PREVENTION AND MANAGEMENT OF ANAL SPHINCTER INJURY AND FAECAL INCONTINENCE

NOTO, 29.-30. November 2013

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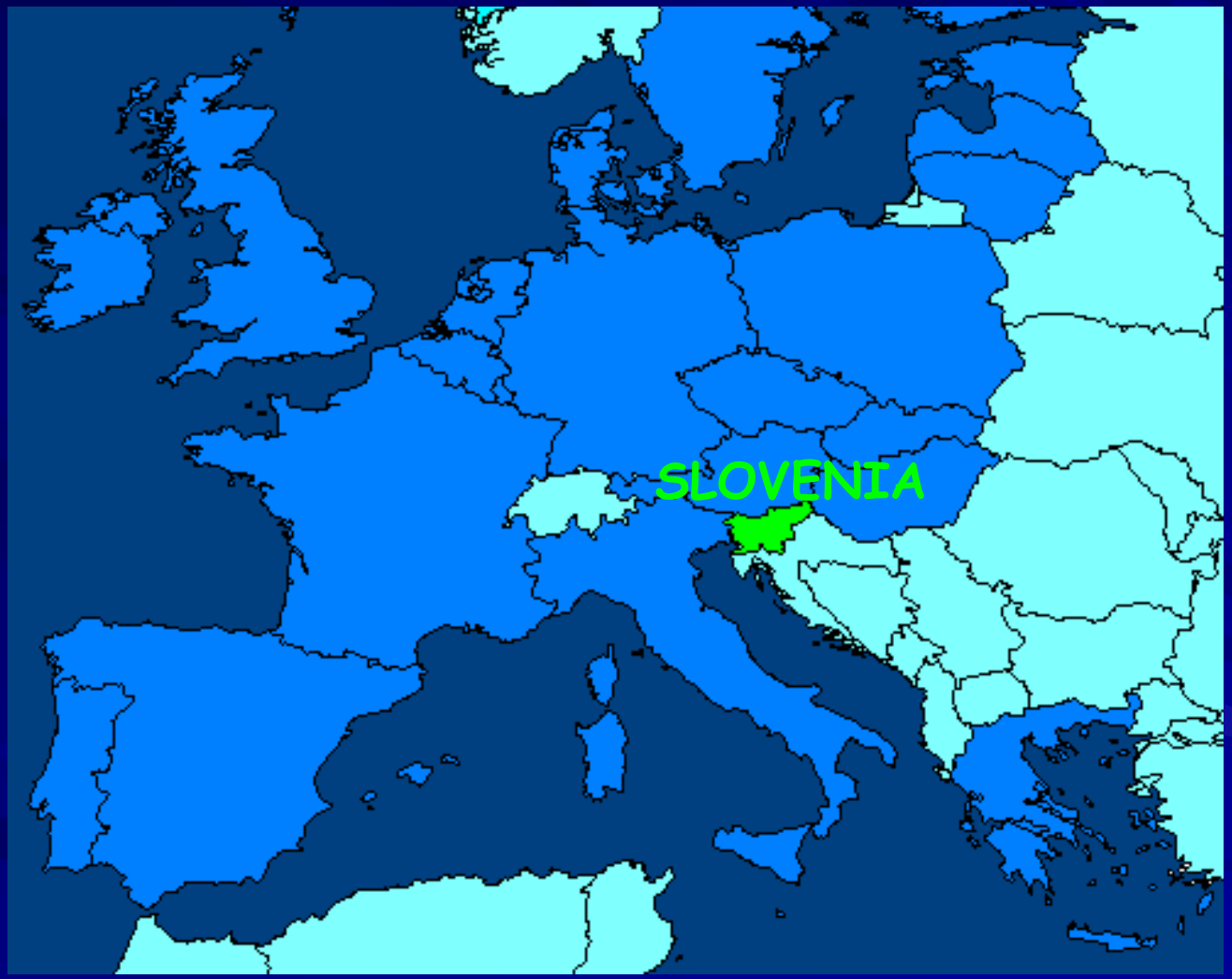
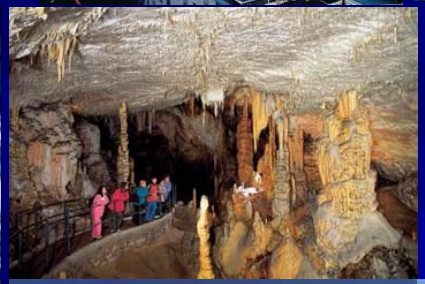
SLOVENIA ON THE MAP OF EUROPE

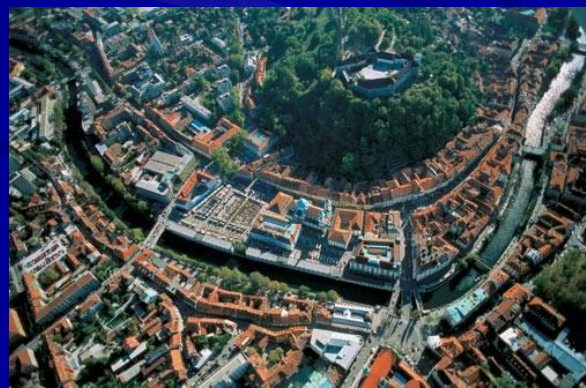


SLOVENIA IN BRIEF

- Area: 20,273 km2
- Forest: 10,124 km2
- Length of coast: 46.6 km
- Capital: Ljubljana
- Population: 2 million
- Language: Slovenian
- Currency: Euro (as of Jan 2007)
- Religion: Roman Catholic (60%)
- Climate: Alpine, Continental, Mediterranean
- Coast: 46 km !

