrasound cervical length to prevent one case of PTB < 33 weeks (<25 mm)[3]	357
Ultrasound cervical length to prevent one case of neonatal morbidity/mortality (<25 mm)[3]	

1. Gates TJ, et al. Am Fam Physician 2001;63:513-22
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Prostate-specific Antigen for Prostate Cancer[2]	1254
Ultrasound cervical length to prevent one case of PTB < 33 weeks (<25 mm)[3]	357
Ultrasound cervical length to prevent one case of neonatal morbidity/mortality (<25 mm)[3]	218

1. Gates TJ, et al. Am Fam Physician 2001;63:513-22
2. Loeb S, et al. J Clin Oncol 29:464-467

Estrategias de prevención

Prevención de parto prematuro en mujeres con cérvix corto.

Longitud cervical ≤ 25 mm

Progesterona
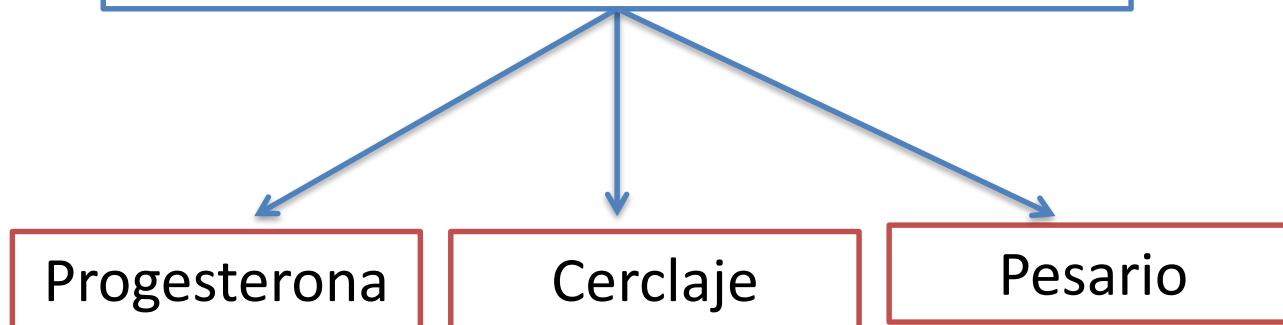
Cerclaje

Pesario

Manejo
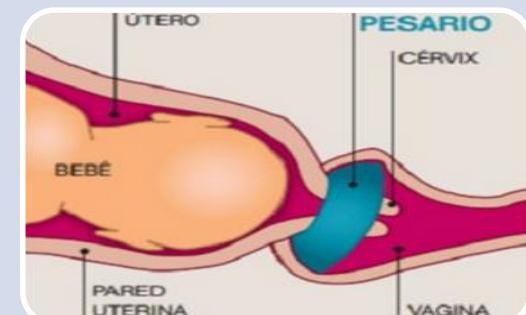
CERCLAJE

Electivo 1rio

Terapéutico 2rio

Emergencia 3rio

**PROGESTERONA**

PESARIO DE ARABIN

Prof Birgit Arabin

Progesterona y parto prematuro: Primeros trabajos
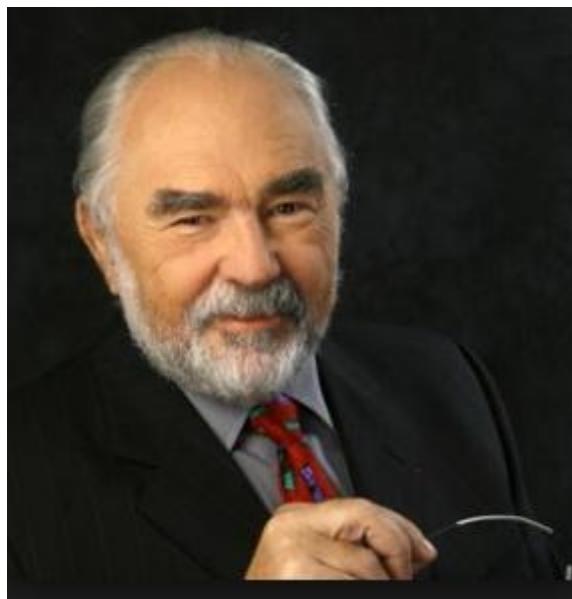
Primera persona en utilizar la progesterona para prevenir el parto prematuro (1970)

Emile Papiernik
Francia

Papiernik-Berkhauer E. Etude en double aveugle d'un medicament prevenant la survenue prematurée de l'accouchement chez des femmes 'a risque eleve' d'accouchement premature. In *Edition Schering, Serie IV, fiche 3, 1970; 65-68.*

Comparación con otras intervenciones en obstetricia y medicina perinatal

| Intervención	Para prevenir	RR (IC 95%)	NNT (IC 95%)
Sulfato de magnesio	Eclampsia	0,41 (0,29-0,58)	100 (50-100)
Aspirina	Pre-eclampsia	0,83 (0,77-0,88)	72 (52-110)
Sulfato de magnesio	Parálisis cerebral	0,65 (0,55-0,88)	52 (31-110)
Corticoides antenatales	Sind. Distrés respiratorio	0,66 (0,50-0,73)	11 (3-14)
	Muerte neonatal	0,69 (0,58-0,81)	22 (16-35)
Progesterona vaginal en cérvix corto	Parto pretérmino < 33 sem	0,55 (0,33-82)	14 (5-87)
	Sind. Distrés respiratorio	0,39 (0,17-0,82)	22 (12-106)

Parto prematuro: Predicción
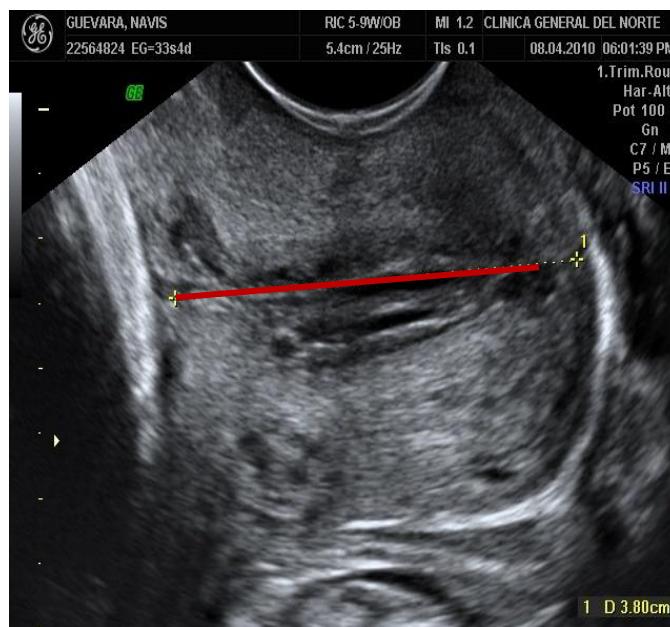
Longitud cervical

Fibronectina fetal /Partus test

¿Y la presencia de sludge?

¿Y la presencia de sludge?

The prevalence and clinical significance of amniotic fluid 'sludge' in patients with preterm labor and intact membranes

J. ESPINOZA*, L. F. GONÇALVES†, R. ROMERO*, J. K. NIEN*, S. STITES†, Y. M. KIM†‡,
S. HASSAN†, R. GOMEZ§, B. H. YOON¶, T. CHAIWORAPONGSA†, W. LEE** and M. MAZOR†

*Perinatology Research Branch, NICHD/NIH/DHHS, Detroit, MI and Bethesda, MD, Departments of †Obstetrics and Gynecology and ‡Pathology, Wayne State University/Hutzel Hospital, Detroit, MI, USA, §CEDIP, Department of Obstetrics and Gynecology, Sotero del Rio Hospital, P. Universidad Catolica de Chile, Puente Alto, Chile, ¶Department of Obstetrics and Gynecology, Seoul National University, Seoul, Korea and **Department of Obstetrics and Gynecology, William Beaumont Hospital, Royal Oak, MI, USA

# ¿Y la presencia de sludge?

84 pctes con PP

- Sludge 22.6%
- Invasión microbiana y corioamnionitis histológica 32.9%

298 pctes. parto a término

- Sludge 1%
- Invasión microbiana y corioamnionitis histológica 12.1%
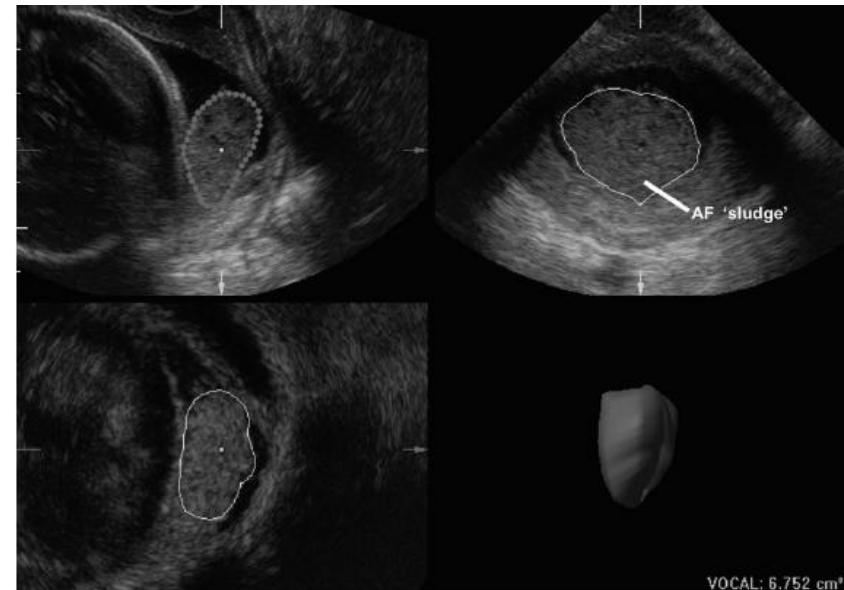
CONCLUSION: La presencia de Sludge en pacientes con parto pretérmino con membranas intactas es un factor de riesgo independiente para riesgo de invasión microbiana de la cavidad amniótica, corioamnionitis histológica y parto pretérmino inminente.

Espinoza J, Goncalves LF, Romero R. el al. The prevalence and clinical significance of amniotic fluid sludge in patients whit preterm labor and intact membranes. Ultrasound Obstet Gynecol 2005; 25:346-52..

Longitud cervical

Accuracy of cervical transvaginal sonography in predicting preterm birth: a systematic review

H. HONEST*, L. M. BACHMANN*†, A. COOMARASAMY*, J. K. GUPTA*, J. KLEIJNEN‡ and K. S. KHAN*

*Department of Obstetrics & Gynaecology, Birmingham Women's Hospital and †Horten Center, University of Zurich, Zurich, Switzerland and ‡NHS Centre for Reviews & Dissemination, University of York, UK

Total citations identified from electronic searches to capture primary articles on all tests for predicting preterm birth: n = 30088*

*MEDLINE (15040), EMBASE (8094), PASCAL (1029), BIOSIS (2382), the Cochrane library (672), MEDION (288), National Research Register (107), SCISEARCH (2468), Conference Papers (8).

Citations excluded after screening titles and/or abstracts: n = 29935

Primary articles on sonographic imaging of the cervix uteri test accuracy for predicting preterm birth retrieved for detailed evaluation: n = 162

From electronic searches   n = 153

From reference lists   n = 9

Articles excluded and reasons:†

Estudios en mujeres asintomáticas -33
•Embarazos únicos – 18 estudios.
•Embarazos gemelares – 11 estudios.
•Número de fetos no especificados o datos no extraíbles por separado para emb simples o múltiples – 4 estudios.

Estudios en mujeres sintomáticas -13
•Embarazos únicos – 9 estudios.
•Embarazos gemelares – 3 estudios.
•Número de fetos no especificados o datos no extraíbles por separado para emb simples o múltiples – 3 estudios.

* 2 estudios provee datos para emb simples y gemelares.

Studies on asymptomatic women = 33

Singleton pregnancies = 18 studies
Twin pregnancies = 11 studies
Number of fetuses unspecified or data not extractable separately for singletons and twins = 4 studies

Singleton pregnancies = 9 studies*
Twin pregnancies = 3 studies*
Number of fetuses unspecified or data not extractable separately for singletons and twins = 3 studies

*2 studies provided data for singleton and twin pregnancies

Figure 1 Study selection process for systematic review of transvaginal cervical ultrasound in predicting spontaneous preterm birth.

Longitud cervical

Pre-test probability (asymptomatic population sub-group)	Gestational age at testing (weeks)	No. of studies (No. of women)	Likelihood ratios		Post-test probabilities % (95% CI)	
			Test negative	Test positive	Test negative	Test positive
4.1% (Singleton pregnancies)	<20	5 (4263)			3.3 (2.7–3.9)	21.2 (12.3–34.0)
	20–24	3 (3330)			2.7 (2.5–3.1)	15.8 (13.1–19.0)
	>24	4 (3663)			2.6 (2.3–3.0)	14.3 (12.0–17.3)
18.5% (Twin pregnancies)	20–24	4 (861)			14.2 (12.9–15.9)	47.6 (38.9–56.4)
	>24	3 (317)			15.2 (13.0–17.6)	29.0 (21.4–36.2)

0.5   1   15

Figure 4 Pooled estimates of likelihood ratios for predicting spontaneous preterm birth at 34 weeks' gestation using 25 mm cervical length threshold measured by transvaginal sonography and their associated post-test probabilities.

Parto prematuro: factores de riesgo

Longitud cervical

¿Cx corto: es frecuente?

NO!!! < 15 mm : 1%
< 25 mm: 5-10%

Población riesgo: 10-39%
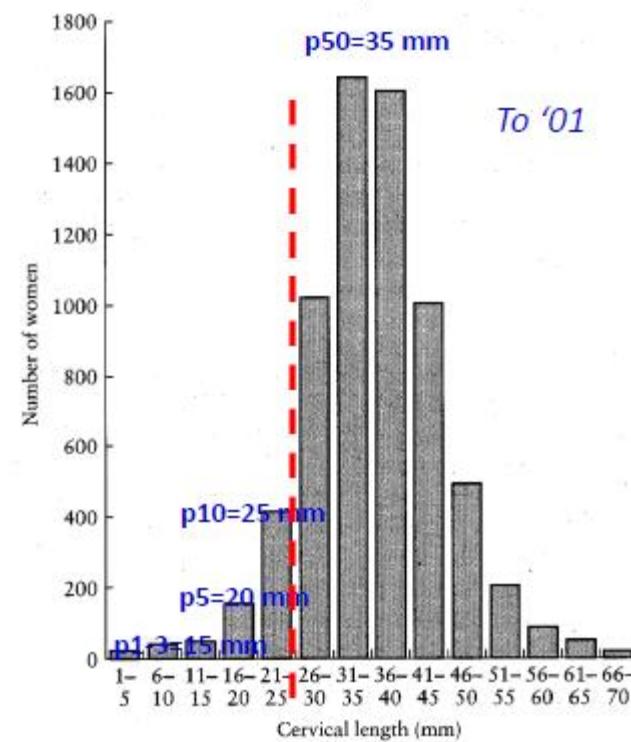
Figure 2 Distribution of cervical length at 23 weeks of gestation.

Semana 23

Crevicometria en ptes sintomaticas

OBSTETRICS

The role of cervical length in women with threatened preterm labor: is it a valid predictor at any gestational age?

Liran Hiersch, MD; Yariv Yogev, MD; Noam Domniz, MD; Israel Meizner, MD;
Ron Bardin, MD; Nir Melamed, MD

Crevicometria en ptes sintomaticas

Gestational age at presentation	Area under the ROC curve		
	Delivery <37 wks	Delivery <35 wks	Delivery within 14 days
24+0 to 26+6 wks	0.661	0.690	0.641
27+0 to 29+6 wks	0.631	0.643	0.698
30+0 to 31+6 wks	0.654	0.643	0.646
32+0 to 33+6 wks	0.678	0.698	0.693
P value[a]	0.8	0.7	0.8

The discriminative ability of cervical length in identifying women with preterm labor who will deliver prematurely is reflected by the area under the receiver-operator characteristic (ROC) curve (AUC).

[a] Comparisons of the AUC were made using the method of Hanley and McNeil.[22]

Hiersch. The effect of gestational age on the predictive accuracy on cervical length in women with preterm labor. Am J Obstet Gynecol 2014.

Detección del P.P <34 sem en el primer trimestre

n=16.496 embarazos unicos;178 (1.1%) pp<34 sem

Maternal History
PPS previo, IMC alto, Tabaco, Edad materna, Raza negra, Nuliparidad.

CL <27 mm (5th centile)

DR for FPR 10%

55 %

33 %
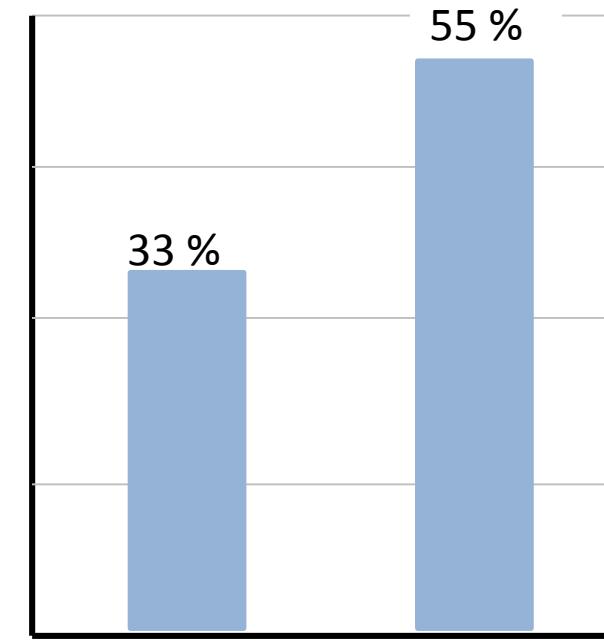
Maternal History   Cervical length

Nicolaides 2013

El ultrasonido ha mejorado la predicción

Anormalidades Cromosómicas
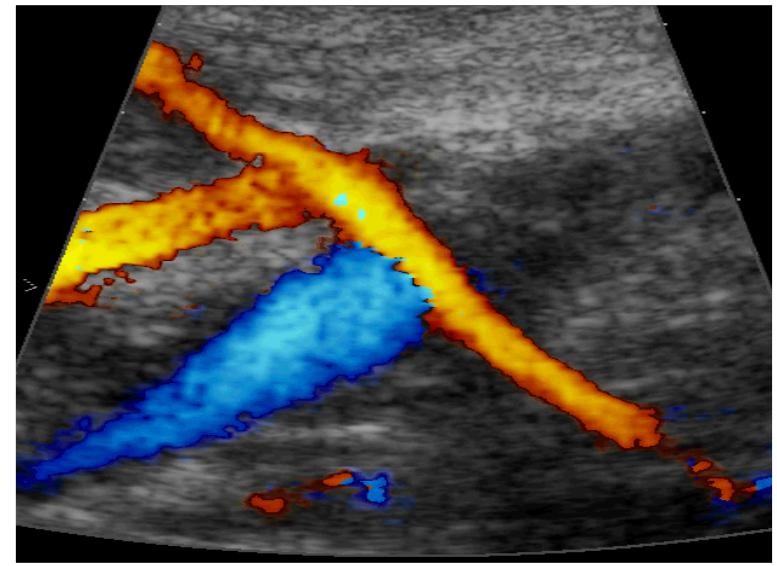
IUGR y preeclamsia

# Sin embargo el elefante en la sala siempre es el parto prematuro

Stuart Campbell, Universal cervical-length screening and vaginal progesterone prevents early preterm births, reduces neonatal morbidity and is cost saving: doing nothing is no longer an option. Ultrasound Obstet Gynecol 2011; 38: 1–9

¿Cómo hacemos la predicción del parto prematuro hoy?

Usamos la valoración ecográfica de la longitud cervical

- 1990: Anderson et al Predicting the risk of preterm delivery by measurement of cervical length.

Prediction of risk for preterm delivery by ultrasonographic measurement of cervical length.Andersen HF, Nugent CE, Wanty SD, Hayashi RH. Am J Obstet Gynecol.1990 Sep;163(3):859-67.

¿La cervicometría es suficiente?

- Después de más de 600 publicaciones a lo largo de los últimos 20 años, la tasa de parto prematuro no ha disminuido.

Prediction of preterm birth using the cervical consistency index. M. PARRA-SAAVEDRA*, L. GOMEZ*, A. BARRERO*, G. PARRA*, F. VERGARA* ´ and E. NAVARRO† Ultrasound Obstet Gynecol 2011; 38: 44–51
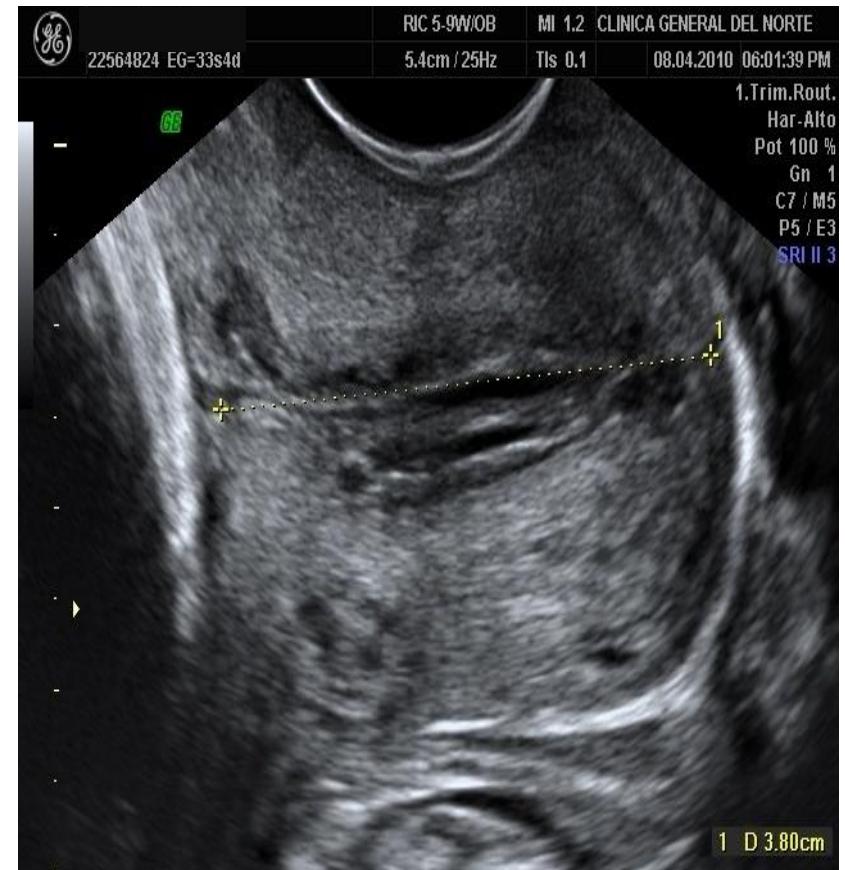
¿La cervicometría es suficiente?

