

## W18: Management of bowel dysfunction following obstetric anal sphincter injury (OASIS)

Workshop Chair: Paula Iguualada-Martinez, United Kingdom

20 October 2014 14:00 - 18:00

Start	End	Topic	Speakers
14:00	14:05	Introduction to the workshop	<ul style="list-style-type: none"> <li>Paula Iguualada-Martinez</li> </ul>
14:05	14:25	OASIS	<ul style="list-style-type: none"> <li>Rufus Cartwright</li> </ul>
14:25	14:45	Anorectal anatomy and physiology	<ul style="list-style-type: none"> <li>Alexis Schizas</li> </ul>
14:45	15:05	Anorectal evaluation following OASIS	<ul style="list-style-type: none"> <li>Alexis Schizas</li> </ul>
15:05	15:30	Bowel dysfunction following OASIS	<ul style="list-style-type: none"> <li>Heidi Brown</li> </ul>
15:30	16:00	Break	None
16:00	16:30	Physiotherapy following OASIS	<ul style="list-style-type: none"> <li>Paula Iguualada-Martinez</li> </ul>
16:30	17:00	Long term consequences of OASIS	<ul style="list-style-type: none"> <li>Heidi Brown</li> <li>Alexis Schizas</li> </ul>
17:00	17:30	The dedicated OASIS clinic and management of subsequent pregnancies	<ul style="list-style-type: none"> <li>Heidi Brown</li> <li>Paula Iguualada-Martinez</li> </ul>
17:30	18:00	Questions	All

### **Aims of course/workshop**

Aim:

The aim of this course is to learn how to evaluate and manage bowel dysfunction following obstetric anal sphincter injury (OASIS).

Objectives:

At the end of the workshop the participants should be able to:

- Understand the anatomy and physiology of the pelvic floor including the anal sphincter complex
- Recognise and classify OASIS following endoanal ultrasound assessment
- Understand anorectal physiology following OASIS
- Identify and evaluate bowel dysfunction following OASIS
- Learn how to set up a dedicated one-stop OASIS clinic and manage subsequent deliveries
- Learn about the role of Physiotherapy management of bowel dysfunction following OASIS
- Understand the long-term consequences of OASIS

## Management of bowel dysfunction following obstetric anal sphincter injury (OASIS)

Monday 20th October 2014  
International Continence Society Annual Scientific Meeting  
Rio de Janeiro, Brazil

*We hope that you will find this workshop stimulating and that it will add to your clinical practice ensuring a safe and effective assessment and treatment of Bowel Dysfunction following Obstetric Anal Sphincter Injury (OASIS).*

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MSc BSc (Hons) Clinical Specialist Physiotherapist, Physiotherapy Department,  
Guy's and St Thomas' NHS Foundation Trust, London, UK  
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*Chair*

### Faculty

**Heidi Brown**

MD MAS Assistant Professor, UW School of Medicine & Public Health,  
Division of Gynaecology, Female Pelvic Medicine and Reconstructive Surgery,  
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**Rufus Cartwright**

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**Alexis Schizas**

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## Obstetric Anal Sphincter Injury: An Introduction

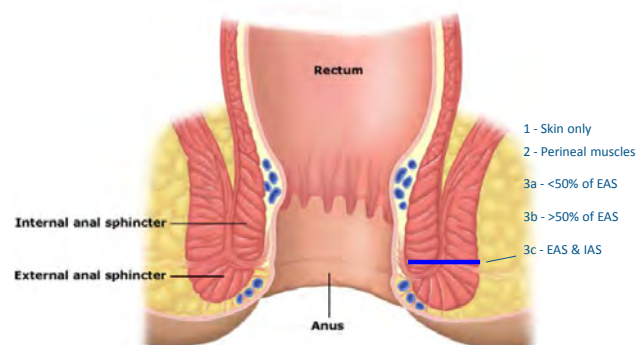
Rufus Cartwright MD (res) MRCOG  
Department of Urogynaecology, and Department of Epidemiology &  
Biostatistics,  
Imperial College, London, UK

### Aims

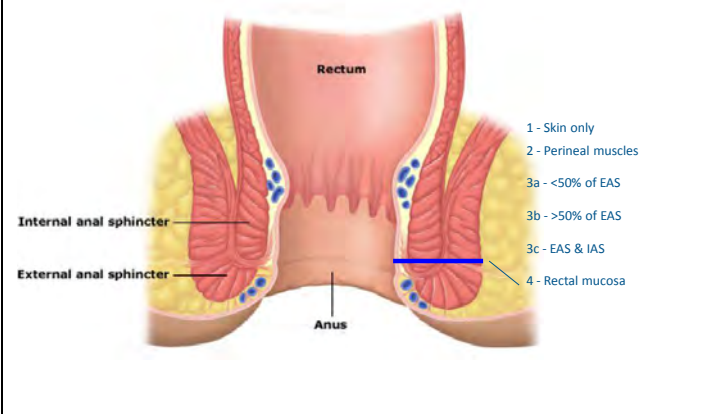
- Review definitions for perineal trauma
- Assess trends in incidence of OASIS
- Consider in detail the risk factors for OASIS



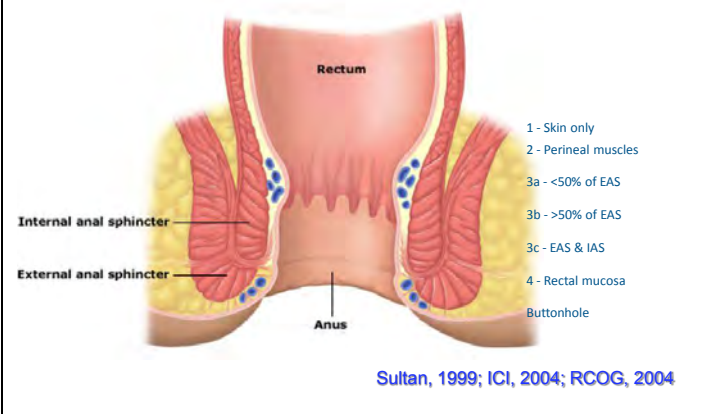
### Grading of Perineal Trauma



## Grading of Perineal Trauma



## Grading of Perineal Trauma



## Classification of Episiotomy



- 1 - Median / midline
- 2 - modified median
- 3 - J shaped
- 4 - mediolateral
- 5 - lateral
- 6 - radical lateral
- 7 - anterior

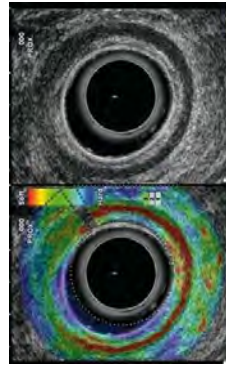
## Incidence

**“True” incidence of OASIS is 11%-35.4% using endoanal ultrasound**

Williams et al, 2001; Sultan et al, 1993

**98.8% of injuries can be detected at the time of delivery without ultrasound**

Andrews et al, 2006



## Incidence

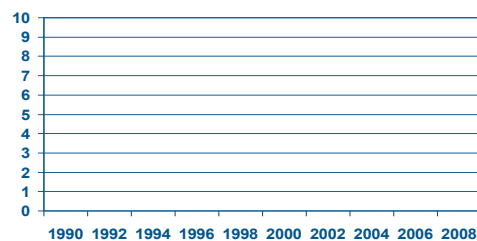
- Rates of recognised injury vary widely
  - between countries 0.4% (Italy) - 9.2 % (Sweden)
  - between hospitals 1.3% - 4.7 % (Norway)
- Impossible to directly compare different studies, because of acquisition bias
- Midwives miss 87% of injuries, doctors miss 28%

Prager et al, 2008

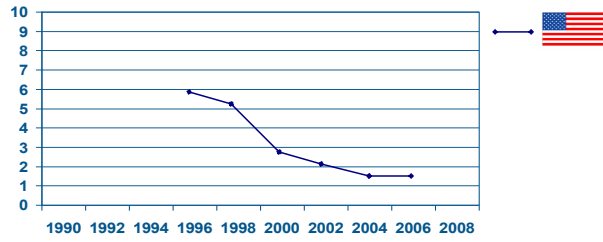
Valbø et al, 2008

Andrews et al, 2006

## Changing incidence or changing recognition?

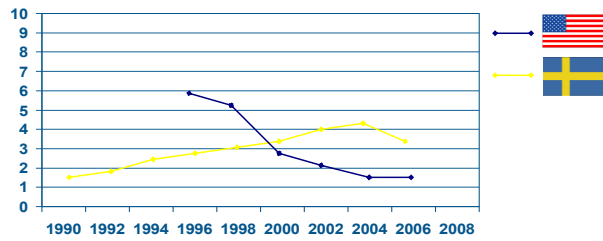


### Changing incidence or changing recognition?



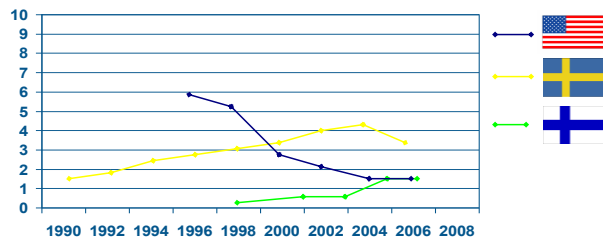
Kudish et al, 2008

### Changing incidence or changing recognition?



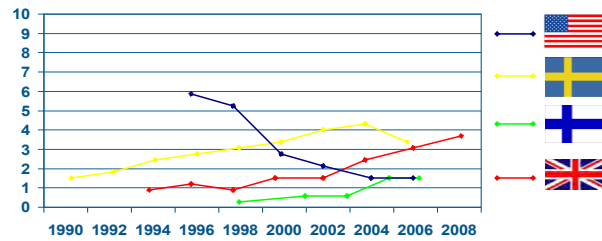
Kudish et al, 2008; Laine et al, 2009

### Changing incidence or changing recognition?



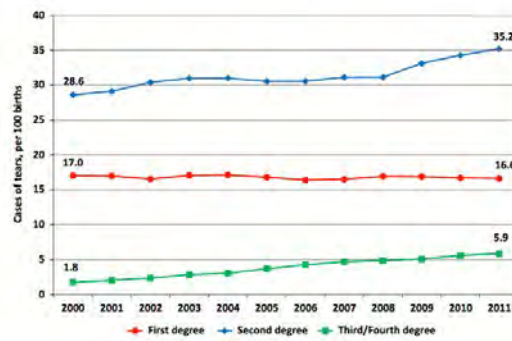
Kudish et al, 2008; Laine et al, 2009; Raisonon et al, 2009

## Changing incidence or changing recognition?



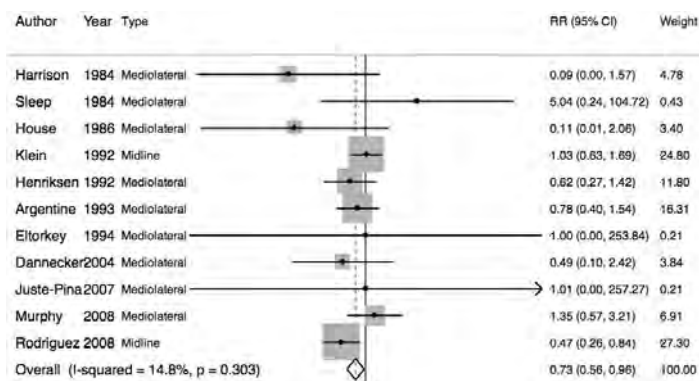
Kudish et al, 2008; Laine et al, 2009; Raisanen et al, 2009

## Changing incidence or changing recognition?



Guro-Urganci et al, 2013

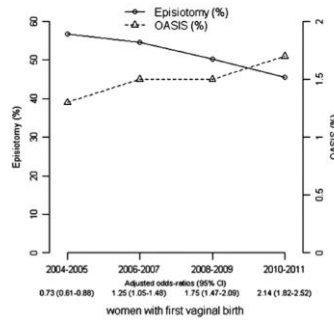
## Episiotomy and OASIS – The RCTs



Mirza et al, ICS 2013

## Unmeasured Confounding

As OASIS has increased in Finland, use of episiotomy has decreased  
The measured association has reversed in direction!  
Caution about unmeasured confounding in observational studies



Raisanen et al, BMJ Open 2013

## The “Established” Risk Factors

Forceps or ventouse,  
Nulliparity  
Birthweight

Identified as major risk factors – little inconsistency in literature

Sultan et al, 1994; de Leeuw et al, 2001; Christianson et al, 2003; Williams et al, 2005; de Leeuw et al 2008; Ekeus et al, 2008



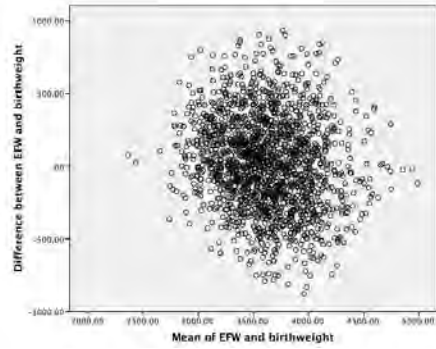
## Can we predict birthweight – and prevent OASIS antenatally?

- Prospective multi-centre cohort
- 40-42 weeks gestation
  - enriched sample at highest risk of OASIS
  - limited interval between estimation of weight and delivery
- Ultrasound EFW using Hadlock's formula
  - abdominal and head circumference, femur length
- Maternal height, weight, parity, ethnicity
- Fetomaternal BMI = EFW / maternal height<sup>2</sup> N=1,707

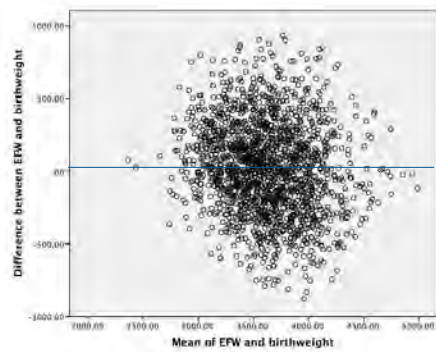
Cartwright et al, 2008



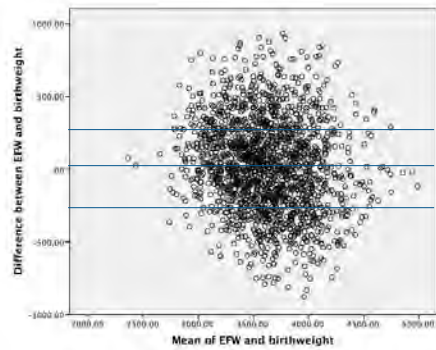
# EFW vs. actual birthweight



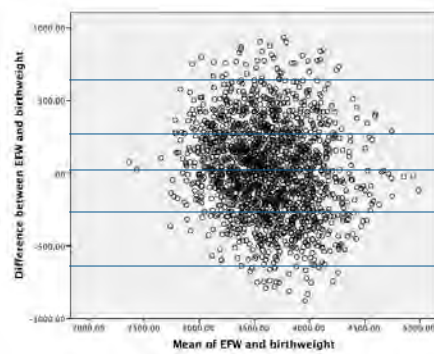
# EFW vs. actual birthweight



# EFW vs. actual birthweight



## EFW vs. actual birthweight



Bias = 23g  
Mean error = 251g  
95%LOA = -601g to +624g

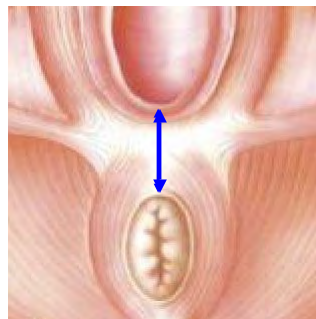
## Fetomaternal BMI and OASIS risk

Multivariate logistic regression models controlling for maternal ethnicity, maternal weight and study centre

Risk Factor	Adjusted OR	p
Parity	0.27	.002
Actual birth weight	2.89 / kg	.007
Estimated fetal weight	2.28 / kg	.05
Fetomaternal BMI	7.97 / kg / m <sup>2</sup>	.027

- Only a small proportion of variation in OASIS is explained by maternal height and estimated fetal weight
- Not likely ever to be able to predict OASIS
- Need to focus on prevention

## Perineal Length and Episiotomy Angle



Angle of mediolateral episiotomy is significantly narrower in women who sustain OASIS

Eogan et al, 2006; Andrews et al 2006; Kallis et al, 2008

Perineal length is significantly shorter in women who sustain tears, and OASIS (after adjustment for birthweight)

Rizk et al, 2000; Dua et al 2009; Stendenfeldt, 2013

## Risk of Asian Ethnicity

Authors	Year	Country	n	Adjusted OR
Ekeus et al	2008	Sweden	365,886	1.51
Dahlen et al	2007	Australia	6,595	1.83
Hopkins et al	2005	USA	17,216	1.41
Goldberg et al	2003	USA	34,048	2.01

Asian women may be at increased risk of obstetric anal sphincter injury compared to Caucasian women  
Only data from Asia reports absolute risk of just 1.7%

Nakai et al, 2006

## Familial Risk

Table 2. Aggregation of obstetric anal sphincter injuries (OASIS) across generations, Norway, 1967-2005

Intergenerational aggregation of OASIS	OASIS in first generation	Second generation (daughters/partners of sons)			
		Total no. of deliveries in second generation	No. (%) of OASIS	Crude RR (95% CI)	Adjusted RR (95% CI)*
Mother and daughter	No OASIS	392 370	13 158 (3.4)	Reference	Reference
	OASIS	1486	106 (7.1)	2.1 (1.7-2.6)	1.9 (1.6-2.3)
Mother and partner of son	No OASIS	263 455	9572 (3.6)	Reference	Reference
	OASIS	1220	68 (5.6)	1.5 (1.2-2.0)	1.4 (1.1-1.7)

\*Adjusted for period of delivery (before 1996, 1996-2000, 2001-2005), maternal age (<20, 20-29, 30-34, 35-39, 40 years or older), instrumental delivery (yes or no), and birthweight (<2500, 2500-2999, 3000-3499, 3500-3999, 4000-4449, 4500 g or greater) in second generation.

- Suggests genetic factors
- Must be acting both on maternal and fetal causal pathways
- But could there be unmeasured confounding?

Baghestan et al, BJOG 2013

## Prior caesarean and OASIS

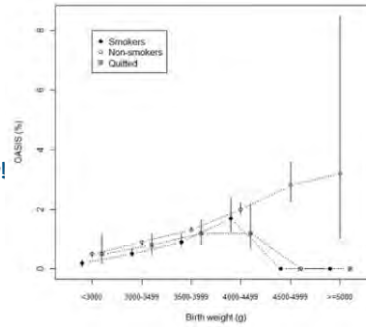
Characteristic	First vaginal delivery, n=221,347 (in 2004-2007, n=49,327-74,220)		p value
	With a prior CS	Without a prior CS	
Mean maternal height, cm (+SD) <sup>a</sup>	165.2 (+5.9)	166.0 (+5.9)	≤0.001
Mean maternal weight, kg (+SD) <sup>a</sup>	67.1 (+13.6)	64.7 (+12.7)	≤0.001
Mean birthweight, g (+SD)	3577.7 (+515.1)	3448.0 (+502.7)	≤0.001
Mean head circumference, cm (+SD) <sup>b</sup>	35.1 (+1.6)	34.7 (+1.6)	≤0.001

Raisanen et al, IUJ 2013

- VBAC associated with OR 1.42 for OASIS
- Even after "maximal" adjustment
- What are these unmeasured factors?