REPUBLIC OF SLOVENIA





LJUBLJANA
The capital of Slovenia

DEPARTMENT OF GYNECOLOGY AND OBSTETRICS

SURGERIES DONE IN 2012

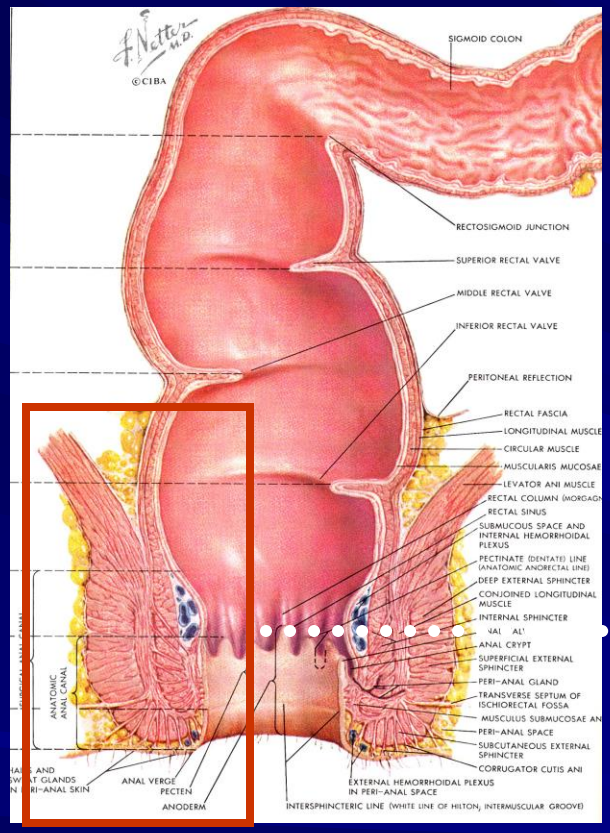
Radical hysterectomy: 66
Laparatomy: 550
Vaginal: 584 (sacrospinous fixation Richter: 44)
Laparascopic: 714
TVT: 306
Prolift: 51

