



# OASIS

**January 2017**

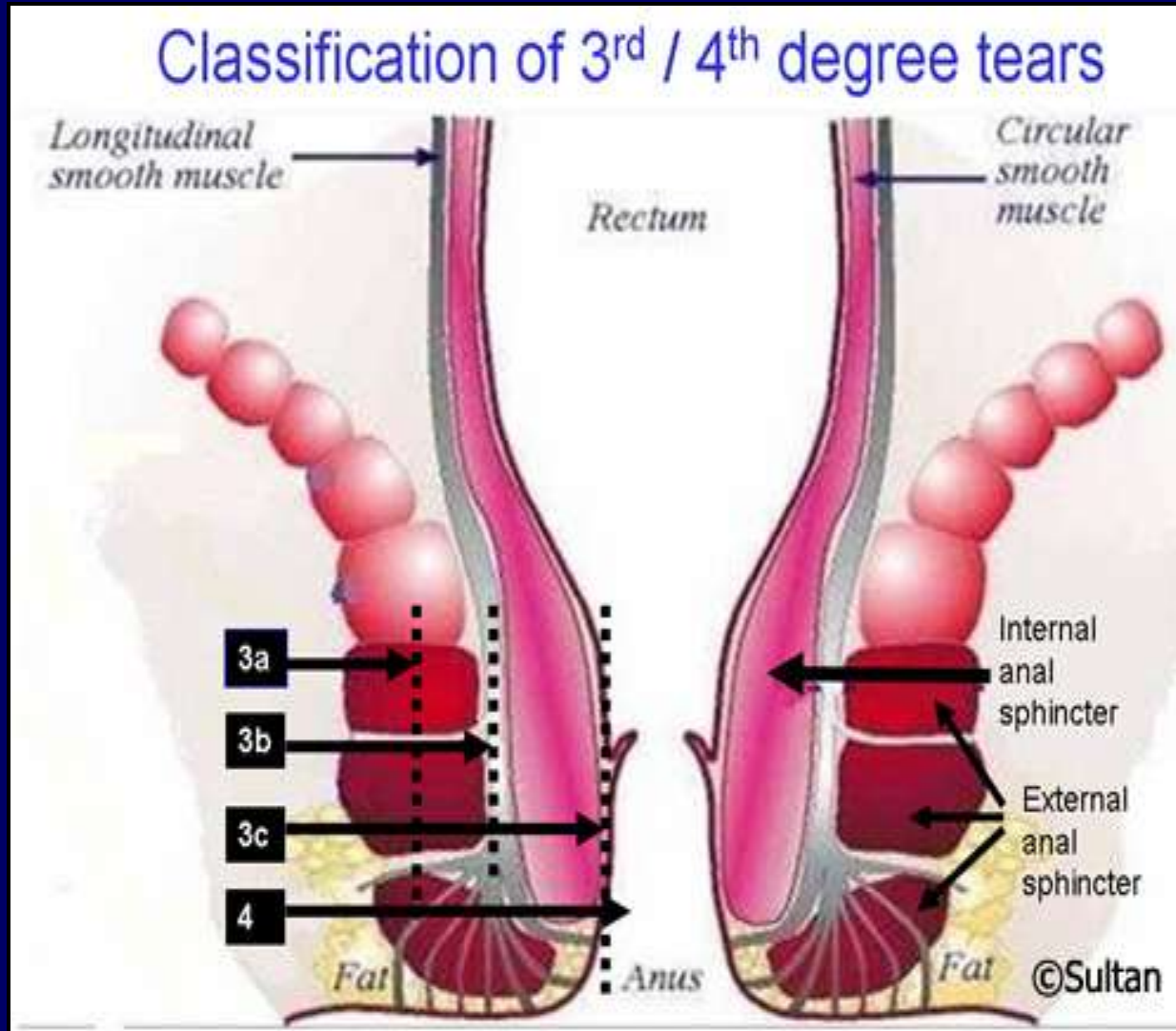
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**Sheba Medical Center, Tel Hashomer**