## Smoking and OASIS

Smoking is strongly protective (aOR 0.72)  
Effect is only apparent for women with big babies  
Other more important reasons not to smoke during pregnancy!



## Socioeconomic Status

	Model 1, crude	Model 2, adjusted by SES and age	Diff. with 1 (%)*	Model 3, adjusted by Model 2 and smoking	Diff. with 2 (%)*	Model 4, adjusted by Model 2 and birthweight	Diff. with 3 (%)*
	OR (95% CI)	OR (95% CI)		OR (95% CI)		OR (95% CI)	
SES							
Upper white-collar	1.57 (1.39–1.78)	1.38 (1.23–1.44)	33.3	1.21 (1.07–1.38)	44.7	1.24 (1.10–1.41)	36.8
Lower white-collar	1.23 (1.12–1.35)	1.12 (1.02–1.23)	47.8	1.08 (0.98–1.18)	33.3	1.10 (1.00–1.21)	16.7
Blue-collar	1	1	-	1	-	1	-
Other †	1.35 (1.22–1.48)	1.32 (1.20–1.46)	8.6	1.28 (1.16–1.41)	12.5	1.31 (1.19–1.44)	3.1
Missing	1.64 (1.48–1.82)	1.58 (1.42–1.75)	9.4	1.55 (1.39–1.72)	5.2	1.59 (1.43–1.76)	-

High socioeconomic status women at increased risk of OASIS  
May reflect “better” care

Raisanen et al, PLoS ONE 2013

## Socioeconomic Status

	Model 1, crude	Model 2, adjusted by SES and age	Diff. with 1 (%)*	Model 3, adjusted by Model 2 and smoking	Diff. with 2 (%)*	Model 4, adjusted by Model 2 and birthweight	Diff. with 3 (%)*
	OR (95% CI)	OR (95% CI)		OR (95% CI)		OR (95% CI)	
SES							
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Raisanen et al, PLoS ONE 2013

## Conclusions



- OASIS is common – and getting more common
- Major risk factors are nulliparity, birthweight and use of forceps
- Strong observed effects of
  - current smoking
  - SES
  - Prior CS
  - Asian ethnicity
- Clearly unexplained causal mechanisms that deserve attention
- Focus should be on population-wide measures to prevent OASIS
  - Prediction remains impossible
  - Many risk factors are not modifiable

## Anorectal Anatomy and Physiology

Alexis Schizas

MD FRCS (Gen Surg) Pelvic floor unit and Colorectal Department,  
Guy's and St Thomas' NHS Foundation Trust, London, UK



Guy's and St Thomas' NHS Foundation Trust



## Levator Ani Muscles

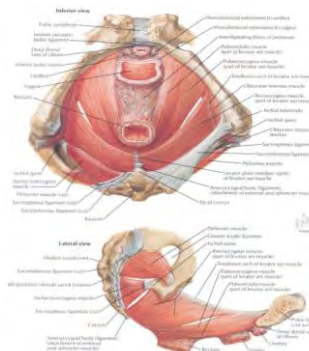


Ischiococcygeus

Iliococcygeus

Pubococcygeus

Puborectalis



## Levator ani

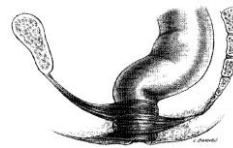


- Anterior
  - Pubis + anterior part of tendinous arch
    - muscle>fascia
  - Superficial
  - Deep - puborectalis
- Posterior
  - tendinous arch, anococcygeal ligament and coccyx
    - fascia>muscle

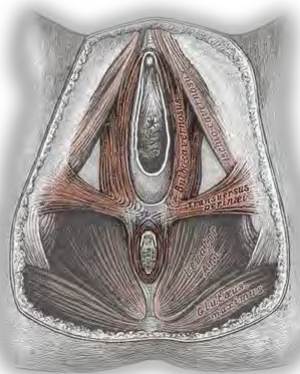
## Puborectalis



- U-shaped, medial most located levator ani muscle
- Pulls the anorectal junction anteriorly, forming the anorectal angle
- Pelvic floor muscle vs. sphincter muscle?

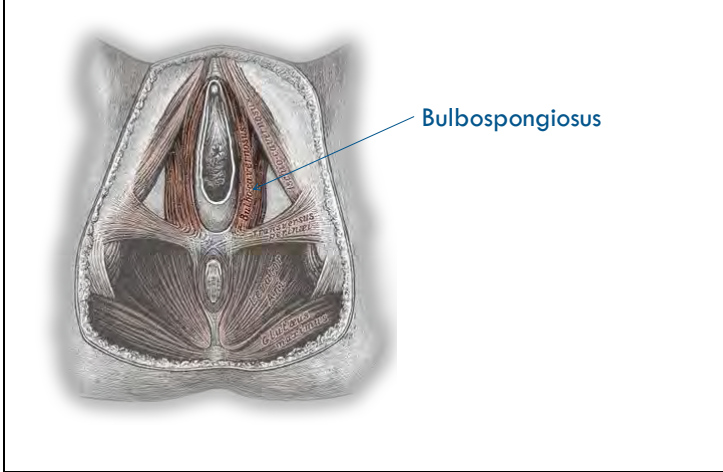


## Perineal Muscles

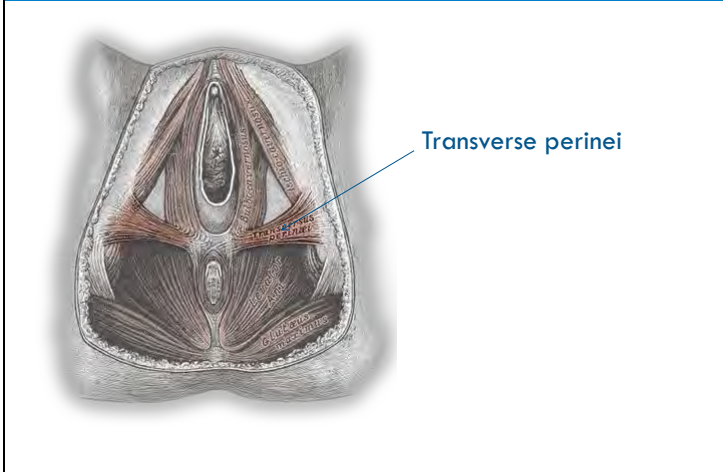


- Bulbospongiosus
- Transverse Perinei
- Puboanalis
- Perineal Body
- Anal Sphincters

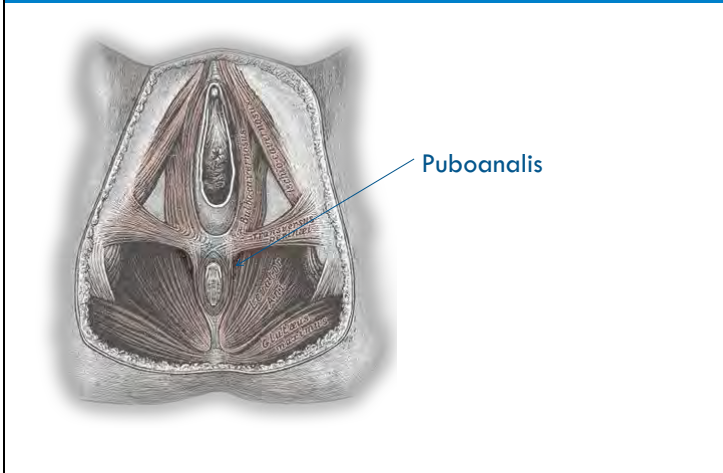
Perineal Muscles



Perineal Muscles

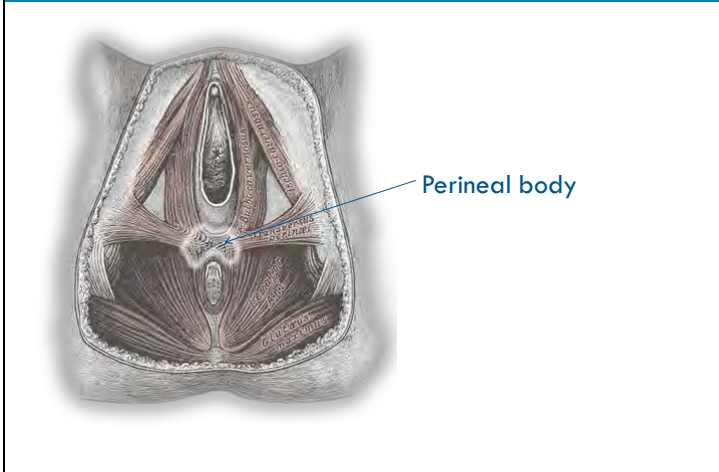


Perineal Muscles



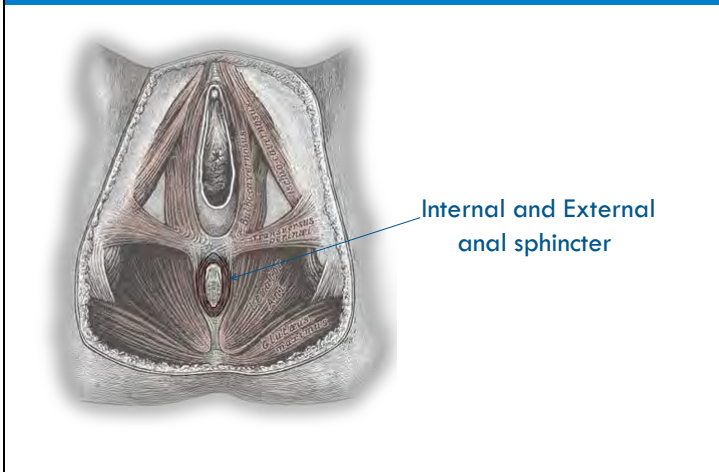
## Perineal Muscles

ICS  
2014  
Rio de Janeiro



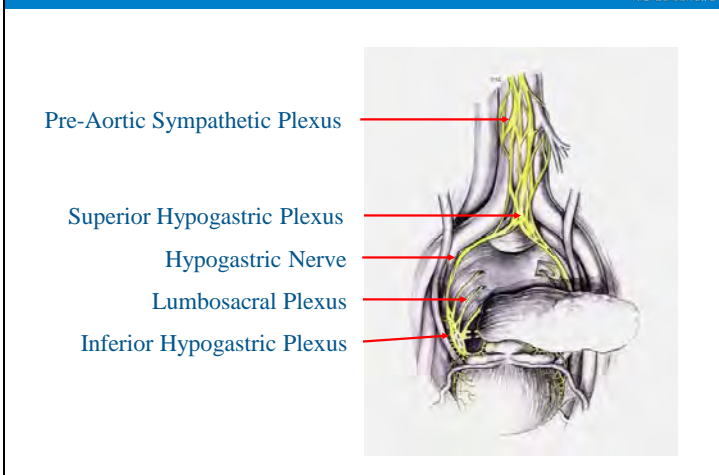
## Perineal Muscles

ICS  
2014  
Rio de Janeiro



## Pelvic Autonomic Nerve Supply

ICS  
2014  
Rio de Janeiro





## Rectal nerve supply



- Sympathetic from hypogastric nerve plexuses
- Parasympathetic from S2,3,4 in Pelvic splanchnics (motor too)
- Pain fibres accompanying both

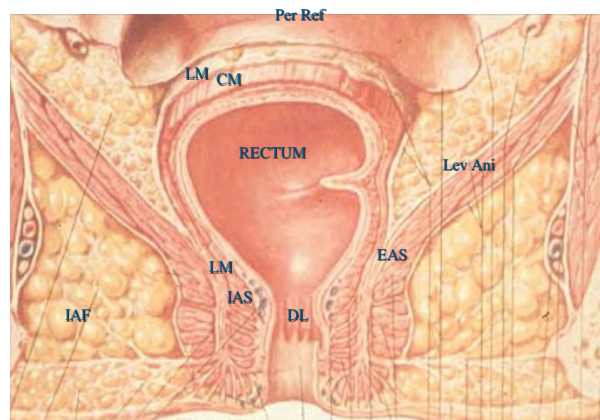
## Perianal Area



## Anal Canal



- Approx. 2-4cm long
- Commences at level of puborectalis muscle
- Upper canal - mucous membrane
  - anal sinuses/valves
  - anal glands at bottom of sinuses (crypts)
- Dentate Line is junction between upper and lower canal
- Lower Canal
  - anal skin or pecten
  - ends at junction between perianal skin and buttock



## Internal Anal Sphincter

- Extension of the circular muscle layer of the rectum
- Constant maximal contraction
- 50-85% of resting anal tone
- Autonomic innervation
  - Parasympathetic.....S2-4
  - Sympathetic.....thoracolumbar ganglia (L5)



## External Anal Sphincter

- Multiple layers of striated muscle
- Voluntary contractions to prevent fecal leak
- 25-30% of resting anal tone
- Somatic innervation from the inferior rectal branch of the pudendal nerve (S2-3) and the perineal branch of S4



## Nerves involved in continence



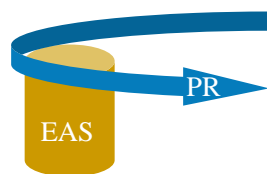
- External Sphincter
  - Pudendal nerve S2,3,4
- Internal sphincter
  - sympathetic contraction
  - parasympathetic relaxation
- Puborectalis
  - S3,4, direct
  - Pudendal
- Sensation
  - pudendal nerve

## Functional Anatomy



- Puborectalis and the anorectal angle allow for gross fecal continence
- Relieves pressure from the sphincter process
- The sphincter complex is responsible for gas and liquid continence
- Defecation
  - Relaxation of the puborectalis
  - Contraction of the other levator muscles

## Male : Female



EAS symmetric cylinder



EAS shorter anteriorly forming anterior ring in perineum

## Anal Canal Anatomy



MUSCLE LENGTHS	MALE	FEMALE	Mann-Whitney U
Canal Length	50.2mm (14.4)	42.2mm (24.2)	P = 0.019
PR Length	23.9mm (22.8)	27.1mm (9.2)	P=0.49
EAS (Anterior)	30.1mm (12)	15.6mm (29.2)	P<0.001
EAS (Coronal)	31.6mm (10.2)	19.5mm (22)	P<0.001
EAS (Posterior)	29.3mm (13.3)	16.5mm (31.6)	P=0.0015
IAS (Coronal)	34.4mm (6.8)	33.2mm (18.8)	P=0.72

**Female EAS Anterior length vs Posterior Length  
(paired t testing) P = 0.27**

**Male EAS Anterior length vs Posterior Length  
(paired t testing) P=0.42**

Williams AB, et al *BJS* 2000

## Anal Canal Anatomy



	MALE (% of anatomical canal)	FEMALE (% of anatomical canal)	Significance MWU testing
Puborectalis (Sagittal Posterior)	45% (35% - 65%)	61% (37% - 73%)	P=0.02
EAS Anterior (Sagittal)	58% (49% - 63%)	38% (22% - 62%)	P<0.001
EAS Posterior (Sagittal)	58% (49% - 64%)	37% (25% - 69%)	P=.003
IAS Coronal	67% (55% - 77%)	73% (57% - 91%)	P=0.12

## Gender Differences

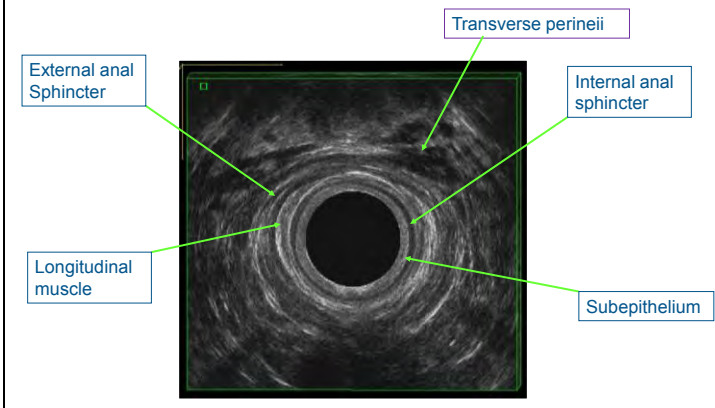


- The anal canal is longer in men than women
- This difference is due to men having a longer external anal sphincter
- Puborectalis occupies a greater proportion of the anal canal length in women
- The muscular components of the anal canal contribute to resting and squeeze pressure to the same extent in men and women

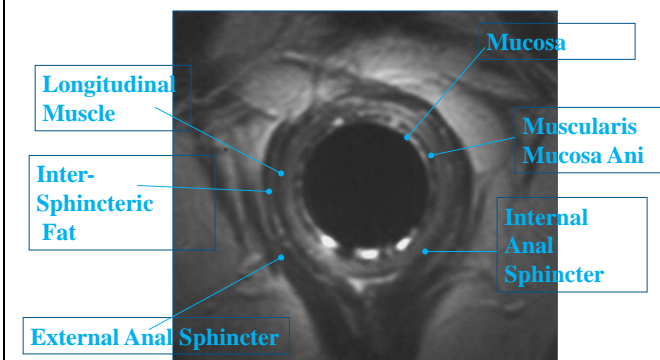
## Normal Anal Canal Anatomy

- The basic 4 layer pattern
  - subepithelium
  - internal anal sphincter
  - longitudinal muscle
  - external anal sphincter

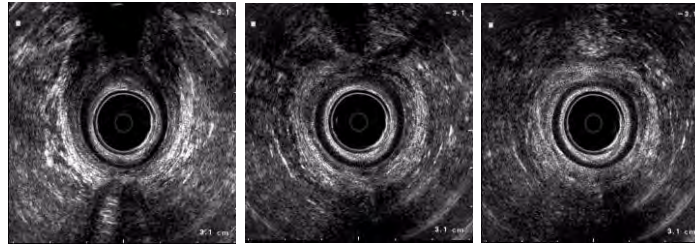
## Normal Anal Canal Anatomy on AES



## Endocoil MRI



## Normal Female



high

upper mid

mid

Anterior ring intact

## Anal Manometry

- Resting pressure
  - Internal anal sphincter function.
- Squeeze pressure
  - External anal sphincter function.
  - Puborectalis

## Anal Canal Pressure

- Maximal squeeze pressure is associated with the overlap of the puborectalis and external anal sphincter
- Puborectalis, where present on its own, is associated with the same squeeze pressure as the pressure where the external sphincter is present on its own
- Puborectalis plays an important part in the development of squeeze pressure in normal individuals

## Anal Manometry



	Women Rest (mmHg)	Men Rest (mmHg)	Women Total Squeeze (mmHg)	Men Total Squeeze (mmHg)	Study
Station pull-through	58+/-3	66+/-6	135+/-15	218+/-18	<i>Read et al. Gastroenterology, 1979; 76:747-756</i>
	50+/-5	63+/-12	159+/-45	238+/-38	<i>Loening-Baucke and Anuras. Am J Gastroenterol, 1985; 80:50-53</i>
	102 (cmH <sub>2</sub> O)	102 (cmH <sub>2</sub> O)	156 (cmH <sub>2</sub> O)	196 (cmH <sub>2</sub> O)	<i>Cali et al. Dis Colon Rectum, 1992; 35:1161-1164</i>
Slow pull-through	46(40-58)	60(51-98)	103(78-190)	163(76-234)	<i>Pedersen and Christiansen. Br J Surg 1989; 76:69-71</i>
Rapid pull-through					
20-39	102+/-19	100+/-21	171+/-40	240+/-65	<i>McHugh and Diamant. Dig Dis Sci, 1987; 32:726-736</i>
40-69	76+/-24	97+/-20	132+/-69	203+/-45	
70 or over	53+/-22	72+/-23	116+/-40	219+/-32	

## Vector Volume Manometry



		Automated puller		Station	
		Male	Female	Male	Female
Maximum pressure (mmHg)	Rest	88.08 (s.d 34.84)	100.54 (s.d 30.22)	89.58 (s.d 45.44)	83.83 (s.d 25.06)
	Squeeze	191.16 (s.d 55.92)	148.54 (s.d 39.39)	256.08 (s.d 71.00)	157.08 (s.d 50.74)
Average pressure (mmHg)	Rest	39.29 (s.d 17.58)	36 (s.d 12)	40.67 (s.d 21.34)	30.17 (s.d 8.40)
	Squeeze	108.13 (s.d 39.21)	62.46 (s.d 18.81)	143.25 (s.d 60.04)	69.67 (s.d 23.70)
High pressure zone length (mm)	Rest	20.91 (s.d 6.35)	19.51 (s.d 4.70)	26.25 (s.d 7.42)	18.33 (s.d 4.44)
	Squeeze	30.76 (s.d 3.98)	23 (s.d 3.76)	30.83 (s.d 6.69)	21.67 (s.d 6.15)
Asymmetry	Rest	26.22 (s.d 5.18)	35.27 (s.d 6.04)	21.82 (s.d 10.82)	32.53 (s.d 7.32)
	Squeeze	19.83 (s.d 4.83)	30.29 (s.d 4.27)	14.74 (s.d 4.31)	26.116 (s.d 7.42)

Schizas AM, Emmanuel AV, Williams AB. Vector volume manometry - methods and normal values. *Neurogastroenterol Motil.* 2011 Jul 4

## Vector Volume Manometry



- Mean anal resting pressure and resting vector volume
  - Highest in patients with anal fissure
  - Lowest in patients with incontinence
- Mean squeeze vector volume
  - Lower in patients with incontinence
- Mean resting pressure and sphincter symmetry
  - Reduced after lateral sphincterotomy

• Zbar et al. *Dis Colon Rectum* 1999;42:1411-1418.  
 • Williams et al. *Dis Colon Rectum* 1995;38:700-704.

