W24: Obstetric anal sphincter injury (OASIS): What next?
Workshop Chair: Alexis Schizas, United Kingdom
30 August 2018 09:05 - 10:35

Start	End	Topic	Speakers
09:05	09:10	Introduction	Alexis Schizas
09:10	09:20	OASIS – Incidence	Rufus Cartwright
09:20	09:40	Anorectal anatomy, physiology and evaluation following OASIS	Alexis Schizas
09:40	09:55	Bowel dysfunction following OASIS (including long-term symptoms)	Heidi Brown Alexis Schizas
09:55	10:05	Conservative management of OASIS-related bowel dysfunction and preventative interventions	Paula Igualada-Martinez
10:05	10:10	Caesarean section following OASIS	Heidi Brown
10:10	10:15	Vaginal birth following OASIS	Rufus Cartwright
10:15	10:30	The Debate of caesarean section versus vaginal birth following OASIS	Heidi Brown Rufus Cartwright
10:30	10:35	Discussion	Paula Igualada-Martinez Heidi Brown Rufus Cartwright Alexis Schizas

Aims of Workshop

The best management of OASIS is a multidisciplinary approach. This workshop will not only evaluate the most up-to-date evidence regarding the incidence, pathophysiology, clinical diagnosis, anorectal investigations, short term and long term bowel dysfunction and the conservative management following OASIS repair but will also provide guidance for evidence-based shared decision making regarding subsequent mode of delivery after OASIS. It is also an opportunity to raise awareness of bowel dysfunction in a society that predominantly focuses on urinary incontinence following birth trauma.

Learning Objectives

Aims:
This workshop aims to familiarise delegates with the mechanisms of OASIS, the management of associated bowel dysfunction, and provide guidance for evidence-based shared decision-making regarding subsequent mode of delivery after OASIS.

Objectives:
At the end of the workshop the participants should be able to:
1. Understand the anatomy and physiology of the pelvic floor including the anal sphincter complex.
2. Recognise and classify OASIS following endoanal ultrasound assessment.
3. Understand anorectal physiology following OASIS.
4. Identify and evaluate bowel dysfunction following OASIS.
5. Understand the management of lower bowel dysfunction following OASIS.
6. Understand the long-term consequences of OASIS.
7. Identify preventative measures of OASIS.
8. Identity interventions to reduce the risk of recurrent injury and associated harms.
9. Understand the process of decision-making about subsequent mode of delivery.

Learning Outcomes

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.
Understand the effect of delivery on pelvic floor and sphincter trauma.

Recognise and classify OASIS.
Understand anorectal physiology and endoanal ultrasound following OASIS and when to use it.
Identify bowel dysfunction following OASIS in both short and long-term and understand the management of lower bowel dysfunction following OASIS.
Identify preventative measures of OASIS.
Understand the process of decision-making about subsequent mode of delivery.

Suggested Learning before Workshop Attendance

- Abrams P, Cardozo L, Wagg A and Wein A (2017) 6th International Consultation on Incontinence. ICUD-ICS. ISBN: 978-0-9569607-3-3. (Chapters 4 and 16)
- https://www.rcog.org.uk/globalassets/documents/guidelines/gtg-29.pdf
- American College of Obstetricians and Gynaecologists' Committee on Practice Bulletins- Obstetrics (2016) Practice Bulletin No. 165: Prevention and Management of Obstetric Lacerations at Vaginal Delivery. Obstet Gynecol. 2016 Jul; 128(1):e1-e15. doi: 10.1097/AOG.0000000000001523.

Speaker 1 (Alexis Schizas)	**Introduction to the Workshop** **Anorectal anatomy, physiology and evaluation following OASIS** An understanding of normal anatomy and physiology is essential to then identify changes and injury following OASIS. Assessment first is performed clinically and then appropriate physiology and imaging can be performed. Clinical Assessment Digital rectal examination can identify sphincter injury and weakness. We can also identify other common pathology following OASIS such as rectocoele, intussusception and scaring or shortening of the perineum. Anorectal Physiology The function of the anal canal and rectum is assessed by a catheter and includes rest and squeeze anal pressures; vectograms; first, urge and maximal sensation; rectal compliance and balloon evacuation. There is conflicting evidence on the association of rectal compliance with obstructive defaecation. Some demonstrate normal compliance and sensation in all subjects (with/ without a rectocele) whilst others show reduced rectal compliance and impaired sensation. Integrated Total Pelvic Floor Ultrasound (endoanal, transvaginal, transperineal) Endoanal, transvaginal and transperineal ultrasound are routinely used for anterior and middle compartmental assessment and the integrity of the anal sphincters. Its' use in the assessment of the anal sphincters, enterocele, rectocele and intussusception. Endoanal ultrasound assesses the integrity of the internal and external sphincters and associated defects, sepsis, and is the gold standard for assessing obstetric trauma. Transperineal ultrasound is more likely that defaecation Proctography to make multiple diagnoses. It has a high positive predictive value and low negative predictive value for abnormalities compared to defaecation Proctography. It may provide a suitable screening tool for symptomatic patients though there remains insufficient evidence to adopt this as routine practice. Defaecation Proctography Defaecation Proctography is a dynamic investigation of rectal emptying involving the voluntary expulsion of barium paste recorded on cineradiography or fluororadiography. It is regarded as gold standard for the morphological assessment of posterior compartment pelvic floor disorders with the advantages of assessing defecatory dynamics. It provides structural and functional assessment of; rectocele, intussusception, rectal prolapse, enterocele, sigmoidocoele, perineal descent and the anorectal angle along with anismus and evacuation. **Take home message:**

	- An understanding of normal anatomy and physiology and what to expect post OASIS - Knowledge of the appropriate investigations for bowel dysfunction following OASIS
Speaker 2 (Rufus Cartwright)	**Incidence of OASIS** Demographic shifts towards higher maternal BMI, larger birth weight, and lower parity have increased risks for OASIS, but in most countries the incidence of OASIS has risen even faster than expected, with increased awareness and diagnosis. This talk will review definitions for perineal trauma, assess the evidence for trends in incidence of OASIS and consider in detail the risk factors for OASIS. We will explore the efforts being made internationally to reduce the incidence of OASIS, and consider whether it is possible antenatally to identify women at risk from OASIS for primary prevention.
Speaker 3 (Heidi Brown)	**Bowel dysfunction following OASIS** Obstetric anal sphincter injuries (OASIS) are associated with increased risk of both short-term and long-term bowel symptoms. The range of bowel symptoms may include fecal incontinence (involuntary loss of feces – solid or liquid), anal incontinence (involuntary loss of feces or flatus), fecal urgency (sudden, compelling desire to defecate that is difficult to defer), diminished rectal sensation, feeling of incomplete evacuation (complaint that the rectum does not feel empty after defecation), and more. Bowel symptoms occur most commonly following OASIS in the setting of operative vaginal delivery (OVD), likely related to global pelvic floor damage in addition to damage to the sphincter complex specifically. The risk of bowel symptoms after OASIS is higher in the setting of other comorbidities, such as abnormal stool consistency and increased age. While OASIS is strongly associated with short-term bowel symptoms, its role is less consistently demonstrated in long-term follow-up. In the first 3-6 months following OASIS, reported rates of fecal incontinence range from 4-10%, while up to 30% of women may experience anal incontinence and fecal urgency. Within 5-10 years following OASIS, the risk of anal incontinence is two-fold higher than among women who have not experienced OASIS, with reported prevalence rates between 20 and 60%. **Cesarean delivery following OASIS** While there are no prospective trials to address this question, both the Royal College of Obstetricians and Gynaecologists (RCOG) and the American College of Obstetricians and Gynecologists (ACOG) suggest that all patients be counselled about the option of Cesarean delivery following OASIS. While the absolute risk of repeat OASI is low, women with a prior OASI are at increased risk for subsequent OASI. Despite this increased risk, the majority of women with prior OASIS deliver vaginally in subsequent pregnancies. Women with a prior OASI who do not have bowel symptoms or abnormalities on anal manometry or endoanal ultrasound may be good candidates for subsequent vaginal delivery. The algorithm used by Professors Ranee Thakar and Abdul Sultan at Croydon Health Services (https://www.perineum.net/documents/Management%20OASIS%20in%20pregnancy-092325.pdf) recommends that those who already have evidence of functional or anatomic compromise on anal manometry or endoanal ultrasound should be offered Cesarean section. ACOG states, based on expert opinion, that women with a history of OASI should be offered a cesarean delivery if she 1) experienced anal incontinence after the delivery; 2) had complications including wound infection or a need for a repeat laceration repair; or 3) expresses suffering psychological trauma and requests a scheduled cesarean delivery. The low risk of repeat OASI must be balanced against the

