



CHRISTOPHORO COLOMBO

MACRON
Advanced Simulation 2016
Newborn Obstetric Crisis
Management Simulation

September 29th – October 1st 2016
CISEF Gaslini, Genoa, Italy



Forceps : Decision Making and Technique

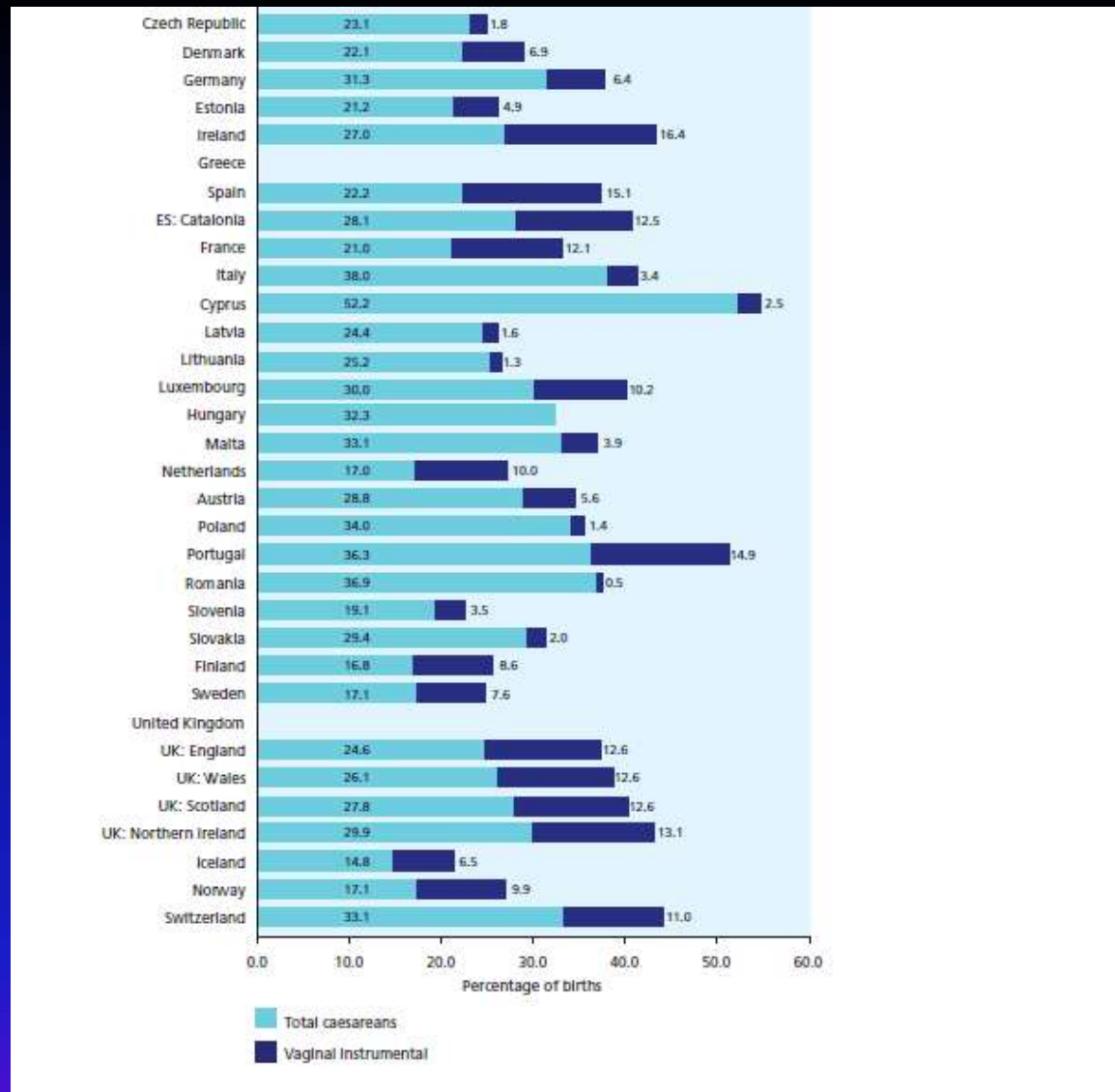
Professor Olivier Dupuis

01 10 2016

Lyon University

I. Instrumental Vaginal Delivery Epidemiology ?

EUROPE 2010



**Romania 0,5% , Italy 3,4%; France 12,1%,
Ireland 16,4%**

Median rate = 7,5% of births

**U.S.A
2013**

**3,3 % of all deliveries
(Same as Italy, one third of France)**

Ref ACOG Practice Bulletin Number 154
November 2015

Large Difference Worldwide
But is there any statistical association
between Rates of CS And
Rates of Instrumental vaginal delivery ?

EUROPE 2010

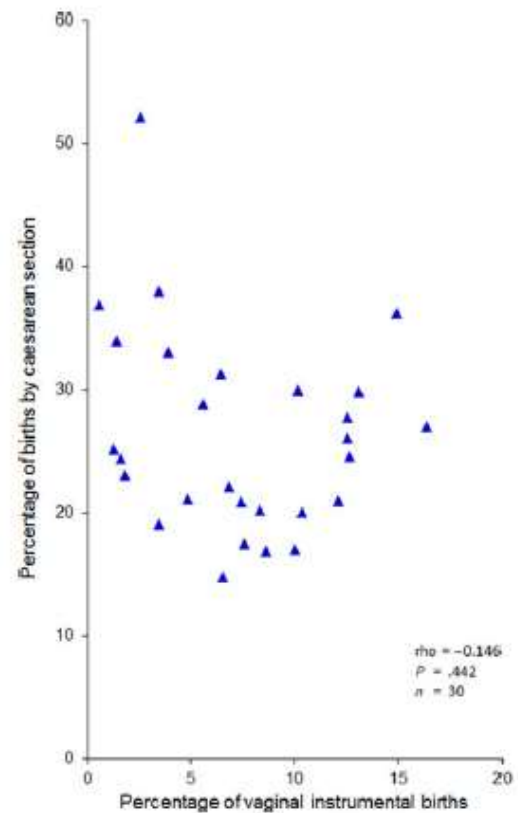


Figure 1. Comparison between caesarean section and vaginal instrumental birth rates, 2010.

26 States of the European Union, No Relation !!

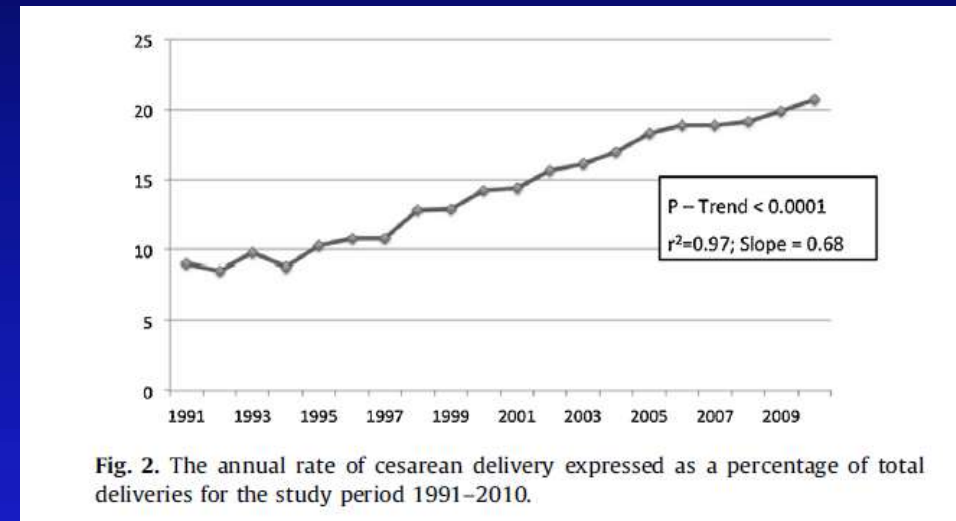
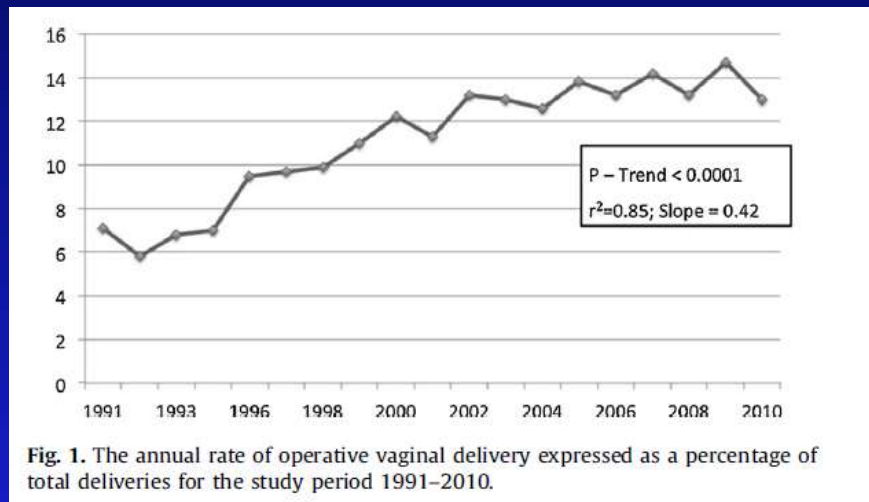
MacFarlane AJ et al BJOG 2015

U.S.A
2015

« According to a newly revised Practice Bulletin
Operative vaginal deliveryshould be used
to safely avoid cesarean delivery »

ACOG, October 21, 2015

Operative Vaginal Delivery rate evolution ?



Hehir MP et al EJOG 2013; 171:40-3
National Maternity Hospital Dublin

National Maternity Hospital , Dublin

- During the 20 years 11,4% of total Births and 13,6% of vaginal deliveries are OVD
- Nulli para Increase From 14,2% in 1991-5 to 23,4 % in 2006-10
- Multi para Increase From 2,6% in 1991-5 to 5,1% in 2006-10
- **Operative Vaginal Delivery increase 0,42 % each year**
- **During the same Time CS Rate Increase**

An association between
Rates of CS
And
Rate of Instrumental vaginal delivery
Is not Demonstrated

Effect of the Maternity Type on Operative Vaginal Rate ?

Data from France 2010 , Low Risk woman

Level I , IIA, IIB , III

No significant Difference

Public VS Private Practice

Significantly More OVD in Private

Public : 13,4% rate

Private : 19,7 % rate

$p < 0,001$

Unit Size <1000 VS > 3000 d/y

**Significantly More OVD in
Maternity with > 3000 deliveries**

OR: 1,47 (95% CI 1,10-1,96)

Explanation for Private practice Increase in OVD ?

- **Higher Fear of litigation in case of FHR abnormalities ?**
- **ObGYN more sensitive to women's requests ?**
- **Allow easier Time management ?**

No direct link with financial incentives.