- La mayoria de los partos prematuros en mujeres de bajo riesgo ocurren en mujeres con una longitud cervical normal en el segundo trimestre:

- Baja Sensibilidad(8-24%)

Quantitative imaging of the cervix: setting the bar H. Feltovich[1*],T. J. Hall Ultrasound Obstet Gynecol 2013; 41: 121–128
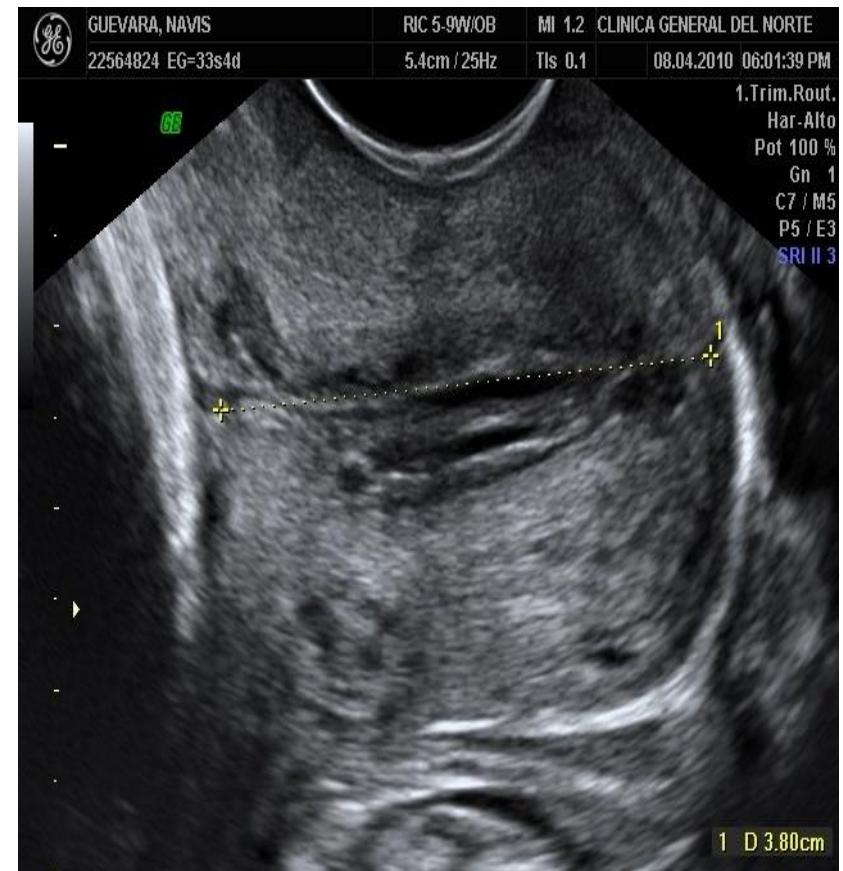
¿La cervicometría es suficiente?

- La mayoría de las mujeres con un cuello corto en el segundo trimestre no llegan a tener un parto prematuro.

- BAJO PPV (≈30%)

Quantitative imaging of the cervix: setting the bar H. Feltovich[1*],T. J. Hall Ultrasound Obstet Gynecol 2013; 41: 121–128
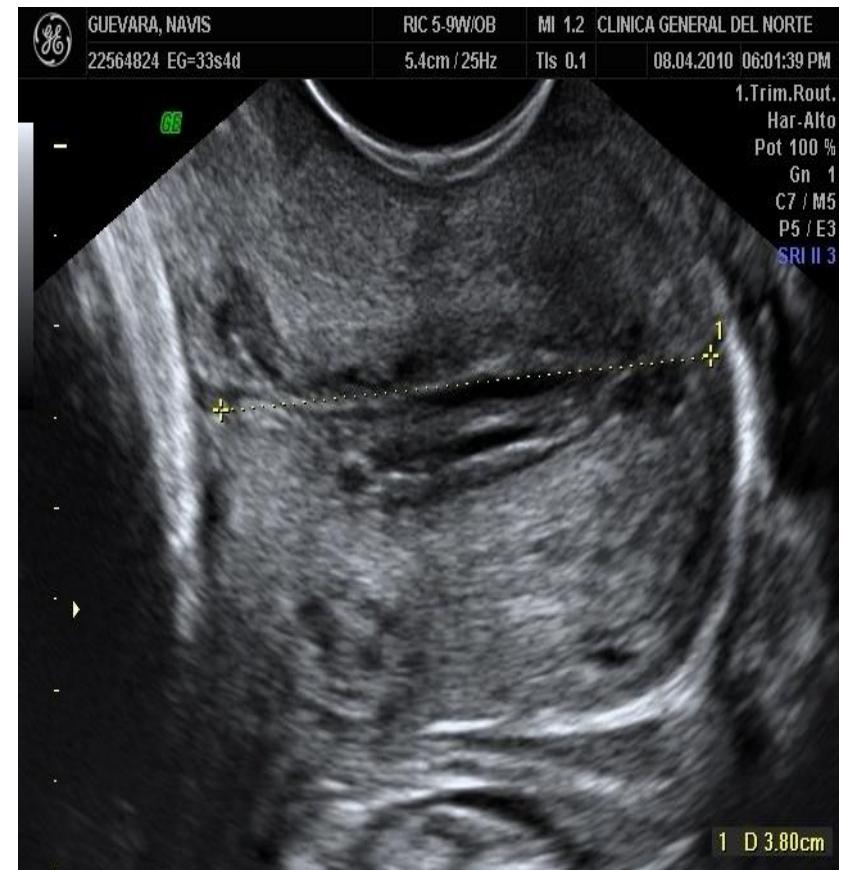
Predicción del parto prematuro en primer trimestre

n = 3.310

Parra-Cordero M, Sepúlveda-Martínez A, Rencoret G, Valdés E, Pedraza D, Muñoz H. Is there a role for cervical assessment and uterine artery Doppler performed during the first trimester of pregnancy as a screening test for spontaneous preterm delivery? Ultrasound Obstet Gynecol 2013, accepted for publication.
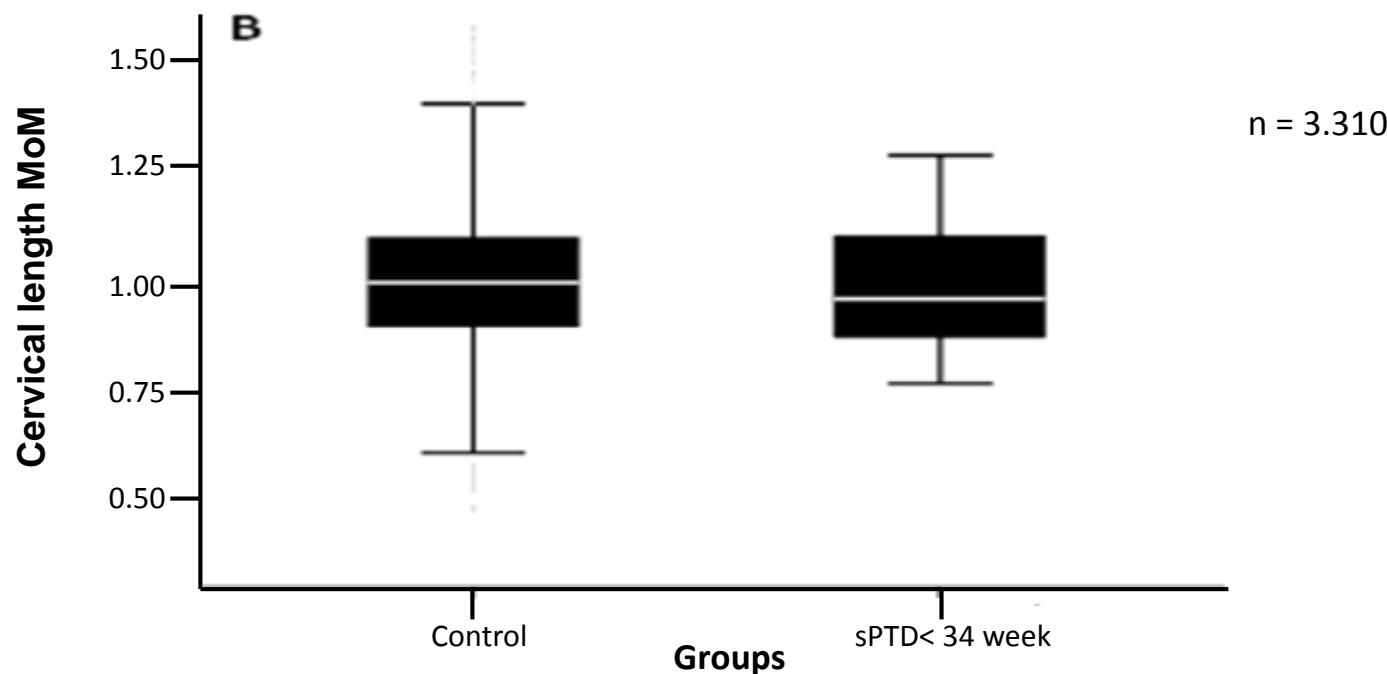
¿Cómo podemos mejorar la predicción del parto prematuro?

Predicción del parto prematuro

¿Es el parto prematuro un problema biomecánico?

Predicción del parto prematuro

¿Cuál es la opinión de los físicos que han estudiado el cérvix?

Biomecánica del cuello uterino

- Sébastien Febvay /Simona Socrate / Michael D. House

  BIOMECHANICAL MODELING OF CERVICAL TISSUE: A QUANTITATIVE INVESTIGATION OF CERVICAL INCOMPETENCE 2003

- Amy E. Kerdok / Simona Socrate / Robert D. Howe

  SOFT TISSUE MODELING AND MECHANICS 2004

- KRISTIN M. MYERS / Advisor: Simona Socrate

  MECHANICAL AND BIOCHEMICAL PROPERTIES OF HUMAN CERVICAL TISSUE 2005

- Michael House, Anastassia Paskaleva, Kristin Myers, Sabrina Craigo, Simona Socrate

  THE CONNECTION BETWEEN UTERINE CONTRACTIONS AND CERVICAL DILATION: THE BIOMECHANICS OF CERVICAL DEFORMATION 2005

- M. House and S. Socrate

  THE CERVIX AS A BIOMECHANICAL STRUCTURE ULTRASOUND IN OBSTETRICS & GYNECOLOGY 2006

El cérvix como una estructura biomecánica

- ´´... For example, cerclage placement assumes that (a) the cervix is structurally weak and (b) a cerclage provides structural support. Currently, however, the assessment of cervical strength is based primarily on clinical history. <u>An objective definition based on biomechanical evaluation is lacking´´</u>

M. House and S. Socrate   ULTRASOUND IN OBSTETRICS & GYNECOLOGY 2006

Biomecánica del cuello uterino

- Edoardo Mazza, Alessandro Nava, Margit Bauer, Raimund Winter, Michael Bajka, Gerhard A. Holzapfel

  MECHANICAL PROPERTIE OF THE HUMAN UTERINE CERVIX: AN IN VIVO STUDY 2006

- PASKALEVA, ANASTASSIA / Advisor: Simona Socrate

  BIOMECHANICS OF CERVICAL FUNCTION IN PREGNANCY : CASE OF CERVICAL INSUFFICIENCY 2007

- Edoardo Mazza, Alessandro Nava, Margit Bauer, Raimund Winter, Michael Bajka, Gerhard A. Holzapfel

  IN VIVO CHARACTERIZATION OF THE MECHANICS OF HUMAN UTERINE CERVICES 2007

- Myers KM, Paskaleva AP, House M, Socrate S.

  MECHANICAL AND BIOCHEMICAL PROPERTIES OF HUMAN CERVICAL TISSUE 2007

  ´´…It was found that the nonpregnant tissue was significantly stiffer than the pregnant tissue in both tension and compression ´´

Biomecánica

Cervical length

Cervical strength

Loading
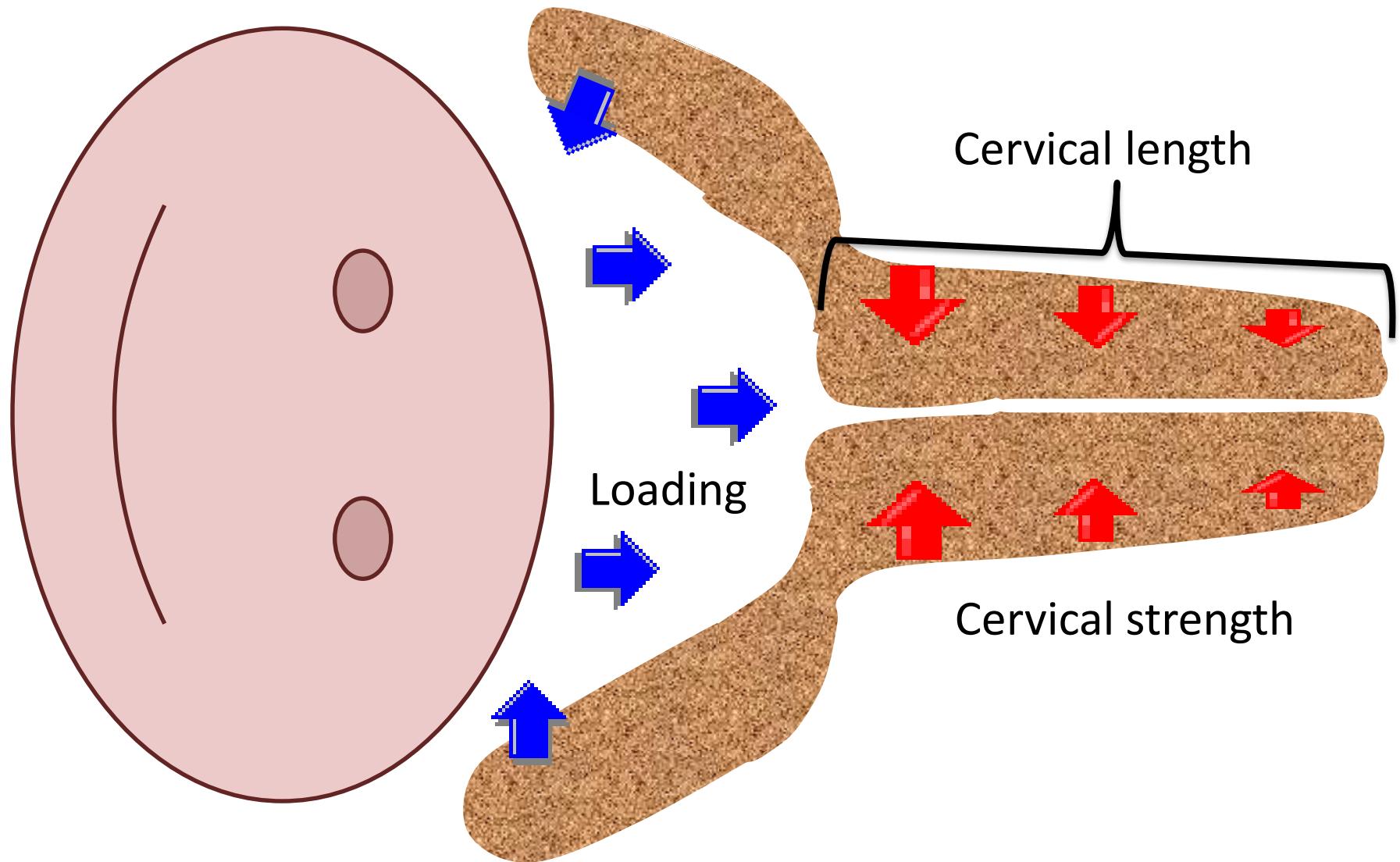
17 semanas

Biomecánica

21 semanas

23 semanas
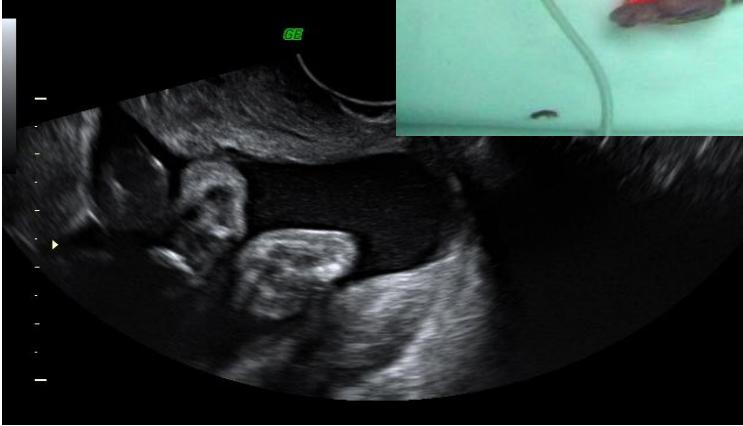
Cuando este balance se rompe antes de las 37 semanas, ocurre el parto prematuro.

¿Cómo podemos mejorar la predicción del parto prematuro?

Mediante la evaluación cuantitativa de las propiedades biomecánicas del cérvix.

¿Cómo podemos hacer ésto?

Revisión de estudios que han evaluado las propiedades biomecánicas del cérvix

Escuela Politécnica Federal de Zúrich
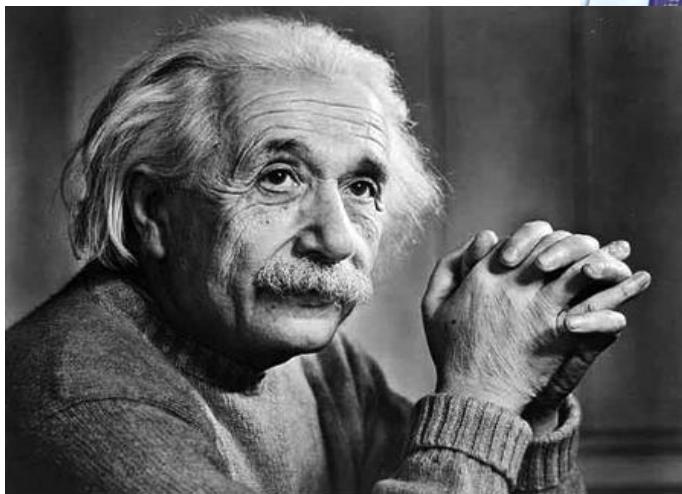
Colombiano

Ex alumno

Revisión de estudios que han evaluado las propiedades biomecánicas del cérvix

REVIEW

In vivo assessment of the biomechanical properties of the uterine cervix in pregnancy

Edoardo Mazza[1]*, Miguel Parra-Saavedra[2,3], Michael Bajka[4], Eduard Gratacos[2], Kypros Nicolaides[5] and Jan Deprest[6]

[1]Swiss Federal Institute of Technology, ETH Zurich, Zurich, Switzerland
[2]Maternal Fetal Medicine Department, ICGON, Hospital Clinic Universitat de Barcelona, Barcelona, Spain
[3]Maternal Fetal Unit, CEDIFETAL, Centro de Diagnostico de Ultrasonido e Imágenes, CEDIUL, Barranquilla, Colombia
[4]Department of Obstetrics and Gynecology, University Hospital of Zurich, Zurich, Switzerland
[5]King's College Hospital, London, UK
[6]KU Leuven, Flanders, Belgium
*Correspondence to: Edoardo Mazza. E-mail: emazza@ethz.ch

Edoardo Mazza, **Miguel Parra-Saavedra**, Michael Bajka, Eduard Gratacos, Kypros Nicolaides, Jan Deprest, **n-vivo assessment of the biomechanical properties of the uterine cervix in pregnancy ,Prenatal diagnosis 2013**

Revisión de estudios que han evaluado las propiedades biomecánicas del cérvix
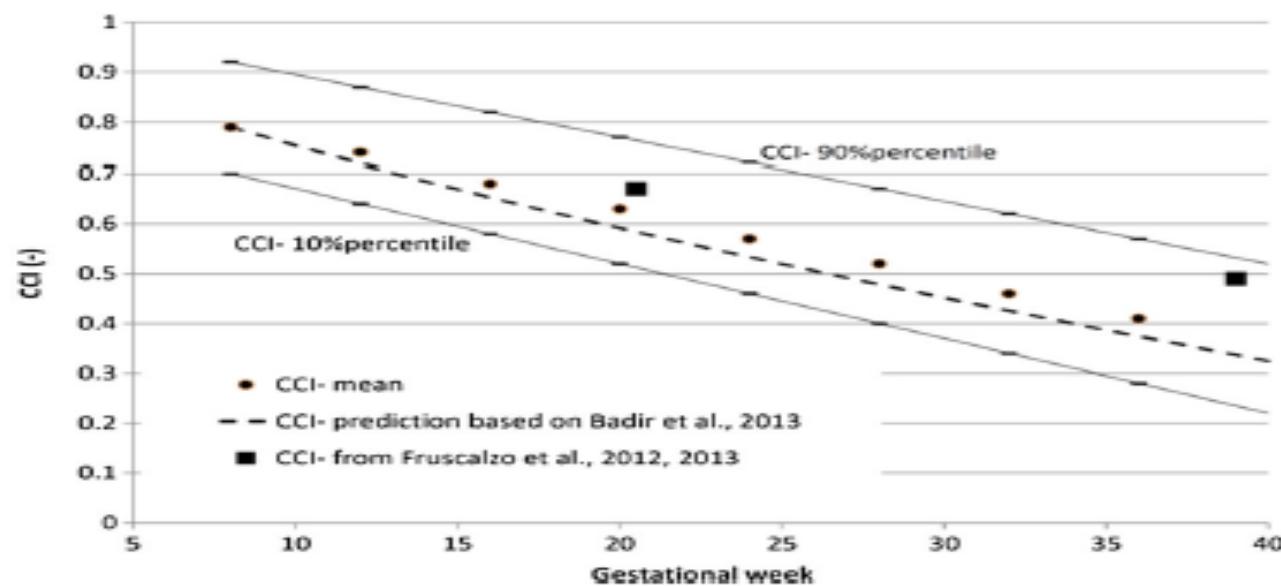
Figure 2 Cervical consistency index (CCI): lines of 10% and 90% percentiles and data for 50% percentile from the study of Parra-Saavedra *et al.*[21] Corresponding observations from the study of Fruscalzo *et al.*[38,39] are reported as squares. The prediction of evolution of CCI over gestational age, based on the aspiration measurements,[22] is reported as dotted line

Edoardo Mazza, **Miguel Parra-Saavedra**, Michael Bajka, Eduard Gratacos, Kypros Nicolaides, Jan Deprest, **n-vivo assessment of the biomechanical properties of the uterine cervix in pregnancy ,Prenatal diagnosis 2013**