	known morbidity of Cesarean delivery, taking into account the patient's long-term family planning goals along with the risks of repeat cesarean delivery. **Take home message:** - Bowel symptoms are common after OASIS and may increase in the long term - Patients should be counselled regarding a cesarean section following OASIS based on the previous degree of injury, bowel symptoms, previous medical complications following OASIS and psychological symptoms
Speaker 4 (Paula Igualada-Martinez)	**Conservative management of OASIS-related bowel dysfunction and preventative interventions** Conservative management is often considered as the first line approach for AI following OASIS due to its' safe, effective and non-invasive nature. It has been recommended by the National Institute for Clinical Excellence (NICE), the International Continence Society and The Royal College of Surgeons. Conservative management includes advice on bowel retraining and lifestyle interventions such as the recommendation of a diet that promotes an ideal stool consistency and predictable bowel emptying and techniques such as transanal irrigation to facilitate bowel evacuation. Conservative management also includes electromyographic (EMG) biofeedback, neuromuscular electrical stimulation (NMES) and in particular, pelvic floor muscle training (PFMT). PFMT aims to increase strength/power (the maximum force produced by a muscle in a single contraction), endurance (ability to contract repetitively and to maintain the muscle contraction over a period of time), and synchronize muscle activity (such as the pre-contraction of pelvic floor muscles including the external anal sphincter previous to a rise in intraabdominal pressure, or to repress urge). PFMT has a Level-A evidence rating and has been recommended as first line prevention and treatment of urinary incontinence (UI) in the adult female population. It is hypothesized the PFMT may also be effective in treating AI in the postpartum population and is routinely advocated as first line management of AI. Johannessen et al (2017) suggested that an individualised PFMT programme might reduce symptoms of AI including patients with OASIS. A recent systematic review evaluated the benefits of PFMT and biofeedback on anal incontinence following OASIS. The authors advocate PFMT to this patient group in order to improve function and quality of life and recommend that future research should evaluate the intervention in well-designed studies. The antenatal interventions utilised as a preventative measure includes perineal massage and pelvic floor exercises. **Take home message:** - All women should be offered conservative management following OASIS - Conservative management should be the first line management of OASIS related bowel dysfunction

<u>Suggested Reading</u>

Abrams P, Cardozo L, Wagg A and Wein A (2017) 6th International Consultation on Incontinence. ICUD-ICS. ISBN: 978-0-9569607-3-3.

Baghurst PA. (2013) The case for retaining severe perineal tears as an indicator of the quality of obstetric care. Aust N Z J Obstet Gynaecol; 53:3–8.
Gurol-Urganci I, Cromwell DA, Edozien LC, Mahmood TA, Adams EJ, Richmond DH, et al. (2013) Third- and fourth-degree perineal tears among primiparous women in England between 2000 and 2012: time trends and risk factors. BJOG 2013; 120:1516–25.
Farrar D, Tuffnell DJ, Ramage C. (2014) Interventions for women in subsequent pregnancies following obstetric anal sphincter injury to reduce the risk of recurrent injury and associated harms. *Cochrane Database of Systematic Reviews* 2014, Issue 11. Art. No.: CD010374. DOI: 10.1002/14651858.CD010374.pub2
LaCross, A., Groff, M. and Smaldone, A. (2015), Obstetric Anal Sphincter Injury and Anal Incontinence Following Vaginal Birth: A Systematic Review and Meta-Analysis. Journal of Midwifery & Women's Health, 60: 37–47. doi:10.1111/jmwh.12283
Norton C and Cody JD (2012) Biofeedback and/or sphincter exercises for the treatment of faecal incontinence in adults. Cochrane Database of Systematic Reviews 2012, Issue 7. Art. No.: CD002111. DOI: 10.1002/14651858.CD002111.pub3
Royal College of Obstetricians and Gynaecologists (RCOG) (2015) The management of Third and Fourth Degree Perineal Tears (Green-top Guideline No.29). London: RCOG Press.
Thiagamoorthy G, Johnson A, Thakar R, Sultan AH. (2014) National survey of perineal trauma and its subsequent management in the United Kingdom. Int Urogynecol J;25:1621–7.
Woodley SJ, Boyle R, Cody JD, Mørkved S, Hay-Smith EJC (2017) Pelvic floor muscle training for prevention and treatment of urinary and faecal incontinence in antenatal and postnatal women**.** Cochrane Database Syst Rev. 2017 Dec 22;12:CD007471. doi: 10.1002/14651858.CD007471.pub3.
Johannessen HH, Wibe A, Stordahl A, Sandvik L, Mørkved S. (2017) Do pelvic floor muscle exercises reduce postpartum anal incontinence? A randomised controlled trial. BJOG;124(4):686-694.

Obstetric Anal Sphincter Injury: An Introduction

Rufus Cartwright

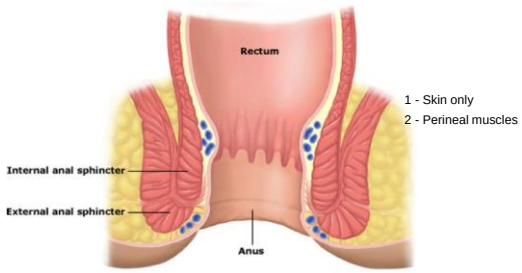
Department of Urogynaecology, Oxford University Hospitals NHS Trust, UK

No relevant financial conflicts of interest

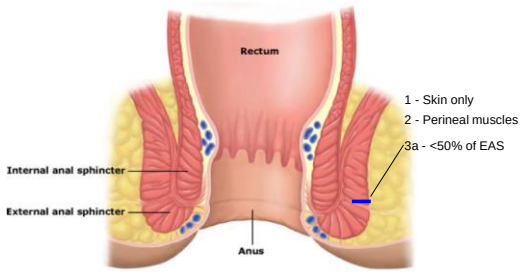
Aims

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

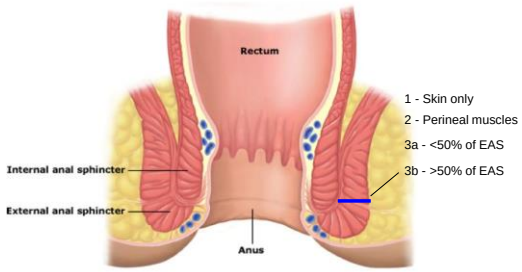
Grading of Perineal Trauma



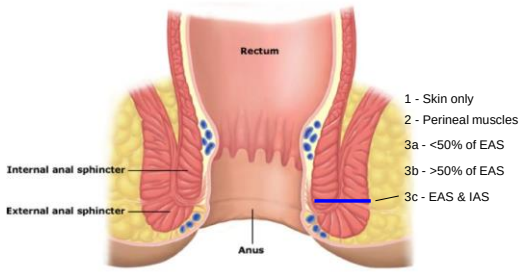
Grading of Perineal Trauma



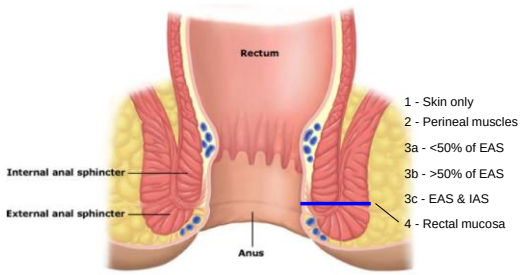
Grading of Perineal Trauma



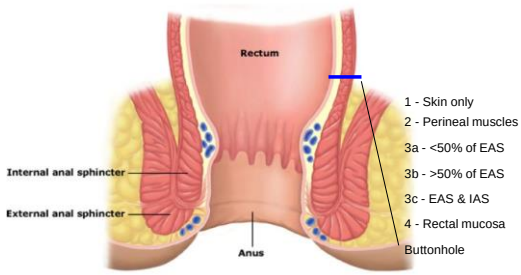
Grading of Perineal Trauma



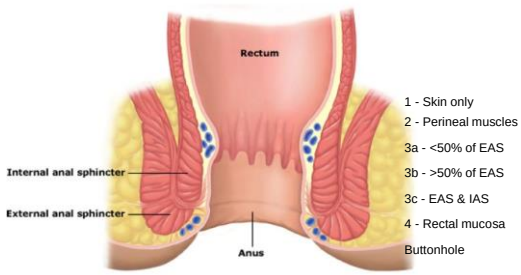
Grading of Perineal Trauma



Grading of Perineal Trauma



Grading of Perineal Trauma



Sultan, 1999; ICI, 2004; RCOG, 2004

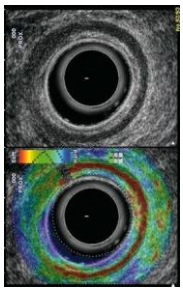
Classification of Episiotomy

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

Kalis et al, BJOG 2012

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
- The overall incidence is increasing

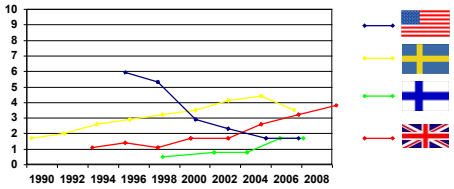


Incidence

- Rates of recognised injury vary widely
  - between countries 0.4% (Italy) - 9.2 % (Sweden)
    Prager et al, 2008
  - between hospitals 1.3% - 4.7 % (Norway)
    Valbø et al, 2008
- Impossible to directly compare different studies, because of acquisition bias
- Midwives miss 87% of injuries, doctors miss 28%

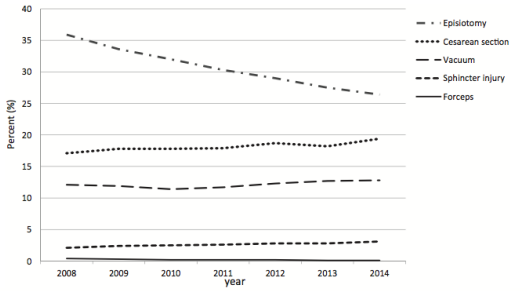
Andrews et al, 2006

Changing incidence or changing recognition?