(In France Fees paid by the National Health Insurance is the same for F, V, CS or SVD)

Instrument Type Rate ?

| | 1991 - 1995 | 2006 - 2010 |
|----------------|-------------|-------------|
| Forceps | 68,2% | 32,9% |
| Vacuum | 31,8% | 67,1% |

In 2016 , Vacuum Is the First Line Instrument

Ref : Hehir MP et al EJOG 2013; 171:40-43
National Maternity Hospital Dublin

Is there any « Ideal Rate » of
Instrumental vaginal,
Spontaneous vaginal,
or CS rate ?

What is a « Best Rate » ?

➤ W.H.O Recommendation

Cesarean Section Optimal Rate ?

Yes

« There is no justification for any region
to have a rate higher than 10-15% »

Lancet 1985; 2 (8452) 436-7

Outdated Recommendations

19%, in 2016

Jama, 2015

Operative Vaginal Delivery Optimal Rate ?

Not stated

➤ R.C.O.G Recommendation

Green Top Guideline n°26 January 2011

Between 10 and 13% of Operative Vaginal Deliveries in U.K

Remained stable

What about Optimal OVD Rate ?

Not stated but

« rate of OVD should be reviewed on a regular basis. »

➤ A.C.O.G Recommendation

Practice Bulletin Summary , Number 154, November 2015

3,3% of all deliveries in 2013

What about Optimal OVD Rate ?

Not stated

➤ Epidemiology Data Summary

- **In 2016, Still a Significant number of deliveries with Forceps or Vacuum**
- **No clear Relation between CS Rate and Forceps and Vacuum Rate**

**No recommended Rate ? =
Of course ... the Type of Delivery
should never ever be a Goal for an
ObGYN**

Our Only Goal is :

**A healthy Mother
A healthy Neonate**

Is CS before labor
always a Safe Procedure ?

Neonatal Trauma

« We were surprised to find that fewer than half of the cases of brachial plexus injury identified in this study were seen in CS for dystocia and that

four of the nine brachial plexus injury occurred in women with CS who did not labor at all.

Several types of fetal injury commonly associated with difficult vaginal delivery occurred in women who did not labor and underwent an elective repeat cesarean delivery. »

Alexander JM Obstet Gynecol 2006 108(4) ; 885-90 2006
(37 110 CS among them 12565 before labor)

❖ *Cesarean Section, Unpublished Case ...*

Difficult delivery through Hysterotomy

Cervical Spine Trauma leading to

a Permanent Spastic Tetraplegia +++

*Rhone-Alpes Région
Medico legal Issue
7 Million Euros ..*

Maternal Mortality

❖ 15 801 CS before Labor and 17 898 trial of labor

« Of the seven maternal deaths in the group that underwent elective repeated cesarean delivery, two maternal death were considered attributable to the cesarean delivery »

Landon M N Engl J Med 2004;351:2581-9
19 maternity Hospitals USA 1999-2002

Never Let Our Patient Think
That delivery with CS means No Risk

**II. The Best Operative Vaginal Delivery
Is the One that can be avoided.**

**Can Operative Vaginal Delivery
Be avoided ?**

Evidence Based Data ?

A. Does Continuous One to One Support decrease OVD ?

Cochrane Database 2007 Hodnett ED et al

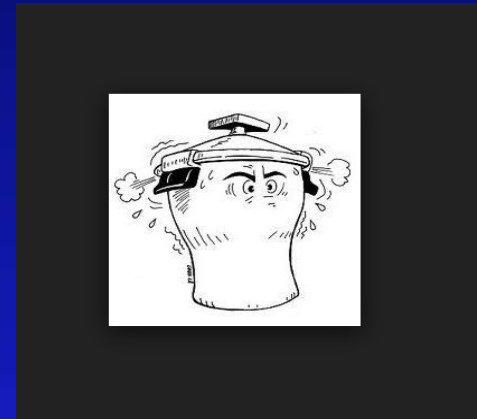
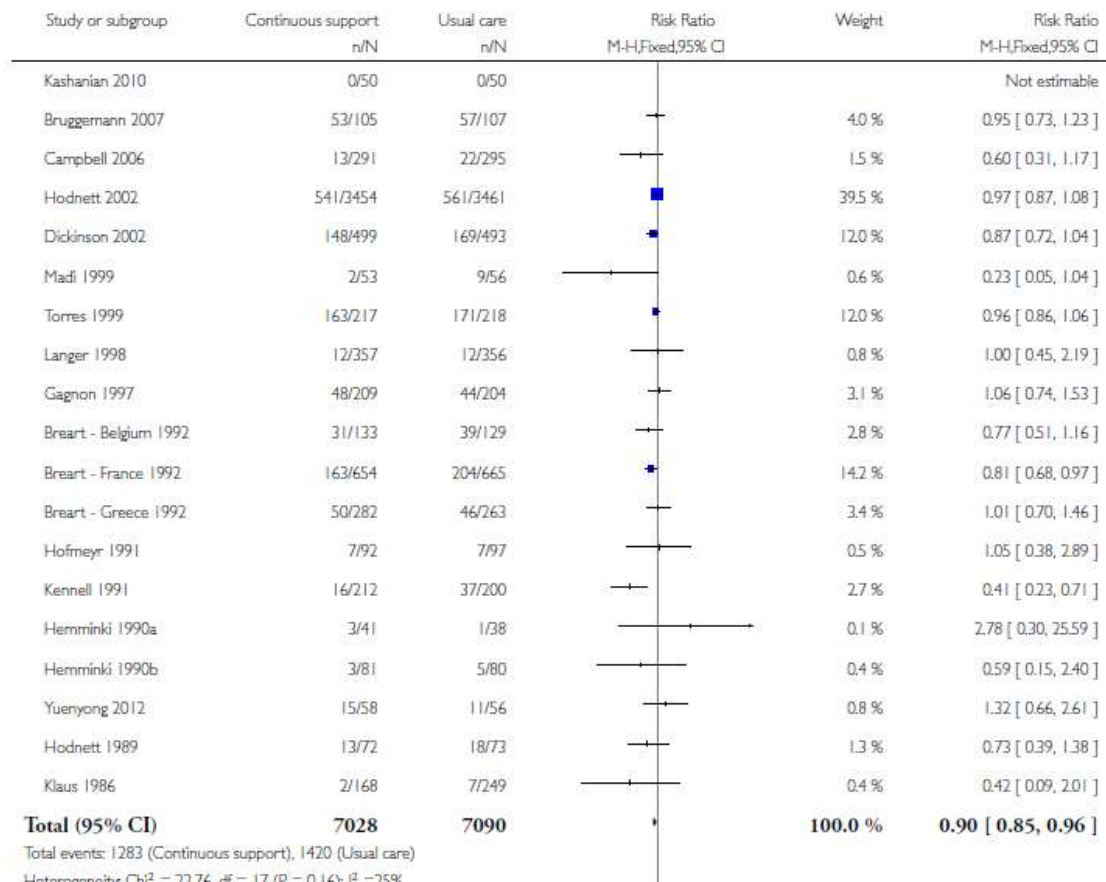
19 trials RR 0,90; 95% CI (0,82-0,96)

« Yes, it Can reduce the incidence of OVD »

Continuous support for women during childbirth (Review)

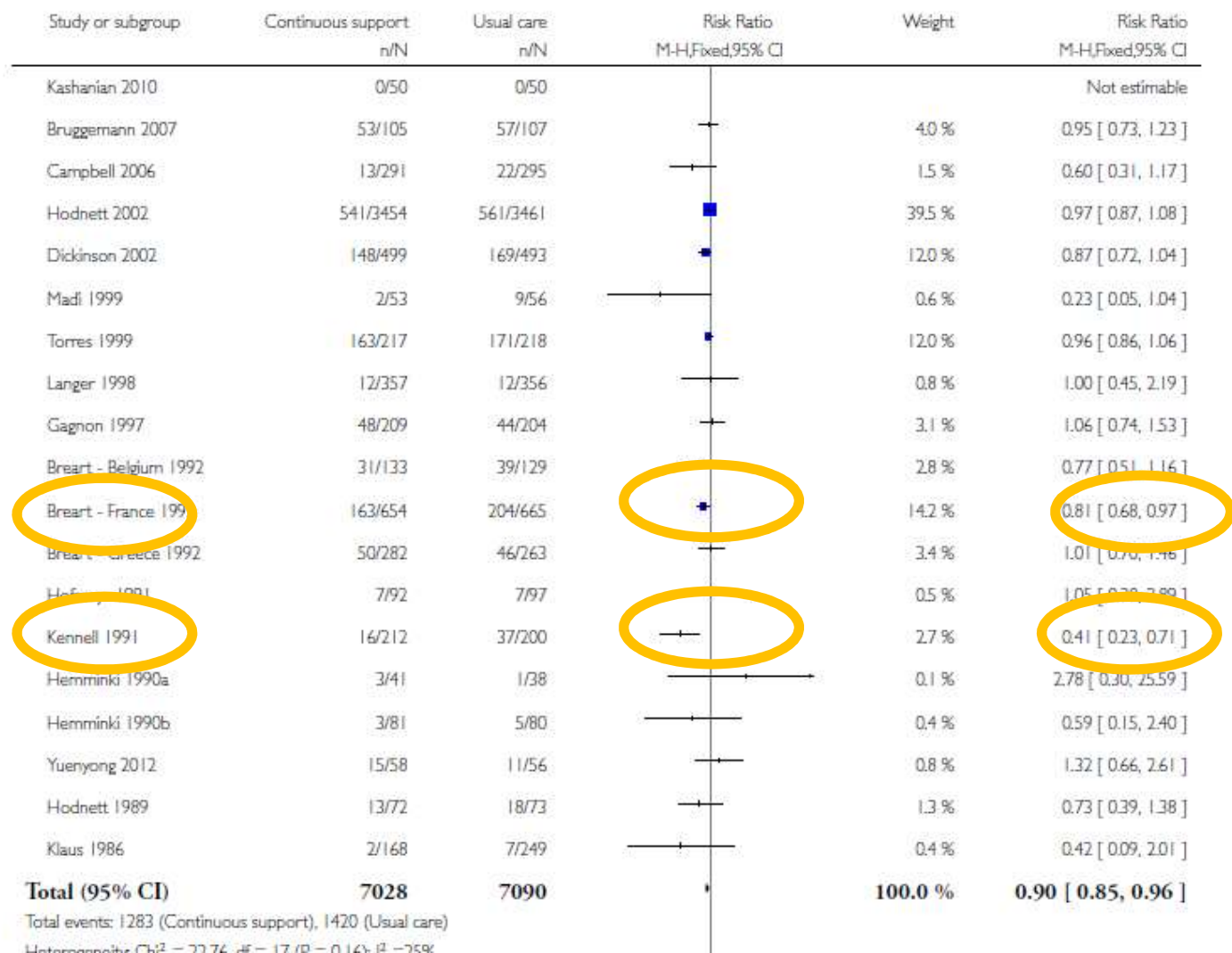
Hodnett ED, Gates S, Hofmeyr GJ, Sakala C







« Look for significant studies :
exclude all the studies in which
the risk ratio
include the value [1] ».