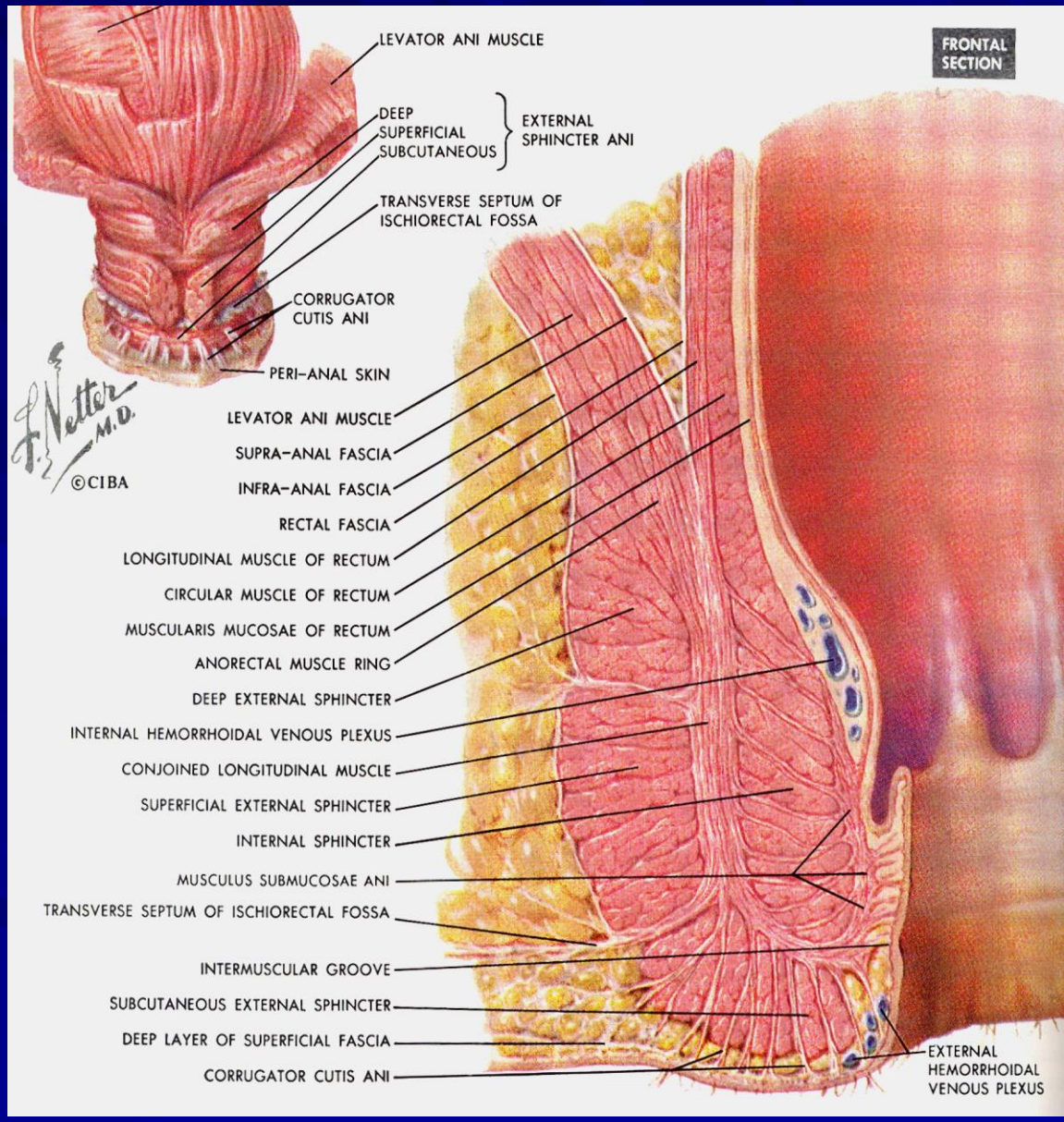
2241

One day surgeries: 2712

ALLTOGETHER OPERATIONS 4953

Anatomy of the anal sphincter





ANAL SPHINCTER INJURY AND FAECAL INCONTINENCE

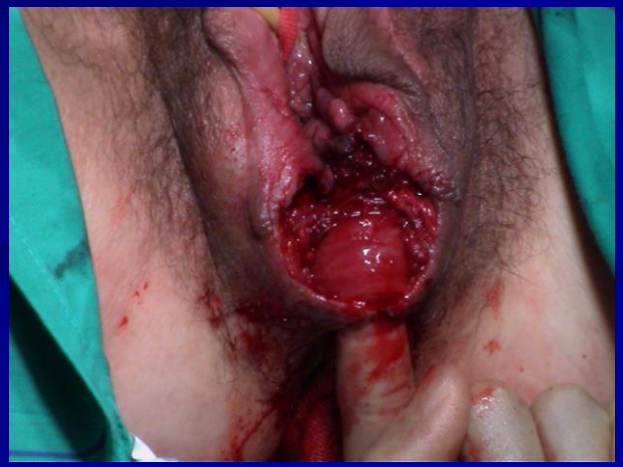
Pregnancy & delivery
causes
Pelvic floor dysfunction:

- Urinary incontinence
- Fecal and anal incontinence
- Perineal pain
- Sexual dysfunction

Liebergall M, Lavy Y. Different interventions during birth and delivery and their connection to pelvic floor damage. Harefuah 2009; 148: 837-41, 854.

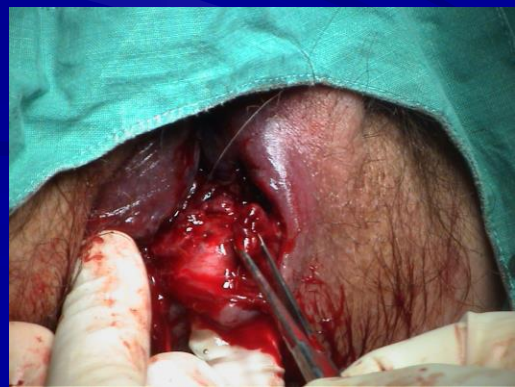
External anal sphincter

- Striated muscle in a state of tonic contraction
- Innervated by pudendal nerve
- Contributes up to 30% of resting pressure
- Responsible for squeeze pressure



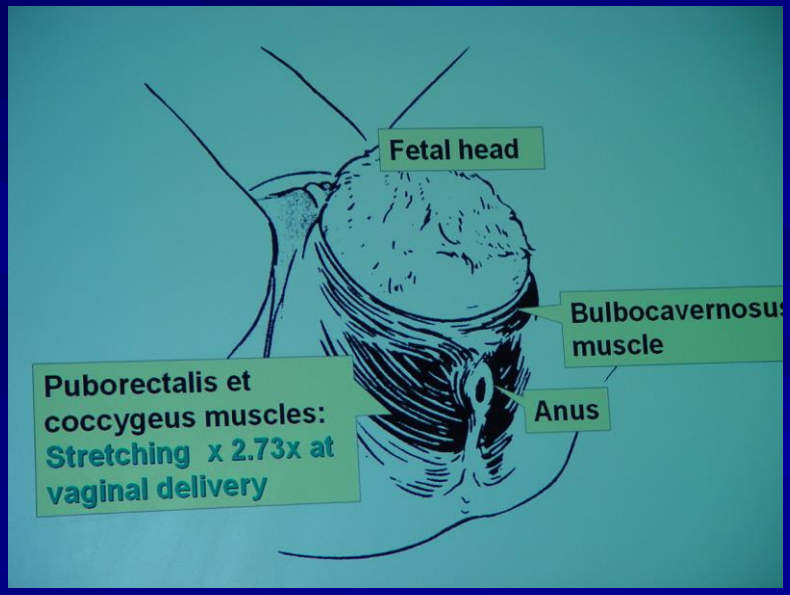
Internal anal sphincter

- Smooth muscle
- Autonomic - myenteric and gut wall plexuses
- Sympathetic contracts
- Contributes up to 70% of resting pressure
- Passive soiling and flatus incontinence



ANAL SPHINCTER INJURY AND FAECAL INCONTINENCE

The overall risk of obstetrics and anal sphincter injuries is 1% of all vaginal deliveries



Sultan AH, Kettle C. Diagnosis of perineal trauma. In: Sultan AH, Thakar R, Fenner D, editors. Perineal and anal sphincter trauma. London: Springer-Verlag: 2007. 13-9.