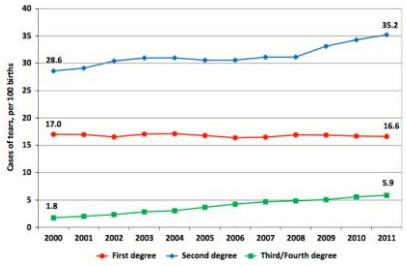
Kudish et al, 2008; Laine et al, 2009; Raisanen et al, 2009

Changing incidence or changing recognition?



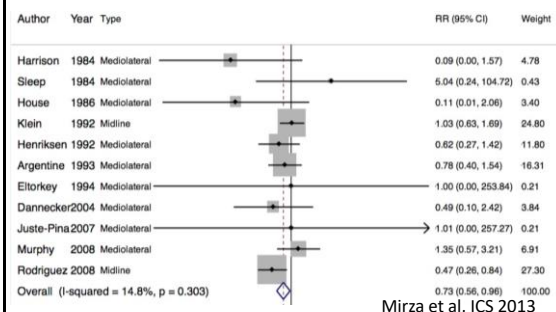
Marschalek et al, Birth 2018

Changing incidence or changing recognition?



Gurol-Urganci et al, 2013

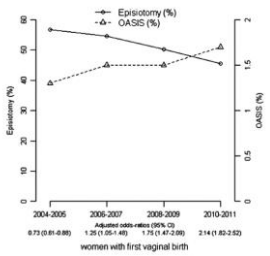
Episiotomy and OASIS – The RCTs



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



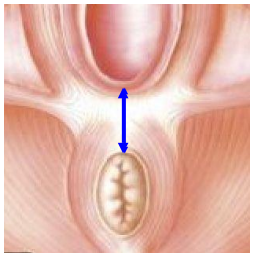
Raisanen et al, BMJ Open 2013

The "Established" Risk Factors

- Forceps or ventouse
- Nulliparity
- Birthweight
- Maternal age
- 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

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 0.3-1.7%

Nakai et al, 2006; Wai et al, 2015

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

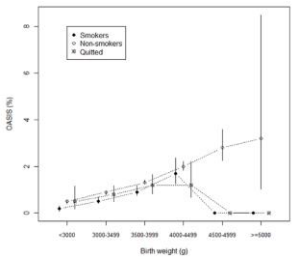
Characteristic	First vaginal delivery, n=221,347 (in 2004–2007, n= 49,327–74,220)		p value
	With a prior CS	Without a prior CS	
Mean maternal height, cm (±SD)[a]	165.2 (±5.9)	166.0 (±5.9)	≤0.001
Mean maternal weight, kg (±SD)[a]	67.1 (±13.6)	64.7 (±12.7)	≤0.001
Mean birthweight, g (±SD)	3577.7 (±515.1)	3448.0 (±502.7)	≤0.001
Mean head circumference, cm (±SD)[a]	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		Model 3, adjusted by Model 2 and smoking		Model 4, adjusted by Model 2 and birthweight	
	OR (95% CI)	OR (95% CI)	Diff. with 1 (%)*	OR (95% CI)	Diff. with 2 (%)*	OR (95% CI)	Diff. with 2 (%)*
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, PLoSONE 2013

Conclusions

- OASIS is common – and getting more common
- Major risk factors are nulliparity, birthweight, maternal age 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

Alexis Schizas

ICS 2018 PHILADELPHIA

Affiliations to disclose†:

Nil

† All financial ties (over the last year) that you may have with any business organization with respect to the subjects mentioned during your presentation

Funding for speaker to attend:

- [x] Self-funded
- [ ] Institution (non-industry) funded
- [ ] Sponsored by:

ICS 2018 PHILADELPHIA

Anorectal Anatomy and Physiology following OASIS

Alexis Schizas

Guy's and St Thomas' Hospital

Guy's and St Thomas' NHS NHS Foundation Trust

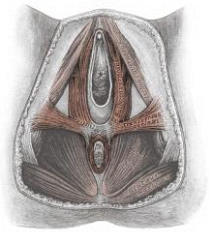
Normal Ano-Rectal Anatomy

ICS 2018 PHILADELPHIA

- Levator ani
- Perineum
- Sphincters

Perineal Muscles

ICS 2018 PHILADELPHIA



Bulbospongiosus

Transverse Perinei

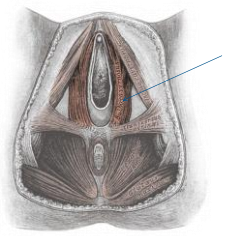
Puboanalis

Perineal Body

Anal Sphincters

Perineal Muscles

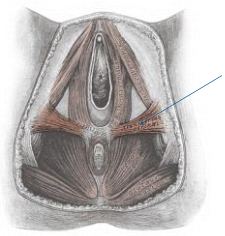
ICS 2018 PHILADELPHIA



Bulbospongiosus

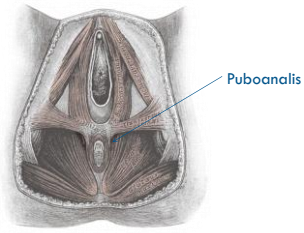
Perineal Muscles

ICS 2018 PHILADELPHIA

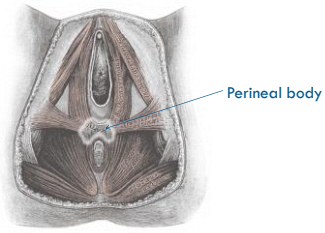


Transverse perinei

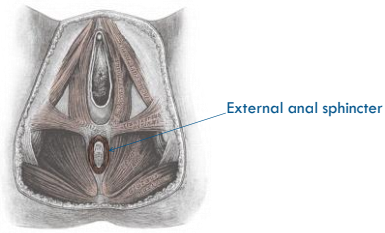
Perineal Muscles



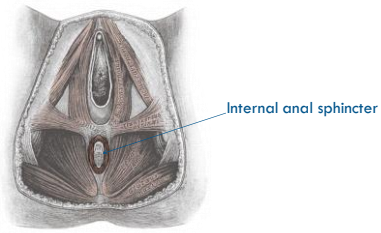
Perineal Muscles



Perineal Muscles



Perineal Muscles



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)

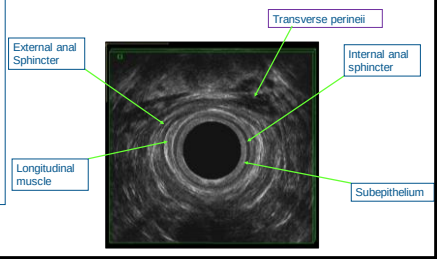
External Anal Sphincter

- 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

Normal Anal Canal Anatomy on AES

ICS 2018 PHILADELPHIA

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



Anal Manometry

ICS 2018 PHILADELPHIA

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

Anal Manometry

ICS 2018 PHILADELPHIA

	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	*Read et al. Gastroenterology, 1979; 76:747-756*
	50+/-5	63+/-12	159+/-45	238+/-38	*Loening-Baucke and Anuras. Am J Gastroenterol, 1985; 80:50-53*
	102 (cmH_2O)	102 (cmH_2O)	156 (cmH_2O)	196(cmH_2O)	*Call et al Dis Colon Rectum, 1992; 35:1161-1164*
Slow pull-through	46(40-58)	60(51-98)	103(78-190)	163(76-234)	*Pedersen and Christiansen. Br J Surg 1989; 76:69-71*
Rapid pull-through					
20-39	102+/-19	100+/-21	171+/-40	240+/-65	*McHugh and Diamant. Dig Dis Sci, 1987; 32:726-736*
40-69	76+/-24	97+/-20	132+/-69	203+/-45	
70 or over	53+/-22	72+/-23	116+/-40	219+/-32	

Obstetric Anal Sphincter Injury (OASIS) Clinical Classification

ICS 2018 PHILADELPHIA

1st Degree
- Injury to the perineal skin only

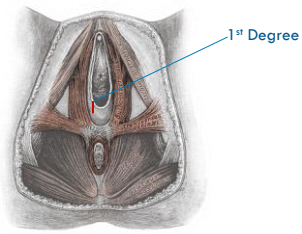
2nd Degree
- Injury to the perineum extending into the perineal muscles but not the anal sphincters.

3rd Degree
- Injury to the perineum involving the anal sphincter complex
- **3a**: Less than 50 % of the external anal sphincter (EAS) thickness torn.
- **3b**: More than 50 % of EAS thickness torn.
- **3c**: Both EAS and internal anal sphincter (IAS) torn.