Nuevas técnicas para evaluar el cérvix y el riesgo de parto prematuro

– Atenuación

– Elastografía

– Método de Aspiración

– **Índice de Consistencia cervical (ICC)**

Atenuación

Ultrasonic attenuation estimation of the pregnant cervix: a preliminary report

B. L. McFARLIN*, T. A. BIGELOW†, Y. LAYBED†, W. D. O'BRIEN Jr‡, M. L. OELZE‡ and J. S. ABRAMOWICZ§

*Women, Children and Family Health Science, University of Illinois at Chicago and §Obstetrics and Gynecology, Rush University Medical Center, Chicago and ‡Computer and Electrical Engineering, University of Illinois at Urbana-Champaign, Urbana, IL and †Electrical and Computer Engineering, Iowa State University, Ames, IA, USA
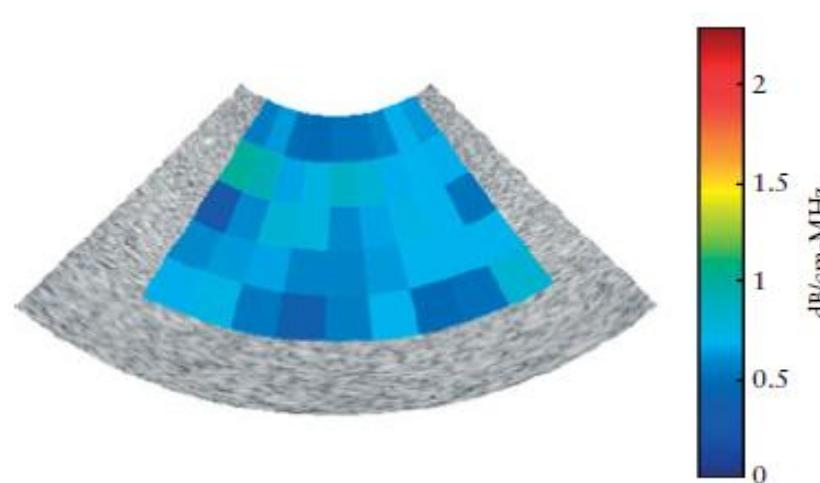
Atenuación
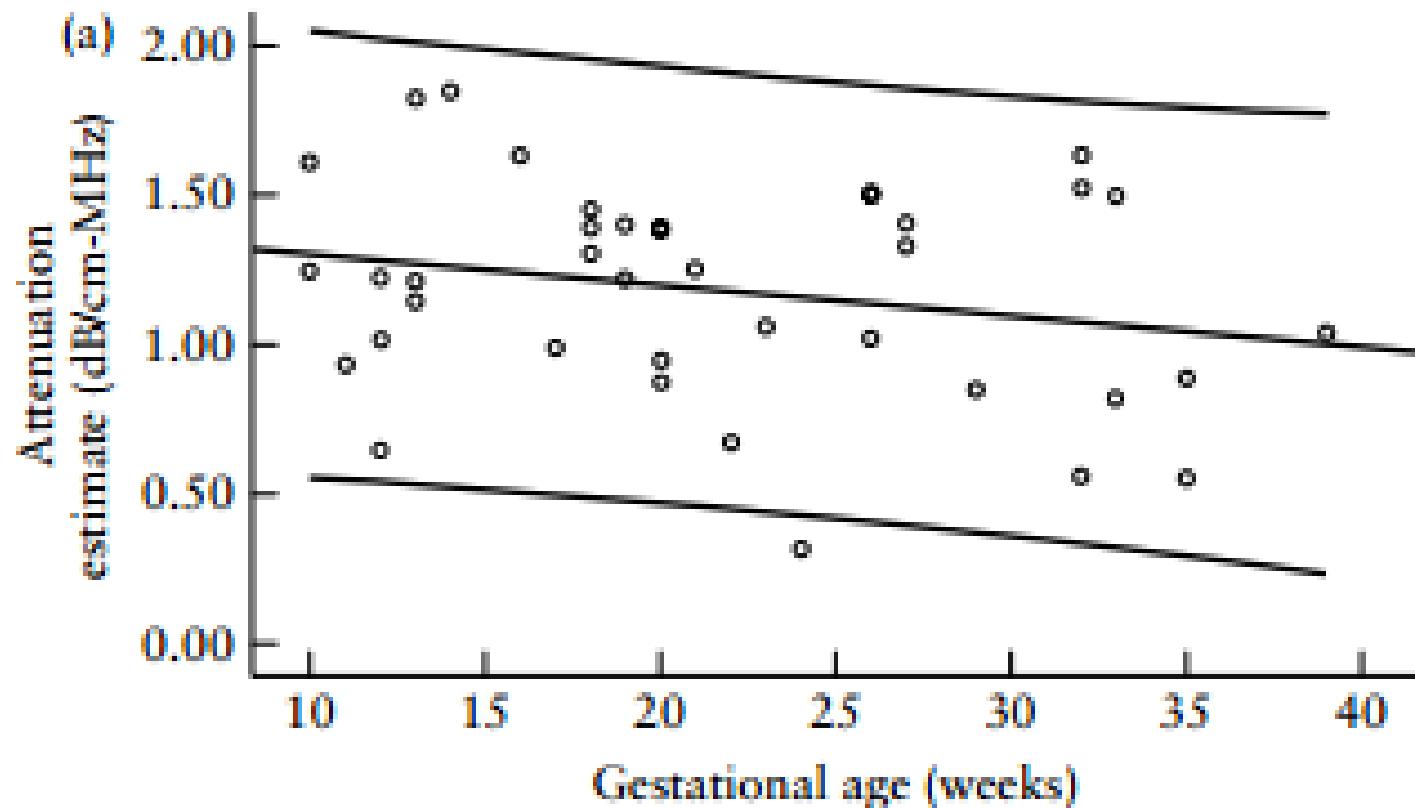
B. L. Mcfarlin, T. A. Bigelow, Y. Laybed, W. D. O'brien Jr, M. L. Oelze And J. S. Abramowicz.Ultrasonic attenuation estimation of the pregnant cervix: a preliminary report Ultrasound Obstet Gynecol 2010; 36: 218–225

Atenuación

DEVELOPMENT OF AN ULTRASONIC METHOD TO DETECT CERVICAL REMODELING *IN VIVO* IN FULL-TERM PREGNANT WOMEN

Barbara L. McFarlin,[*] Jennifer Balash,[†] Viksit Kumar,[‡] Timothy A. Bigelow,[‡] Xavier Pombar,[†] Jacques S. Abramowicz,[§] and William D. O'Brien, Jr.[‖]

[*] Department of Women Children and Family Health Science, University of Illinois at Chicago, Chicago, IL, USA; [†] Department of Obstetrics and Gynecology, Rush University, Chicago, IL, USA; [‡] Department of Mechanical Engineering, Iowa State University, Ames, IA, USA; [§] Department of Obstetrics and Gynecology, Wayne State University, Detroit, MI, USA; and [‖] Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, USA

Abstract—The objective of this study was to determine whether estimates of ultrasonic attenuation could detect changes in the cervix associated with medically induced cervical remodeling. Thirty-six full-term pregnant women underwent two transvaginal ultrasonic examinations separated in time by 12 h to determine cervical attenuation, cervical length and changes thereof. Ultrasonic attenuation and cervical length data were acquired from a zone (Zonare Medical Systems, Mountain View, CA, USA) ultrasound system using a 5–9 MHz endovaginal probe. Cervical attenuation and cervical length significantly decreased in the 12 h between the pre-cervical ripening time point and 12 h later. The mean cervical attenuation was 1.1 ± 0.4 dB/cm-MHz before cervical ripening agents were used and 0.8 ± 0.4 dB/cm-MHz 12 h later ($p < 0.0001$). The mean cervical length also decreased from 3.1 ± 0.9 cm before the cervical ripening was administered to 2.0 ± 1.1 cm 12 h later ($p < 0.0001$). Cervical attenuation and cervical length detected changes in cervical remodeling 12 h after cervical ripening administration. (E-mail: bmcfar1@uic.edu) © 2015 World Federation for Ultrasound in Medicine & Biology.

Atenuación

Conclusion

sue remodeling. Although macro-structural changes of the cervix can be quantified with cervical length (Berghella et al. 2009; Iams et al. 1996; Iams and Berghella 2010; Romero et al. 2013) and cervical consistency index (Parra-Saavedra et al. 2011), there is currently no method to objectively estimate cervical tissue property changes non-invasively at a microstructural level.

Barbara McFarlin et al, Ultrasound in Med. & Biol., Vol. 41, No. 9, pp. 2533–2539, 2015

It is possible to provide an objective quantification of elastographic colors in the cervix. The measurements obtained by elastography may be a mere reflection of the force being applied by the transducer to different parts of the cervix. It is too premature to suggest that the measurements of rate-of-change in tissue displacement reflect histological changes that could provide a measure of cervical ripening.

Elastografía

Evaluation of cervical stiffness during pregnancy using semiquantitative ultrasound elastography

E. HERNANDEZ-ANDRADE*†, S. S. HASSAN*†, H. AHN*†, S. J. KORZENIEWSKI*†,
L. YEO*†, T. CHAIWORAPONGSA*† and R. ROMERO*

*Perinatology Research Branch, NICHD/NIH/DHHS, Bethesda, MD and Detroit, MI, USA; †Department of Obstetrics and Gynecology,
Wayne State University School of Medicine, Detroit, MI, USA

Elastografía
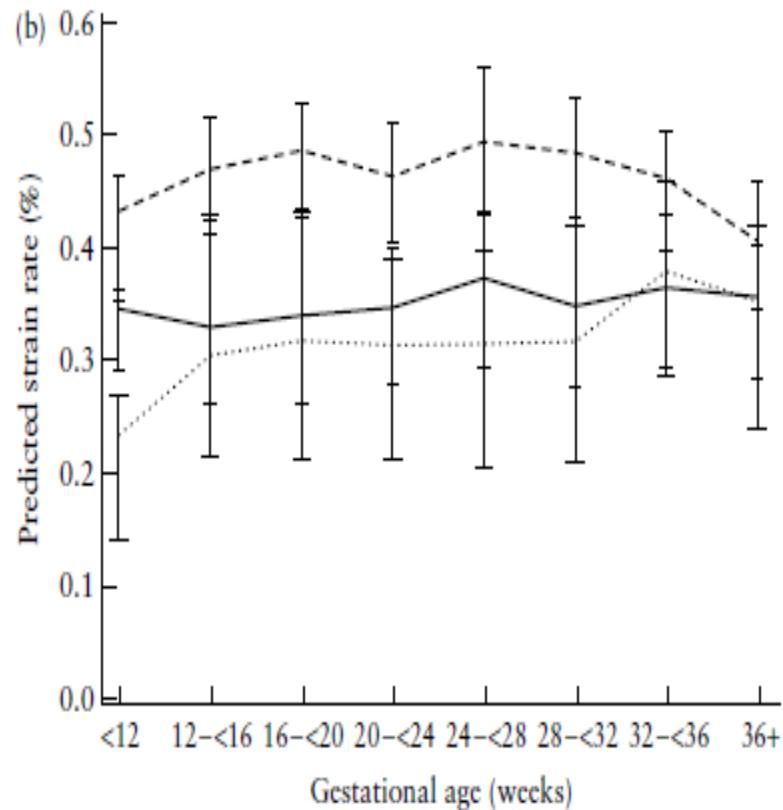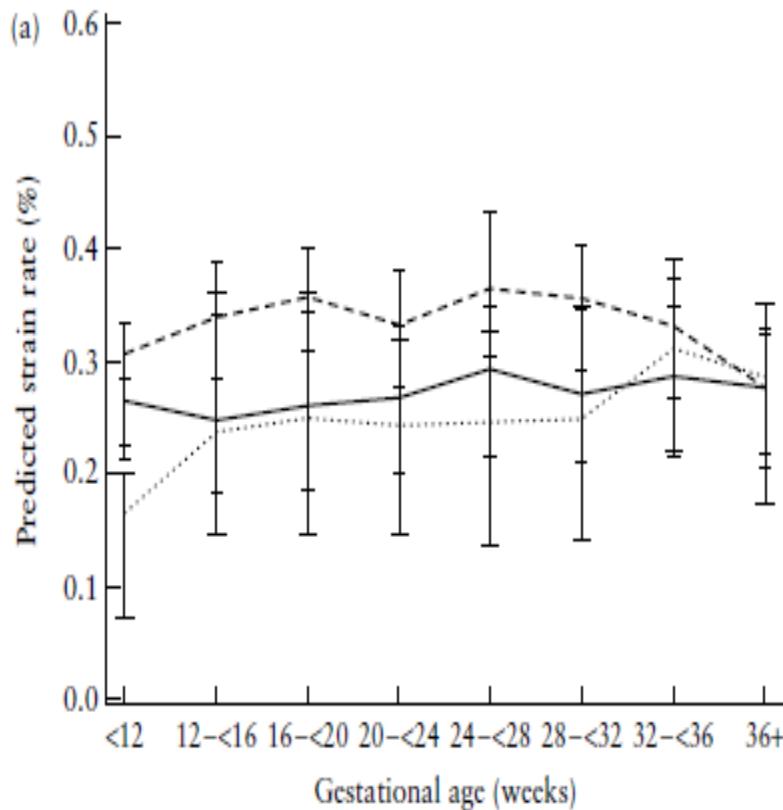
E. Hernandez-andrade, S. S. Hassan, H. Ahn, S. J. Korzeniewski, L. Yeo, T. Chaiworapongsa And R. Romero. Evaluation of cervical stiffness during pregnancy using semiquantitative ultrasound elastography. *Ultrasound Obstet Gynecol 2013; 41: 152–161*

Elastografía

Cervical strain determined by ultrasound elastography and its association with spontaneous preterm delivery

Edgar Hernandez-Andrade[1,2], Roberto Romero[1,3,4], Steven J. Korzeniewski[1,2], Hyunyoung Ahn[1,2], Alma Aurioles-Garibay[1,2], Maynor Garcia[1,2], Alyse G. Schwartz[1,2], Lami Yeo[1,2], Tinnakorn Chaiworapongsa[1,2], and Sonia S. Hassan[1,2]

[1]Perinatology Research Branch, NICHD/NIH/DHHS, Detroit, Michigan, and Bethesda, Maryland, USA

[2]Department of Obstetrics and Gynecology, Wayne State University School of Medicine, Detroit, Michigan, USA

[3]Department of Obstetrics and Gynecology, University of Michigan, Ann Arbor, MI

[4]Department of Epidemiology and Biostatistics, Michigan State University, East Lansing, MI, USA

Elastografía

Abstract

Objective—To determine if there is an association between cervical strain, evaluated using ultrasound elastography, and spontaneous preterm delivery (sPTD) <37 weeks of gestation.

Methods—One hundred and eighty nine (189) women at 16–24 weeks of gestation were evaluated. Ultrasound elastography was used to estimate cervical strain in three anatomical planes: one mid-sagittal in the same plane used for cervical length measurement, and two cross sectional images: one at the level of the internal cervical os, and the other at the level of the external cervical os. In each plane, two regions of interest (endocervix and entire cervix) were examined; a total of six regions of interest were evaluated.

Elastografía

Results—The prevalence of sPTD was 11% (21/189). Strain values from each of the six cervical regions correlated weakly with cervical length (r= −0.24, p<0.001 to r= −0.03, p=0.69). Strain measurements obtained in a cross sectional view of the internal cervical os were significantly associated with sPTD. Women with strain values ≤25th centile in the endocervical canal (0.19) and in the entire cervix (0.14) were 80% less likely to have a sPTD than women with strain values >25th centile (endocervical: odds ratio [OR] 0.2; 95% confidence interval [CI], 0.03–0.96; entire cervix: OR 0.17; 95% CI, 0.03–0.9). Additional adjustment for gestational age, race, smoking status, parity, maternal age, pre-pregnancy body mass index and previous preterm delivery did not appreciably alter the magnitude or statistical significance of these associations. Strain values obtained from the external cervical os and from the sagittal view were not associated with sPTD.

Conclusion—Low strain values in the internal cervical os were associated with a significantly lower risk of spontaneous preterm delivery <37 weeks of gestation.

Método de aspiración

## A novel procedure for the mechanical characterization of the uterine cervix during pregnancy

Sabrina Badir[a],[*], Michael Bajka[c], Edoardo Mazza[a,b]

[a]Departement of Mechanical and Process Engineering, Swiss Federal Institute of Technology Zürich, Tannenstrasse 3, 8092 Zürich, Switzerland
[b]EMPA, Swiss Federal Laboratories for Materials Testing and Research, Überlandstrasse 129, 8600 Dübendorf, Switzerland
[c]Department of Obstetrics and Gynecology, University Hospital of Zürich, Frauenklinikstrasse 10, 8091 Zürich, Switzerland

Método de aspiración
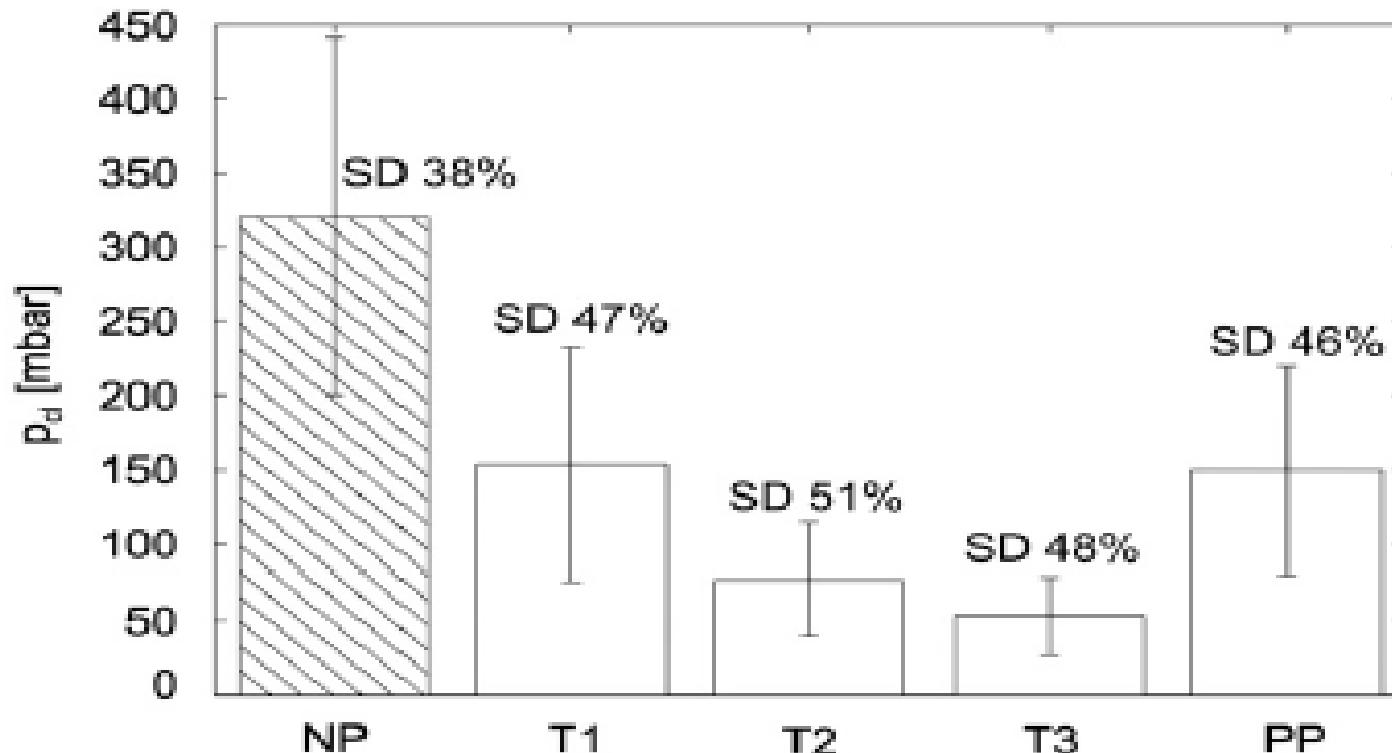
Fig. 10 – Closure pressure for the groups: non-pregnant (NP), first trimester (T1), second trimester (T2), third trimester (T3) and post-partum (PP). The diagram reports mean values and the corresponding standard deviation.

Índice de Consistencia Cervical(ICC)
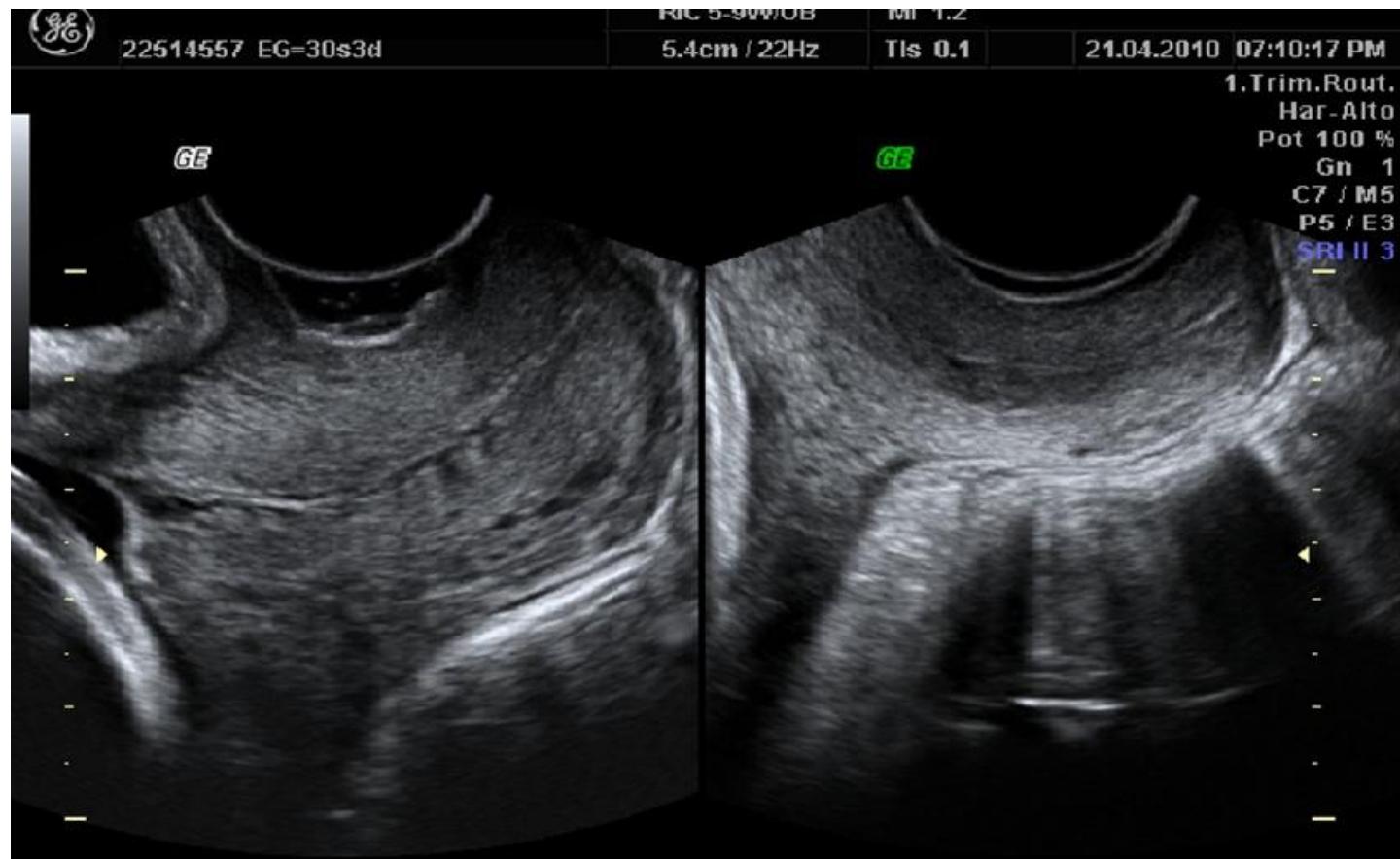
# Índice de Consistencia Cervical(ICC)

Consistencia

(De *consistente*).