## Anal Canal Pressures



Anatomical Level	Both sexes: % of Max Squeeze, Median (Range)
Rectum	12% (0%-39%)
Puborectalis	62% (32%-100%)
Puborectalis & External Sphincter	93% (47%-100%)
External with Internal Sphincter	91% (51%-100%)
External Sphincter alone	65% (4%-100%)

## Summary



- Pelvic floor anatomy and physiology
- Rest pressure – internal anal sphincter
- Squeeze pressure – puborectalis and external anal sphincter

## Summary



- Faecal continence and defaecatory disorders
  - Multi-factorial aetiology
    - Stool volume and consistency
    - Rectal reservoir
    - Rectal sensation
    - Puborectalis and angle between rectum and anal canal
    - Anal sphincter function
    - Recto-anal inhibitory reflex
    - Anal cushion



# Anorectal Evaluation Following OASIS

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## OASIS

- Clinically diagnosed obstetric anal sphincter injury occurs in 2.9% of primiparous women and 0.8% of multips.
- This injury can lead to bowel symptoms in 28% of women with a third degree tear and 59% with a fourth degree tear.
- Anal Endosonography (AES) can be used to assess the accuracy of clinical diagnosis.

## Parturition following OASIS

- The risk of mechanical anal sphincter injury is greatest after the first delivery.
  - 4.4% risk of recurrence of tear with second vaginal delivery
- Primiparous women with faecal continence symptoms
  - deterioration after a second vaginal delivery.
- Women with transient faecal incontinence or occult anal-sphincter injury after their first vaginal delivery
  - high risk of faecal incontinence after a second vaginal delivery.

## OASIS on AES



Author	Year	Number of deliveries	Tear rate	Paired scans	Review method
Sultan AH et al.	1993	79	35%	Yes	Video axial
Riegler N et al.	1998	37	41%	No	Not stated
Donnelly V et al.	1998	168	35%	No	Static images
Zetterstrom J et al	1999	35	20%	Yes	Static and video
Varma A et al.	1999	78	11.5%	Yes	Static axial images

## OASIS on AES



- 29% of women had ultrasound evidence of postpartum trauma after vaginal delivery.
  - 11% involving the external sphincter.
  - 20% involving puboanalis .
  - 7% involving transverse perineii .
- External sphincter trauma was associated with
  - a significant decrease in squeeze pressure.
  - an increase in incontinence score .
- Tears to the puboanalis or transverse perineii only did not affect pressure or incontinence scores.

## Risk Factors for OASIS



- Instrumental vaginal delivery was associated with
  - 8.1-fold risk of anal sphincter injury.
  - 7.2-fold risk of symptoms.
- Duration of the second stage of labour beyond 60 minutes
  - 1.7-fold risk of anal sphincter injury .
  - 1.6-fold risk of symptoms.
- Epidural analgesia prolonged the second stage of labour
  - associated with increased risk of sphincter injury.
  - associated with increased risk of symptoms.

## OASIS



- Positive correlation between the extent of sphincter defect and the degree of anal incontinence following primary repair
- Internal anal sphincter injury is significantly related to faecal incontinence.

## Overlap vs. End to End Repair



- Overlap(vicryl)-end to end(vicryl)-overlap(PDS)-end to end(PDS)
  - No functional differences
  - 70% asymptomatic
- OASIS repair carried out by appropriate trained staff is associated with low morbidity, irrespective of method.

## Investigations



- Anal canal anatomy
  - Anal Endosonography
  - MRI
- Function
  - Anorectal Physiology

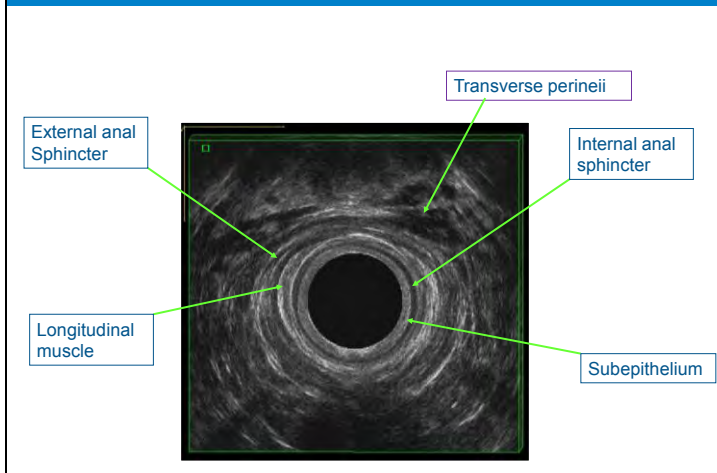
## Anal Canal Imaging

ICS  
2014  
Rio de Janeiro

- Assessment of anal sphincters
  - Clinical examination
  - MRI
  - AES
- Anal Endosonography (AES)
  - Regarded as gold standard

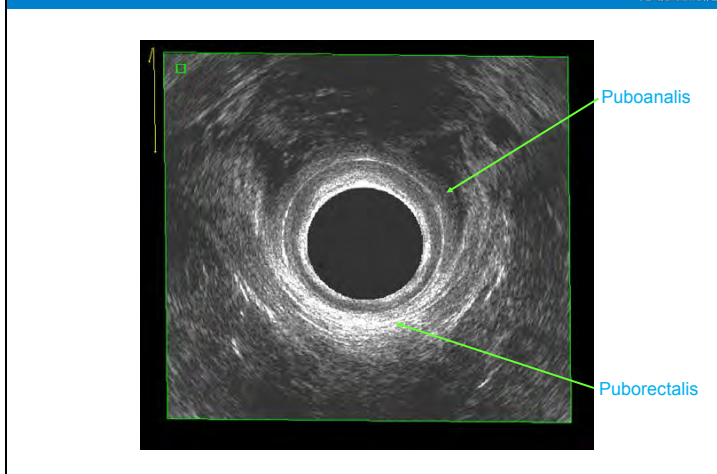
## Normal Anal Canal Anatomy on AES

ICS  
2014  
Rio de Janeiro

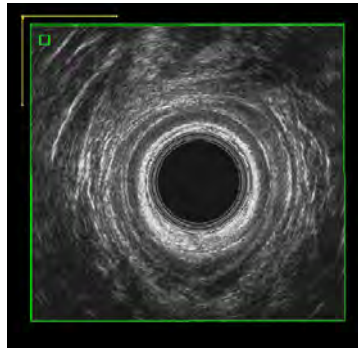


## Normal Anal Canal Anatomy on AES

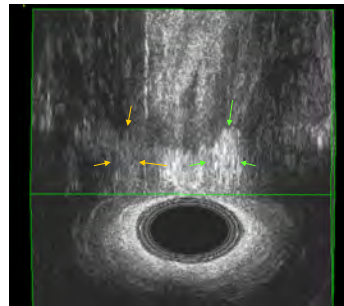
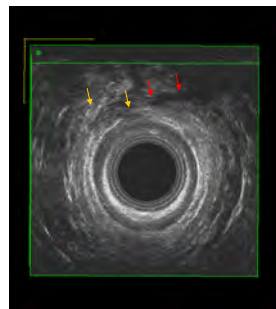
ICS  
2014  
Rio de Janeiro



## Scarring to Right Transverse Perineii

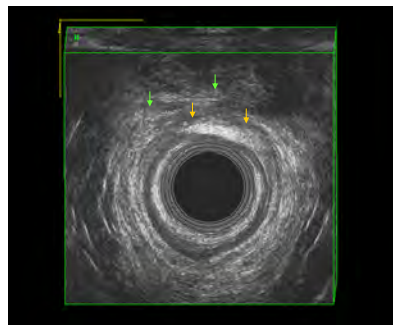


## External Anal Sphincter Defect



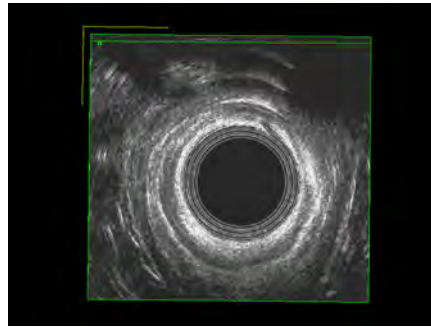
Axial view. The course of the tear is marked by the red arrows and a defect in the external sphincter is seen (yellow arrow).  
Coronal view. The external sphincter can be seen on the left (green) and the defect is seen along the entire length of the external sphincter on the right (yellow).

## Overlapping Sphincter Repair



The two ends of the external sphincter are marked with yellow and green arrows.

## Internal and External Sphincter Defect



External sphincter defect between 11 and 2 o'clock and internal sphincter defect between 10 and 3 o'clock.

## Anorectal Physiology



- Physiology of the anorectal region is complex
- Aim of investigations
  - Give a clearer picture of the mechanisms of anorectal disease
  - Demonstrate pathophysiologic abnormalities
  - Therapeutic recommendations
    - best when the anatomy and the physiology are understood

## Anorectal Investigations



- Anal manometry
- Balloon sensation
- RAIR
- Barostat studies
- Pudendal nerve terminal motor latency
- Anal electromyography

## Anal Manometry



- Resting and squeeze pressures are lower in patients with incontinence
- Overlap between those with incontinence and normal's

## Anal Manometry



- Caesarean section
  - No change in anal pressure
- Vaginal delivery
  - Fall in rest and squeeze pressure
- Instrumental delivery
  - Further decrease in squeeze
  - Reduction in pressure is greatest after a third or fourth degree tear
  - Decrease in anal canal symmetry

## Anal Manometry



- Maximum resting pressure
  - higher in nulliparous women than in multiparous
- Maximal squeeze pressure lower post partum
- Anterior sphincter defect repair
  - Anal manometry and symptoms improved
    - Increase in functional anal sphincter length
    - Increase in resting and squeeze pressure

## Three Dimensional Manometry



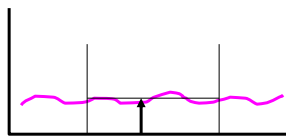
- Low resting pressure
  - Associated with internal anal sphincter defects seen on anal endosonography after transanal surgery
- Segmental symmetry
  - As sensitive as anal endosonography in diagnosing a localised anal sphincter defect
- Association between anal asymmetry and incontinence and rectal prolapse

## Investigation

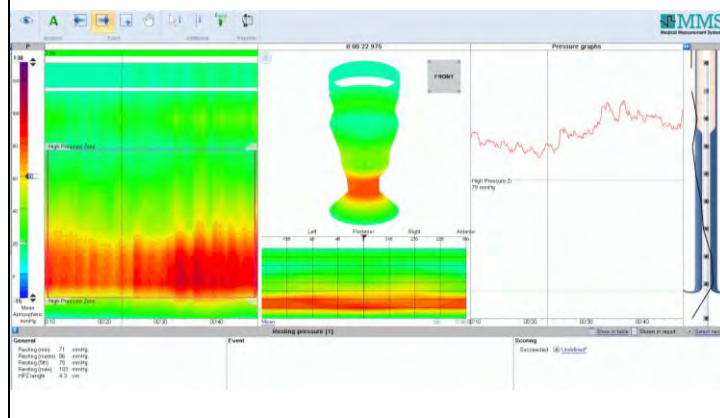


### Resting/Relax pressure

- Tone of the IAS and the EAS
- Patient resting, no squeeze for 30 seconds
- Analyze average resting pressure in the high pressure zone



## Rest

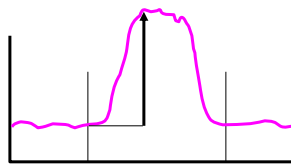




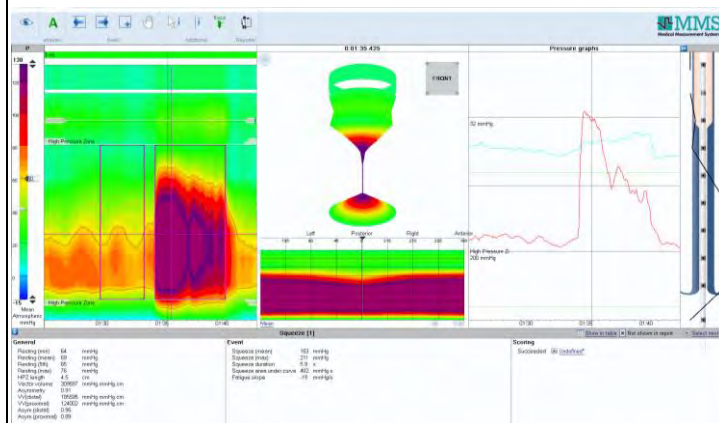
## Investigation

### Squeeze pressure

- Patient squeezing
- Usually repeated 3 times
- Analyze sphincter contraction
  - pressure increase with reference to resting pressure



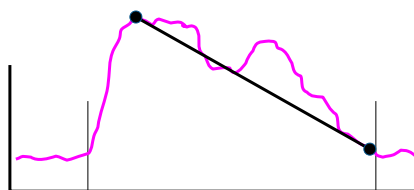
## Squeeze



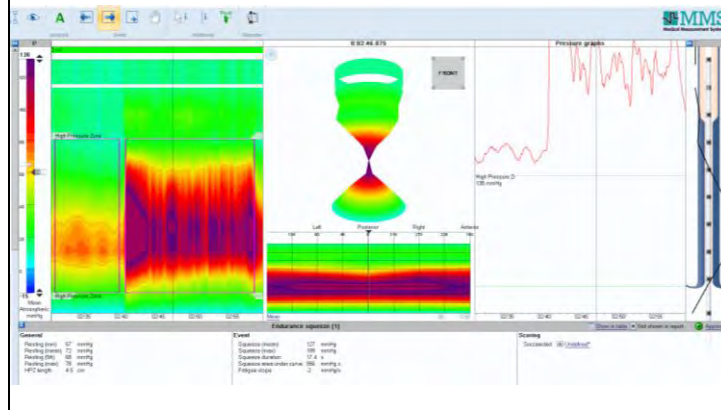
## Investigation

### Endurance squeeze pressure

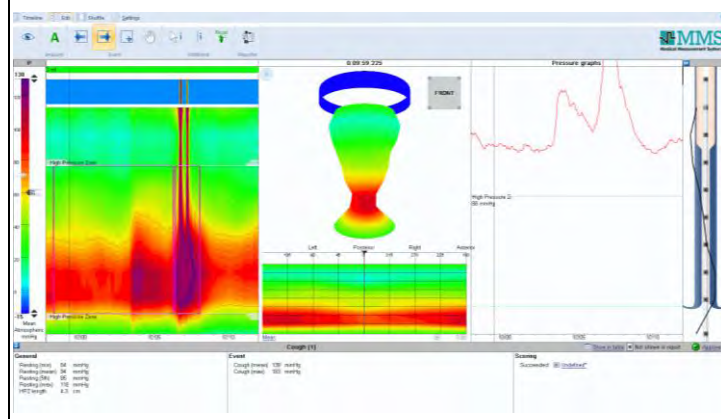
- Patient squeeze for 15 to 20 seconds
- Analyze fatigue slope of sphincter



# Endurance



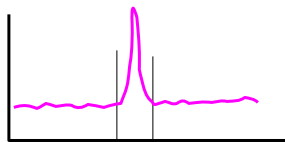
# Cough



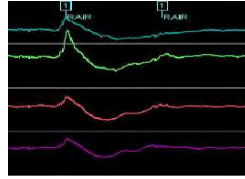
# Investigation

## Cough test

- Patient coughs
- Repeated more than once
- Analyze (reflex) sphincter contraction in response to sudden increase of abdominal pressure



## RectoAnal Inhibitory Reflex



- RAIR
  - Increasing rectal distension
    - transient reflex relaxation of the internal anal sphincter
    - contraction of the external anal sphincter
  - Relaxation/Resting Anal Pressure - 36% at HPZ
  - Duration of relaxation - 9.4sec
    - Ricardo et al. *Dis Colon Rectum*, 1995; 38:1043-1046

## PNTML

- Distinguish between
  - Nerve or muscle injury
- Operator dependent
  - poor correlation with clinical symptoms and histological
- Normal values
  - 2.0ms +/-0.5ms
    - Laurberg and Swash *Dis Colon Rectum* 1989;32:737-742.
  - Female - 1.91 ms (2 SD, 0.52 ms)
  - Male - 1.74 ms (2 SD, 0.33 ms)
    - Tetzschner et al. *Int J Colorect Dis* 1997, 12: 280-284

## GSTT – OASIS Clinic

June 2008 and February 2012

- clinical diagnosis of OASIS
- referred to a dedicated clinic three months post-delivery

Full history

- obstetric delivery factors
- faecal and urinary symptoms

Three-dimensional anal endosonography (AES)

- accuracy of clinical diagnosis of anal sphincter injury was assessed

Women with confirmed third degree tears or symptoms of faecal incontinence

- referred for anal physiology

Anal sphincter injury was confirmed in 372 (81%)

- 18% had no injury to the anal sphincters
- 22.8% had a persistent defect
- 30% had scaring alone
- 34.8 % had evidence of an anal sphincter repair
  - either end to end or overlap
- 22% had an internal and external anal sphincter injury

456 women were referred to the clinic

- Mean age - 31 years
- Primiparous - 77%
- Episiotomy in 169 (37%)
- Forceps delivery in 144 (32%)
- Ventouse delivery in 46 (10%)
- Epidural anaesthetic was performed in 200 (44%)

143 (31%) complained of one or more of the following symptoms

- flatus incontinence (26%)
  - 29% confirmed OASIS vs 2% (p=0.004)
- passive incontinence (2%)
  - 2% confirmed OASIS vs 2%
- faecal urge incontinence (2%)
  - 3% confirmed OASIS vs 0% (p=0.1)
- post defecation soiling (6%)
  - 6% confirmed OASIS vs 5%

## Anal Physiology



386 women were referred physiology of which 309 returned for tests

### Scarring alone

- maximum resting pressure 61.7mmHg and squeeze increment of 52.3mmHg

### Sphincter repair

- maximum resting pressure 57.1mmHg and squeeze increment of 52.8mmHg.