4th Degree
- Disruption of the anal sphincter complex (EAS and IAS) and anal epithelium

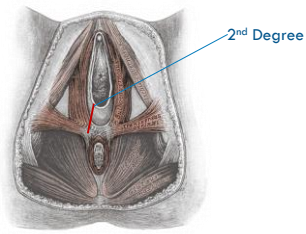
OASIS

ICS 2018 PHILADELPHIA

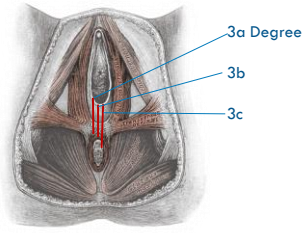


OASIS

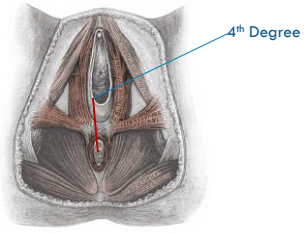
ICS 2018 PHILADELPHIA



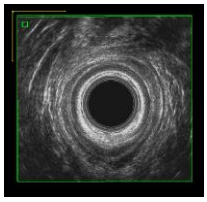
OASIS



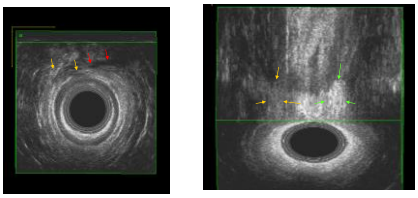
OASIS



Scarring to Right Transverse Perineii

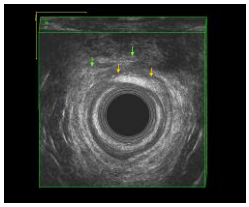


External Anal Sphincter Defect



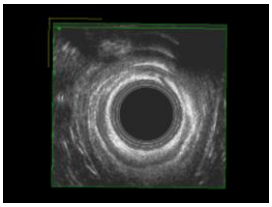
Axial view. The course of the tear is marked by the red arrows and a defect in the external sphincter is seen (yellow arrow).
Coronal view. The external sphincter can be seen on the left (green) and the defect is seen along the entire length of the external sphincter on the right (yellow).

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.

OASIS on AES

- Positive correlation between the extent of sphincter defect and the degree of anal incontinence following primary repair
- External sphincter trauma was associated with
  - a significant decrease in squeeze pressure
  - an increase in incontinence score
- Internal anal sphincter injury associated with
  - decreased anal physiology
  - significantly related to faecal incontinence.
- Tears to the puboanalis or transverse perineii only do not affect pressure or incontinence scores.

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

Summary

- Severity of OASIS correlates with symptoms and physiology
- AES used to assess injury
- 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

Heidi Brown

ICS 2018 PHILADELPHIA

Affiliations to disclose†:

None

† All financial ties (over the last year) that you may have with any business organization with respect to the subjects mentioned during your presentation

Funding for speaker to attend:

- [ ] Self-funded
- [X] Institution (non-industry) funded
- [ ] Sponsored by:

ICS 2018 PHILADELPHIA

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

What is "bowel dysfunction?"

ICS 2018 PHILADELPHIA

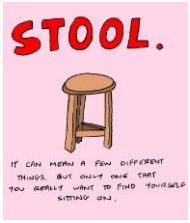
OASI + "?"

Pubmed hits:

Fecal incontinence: 321
Anal incontinence: 147
Faecal incontinence: 64

Constipation: 8

Defecatory dysfunction: 1



Anal incontinence after OASIS

ICS 2018 PHILADELPHIA

Anal incontinence is prevalent after OASIS in the immediate post-partum period, in the short-term, and in the long-term.

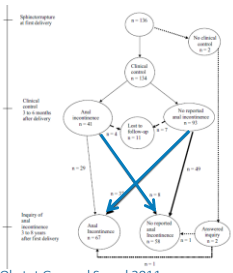
Country	Author	Follow-up	n	Prevalence
UK	Marsh	3 mos	435	25%
Sweden	Wegnelius	6 mos	134	31%
Norway	Laine	10 mos	591	21%
Norway	Johannessen	12 mos	1030	19%
Sweden	Wegnelius	3-8 years	134	49%
Netherlands	Visscher	5 years	66	63%
Denmark	Jangö 2018	11 years	2008	41 – 59%
Denmark	Soerensen	22 years	125	35%
Germany	Huebner	27 years	99	39%

AI after OASIS varies within individuals.

ICS 2018 PHILADELPHIA

3 – 6 mos PP: 31% AI

3 – 8 years PP: 49% AI



Wegnelius, Acta Obstet Gynecol Scand 2011

AI symptoms worsen with time p/ OASIS

ICS 2018 PHILADELPHIA

Retrospective case-control study (surveys in 1996 & 2005)
171 women s/p OASIS repair (1971-1990)
171 parity- and delivery-date-matched controls
Response rate: 61% to both questionnaires
Anorectal complaints:
1996: 38% of case versus 16% of controls
2005: 61% of cases versus 22% of controls

In contrast to the control group, the increase of anorectal complaints in the case group between 1996 and 2005 was highly significant (P < .0001)

Mous BJOG. 2008 Jan;115(2):234-8. Epub 2007 Nov 12. Netherlands

OASIS increases odds of anal incontinence.

Systematic review & meta-analysis of association between perineal trauma (OASIS / episiotomy) and AI

Searched PubMed, Ovid (MEDLINE), Cochrane Trials, Cumulative Index to Nursing and Allied Health Literature (CINAHL)

12/16 studies (N=2288) evaluated OASIS & AI → met inclusion for meta-analysis

OR 2.66 (95% CI 1.77-3.98)

Q = 27.9; P = .002; I2 = 64.1

LaCross, J Midwifery Womens Health. 2015 Jan-Feb;60(1):37-47

QOL impact may be worse

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.

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

Evers, AJOG 2012

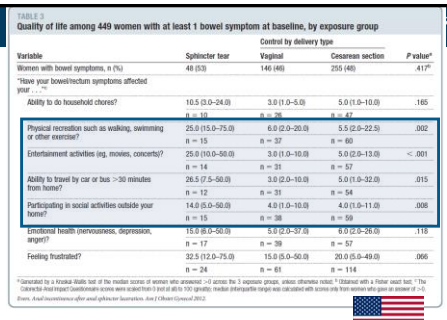


TABLE 3
Quality of life among 449 women with at least 1 bowel symptom at baseline, by exposure group

Variable	Sphincter tear	Control by delivery type: Vaginal	Cesarean section	P value*
Women with bowel symptoms, n (%)	48 (53)	146 (46)	255 (48)	.417[a]
"Have your bowel/rectum symptoms affected your . . .?"				
Ability to do household chores?	10.5 (3.0–24.0)	3.0 (1.0–5.0)	5.0 (1.0–10.0)	.165
	n = 19	n = 28	n = 47	
Physical recreation such as walking, swimming or other exercise?	25.0 (15.0–75.0)	6.0 (2.0–20.0)	5.5 (2.0–22.5)	.002
	n = 15	n = 37	n = 60	
Entertainment activities (eg, movies, concerts)?	25.0 (10.0–50.0)	3.0 (1.0–10.0)	5.0 (2.0–13.0)	< .001
	n = 14	n = 31	n = 57	
Ability to travel by car or bus >30 minutes from home?	26.5 (7.5–50.0)	3.0 (2.0–10.0)	5.0 (1.0–32.0)	.015
	n = 12	n = 31	n = 54	
Participating in social activities outside your home?	14.0 (5.0–50.0)	4.0 (1.0–10.0)	4.0 (1.0–11.0)	.008
	n = 15	n = 38	n = 59	
Emotional health (nervousness, depression, anger)?	15.0 (6.0–50.0)	5.0 (2.0–37.0)	6.0 (2.0–26.0)	.118
	n = 17	n = 39	n = 57	
Feeling frustrated?	32.5 (12.0–75.0)	15.0 (5.0–50.0)	20.0 (5.0–49.0)	.066
	n = 24	n = 61	n = 114	

[a] Generated by a Kruskal-Wallis test of the median scores of women who answered >0 across the 3 exposure groups, unless otherwise noted; [b] Obtained with a Fisher exact test; [c] 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.

Evers, Anal incontinence after anal sphincter laceration. Am J Obstet Gynecol 2012

Evers, AJOG 2012

Fecal incontinence after OASIS

Fecal incontinence is more prevalent in the immediate post-partum period, in the short-term, and in the long-term.

Country	Author	Follow-up	n	Prevalence
Sweden	Wegnelius	6 mos	134	8%
UK	Brown	4 – 12 mos	48	23%
Norway	Laine	10 mos	591	21%
Netherlands	Visscher	5 years	66	50%
Denmark	Linneberg	5 years	82	74%
Denmark	Jangö 2018	11 years	2008	15 - 31%
Denmark	Soerensen	22 years	125	16%
Huebner	Germany	27 years	99	17%

OASIS increases odds of fecal incontinence

Within 1 year **OR 1.90 (0.92-3.95)**

At 10 years **AOR 2.49 (1.73 - 3.56)**

At 20 years **AOR 1.84 (1.40 – 2.43)**

Brown, Obstet Gynecol 2012; Jango 2018; Soerensen, Dis Col Rect 2013

OASIS & other bowel symptoms

- Fecal urgency
- Difficulty with defecation
- Fecal incontinence with intercourse

Wegnelius, Acta Obstet Gynecol Scand 2011; Johannessen, BJOG, 2014; Huebner, Intl J Gynecol Obstet 2013; Mous BJOG. 2008 Jan;115(2):234-8

Degree of injury & quality of repair matter.

Prospective study of 531 women s/p primary OASIS repair

Mean follow-up 9 (SD, 5.9) weeks after delivery

Compared to women with 3a – 3b, women with 3c – 4:

- Worse defecatory symptoms & more impaired QoL
- More impaired QOL
- Abnormal ARM findings
- Residual defect on EAUS (IAS alone or IAS & EAS)

Combined IAS & EAS defect →

- Incontinence of liquid stool
- Lower anal canal pressures

Roos, Thakar, Sultan. Ultrasound Obstet Gynecol. 2010 Sep;36(3):368-74.