- **1.** f. Duración, estabilidad, solidez.

- **2.** f. coherencia entre las partículas de una masa o los elementos de un conjunto.

Real Academia Española

Índice de Consistencia Cervical(ICC)

▶ **Índice**

Expresión numérica de la relación entre dos cantidades.

Real Academia Española
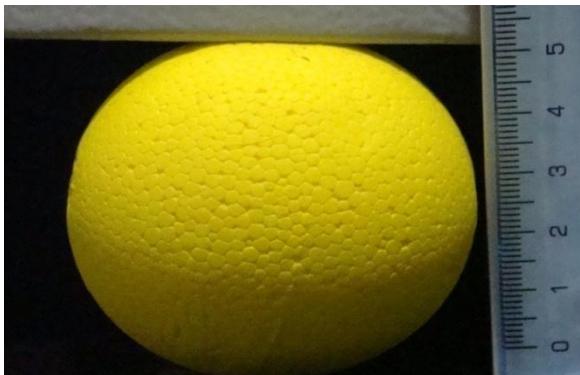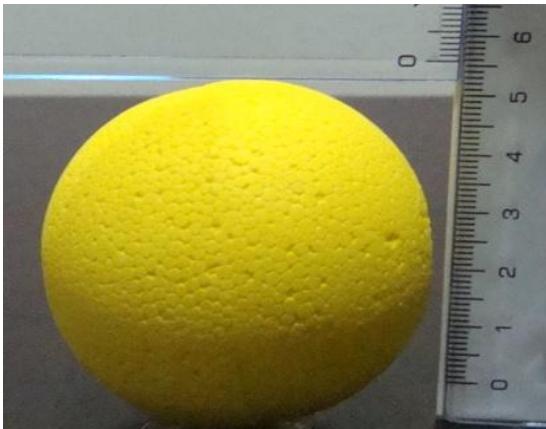
CI: 50/53mmX100
CI: 94%
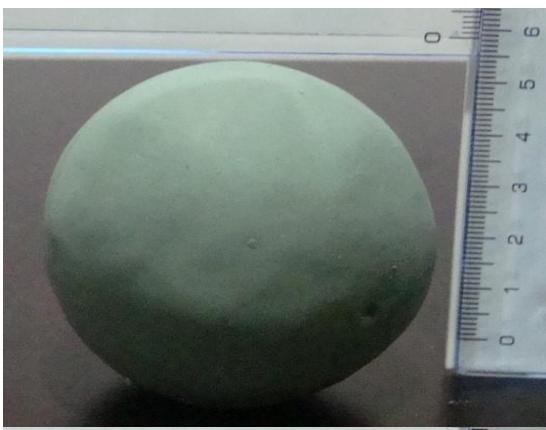
CI: 45/58mmX100
CI: 77%
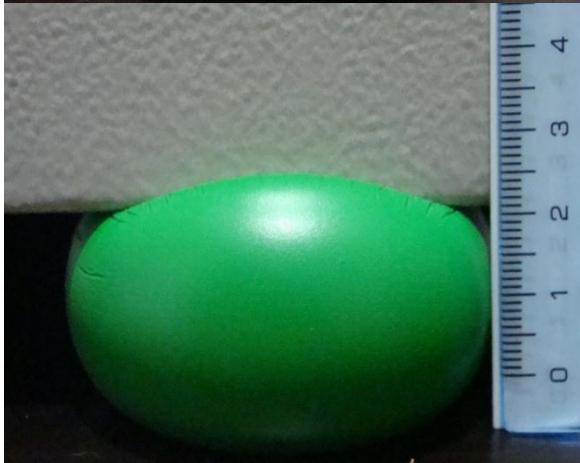
CI: 22/52mmX100
CI: 42%

Cedifetal
UNIDAD MATERNO FETAL

¿Cúal de éstas dos pacientes con longitud cervical de 40 mm a las 24 semanas tiene mayor riesgo de parto prematuro?
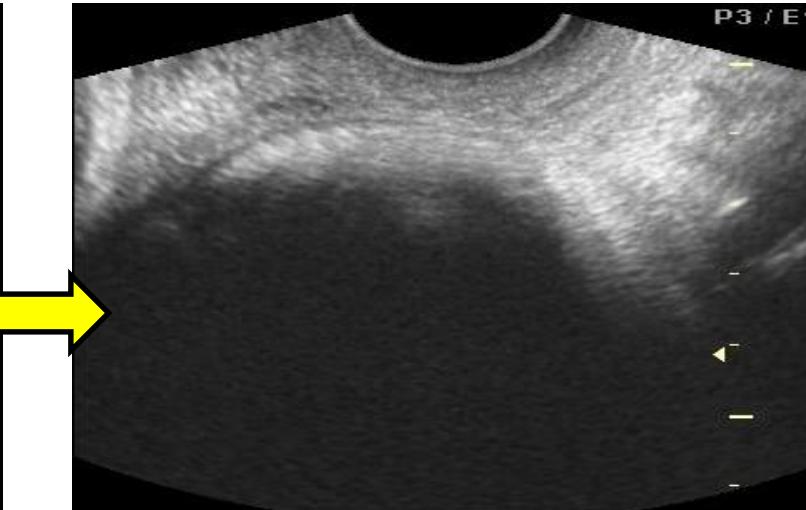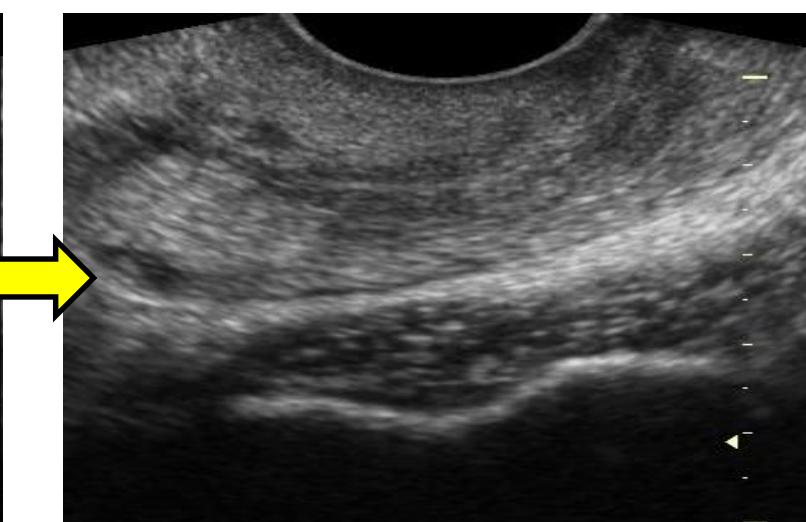
Primer trabajo

Provide article type
Pl. clarify ICC on page no. 144

Cervical Consistency Index: A New Concept in Uterine Cervix Evaluation

[1,2]Miguel A Parra-Saavedra, [1,4]Libardo A Gómez, [1]Amanda Barrero, [1]Guido Parra, [1]Felipe Vergara, [1]Israel Diaz-Yunez, [1]Martha Gómez, [3]Carlos Bermúdez, [4]Eftichia V Kontopoulos, [4]Rubén A Quintero

[1]Maternal Fetal Medicine Unit CEDIFETAL, Centro de Diagnóstico de Ultrasonido e Imágenes, CEDIUL, Barranquilla, Colombia
[2]Northern General Clinic, Barranquilla, Colombia
[3]Hospital Universitario de Caracas, Universidad Central de Venezuela, Caracas, Venezuela
[4]Division of Maternal Fetal Medicine, Department of Obstetrics and Gynecology, University of Miami, USA

Cervical Consistency Índex: A new concept in uterine cervix evaluation
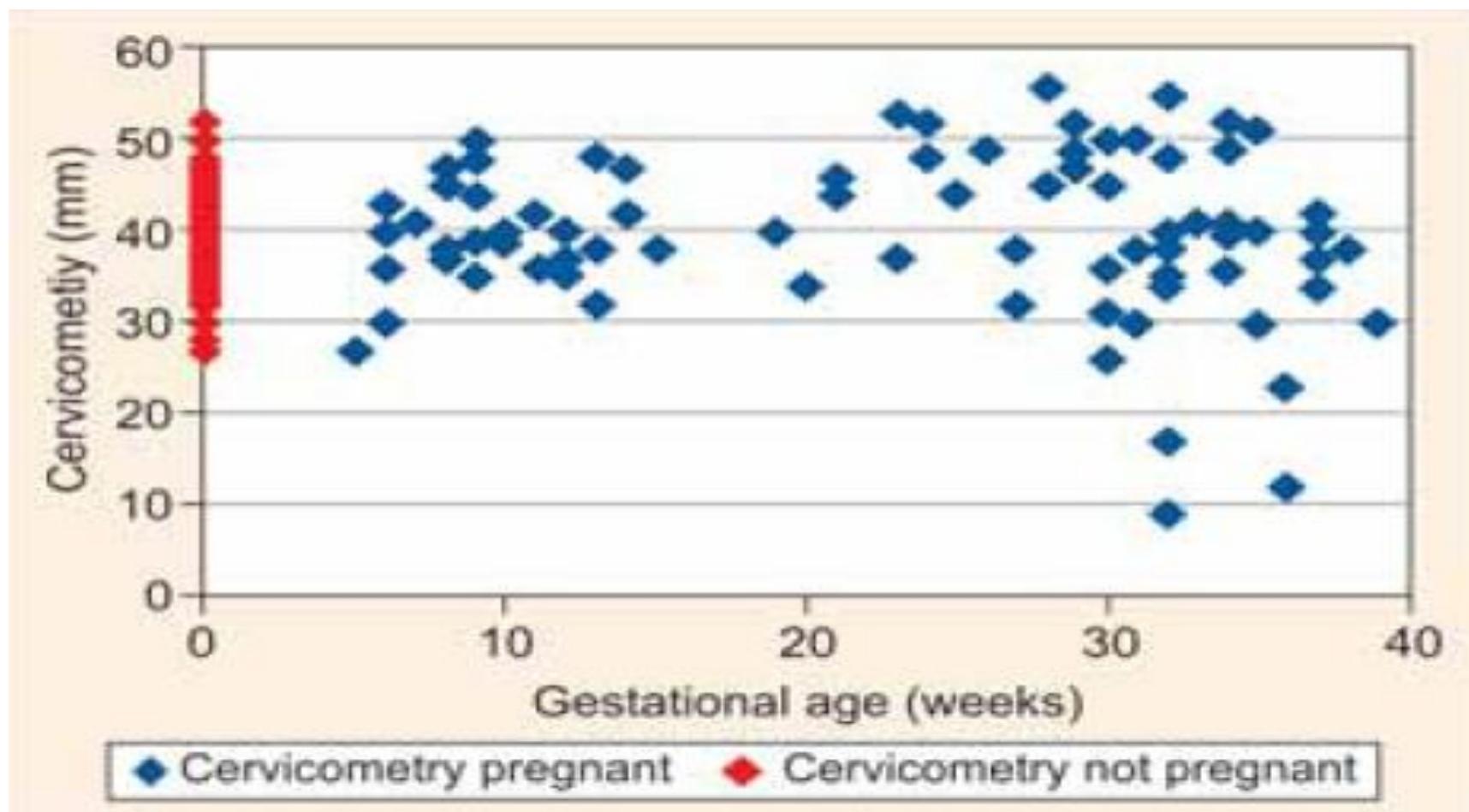
Cervical Consistency Índex: A new concept in uterine cervix evaluation
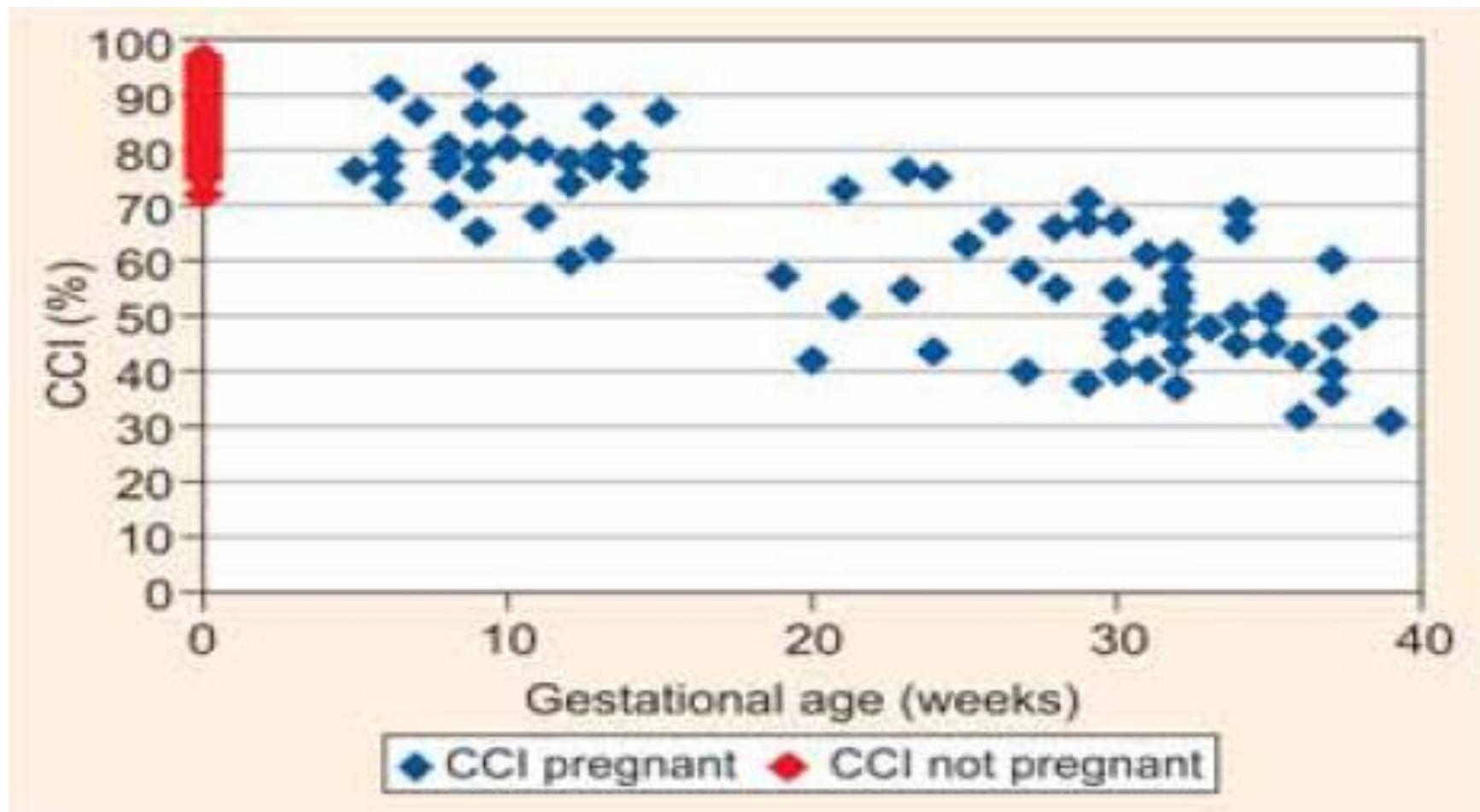
Índice de Consistencia Cervical(ICC)

- Conclusion:

Physiological changes in cervix consistency can be quantified from the first trimester of pregnancy using CCI. This shows an inverse linear relation with regard to the pregnancy stage. Cervical length did not show a shortening predicable pattern, with no statistically significant differences among groups.

Cérvix:

* Cambios
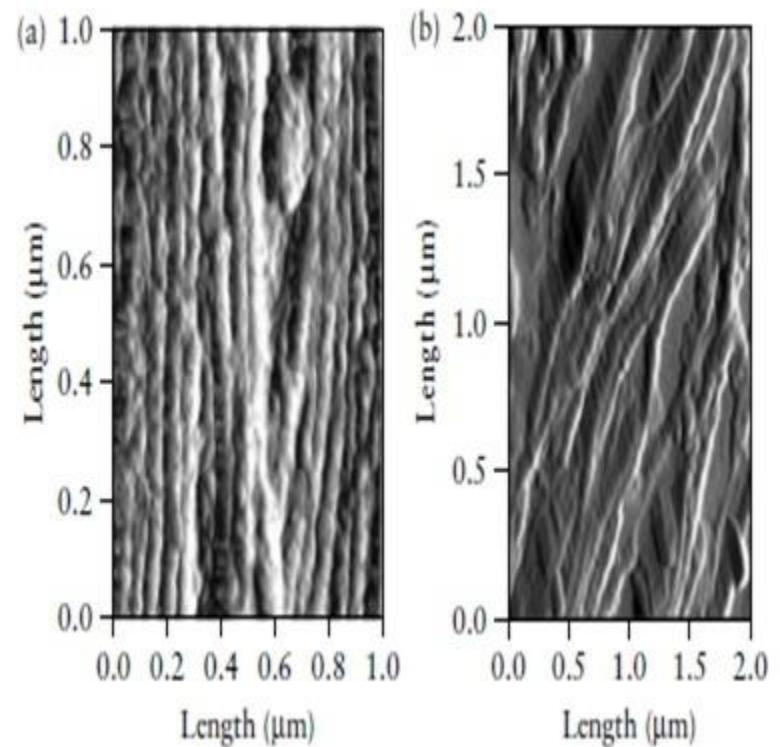
Ultrasonic attenuation estimation of the pregnant cervix:
a preliminary report , B. L. McFARLIN .*Ultrasound Obstet
Gynecol 2010; 36: 218–225*

Cervical length against gestational age from 5 to 36 weeks
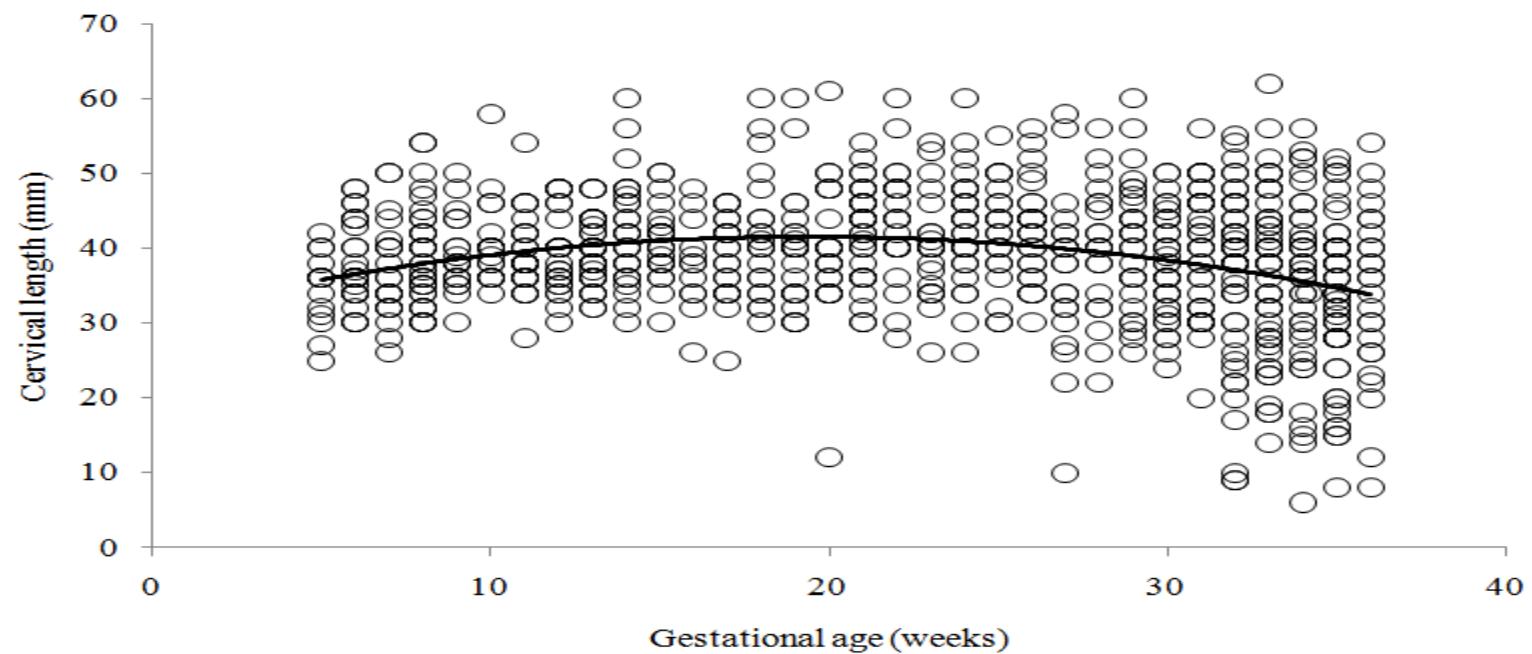
cervical length $= 31.08 - 0.0278(EG)^2 + 1.0772(GA)$