# Anatomy

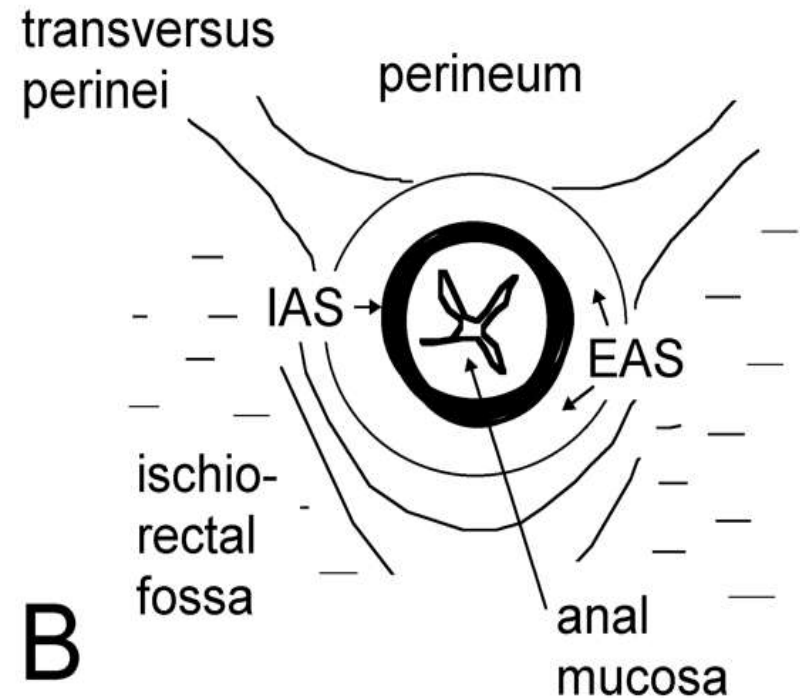


# OASIS





# Anal sphincter assessment



•Courtesy of Peter Dietz

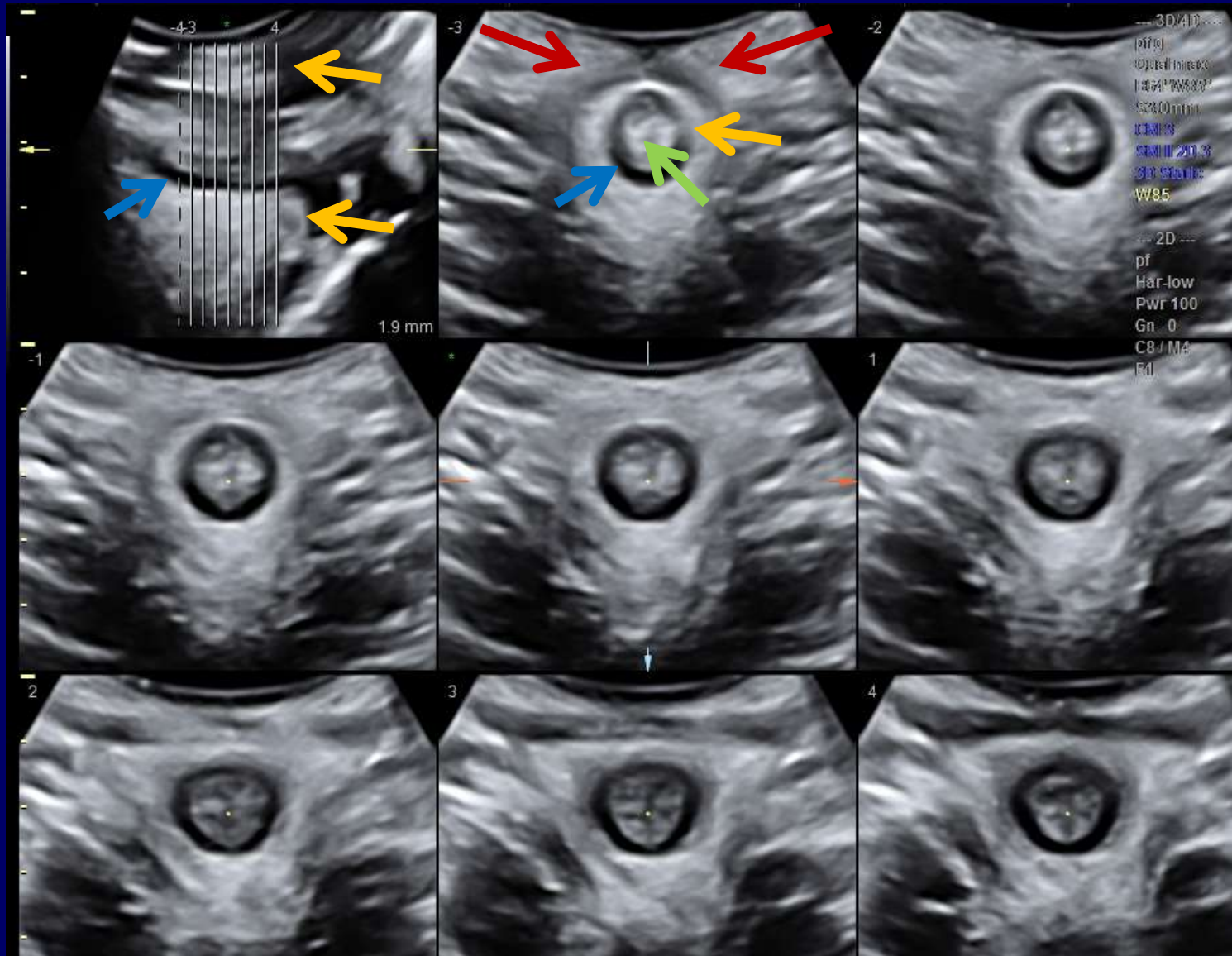


•TP

•EAS

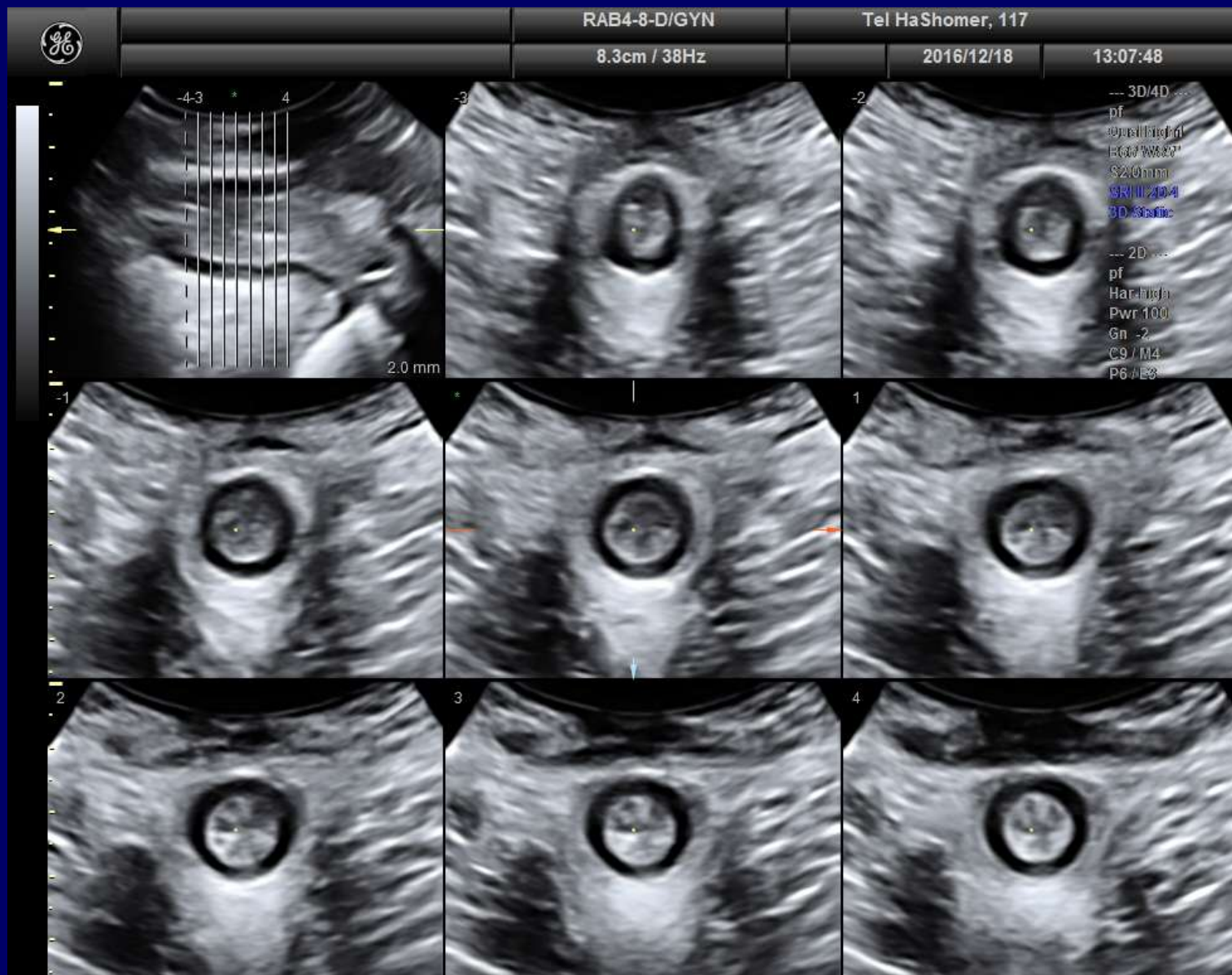
•IAS

• **M**



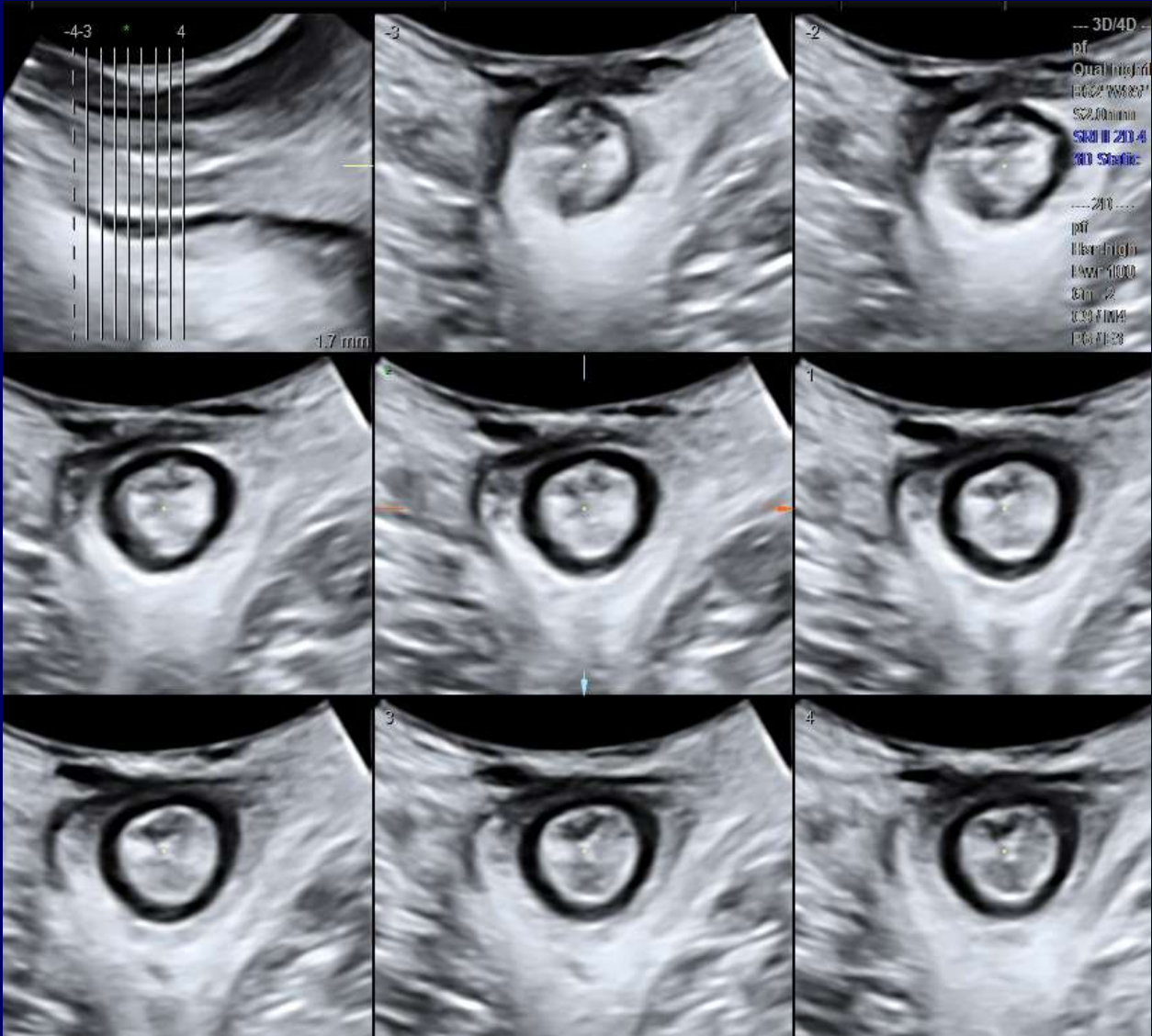


# 3a



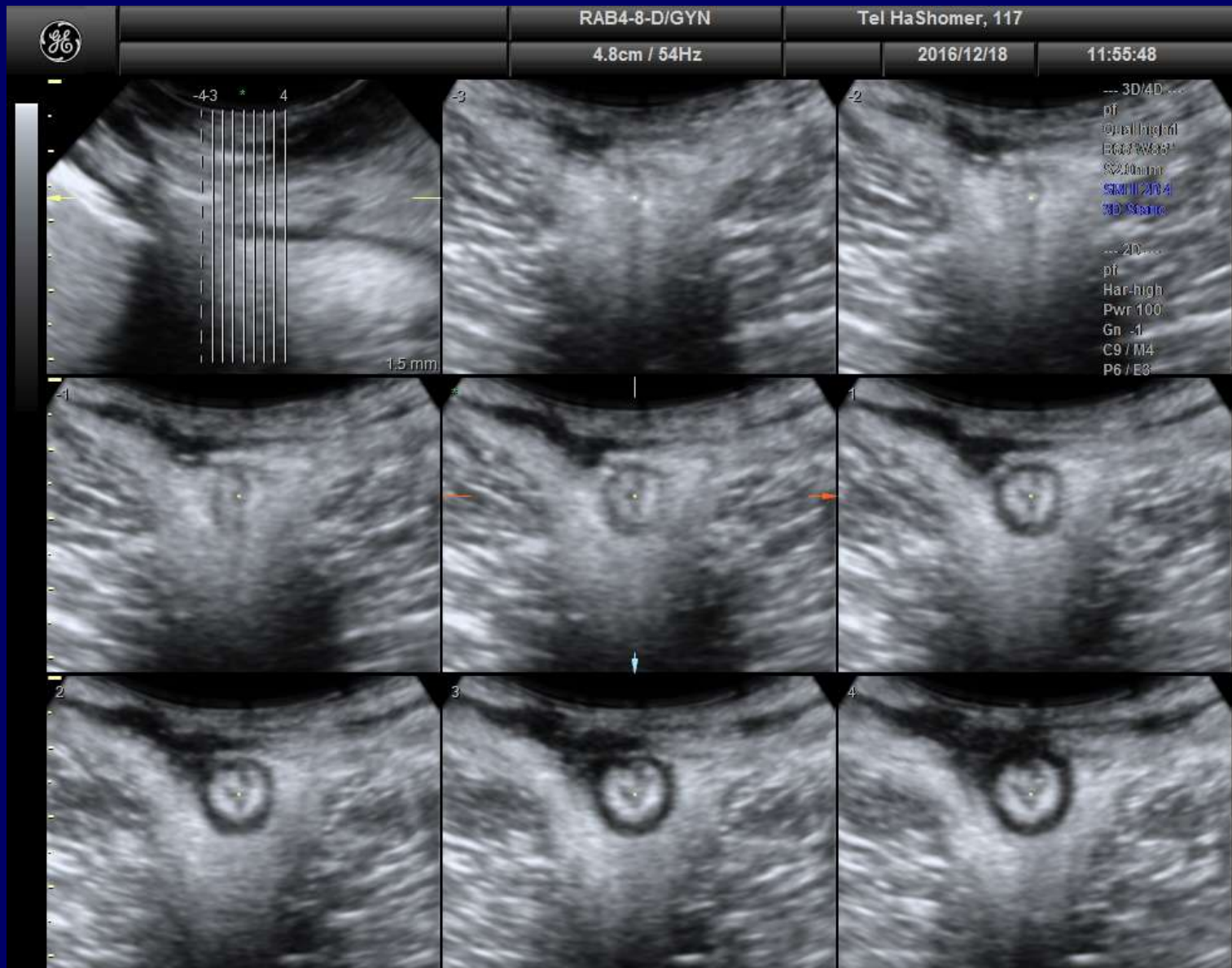


# 3b





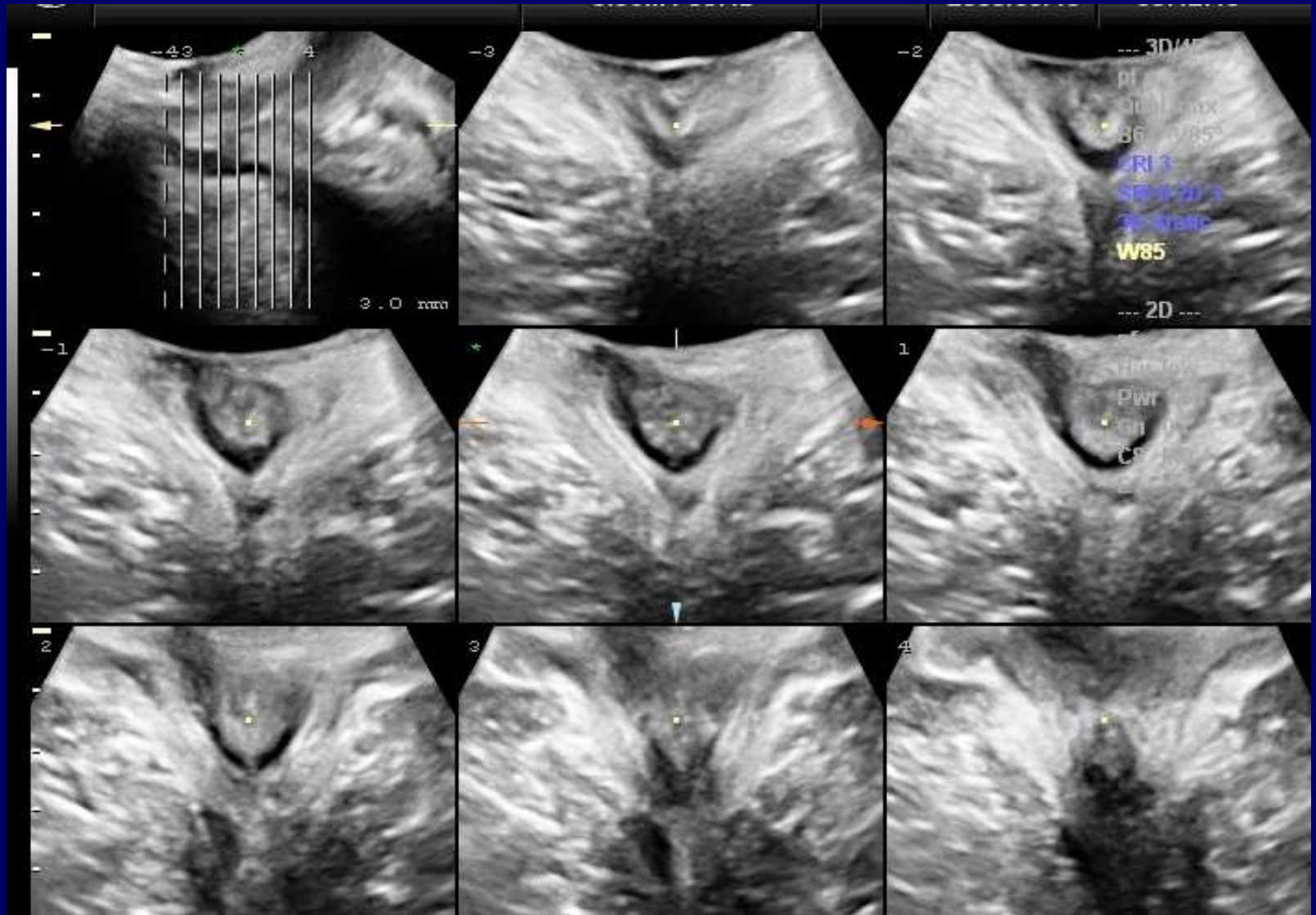
# 3b







$$3c = 4$$





# **Anorectal symptoms and residual sonographic defects by OASIS grade classification at delivery**

<b>OASIS classification at delivery</b>	<b>3A n=103 (52%)</b>	<b>3B n=33 (16.7%)</b>	<b>3C n=25 (12.6%)</b>	<b>4 n=37 (18.7%)</b>	<b>Total n=198</b>	<b>Correlation P value</b>
<b>Any fecal incontinence</b>	<b>4 (4%)</b>	5 (15%)	6 (25%)	10 (28%)	<b>25 (12.6%)</b>	<0.001
<b>Any urgency incontinence</b>	<b>23 (22%)</b>	11 (33%)	9 (36%)	17 (46%)	<b>60 (30%)</b>	0.002
<b>Any flatus incontinence</b>	<b>46 (44.5%)</b>	21 (63.6%)	12 (48%)	27 (73%)	<b>106 (54%)</b>	0.004