### Persistent defect

- maximum resting pressure 50.8mmHg (lower than scarring ( $p < 0.0001$ ) and repair ( $p = 0.01$ )) and squeeze increment of 52.8mmHg (lower than scarring ( $p = 0.02$ ) and repair ( $p = 0.01$ )).

### External anal sphincter injury alone

- maximum resting pressure 55.5mmHg and squeeze increment 45.8mmHg

### Internal and external anal sphincter injury

- Maximum resting pressure 46.5mmHg (lower than external sphincter injury alone ( $p = 0.01$ )) and squeeze increment 39.0mmHg

## Summary



Severity of OASIS correlates with symptoms and physiology

### Risk factors

- Instrumentation
- Duration of second stage of labour
- Epidural
- Birth weight

Risk of injury higher with first delivery

Significant risk of incontinence with second delivery

- injury sustained with first
- Incontinence symptoms

## Summary



### OASIS injury

- Clinically diagnosed in 2%
- AES diagnosed in 10%

AES can reassure 20% of women with a clinically diagnosed OASIS that they have not had one

To prevent future deterioration in bowel symptoms

- directed to further investigations and treatment
- guidance for future mode delivery

## Bowel Dysfunction following OASIS

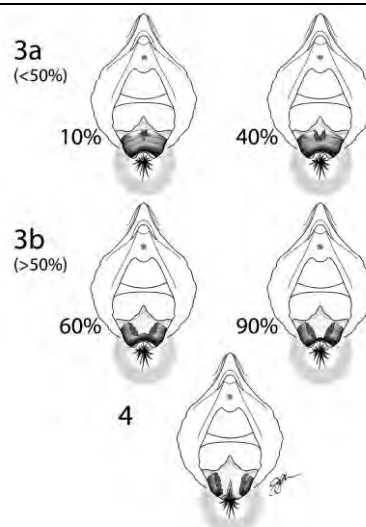
Heidi Brown, MD, MAS  
Assistant Professor, Female Pelvic Medicine & Reconstructive Surgery  
Departments of Obstetrics & Gynecology and Urology  
University of Wisconsin School of Medicine & Public Health

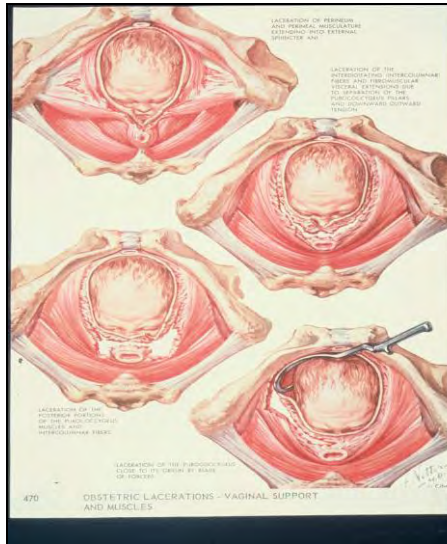



### Aims

- Review the context in which OASIS occurs
- Summarize relationship between obstetrics & bowel dysfunction
  - Pregnancy
  - Vaginal birth
  - Operative vaginal delivery
  - OASIS
- Review principles of treatment of OASIS

Examples of Grade 3a, 3b, and 4 obstetric anal sphincter injuries (OASIS)

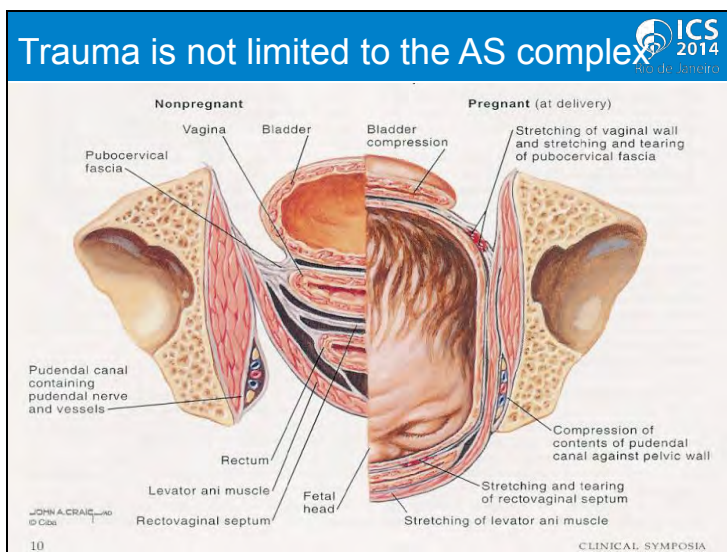
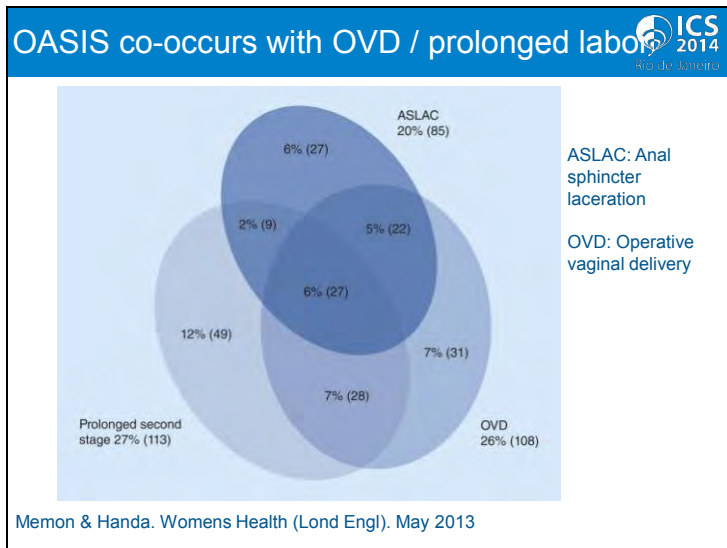




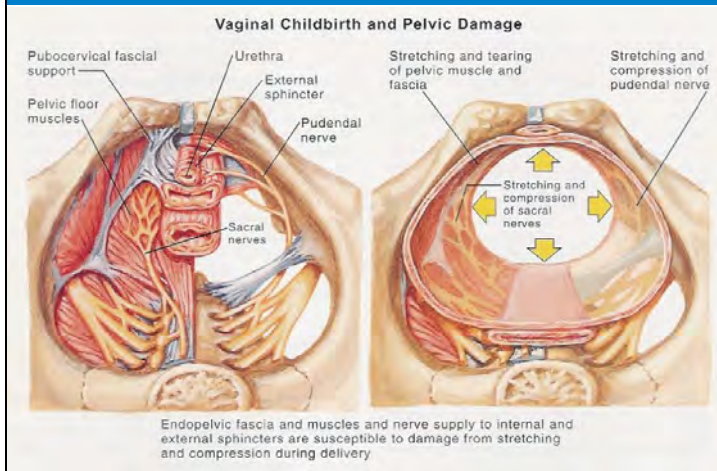
  
 Rio de Janeiro

**But OASIS  
 does not  
 happen in a  
 vacuum**

**(no pun  
 intended)**



## Stretching, Compression and Ischemia



## Vaginal Birth & Nerve Function



- Compression → ischemia (Rempen, J Perinat Med, 1991)
  - 20-30 mmHg → microvascular flow stops
  - 80 mmHg → complete cessation of blood flow
  - 100 mmHg = average force during labor
- Stretching → neuropraxic injury (Allen, BJOG, 1990)
- *Denervation* followed by re-innervation occurs in up to 80% of women after first vaginal delivery

## Impaired Anorectal Function after SVD



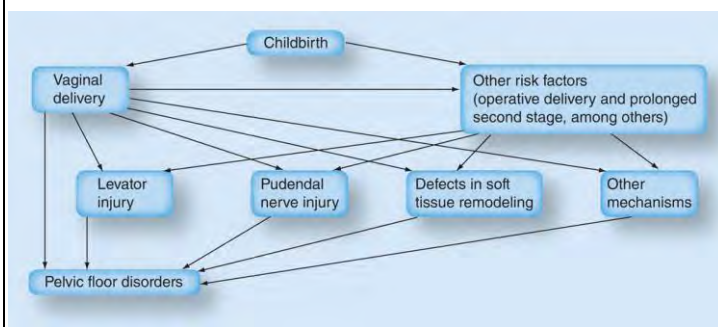
More perineal descent- Increasing parity is associated with perineal descent ( $r=0.26$ ) and perineal descent with straining ( $r=0.24$ ) (Ryhammer, Dis Col R 1996)

Reduced anal function -Parous women have a significantly reduced voluntary anal squeeze (75cm) compared to their nulliparous counterparts (105 cm) (Jameson Br J Surg 1994)

Decreased anal sensation-Parity significantly decreases anal mucosal electrosensitivity ( both of above references)



Etiology of bowel dysfunction after OASIS is multifactorial



Memon & Handa. Womens Health (Lond Engl). May 2013

- Review the context in which OASIS occurs
- Summarize relationship between obstetrics & bowel dysfunction
  - Pregnancy
  - Vaginal birth
  - Operative vaginal delivery
  - OASIS
- Review principles of treatment of OASIS

Cohort of 1571 Norwegian primips surveyed about bowel symptoms during the last month of pregnancy



Loss of formed stool at least monthly: 9%

Loss of loose stool at least monthly: 13%

Loss of flatus at least weekly: 12%

Fecal urgency: 20%

At least one symptom: 24%

Three or more symptoms: 5%

***AI in pregnancy is the STRONGEST PREDICTOR of AI one year postpartum!***

Johannessen, BJOG, 2014

DOI: 10.1111/j.1471-0528.2007.01553.x  
www.blackwellpublishing.com/bojog

Systematic review

## Does the mode of delivery predispose women to anal incontinence in the first year postpartum? A comparative systematic review

SJ Pretlove,<sup>a</sup> PJ Thompson,<sup>a</sup> PM Toozs-Hobson,<sup>a</sup> S Radley,<sup>b</sup> KS Khan<sup>a</sup>

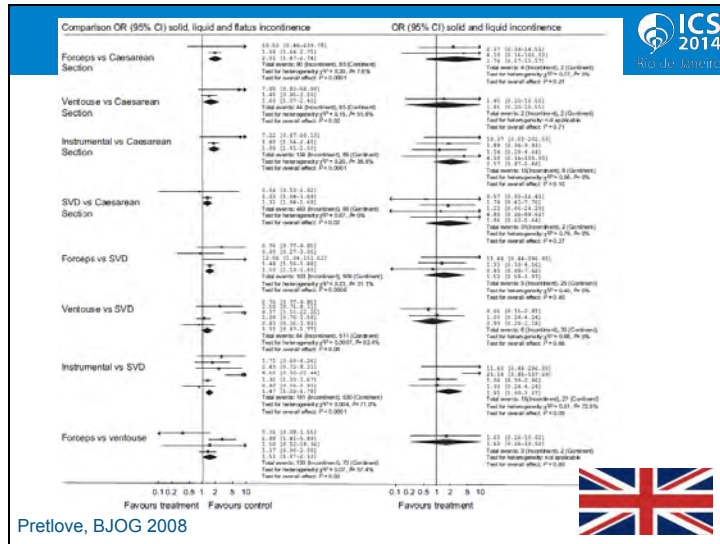
<sup>a</sup> Department of Obstetrics and Gynaecology, Birmingham Women's Hospital, Edgbaston, Birmingham, UK; <sup>b</sup> Department of Colorectal Surgery, University Hospital Birmingham, Queen Elizabeth Site, Edgbaston, Birmingham, UK  
Correspondence: Dr SJ Pretlove, Birmingham Women's Hospital, Metchley Park Road, Edgbaston, Birmingham B15 2TG, UK.  
Email: sampretlove@doctors.net.uk

Accepted 16 September 2007.

OVD > SVD > C-section



Pretlove, BJOG 2008



Pretlove, BJOG 2008



Study or subgroup	log [Odds Ratio] (SD)	Odds Ratio IV, Random, 95% CI	Odds Ratio IV, Random, 95% CI
Abramov 2005	-0.94 (0.53)		0.39 [ 0.14, 1.10 ]
Altman 2007	0.039 (1.157)		1.04 [ 0.11, 10.04 ]
Goldberg 2003	0.058 (0.165)		1.06 [ 0.77, 1.46 ]
MacArthur 2005	0.039 (0.187)		1.04 [ 0.72, 1.50 ]
MacLennan 2000	-0.25 (0.655)		0.78 [ 0.22, 2.81 ]
Melville 2005	-0.139 (0.371)		0.87 [ 0.42, 1.80 ]
Varma 2006	-0.041 (0.44)		0.96 [ 0.41, 2.27 ]



Nelson, Cochrane Database of Systematic Reviews, 2010.

## Bowel dysfunction 1 year p/pregnancy

Cohort of 1030 Norwegian primips surveyed about bowel symptoms 1 year PP

Loss of formed stool at least monthly: 5%

Loss of loose stool at least monthly: 9%

Loss of flatus at least weekly: 6%

Fecal urgency: 16%

At least one symptom: 19%

Three or more symptoms: 2%

OVD → Fecal urgency (OR 2.0, 1.3 – 2.9)

OASIS → Loss of flatus or stool (OR 4.1, 1.7–9.6)



Johannessen, BJOG, 2014

## Bowel dysfunction after OVD

Nested prospective cohort of 198 nullips in RCT of routine vs. restricted episiotomy at time of OVD

Table 2. Urinary, anal and sexual morbidities up to 1 year after operative vaginal delivery

	Antenatal n = 198	6 weeks postpartum n = 164	P****	1 year postpartum n = 108	P*****
Urgency of micturition (%)	148 (74.7)	82 (50.0)	<-0.001*	52 (49.5)	1.00
Urge urinary incontinence (%)	70 (35.4)	57 (34.8)	0.67	39 (37.1)	0.82
Stress urinary incontinence (%)	82 (41.4)	57 (34.8)	0.34	49 (46.7)	0.02*
Reduced urinary sensation (%)	25 (13.2)	16 (9.8)	0.83	6 (5.7)	0.23
Anal incontinence of flatus (%)	104 (52.5)	70 (42.9)	0.04*	38 (35.2)	0.54
Anal incontinence of liquids (%)	9 (4.5)	10 (6.1)	0.29	6 (5.5)	0.69
Anal incontinence of solids (%)	2 (1.0)	8 (4.9)	0.02*	0 (0)	0.03*
Urgency of defecation (%)****	14 (7.1)	13 (7.9)	1.00	8 (7.5)	1.00
Moderate/severe dyspareunia (%)	8 (4.1)	12 (9.6)	0.18	5 (4.7)	0.34
Dyspareunia preventing intercourse (%)	18 (9.3)	29 (17.8)	0.02*	9 (9.1)	0.01*

\*Significant, P < 0.05.

\*\*McNemar's test (chi-square test equivalent for paired data).

\*\*\*Comparison of morbidities at baseline and 6 weeks postpartum.

\*\*\*\*Comparison of morbidities at 6 weeks postpartum and 1 year postpartum.

\*\*\*\*\*Inability to wait 5 minutes after urge to defecate.



MacLeod, BJOG 2013

## Bowel dysfunction 3 mos after OASIS

Obstetric anal sphincter injury in the UK and its effect on bowel, bladder and sexual function

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Faecal symptoms  
Urinary symptoms  
Sexual function  
Forceps



### ABSTRACT

**Objective:** To determine the incidence and factors associated with the development of bowel, urinary and sexual symptoms following obstetric anal sphincter injury (OASIS).

**Study design:** A prospective cohort study involving 425 women who sustained OASIS, over a five-year period, in a large UK teaching hospital. Details of bowel, urinary and sexual function were documented using a structured questionnaire. The outcome measures included the incidence of symptoms following OASIS and factors which modify the risk of developing symptoms.

**Results:** The majority (96%) of women were faecally continent three months after primary OASIS repair. Nevertheless, 34.2% reported faecal urgency, 25% suffered poor flatal control, and nearly 30% reported pain and bleeding on defaecation. Sixteen percent of women reported stress urinary incontinence, 15% experienced urgency and 20% reported urinary frequency. Fifty-seven percent of women had resumed intercourse but 32% of those women reported dyspareunia. Women who developed faecal symptoms were significantly more likely to develop urinary symptoms. Advancing maternal age and the use of forceps, in particular rotational forceps, significantly increase the risk of developing faecal and urinary symptoms.

**Conclusions:** Obstetric anal sphincter injuries continue to be responsible for significant morbidity, with approximately 30% of women reporting faecal, urinary or sexual symptoms, three months postpartum. This large prospective UK study provides up-to-date information relating to factors which increase the likelihood of such symptoms occurring. These data are useful for counselling and targeting more intensive follow up to women at higher risk of developing symptoms.