$R^2 = 0,076$

p:0.11

Cervical length against gestational age from 5 to 36 weeks
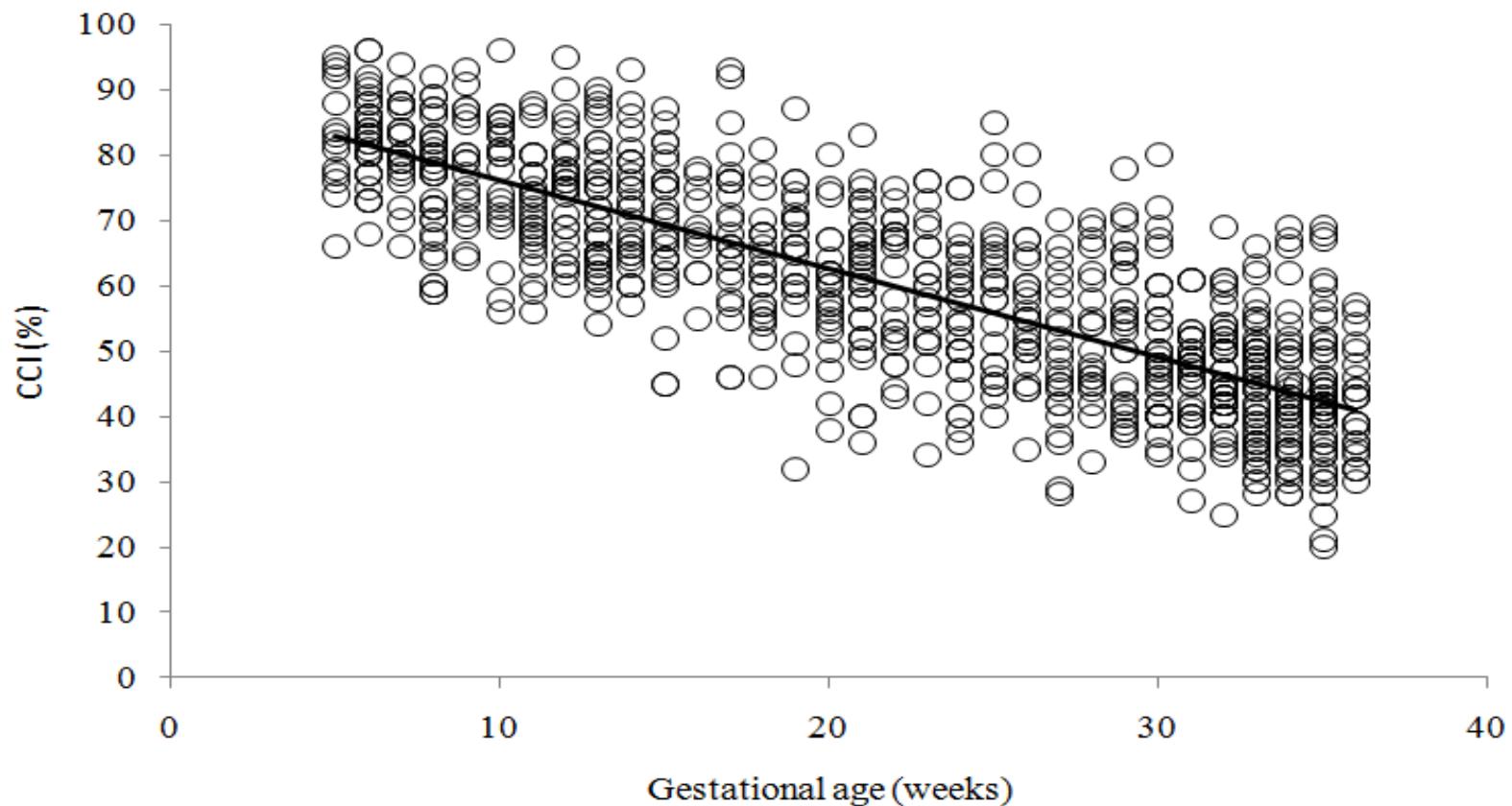
CCI=89.2-[1.35x(GA, Weeks)   **p:<0.0001**
R² = 0,6664
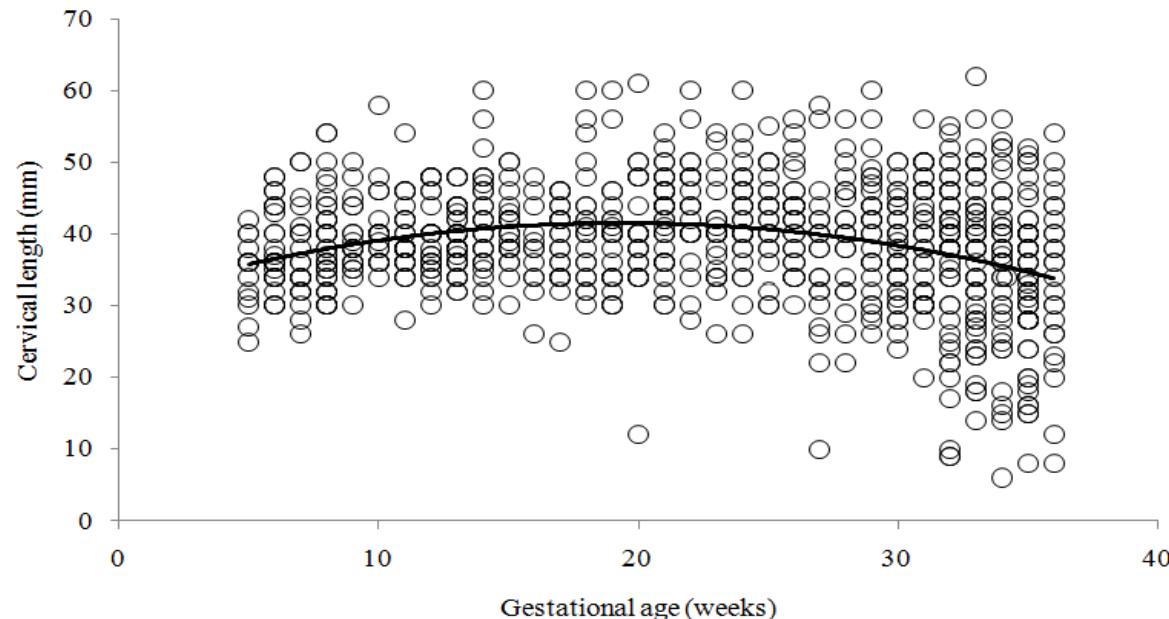
cervical length
$= 31.08 - 0.0278(EG)^2 + 1.0772(EG)$
$R^2 = 0,076$

p: 0.11
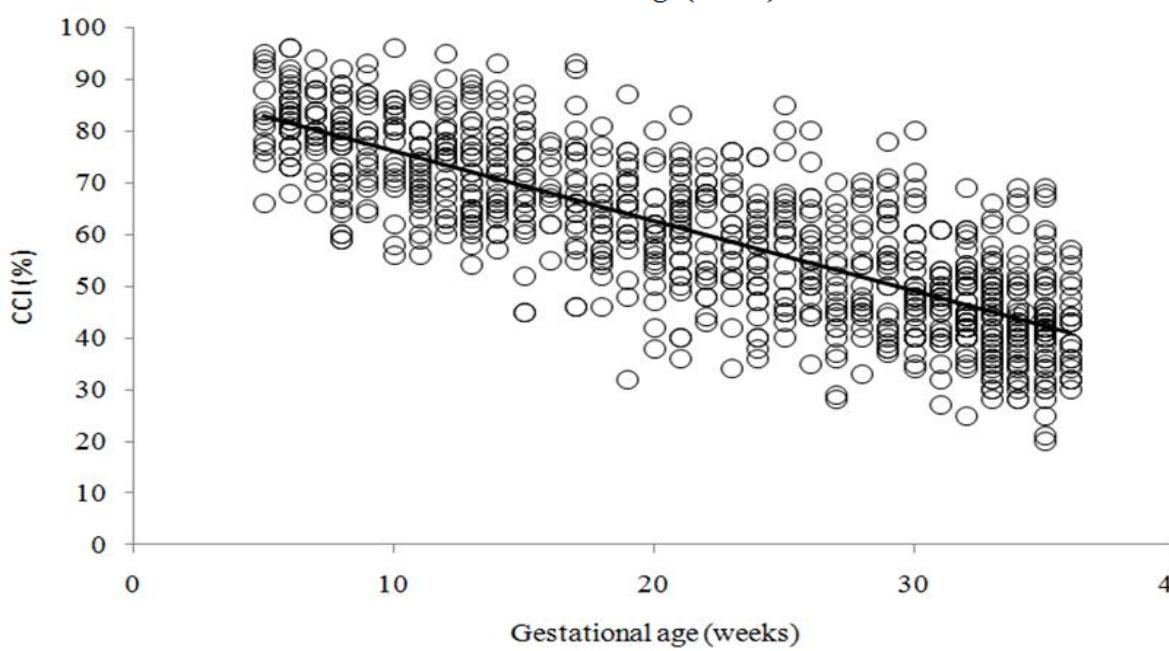
CCI=89.2-[1.35x(G.E Weeks)
$R^2 = 0,6664$

p<0.0001

Predicción del parto prematuro

Longitud cervical

ICC
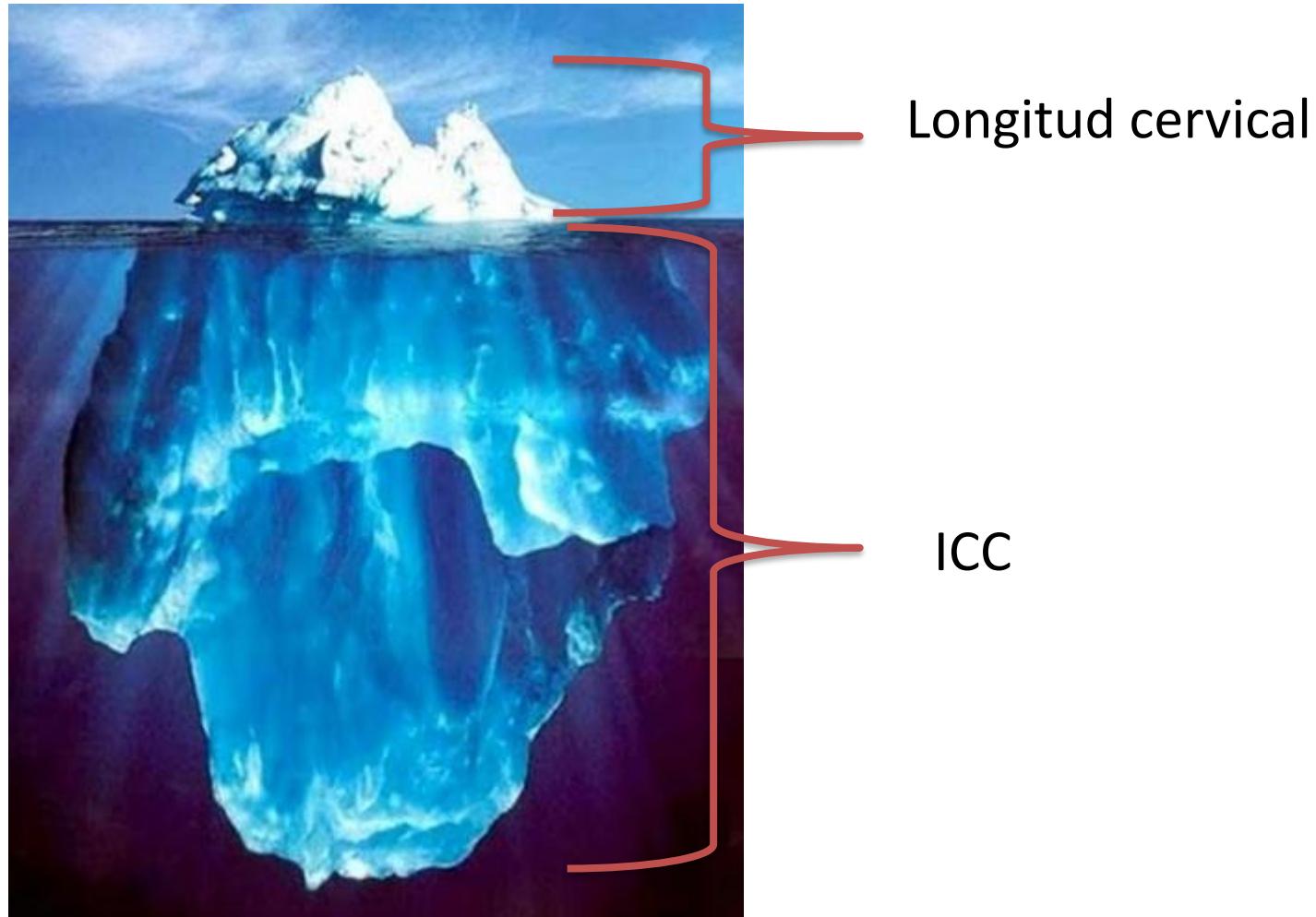
ICC distribución por trimestre
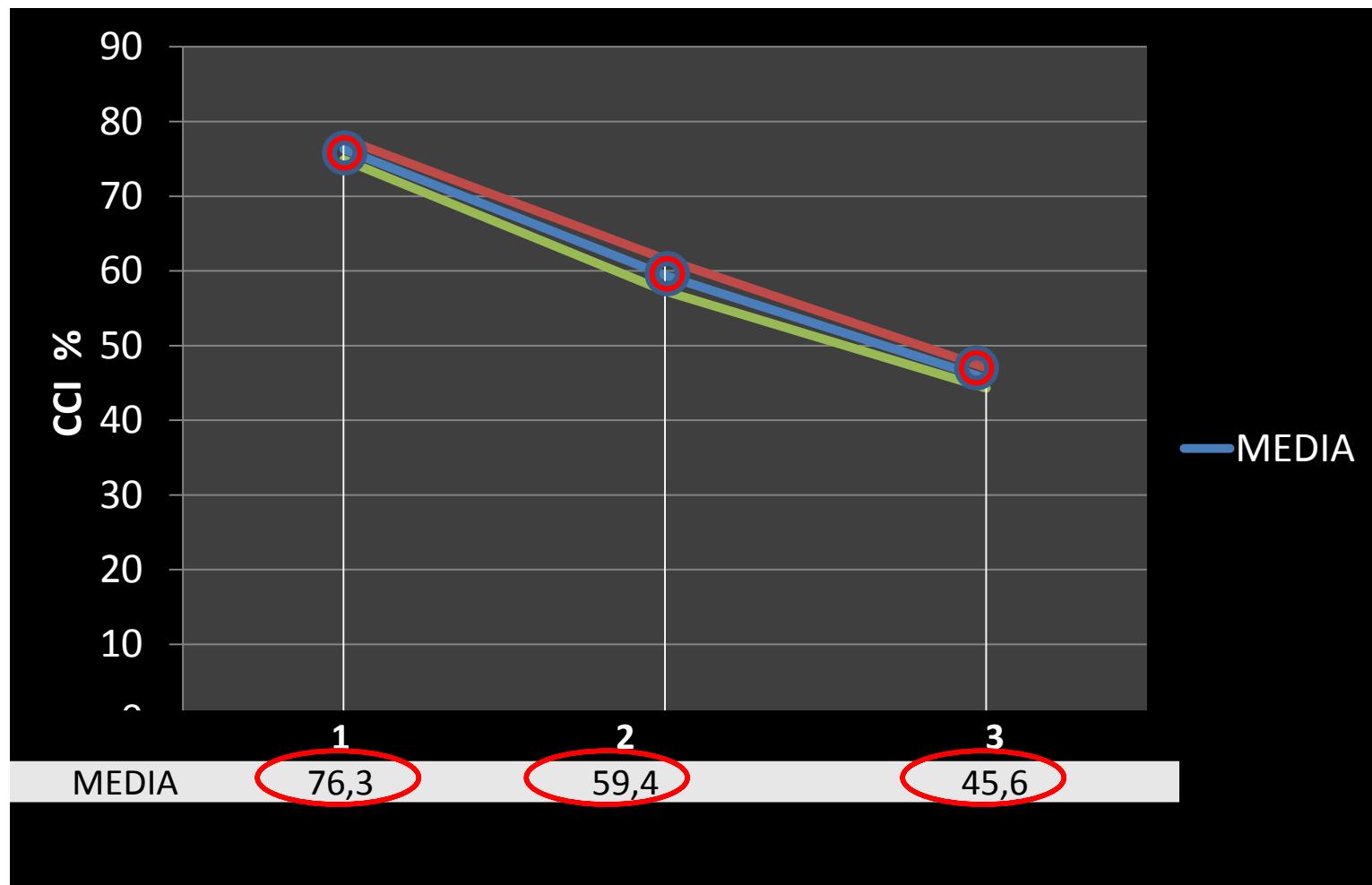
Técnica ICC
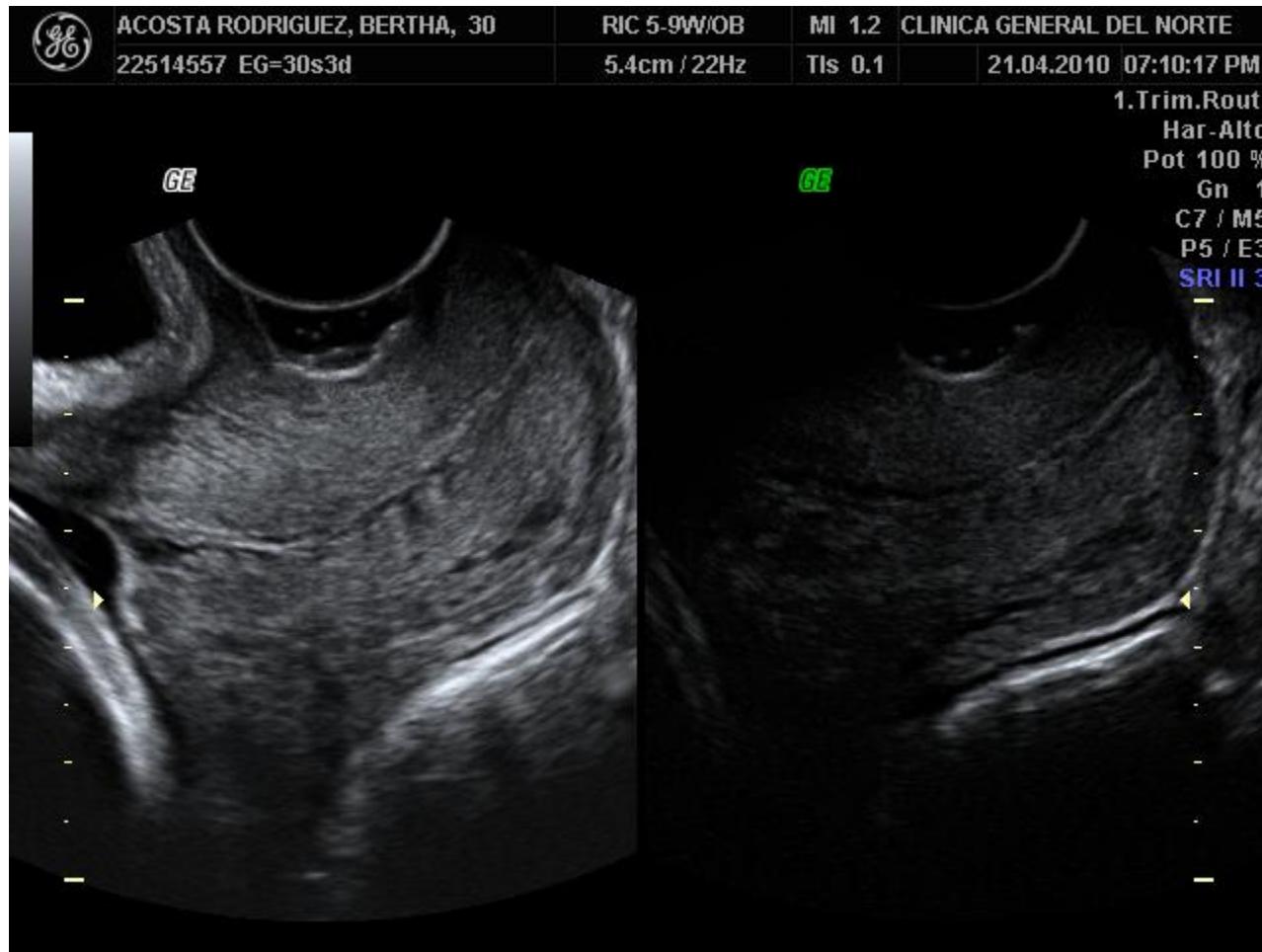
Técnica ICC
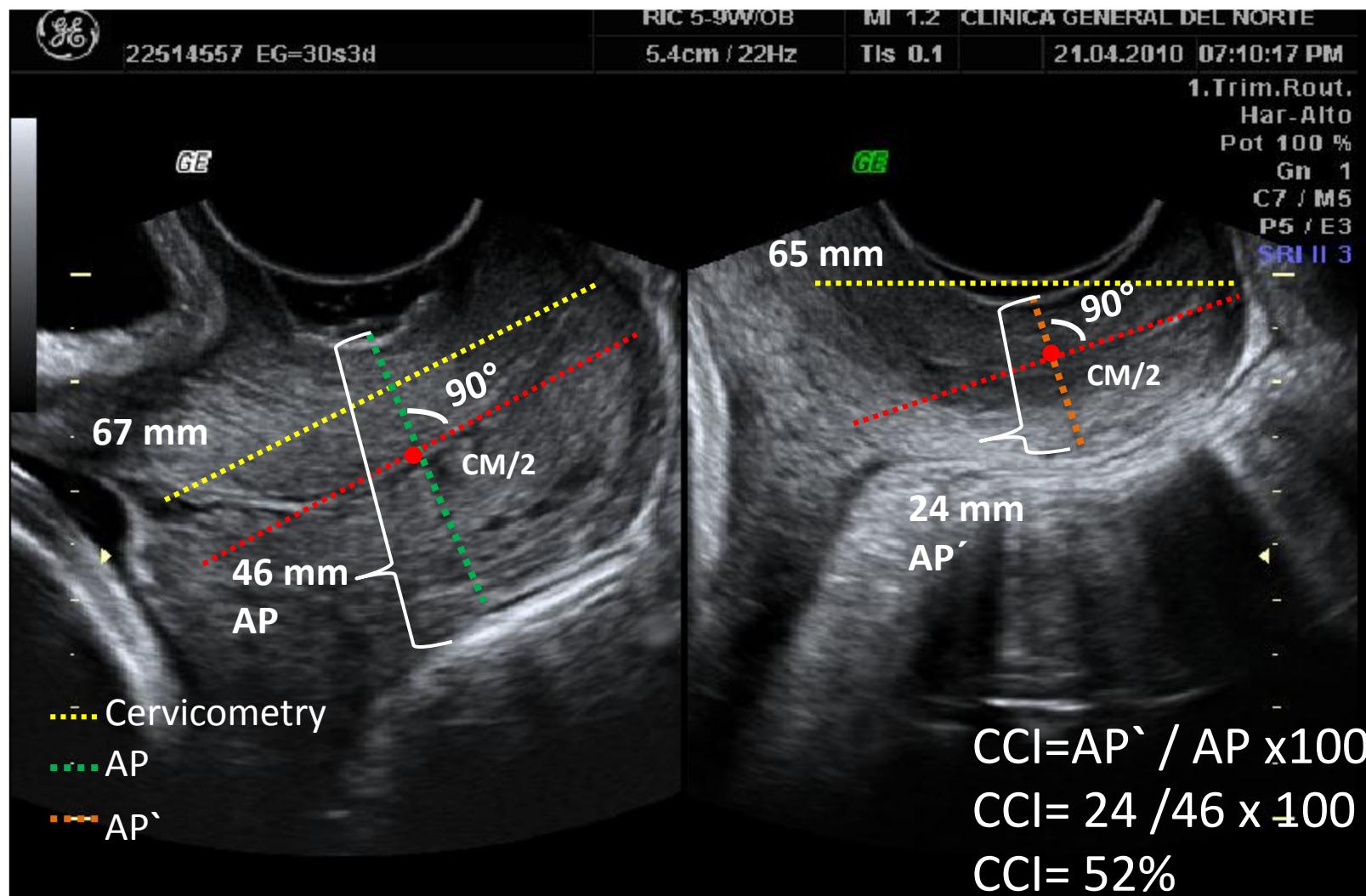
Percentiles de Índice de Consistencia Cervical (%) para edad gestacional de 5–36 sem.
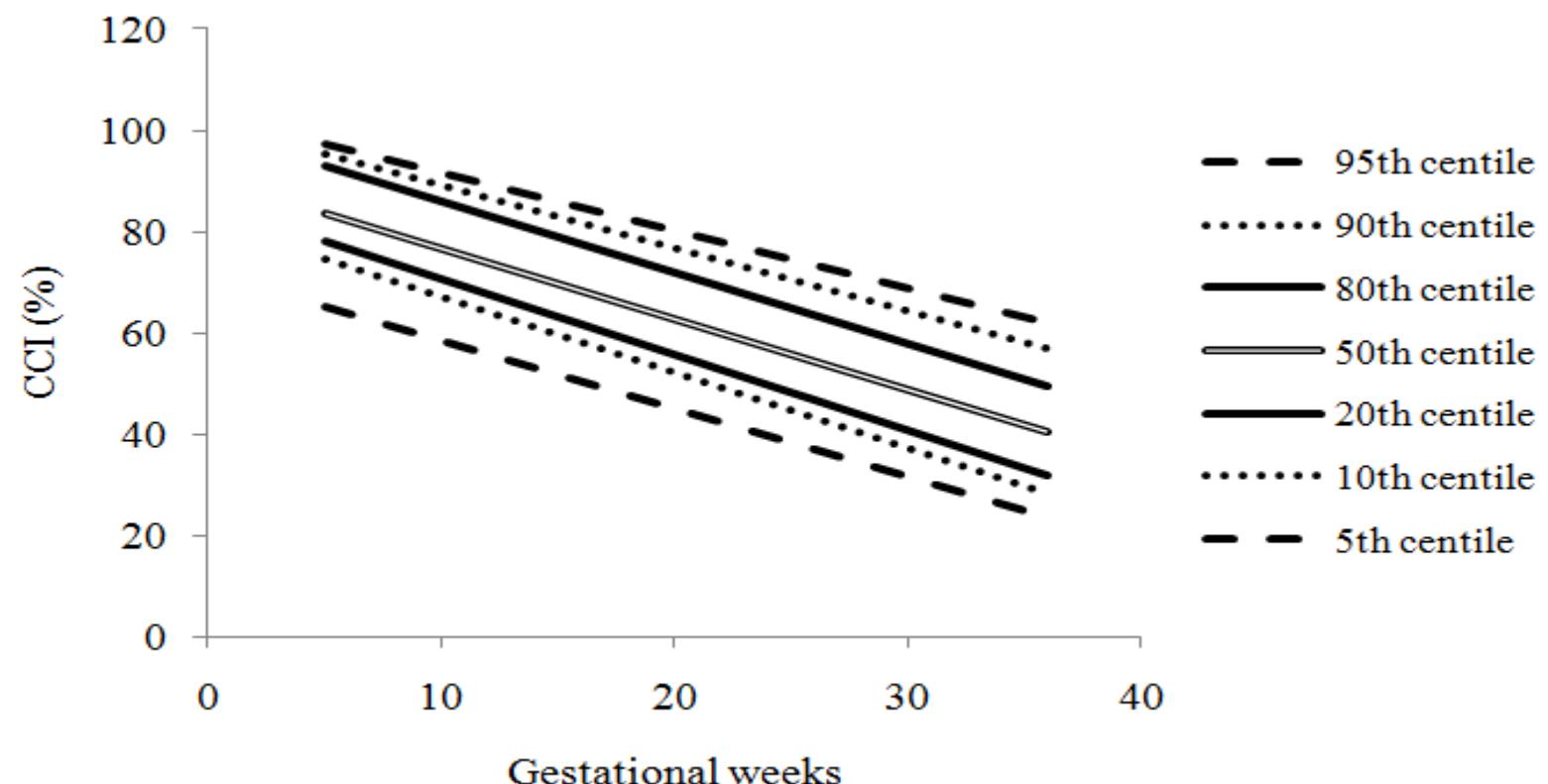
Percentiles de Índice de Consistencia Cervical (%) para edad gestacional de 5–36 sem.