Look for significant studies : exclude all the studies in which the risk ratio
Include the value « 1 » Breart 1992 Study No access to the paper, unclear reference

Among 19 studies only 2 with significant results :

- First study : Wrong reference ?

- Second study : John Kennell study Jefferson Davis Hospital, Tx
« One to One group » **8,2% forceps rate**
versus 21,3% in the « observed group ». $P < 0,05$

BUT.....

« At this facility, companions were not routinely permitted to be with a woman during labor and delivery because most patients labored in a 12 bed ward that had insufficient privacy to allow visitors... »

2 Studies but

- From the early 1990 > 20 years
- In both studies : « Discrepancy in the number of woman enrolled »

Cochrane Review « The trials were of generally good quality »

I do not agree : Lack of Good studies , Lack of Clear evidence

**No Clear Evidence of any effect of continuous
One to One Support on Forceps or Vacuum Rate
Do not Take Cochrane Review
Conclusions For Granted ...**

**B. In woman with epidural in the second stage
Does any specific Maternal position decrease
OVD ?**

**At least 30% of time in the relevant phase of labor in the
allocated position**

Cochrane Database ?

2013, Emily Kemp et al

**Rate of Operative deliveries =
CS or Operative vaginal delivery
are not Significantly different ++
5 RCT ,874 woman**

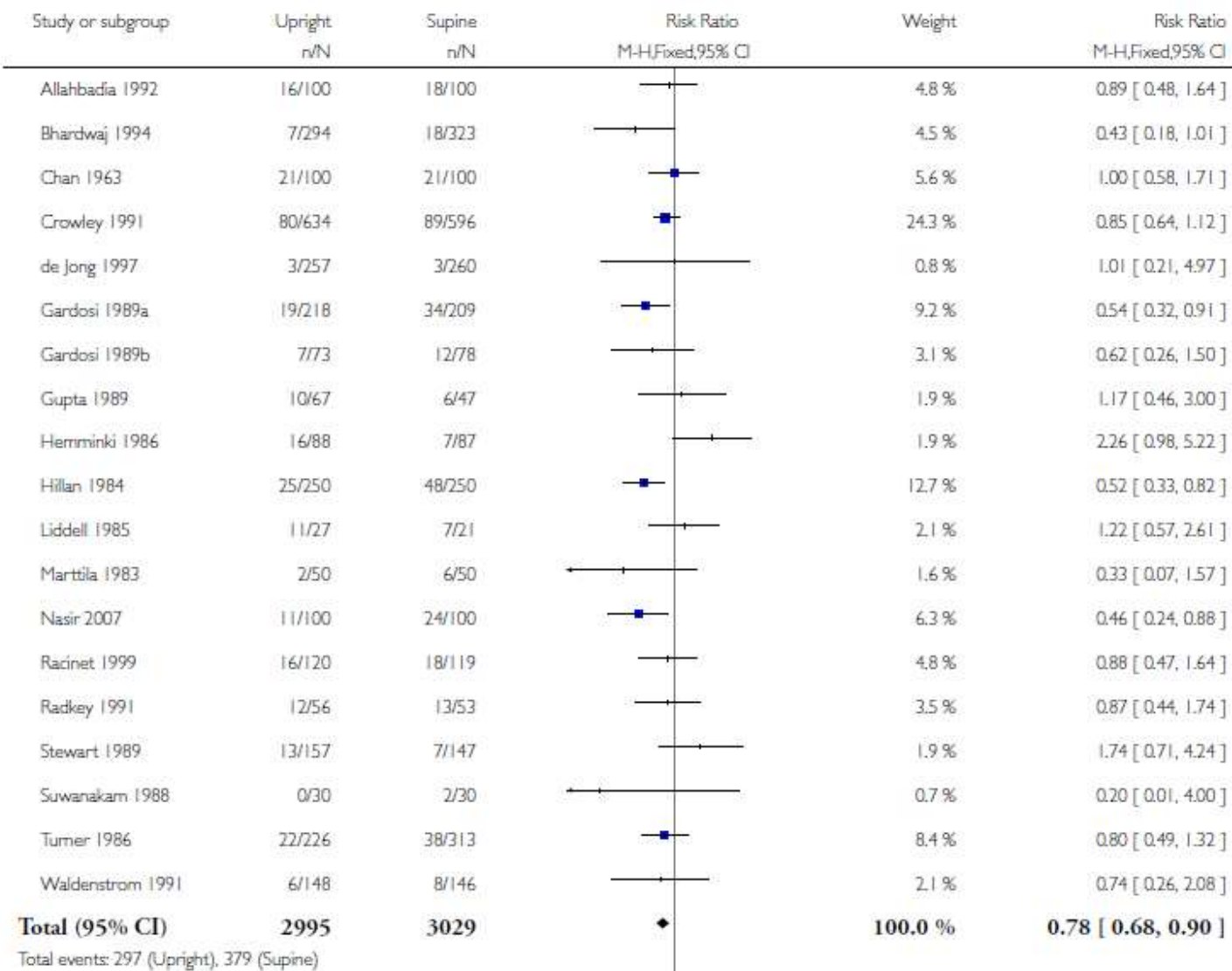
**« At full dilatation if the woman has an
epidural analgesia she can use whatever
position she find comfortable ... »**

**In cases with epidural analgesia
No Clear Evidence of any effect of
Maternal Positions on Forceps or Vacuum Rate**

C. In woman Without epidural analgesia and in the second stage does any specific Maternal positions decrease OVD ?

Cochrane Database ?

2012 Janesh Gupta et al



Outcome = Assisted deliveries = Forceps or Vacuum

« At full dilatation if the woman has no epidural analgesia an Upright position Could induce a small significant decrease In rate of Forceps or Vacuum ... »

**In cases without epidural analgesia
Significant and small benefit of
An Upright Positions during Second stage on
Forceps or Vacuum Rate**



Fig 1—Supported squatting on the birth cushion.

Study by Gardosi Lancet 1989 . Without Epidural Analgesia

Squatting
Recumbent

Forceps + Vacuum deliveries = 9%

Forceps + Vacuum deliveries = 16%

$p < 0,05$

**Upright Positions : Main body axis $>45^\circ$ from Horizontal
(Non recumbent)**

- Sitting ++**
- Semi recumbent $> 45^\circ$**
- Squatting**
- Kneeling (upright leaning on the head of the
bed or supported by a partner)**
- Standing**

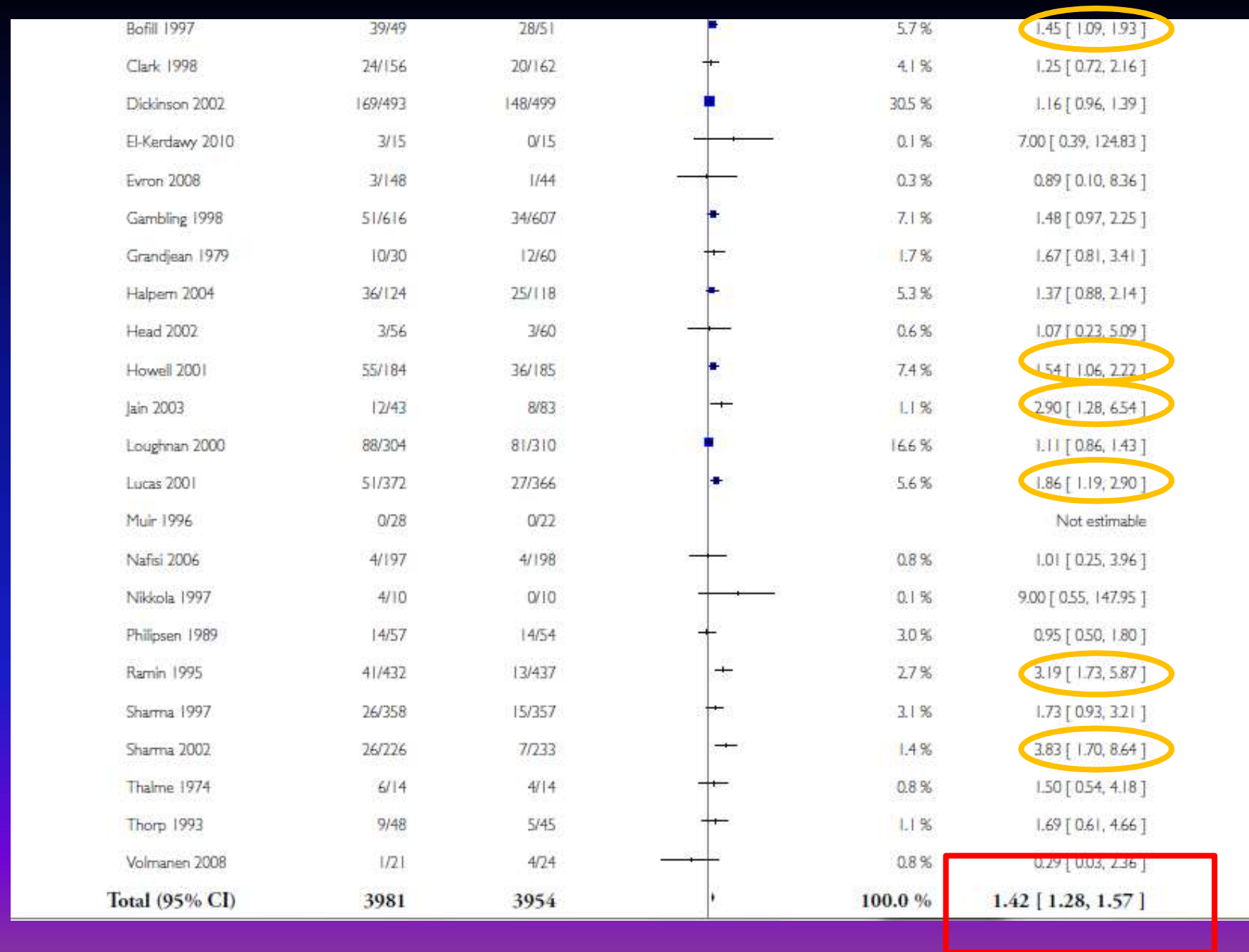
D. Does epidural Analgesia increase Operative Vaginal Delivery Rate ?

Cochrane Database ?