<b>Mean CCIS score</b>	<b>1.67 (0-15)</b>	2.48 (0-10)	3.88 (0-20)	4.57 (0-25)	<b>2.63 (0-25)</b>	<0.001
<b>Score≥2</b>	<b>32 (31.1%)</b>	17 (51.5%)	11 (44%)	23 (62.2%)	<b>83 (41.2%)</b>	0.001
<b>Residual sonographic defect</b>	<b>80 (78%)</b>	30 (91%)	22 (88%)	37 (100%)	<b>171 (86.4%)</b>	0.005



## **Outcome of primary repair of obstetric anal sphincter injuries (OASIS): does the grade of tear matter?**

A.-M. ROOS, R. THAKAR and A. H. SULTAN

*Department of Obstetrics and Gynaecology, Mayday University Hospital, Croydon, Surrey, UK*

- 531 women, seen at 8-12 weeks postpartum
- 39% anorectal symptoms
- Minor tears: 3a and 3b
- Major tears: 3c and 4
- In major:
  - more symptoms, worse QoL, worse outcomes
  - more endosonographic defects:
    - IAS, IAS+EAS (39%)
  - combined defects associated with loose fecal incontinence
- **27% missed IAS tears at delivery**

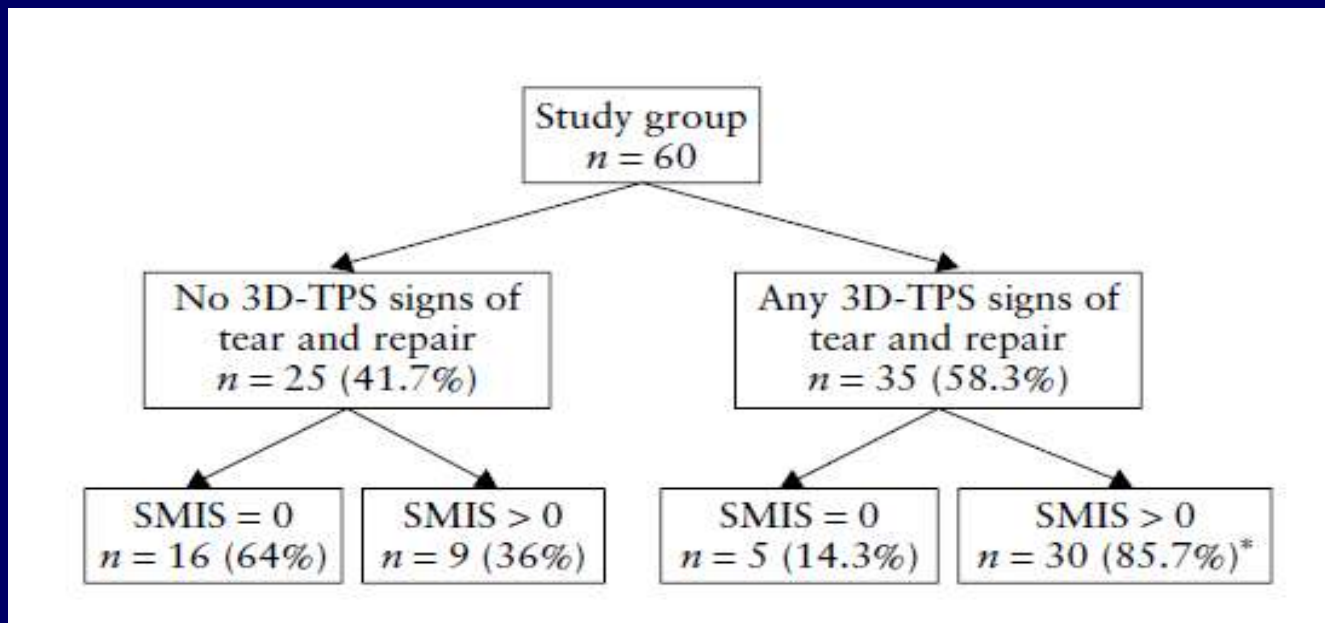




## Three-dimensional transperineal ultrasound findings associated with anal incontinence after intrapartum sphincter tears in primiparous women

D. V. VALSKY, S. M. COHEN, M. LIPSCHUETZ, D. HOCHNER-CELNIKIER and S. YAGEL

Department of Obstetrics and Gynecology, Hadassah-Hebrew University Medical Centers, Mount Scopus, Jerusalem, Israel



- A substantial proportion of women report some complaint of incontinence after sphincter repair, most of a slight degree. Such complaints are associated with abnormal 3D-TPS findings at follow up.



## **Outcome of Subsequent Vaginal Delivery Depending on Combined Finding on Endoanal Ultrasound and Anal Manometry Following OASIS at Index Delivery**

Sultan reported his results following antenatal counselling for the route of delivery in subsequent pregnancy for women with previous OASIS,<sup>114</sup> with updated results presented in 2013.<sup>122</sup> In his study, substantial anal compromised was defined as either:

- external sphincter defect on ultrasound  $> 30^\circ$  and a maximum squeeze pressure increment of  $< 20$  mmHg on anal manometry;

OR

- defect  $< 30^\circ$  and a maximum squeeze pressure increment of  $< 20$  mmHg;

OR

- no defect and a maximum squeeze pressure increment of  $< 20$  mmHg.



# Postpartum 2D and 3D ultrasound evaluation of the anal sphincter complex in women with obstetric anal sphincter injuries

Ros C\*, Martínez-Franco E†, Wozniak MM‡, Cassado J§, Santoro GA¶, Elías N\*, López M\*\*, Palacio M\*\*, Wieczorek AP‡, Espuña-Pons M\*

**Conclusions:** 2D-TPUS and 3D-EVUS are not accurate modalities for the assessment of the anal sphincters after OASIS. 3D-TPUS shows a good correlation with the gold standard 3D-EAUS and a high sensitivity. It can be used as a screening tool after primary repair of OASIS.