| Gestational age (weeks)	5th centile	10th centile	20th centile	50th centile	80th centile	90th centile	95th centile
5	65	74	78	84	93	95	97
6	64	73	77	82	92	94	96
7	63	71	75	81	90	93	95
8	61	70	74	79	89	92	94
9	60	69	72	78	87	90	93
10	59	67	71	77	86	89	92
11	57	66	69	75	85	88	90
12	56	64	68	74	83	87	89
13	54	63	66	73	82	85	88
14	53	61	65	71	80	84	87
15	52	60	63	70	79	83	86
16	50	58	62	68	78	82	85
17	49	57	60	67	76	80	84
18	48	55	59	66	75	79	82
19	46	54	57	64	73	78	81
20	45	52	56	63	72	77	80
21	44	51	54	61	71	76	79
22	42	49	53	60	69	74	78
23	41	48	51	59	68	73	77
24	40	46	50	57	66	72	76
25	38	45	48	56	65	71	75
26	37	43	47	54	64	69	73
27	36	42	45	53	62	68	72
28	34	40	44	52	61	67	71
29	33	39	42	50	59	66	70
30	32	37	41	49	58	64	69
31	30	36	39	47	56	63	68
32	29	34	38	46	55	62	67
33	27	33	36	45	54	61	65
34	26	31	35	43	52	59	64
35	25	30	33	42	51	58	63
36	23	28	32	41	49	57	62

Longitud Cervical
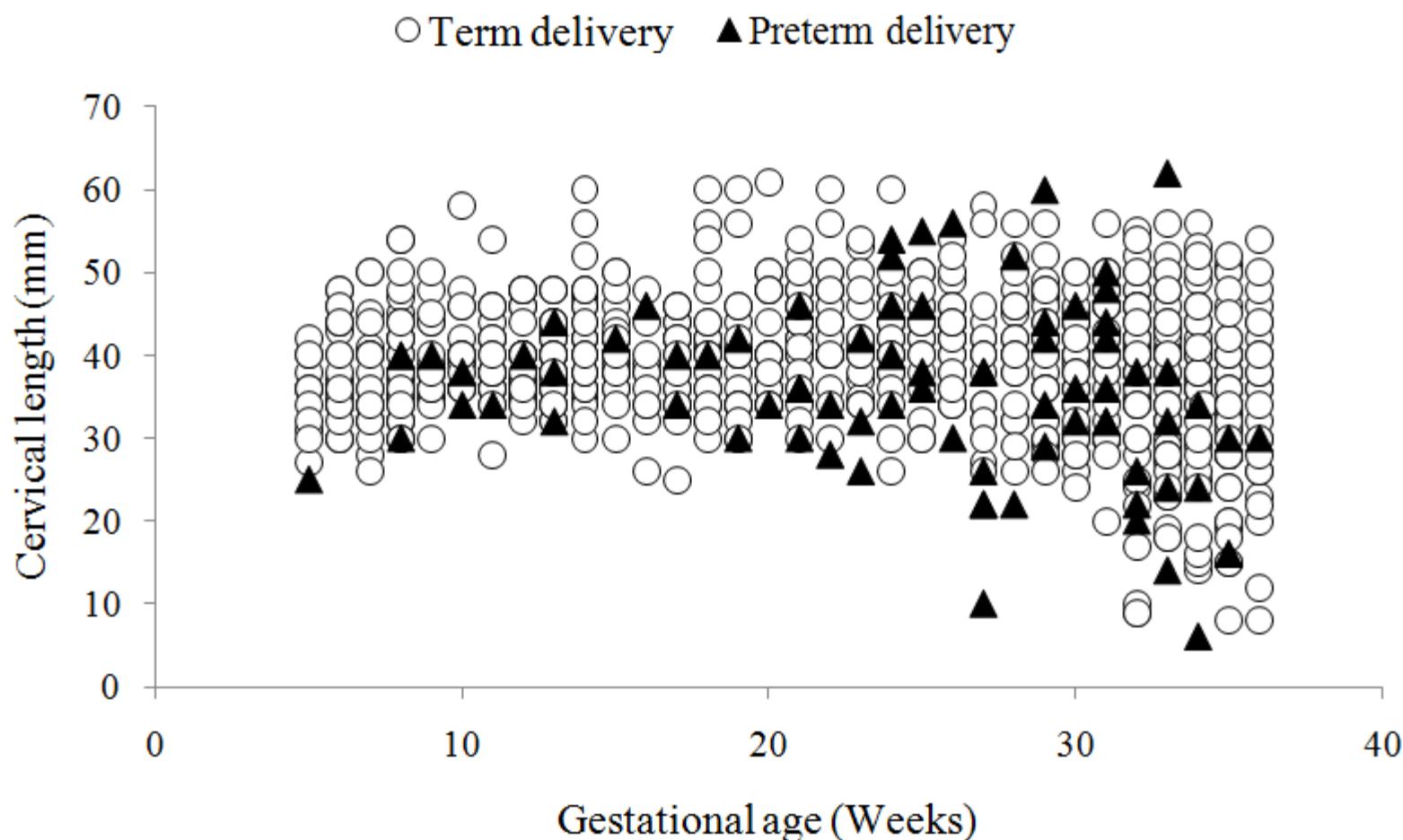
Prediction of preterm birth using the cervical consistency index. M. PARRA-SAAVEDRA*, L. GOMEZ*, A. BARRERO*, G. PARRA*, F. VERGARA* ´ and E. NAVARRO† Ultrasound Obstet Gynecol 2011; 38: 44–51

Índice de Consistencia Cervical(ICC)
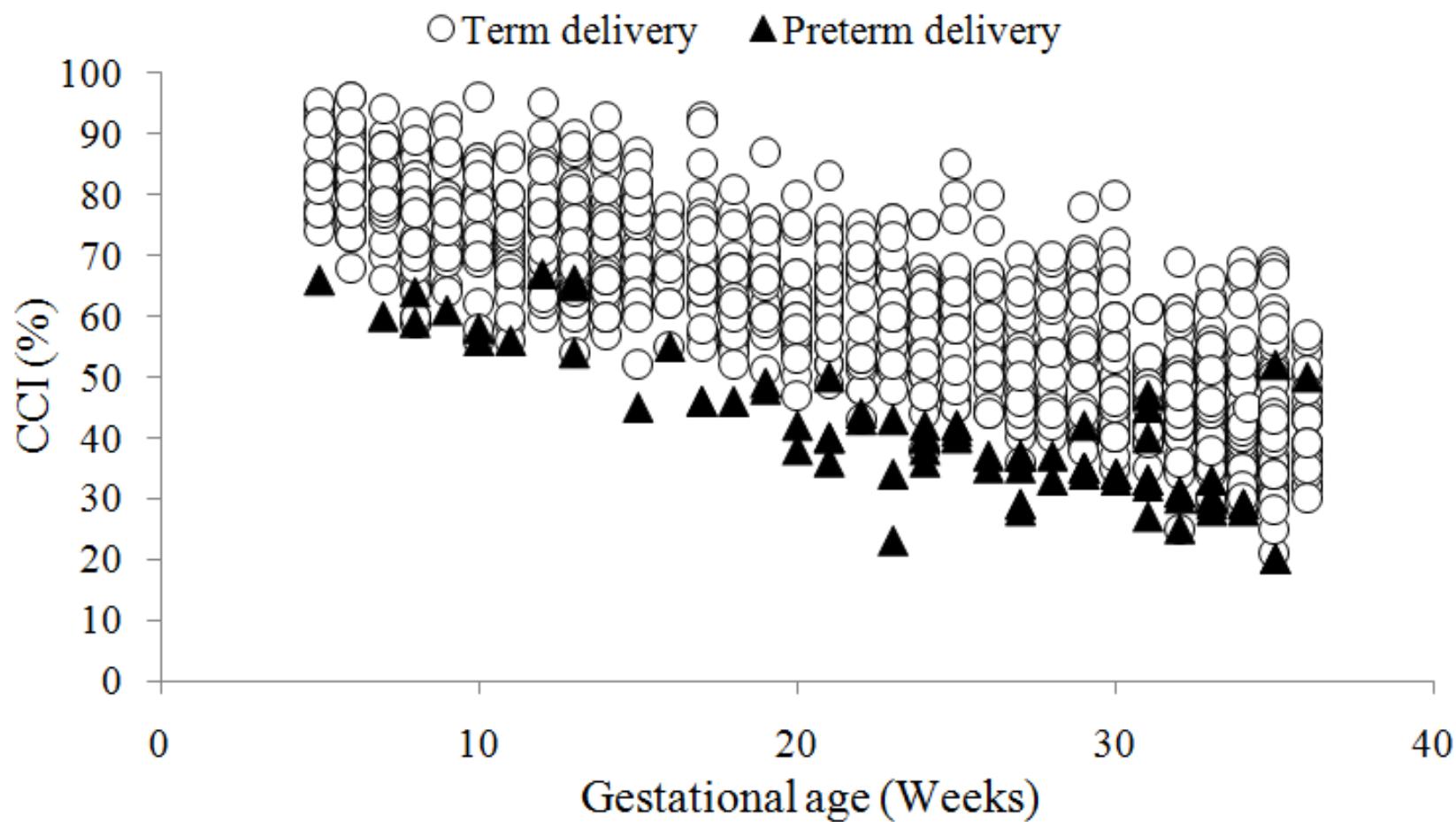
Prediction of preterm birth using the cervical consistency index. M. PARRA-SAAVEDRA*, L. GOMEZ*, A. BARRERO*, G. PARRA*, F. VERGARA* ´ and E. NAVARRO† Ultrasound Obstet Gynecol 2011; 38: 44–51

Sensitivity, specificity, ppv, npv, LHR of percentiles of CCI and CL in predicting SPTB according to gestational age

	CCI			Cervical length		
	Screening performance for fixed screen-positive rate of:					
	5%	10%	20%	5%	10%	20%
SPTB ≤ 32 weeks						
Sensitivity (%)	66.7 (30.31–100)	100 (94.9–100)	100 (94.4–100)	11.1 (0–37.2)	33.3 (0–69.7)	33.3 (0–69.9)
Specificity (%)	97.1 (96.1–98.2)	88.2 (86.2–90.3)	77.2 (74.5–79.8)	97.8 (96.9–98.8)	94.8 (93.3–96.2)	86.3 (84.1–88.4)
PPV (%)	17.1 (3.2–31.1)	7 (2.2–11.9)	3.8 (1.1–6.4)	4.4 (0–14.9)	5.4 (0–12.2)	2.1 (0–4.8)
NPV (%)	99.7 (99.3–100)	100 (99.9–100)	100 (99.9–100)	99.2 (98.6–99.8)	99.4 (98.8–99.9)	99.3 (98.7–99.9)
LR+	23.3 (12.9–41.8)	8.1 (7.2–10.1)	4.38 (3.91–4.91)	5.1 (0.8–33.9)	6.4 (2.4–16.6)	2.4 (0.9–6.2)
SPTB ≤ 34 weeks						
Sensitivity (%)	63.6 (41.3–86.0)	90.9 (76.6–100)	95.4 (84.5–100)	9.1 (0–23.4)	27.3 (6.4–48.2)	40.9 (18.1–63.7)
Specificity (%)	98.4 (97.6–99.2)	89.4 (87.4–91.4)	78.2 (75.6–80.8)	97.9 (96.9–98.8)	94.9 (93.6–96.4)	86.7 (84.5–88.8)
PPV (%)	46.7 (27.2–66.2)	15.9 (9.1–22.7)	8.8 (4.9–12.6)	8.7 (0–22.4)	10.7 (1.7–19.7)	6.3 (1.9–10.7)
NPV (%)	99.2 (98.6–99.8)	99.8 (99.4–100)	99.9 (99.6–100)	98 (97.1–98.9)	98.3 (97.5–99.2)	98.5 (97.7–99.4)
LR+	39.7 (22.2–70.9)	8.6 (6.9–20.7)	4.4 (3.8–5.1)	4.32 (1.1–17.3)	2.2 (1.2–3.1)	3.1 (1.8–5.2)
SPTB ≤ 37 weeks						
Sensitivity (%)	45 (33.5–56.5)	78.8 (64.2–88.6)	87.5 (79.7–95.4)	11.3 (3.7–18.8)	26.3 (15.9–36.5)	38.8 (27.4–50.1)
Specificity (%)	99.8 (99.4–100)	94.9 (93.4–96.4)	81.9 (79.4–84.4)	98.5 (97.7–99.3)	96.3 (95.0–97.5)	88.2 (86.1–90.3)
PPV (%)	94.7 (86.3–100)	56.8 (47.1–66.4)	24.9 (23.2–25.3))	39.1 (17.0–61.3)	37.5 (23.9–51.1)	21.8 (14.7–28.9)
NPV (%)	95.5 (94.2–96.9)	98.1 (97.2–99.1)	98.7 (97.9–99.6)	92.9 (91.2–94.5)	93.9 (92.3–95.4)	94.4 (92.8–96.0)
LR+	211.7 (51.9–863.3)	15.44 (11.5–20.8)	4.84 (4.13–5.7)	7.6 (6.1–9.5)	7.1 (4.3–11.5)	3.3 (2.4–4.6)

95% CIs are given in parentheses.

Prediction of preterm birth using the cervical consistency index

M. PARRA-SAAVEDRA*, L. GÓMEZ*, A. BARRERO*, G. PARRA*, F. VERGARA*
and E. NAVARRO†

*Maternal–Fetal Unit, CEDIFETAL, Centro de Diagnóstico de Ultrasonido e Imágenes, CEDIUL, Barranquilla, Colombia; †Public Health
Department, Universidad Del Norte, Barranquilla, Colombia

Nuevos trabajos

Predicción parto prematuro primer trimestre

Association between first trimester cervical consistency index (CCI) and preterm birth in low risk population

[1,2]Miguel Parra-Saavedra, [1]Juan Carlos Ramirez, [1]Núria Baños, [1]Anna Peguero, [1]Ana Fervienza, [1]Eduard Gratacos, [1]Montse Palacio.

[1]BCNatal - Barcelona Center for Maternal-Fetal and Neonatal Medicine (Hospital Clínic and Hospital Sant Joan de Déu), IDIBAPS, University of Barcelona, and Centre for Biomedical Research on Rare Diseases (CIBER-ER), Barcelona, Spain

[2] Maternal–Fetal Unit, CEDIFETAL, Imágenes diagnosticas y terapeuticas, CEDIUL, Clinica La Asuncion, Barranquilla Colombia.

- <u>Objective</u>: To establish the association between cervical consistency index (CCI) in the 11 to 13.6 weeks ultrasound screening and spontaneous preterm delivery before 35 weeks.

Abstract ISUOG, Montreal 2015

MADRID

12th World congress of Perinatal Medicine

SPAIN
3rd-6th November, 2015

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Results

```
┌─────────────────────────────────────────────────────────┐
│   Aneuploidy screening in 11-13.6 weeks, database        │
│                      (n=843)                             │
└─────────────────────────────────────────────────────────┘
           │                              │
    ┌────────────┐                 ┌────────────┐
    │    Case    │                 │  Control   │
    └────────────┘                 └────────────┘
           │                              │
      ┌─────────┐                   ┌──────────┐
      │  n: 23  │                   │  n: 820  │
      └─────────┘                   └──────────┘
           │                              │
 ┌────────────────────┐          ┌──────────────────┐
 │ Spontaneous preterm│          │ Healthy controls │
 │                    │          └──────────────────┘
 │delivery before 35  │                   │
 │      weeks.        │          ┌──────────────────────┐
 └────────────────────┘          │  Delivery at term    │
                                 │(≥ 36 weeks and 6 days)│
                                 └──────────────────────┘
```
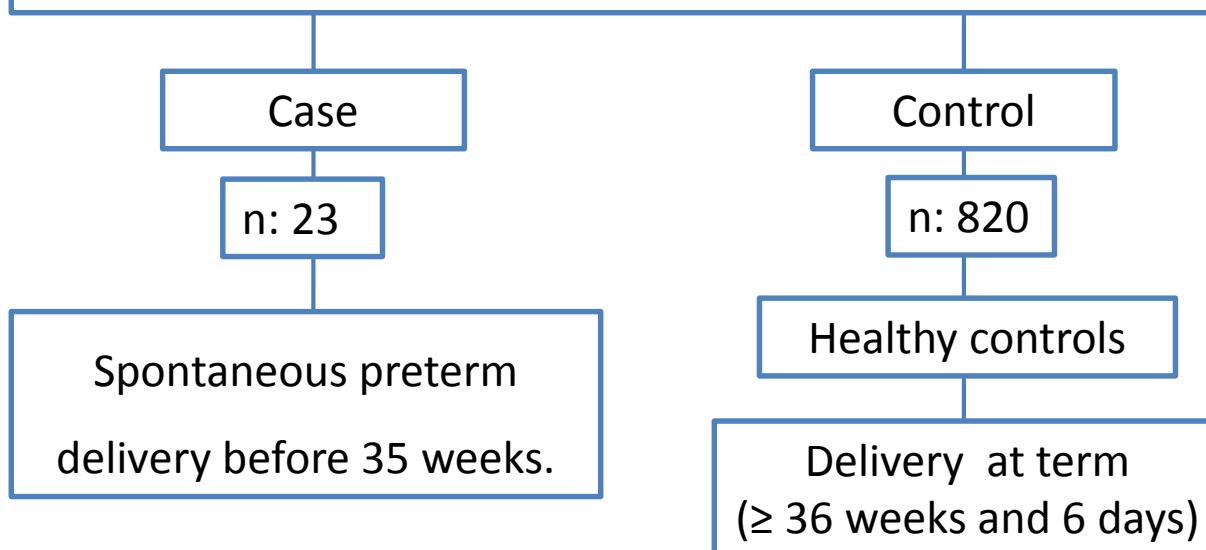
We evaluated 843 pregnant women and identified 23 cases (2.73%) with spontaneous preterm delivery below 35 weeks.