2011, Anim-Somuah M et al , UK +++++

Epidural versus non-epidural or no analgesia in labour
(Review)

Anim-Somuah M, Smyth RMD, Jones L



**Epidural analgesia increase OVD, both vacuum
And forceps deliveries**

**Avoiding Epidural Analgesia Significantly reduce
the Rate of Forceps**

as well as the rate of Vacuum delivery

(RR = 1,42 95% CI 1,28-1,57 ; 7935 woman)

**But ... EA offer a significantly
better pain relief**

(3 trials, 1166 women)

**In My Department
85% rate of epidural analgesia**

E. At Full dilatation How Many Time
can I Wait before
Proceeding to An OVD ?

| | Median* | 95th Percentile |
|------------------|--------------------------|--|
| Primipara | 1,1 h (66 mn) | 3,6 h (216 mn) Warning > 2 h X 6 Anal Sphincter Risk ** |
| Multipara | 0,4 h (24 mn) | 2 hr (120 mn) |

*Ref : Safe labor consortium group; Obstet Gynecol 2012; Nov

** Fitzgerald Obstet Gynecol 2007, 109;29 407 anal sphincter tear

**We need study to Know whether
Waiting until the 95th Percentile
Of time**

**decrease The Rate of Forceps
Or Vacuum AND whether
This Attitude is Safe ++**

**Small number of US studies leading to new
recommandations but
Complications increase ...
(PPH...)**

**III. Is Forceps Better than Vacuum
Which Instrument should I Use ?**

Failure Rate ?

- Significantly more failure with Vacuum
OR 1,7; 95% CI 1,3- 2,2

Ref : Cochrane review , Johanson RB, 1999;2
Vacuum extraction VS forceps for assisted vaginal delivery

- High Failure Rate with Vacuum

Kiwi Omni Cup from 12,9 to 34%

Standard Cup 21%

Ref : Attilakos, G, BJOG 2005;112:1510-5 and Groom KM BJOG 2006;113:183-9
And Baskett TF J Obstet Gynaecol Can 2008;30:573

Maternal and Neonatal Morbidity ?

➤ Vacuum :

-- Any reported Maternal Death ? Yes, from cervical tear

-- Any reported Neonatal Death ? Yes, from Subgaleal Hemorrhage ++

➤ Forceps

-- Any reported Maternal Death ? Yes, from uterine rupture undiagnosed

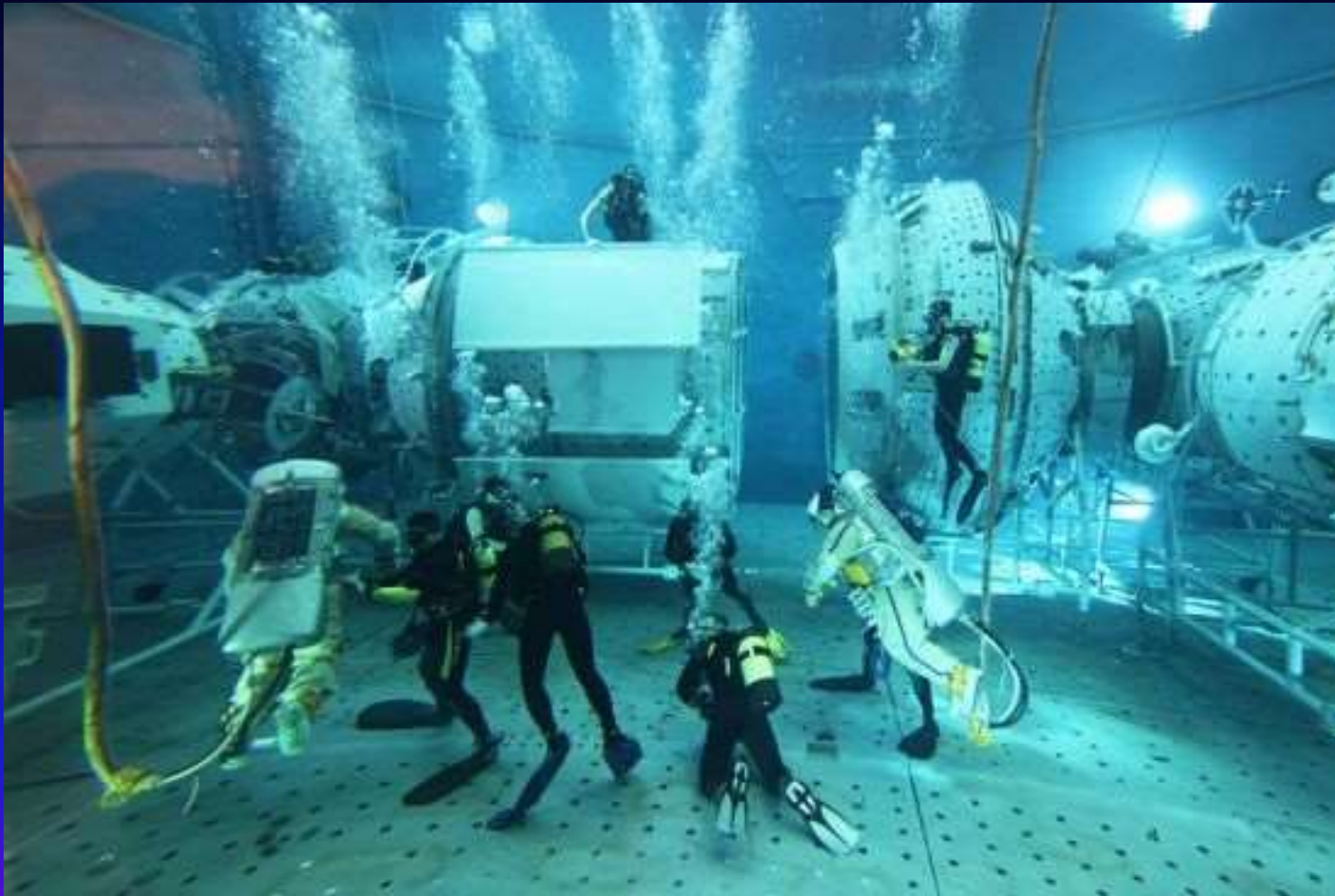
-- Any reported Neonatal Death ? Yes, from Intracranial Hemorrhage

For Both Instruments the
Obstetrician Need to follow the
appropriate safety procedures

IV. Forceps and Vacuum Procedures ?

1. Pre Requisite : Training + Senior Supervision

- No OVD before Training
- For Resident No OVD without Senior supervision
- Vacuum
 - No use before 36 weeks
 - No use on Face presentation
 - No use with significant caput



Training for Astronaut

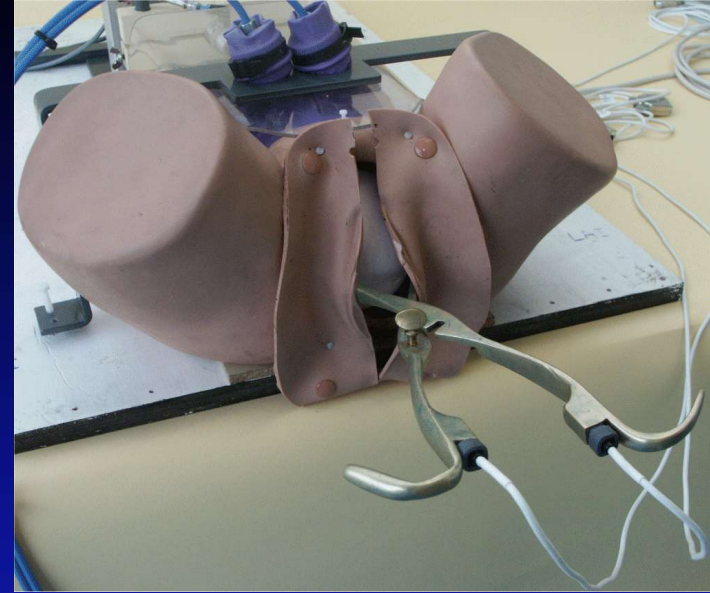
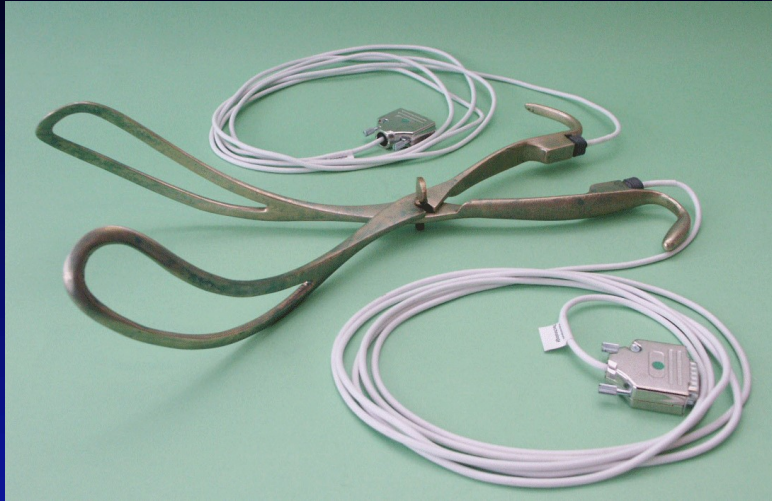


Training for Pilot



YouTube « birth simulator insa »

Training for ObGyn



« A 2 hour Birth Simulator training session that includes 30 practice Placements of forceps blades allows for significant improvement In obstetricians' skills »

Dupuis O et al EJOG 2011

2. Look for any of those 4
Contra indication :

A. Slow Labor ? Warning :

Reaching Full Dilatation is not a Goal !

Look at the Partogram +++

I Use « the 8 Hours Rule »

8 Hours after the beginning of the active
Phase (4cm), full dilatation should be achieve

B. Severe Molding ?

No OVD if cranial bone overlap

C. Large Caput ?

Never ever say : « I see the neonate hair, proceed to forceps or vacuum, the baby is Here »

You should assess the skull and not the skin position ++++

Never ever speak of « skin to foetal head distance », speak of « skin to skull distance »

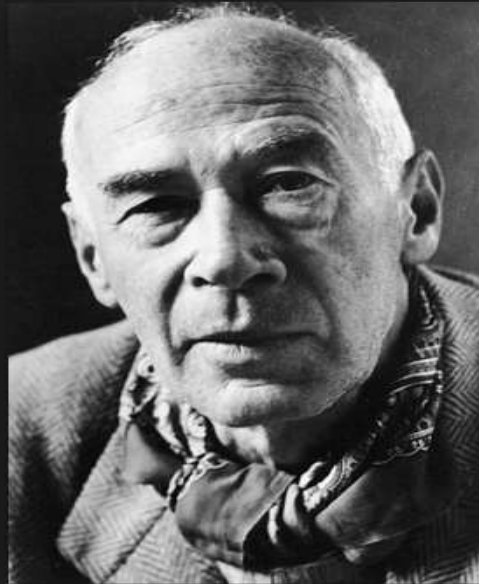
D. Significant Maternal pain ?