Anomalies on sonography and ARM

Persistent sphincter defect is often correlated with symptoms, especially if defect involves both IAS and EAS

- Combined IAS and EAS OASI → worse FI & lower anal pressures than women with isolated EAS 5 years after delivery (Visscher, IUJ 2014)
- Shorter anterior EAS length in cases with severe FI years after OASIS imaged by both EAUS and MRI (Soerenson, Dis Col Rect 2013)

Recurrent OASI is very bad for bowel symptoms

N = 1490 women s/p vaginal delivery after a first delivery with OASIS

106 had recurrent OASI

50.0% (n = 53) AI	versus 37.9% (n = 525) without recurrent OASIS
23.6% (n=25) FI	versus 13.2% (n = 183) without recurrent OASIS
34.9% (n=37) QOL impact	versus 24.2% (n = 335)

Controlling for degree of OASIS in first delivery, maternal age, birthweights, years since first and second delivery, and AI prior to second pregnancy:

AI with recurrent OASI: AOR 1.68 (1.05-2.70), P = .03

FI with recurrent OASI: AOR 1.98 (1.13-3.47), P = .02

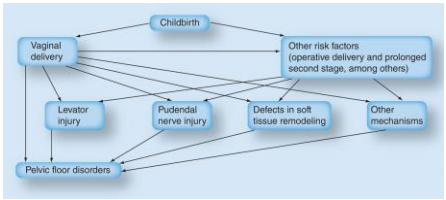
Jango 2017

OASIS is not good for anal continence.

'A masterful victory, Higgins. Your method of distracting your opponent by loudly fouling your trousers at key moments in the game is a most formidable strategem.'

OASIS is not the only culprit!

Etiology of bowel dysfunction after OASIS is multifactorial



Memon & Handa. Womens Health. May 2013

Vaginal delivery → AI

	NP=787 (19%)	CS = 389 (10%)	VP = 2927 (71%)
POP	4% (29/774)	4% (16/386)	8%*† (223/2883)
SUI	8% (64/771)	11% (43/387)	18%*† (505/2885)
OAB	9% (70/773)	9% (36/381)	15%*† (427/2852)
AI	19% (143/766)	16% (60/365)	28%*† (786/2823)
PFD	27% (201/750)	27% (98/369)	42%*† (1153/2767)

*† p < 0.05 VP compared to CS AND NP

Lukacz ES, IUJ 2005 (KP CARES survey N>4,000)

OVD → AI

ICS 2018 PHILADELPHIA

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

Pelvic Floor Disorder	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 (95% CI)	1 (ref)	1.07 (.53-2.17)	1.63 (.79-3.39)	1.52 (.81-2.84)	2.10 (1.02-4.30)
AOR (95% CI)	1 (ref)	1.12 (.55-2.29)	1.48 (.70-3.11)	1.62 (.85-3.10)	2.22 (1.06-4.64)
Prolapse to or beyond the hymen on examination					
Unadjusted	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)**
Adjusted*	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)**

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

Handa, Obstet Gynecol 2011

OVD > SVD > C-section → AI

ICS 2018 PHILADELPHIA


Systematic review

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

SJ Pretlove,[a] PJ Thompson,[a] PM Toozs-Hobson,[a] S Radley,[b] KS Khan[a]

Prevalence of AI:

OVD > SVD > C-section

Pretlove, BJOG 2008

Bowel dysfunction 3 mos after OASIS

ICS 2018 PHILADELPHIA

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

OASIS in the setting of OVD → more AI

ICS 2018 PHILADELPHIA

- Prospective cohort of 268 women with OASIS in early postpartum period
  - 194 OVD (91% FAVD, 9% VAVD)
  - 74 SVD
- At 1 week: OASIS p/OVD → AI & higher FISI score
- Also more pain and UI
- No differences @ 12 weeks

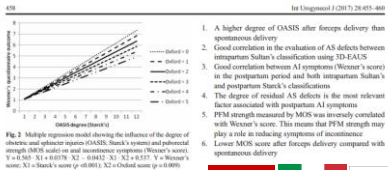
Dave, Female Pelvic Med Reconstr Surg. 2016 Jul-Aug;22(4):194-8.

PFM strength plays a role in symptoms

ICS 2018 PHILADELPHIA

Prospective cohort of 95 women with OASIS evaluated 6 mos postpartum (Spain, Italy, Poland)

- How do residual AS defect & PFM strength → AI?



Cerro, Int Urogynecol J. 2017 Mar;28(3):455

OASIS & interaction with bowel symptoms

ICS 2018 PHILADELPHIA

Objective: To ID OB risk factors associated with FI in women with irritable bowel syndrome (IBS)

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

Results:

FI associated with: parity, OVD, OASIS, fecal urgency, diarrhea, & hysterectomy (NOT with episiotomy, POP, or UI)

Interaction between OASIS and bowel symptoms amplified risk of FI

OASIS + diarrhea → more than doubled risk of FI

OASIS + fecal urgency → increased the risk of FI by nearly 2-fold

OASIS data was by patient report, so concern about recall bias

Robinson, FPMRS 2013

OASIS matters, but so do other things

" It says here that you'd prefer someone with regular bowel movements..Does it matter if they're involuntary ? "

References for tables

Brown, Obstet Gynecol 2012
Huebner, Intl J Gynecol Obstet 2013
Jangö, Am J Obstet Gynecol. 2017 Jun;216(6):610.e1-610.e8.
Jangö, Am J Obstet Gynecol. 2018 Feb;218(2):232.e1-232.e10
Johannessen, BJOG, 2014
LaCross, J Midwifery Womens Health. 2015 Jan-Feb;60(1):37-47
Laine, Acta Obstet Gynecol Scand. 2011 Apr;90(4):319-24
Linneberg, Eur J Obstet Gynecol Reprod Biol. 2016 Aug;203:315-9
Marsh, Eur J Obstet Gynecol Reprod Bio May 2013
Soerensen, Dis Col Rect 2013
Visscher, Int Urogynecol J 2014
Wegnelius, Acta Obstet Gynecol Scand 2011

Paula Igualada-Martinez

ICS 2018 PHILADELPHIA

Affiliations to disclose†:

Coloplast Ltd
(Continence Advisory Board-Product Development)

† All financial ties (over the last year) that you may have with any business organisation with respect to the subjects mentioned during your presentation

Funding for speaker to attend:

- [x] Self-funded
- [ ] Institution (non-industry) funded
- [ ] Sponsored by:

ICS 2018 PHILADELPHIA

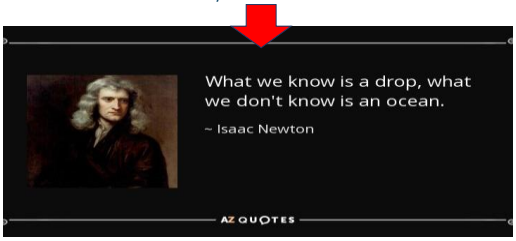
Conservative Management of OASIS-related bowel dysfunction and preventative interventions

By
Paula Igualada-Martinez
Clinical Specialist Physiotherapist
Physiotherapy Department- Pelvic Floor Unit
Guy's and St Thomas' NHS Foundation Trust
London, UK

Guy's and St Thomas' NHS
NHS Foundation Trust

ICS 2018 PHILADELPHIA

Conservative Management of OASIS related bowel dysfunction



ICS 2018 PHILADELPHIA

"Women should be advised that physiotherapy following repair of OASIS could be beneficial."

(Royal College of Obstetricians and Gynaecologists (RCOG) (2015). The management of third and fourth degree perineal tears. Green-top Guidelines No 29)

Conservative Management of OASIS related bowel dysfunction: Goals

ICS 2018 PHILADELPHIA

- To change stool consistency
- To promote and complete effective defecation
- To strengthen the Pelvic Floor Muscles including EAS
- To normalise the sensibility of rectum

Bø et al (2007) Evidence-Based Physical Therapy for the Pelvic Floor
Bols et al (2013) KNFG Evidence Statement Anal incontinence

Acute physiotherapy management

ICS 2018 PHILADELPHIA

- R.I.C.E
  Rest, Ice, Compression and Elevation
  National Institute for Health and Clinical Excellence (NICE) (2006). Routine postnatal care of women and their babies
- Avoidance of excessive forces on healing tissue (Defecation dynamics and constipation management)
  Sherburn et al (2013) The role of physiotherapy after obstetric anal sphincter injury: An overview of current clinical practice. Australian and New Zealand Continence Journal. 19 (1)
- Pelvic Floor Muscle Training (PFMT) (pain-free activation!)
  NICE (2006). Routine postnatal care of women and their babies
  Boyle et al (2012) Cochrane Database of Systematic Reviews, Issue 10. Art. No.: CD007471
  RCOG (2015). The management of third and fourth degree perineal tears. Green-top Guidelines No 29.
- Raise awareness of common symptoms following OASIS
  NICE (2006). Routine postnatal care of women and their babies

From 6-12 weeks onwards

Initial clinical assessment:
History taking
Observation and Physical examination
Outcome measures

Primary interventions

Secondary Interventions

Bliss et al (2017) 6th International Consultation on Incontinence

Primary Interventions

- Education of the patient about OASIS-related bowel pathology and treatments available
- Review the medication if AI is a side effect
- Practical advice for coping:
  - Locating toilets
  - Radar Key Card
  - Just Can't Wait Card
  - Support networks like MASIC, the B&B Foundation, Facebook groups
- Diet and eating pattern modification

Ward J. (2011) Gastroenterol Clin N Am;36:687–711
Foxx- Orenstein et al (2014) Gastroenterol Hepatol (NY);10(5):294–301.
Bliss et al (2017) Committee 16 Incontinence 6th edition ICI: 1996-2086

Primary Interventions

1. Good defecation dynamics

2. Glycerine Suppositories

Bliss et al (2017) 6th International Consultation on Incontinence

Primary Interventions

What about stool consistency?