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Marsh, Eur J Obstet Gynecol Reprod Bio May 2013

## Cohort of 435 women with OASIS



Table 1: Sample Description

Mean age	29.5 years (17-42)
Primiparous	82 % (n=357)
Spontaneous vaginal delivery	57.2% (n = 247)
Forceps	34.2% (n = 148)
Ventouse	8.6% (n = 37)
Anal sphincter injury Classification	
3a (<50% of EAS)	40.1% (n = 132)
3b (>50% of EAS)	40.7% (n = 134)
3c (both IAS & EAS)	14.3% (n = 47)
4	4.9% (n = 16)
Type of repair	
End to end	25.9% (n = 73)
Overlapping	74.1% (n = 209)

Marsh, Eur J Obstet Gynecol Reprod Bio May 2013



## Bowel dysfunction 3 mos after OASIS



### Prevalence of Symptoms

- 4% fecal incontinence
- 34% fecal urgency
- 25% pain w/ defecation
- 25% variable or poor flatal control

23% ≤ 35 yo  
37% > 35 yo  
(p = 0.038)

### Associated Factors

- No difference with EAS alone vs IAS & EAS injury
- No difference with mode of repair
- Poor flatal control associated with maternal age
- Bowel sx associated with OVD

Marsh et al, Euro J Ob Gyn Repro Bio 154 (2011) 223-227



## Bowel dysfunction 3 mos after OASIS



### Patients with OASIS & OVD at highest risk!

Fecal urgency:

41% FCP, 30% SVD/VAVD (p=0.04)

Incomplete bowel emptying:

43% FCP, 28% SVD (p=0.03)

Highest rates of bowel symptoms in patients with rotational forceps compared to all others

- Fecal Urgency: 61% vs. 32% (p = 0.001)
- Fecal Incontinence: 9% vs. 3% (p = 0.1)

Marsh et al, Euro J Ob Gyn Repro Bio 154 (2011) 223-227



## BOOST Study: Correlates of AI 24 weeks p/OASIS



Variable	Adjusted Odds Ratio	95% Confidence Interval	p-value
Episiotomy No Yes	1.000 (reference) 2.76	0.94-8.14	0.06
Primary Race Non-White White	1.000 (reference) 4.64	1.35-16.02	0.015
Duration 2 <sup>nd</sup> Stage of Labor (unit=30 minutes)	0.68	0.52-0.89	0.004



Richter, ICS abstract (<http://www.ics.org/Abstracts/Publish/180/000283.pdf>)

## Bowel dysfunction 6 mos after OASIS



Case-control study of 136 Swedish primips matched with 2 controls (C-section, VD)



Of 134 women with OASIS, at 6 mos:

- 8% (n=11) faecal incontinence (mainly "soiling")
- 29% (n=39) flatal incontinence
- 10% (n = 13) faecal urgency
- 31% (n=41) anal incontinence

Wegnelius, Acta Obstet Gynecol Scand 2011

## Bowel dysfunction 4-12 mos p/OASIS



Maternal Health Study: cohort of 1,507 UK nullips



Table 3. Fecal Incontinence 4 to 12 Months Postpartum by Maternal, Pregnancy, Labor, and Birth Factors\* (n=1,244<sup>†</sup>) (continued)

Factor	Data Collected	Total	Continent	Incontinent	Odds Ratio (95% Confidence Interval)
Posterior perineal tear**	Medical record				
No tear		407	352 (86.5)	55 (13.5)	1.00 (reference)
First-degree		92	80 (87.0)	12 (13.0)	0.96 (0.49-1.88)
Second-degree		334	300 (89.8)	34 (10.2)	0.73 (0.46-1.14)
Third- or fourth-degree		48	37 (77.1)	11 (22.9)	1.90 (0.92-3.95)
Perineal trauma <sup>†</sup>	Medical record				
Intact perineum		204	181 (88.7)	23 (11.3)	1.00 (reference)
Unstured tear		71	62 (87.3)	9 (12.7)	1.14 (0.50-2.60)
Sutured tear		404	361 (89.4)	43 (10.6)	0.94 (0.55-1.60)
Episiotomy		270	222 (82.2)	48 (17.8)	1.70 (1.00-2.90)
Neonatal birth weight (g)	3 mo postpartum				
Less than 2,500		60	51 (85.0)	9 (15.0)	1.23 (0.59-2.56)
2,500-3,999		1,013	886 (87.5)	127 (12.5)	1.00 (reference)
4,000 or more		144	123 (85.4)	21 (14.6)	1.19 (0.72-1.96)
Total		1,244	1,085 (87.2)	159 (12.8)	

Brown, Obstet Gynecol 2012

# Obtaining Informed Consent



Royal College of Obstetricians and Gynaecologists



Consent Advice No. 9  
June 2010

## REPAIR OF THIRD- AND FOURTH-DEGREE PERINEAL TEARS FOLLOWING CHILDBIRTH

### Presenting information on risk

Term	Equivalent numerical ratio	Colloquial equivalent
Very common	1/1 to 1/10	A person in family
Common	1/10 to 1/100	A person in street
Uncommon	1/100 to 1/1000	A person in village
Rare	1/1000 to 1/10000	A person in small town
Very rare	Less than 1/10000	A person in large town

# Bowel dysfunction p/ OASIS & repair



976 Int Urogynecol J (2009) 20:973-978

Table 3 Flatus incontinence and fecal urgency

	Before delivery (n=59)	7weeks postpartum (n=59)	1year postpartum (n=43)	p value <sup>a</sup> before delivery compared to 1year	p value <sup>b</sup> 7weeks compared to 1year
Flatus incontinence, n (%)	2 (5)	1 (2)	2 (5)	1.00	0.58
Fecal urgency, n (%)	5(12)	4 (10)	2 (5)	0.46	0.70

Int Urogynecol J (2013) 24:55-60

57

Table 2 Symptoms of anal Incontinence and quality of life over time

	No OASIS sustained				OASIS sustained			
	Prior to delivery (n=182)	7 weeks (n=143)	4 years (n=61)	P value	Prior to delivery (n=59)	7 weeks (n=53)	4 years (n=25)	P value
Flatus incontinence n (%) *	3(1.6)	1(0.7)	6(9.8)	0.63	2(3.4)	3(12)	1.00	
Incontinence to loose stools n (%) *	0	0	5(8.2)	0.13	0	0	2(8)	0.25
Incontinence to hard stools n (%) *	0	0	1(1.6)	1.00	0	0	1(4)	0.50
Anal incontinence n (%) *	3(1.6)	1(0.7)	6(9.8)	0.13	2(3.4)	4(16)	0.25	
Incontinence to flatus symptom score**	1.5	1.5	1.70	0.28	1.6	1.7	1.8	1.00
Incontinence to loose stools symptom score**	1.0	1.0	1.08	0.06	1.0	1.0	1.24	0.11
Incontinence to hard stools symptom score**	1.0	1.0	1.02	0.32	1.0	1.0	1.12	0.19

Andrews, IUJ 2009; Andrews, IUJ 2013



# RCOG Consent Advice #9, 2010



I have explained the procedure to the patient, in particular, I have explained:

The intended benefits: To repair damage that has already occurred, to attempt to restore normal anatomy, help wound healing and reduce the risk of long-term bowel problems. The risks quoted below might be linked to sphincter (anal muscle) damage rather than the repair and these are likely to be significantly higher if the trauma is not repaired.

Serious risks:

- inability to control bowels and/or flatus (passing wind; common)
- possibility of recommending delivery by caesarean section in future pregnancies if symptoms persist or investigations suggest abnormal anal function. (uncommon)
- haematoma (collection of blood; rare)
- consequences of failure of repair requiring the need for further interventions and treatments (rare)
- developing a fistula (hole) between your back passage and vagina after the tear has healed. This will need to be repaired by further surgery (very rare)

Frequent risks:

- difficulty in passing stools initially (common)
- suture material causing discomfort and requiring removal (common)
- healing with excessive immature tissue formation (common)
- urinary infection (common)
- wound Infection (common)
- a feeling that you need to rush to the toilet to open your bowels urgently (very common)
- pain or soreness in the perineum and pain during intercourse (common)



## Guidelines for OASIS Repair



Royal College of  
Obstetricians and  
Gynaecologists

Setting standards to improve women's health

Green-top Guideline No. 29  
March 2007

### THE MANAGEMENT OF THIRD- AND FOURTH-DEGREE PERINEAL TEARS

## Principles of OASIS repair

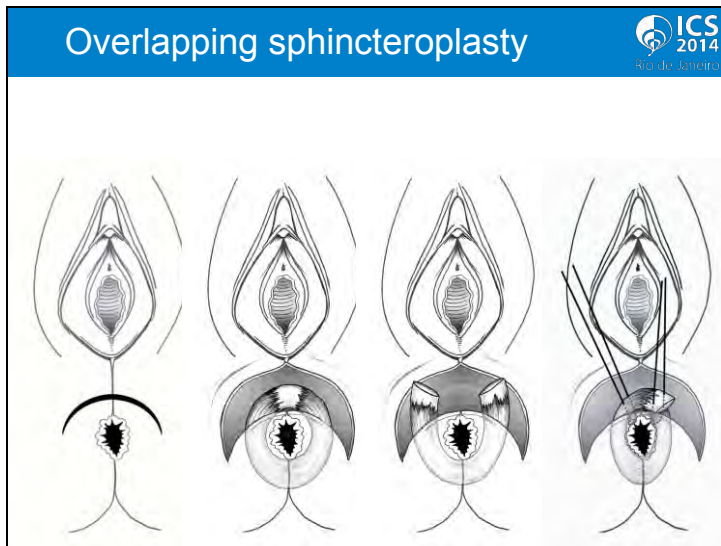
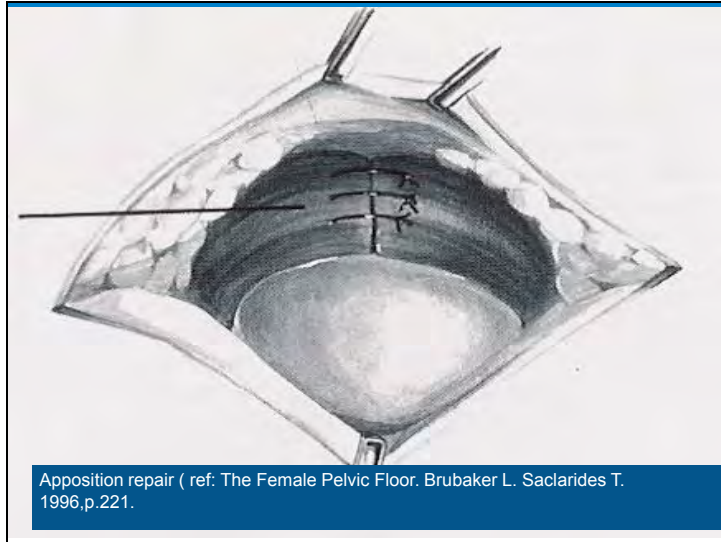


- Realize that this sphincter is an important physiological structure deserving excellent surgical conditions and technique - Treat it like it was yours!
- Good lighting - To the OR if needed
- Excellent anesthesia- Regional or general anesthesia necessary for overlapping repair and preferred for both
- Aseptic conditions
- Do one or more rectal exams to carefully delineate extent of injury.
- Recognize and repair IAS separately if needed

## OB Sphincter Repair



- Carefully identify ends of external sphincter - Grasp with Allis forceps
- If complete EAS disruption, current data does not currently tell us whether approximation repair or overlapping repair is better. ( Sultan RCT - overlapping better; S. Farrell RCT – not better)
- Do not transect EAS completely to do overlapping!
- Although data lacking, consider:
  - Long lasting monofilament absorbable suture for EAS (e.g 2-0,3-0 Maxon, PDS)
  - Prophylactic antibiotics ( 2<sup>nd</sup> or 3<sup>rd</sup> generation cephalosporins, Metronidazole, Amoxicillin/clavulanate all reported)
- Stool softeners, Bulking agents?



ICS  
2014  
Rio de Janeiro

## Physiotherapy Management of Obstetric Anal Sphincter Injuries (OASIS)

Paula Igualada-Martinez MSc BSc (Hons)  
Clinical Specialist Physiotherapist  
Guy's and St Thomas' NHS Foundation Trust , London, UK



***“All women should be offered physiotherapy and pelvic-floor exercises for 6–12 weeks after obstetric anal sphincter repair.”***

***(RCOG 2007)***

## Aims of this presentation

- Acute physiotherapy management
- Physiotherapy Assessment
- Physiotherapy Management
  - PFMT
  - Biofeedback
  - Neuromuscular Electrical Stimulation (NMES)
  - Other management strategies (Loperamide/Rectal Irrigation/Anal plugs)
  - Management of rectal evacuation disorders (Lifestyle changes, defecation dynamics)
  - Preventative conservative measures

## Physiotherapy in Bowel dysfunction

- Faecal Incontinence
  - To strengthen the Pelvic Floor Muscles including EAS
  - To increase the sensibility of rectum
  - To keep the rectum empty
  - To change stool consistency

Bø et al (2007) Evidence-Based Physical Therapy for the Pelvic Floor

- Rectal Evacuation disorders
  - To correct muscle disco-ordination
  - To correct incorrect defecation patterns
  - To strengthen pelvic floor muscles
  - To change stool consistency

Laycock and Haslam (2002) Therapeutic Management of Incontinence and Pelvic Pain

## Acute physiotherapy management



- R.I.C.E
  - Rest, Ice (NICE 2006; East et al 2007), Compression and Elevation
- Avoidance of excessive forces on healing tissue (defecation dynamics and constipation management) (Sherburn et al 2013)
- PFMT (NICE 2006; RCOG 2007; Hay-Smith et al 2009)
- Raise awareness of common symptoms following OASIS (NICE 2006)

## Physiotherapy Assessment



- The physiotherapy assessment includes:
  - History taking
  - Standardized assessment tools
  - Observation and Physical examination
    - Vaginal and anorectal examination
    - Pelvic floor muscle assessment
- Further tests and investigations

Chartered Society of Physiotherapy (2000) (Appendix 9)

## History taking



- Patient's presenting symptoms and the history of present condition
- Bowel symptoms, habits and coping strategies
- Bladder, pelvic organ prolapse and sexual associated symptoms
- Red flags
- Past gynecological, obstetric, medical, surgical and drug history
- Diet and fluid intake
- Psychosocial history

Laycock and Haslam (2002) Therapeutic Management of Incontinence and Pelvic Pain  
Bols et al (2013) KNFG Evidence Statement Anal incontinence

## Standardized Assessment tools



- St Marks Continence score

Roos et al (2009) Int Urogynecol J Pelvic floor Dysfunct.;20(4):407-10

- Thompson score

- Bristol Stool Chart

- Defecation diary

- Wexner Score

- Global Perceived Effect (GPE)

Bols et al (2013) KNFG Evidence Statement Anal incontinence

## Observation and physical examination



- Observation:

- Skin abnormalities: scars, swellings, atrophy, skin tag, haemorrhoids, faecal soiling, fistula, fissure
- Introitus: open/closed
- Perineal body: shortened/absent, descent at rest and straining
- Vagina: pink, red, white, moist, dry, discharge
- Anus: anus closed or open at rest, bulging anus

- Physical examination/Digital examination (anal/vaginal):

- Dermatomes/Myotomes/Reflexes
- Presence of faecal material in the rectum
- Vaginal, anal and rectal sensation
- Presence of pelvic organ prolapse (at rest/straining)
- PFM contraction during coughing/straining and use of concomitant muscles

Laycock and Haslam (2002) Therapeutic Management of Incontinence and Pelvic Pain  
Bols et al (2013) KNFG Evidence Statement Anal Incontinence

## Pelvic floor muscle assessment



- A digital assessment via the vagina and/or the rectum is undertaken to assess correct pelvic floor muscle contraction

- International Continence Society Pelvic Floor Score (Messelink et al 2005) Absent-Weak-Normal- Strong and more recently the PFMF assessment scheme (Slieker-ten Hove et al 2009)

Slieker-ten Hove et al (2009) Neurourology and Urodynamics 28:295-300  
Messelink B et al. (2005) Neurourology and Urodynamics 24:374-380

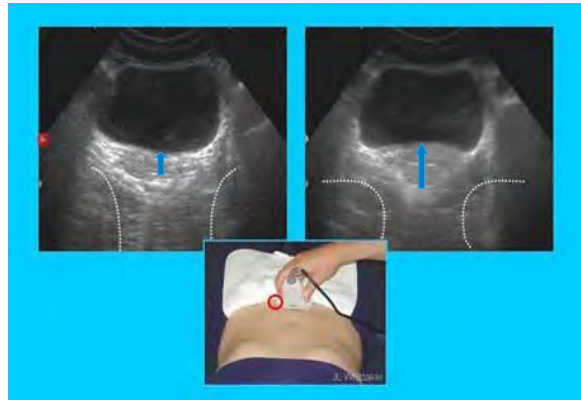
- Pelvic floor muscle contractions can be graded- Modified Oxford Scale – the PERFECT scheme

- 0 - no discernible contraction
- 1 - flicker of movement or pulsation under examining finger
- 2 - weak contraction without lift or squeeze
- 3 - moderate contraction, lift of posterior wall and squeeze on finger
- 4 - good contraction, elevation of posterior wall against resistance
- 5 - strong contraction against strong resistance

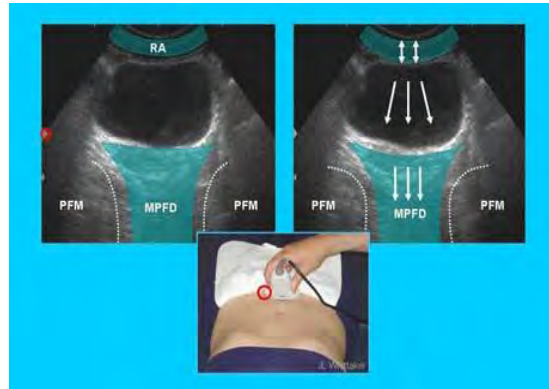
- PERFECT acronym for

- P: power (according to the Modified Oxford Scale)
- E: endurance
- R: repetitions
- F: fats
- ECT: every contraction timed

Laycock J and Jerwood D (2001) Physiotherapy 87 (12):631-642



2009 Whittaker Physiotherapy Corporation  
<http://www.rtuspt.com/gallery/stillsTransverseBladder2.php>



2009 Whittaker Physiotherapy Corporation  
<http://www.rtuspt.com/gallery/stillsTransverseBladder3.php>

## Further investigations

- Anorectal manometry
- Endoanal ultrasound
- Pelvic floor ultrasound
- Defecating proctogram
- Sigmoidoscopy/Colonoscopy
- Barium enema
- Colonic transit studies
- Stool samples
- Blood tests (Calcium and Thyroid levels)

## Pelvic floor muscle training



Margaret Morris through the British Physiotherapy Association highlighted:

“The importance of tensing and relaxing the pelvic floor muscles together with the **sphincters** as a **preventative** and **treatment** option for urinary and **faecal incontinence**

(St Thomas’ Hospital 1936)”



## Pelvic floor muscle training



- PFMT is effective in the treatment of:

- **Urinary Incontinence (level 1)**

Dumoulin et al (2014) Cochrane Database of Systematic Reviews, Issue 5. Art. No.: CD005654  
NICE (2013) The management of Urinary Incontinence. Clinical Guideline 171  
Boyle et al (2012) Cochrane Database of Systematic Reviews, Issue 10. Art. No.: CD007471

- **Improve pelvic organ prolapse**

Hagen and Stark (2011) Cochrane Database of Systematic Reviews, Issue 12. Art. No.: CD003882

- **Faecal Incontinence**

Boyle et al (2012) Cochrane Database of Systematic Reviews, Issue 10. Art. No.: CD007471  
Norton and Cody (2012) Cochrane Database of Systematic Reviews, Issue 7. Art. No.: CD002111  
NICE (2007) Faecal incontinence. Clinical guideline 49

## PFMT



- PFE's should involve fast and slow twitch fibres and be performed in a variety of positions
- Exercise programs should follow the principles of:
  - Specificity
  - Overload
  - Progression
  - Maintenance and reversibility
- For a minimum of 5 months
- Include strategies to adhere to the exercise regime
- Endurance of squeeze

Bø et al (2007) Evidence-Based Physical Therapy for the Pelvic Floor  
American College of Sports Medicine (ACSM) (1998) Med Sci Sports Exer 30: 975-991

## Biofeedback



Biofeedback in patients with bowel dysfunction can be used in various ways:

- EMG biofeedback (activity of motor units- registration of a physiological activity by audio or visual means)
  - Improve PFMT technique
  - Increase motivation
  - Monitor progress
  - Functionality
  - Enjoyment

Herderschee et al (2011) Cochrane Database of Systematic Reviews, Issue 7. Art. No.: CD009252

Bols et al (2013) KNFG Evidence Statement Anal incontinence

## Sensory Training



- pressure (anal manometry or probe) or using a rectal balloon:
  - To improve defecation dynamics in patients with RED
  - Patients with hypersensitive rectums are taught to tolerate larger volumes and increase urge resistance
  - Patients with urge incontinence learn to contract their pelvic floor in response to rectal filling
  - Patients with insensitive rectum are taught how to discriminate smaller rectal volumes

Bols et al (2013) KNFG Evidence Statement Anal incontinence

Norton and Cody (2012) Cochrane Database of Systematic Reviews, Issue 7. Art. No.: CD002111

Bols et al (2007) BMC Public Health 7:355

## Neuromuscular Electrical Stimulation (NMES)



- NMES is aimed at training the pelvic floor and external anal sphincter muscles by producing a series of electrically induced contractions, to improve strength, sensation and function
- NMES is a treatment for women who demonstrate a grade 0, 1 on the modified Oxford scale and would otherwise be unable to re-educate their pelvic floor muscles
- Patients should join in with the electrically induced contraction.
- Caution when using before 12/52 postpartum

Vonthein et al (2013) Int J Colorectal Dis 28:1567-1577

## 'The Knack'

- The use of anticipatory pelvic floor contraction immediately prior to an activity that causes urinary leakage ("the knack") is taught
- No studies yet on Faecal and/or Flatus incontinence
- Used in POP by Hagen et al (2009) and Braekken et al (2010)



Miller et al (1996) Neurourology and Urodynamics 15:392-393

## PFMT, EMG and NMES following OASIS

- **Study:** Mahony et al (2004) Randomized clinical trial of intra-anal electromyographic biofeedback physiotherapy with intra-anal electromyographic biofeedback augmented with electrical stimulation of the anal sphincter in the early treatment of postpartum fecal incontinence. *American Journal of Obstetrics and Gynecology*;191(3):885-90.
- **Design:** 2 arm RCT: Anal BFB + home PFMT (n=26) and Anal BFB/NMES + home PFMT (n=28)
- **N:** 60 women at 12/52 postpartum
- **OASIS Diagnosis:** EAUS confirmed OASIS + ARP
- **Training Protocol:** 12/52 of Anal BFB for 10 mins and Anal BFB/NMES for 20 mins
- **Drop-out Adherence:** 10% dropout- Adherence reported
- **Results:** NS between groups, significant change combination of groups, improvement of squeeze pressure

## PFMT, EMG and NMES following OASIS

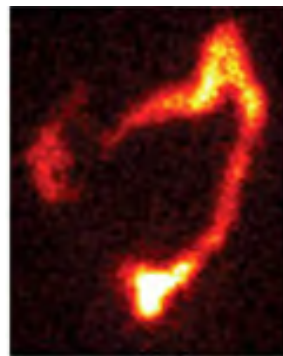
- **Study:** Naimy et al (2007) Biofeedback vs. electrostimulation in the treatment of post delivery anal incontinence: a randomized, clinical trial. *Diseases of the Colon & Rectum*; 50 (12):2040-6.
- **Design:** 2 arm RCT: Daily use of Anal BFB (n=19) and Anal NMES (n=21)
- **N:** 49
- **OASIS Diagnosis:** Clinical diagnosis of OASIS (a few had EAUS)
- **Training Protocol:** Daily use (x2) of 20 minutes home BFB or NMES (with anal probe) for 8/52
- **Drop-out Adherence:** 20% dropout – Adherence reported
- **Results:** No difference on the Wexner score between groups

## PFMT, EMG and NMES following OASIS

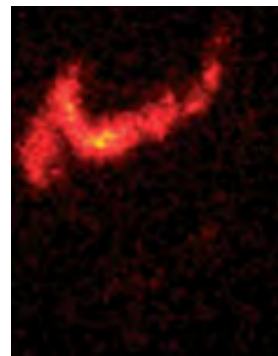


- **Study:** Peirce et al (2013) Randomised controlled trial comparing early home biofeedback physiotherapy with pelvic floor exercises for the treatment of third-degree tears (EBAPT Trial). *BJOG*;120(10):1240-7
- **Design:** 2 arm RCT: Early Home Biofeedback Physiotherapy (n=30) and Pelvic floor exercises (n=90)
- **N:** 120
- **OASIS Diagnosis:** Clinical diagnosis and EAUS+ARP
- **Training Protocol:** Early Biofeedback (with anal probe) Physiotherapy and PFE's for 12/52
- **Drop-out Adherence:** 5% - Adherence reported
- **Results:** No change in resting and squeeze anal pressures, QoL and symptom questionnaires between groups

## Rectal Irrigation



Before emptying



After emptying

Christensen et al (2003) *Diseases of the Colon and Rectum* 46:68-76

## Loperamide



- There is moderate evidence that constipating medication (loperamide oxide and diphenoxylate with atropine) reduces the risk of FI among patients with liquid stool

Omar and Alexander (2013) *Cochrane Database of Systematic Reviews*, Issue 6. Art. No.: CD002116



## Anal plugs



- *“Plugs could then be useful in a selected group of people either as a substitute for other forms of management or as an adjuvant treatment option”*



Deutekom and Dobben (2012) Cochrane Database of Systematic Reviews, Issue 4, Art. No.: CD005086.

## Defecation dynamics



- Defecation technique:
  - Knees higher than hips
  - Forearms on thighs
  - Lean forward, neutral spine
  - Avoid holding the breath
- Toilet Routine:
  - Regular attempt following breakfast (stimulation of gastro-colic reflex)
  - Privacy and time
  - Avoid ignoring the urge to defecate



Laycock and Haslam (2002) Therapeutic Management of Incontinence and Pelvic Pain

## Lifestyle advice



- Patient education and advice
- Dietary supplementation with Psyllium husk or gum Arabic fiber is associated with a reduced number of FI episodes and improved consistency of stools
- Weight loss through behavioural intervention is associated with improvement in the frequency of liquid stool incontinence among obese women with urinary incontinence
- Increasing fluid intake to influence the consistency of stools
- Review of medication
- Fibre intake

Bols et al (2013) KNFG Evidence Statement Anal incontinence

Markland et al (2011) Int Urogynecol Journal ;22(9):1151-7

Norton et al (2010) Neurourolog Urodyn ;29(1):199-206

Abrams et al (2009) Incontinence. Health Publications Ltd; p. 1321-86.

Bliss et al (2001) Nurs Res; 50(4):203-13.

## Preventative conservative measures



- Pelvic floor muscle training



Boyle et al (2012) Cochrane Database of Systematic Reviews, Issue 10. Art. No.: CD007471

Stafne et al (2012) BJOG: an international journal of obstetrics and gynaecology;119(10):1270-80.

- Perineal Massage

Beckmann and Stock (2013) Cochrane Database of Systematic Reviews 2013, Issue 4. Art. No.: CD005123

## Conclusions



- Physiotherapy/Conservative management should be first line management of OASIS related bowel dysfunction.
- Always allow time for natural resolution of symptoms before commencement of any more intrusive intervention such as intra anal/vaginal EMG/NMES, use of rectal irrigation, loperamide, etc...
- Prevention is better than cure!
- Ensure good communication with the MDT!



## Long-term Consequences of OASIS

Heidi Brown, MD, MAS

Assistant Professor, Female Pelvic Medicine & Reconstructive Surgery  
Departments of Obstetrics & Gynecology and Urology  
University of Wisconsin School of Medicine & Public Health



## Aims



- Review associations between mode of delivery and pelvic floor dysfunction, focusing on bowel symptomatology
- Review studies addressing bowel dysfunction after OASIS specifically

## KP CARES Study



Kaiser Permanente Continence Associated Risk Epidemiology Study (KP CARES)

- Mail survey
- >4,000 women: 25-39, 40-54, 55-69, 70-84 yo
- 19% nulliparous
- 10% C-section only
- 71% vaginally parous

Evaluated prevalence of pelvic floor disorders in each birth group



Lukacz ES, Intl Urogyn J 2005

## KP CARES: PFD by Birth Group





	<b>NP = 787</b>	<b>CS = 389</b>	<b>VP = 2927</b>
<b>POP</b>	4% (29/774)	4% (16/386)	<b>8%*†</b> (223/2883)
<b>SUI</b>	8% (64/771)	11% (43/387)	<b>18%*†</b> (505/2885)
<b>OAB</b>	9% (70/773)	9% (36/381)	<b>15%*†</b> (427/2852)
<b>AI</b>	19% (143/766)	16% (60/365)	<b>28%*†</b> (786/2823)
<b>PFD</b>	27% (201/750)	27% (98/369)	<b>42%*†</b> (1153/2767)

\*† p < 0.05 VP compared to CS AND NP



Lukacz ES, Intl Urogyn J 2005

KP CARES Odds PFD by Birth Group 					
	POP	SUI	OAB	AI	PFD
<b>CS vs. NP</b>					
Crude OR	1.72	1.38	1.05	0.86	0.99
95% CI	(0.87-3.38)	(0.92-2.07)	(0.69-1.60)	(0.62-1.19)	(0.75-1.31)
Adjusted OR	1.61	1.26	1.00	0.84	0.92
95% CI	(0.80-3.24)	(0.82-1.93)	(0.64-1.55)	(0.60-1.18)	(0.69-1.24)
<b>VP vs. NP</b>					
Crude OR	<b>3.33*</b>	<b>2.34*</b>	<b>1.77*</b>	<b>1.68*</b>	<b>1.95*</b>
95% CI	(2.07-5.36)	(1.78-3.08)	(1.35-2.31)	(1.38-2.05)	(1.63-2.33)
Adjusted OR	<b>3.21*</b>	<b>2.26*</b>	<b>1.46*</b>	<b>1.53*</b>	<b>1.76*</b>
95% CI	(1.96-5.26)	(1.70-3.00)	(1.11-1.93)	(1.24-1.89)	(1.46-2.12)
<b>VP vs. CS</b>					
Crude OR	<b>1.94*</b>	<b>1.70*</b>	<b>1.69*</b>	<b>1.96*</b>	<b>1.98*</b>
95% CI	(1.15-3.26)	(1.22-2.36)	(1.18-2.41)	(1.45-2.62)	(1.55-2.52)
Adjusted OR	<b>1.82*</b>	<b>1.81*</b>	<b>1.53*</b>	<b>1.72*</b>	<b>1.85*</b>
95% CI	(1.04-3.19)	(1.25-2.61)	(1.02-2.29)	(1.27-2.35)	(1.42-2.41)

Lukacz ES, Intl Urogyn J 2005      Adjusted OR (Age, BMI, and parity) \* p < 0.05

## KP CARES - Conclusions

**Pregnancy**

- Does not increase the odds of AI

**Vaginal delivery**

- Associated with an increased risk of AI compared to nulliparity or Cesarean section


**Cesarean section**

- Protective effect on AI
- Vaginal parity has a nearly 2 fold (72%) increased odds of AI compared to Cesarean section

**Number needed to treat**

- 7 Cesarean sections need to be performed to prevent one individual from developing a pelvic floor disorder

Impact – risk / benefit ratio needs to be considered




## MOAD Study

**Mothers' Outcomes After Delivery (MOAD) Study**

- >1,000 women recruited 5- 10 years p/ first birth
- 19% C-section without labor
- 23% C-section with labor
- 14% C-section @ 10cm
- 32% SVD
- 12% OVD

Evaluated prevalence of pelvic floor disorders in each birth group with validated questionnaires & POP-Q



Handa, Obstet Gynecol 2011

# MOAD Study: Results



Table 3. Relative Odds for Each Pelvic Floor Disorder 5–10 Years From First Delivery by Obstetric Exposure

Pelvic Floor Disorder	Obstetric Exposure				
	All Births Cesarean Before Active Labor (n=192)	All Cesarean Births Before Complete Cervical Dilation (n=228)	At Least One Cesarean Delivery After Complete Cervical Dilation (n=140)	No Operative Vaginal Births (n=325)	At Least One Operative Vaginal Birth (n=126)
AI	CS s/ labor	CS - labor	CS- 10cm	SVD	OVD
OR	1 (ref)	1.07	1.63	1.52	2.10
(95% CI)		(.53-2.17)	(.79-3.39)	(.81-2.84)	(1.02-4.30)
AOR	1 (ref)	1.12	1.48	1.62	2.22
(95% CI)		(.55-2.29)	(.70-3.11)	(.85-3.10)	(1.06-4.64)
Unadjusted	1 (referent)	0.72 (0.12-4.42)	0.99 (0.16-6.13)	2.80 (0.73-10.81)	6.83 (1.68-27.80)
Adjusted*	1 (referent)	0.50 (0.12-2.12)	0.82 (0.19-3.49)	5.70 (2.22-14.66)	7.48 (2.74-20.42)
Unadjusted	1 (referent)	0.53 (0.13-2.27)	0.73 (0.17-3.13)	5.64 (2.16-14.70)	7.50 (2.70-20.87)
Adjusted*	1 (referent)				

Data are odds ratio (95% confidence interval).  
 Bold indicates those ratios that are significantly different from 1.  
 \* Adjusted for African American race, maternal age older than 35 years at first delivery, multiparity, smoking, and obesity.

Handa, Obstet Gynecol

# MOAD: VB

Objective: To assess whether episiotomy, perineal laceration, and operative delivery are associated with pelvic floor disorders after vaginal childbirth in 449 participants in MOAD.



Handa, Obstet Gynecol 2012

	Stress Urinary, Obstructive Bladder, Anal Incontinence, POP		
	AI	VAVD	FCP
<b>Operative Birth*</b>			
Vacuum:	OR	0.88	1.75
Unadjusted:	(95% CI)	(0.33-2.36)	(0.89-3.44)
Adjusted†			
Forceps:	AOR	0.90	1.66
Unadjusted:	(95% CI)	(0.34-2.43)	(0.84-3.28)
Adjusted†			
<b>Episiotomy‡</b>	AI	1 epis	>2 epis
One episiotomy:	OR	1.12	0.98
Unadjusted:	(95% CI)	(0.61-2.06)	(0.41-2.34)
Adjusted§			
More than two episiot	AOR	0.98	1.01
Unadjusted:	(95% CI)	(0.52-1.85)	(0.41-2.48)
Adjusted*			
<b>Spontaneous Lacerati</b>	AI	1 lac	>2 lac
One laceration:	OR	0.75	0.67
Unadjusted:	(95% CI)	(0.40-1.40)	(0.30-1.49)
Adjusted¶			
More than two lacerati	AOR	0.84	0.80
Unadjusted:	(95% CI)	(0.44-1.60)	(0.34-1.90)
Adjusted*			

# MOAD Study: Conclusions



VB increased odds of SUI & POP to hymen

OVD increased odds of all PFDs, especially POP

Perineal laceration, but not episiotomy, increased odds of PFDs

Number needed to harm:

1 additional woman would develop POP for every 8 women who experienced ≥1 FCP birth (vs SVD)

1 additional woman would develop POP for every 7 women who experienced ≥1 OVD (vs CS)

1 additional woman would develop POP for every 9 women who experienced ≥1 SVD (vs CS)

Handa, Obstet Gynecol 2011; Handa, Obstet Gynecol 2012



## Aims



- Review associations between mode of delivery and pelvic floor dysfunction, focusing on bowel symptomatology
- Review studies addressing bowel dysfunction after OASIS specifically

## Bowel dysfunction 3-8 years after OASIS



### Case-control study of 136 Swedish primips with OASIS matched with 2 controls (C-section, VD)

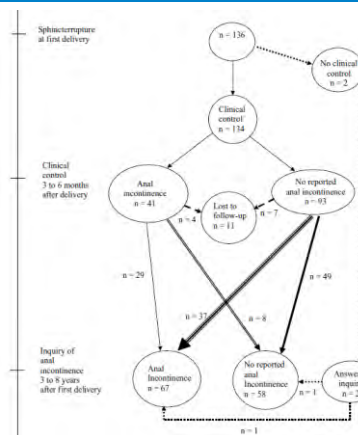
Table 2. Reported complaints when answering the questionnaire 3-8 years after the first delivery. Case group compared to control groups.

	Case group, n = 125		Cesarean group, n = 121		Normal delivery group, n = 211		p-value
	n	%	n	%	n	%	
<b>Anal incontinence</b>	67	54	25	21	48	23	
Cases vs. cesarean OR (95% CI)	3.72 (2.07-6.90)						<0.0001
Cases vs. normal delivery OR (95% CI)	3.34 (2.02-5.62)						<0.0001
<b>Vaginal pain</b>	33	26	19	16	30	14	
Cases vs. cesarean OR (95%CI)	1.90 (0.97-3.85)						0.062
Cases vs. normal delivery OR (95%CI)	2.02 (1.11-3.68)						0.019
<b>Urinary incontinence</b>	35	28	23	19	74	35	
Cases vs. cesarean OR (95% CI)	1.55 (0.80-3.02)						0.211
Cases vs. normal delivery OR (95% CI)	0.69 (0.40-1.17)						0.181



Wegnelius, Acta Obstet Gynecol Scand 2011

## Bowel dysfunction 3-8 years after OASIS



Wegnelius, Acta Obstet Gynecol Scand 2011

### Obstetrical anal sphincter laceration and anal incontinence 5-10 years after childbirth

Emily C. Evers, MPH; Joan L. Blomquist, MD; Kelly C. McDermott, BS; Victoria L. Handa, MD, MHS

**OBJECTIVE:** The purpose of this study was to investigate the long-term impact of anal sphincter laceration on anal incontinence.

**STUDY DESIGN:** Five to 10 years after first delivery, anal incontinence and other bowel symptoms were measured with the Epidemiology of Prolapse and Incontinence Questionnaire and the short form of the Colorectal-Anal Impact Questionnaire. Obstetric exposures were assessed with review of hospital records. Symptoms and quality-of-life impact were compared among 90 women with at least 1 anal sphincter laceration, 320 women who delivered vaginally without sphincter laceration, and 527 women who delivered by cesarean delivery.

**RESULTS:** Women who sustained an anal sphincter laceration were most likely to report anal incontinence (odds ratio, 2.32; 95% confidence interval, 1.27–4.26) and reported the greatest negative impact on quality of life. Anal incontinence and quality-of-life scores were similar between women who delivered by cesarean section and those who delivered vaginally without sphincter laceration.

**CONCLUSION:** Anal sphincter laceration is associated with anal incontinence 5-10 years after delivery.

**Key words:** anal incontinence, cesarean delivery, obstetrical anal sphincter laceration, quality of life

Cite this article as: Evers EC, Blomquist JL, McDermott KC, et al. Obstetrical anal sphincter laceration and anal incontinence 5-10 years after childbirth. Am J Obstet Gynecol 2012;207:425.e1-6.