No OVD in case of Significant Pain

Start by an efficient and safe Analgesia

3. Is there a Real Indication ?

A. Is the bladder empty
Distensione della vescica ?



“To relieve
a full bladder
is one of the
great human
joys.”

-Henry Miller

1. Epidural analgesia
2. No more bladder sensation
3. Full bladder (300 ml or more)
4. Lack of descent
5. Forceps

This is a typical « Nocebo effect »

Empty the bladder and know How many ml was in the bladder ? More than 150 ml explain a lack of descent

B. If FHR is normal, did you allow enough Time for descent ?

If elapsed time since full dilatation is less than 2 hours : Relax and Wait +++

C. If FHR is normal and its an OP

Proceed to manual rotation if the mother OK

D. If FHR is abnormal look for an etiological treatment Stop Oxytocin if $> 5\text{CU}/10\text{mn}$

4. Make Sure you Have a Spatial Image of the foetus position and that you master the « theory of symmetry »

- Station ?
- Position ?
- Instrument application ?

What is my « Theory of symmetry » The Egg theory ?

Professor Olivier Dupuis PhD Thesis
Available online at
« Apport du forceps instrumenté »
Dupuis O, 236 pages

Theory of Symmetry

« A small force applied asymmetrically could be more dangerous than a great deal of force applied symmetrically »



**During a delivery
DO NOT ONLY FOCUS ON THE
QUANTITY
OF MECHANICAL FORCES
Rather
FOCUS ON
QUALITY
OF MECHANICAL FORCES**

During Every Delivery The Best Forces are

=

Forces as small as possible

Forces as symmetrical as possible



**Synchronisation between Uterine Contractions
Pushing effort and Traction**

Good pain relief

Mother cooperation or GA

Quality control of ID application

Ref : Mises à jour en Gynécologie et Obstétrique et techniques
Chirurgicales CNGOF 2013 Editions VIGOT Paris
Simulation et extraction instrumentale.

La théorie de la symétrie.

Olivier Dupuis

2013

Pages 437-443

Ref : Lapeer R, Audinis V, Gerikhanov Z, Dupuis O.

A computer based simulation of obstetric forceps

Placement Med Image

Comput Comput Assist Interv

2014 , 17(Pt 2):57-64.

How did I get to this theory ?

American Journal of Obstetrics and Gynecology (2005) 192, 165–70



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AMERICAN JOURNAL
of
OBSTETRICS
and
GYNECOLOGY

www.ajog.org

**Comparison of “instrument-associated” and “spontaneous”
obstetric depressed skull fractures in a cohort of
68 neonates**



Theory of Symmetry

« A small force applied asymmetrically could be more dangerous than a great deal of force applied symmetrically »



During a delivery which reasons can lead to asymmetrical forces ?

A. What is the foetal head Station ?

No mistake

Mistake :
Estimated Station \neq Real Station
= First reason of asymmetry

↓
complication

B. What is the Fetal head Position ?

No mistake

Mistake :
Estimated Position \neq Real Position
= Second reason of asymmetry

↓
complication

C. Is the instrument applied symmetrically ?

No mistake

Mistake
Instrument trajectory \neq Ideal trajectory
= Third reason of asymmetry

SUCCESSFUL
INSTRUMENTAL
DELIVERY

↓
complication

A. Question n°1 : What is the foetal head Station ?

Mistake :
Estimated Station \neq Real Station

No mistake

= First reason of asymmetry

complication

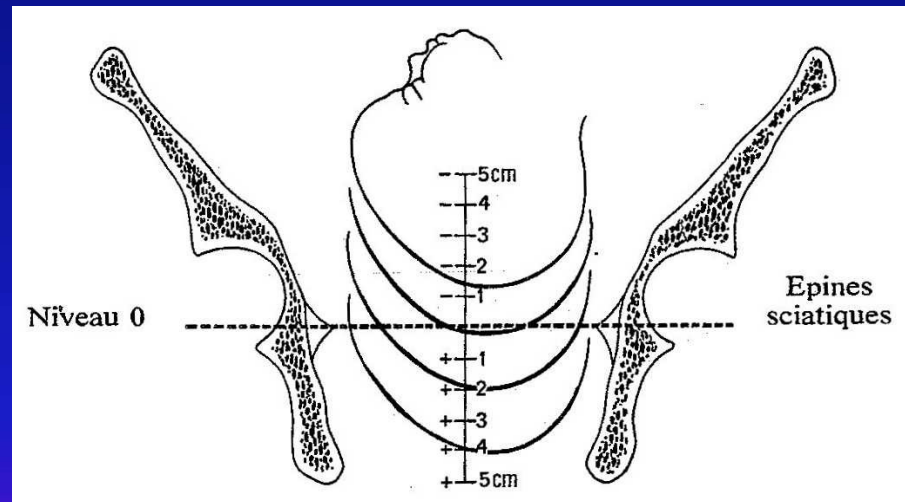
American Journal of Obstetrics and Gynecology (2005) 192, 868–74



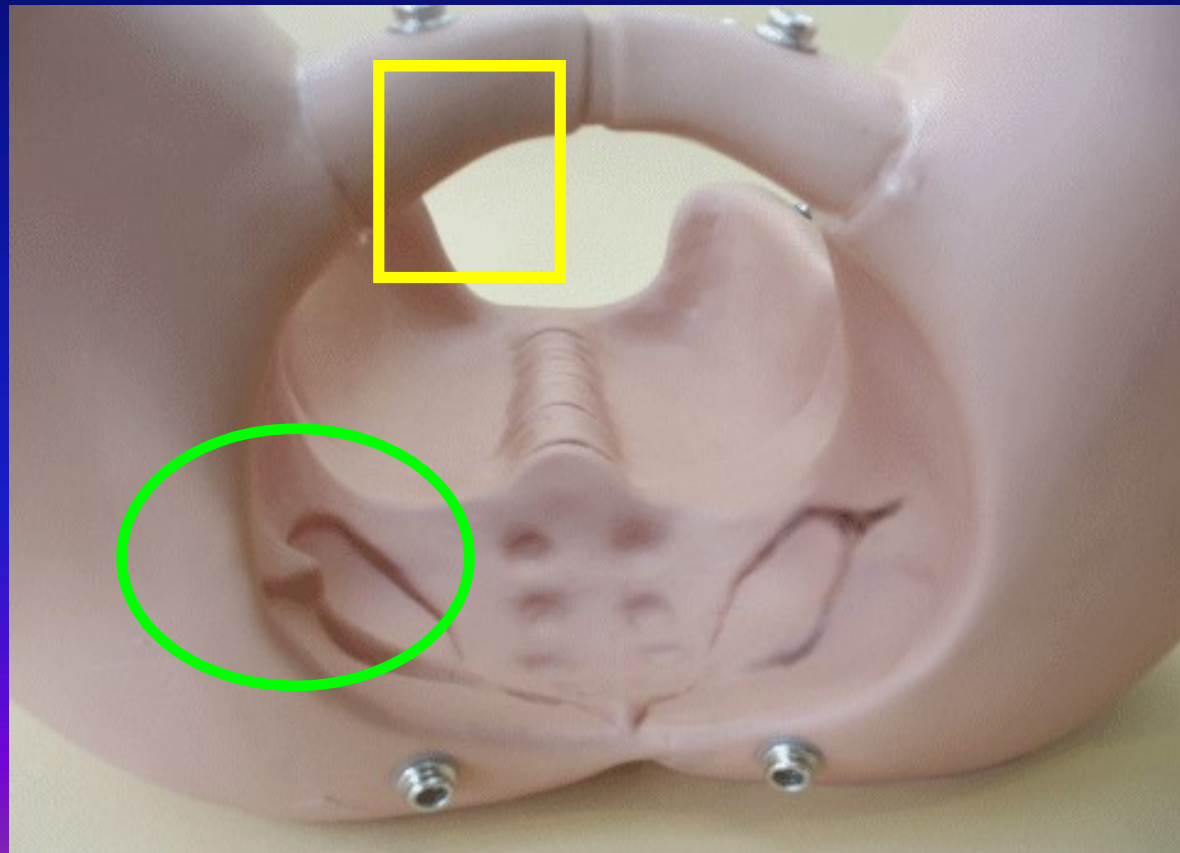
American Journal of
**OBSTETRICS and
GYNECOLOGY**
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Birth simulator: Reliability of transvaginal assesment of fetal head station as defined by the American College of Obstetricians and Gynecologists classification

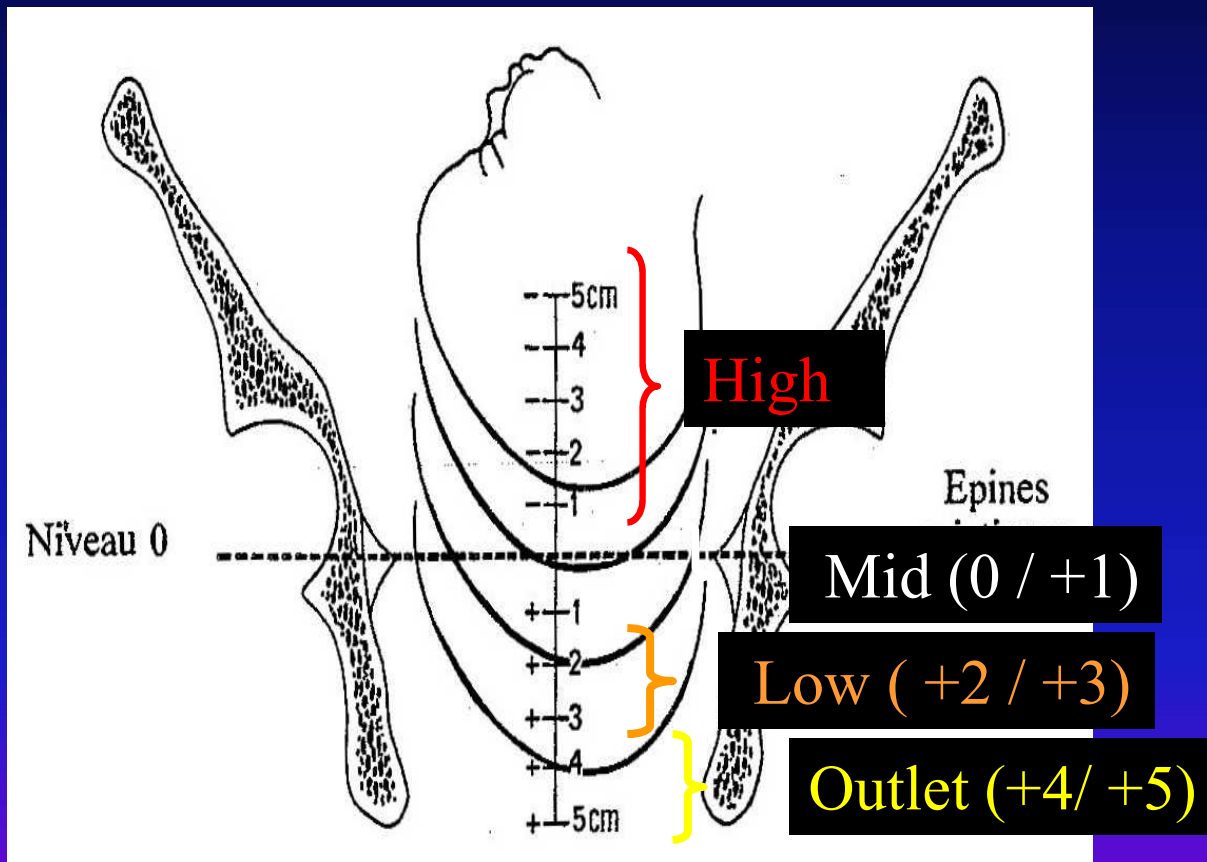
Olivier Dupuis, MD,^{a,b,*} Ruimark Silveira, MS,^b Adrien Zentner, MS,^b André Dittmar, PhD,^b Pascal Gaucherand, MD,^c Michel Cucherat, MD,^d Tanneguy Redarce, PhD,^b René-Charles Rudigoz, MD^a