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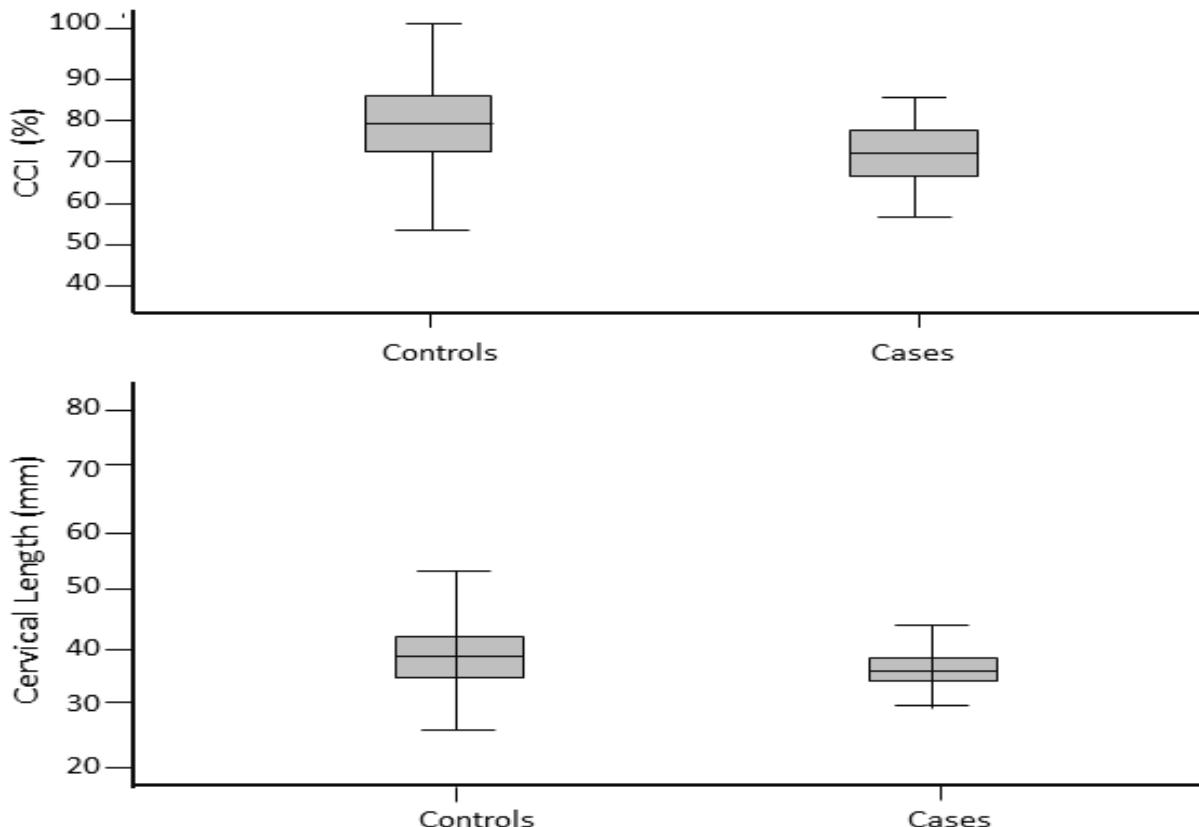
The CCI was lower in cases than in controls: mean 71.2% [range 67.3-77.6%] vs. 78.6% [range 72.4-84.5%] (p <0.001), respectively. Cervical length did not differ between cases and controls: mean 37.2mm [range 34-40 mm] vs 39.1mm [range 35-42 mm] (p = 0.14), respectively.

Conclusions

Women who presented with preterm birth before 35 weeks had significantly lower values of CCI at first trimester than women who delivered at term.

The measurement of CCI in ultrasound screening at 11-13.6 weeks may have clinical value for the early identification of women at risk of preterm birth before 35 weeks.

Resultados: ICC vs LC en 2º trimestre

| Characteristics	Median (IQR) or n (%)		P
Number of subjects	**Term birth n= 161**	**Preterm birth n= 10**	
Age (years)	33 (28-37)	33 (30-35)	0.69
BMI	23 (20.9-26.2)	22 (21.9-26.5)	0.54
Ethnicity			
Caucasian	103 (64)	7 (70)	0.7
Others	58 (36)	3 (30)	
Parity			
Nulliparous	100 (62.1)	4 (40)	0.16
Multiparous	61 (37.9)	6 (60)	
Previous SPTB	12 (9.45)	1 (10)	0.95
GA at scan	20.8 (20.1-23.6)	22.5 (21-23.5)	0.15
Cervical consistency index (CCI)	68.54 (63.1-74.2)	62.3 (58.1-67.8)	**0.02**
Cervical length (CL)	39.6 (35.8-44.1)	41.6 (34.6-47.9)	0.74
GA at delivery	39.6 (38.6-40.5)	28.3 (22.5-34.6)	<0.001

Caso clínico

Caso clínico

Caso clínico

Caso clínico

GOOGLE
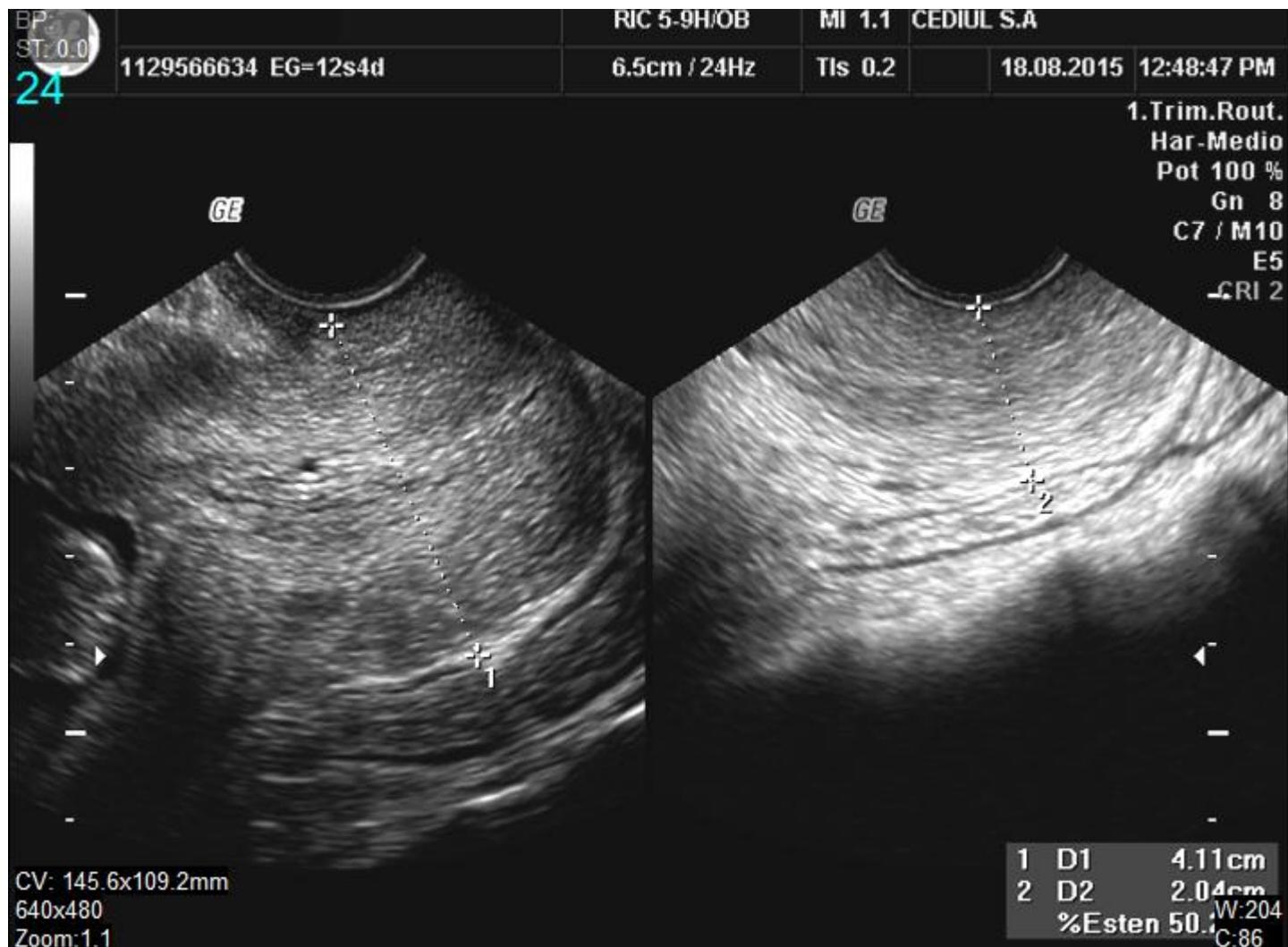
Prediction of preterm birth using the cervical consistency ...
www.ncbi.nlm.nih.gov/pubmed/21465603 ▾ Traducir esta página
de M Parra-Saavedra - 2011 - Citado por 36 - Artículos relacionados
OBJECTIVES: To assess the diagnostic power of a new cervical consistency index
(CCI) obtained using transvaginal sonography for the prediction of ...

¿Futura indicación?

- Pacientes con Índice de Consistencia Cervical
    Menor del percentil 5%

- ¿Deberían recibir progesterona?

parece razonable, si un cuello es blando y se acorta progresivamente ...

- Faltan estudios en este campo

Casos clínicos

- Síndrome de parto prematuro

Caso # 1.

ID: Y.L

22 años,

EG: 24,2 semanas

Antecedentes:

-G3 A2 ultima perdida de 20 sem

-Doble sistema colector

-Infección de vías urinarias en primer trimestre.

-Refiere actividad uterina irregular

-Cervicometria 27 mm
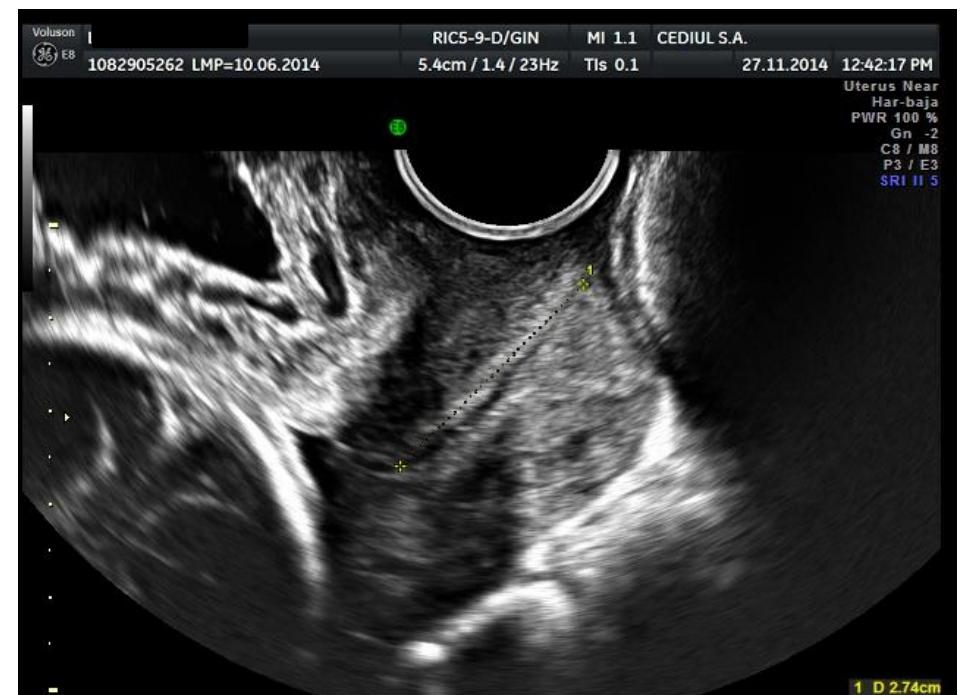

Cervicometria: 2,74 cm

¿Cuál seria el manejo indicado?

Caso # 1.
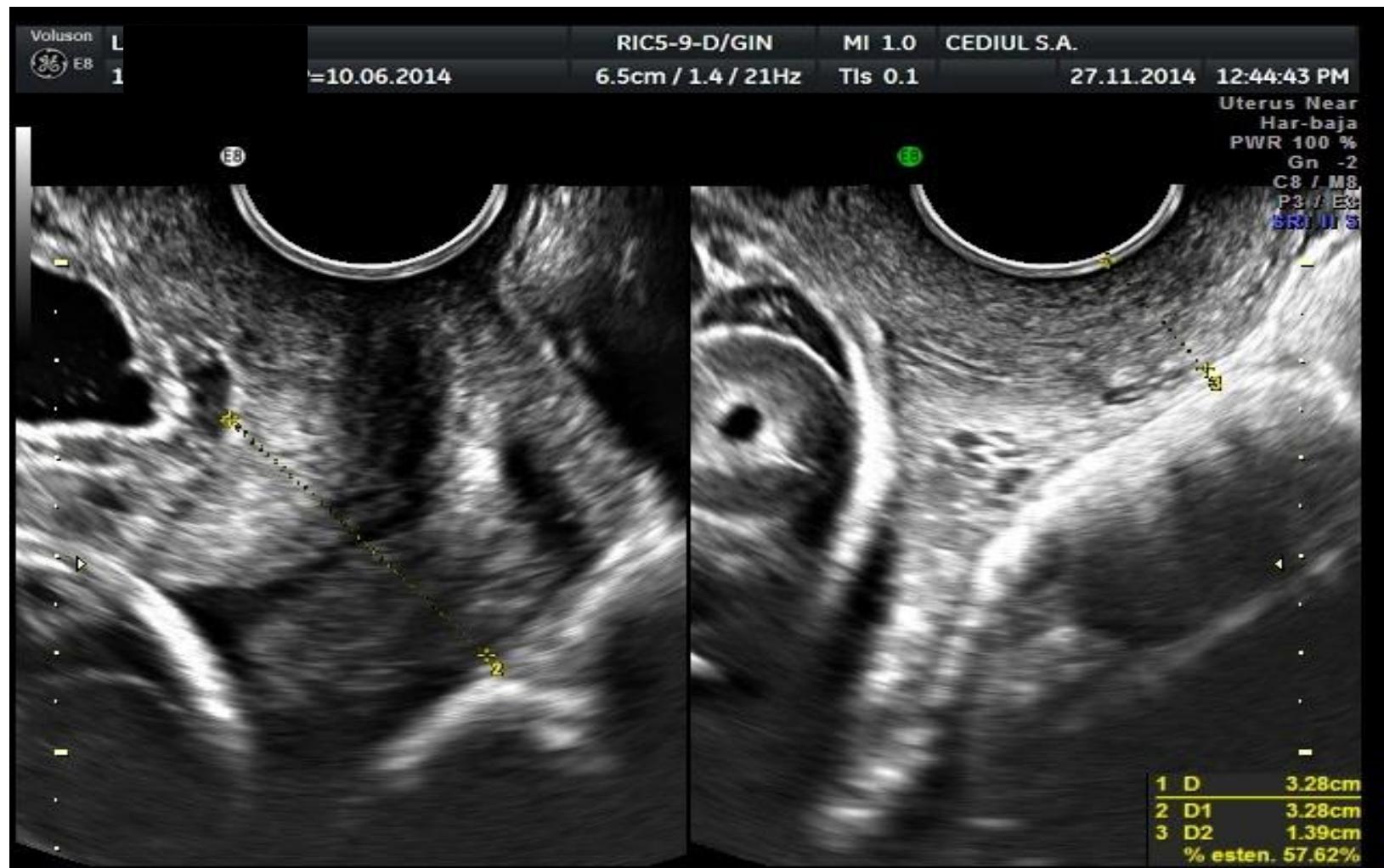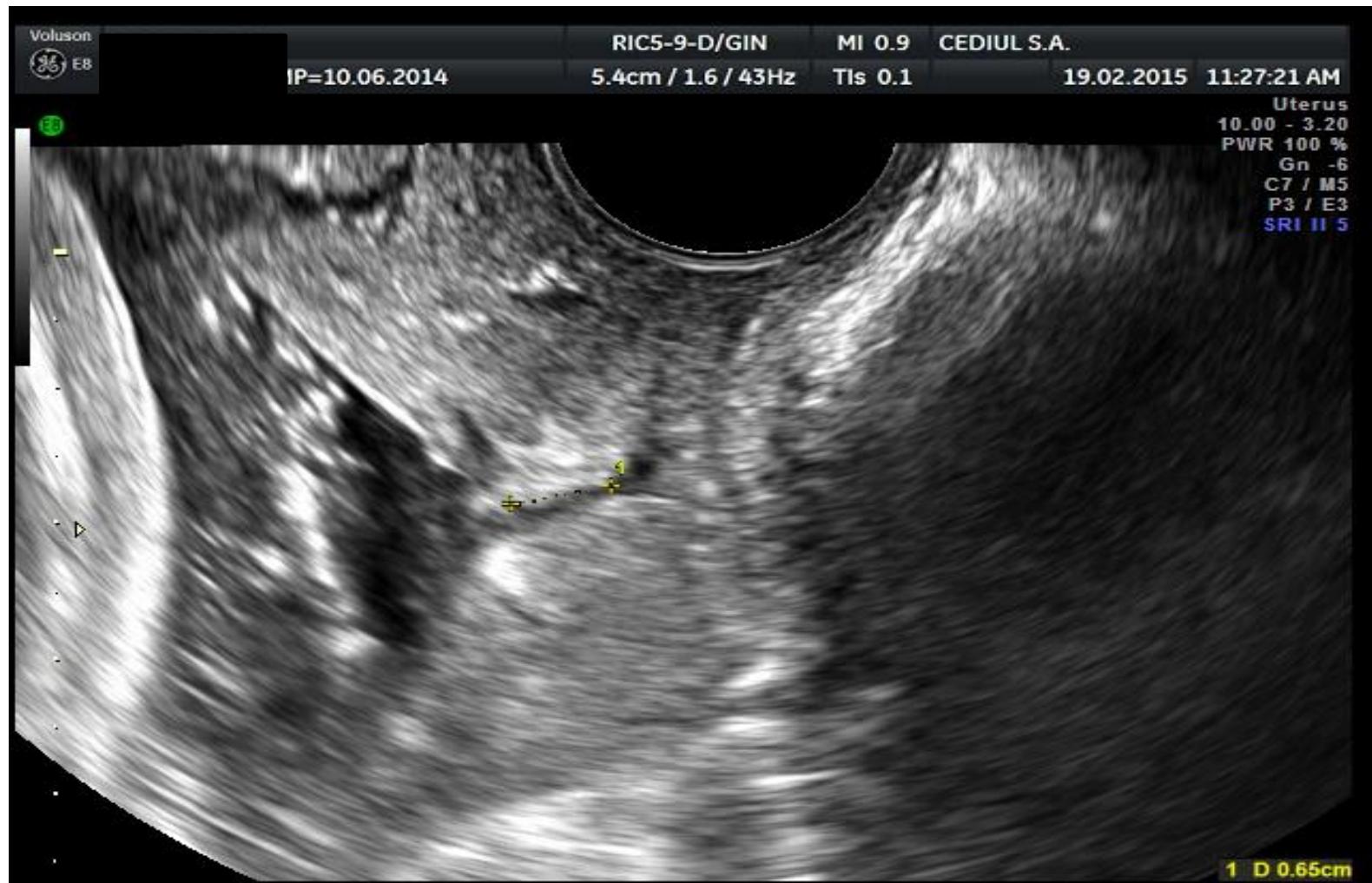
Caso # 1.

Caso # 1.

Caso # 1.

ID: Y.L
22 años,

Caso # 2

ID: Z.A

28 años

-Embarazo actual 22 sem

-Actvidad uterina regular de 8 horas

-Cervix 5 mm

-Sludge

-PCR 48

-CH: Leucocitos 16820

Antecedentes:

G5a3pp1 v0

PP 23 semanas, con muerte neonatal temprana.
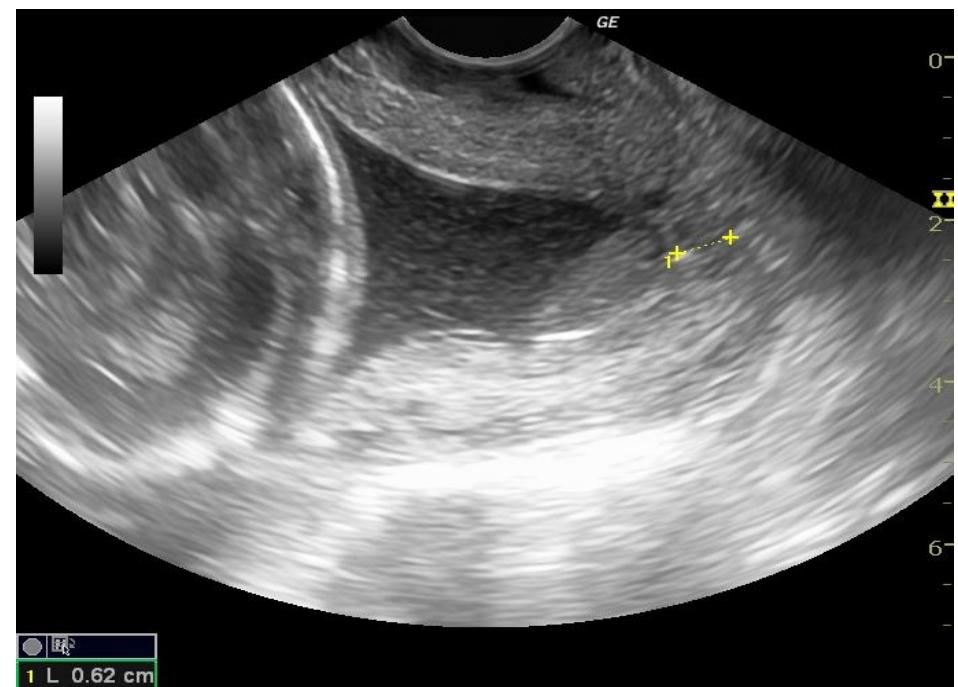
¿Cuál seria el manejo indicado?

Caso # 2

ID: Z.A
28 años
-Embarazo actual 22 sem
-Actvidad uterina regular de 8 horas
-Cervix 5 mm
-Sludge
-PCR 48
-CH: Leucocitos 16820
Antecedentes:
G5a3pp1 v0
PP 23 semanas, con muerte neonatal temprana.