**Table 2.** Comparison of different ultrasound techniques using the gold standard method (3D-EAUS) as reference in women with a history of OASIS.

	2D-TPUS	3D-TPUS	3D-EVUS	3D-EAUS
<b>EAS defect</b>				
• Number	41	48	43	50
• Sensitivity	81%	95%	90%	100%
• Specificity	50%	75%	11%	100%
• PPV	85%	93%	81%	100%
• NPV	43%	82%	20%	100%
• Cohen's kappa	0.296	0.725	0.010	1
<b>IAS defect</b>				
• Number	6	12	6	9
• Sensitivity	45%	73%	40%	100%
• Specificity	98%	93%	95%	100%
• PPV	83%	73%	67%	100%
• NPV	88%	93%	86%	100%
• Cohen's kappa	0.521	0.659	0.407	1

EAS: external anal sphincter; IAS: internal anal sphincter; NPV: negative predictive value; PPV: positive predictive value



# Obstetric Anal Sphincter Injury and Anal Incontinence Following Vaginal Birth: A Systematic Review and Meta-Analysis

Allison LaCross, DNP, CNM, Meredith Groff, DNP, AGPCPNP-BC, Arlene Smaldone, PhD, CPNP, CDE

**Introduction:** The aim of this study was to systematically review current evidence for the relationship between obstetric anal sphincter injury (ie, episiotomy and third- or fourth-degree perineal lacerations) and anal incontinence in parous women.

**Methods:** PubMed, Ovid (MEDLINE), Cochrane Trials, and Cumulative Index to Nursing and Allied Health Literature were searched. Studies eligible for review assessed the relationship between episiotomy and/or third- or fourth-degree perineal laceration and anal incontinence. Two reviewers independently searched for studies for review and used the Meta-Analysis of Observational Studies in Epidemiology guidelines. Quality of individual studies was appraised using the Downs and Black criteria. Pooled effect sizes were estimated for the relationships between episiotomy and third- or fourth-degree perineal laceration with anal incontinence using random effects meta-analysis models. Heterogeneity of each model was assessed using Cochran Q and  $I^2$  statistics.

**Results:** Of 578 articles, 19 studies (7 prospective cohort studies, 6 retrospective studies, one case-control study, and 5 population-based cross-sectional studies) met inclusion/exclusion criteria for the systematic review. Of the 19 studies, 3 examined episiotomy, 7 examined third- or fourth-degree perineal laceration, and 9 studies examined both risk factors for anal incontinence. Eight studies (N = 2929 women) examining the relationship between episiotomy and anal incontinence and 12 studies (N = 2288 women) examining the relationship between third- or fourth-degree perineal laceration and anal incontinence met criteria for inclusion in the meta-analyses. Pooled odds ratios (ORs) demonstrated a significant association between perineal trauma (episiotomy [OR, 1.74; 95% confidence interval [CI], 1.28-2.38; Q = 8.9;  $P < .26$ ;  $I^2 = 21.4$ ] and third- or fourth-degree perineal laceration (OR, 2.66; 95% CI, 1.77-3.98; Q = 27.9;  $P = .002$ ;  $I^2 = 64.1$ ) and anal incontinence.

**Discussion:** Both episiotomy and third- or fourth-degree perineal laceration are significantly associated with anal incontinence after vaginal birth. The evidence provided in this systematic review and meta-analysis highlights the importance of reducing perineal trauma during vaginal births in order to ameliorate anal incontinence in parous women.

J Midwifery Womens Health 2015;60:37-47 © 2015 by the American College of Nurse-Midwives.





# Imaging

## 5.1: Ultrasonography (2D/3D/4D) of the Posterior Compartment Including Anal Sphincters, Pelvic Floor Muscles, and Prolapse (Endoanal, Transperineal, Transvaginal)

Ultrasound is increasingly being incorporated as an investigation of posterior compartment disorders<sup>7,74</sup> (Table III). An integrated multi-compartmental pelvic floor ultrasonography with a combination of different modalities has been described to assess pelvic floor dysfunction for a global and multi-compartmental perspective.<sup>75,76</sup>

Modalities in current routine clinical use:

- (a) **Endoanal:** intra-anal 360° sector scanning using rotational mechanical probe or radial electronic probe.
- (b) **Transperineal:** curved array probe applied in the perineum between the mons pubis and the anal margin. This term incorporates trans-labial ultrasound. Introital ultrasound is usually assumed to imply the placement of transducer with smaller footprints (such as end-firing endo-vaginal probe) within the introitus.
- (c) **Transvaginal:** intra-vaginal curvilinear, linear array, or 360° sector scanning.



# Recommendations for OASIS

OASIS are reported to occur in 0.5–14% of vaginal deliveries (2.9–19% of primiparous vaginal deliveries).<sup>116</sup> It has previously been shown in a prospective study that about one third of OASIS can be diagnosed 8 weeks after delivery by endoanal ultrasound alone. As these were not identified clinically, the injuries were believed to be “occult.”<sup>2</sup> However, it has subsequently been proven that such injuries are not necessarily occult but in fact undiagnosed due to lack of expertise of midwives and doctors.<sup>3</sup>

Training in diagnosis and management of perineal trauma has been shown to be suboptimal<sup>117</sup> and dedicated hands-on courses have shown significant improvements in diagnosis and classification of OASIS.<sup>118</sup> Sultan therefore proposed a more descriptive classification of OASIS (Figs. 12 and 13)<sup>119</sup> that has now been accepted internationally to support consistency in reporting.<sup>120–122</sup> To avoid underestimation of the injury, if there is uncertainty regarding the full extent of the injury it should be classified as the greater degree, for example, if one is unsure as to whether an injury is a Grade 3a or 3b it should be classified as 3b (Figs. 14 and 15). This classification also has clinical relevance as it ensures increased vigilance for internal sphincter injuries that are best repaired soon after delivery<sup>123</sup> as persistent internal sphincter defects are associated with fecal incontinence.<sup>124</sup> Examination techniques to improve detection of these injuries and avoiding pitfalls in diagnosis have been described in detail.<sup>116</sup>





# Obstetrical Anal Sphincter Injuries (OASIS): Prevention, Recognition, and Repair

SOGC CLINICAL PRACTICE GUIDELINE

No. 330, December 2015

- a. The risk of recurrence of an obstetrical anal sphincter injury at a subsequent delivery is 4% to 8%. (II-2)
- b. It was calculated that 2.3 Caesarean sections at the cost of increased maternal risk would be required to prevent one case of anal incontinence in a woman with prior obstetrical anal sphincter injury. (II-2)
- b. Repair of the internal anal sphincter is recommended as women who demonstrate an internal anal sphincter defect on postpartum ultrasound have more anal incontinence. (III)
- d. A persistent defect of the external anal sphincter remote from delivery may increase the risk of worsening symptoms following subsequent vaginal deliveries. (II-2)