Evers, AJOG 2012

Mothers' Outcomes After Delivery (MOAD) cohort: recruited 5-10 years after first birth (term, singleton) – followed prospectively, N=937

- Anal sphincter injury (3<sup>rd</sup> or 4<sup>th</sup>) N=90 (operative delivery 42%) – AI higher in group with OVD and OASI than SVD and OASI
- VB without OASI N=390 (op del 13%) – AI similar with OVD or SVD
- C-section N=527

10% AI (19% in OASI, 10% VB, 9% CS) – only 9% seek care

Significantly higher rates of flatal incontinence, stool incontinence, pad use in OASI group

QOL impact higher in OASI group in domains of physical recreation, entertainment, travel, social activities

Poor maternal recall about OASIS

Evers, AJOG 2012

### 90 women with OASIS compared to 320 women who underwent VB and 527 women who underwent CS

TABLE 1  
Characteristics of 937 study participants, by exposure group

Characteristic	Sphincter tear (n = 90)	Control by delivery type		P value*
		Vaginal (n = 320)	Cesarean (n = 527)	
Age at enrollment, y <sup>b</sup>	40.2 (35.8–43.2)	39.9 (36.3–43.1)	39.4 (35.7–43.0)	.770
Primary race, n (%)				.509
White	77 (86)	268 (84)	420 (80)	
Black	9 (10)	40 (13)	79 (15)	
Other	4 (4)	12 (4)	28 (5)	
Maternal age >35 years at first delivery, n (%)	27 (30)	89 (28)	154 (29)	.880
Multiparous at enrollment, n (%)	61 (68)	237 (74)	354 (67)	.095
Body mass index ≥30 kg/m <sup>2</sup> at enrollment, n (%)	11 (12)	52 (16)	169 (32)	<.001

\* With a Kruskal-Wallis test for continuous variables and a Fisher exact test for categorical variables; <sup>b</sup> Data are presented as median (interquartile range).  
Evers. Anal incontinence after anal sphincter laceration. Am J Obstet Gynecol 2012.



Evers, AJOG 2012

Symptoms	Control by delivery type			P value <sup>a</sup>
	Sphincter tear (n = 99)	Vaginal (n = 320)	Cesarean section (n = 527)	
AnaI incontinence score, n (%)				.011
0	59 (59)	245 (77)	427 (81)	
>0, <22.8	14 (14)	44 (14)	52 (10)	
≥22.8	17 (19)	31 (10)	45 (9)	
Unadjusted odds ratio (95% CI) <sup>b</sup>	2.32 (1.27-4.26)	1.07 (0.67-1.72)	Reference	
Ever lose gas beyond your control?, n (%)	28 (31)	73 (23)	80 (15)	<.001
Unadjusted odds ratio (95% CI) <sup>b</sup>	2.52 (1.52-4.18)	1.65 (1.16-2.35)	Reference	
How much are you bothered by losing gas? <sup>c,d</sup>	57.0 (22.0-94.0)	30.0 (19.0-70.0)	50.0 (17.5-92.0)	.241
Ever lose liquid stool beyond your control?, n (%)	15 (17)	24 (8)	39 (7)	.020
Unadjusted odds ratio (95% CI) <sup>b</sup>	2.50 (1.32-4.76)	1.02 (0.60-1.72)	Reference	
How much are you bothered by losing liquid stool? <sup>e,f</sup>	90.0 (60.0-100.0)	50.0 (4.5-83.5)	66.0 (37.0-97.0)	.030
Ever lose well-formed stool beyond your control?, n (%)	4 (4)	0	6 (1)	.003
Unadjusted odds ratio (95% CI) <sup>b</sup>	4.04 (1.12-14.61)	Not available	Reference	
How much are you bothered by loss of well-formed stool? <sup>e,f</sup>	82.5 (24.0-80.0)	Not available	50.0 (5.0-79.0)	.831
Ever have difficulty having a bowel movement?, n (%)	24 (27)	97 (30)	197 (37)	.034
Unadjusted odds ratio (95% CI) <sup>b</sup>	0.61 (0.37-1.00)	0.72 (0.54-0.98)	Reference	
Ever have to push on vagina/rectum to have bowel movement?, n (%)	14 (16)	54 (17)	92 (17)	.924
Unadjusted odds ratio (95% CI) <sup>b</sup>	0.87 (0.47-1.61)	0.96 (0.66-1.30)	Reference	
Do you wear liners, pads, etc. or do you change undergarments to protect clothes from loss of stool?, n (%)	8 (9)	9 (3)	13 (2)	.013
Unadjusted odds ratio (95% CI) <sup>b</sup>	3.89 (1.55-9.59)	1.01 (0.42-2.47)	Reference	
Talked to healthcare professional for help with loss of stool or gas?, n (%)	8 (9)	15 (5)	30 (6)	.406
Unadjusted odds ratio (95% CI) <sup>b</sup>	1.62 (0.72-3.65)	0.82 (0.43-1.54)	Reference	
Surgery to correct the loss of stool or gas?, n (%)	1 (1)	2 (1)	0	.059



Evers, AJOG 2012

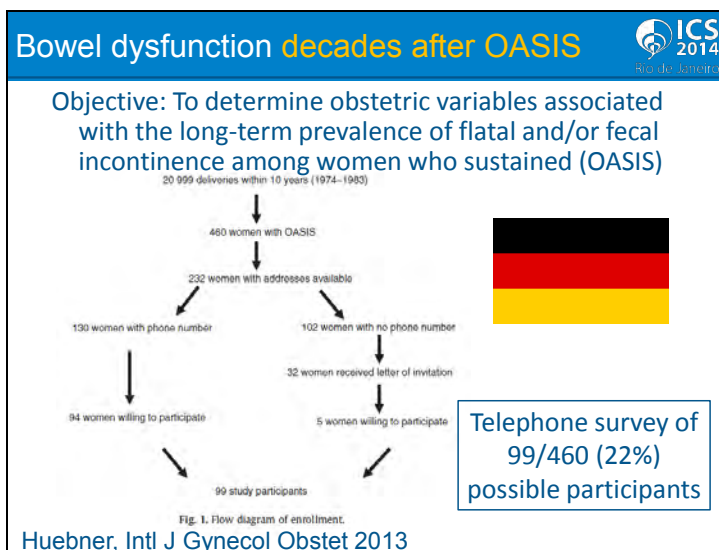
TABLE 9  
Quality of life among 449 women with at least 1 bowel symptom at baseline, by exposure group

Variable	Control by delivery type			P value <sup>a</sup>
	Sphincter tear	Vaginal	Cesarean section	
Women with bowel symptoms, n (%)	48 (53)	146 (46)	255 (48)	.417 <sup>b</sup>
*Have your bowel/rectum symptoms affected your . . . <sup>c</sup>				
Ability to do household chores?	10.5 (3.0-24.0) n = 10	3.0 (1.0-5.0) n = 26	5.0 (1.0-10.0) n = 47	.165
Physical recreation such as walking, swimming or other exercise?	25.0 (15.0-75.0) n = 15	6.0 (2.0-20.0) n = 37	5.5 (2.0-22.5) n = 60	.002
Entertainment activities (eg, movies, concerts)?	25.0 (10.0-50.0) n = 14	3.0 (1.0-10.0) n = 31	5.0 (2.0-13.0) n = 57	<.001
Ability to travel by car or bus >30 minutes from home?	26.5 (7.5-50.0) n = 12	3.0 (2.0-10.0) n = 31	5.0 (1.0-32.0) n = 54	.015
Participating in social activities outside your home?	14.0 (5.0-50.0) n = 15	4.0 (1.0-10.0) n = 38	4.0 (1.0-11.0) n = 59	.008
Emotional health (nervousness, depression, anger)?	15.0 (6.0-50.0) n = 17	5.0 (2.0-37.0) n = 39	6.0 (2.0-26.0) n = 57	.118
Feeling frustrated?	32.5 (12.0-75.0) n = 24	15.0 (5.0-50.0) n = 61	20.0 (5.0-49.0) n = 114	.066

<sup>a</sup> Generated by a Kruskal-Wallis test of the median scores of women who answered >0 across the 3 exposure groups, unless otherwise noted. <sup>b</sup> Obtained with a Fisher exact test. <sup>c</sup> The Colorectal Anal Impact Questionnaire scores were scaled from 0 (not at all) to 100 (greatly). Median (interquartile range) was calculated with scores only from women who gave an answer of >0. <sup>d</sup> Evers. Anal incontinence after anal sphincter laceration. Am J Obstet Gynecol 2012.



Evers, AJOG 2012





## Long-term bowel symptoms after OASIS



Mean follow-up: 27.5±2.4 years



- 39% anal incontinence (fecal or flatal) – 39/99
- 17% fecal incontinence (76% (13/17) before menopause)
- 35% flatal incontinence (63% (22/35) before menopause)
- 13% both fecal and flatal incontinence
- 16% difficulties emptying bowel completely

Huebner, Intl J Gynecol Obstet 2013

## Long-term bowel symptoms after OASIS



- Multivariate models built to look at long-term bowel sx:  
FI, flatal incontinence, incomplete evacuation
- OVD → fecal incontinence (OR 3.27, 1.12–9.56, p=.026)
- Trend with forceps > vacuum for flatal incontinence  
(OR 7.00, 0.73–66.80, p=0.064)
- No other variables associated with long-term bowel sx  
(parity, length of second stage, fetal weight, BMI,  
episiotomy, diabetes)
- Retrospectively, would you have opted for C-section?  
9% of women with flatal incontinence  
13% of women with fecal incontinence



Huebner, Intl J Gynecol Obstet 2013

## Bowel dysfunction decades after OASIS



- Objective: To evaluate the long-term risk of fecal incontinence after primary anal sphincter reconstruction and its impact on quality of life
- Methods: Cohort study of 125 women with complete anal sphincter rupture between 1976 and 1991 and 238 nonexposed parous controls
- Primary outcomes: Wexner score, St Mark score, QOL
- Mean follow up time: 22 (21.7–22.6) years
- Mean age at follow up: 50 (49.8–51.0) years



Soerensen, Dis Col Rect 2013


**Soerensen, Dis Col Rect 2013** ICS 2014 Rio de Janeiro

49% of exposed women and 74% of nonexposed women continent at final follow up

**TABLE 3. Continence status at time of evaluation**

	Exposed			Nonexposed		
	1989 (n = 97) <sup>a</sup>	1992 (n = 173) <sup>b</sup>	Final follow-up (n = 125)	1989 (n = 231) <sup>c</sup>	1992 (n = 329) <sup>d</sup>	Final follow-up (n = 238)
Continent	62 (64)	81 (47)	61 (49)	195 (84)	291 (88)	177 (74)
Flatus incontinent	17 (18)	48 (28)	43 (35)	27 (12)	28 (9)	34 (14)
Liquid stool	11 (11)	24 (14)	18 (14)	8 (3)	5 (2)	21 (9)
Solid stool	7 (7)	20 (12)	3 (2)	1 (0.4)	5 (2)	6 (3)

Incontinence of flatus and liquid stool were more common in OASIS group at all time points  
 OASIS → FI (RR= 2.00, 1.52–2.63)  
 No other risk factors identified




**Bowel dysfunction decades after OASIS** ICS 2014 Rio de Janeiro

**TABLE 4. Association between demographic characteristics and fecal incontinence**

	RR (95% CI)	Adjusted OR <sup>*</sup> (95% CI)
<b>Descriptive data</b>		
Obstetric anal sphincter tear	2.00** (1.52–2.63)	1.84** (1.40–2.43)
Age	0.98 (0.96–1.00)	1.02 (0.92–1.09)
<b>Age group</b>		
<45	Reference	
45–49	0.86 (0.60–1.23)	0.85 (0.50–1.45)
50–54	0.83 (0.56–1.23)	0.86 (0.37–2.01)
55–60	0.50*** (0.29–0.86)	0.51 (0.14–1.86)
≥60	0.82 (0.44–1.53)	0.93 (0.15–5.86)
<b>BMI</b>		
<25	0.82 (0.47–1.45)	0.86 (0.30–1.46)
25–30	0.88 (0.66–1.18)	1.25 (0.89–1.75)
>30	0.66 (0.41–1.06)	0.71 (0.44–1.13)
<b>Obstetric risk factors</b>		
Obstetric anal sphincter tear	2.00** (1.52–2.63)	1.98** (1.42–2.77)
Birth weight	0.88 (0.44–1.65)	0.79 (0.30–1.05)
Mode of delivery	1.27 (0.92–1.74)	0.90 (0.60–1.35)
Labor induction	1.03 (0.76–1.39)	0.91 (0.66–1.26)
Mediolateral episiotomy	1.46*** (1.06–2.01)	1.16 (0.81–1.64)
Duration of second stage	1.32 (0.94–1.86)	1.07 (0.73–1.57)
Fetal presentation	1.39 (0.80–1.92)	1.04 (0.66–1.62)
<b>Delivery data</b>		
<b>Subsequent deliveries</b>		
0	Reference	
1	1.16 (0.83–1.62)	
2	1.51 (1.01–2.25)	
3	1.34 (0.69–2.62)	
>3	1.68 (0.41–6.87)	
<b>Total parity</b>		
1	Reference	
2	0.78 (0.50–1.23)	
3	0.88 (0.54–1.45)	
>3	1.07 (0.63–1.83)	

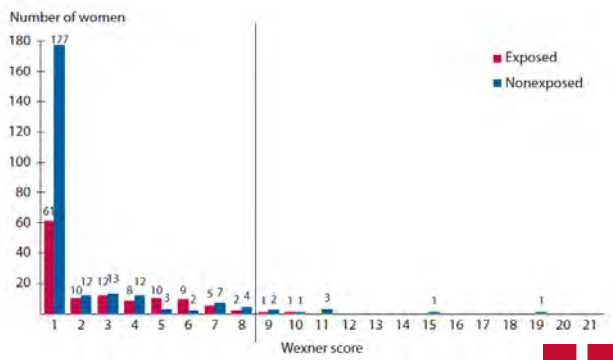
\*Each variable is adjusted to the remaining variables in the category.

Soerensen, Dis Col Rect 2013




**Bowel dysfunction decades after OASIS** ICS 2014 Rio de Janeiro

Number of women

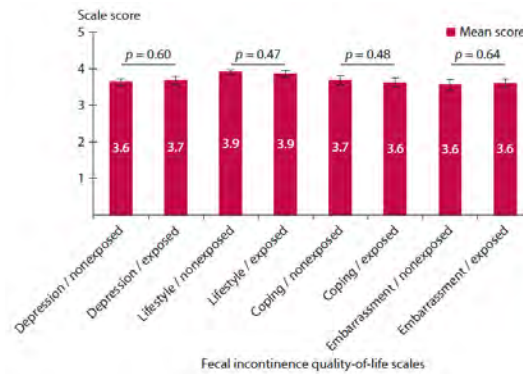


Wexner score

Soerensen, Dis Col Rect 2013



## FI-related QOL impact no different



Fecal incontinence quality-of-life scales



Soerensen, Dis Col Rect 2013

## Bowel anatomy/function decades p/ OASIS



Nested case-control – 68 women with FI and 68 age-matched controls completed survey & MRI to assess pelvic floor support

Internal sphincter injury (8.8, 2.3 – 34) → FI

Reduced perineal descent ( 1.7, 1.2-2.4) → FI

EAS injury and PR injury not predictive of FI

Fecal urgency & stool consistency → FI

3<sup>rd</sup>/4<sup>th</sup> degree episiotomy -> pelvic floor injury (IAS, EAS, PR)

Smokers more likely to have EAS atrophy even s/ other OB risk factors

Age at development of FI : <40: 9%, 40-59 (47%), 60+: 44%

Prevalence of IAS/EAS injury in asymptomatic women: 10% (11% using 3D sono) – 25-30% of women with FI

OB trauma is a stronger RF for postpartum FI than delayed onset FI

Bharucha, Am J Gastroenterol 2012



## OASIS & interaction with bowel symptoms



Objective: To identify obstetrical risk factors associated with FI in women with irritable bowel syndrome & and to determine whether obstetric anal sphincter injuries interact with diarrhea or urgency to explain the occurrence of FI

Methods: 115/164 (70%) of women in parent study about IBS completed interview about bowel symptoms and OB history

Results:

RF for FI: parity (p = 0.007), operative abdominal delivery (P = 0.049), obstetrical sphincter lacerations (P = 0.007), fecal urgency (P = 0.005), diarrhea (P = 0.008), and hysterectomy (P = 0.004)

Not associated with episiotomy, pelvic organ prolapse, or urinary incontinence

Interaction between OASIS and bowel symptoms amplified risk of FI

Robinson, FPMRS 2013



## OASIS & interaction with bowel symptoms



Interaction between OASIS and bowel symptoms  
amplified risk of FI

OASIS + fecal urgency → increased the risk of FI by nearly 2-fold when  
compared to the presence of urgency alone

OASIS + diarrhea → more than doubled risk of FI

But major limitation is that sphincter laceration data was by patient  
report, so people with bowel symptoms may have different recall of  
their obstetric experience.