DELIVERY and its Effects on Pelvic Floor

Anatomic Lesions EVIDENT

Connective tissue, muscle and nerve damage

Functional Lesions UNCLEAR

Relationship of these lesions with UI, FI, PAIN

ANAL SPHINCTER INJURY AND FAECAL INCONTINENCE

- Belmonte- Montes 2001 13%
- Nazu et al 2003 19%
- Abramowitz et al 2000 26%
- Donnely et al 1999 35%
- Rieger et al 1998 41%
- Our results 42% (110/270)

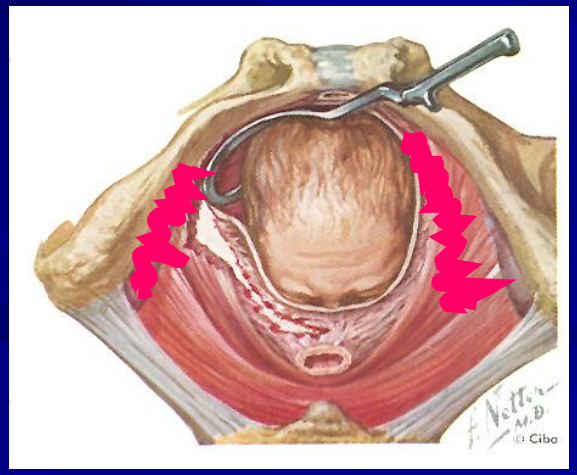
Alperin M, Krohn MA, Parviainen K. Episiotomy and increase in the risk of obstetric laceration in a subsequent vaginal delivery. Obstet Gynecol 2008; 111(6): 1264-5.

ANAL SPHINCTER INJURY AND FAECAL INCONTINENCE

Epidural analgesia: ↑ vacuum extraction
↑ forceps delivery

↑ RISK FOR PERINEAL TEAR

Robinson JN, Norwitz ER, Cohen AP, McElrath TF, Lieberman ES. Epidural analgesia and third- or fourth-degree lacerations in nulliparas. Obstet Gynecol 1999; 94 (2): 259-62.



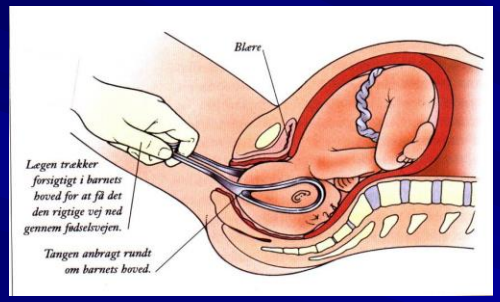
Departement of Obstetrics UCC Ljubljana
% of cesarean sections

- 1955 5.444 deliveries, 136 CS = 2.50 %
- 1965 7.495 deliveries, 371 CS = 4.95 %
- 1975 7.251 deliveries, 534 CS = 7.36 %
- 1985 6.897 deliveries, 520 CS = 7.54 %
- 1995 5.911 deliveries, 695 CS = 11.76 %
- 2005 5.501 deliveries, 866 CS = 15.74 %

ANAL SPHINCTER INJURY AND FAECAL INCONTINENCE

More IAS and EAS damages at primiparas with forceps delivery and vacuum extraction than at spontaneus vaginal delivery.

Belmonte-Montes C, Hagerman G, Vega-Yepez PA, Hernández-de-Anda E, Fonseca-Morales V. Anal sphincter injury after vaginal delivery in primiparous females. Dis Colon Rectum 2001; 44: 1244–8.



More pelvic floor dysfunction with forceps and vaccum delivery:
Urinary incontinence, fecal and anal incontinence, POP

MacLennan AH, Taylor AW, Wilson DH, Wilson D. The prevalence of pelvic floor disorders and their relationship to gender, age, parity and mode of delivery. BJOT 2000; 107: 1460–70.

ANAL SPHINCTER INJURY AND FAECAL INCONTINENCE

After first pregnancy:

Incidence of stress urinary incontinence ↑ 4 X

Nuliparous women: 10,9 %

After first delivery: 37,4 %

42% of women with occult sphincter damage reveal anal incontinence after second vaginal delivery.

MacLennan AH, Nicolson R, Green RC. Serum relaxin in pregnancy. Lancet 1986; 2: 241–3.

ANAL SPHINCTER INJURY AND FAECAL INCONTINENCE

Risk factors for pelvic floor damage at vaginal delivery

Fetal weight over 3500 g
Forceps delivery
Occipito-posterior presentation
Shoulder dystocia
Prolonged second stage of delivery
Median episiotomy
Previous anorectal surgery
Maternal age over 35 years at first delivery

Dannecker C, Anthuber C. The effects of childbirth on the pelvic floor. J Perinat Med 2000; 28: 175–84.

ANAL SPHINCTER INJURY AND FAECAL INCONTINENCE

Vaginal delivery:

Damage to IAS and EAS (fecal incontinence)
Damage to EAS (perineal tear 3rd and 4th degree)
Episiotomy
Inervation disruption

Boer K. Midline episiotomy and anal incontinence. BMJ 2000; 320: 1601–1.

ANAL SPHINCTER INJURY AND FAECAL INCONTINENCE

Damage of pelvic floor muscles: Muscle laceration
evident (perineal tear 3rd and 4th degree)
occult (36% primigravide at vaginal delivery)

Dietz HP, Lanzarone V. Levator trauma after vaginal delivery. Obstet Gynecol 2005; 106: 707-12.