Ask your patients which one is easier to hold on the hand!

- Bowel diary
- Avoidance of known triggers
- Two RCT's to show that psyllium is effective in reducing AI compared with Loperamide and has less side effects
- Liquid Loperamide a better option as reduces the risk of constipation
- Avoid codeine if breastfeeding

Bliss et al (2017) 6th International Consultation on Incontinence

Secondary Interventions

- **PFMT (B)**
- **PFMT + Rectal Balloon Training (A)**
- **Electromyographic (EMG) Biofeedback (B)**
  - **Home device preferable**
- **Neuromuscular Electrical Stimulation (B)**
- **Incontinence products such as an anal plug or insert (B)**
- **Transanal Irrigation (C)**

Bliss et al (2017) 6th International Consultation on Incontinence

Pelvic floor muscle training

- PFMT: training consists of repetitive and maximal voluntary contractions and relaxations of the PFM's and external anal sphincter
- Exercise programs should follow the principles of:
  - Specificity, Overload, Progression and Maintenance
- For a minimum of **5 months**
- Include strategies to **adhere** to the exercise regime
- **Endurance of squeeze**

Bø K (1995) *Int Urogynecol J*; **6**: 282–91.
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

ICS 2018 PHILADELPHIA

EMG Biofeedback

Rectal Balloon Training

Neuromuscular electrical stimulation

ICS 2018 PHILADELPHIA

Cochrane Library

Cochrane Database of Systematic Reviews

Biofeedback and/or sphincter exercises for the treatment of faecal incontinence in adults (Review)

Norton C, Cody JD

- There is evidence that BFB and NMES may enhance the outcome of treatment compared to NMES alone or exercises alone
- Biofeedback therapy and sphincter exercises may have a therapeutic effect

ICS 2018 PHILADELPHIA

ASSESSMENT AND CONSERVATIVE MANAGEMENT OF FAECAL INCONTINENCE AND QUALITY OF LIFE IN ADULTS

ICI, 2017

D. Bliss (USA), T. Mimura (Japan)
B. Berghmans (Netherlands), A. Bharucha (USA), G. Chiarioni (Italy),A. Emmanuel (UK),Y. Maeda (UK), M. Northwood (Canada), C. Peden-Mcalpine (USA), H. Rafiee (UK), Todd Rock-Wood (USA), G. Santoro (Italy), S. Taylor (UK), W. Whitehead (USA)

- PFMT is recommended as an early intervention in the treatment of AI as part of a conservative management bundle of interventions, based upon low cost, low morbidity, and at least weak evidence of efficacy **(Grade B)**.
- Biofeedback, which is usually combined with PFMT and sensory training with a rectal balloon, is recommended as second line treatment for AI after other behavioral and conservative/medical management have been tried and have failed to provide adequate symptom relief. **(Grade A)**.

ICS 2018 PHILADELPHIA

EUROPEAN JOURNAL OF PHYSIOTHERAPY, 2017
http://dx.doi.org/10.1080/21679169.2016.1263872

Taylor & Francis

REVIEW ARTICLE

Effects of physiotherapy treatment for patients with obstetric anal sphincter rupture: a systematic review

Elisabeth Arkel[a], Karin Torell[b], Sofia Rydhög[c], Åsa Rikner[d], Helena Neymark Bachmeier[e], Annelie Gutke[f] and Monika Fagevik Olsén[b,c]

[a]Department of Physical Therapy Norra Älvsborgs Länssjukhus, Trollhättan, Sweden; [b]Department of Physical Therapy, Sahlgrenska University Hospital, Göteborg, Sweden; [c]Department of Women's Health/Physical Therapy, Skånes University Hospital, Malmö, Sweden; [d]Department of Physical Therapy, Akademiska sjukhuset, Uppsala, Sweden; [e]Department of Physical Therapy, Centralsjukhuset, Karlstad, Sweden; [f]Department of Health and Rehabilitation/Physical Therapy, Gothenburg University/Sahlgrenska Academy, Gothenburg, Sweden

The studies included in this systematic review had different interventions, length of treatment, outcome measures: unable to draw conclusions about the effectiveness of physiotherapy in women following OASIS HOWEVER the authors still recommend offering treatment to this group of patients.

better effects compared to sensory biofeedback for women with impaired faecal continence after OASIS and that adjuvant biofeedback has effect on anal incontinence and decreases embarrassment following anal sphincter repair years after OASIS. The studies evaluating solely pelvic floor exercises or electrical stimulation were contradictory or showed no significant effects.
Conclusions: There are a limited number of trials evaluating the effect of physical therapy interventions to prevent or treat anal incontinence after OASIS. The studies are diverse and the level of evidence is consequently very low or missing. Until there are enough studies to write evidence-based guidelines, it is still of importance to treat women with leakage and pain in the attempt to increase

stimulation; pelvic floor exercises; physical therapy

ICS 2018 PHILADELPHIA

Cochrane Library

Cochrane Database of Systematic Reviews

Pelvic floor muscle training for prevention and treatment of urinary and faecal incontinence in antenatal and postnatal women (Review)

Woodley SJ, Boyle R, Cody JD, Mørkved S, Hay-Smith EJC

ICS 2018 PHILADELPHIA

ICS 2018 PHILADELPHIA

Objective To evaluate the effect of pelvic floor muscle exercises (PFME) for postpartum anal incontinence (AI).

Design A parallel two-armed randomised controlled trial stratified on obstetrical anal sphincter injury with primary sphincter repair and hospital affinity.

Setting Ano-rectal specialist out-patient clinics at two hospitals in Norway.

Population One hundred and nine postpartum women with AI at

Methods The intervention group received 6 months of individual physiotherapy-led PFME and the control group written information on PFME. Changes in St. Mark's scores and predictors of post-intervention AI were assessed by independent samples *t*-tests and multiple linear regression analyses,

Main outcome measures The primary outcome measure was change in AI symptoms on the St. Mark's score from baseline to post-intervention. Secondary outcome measures were manometry measures of anal sphincter length and strength, endoanal ultrasound (EAUS) defect score and voluntary pelvic floor muscle

Results There was a significant difference in the reduction of St. Mark's scores from baseline to post-intervention in favour of the PFME group (−2.1 versus −0.8 points, $P = 0.040$). No

between groups. Baseline St. Mark's, PFME group affinity and EAUS defect score predicted post-intervention St. Mark's score in the imputed intention-to-treat analyses. The analysis on un-imputed data showed that women performing weekly PFME improved their AI scores more than women in the control group did.

Conclusions Our results indicate that individually adapted PFME reduces postpartum AI symptoms.

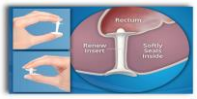
randomised controlled trial.

Tweetable abstract Performing regular pelvic floor muscle exercises may be an effective treatment for postpartum anal incontinence.

Secondary Interventions

ICS 2018 PHILADELPHIA

Anal Plugs, pads and TAI



Bliss et al (2011).J Wound Ostomy Continence Nurs. 2011 May-Jun; 38(3): 289–297
ekom and Dobben (2012) Cochrane Database of Systematic Reviews, Issue 4. Art. No.: CD005086.
Omar and Alexander (2013) Cochrane Database of Systematic Reviews, Issue 6. Art. No.: CD002116

Preventative conservative measures

ICS 2018 PHILADELPHIA

- 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
Egan et al (2006) J Matern Fetal Neonatal Med, 19 (4): 225-9

Conclusions

ICS 2018 PHILADELPHIA

- Conservative management has **NO ADVERSE EFFECTS**:
  - It should be first line management of anal incontinence!
- Prevention is better than cure
- Ensure good communication with the MDT!
- We should aim for a standardization of protocols and equipment
  - "There is marked variation in practice, training and supervision of BFB therapists in the UK"

Etherson et al. (2016) Frontline Gastroenterology. 0:1-6.

ICS 2018 PHILADELPHIA

Thank you for listening!

DEBATE: THE MOTION

ICS 2018 PHILADELPHIA

THE BEST MODE OF DELIVERY FOLLOWING PRIOR OASI IS VAGINAL.