Robinson, FPMRS 2013

## Summary



OASIS is associated with increased risk of both short-  
term and long-term bowel symptoms

Risk of bowel symptoms after OASIS is likely higher  
after OVD

Risk of bowel symptoms after OASIS is higher with  
other comorbidities (increasing age, white race)

More research should explore the mechanisms by  
which OASIS impacts both short- and long-term  
bowel symptoms

## The dedicated OASIS clinic and management of subsequent pregnancies



Heidi Brown MD MAS

Paula Igualada-Martinez MSc BSc (Hons)



***“All women who have had obstetric anal sphincter repair should be reviewed 6–12 weeks postpartum by a consultant obstetrician and gynaecologist.”***

***“If facilities are available, follow-up of women with OASIS should be in a dedicated perineal clinic with access to endoanal ultrasonography and anal manometry, as this can aid decision on future delivery.”***

***(RCOG 2007)***

## The dedicated OASIS clinic

A dedicated one-stop OASIS clinic enables provision of:

- Evaluation of the clinical diagnosis and ano-rectal function following OASIS:
  - Physical examination
  - Endoanal ultrasound
  - Anorectal physiology
- Recognition and management of OASIS-related complications:
  - Assessment of pelvic floor symptoms with a standardized questionnaire
  - If symptomatic, referral to the most appropriate health professional
  - Consider psychological trauma

- Education of women (continue debriefing):
  - Explain injury, cause of injury, clinical significance and impact on quality of life
  - Appropriate counselling regarding mode of subsequent delivery
  - Reassurance and support

## Multidisciplinary One-stop clinic



- An ideal multidisciplinary one-stop clinic should allow:
  - Assessment and investigations at once to minimise visits to the hospital
  - Mum and baby friendly
  - Array of expertise (Colorectal Nurse Specialist, Physiotherapist, Clinical Scientist, Colorectal Surgeon, Midwife and Obstetrician/Urogynaecologist)
  - Continuity of care (consistency of information given to the women by all members of the MDT at all stages –labour, postnatal ward, dedicated clinic and with subsequent pregnancies)
  - At 12 weeks and 9-12 months postpartum

## The St Thomas' OASIS one-stop clinic:



- At 3 months:
  - Evaluation of bowel, urinary and sexual symptoms with a standardized questionnaire by Colorectal Nurse Specialist and/or Women's Health Physiotherapist
  - Manage complications such as constipation, dyspaurenia, urinary and faecal incontinence, wound breakdown and perineal pain
  - Endoanal ultrasound and anorectal physiology
- MDT meeting/review (Obstetrician, Colorectal Surgeons, Colorectal Nurse Specialists, Women's Health Physiotherapists and Clinical Scientists)
  - Review of anorectal investigations and patients symptoms to decide on further mode of delivery
- At 9 months:
  - Discussion with the Obstetric Consultant of ongoing pelvic floor symptoms and subsequent mode of delivery
  - If *de novo* pelvic floor symptoms referral to the most appropriate clinician

## Aims



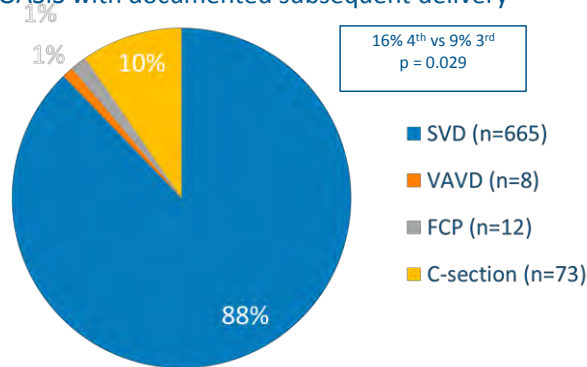
- Review existing literature
- Review guidelines
- Tackle the gray zone



## Mode of Delivery with prior OASIS



Retrospective cohort of 758 US women who had an OASIS with documented subsequent delivery

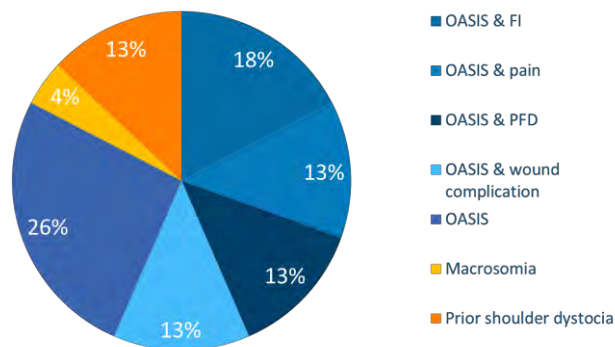


Basham, FPMRS 2013

## Reason for Elective Section p/ OASIS

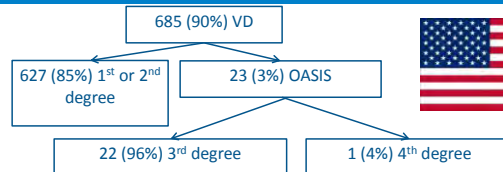


Reason for C-section was elective in 32% (23/73)



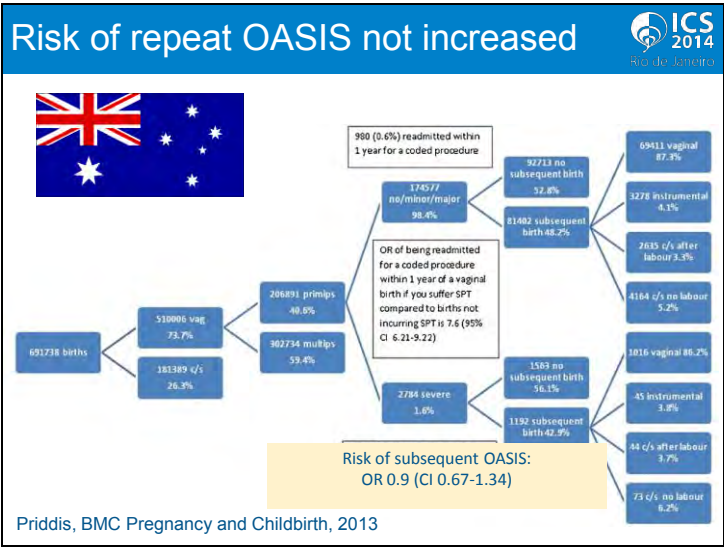
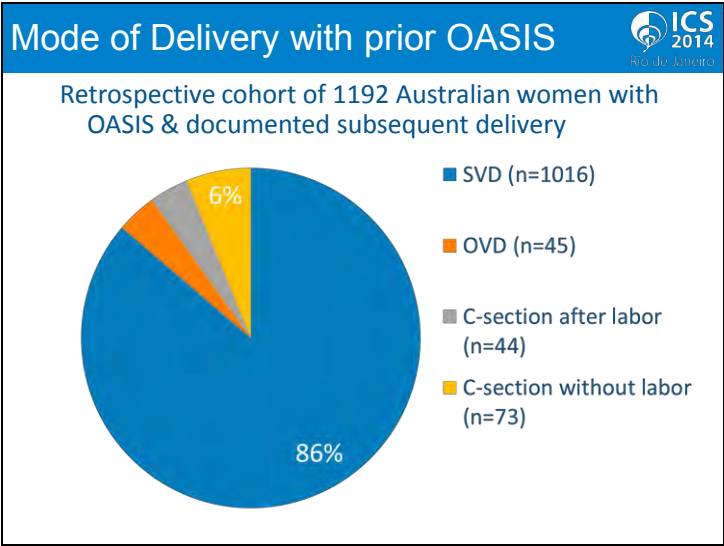
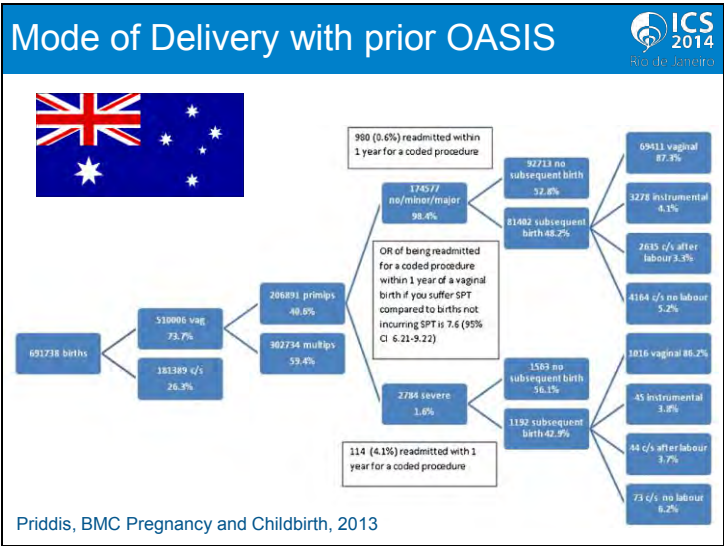
Basham, FPMRS 2013

## Mode of Delivery with prior OASIS



Associated Factors	RR (95% CI)
<b>Characteristics of Index Delivery / OASIS</b>	
Mediolateral episiotomy	7.3 (1.9 - 28.0)
Chronic suture for OASIS repair	7.4 (1.5 - 37.8)
<b>Characteristics of Subsequent Delivery</b>	
Forceps (ref: SVD)	12.0 (3.0 - 48.0)
Birth weight >4kg	2.9 (1.1 - 7.5)

Basham, FPMRS 2013





## Authors Conclusions



Primiparous women who experience OASIS are:

- less likely to have a subsequent baby
- more likely to have a related surgical procedure in the 12 months postpartum
- no more likely to have an OVD or OASIS in a subsequent birth



Priddis, BMC Pregnancy and Childbirth, 2013

## Bowel dysfunction 3-8 years after OASIS



Table 3. The women's thoughts concerning subsequent deliveries

	Case group, n = 125		Cesarean group, n = 121		Normal delivery group, n = 211		Test of equal proportions p-value
	n	% (95%CI)	n	% (95%CI)	n	% (95%CI)	
Wished to postpone the subsequent delivery	41	32.8 (24.8-41.8)	21	17.4 (11.3-25.5)	34	16.1 (11.6-21.9)	0.0007
Wished to abandon plans for more children	22	17.6 (11.6-25.7)	16	13.2 (8.0-20.9)	10	4.7 (2.4-8.8)	0.0005
Had more than one delivery during the study period	74	59.2 (50.0-67.8)	73	60.3 (50.0-69.0)	129	61.1 (54.2-67.7)	0.94

- 33% wished to postpone subsequent delivery
- 18% wished to abandon plans for more children
- 59% had another baby anyway



Wegnelius, Acta Obstet Gynecol Scand 2011

## Bowel dysfunction 3-8 years after OASIS



Table 4. Frequency of cesarean sections and sphincter ruptures at the second delivery.

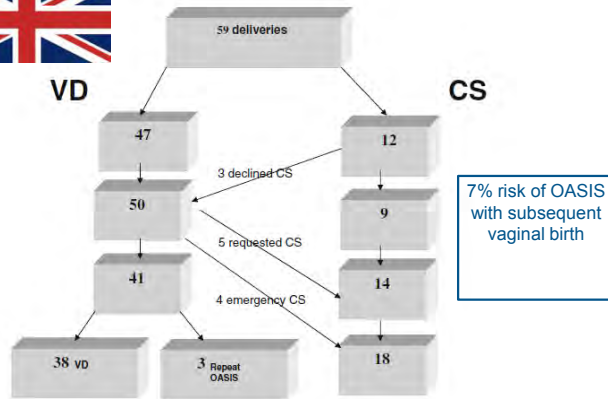
Second delivery during the study period	Case group, n = 125 n = 74 (59%)		Cesarean group, n = 121 n = 73 (60%)		Normal delivery group, n = 211 n = 129 (61%)		p-value
	n	% (95%CI)	n	% (95%CI)	n	% (95%CI)	
Cesarean section at second delivery	36	48.6 (37-60.5)	47	64.4 (52.2-75)	5	3.9 (1.4-9.3)	<0.0001
Vaginal second delivery	n = 38		n = 26		n = 124		
Rupture of anal sphincter at the second delivery	3	7.9 (1.77-21.4)	5	19.2 (6.6-39.4)	1	0.8 (0-4.4)	
Relative risk (RR) Odds ratio (OR)	9.79 10.54		23.85 29.29		1 1		

- 49% had a C-section for subsequent delivery
- 3/38 with VD had OASIS in case group, versus 5/26 in C-section group
- Risk of OASIS was highest in C-section group



Wegnelius, Acta Obstet Gynecol Scand 2011

# OASIS, bowel sx, QoL after prior OASIS



Scheer, IUJ, 2009

## Anorectal manometry findings

Among women with prior OASIS who delivered in subsequent pregnancy via recommended mode of delivery, maximum squeeze pressures were lower after vaginal birth but did not change after C-section

Table 3 Mean maximum resting pressure (MRP) and mean maximum squeeze pressure (MSP) during subsequent pregnancy and after delivery in women who had their recommended mode of delivery

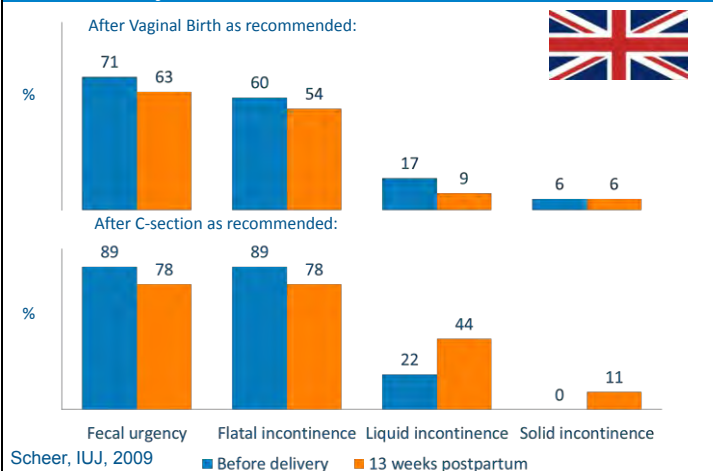
	MRP mmHg (SD)			MSP mmHg (SD)			$\Delta P$ mmHg (SD)		
	Antenatal	Postnatal	<i>p</i> value <sup>a</sup>	Antenatal	Postnatal	<i>p</i> value <sup>a</sup>	Antenatal	Postnatal	<i>p</i> value <sup>a</sup>
Vaginal delivery (n=35)	53.8 (15.9)	53.5 (16.3)	0.93	94.7 (26.5)	89.0 (31.9)	0.18	36.1 (26.7)	24.6 (17.2)	0.06
Caesarean section (n=9)	37.78 (13.8)	42.33 (10.7)	0.55	59.89 (19.3)	66.67 (12.4)	0.17	20.5 (14)	24.33 (14.7)	0.72

<sup>a</sup> Paired *t* test: manometry findings antenatal vs. postnatal



Scheer, IUJ, 2009

## Bowel symptoms p/ subsequent delivery



Scheer, IUJ, 2009

■ Before delivery ■ 13 weeks postpartum

## Authors' conclusions



“Women who have no antenatal evidence of objective compromise of anal sphincter function can be reassured that a vaginal delivery is not associated with any significant deterioration in function or quality of life.”

Scheer, IUJ, 2009

## Decision Analysis



Theoretical cohort of >75,000 women with prior OASIS created using TreeAge software to inform an analytic decision model comparing elective CS w/ TOL

Table 1. Elective Cesarean Delivery Compared With Trial of Labor After Obstetric Anal Sphincter Injuries

Assumed Rates	Elective Cesarean Delivery	Trial of Labor
Repeat obstetric anal sphincter injuries	n/a	5.6%
Urinary incontinence	6.1%	21.4% (obstetric anal sphincter injuries)
Fecal incontinence	7.6%	17% (obstetric anal sphincter injuries)
Dyspareunia	21%	35.7% (obstetric anal sphincter injuries)
Fistula	n/a	2.98% (obstetric anal sphincter injuries)
Outcomes	Elective cesarean delivery	Trial of labor
Maternal deaths	26	9
Cesarean deliveries	75,152	24,725
Postpartum urinary incontinence	4,568	10,279
Postpartum fecal incontinence	5,710	6,336
Postpartum dyspareunia	15,776	20,631
Postpartum fistula	0	84
Cost per pregnancy	\$14,072	\$9,989
Quality-adjusted life-years	2,026,849	2,028,352

n/a, not applicable.

Worstell, Obstet Gynecol S, 2014



## Decision Analysis - Conclusions



Varying duration of FI favored trial of labor to 5.3 years

Varying duration of FI in women who experienced repeat OASIS favored trial of labor to 4.8 years

The authors conclude:

Women with a history of OASIS experience more postpartum UI and FI. However, the burden of postpartum incontinence is high in general and CS is not entirely protective.

But most bowel symptoms manifest decades later...

Worstell, Obstet Gynecol S, 2014





## 12. Future deliveries

*What advice should women be given following an obstetric anal sphincter injury concerning future pregnancies and mode of delivery?*

All women who sustained an obstetric anal sphincter injury in a previous pregnancy should be counselled about the risk of developing anal incontinence or worsening symptoms with subsequent vaginal delivery.

All women who sustained an obstetric anal sphincter injury in a previous pregnancy should be advised that there is no evidence to support the role of prophylactic episiotomy in subsequent pregnancies.

All women who have sustained an obstetric anal sphincter injury in a previous pregnancy and who are symptomatic or have abnormal endoanal ultrasonography and/or manometry should have the option of elective caesarean birth.



## COMMITTEE OPINION

Number 559 • April 2013

Committee on Obstetric Practice

*This document reflects emerging clinical and scientific advances as of the date issued and is subject to change. The information should not be construed as discussing an exclusive course of treatment or procedure to be followed.*

### Cesarean Delivery on Maternal Request

**ABSTRACT:** *Cesarean delivery on maternal request* is defined as a primary prelabor cesarean delivery on maternal request in the absence of any maternal or fetal indications. Potential risks of cesarean delivery on maternal request include a longer maternal hospital stay, an increased risk of respiratory problems for the infant, and greater complications in subsequent pregnancies, including uterine rupture, placental implantation problems, and the need for hysterectomy. Potential short-term benefits of planned cesarean delivery compared with a planned vaginal delivery (including women who give birth vaginally and those who require cesarean delivery in labor) include a decreased risk of hemorrhage and transfusion, fewer surgical complications, and a decrease in urinary incontinence during the first year after delivery. Given the balance of risks and benefits, the Committee on Obstetric Practice believes that in the absence of maternal or fetal indications for cesarean delivery, a plan for vaginal delivery is safe and appropriate and should be recommended to patients. In cases in which cesarean delivery on maternal request is planned, delivery should not be performed before a gestational age of 39 weeks. Cesarean delivery on maternal request should not be motivated by the unavailability of effective pain management. Cesarean delivery on maternal request particularly is not recommended for women desiring several children, given that the risks of placenta previa, placenta accreta, and gravid hysterectomy increase with each cesarean delivery.

## US Policy Statements

### American College of Obstetrics & Gynecology:

- Anorectal dysfunction listed among conditions for which neither VB nor CS is favored

### National Institutes of Health:

- Case– control studies supply weak-quality evidence for reduced risk of anal incontinence w/ planned CS vs. unplanned CS or *instrumental* VB
- + association between OASIS & fecal incontinence
- Limiting use of midline episiotomy & forceps can reduce the frequency of OASIS



## Consider prophylactic episiotomy?



### The effect of a mediolateral episiotomy during operative vaginal delivery on the risk of developing obstetrical anal sphincter injuries



Joey de Vogel, MD; Anne Jan Willem de Leeuw, M

“We advocate the use of a mediolateral episiotomy in all operative vaginal deliveries to reduce the incidence of OASIS.”



**OBJECTIVE:** The objective of the study was to evaluate the frequency of obstetrical anal sphincter injuries (OASIS) in women undergoing operative vaginal deliveries (OVD) and to assess whether a mediolateral episiotomy is protective for developing OASIS in these deliveries.

**STUDY DESIGN:** We performed a retrospective cohort study. Maternal and obstetrical characteristics of the 2861 women who delivered liveborn infants by an OVD at term in the years 2001-2009 were extracted from a clinical obstetrics database and were analyzed in a logistic regression model.

**RESULTS:** The frequency of OASIS was 5.7%. Women with a mediolateral episiotomy were at significantly lower risk for OASIS compared with

the women without a mediolateral episiotomy in case of an OVD (adjusted odds ratio, 0.17; 95% confidence interval, 0.12-0.24).

**CONCLUSION:** We found a 6-fold decreased odds for developing OASIS when a mediolateral episiotomy was performed in OVD. Therefore, we advocate the use of a mediolateral episiotomy in all operative vaginal deliveries to reduce the incidence of OASIS.

**Key words:** mediolateral episiotomy, obstetrical anal sphincter injuries, operative vaginal delivery

Cite this article as: de Vogel J, van der Leeuw-van Beek A, Gietelink D, et al. The effect of a mediolateral episiotomy during operative vaginal delivery on the risk of developing obstetrical anal sphincter injuries. Am J Obstet Gynecol 2012;206:404.e1-5.

De Vogel, AJOG 2012

## 2010 Cochrane Review



“No benefit could be demonstrated for Cesarean delivery over vaginal delivery in the prevention of anal incontinence.”

This review encompasses 21 published studies, involving 31,698 women, delivered by 6,028 CD and by 25,170 VD. No randomised studies comparing CD to VD in average risk pregnancies exist. The above conclusion is therefore based upon less than optimal evidence.

## Communication with patients is key



Things to Consider:

- Patient preferences
- Bowel symptoms after last OASIS / birth
- Current bowel symptoms
- Objective assessment of sphincter anatomy and function
- Estimated fetal weight
- Future childbearing plans
- Medical comorbidities
- Documentation, documentation, documentation