Consequences:
reduced muscular strenght → fecal et anal incontinence

Symptoms become evident with age and postmenopausis

ThakarR. Childbirth and fecal incontinence. Urogynecology: from science to practice.International Urogynecological Association - IUGA, 2008.

ANAL SPHINCTER INJURY AND FAECAL INCONTINENCE

EPISIOTOMY

WHO estimation: in 10% of vaginal delivery there is indication

SLOVENIA: 54% !!!!!

INDICATIONS:

- fetal distress
- high, not elastic perineum
- fetal position
- disproportion between fetal weight and maternal constitution
- instrumental delivery

Mediolateral or midline episiotomy ???

Midline episiotomy:

- Less bleeding
- easier reconstruction
- better healing
- less pain
- but 6X ↑ possibility to be prolonged to perineal tear 3rd or 4th degree

Sultan AH, Thakar R. Third and fourth degree tears. In: Sultan AH, Thakar R, Fenner D, eds. Perineal and anal sphincter trauma. London: Springer-Verlag; 2007; 33-51.

Pros Episiotomy

Avoids

Spontaneous uncontrolled tears and
long term relaxation of the pelvic floor

But
These advantages are difficult to substantiate

No Benefits from Episiotomy

Maternal postpartum Outcome
Perineal Outcome
Healing Outcomes
Incision type
Urinary and Fecal Incontinence, Pelvic Floor defects
Sexual Function

Agency for Healthcare Research and Quality –
Evidence Report/Technology Assessment n. 12
The Use of Episiotomy in Obstetrical Care: A Systematic Review 2007

Outcomes of Routine Episiotomy: A Systematic Review
JAMA, May 4, 2005—Vol 293, No. 17 **2141**

Pelvic Floor Dysfunctions & Episiotomy

ACOG GUIDELINES
Evidence Based Medicine

Level A

Restrictive episiotomy is better than routinary

Mediolateral episiotomy is better than midline

M
i
d
l

Obstet. & Gynecol. 107: 957-961 (2006)

Pelvic Floor Dysfunctions & Episiotomy

ICI 2009

Evidence Based Medicine

LEVEL 1

Mediolateral episiotomy is associated with a lower risk of anal sphincter rupture (12% vs 2%) than midline episiotomy

Liberal use of episiotomy is not beneficial

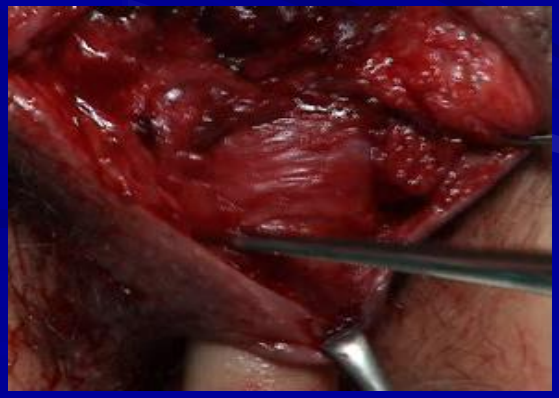
LEVEL 4

Restricting the rate of episiotomy to about 30% may reduce
the risk of trauma to the anal sphincter