For: RC Against: HB

For:
Vaginal Birth After OASIS

Rufus Cartwright

Department of Urogynaecology, Oxford University Hospitals NHS Trust, UK

No relevant financial conflicts of interest

- Women may experience recurrence of OASIS
  - But at similar rates to first-time mothers
  - 3.2% - 5.6% Baghestan et al, 2011 Basham et al, 2013
  - And AI outcomes following adequately repaired OASIS are good
- Women may experience worsening or new onset anal incontinence
  - But this may occur regardless of mode of delivery
  - For asymptomatic women the largest series reports no change in anal incontinence symptoms after vaginal delivery (n=99) Jordan et al, 2018
- We can identify women at higher risk of recurrent OASIS Iha et al, 2016
  - But both the absolute risk increase and the population attributable risk fraction remains very small
  - For a large majority of women a vaginal delivery is a safe option for their bowel function

S6 Figure: A random effects meta-analysis of fecal incontinence after cesarean delivery compared to vaginal delivery

Study or Subgroup	Odds Ratio M-H, Random, 95% CI
Abdel-Fattah 2011	0.34 [0.12, 0.91]
Brown 2012	0.83 [0.53, 1.31]
Cyhagen 2015	1.46 [1.07, 1.98]
MacArthur 2011	0.94 [0.73, 1.20]
Woolhouse 2012	1.64 [1.02, 2.64]
Total (95% CI)	**1.04 [0.73, 1.48]**

Total events

Heterogeneity: $Tau^2 = 0.11$; $Chi^2 = 14.50$, df = 4 (P = 0.006); $I^2 = 72\%$

Test for overall effect: Z = 0.22 (P = 0.82)

Odds Ratio M-H, Random, 95% CI

0.1 0.2 0.5 1 2 5 10

Favors cesarean delivery Favors vaginal delivery

Keag et al, 2018

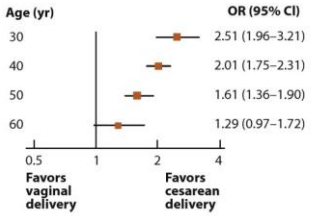
Term Breech Trial: FI OR 3.07 95%CI 0.9-10.49
Hannah et al, 2004

Outcome	Planned cesarean birth Total (n = 1155)	Planned vaginal birth Total (n = 1150)	Adjusted odds ratio (95% CI) [P value]
Urinary incontinence	187 (16.2%)	250 (21.7%)	
No problem at all	89	107	
A little problem	81	118	
A big problem	12	22	
Missing	5	3	
Problematic urinary incontinence**	93 (8.1%)	140 (12.2%)	0.63 (0.47, 0.83) [0.001]
IIQ-7, mean (SD)***	18.4 (21.0)	19.1 (21.5)	[0.82]
Problematic urinary incontinence with			
No previous history of problematic incontinence	74/1084 (6.8%)	125/1080 (11.6%)	0.56 (0.41, 0.76) [0.0002]
Previous history of problematic incontinence	16/52 (30.8%)	14/58 (24.1%)	1.40 (0.60, 3.24) [0.44]
Problematic urinary incontinence by method of birth*			
Cesarean for both infants	76 (7.3%)	44 (9.8%)	
Vaginal birth for one or both infants	17 (14.2%)	96 (13.7%)	
Fecal incontinence*	47 (4.1%)	68 (5.9%)	
No problem at all	25	38	
A little problem	18	21	
A big problem	3	8	
Missing	1	1	
Problematic faecal incontinence*	21 (1.8%)	29 (2.5%)	0.68 (0.38, 1.21) [0.19]
Flatal incontinence*	180 (15.6%)	224 (19.5%)	
No problem at all	111	139	
A little problem	62	72	
A big problem	6	10	
Missing	1	3	
Problematic flatal incontinence*	68 (5.9%)	82 (7.1%)	0.82 (0.56, 1.10) [0.17]
Missing	11	7	

Hutton et al, 2018

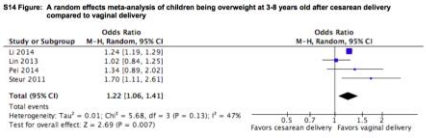
Outcome	Planned cesarean birth Total (n = 1155)	Planned vaginal birth Total (n = 1150)	Adjusted odds ratio (95% CI) [P value]
Urinary incontinence	187 (16.2%)	250 (21.7%)	
No problem at all	89	107	
A little problem	81	118	
A big problem	12	22	
Missing	5	3	
Problematic urinary incontinence**	93 (8.1%)	140 (12.2%)	0.63 (0.47, 0.83) [0.001]
IIQ-7, mean (SD)***	18.4 (21.0)	19.1 (21.5)	[0.82]
Problematic urinary incontinence with			
No previous history of problematic incontinence	74/1084 (6.8%)	125/1080 (11.6%)	0.56 (0.41, 0.76) [0.0002]
Previous history of problematic incontinence	16/52 (30.8%)	14/58 (24.1%)	1.40 (0.60, 3.24) [0.44]
Problematic urinary incontinence by method of birth*			
Cesarean for both infants	76 (7.3%)	44 (9.8%)	
Vaginal birth for one or both infants	17 (14.2%)	96 (13.7%)	
Fecal incontinence*	47 (4.1%)	68 (5.9%)	
No problem at all	25	38	
A little problem	18	21	
A big problem	3	8	
Missing	1	1	
Problematic faecal incontinence*	21 (1.8%)	29 (2.5%)	0.68 (0.38, 1.21) [0.19]
Flatal incontinence*	180 (15.6%)	224 (19.5%)	
No problem at all	111	139	
A little problem	62	72	
A big problem	6	10	
Missing	1	3	
Problematic flatal incontinence*	68 (5.9%)	82 (7.1%)	0.82 (0.56, 1.10) [0.17]
Missing	11	7	

Hutton et al, 2018



Tahtinen et al, 2016

Caesarean has major harms for the mother and infant

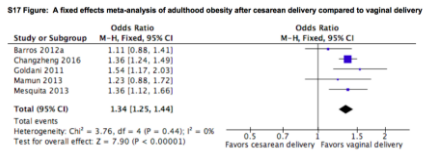


S14 Figure: A random effects meta-analysis of children being overweight at 3-8 years old after cesarean delivery compared to vaginal delivery

Study or Subgroup	Odds Ratio M–H, Random, 95% CI
Li 2014	1.24 [1.19, 1.29]
Lin 2013	1.02 [0.84, 1.25]
Pei 2014	1.34 [0.89, 2.02]
Steur 2011	1.70 [1.11, 2.61]
Total (95% CI)	**1.22 [1.06, 1.41]**
Total events	

Heterogeneity: $Tau^2 = 0.01$; $Chi^2 = 5.68$, df = 3 (P = 0.13); $I^2 = 47\%$
Test for overall effect: Z = 2.69 (P = 0.007)

Favors cesarean delivery | Favors vaginal delivery



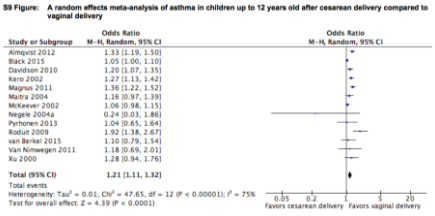
S17 Figure: A fixed effects meta-analysis of adulthood obesity after cesarean delivery compared to vaginal delivery

Study or Subgroup	Odds Ratio M–H, Fixed, 95% CI
Barros 2012a	1.11 [0.88, 1.41]
Changzheng 2016	1.36 [1.24, 1.49]
Goldani 2011	1.54 [1.17, 2.03]
Mamun 2013	1.23 [0.88, 1.72]
Mesquita 2013	1.36 [1.12, 1.66]
Total (95% CI)	**1.34 [1.25, 1.44]**
Total events	

Heterogeneity: $Chi^2 = 3.76$, df = 4 (P = 0.44); $I^2 = 0\%$
Test for overall effect: Z = 7.90 (P < 0.00001)

Favors cesarean delivery | Favors vaginal delivery

Keag et al, 2018



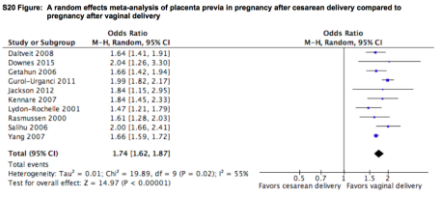
S9 Figure: A random effects meta-analysis of asthma in children up to 12 years old after cesarean delivery compared to vaginal delivery

Study or Subgroup	Odds Ratio M–H, Random, 95% CI
Almqvist 2012	1.33 [1.19, 1.50]
Black 2015	1.05 [1.00, 1.10]
Davidson 2010	1.20 [1.07, 1.35]
Kero 2002	1.27 [1.13, 1.42]
Magnus 2011	1.36 [1.22, 1.52]
Maitra 2004	1.16 [0.97, 1.39]
McKeever 2002	1.06 [0.98, 1.15]
Negele 2004a	0.24 [0.03, 1.86]
Pyrhonen 2013	1.04 [0.65, 1.64]
Roduit 2009	1.92 [1.38, 2.67]
van Berkel 2015	1.10 [0.79, 1.54]
Van Nimwegen 2011	1.18 [0.69, 2.01]
Xu 2000	1.28 [0.94, 1.76]
Total (95% CI)	**1.21 [1.11, 1.32]**
Total events	

Heterogeneity: $Tau^2 = 0.01$; $Chi^2 = 47.65$, df = 12 (P < 0.00001); $I^2 = 75\%$
Test for overall effect: Z = 4.39 (P < 0.0001)

0.05 | 0.2 | 1 | 5 | 20
Favors cesarean delivery | Favors vaginal delivery

Keag et al, 2018



S20 Figure: A random effects meta-analysis of placenta previa in pregnancy after cesarean delivery compared to pregnancy after vaginal delivery

Study or Subgroup	Odds Ratio M–H, Random, 95% CI
Daltveit 2008	1.64 [1.41, 1.91]
Downes 2015	2.04 [1.26, 3.30]
Getahun 2006	1.66 [1.42, 1.94]
Gurol-Urganci 2011	1.99 [1.82, 2.17]
Jackson 2012	1.84 [1.15, 2.95]
Kennare 2007	1.84 [1.45, 2.33]
Lydon-Rochelle 2001	1.47 [1.21, 1.79]
Rasmussen 2000	1.61 [1.28, 2.03]
Salihu 2006	2.00 [1.66, 2.41]
Yang 2007	1.66 [1.59, 1.72]
Total (95% CI)	**1.74 [1.62, 1.87]**
Total events	

Heterogeneity: $Tau^2 = 0.01$; $Chi^2 = 19.89$, df = 9 (P = 0.02); $I^2 = 55\%$
Test for overall effect: Z = 14.97 (P < 0.00001)

Favors cesarean delivery | Favors vaginal delivery

Keag et al, 2018

Conclusions

- The absolute risks of recurrent OASIS or anal incontinence are small after vaginal delivery
- There is no evidence that caesarean protects against anal incontinence
- There is ample evidence that caesarean has harms for both mother and baby

"IT'S NOT HARD TO MAKE DECISIONS WHEN YOU KNOW WHAT YOUR VALUES ARE"

– ROY DISNEY

- We should never presume to make a strong recommendation for or against caesarean after OASIS
- We should trust that women are able to make a decision that fits with their values and preferences….once they understand the risks and benefits

DEBATE: AGAINST THE MOTION

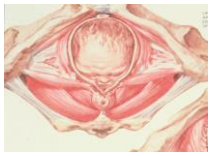
ICS 2018 PHILADELPHIA

THE BEST MODE OF DELIVERY FOLLOWING PRIOR OASI IS NOT VAGINAL.