## Summary Statements

1. Obstetrical anal sphincter injuries may lead to significant comorbidities, including anal incontinence, rectovaginal fistula, and pain. (II-2)
2. Obstetrical anal sphincter injuries are more commonly associated with forceps deliveries than with vacuum-assisted vaginal deliveries. (II-2)
3. Obstetrical anal sphincter injuries (OASIS) repair:
  - a. Suture-related morbidity is similar at 6 weeks following the use of either polyglactin 2-0 or polydioxanone 3-0 for OASIS repairs. (I)
  - b. Repair of the internal anal sphincter is recommended as women who demonstrate an internal anal sphincter defect on postpartum ultrasound have more anal incontinence. (III)
  - c. Repair of the external anal sphincter should include the fascial sheath. An overlapping technique often requires more dissection and mobilization of the sphincter ends and is only possible with full thickness 3b sphincter tears or greater. (III)
  - d. A persistent defect of the external anal sphincter remote from delivery may increase the risk of worsening symptoms following subsequent vaginal deliveries. (II-2)
4. Obstetrical anal sphincter injuries are associated with an increased risk of postpartum urinary retention. (II-2)
5. After a successful repair of obstetrical anal sphincter injuries, most women can safely deliver vaginally in a future pregnancy. (III)
6. Counselling women about future delivery plans:
  - a. The risk of recurrence of an obstetrical anal sphincter injury at a subsequent delivery is 4% to 8%. (II-2)
  - b. It was calculated that 2.3 Caesarean sections at the cost of increased maternal risk would be required to prevent one case of anal incontinence in a woman with prior obstetrical anal sphincter injury. (II-2)

## Recommendations

1. All women should be carefully examined for perineal or vaginal tears; those with a tear that is more than superficial in depth should have a systematic rectal examination for obstetrical anal sphincter injury prior to repair. (II-2B)
2. The World Health Organization classification should be used to classify obstetrical anal sphincter injury. This distinguishes the degree of external sphincter tear (3a: < 50% or 3b: ≥ 50%) and the presence of internal sphincter defects (3c). A button-hole injury is distinct and should be classified separately as such. (III-B)
3. In women having a spontaneous vaginal delivery, the rate of obstetrical anal sphincter injury is decreased when the obstetrical care provider slows the fetal head at crowning. (II-2A)
4. Episiotomy:
  - a. At the time of either a spontaneous vaginal or instrumental delivery, the obstetrical care provider should follow a policy of "restricted" episiotomy (i.e., only if indicated), rather than "liberal" use (i.e. routine), for the prevention of obstetrical anal sphincter injuries. (I-A)
  - b. If an episiotomy is deemed indicated, preference for a mediolateral over a midline should be considered. (II-2B) The optimal cutting angle appears to be no less than 45 degrees, ideally around 60 degrees. (II-2B)
5. Repair can be delayed for 8 to 12 hours with no detrimental effect. Delay may be required so a more experienced care provider is available for the repair. (I-A)
6. Prophylactic single dose intravenous antibiotics (2nd generation cephalosporin, e.g. cefotetan or cefoxitin) should be administered for the reduction of perineal wound complications following the repair of obstetrical anal sphincter injury. (I-A)
7. Laxatives (e.g., lactulose) should be prescribed following the primary repair of obstetrical anal sphincter injury as they are associated with earlier and less painful first bowel motions and earlier discharge from hospital. Constipating agents and bulking agents are not recommended. (I-A)





Gynaecologists recommend that “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.”<sup>79</sup>

# Risk factors for recurrent obstetric anal sphincter injury (rOASI): a systematic review and meta-analysis

Swati Jha<sup>1</sup> · Victoria Parker<sup>1</sup>

Study year	Authors (location)	Study period	Sample size (rOASI)	Type of study	Risk factors assessed	Risk of OASI in 1st pregnancy (%)	Risk of 1st OASI in 2nd pregnancy (%)	Risk of recurrence (%) (OR; CI)
1999	Payne et al. (US) [23]	1990–1994	178 (19)	Cohort	—	10.2	3.6	10.7 (3.4; 1.8–6.4)
1999	Peleg et al. (US) [2]	1978–1995	774 (58)	Case-control	Episiotomy	19.3	3.2	7.5 (2.5; 1.8–3.4)
2003	Harkin et al. (Ireland) [22]	1997–1999	45 (2)	Cohort	—	1.7	0.8	4.4 (—)
2004	Elfaghi et al. (Sweden) [20]	1973–1997	10,807 (478)	Cohort	—	1.3	0.8	4.4 (5.98; 5.44–6.58)
2005	Dandolu et al. (US) [26]	1990–2001	14,990 (864)	Case-control	Forceps; ventouse, episiotomy; grade of previous tear	7.31	—	5.76 (0.78; 0.72–0.83)
2009	Burton et al. (UK) [21]	2001–2008	53 (2)	Cohort	—	4	—	3.8
2012	Jango et al. (Denmark) [27]	1997–2010	7336 (521)	Case-control	Forceps; ventouse; episiotomy; induction; epidural; presentation; birthweight; head circumference; age; grade of OASI in first; shoulder dystocia	4.6	—	7.1 (5.91; 6.5–7.7)
2012	Baghestan et al. (Norway) [30]	1967–2004	13,305 (750)	Case-control	Forceps; ventouse; birthweight; age;	2.8	0.8	5.6 (4.2; 3.9–4.5)
2012	Parmar et al. (US) [7]	1991–2004	43,583 (2648)	Case-control	Forceps; ventouse; birthweight; age	11.6	1.4	6.1 (3.79; 3.60–3.98)
2013	Basham et al. (US) [25]	2005–2010	685 (22)	Case-control	Forceps; ventouse; episiotomy; grade of OASI in 1st	—	—	3.2 (—)
2014	Yogev et al. (Israel) [9]	2000–2012	166 (4)	Case-control	Forceps; ventouse; grade of OASI in 1st	0.6	0.3	2 (2.3–18.3)
2014	Doumouchtsis et al. (UK) [19]	2001–2013	307 (28)	Case-control	Head circumference; Birth wt; Age; Ethnicity; smoking; mode of delivery	—	—	9.12 (—)
2014	Boggs et al. (Canada) [18]	2006–2010	1923 (102)	Case-control	Episiotomy; augmentation; induction; instrumental	5.3	—	5.3 (1; 0.8–1.2)
2014	Ali et al. (Ireland) [10]	2010–2012	82 (11)	Case-control	Episiotomy; forceps; ventouse	3.4	1	13.4
2014	Edozien et al. UK [8]	2004–2012	17,352 (1249)	Cohort	Episiotomy; forceps; ventouse; grade of tear; birthweight; age; shoulder dystocia	3.8	1.3	7.2
2015	Ampt et al. (Australia) [24]	2001–2011	4808 (276)	Case-control	Episiotomy; ethnicity; induction; instrumental; birthweight; epidural; age	4.5	—	5.7 (—)