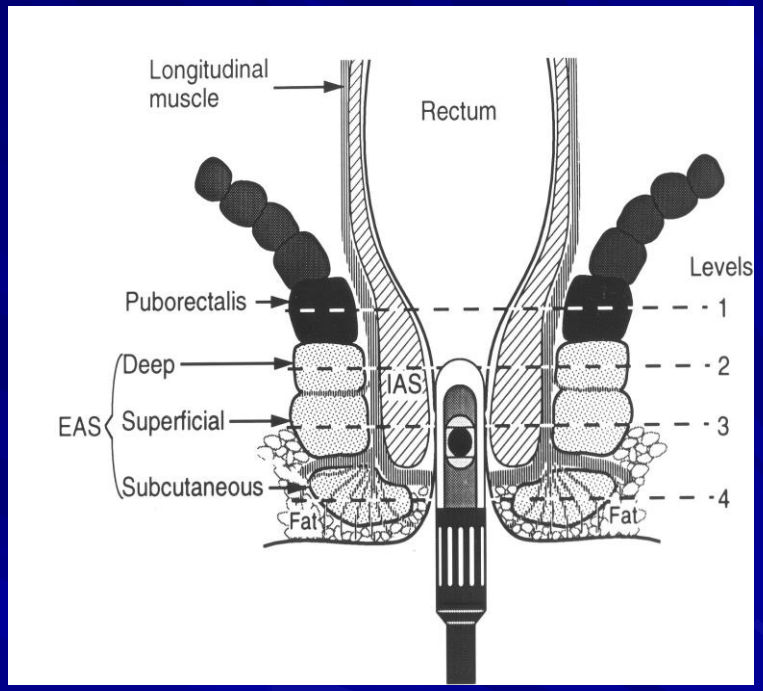
ICI, Paris 2009

DIAGNOSTIC EVALUATION

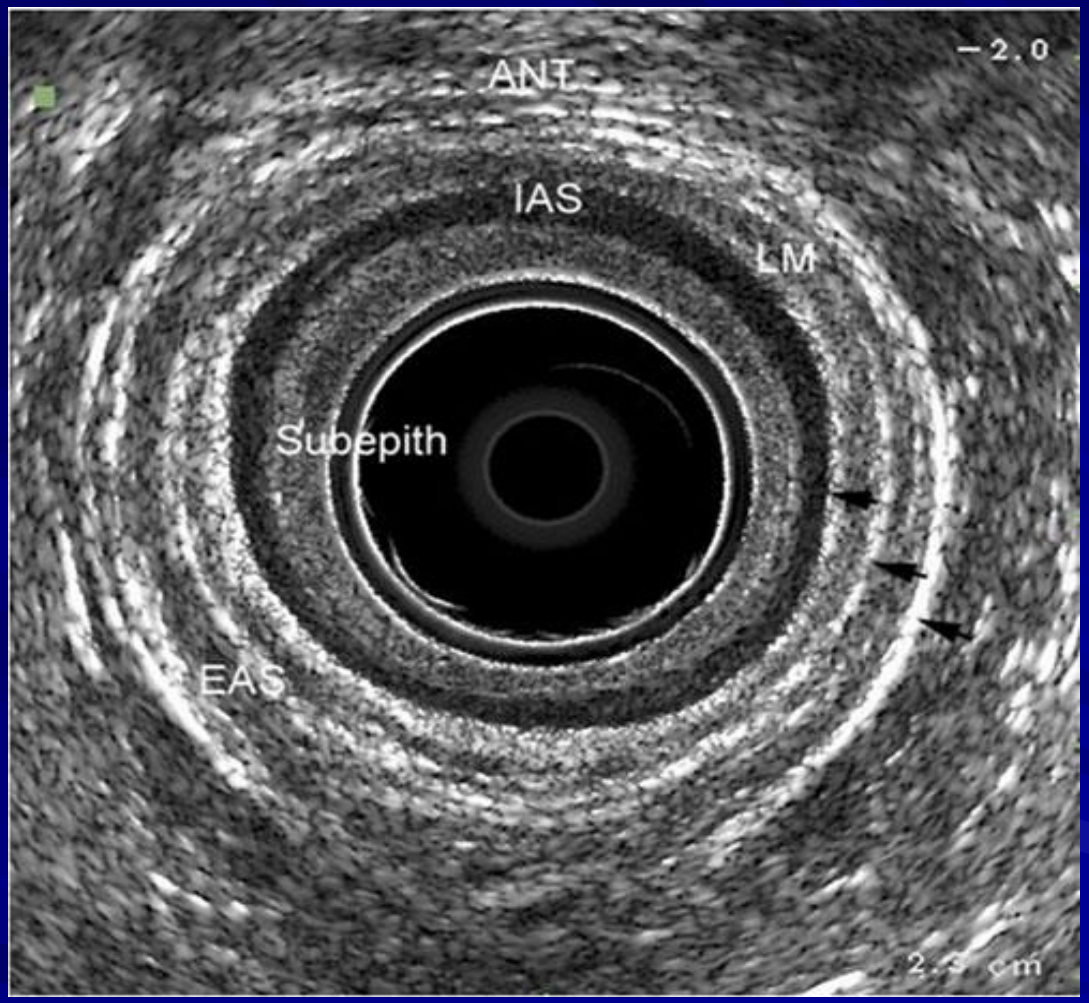
- Anamnesis
- Clinical inspection: rectal!
- Anorectal manometry
- Endoanal ultrasonography