Caso clínico # 3

Caso clínico

ICC: 49%
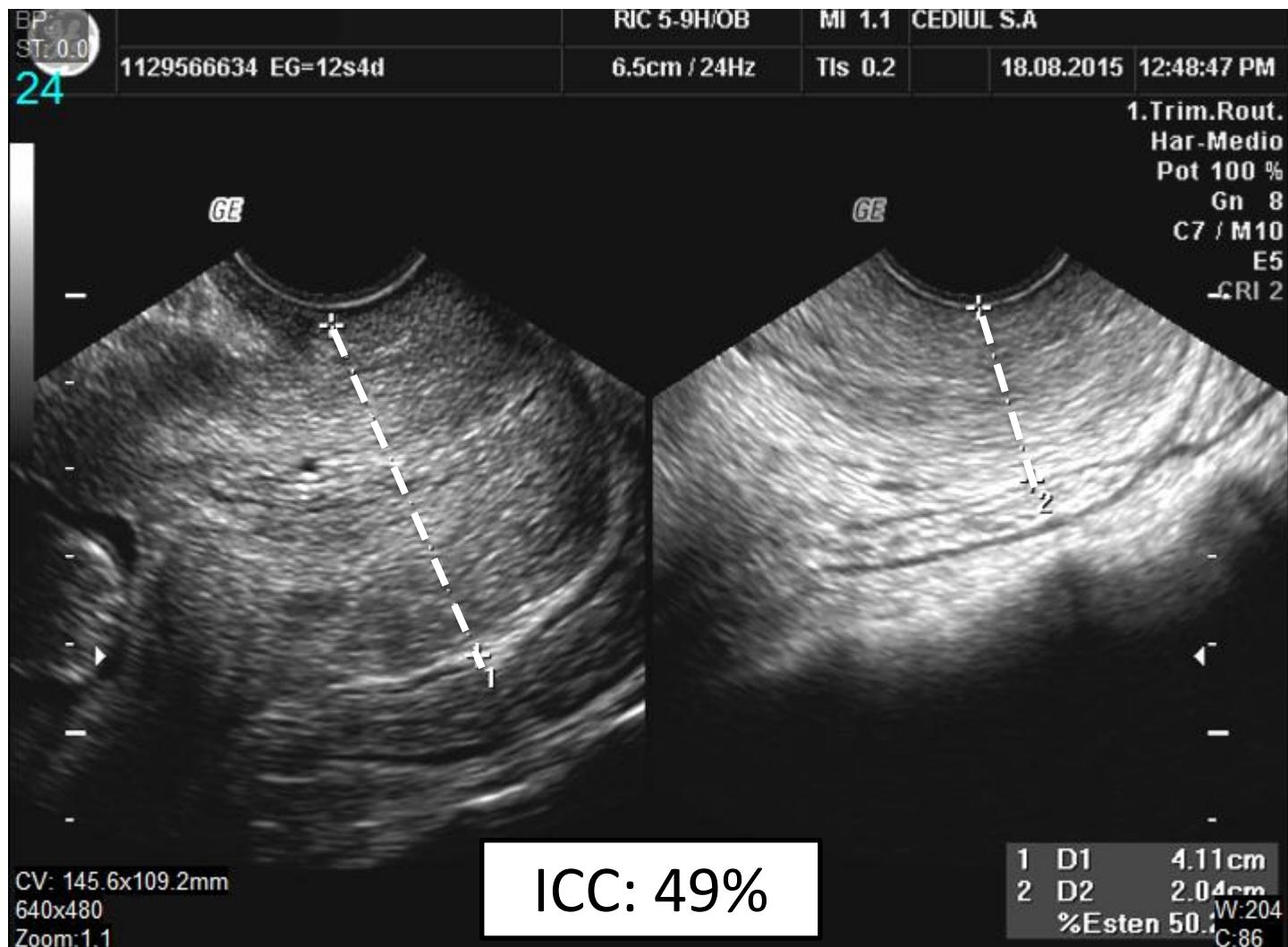
Caso clínico

Table S1 Percentiles for cervical consistency index (CCI in %) for gestational ages of 5–36 weeks

Gestational age (weeks)	n	5th centile	10th centile	20th centile	50th centile	80th centile	90th centile	95th centile
5	34	65	74	78	84	93	95	97
6	38	64	73	77	82	92	94	96
7	29	63	71	75	81	90	93	95
8	39	61	70	74	79	89	92	94
9	24	60	69	72	78	87	90	93
10	26	59	67	71	77	86	89	92
11	33	57	66	69	75	85	88	90
12	34	56	64	68	74	83	87	89
13	41	54	63	66	73	82	85	88
14	34	53	61	65	71	80	84	87
15	36	52	60	63	70	79	83	86
16	34	50	58	62	68	78	82	85
17	29	49	57	60	67	76	80	84
18	28	48	55	59	66	75	79	82
19	29	46	54	57	64	73	78	81
20	26	45	52	56	63	72	77	80
21	38	44	51	54	61	71	76	79
22	29	42	49	53	60	69	74	78
23	27	41	48	51	59	68	73	77
24	33	40	46	50	57	66	72	76
25	29	38	45	48	56	65	71	75
26	30	37	43	47	54	64	69	73
27	28	36	42	45	53	62	68	72
28	27	34	40	44	52	61	67	71
29	31	33	39	42	50	59	66	70
30	41	32	37	41	49	58	64	69
31	41	30	36	39	47	56	63	68
32	56	29	34	38	46	55	62	67
33	53	27	33	36	45	54	61	65
34	50	26	31	35	43	52	59	64
35	58	25	30	33	42	51	58	63

Caso clínico

- Nota: paciente con Índice de Consistencia Cervical menor al percentil 5, alto riesgo de parto prematuro, se sugiere evaluación ecografica del cérvix en semana 16 y tamizaje de cervicometría en semana 20.

- Pte ingresa 23 semanas a urgencia con 9 centímetros de dilatación y partes fetales en vagina.

¿Cuál es método para evaluar la consistencia del cérvix?

Challenging the in-vivo assessment of biomechanical properties of the uterine cervix: A critical analysis of ultrasound based quasi-static procedures

M.M. Maurer [a,*,1], S. Badir [a,1], M. Pensalfini [a], M. Bajka [b], P. Abitabile [c], R. Zimmermann [b], E. Mazza [a,d]

[a] Department of Mechanical and Process Engineering, ETH Zurich, 8092 Zurich, Switzerland
[b] Department of Obstetrics and Gynecology, University Hospital Zurich, 8091 Zurich, Switzerland
[c] Hospital Laufenburg, 5080 Laufenburg, Switzerland
[d] EMPA, Swiss Federal Laboratories for Materials Testing and Research, 8600 Dubendorf, Switzerland

M.M. Maurer a,n,, S.Badir a,, M.Pensalfini a, M.Bajka b, P.Abitabile c, R. Zimmermann b, E.Mazza ; Challenging the in-vivo assessment of biomechanical properties of the uterine cervix: A critical analysis of ultrasound based quasi-static procedures

# ¿Cuál es método para evaluar la consistencia del cérvix?
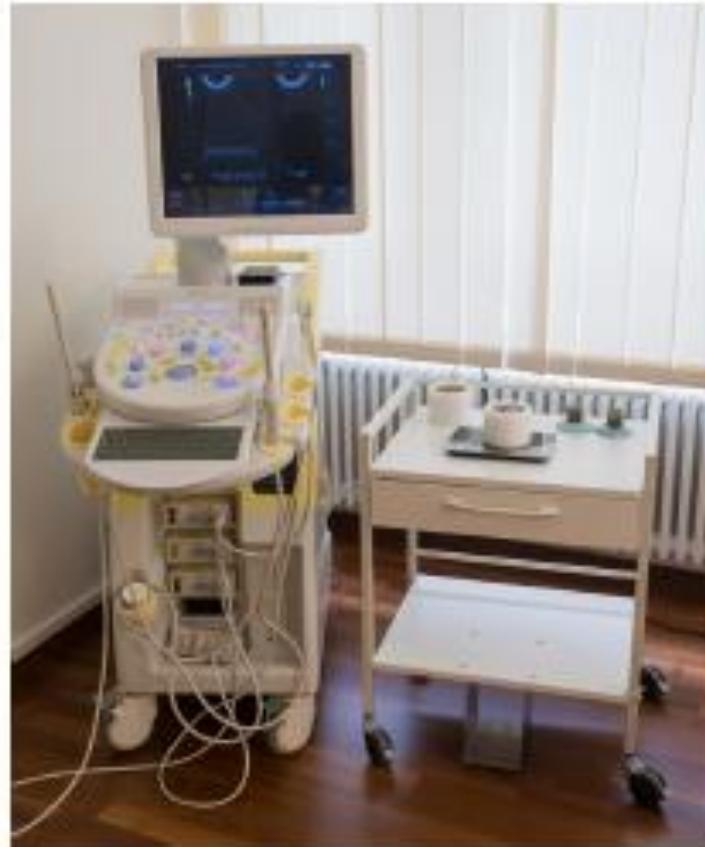
Phantoms

M.M. Maurer a,n,, S.Badir a,, M.Pensalfini a, M.Bajka b, P.Abitabile c, R. Zimmermann b, E.Mazza ; Challenging the in-vivo assessment of biomechanical properties of the uterine cervix: A critical analysis of ultrasound based quasi-static procedures

¿Cuál es método para evaluar la consistencia del cérvix?

Elastografía

M.M. Maurer a,n,, S.Badir a,, M.Pensalfini a, M.Bajka b, P.Abitabile c, R. Zimmermann b, E.Mazza ; Challenging the in-vivo assessment of biomechanical properties of the uterine cervix: A critical analysis of ultrasound based quasi-static procedures
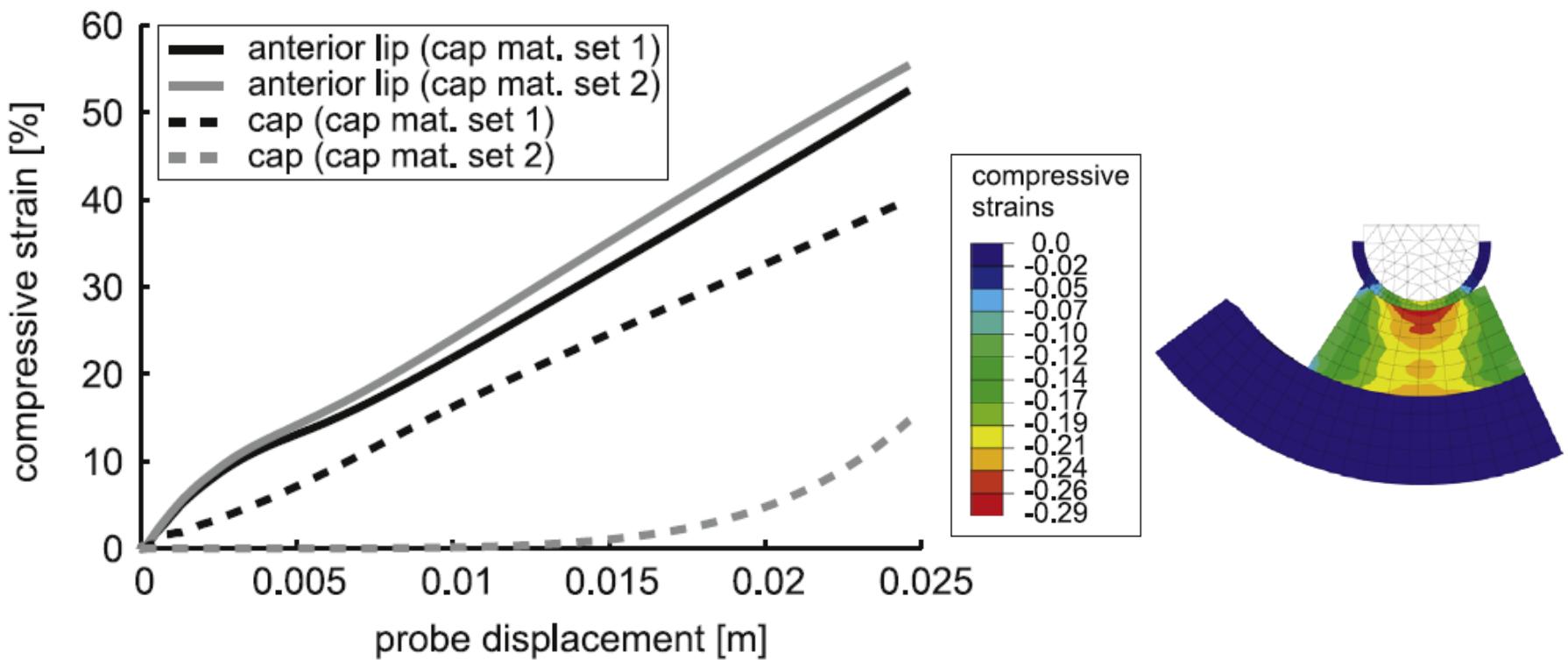
¿Cuál es método para evaluar la consistencia del cérvix?

Índice de Consistencia Cervical

M.M. Maurer a,n,, S.Badir a,, M.Pensalfini a, M.Bajka b, P.Abitabile c, R. Zimmermann b, E.Mazza ; Challenging the in-vivo assessment of biomechanical properties of the uterine cervix: A critical analysis of ultrasound based quasi-static procedures
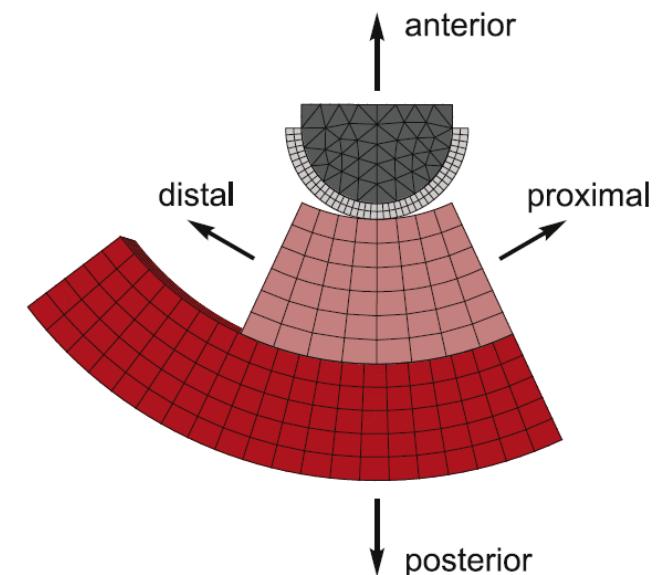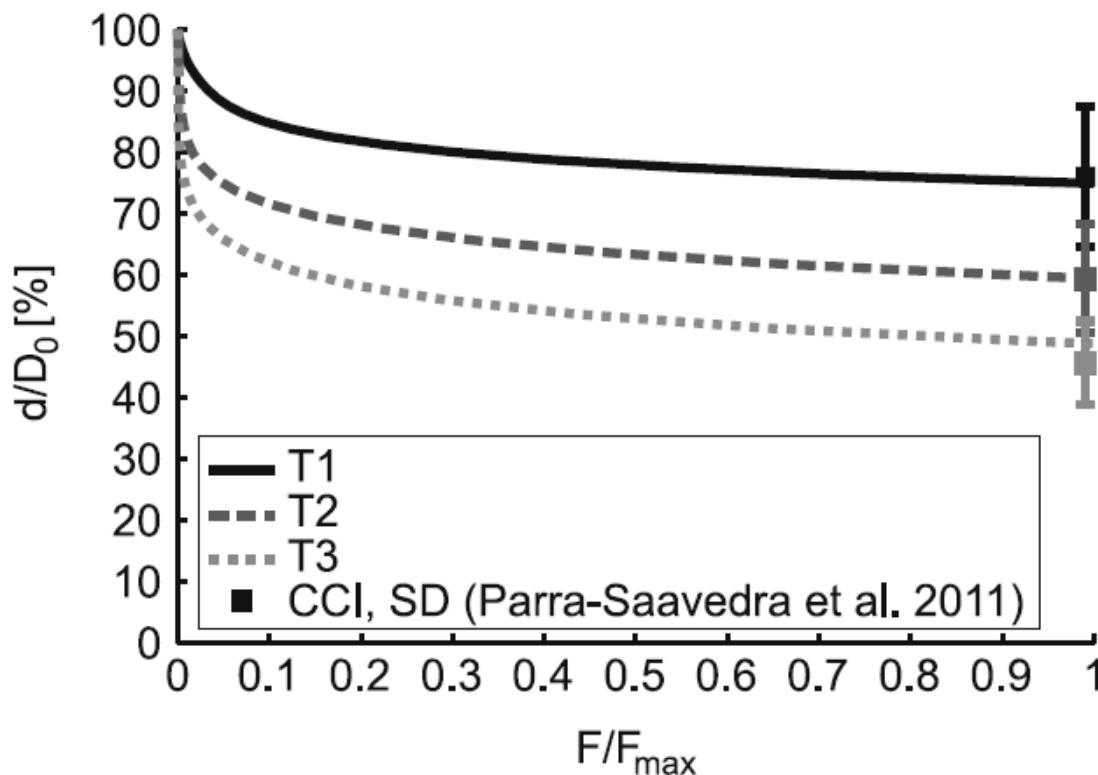
Conclusión

"We have demonstrated that the quasi-static elastography protocol as proposed by Hernandez-Andrade et al. (2013), Hernandez-Andrade et al. (2014) and Molina et al. (2012) <u>does not allow to distinguish between a stiff and soft cervix</u>"

M.M. Maurer a,n,, S.Badir a,, M.Pensalfini a, M.Bajka b, P.Abitabile c, R. Zimmermann b, E.Mazza ; Challenging the in-vivo assessment of biomechanical properties of the uterine cervix: A critical analysis of ultrasound based quasi-static procedures

Conclusión

- "The simulations of the maximum compressibility approach, as introduced by Parra-Saavedra et al. (2011), indicate that this procedure can deliver a repeatable assessment of cervical consistency <u>and is able to differentiate between subjects and time point in gestation</u> "

M.M. Maurer a,n,, S.Badir a,, M.Pensalfini a, M.Bajka b, P.Abitabile c, R. Zimmermann b, E.Mazza ; Challenging the in-vivo assessment of biomechanical properties of the uterine cervix: A critical analysis of ultrasound based quasi-static procedures
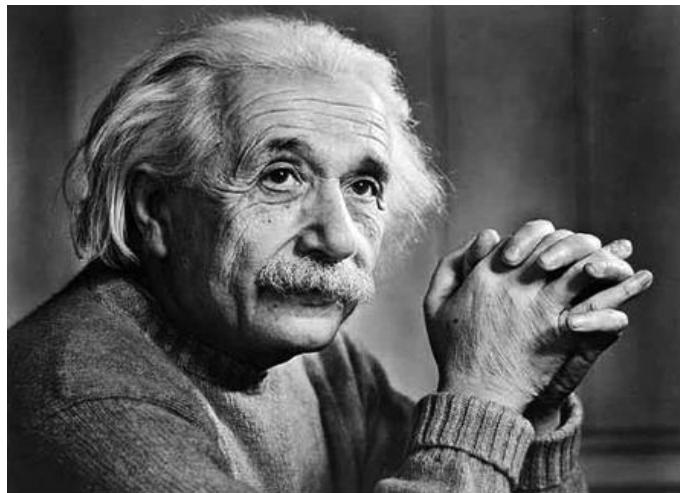
Un ejemplo final
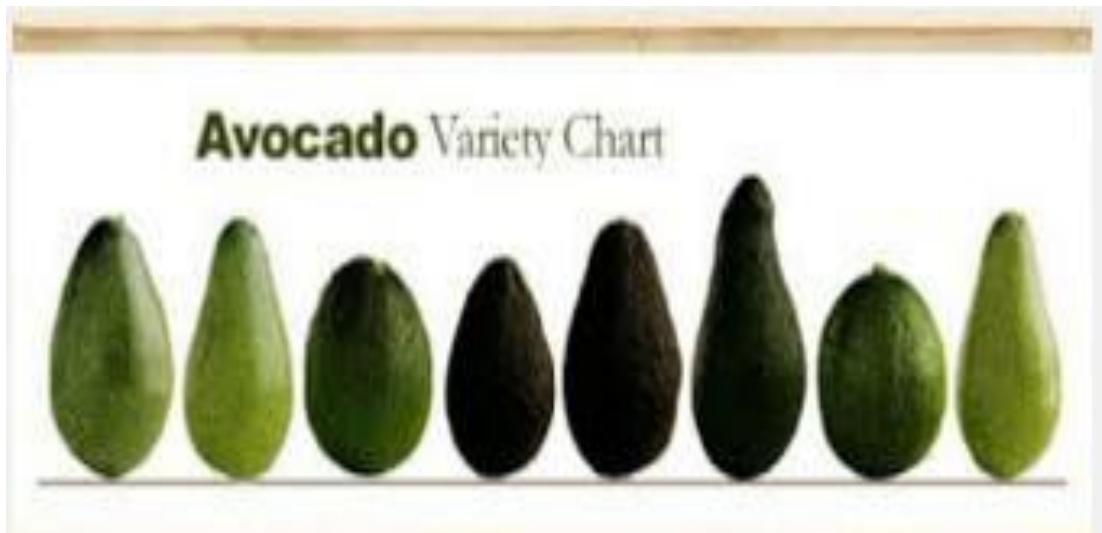
Equipo CEDIFETAL

¡¡¡GRACIAS A TODOS!!!

Agradecimientos

Gracias a el equipo CEDIFETAL

Perinatologos
    Nicolas Castillo
    Isaac Vargas

Ginecólogos
        Guido Parra
        Felipe Vergara

Residentes
        Ana Maria Rivera
         Álvaro Sarmiento
        Heidy Iglesias

Cuerpo Administrativo
        Gerente Ilsy de La Torre

Equipo Medicina Fetal Barcelona

¡¡¡GRACIAS A TODOS!!!

2nd European Spontaneous Preterm Birth Congress

Gothenburg, Sweden, 26th - 28th of May 2016 - preliminary programme

Prediction of preterm delivery by cervical assessment

	Chair: Miguel Parra-Saavedra, Barranqiulla, Colombia
13.45 - 14.20	"Cervical length measurement and prediction of preterm delivery"
	Vincenzo Berghella, Philadelphia, USA
14.20 - 14.50	"Cervical length measurement from a Northern European Perspective"
	Lil Valentin, Lund, Sweden
14.50 - 15.15	"New Techniques on cervical assessment
	Helen Feltovich, Madison, USA
15.15 - 15.45	Break
15.45 - 17.00	Oral presentations
17.00 - 17.15	Short break

Gracias