Pregnancy is magical…

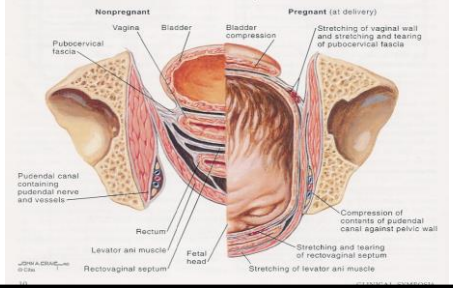
ICS 2018 PHILADELPHIA

OASIS is not.



Compression & ischemia are part of the physiologic parturition process.

ICS 2018 PHILADELPHIA



And the risk of recurrence is high.

ICS 2018 PHILADELPHIA

3 – 13%

recurrent OASI

Ampt. BMC Pregnancy Childbirth. 2015 Feb 13;15:31.
Ali. Eur J Obstet Gynecol Reprod Biol. 2014 Mar;174:51-3
Basham, Female Pelvic Med Reconstr Surg. 2013 Nov-Dec;19(6):328-32.

Even if you don't have another OASI,

10%

symptom deterioration

Risk of symptom deterioration

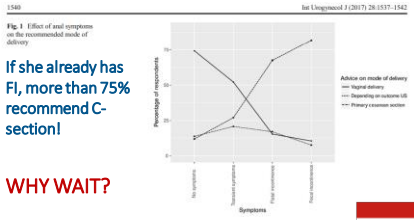
In a cohort of 1978 women with prior OASIS, AI worsened after vaginal delivery and improved after C-section.

	Vaginal Delivery N = 1472	Elective C-section N = 506
Before 2nd delivery	29.4%	56.2%
After 2nd delivery	38.9%	53.2%
Change in AI	+ 9.5%	- 3%

Jangö. Am J Obstet Gynecol. 2016 Jun;214(6):733.e1-733.e13.

What do gynecologists say?

Mail survey of 234/973 (24%) Dutch gynecologists



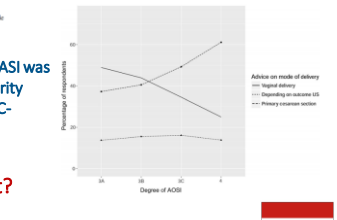
If she already has FI, more than 75% recommend C-section!

WHY WAIT?

Donners. Int Urogynecol J. 2017 Oct;28(10):1537-1542

What do gynecologists say?

Mail survey of 234/973 (24%) Dutch gynecologists

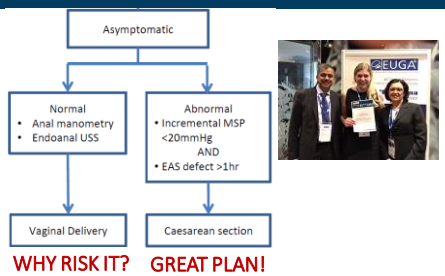


If her prior OASI was 3c or 4, majority recommend C-section.

Why risk it?

Donners. Int Urogynecol J. 2017 Oct;28(10):1537-1542

Should we use imaging to guide us?



WHY RISK IT? GREAT PLAN!

https://www.perineum.net/documents/Management%20OASIS%20in%20pregnancy-092325.pdf

Pregnancy is magical…

AI is not.

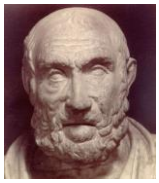
REBUTTAL: FOR THE MOTION

ICS 2018 PHILADELPHIA

THE BEST MODE OF DELIVERY FOLLOWING PRIOR OASI IS VAGINAL.

Disadvantages

ICS 2018 PHILADELPHIA



Primum non nocere

Caesarean has clear harms – and the benefits in this setting are entirely unproven

REBUTTAL: AGAINST THE MOTION

ICS 2018 PHILADELPHIA

THE BEST MODE OF DELIVERY FOLLOWING PRIOR OASI IS NOT VAGINAL.

ICS 2018 PHILADELPHIA

BMC Pregnancy & Childbirth

RESEARCH ARTICLE Open Access

Risk of pl… birth cesa… and meta…

The *risk of placenta previa* in the subsequent pregnancy after CS delivery is *lower than previously estimated*. Given the placenta previa rate in England and the adjusted effect of previous CS, *359 deliveries by CS would result in one additional case of placenta previa* in the next pregnancy.

ICS 2018 PHILADELPHIA

Parity, Mode of Delivery, and Pelvic Floor Disorders

Emily S. Lukacz, MD, Jean M. Lawrence, ScD, MPH, Richard Contreras, Charles W. Nager, MD, and Karl M. Luber, MD

Only 7 women would have to deliver by CS to prevent 1 woman from having a pelvic floor disorder.

ICS 2018 PHILADELPHIA

The data are limited.

Cochrane Database Syst Rev. 2014 Nov 6;11:CD010374. doi: 10.1002/14651858.CD010374.pub2.

Interventions for women in subsequent pregnancies following obstetric anal sphincter injury to reduce the risk of recurrent injury and associated harms.

Farrar D[1], Tuffnell DJ, Ramage C.

Author information

Abstract

BACKGROUND: Perineal damage occurs frequently during childbirth, with severe damage involving injury to the anal sphincter reported in up to 18% of vaginal births. Women who have sustained anal sphincter damage are more likely to suffer perineal pain, dyspareunia (painful sexual intercourse), defaecatory dysfunction, and urinary and faecal incontinence compared to those without damage. Interventions in a subsequent pregnancy may be beneficial in reducing the risk of further severe trauma and may reduce the risk of associated morbidities.

OBJECTIVES: To examine the effects of interventions for women in subsequent pregnancies following obstetric anal sphincter injury for improving health.

SEARCH METHODS: We searched the Cochrane Pregnancy and…

SELECTION CRITERIA: Randomised controlled trials, cluster-ran… effects of any intervention in subsequent pregnancies following o… randomised controlled trials and cross-over trials were not eligible…

DATA COLLECTION AND ANALYSIS: No trials were included. In future … authors will extract data and assess the risk of bias of included studies.

MAIN RESULTS: No eligible completed trials were identified. One ongoing trial was identified.

AUTHORS' CONCLUSIONS: No relevant trials were included. The effectiveness of interventions for women in subsequent pregnancies following obstetric anal sphincter injury for improving health is therefore unknown. Randomised trials to assess the relative effects of interventions are required before clear practice recommendations can be made.

RCT: CS vs VD for continent women with h/o OASI - Abramowitz, 2008

ClinicalTrials.gov NCT00632567

Recruitment Status : Completed
First Posted : March 10, 2008
Last Update Posted : December 15, 2016

Study Type :	Interventional (Clinical Trial)
Actual Enrollment :	554 participants
Allocation:	Randomized
Intervention Model:	Parallel Assignment
Masking:	None (Open Label)
Primary Purpose:	Prevention
Official Title:	**Anal Incontinence** After Delivery. Secondary Prevention With Caesarean Section.
Study Start Date :	March 2008
Actual Primary Completion Date :	March 2016
Actual Study Completion Date :	April 2016

What People Don't Tell You About Childbirth: The Realities of Vaginal Tearing

https://www.cosmopolitan.com/health-fitness/a22517294/what-is-vaginal-tearing-childbirth/

MASIC

Professor Michael Keighley says:
"The MASIC Foundation, concerned about preventing obstetric anal sphincter injury in childbirth, endorses the right of every pregnant woman to receive evidence-based, unbiased and personalised information when discussing a planned mode of birth with her care provider. The potential associated risks and benefits of all care choices, both for the mother and her baby, should always be explained in a way that is understandable, relevant and sensitive. Respect for each woman's autonomy and individuality must be the cornerstone of maternity care."

Christine:
"I chose to have a c-section because I previously had a 4th degree tear.

My c-section was absolutely amazing and my recovery was super easy and quick in comparison to my 4th degree."

Jemma:
"A c-section was absolutely the right decision for us after a previous 4th degree tear, but not an easy one to make.

I got my healing birth after a previous birth trauma with a 4th degree tear."