➤ What are the « ischial spines » ?



| Station | Definition | Delivery |
|---------------------------------|------------|--|
| - 5 - 4 - 3 - 2 - 1 | « HIGH » | « C section » |
| 0 +1 | « MID » | Potentially Dangerous Only Senior MD « Discuss a CS » |
| +2 +3 | « LOW » | « Vaginal Operative Delivery » |
| +4 +5 | « OUTLET » | |





➤ **Rate of engagement errors :**

12 % (IC 95%; 8.6 – 16) (resident)

12 % IC 95%; 8.1 – 15) (attending physician)

**Accuracy of clinical estimation of foetal head
station is not optimal**

➤ **Choosing not to perform « Mid » instrumental deliveries could decrease the
number of potentially dangerous situations...**

➤ **News tools are needed to help physicians
estimate foetal station**

Transperineal Ultrasound +++++

B. Question n°2 Foetal head Position ?

No mistake

Mistake :
Estimated Position \neq Real Position
Second reason of asymmetry

Available online at www.sciencedirect.com

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European Journal of Obstetrics & Gynecology and
Reproductive Biology 123 (2005) 193–197

www.elsevier.com/locate/ejogrb

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Fetal head position during the second stage of labor:
Comparison of digital vaginal examination and
transabdominal ultrasonographic examination

Olivier Dupuis^{a,*}, Silveira Ruimark^b, Dupont Corinne^c,
Thevenet Simone^d, Dittmar André^b, Rudigoz René-Charles^a

^aUnité de Gynécologie Obstétrique, Hôpital de la Croix Rousse, 103 Grande-Rue de la Croix Rousse, 69317 Lyon Cedex 04, France
^bLaboratoire de Physique de la matière, Bâtiment Blaise Pascal, INSA, 7 Avenue Jean Capelle, 69621 Villeurbanne Cedex, France

Table 3

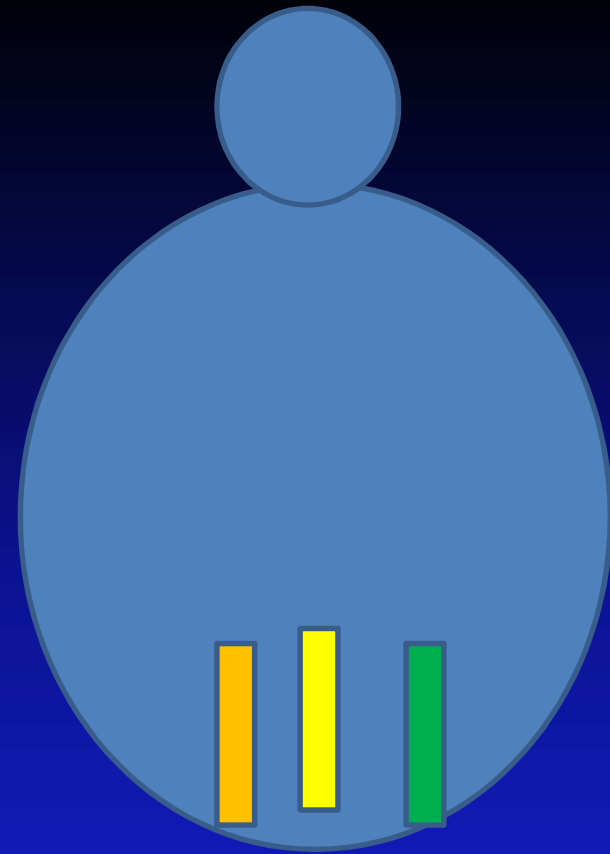
Relationship between head location and digital vaginal examination error

| Head location | Range of error | | Total |
|---|----------------|------|-------|
| | 0–45° | >45° | |
| Occiput anterior (OA, ROA, LOA) | 78 | 12* | 90 |
| Occiput posterior (OP, ROP, LOP) and occiput transverse | 10 | 10* | 20 |
| Total | 88 | 22 | 110 |

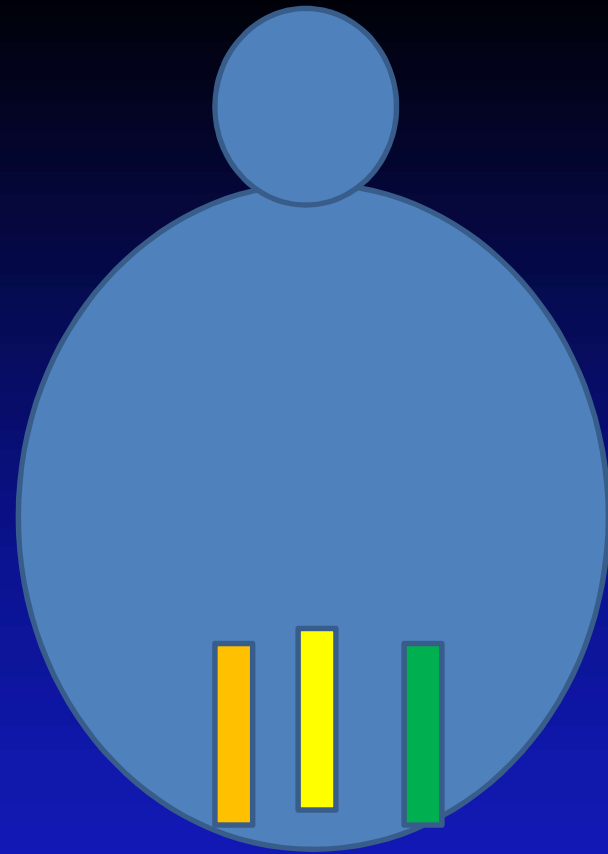
* Difference in error rate between the occiput anterior and the occiput posterior + occiput transverse group is highly significant: $p < 0.001$.

In OP position as much as 50% of errors

- **Accuracy of clinical estimation of foetal head
Station is not optimal**
- **Transabdominal ultrasonography is a simple, quick and efficient way of
increasing the accuracy of fetal head position**
- **Ultrasound identification of the foetal head position might
Increase the success rate and safety of instrumental delivery**