## Mode of delivery after obstetric anal sphincter injury and the risk of long-term anal incontinence

Hanna Jangö, MD; Jens Langhoff-Roos, MD, DMSc; Susanne Rosthøj, MSc, PhD; Abelone Sakse, MD, PhD

**CONCLUSION:** Mode of second delivery did not significantly affect the risk of long-term anal or fecal incontinence in multivariable analyses of patients with previous obstetric anal sphincter injury in this population in which patients with anal incontinence before the second pregnancy were recommended to have an elective cesarean delivery in the subsequent delivery. Nonetheless, we found that patients with vaginal delivery had a higher risk of deterioration of anal incontinence symptoms compared with those with an elective cesarean delivery.



# Modifiable risk factors of obstetric anal sphincter injury in primiparous women: a population—based cohort study

Hanna Jangö, MD; Jens Langhoff-Roos, MD, DMSc; Susanne Rosthøj, MSc, PhD; Abeline Sakse, MD, PhD

Vacuum extraction		Episiotomy					
"no"	"no"	1.0			1.0		
"yes"	"no"	3.42	3.29—3.56	< .0001	2.99	2.86—3.12	< .0001
"no"	"yes"	1.05	0.99—1.12	.1184	0.95	0.89—1.02	.1541
"yes"	"yes"	2.31	2.16—2.46	< .0001	1.80	1.68—1.93	< .0001
Forceps		2.61	1.88—3.61	< .0001	1.95	1.39—2.75	.0007
Shoulder dystocia		3.18	2.79—3.62	< .0001	1.33	1.16—1.53	< .0001



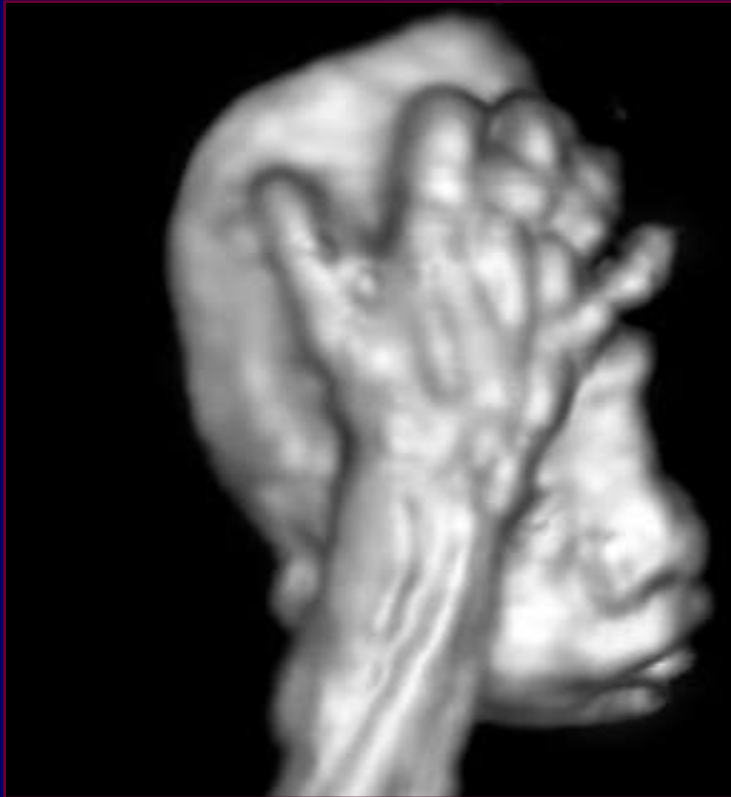


**Table 3. Risks factors for OASIS**

<b>Maternal risks factors</b>	<b>OR*</b>
Primiparity <sup>19-24</sup>	3.5 to 9.8
Age (> 35) <sup>24</sup>	1.1
Age (> 27) <sup>23</sup>	1.9
Race <sup>19,23</sup>	1.4 to 2.5
Maternal diabetes <sup>19,23</sup>	1.2 to 1.4
Infibulation <sup>25</sup>	1.8 to 2.7
<b>Delivery risks factors</b>	<b>OR</b>
Operative vaginal delivery†	
Vacuum <sup>19,21,24,26</sup>	1.5 to 3.5
Forceps <sup>19,21,24,26,27</sup>	2.3 to 5.6
Vacuum + forceps <sup>24,28</sup>	8.1
Episiotomy	
Midline <sup>26</sup>	2.3 to 5.5
Mediolateral <sup>26,29</sup>	0.21
Mediolat episiotomy + instrumental <sup>29</sup>	
Vacuum	0.11
Forceps	0.08
Midline episiotomy + instrumental (nulliparous) <sup>30</sup>	
Vacuum	4.5
Forceps	8.6
Unspecified episiotomy + instrumental <sup>31</sup>	
Vacuum	2.9
Forceps	3.9
Epidural <sup>23</sup>	1.1 to 2.2
Second stage >1 h‡	1.5
Shoulder dystocia	2.7 to 3.3
VBAC <sup>21,32</sup>	1.4 to 5.5
Water birth <sup>27</sup>	1.46
Oxytocin augmentation‡ <sup>33</sup>	1.2
<b>Infant risks factors</b>	<b>OR</b>
Birth weight > 4000 gm <sup>20</sup>	2.2 to 3.0
Malpresentation <sup>23</sup>	2.0
Postmaturity <sup>20,24</sup>	1.1 to 2.5
Fetal distress	1.3
OP§	
SVD <sup>23</sup>	2.0
Instrumental <sup>34,35</sup>	4.7



# Thank you



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