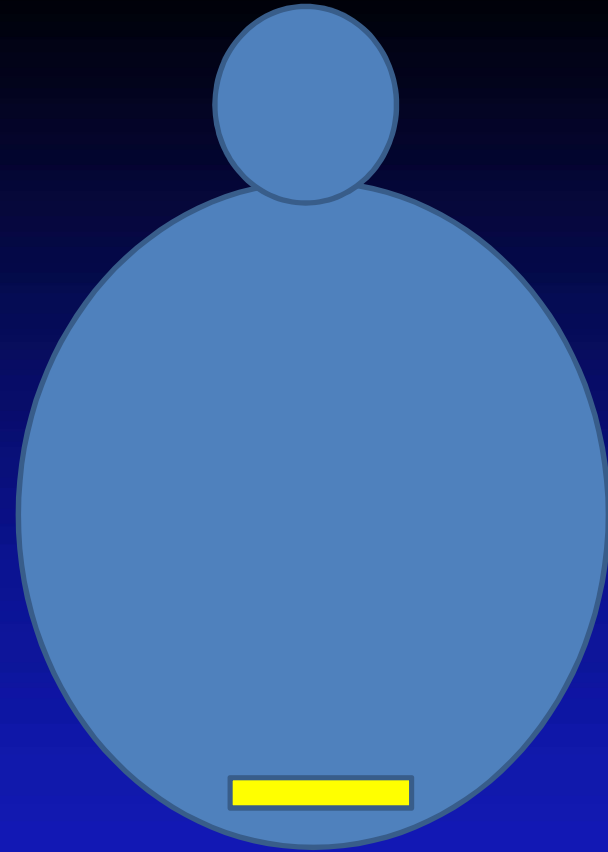


US transducer location

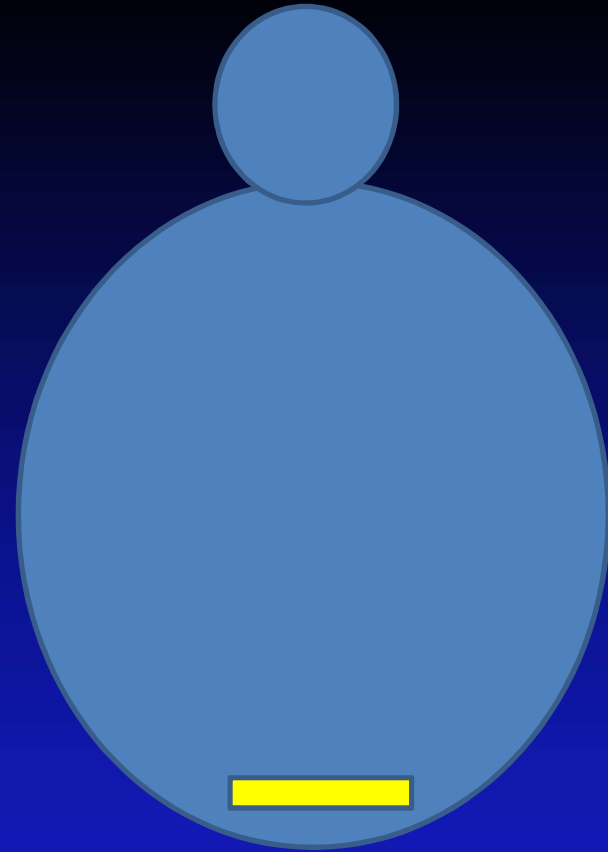


OA position
ROA position
LOA position

US transducer location

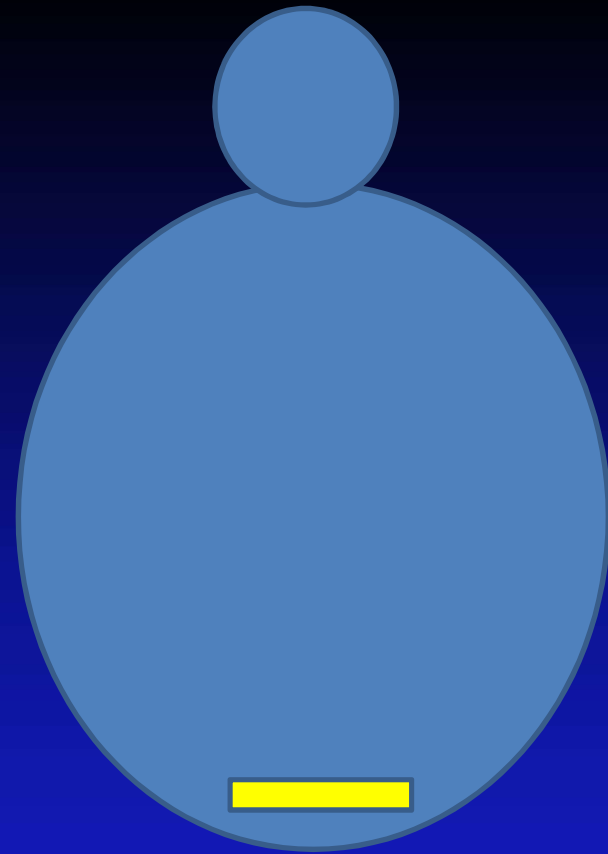


US transducer location

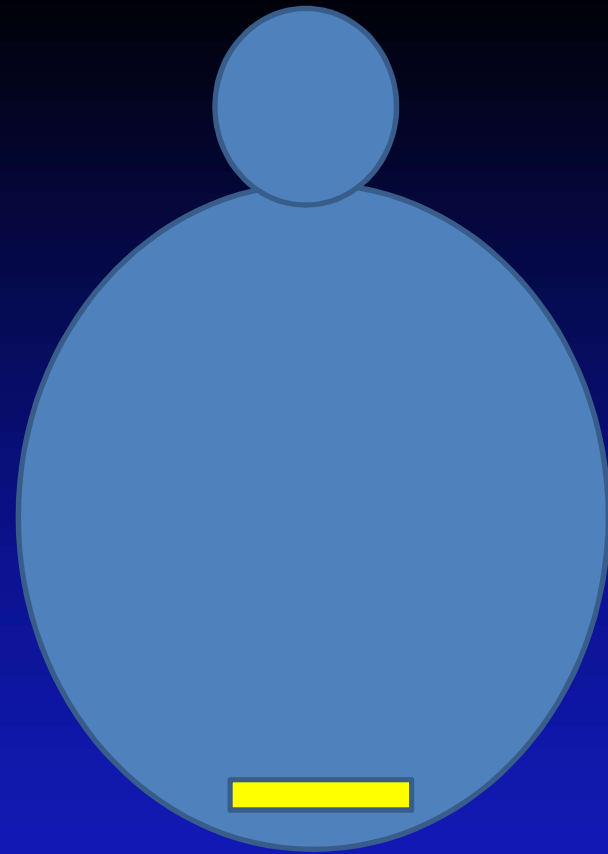


OP position

US transducer location



US transducer location



LOP position

US transducer location

Use abdominal Ultrasonography

Or

The « Two fontanel sign »

Once you have one fontanel

Look for the second one 9,5cm ahead*

*O Dupuis et al 2016 J Gynecol Obstet Biol Reprod
2016 Feb 10 epub ahead of print

C. Question n°3 Is the instrument applied symmetrically ?

No mistake

American Journal of Obstetrics and Gynecology (2006) 194, 1524-31



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American Journal of
**Obstetrics &
Gynecology**
www.ajog.org

**A new obstetric forceps for the training of junior doctors:
A comparison of the spatial dispersion of forceps blade
trajectories between junior and senior obstetricians**

Olivier Dupuis, MD, PhD,^{a,b,*} Richard Moreau, MS,^b Rui-mark Silveira, PhD,^b
Minh Tu Pham, PhD,^b Adrien Zentner, MS,^b Michel Cucherat, MD,^c
René-Charles Rudigoz, MD,^a Tanneguy Redarce, PhD^b

Mistake

Instrument trajectory \neq Ideal trajectory

= Third reason of asymmetry



complication



Contents lists available at SciVerse ScienceDirect

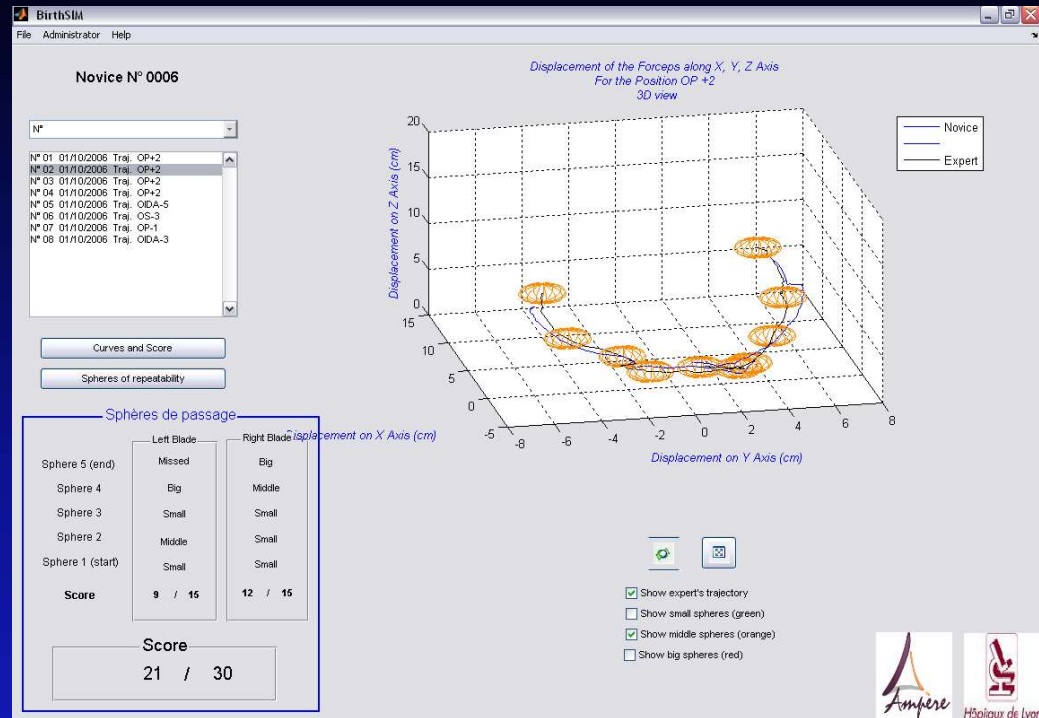
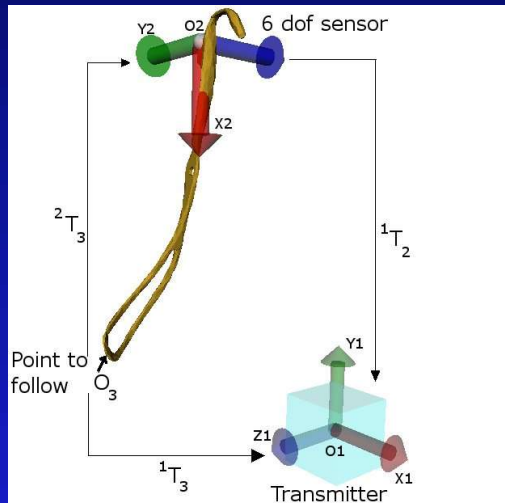
**European Journal of Obstetrics & Gynecology and
Reproductive Biology**

journal homepage: www.elsevier.com/locate/ejogrb



Does forceps training on a birth simulator allow obstetricians to improve forceps blade placement?

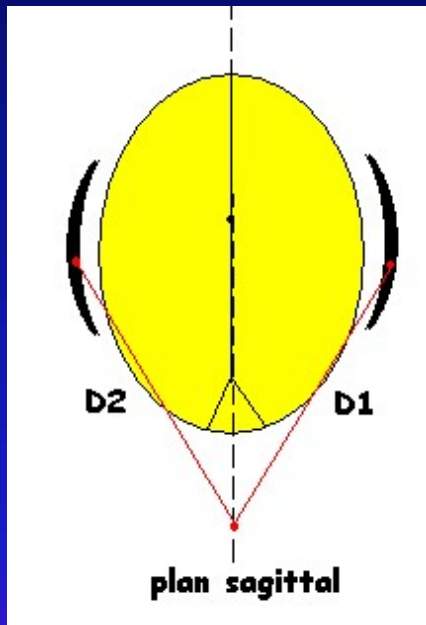
Olivier Dupuis^{a,*}, Evelyne Decullier^b, Jessica Clerc^a, Richard Moreau^c, Minh-Tu Pham^c,
Sylvie Bin-Dorel^b, Xavier Brun^c, Michel Berland^a, Tanneguy Redarce^c



**Computer driven analysis of the forceps blade trajectories
Has shown that you need to master the forceps to put it in a LOA,
ROA, ROP or LOP position**

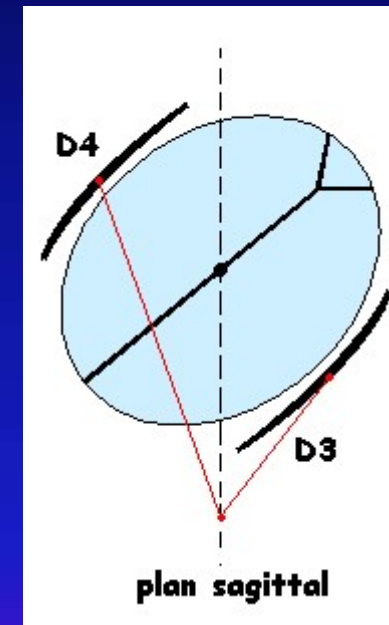
Forceps and Vacuum should be applied Symmetrically on the foetal head +++

Sagittal Position (OP, OA)



Symmetric application of the instrument requires a symmetric movement from the obstetrician

Oblique Position (LOA, ROA, LOP, ROP)



Symmetric application of the instrument requires an asymmetrical movement from the obstetrician

5. Classify the OVD using the 3 Color Code



Available online at www.sciencedirect.com



European Journal of Obstetrics & Gynecology and
Reproductive Biology 140 (2008) 206–211



www.elsevier.com/locate/ejogrb

Red, orange and green Caesarean sections: A new communication
tool for on-call obstetricians

Olivier Dupuis^{a,*}, Isabelle Sayegh^b, Evelyne Decullier^{c,d}, Corinne Dupont^f,
Henri-Jacques Clément^c, Michel Berland^a, René-Charles Rudigoz^b

What are the conclusions of Faro, Windle and Ranck studies ?



EXPERIMENTAL NEUROLOGY **1**, 130-154 (1959)

Brain Damage in the Monkey, *Macaca mulatta*, by Asphyxia Neonatorum

JAMES B. RANCK, JR. AND WILLIAM F. WINDLE¹

*Laboratory of Neuroanatomical Sciences, National Institute of Neurological Diseases
and Blindness, National Institutes of Health, Public Health Service, U. S. Department
of Health, Education and Welfare; and Department of Anatomy,
School of Medicine, University of Puerto Rico*

Received January 12, 1959

| Asphyxia length of time | Brain histologic lesions ? |
|--------------------------------|-----------------------------------|
| < 8 mn | None |
| 8 – 11 mn | Minor |
| 11 – 17 mn | Major |

Red Code

Delivery < 15 mn

Orange Code

Delivery < 30 mn

Green Code

Delivery < 60 mn

Red Code

First Line : Use Forceps or CS

Second Line : Cesarean Section

Try to avoid Forceps Trial

**Proceed to Forceps only if you think
that Failure will not happen or perform a
CS ...**

Exemple : bradycardia without recovery

Orange Code

First line : Use Forceps or Vacuum

Second Line : Vacuum or CS

**Ex : pathological CTG without
bradycardia**

Green Code

First Line : Vacuum (≤ 3)

Second Line : Forceps (≤ 3)

Third Line : CS

6. Apply the instrument and check its symmetry

7. Traction :

- Always synchronise your pull with Uterine Contraction and with Bearing effort
- Get the appropriate axis of traction
 - Vertical axis in case of OA
 - « Enroulement » or Rotation in case of OP

≤ 3

Never ever > 3 pull
If there is no evidence of
progressive descent

8. Expect Shoulder Dystocia

Ask the woman Not to push =
Open the mouth,

Pushing for shoulders = Dystocia

Pushing for shoulders = Anal Sphincter Injury

Shoulder Dystocia
risk if Forceps or
Vacuum

12,2%

16,7%

27,3%

34,8%

Weight (g)

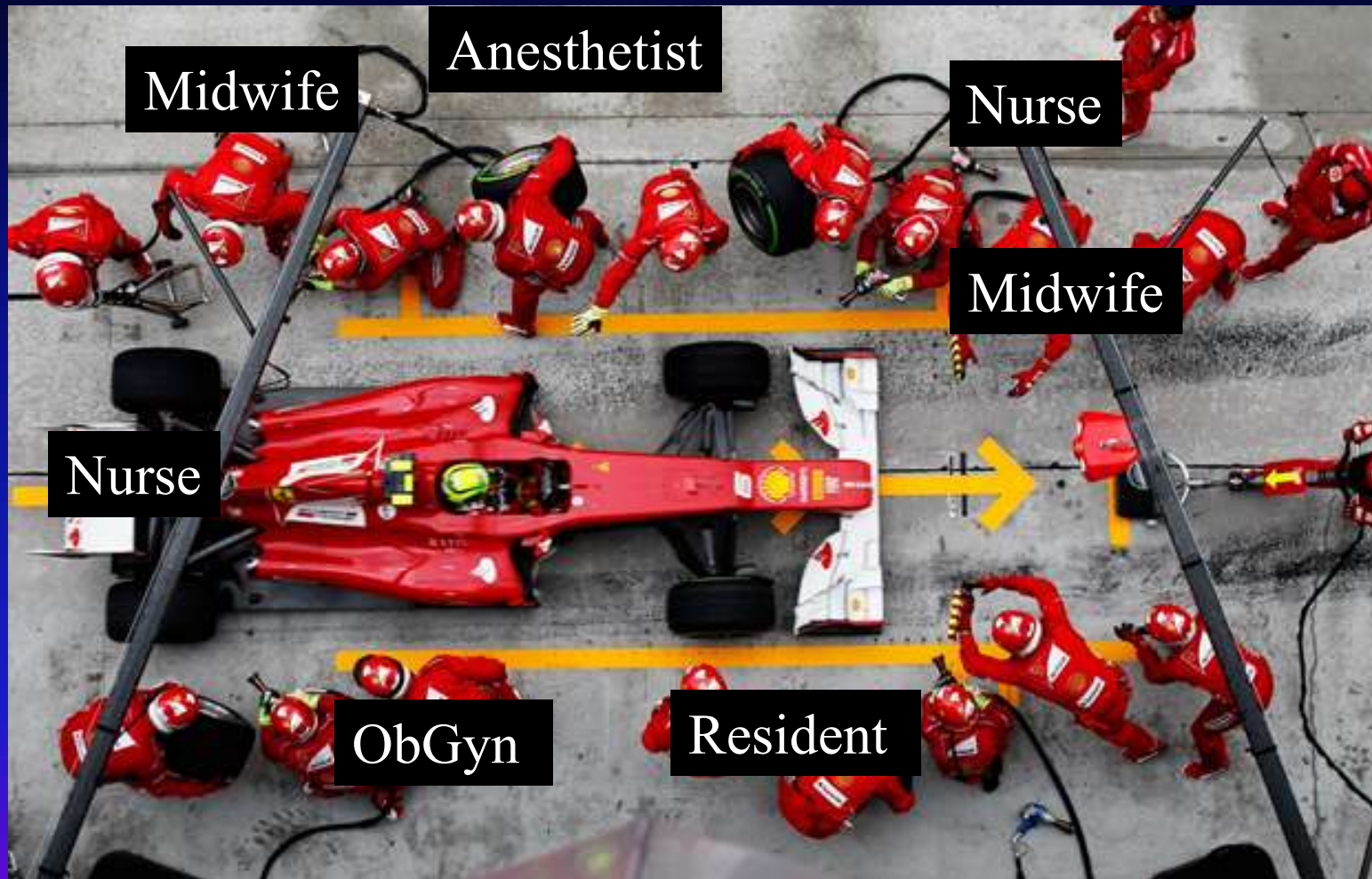
4000-4250

4250-4500

4500-4750

>4750

CONCLUSION



« I. Team Work is mandatory »



« II. A foetus is a deep sea diver »



....He is il Fragile ... , in case of Bradycardia, or pathological FHR length of time Matter »

≤ 3

Never ever make more than 3 pull
if there is no evidence of
progressive descent

« Each Time you Can Make
invisible thing Visible,
Make it visible »

« I do not want a good or an old professionnall,
I want a professional
That Understand and Respect Procedures »



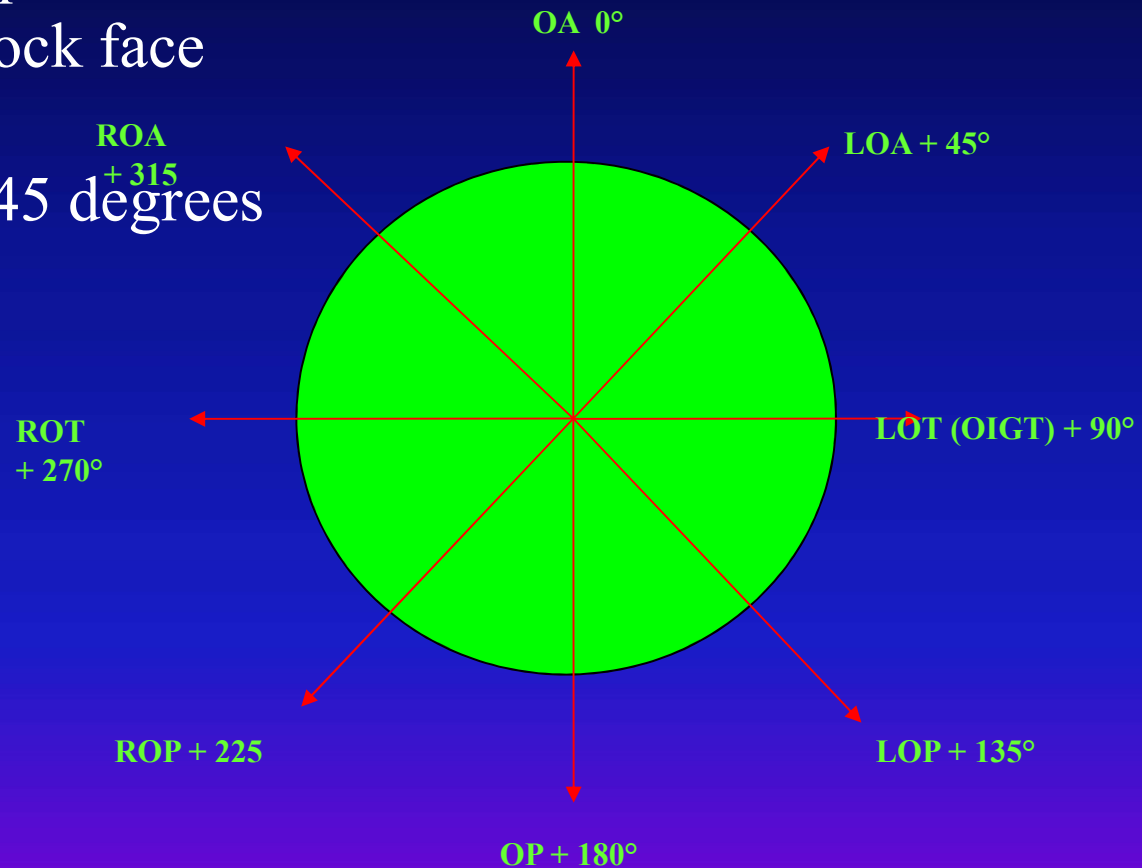
Grazie Per L'Attenzione

What does « Station » mean ?

➤ Position of the occipital fontanel = lambda relative to the maternal birth canal using a clock face

➤ One position every 45 degrees

➤ Eight positions



Pressure = Force / Surface

Asymmetrical force application leads to decrease surface between the instrument and the neonate skull hence increase pressure on the foetal head , hence might be related to associated brain lesions

Total Forces = Normal Forces + Shearing Forces

Asymmetrical force application leads to Shearing Forces
Hence Tearing of cerebral veins, hence intracranial hemorrhage

- The theory of symmetry needs to be kept in mind

Theory of Symmetry

« A small force applied asymmetrically could be more dangerous than a great deal of force applied symmetrically »

**Quality ie Symmetry of forces is very important
Do not only focus on Quantity
Focus on Quality**

Neonatal Trauma

- ❖ 12 565 CS before labor among 37 110 CS (1999 and 2000)
- ❖ 418 Neonate Trauma = 1,13% (418 / 37 110)
- ❖ 64% = skin abrasion
- ❖ Higher Risk of Neonatal Trauma if Failure of OVD
or if Skin to Delivery interval < 3 mn

James M Alexander et al Fetal Injury Associated with cesarean
delivery Obstet Gynecol 2006;108:885-90
13 maternity hospitals in USA