Anal Endosonography



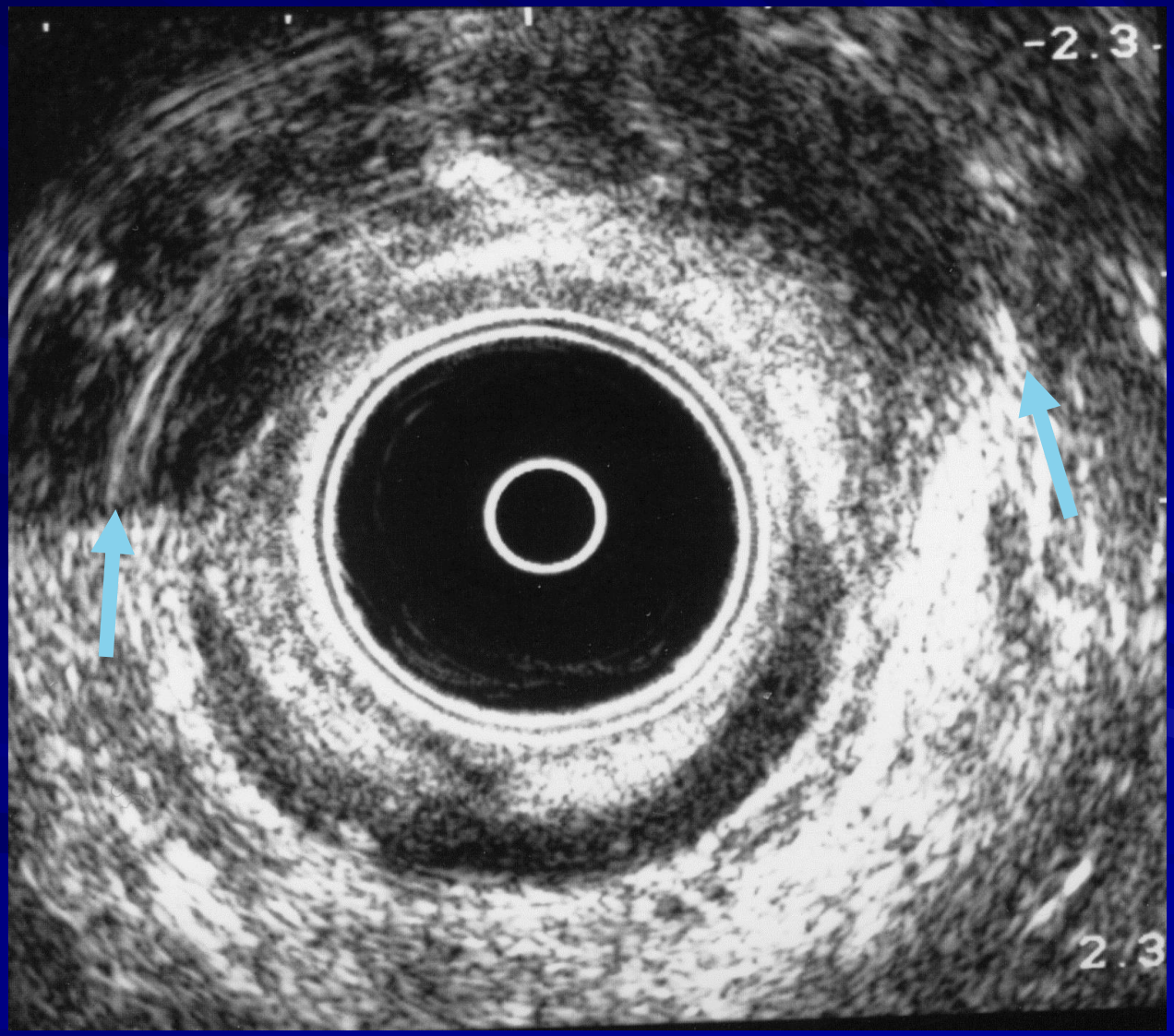
Anal sphincter imaging

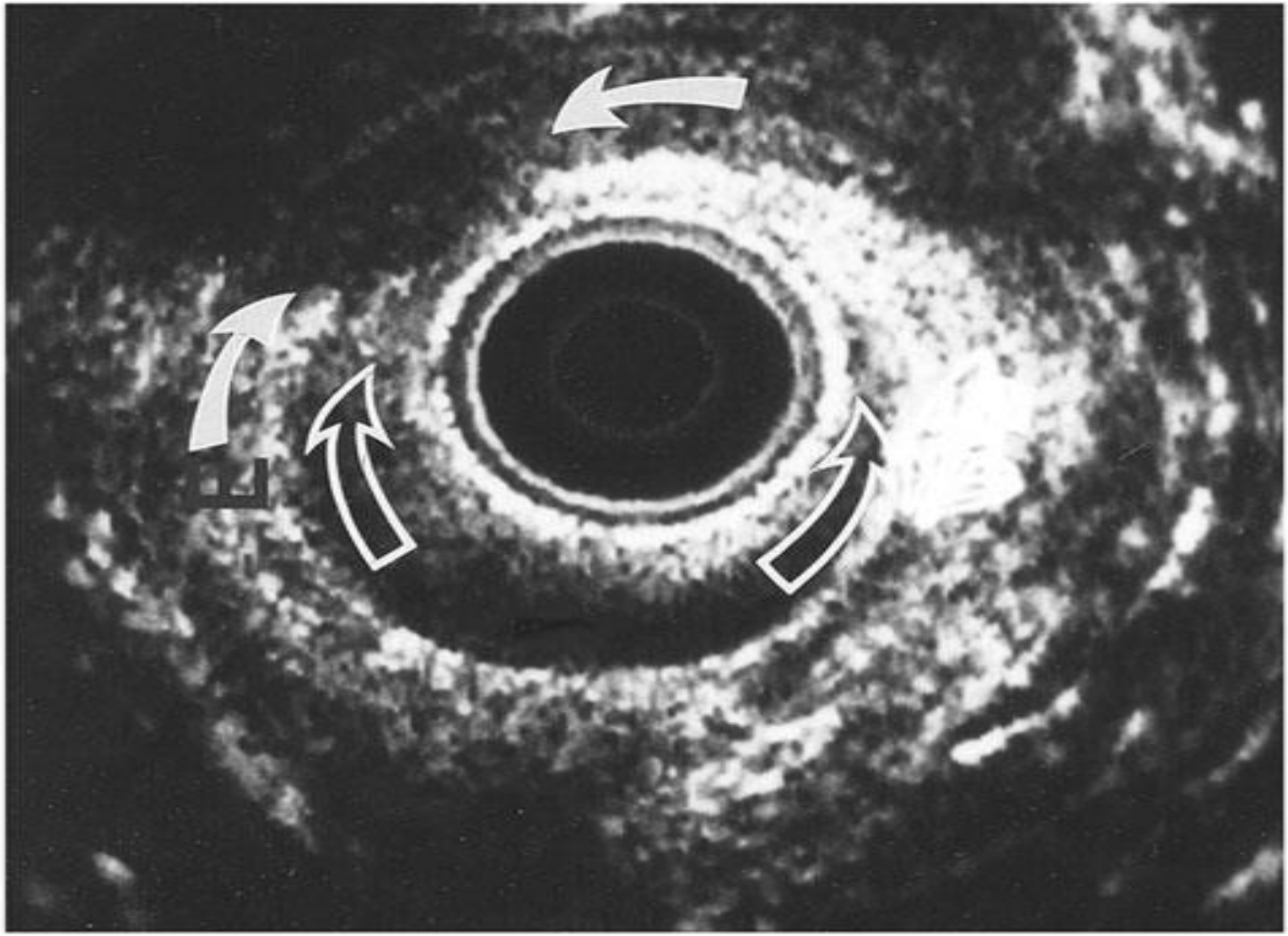


IAS: hypo-echoic circle

EAS: hyper-echoic circle

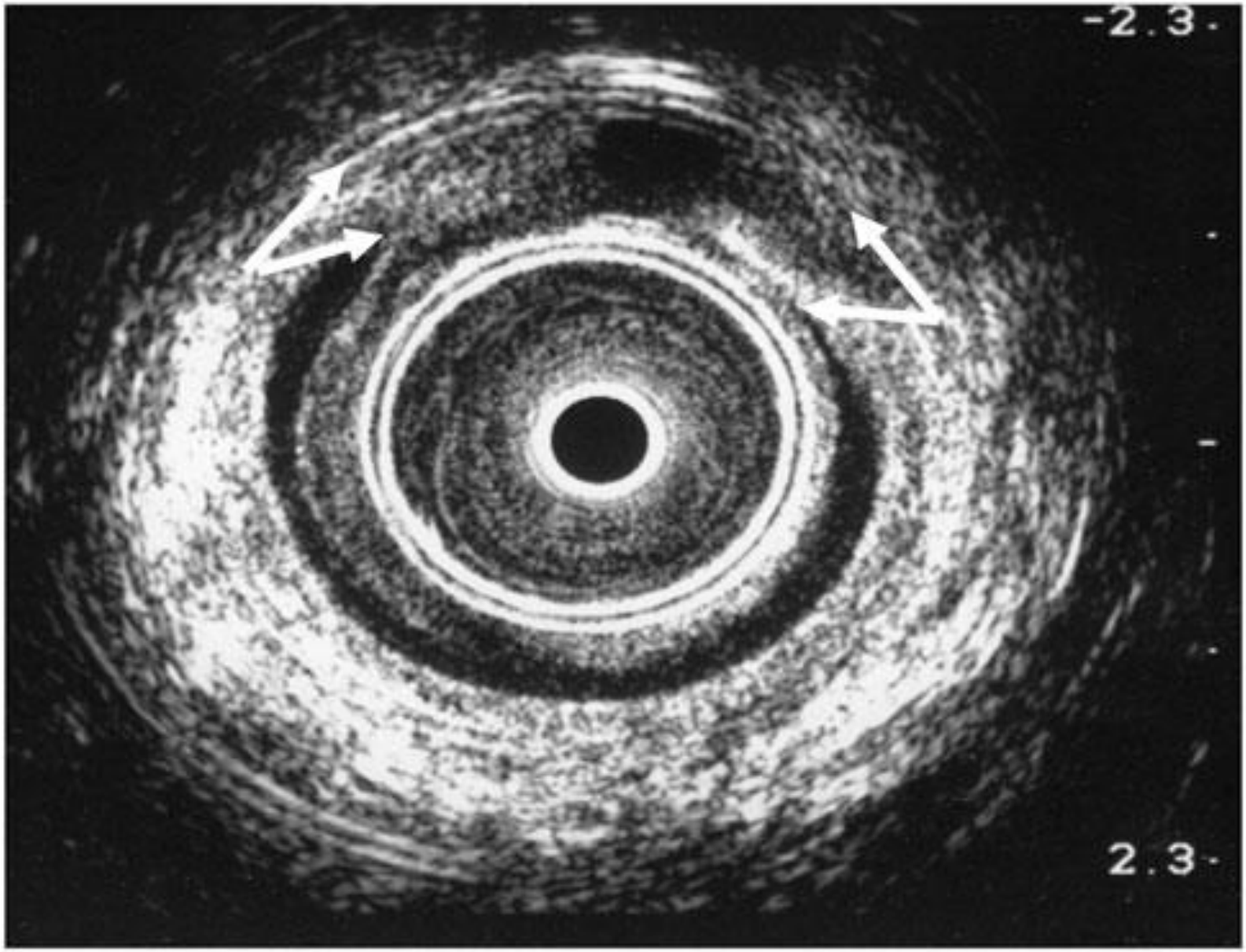
Damaged EAS & IAS



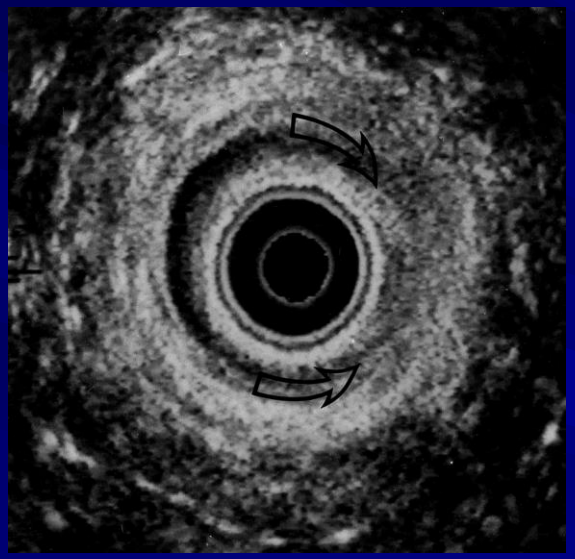


Internal anal sphincter defect between white arrows
External anal sphincter defect between open arrows

Combined external and internal sphincter defects



Damaged IAS



14h-16h

Anal Incontinence

Wide spectrum of symptoms

- Urgency
- Urge incontinence
- Flatus incontinence
- Soiling or staining
- Incontinence to liquid stool
- Incontinence to solid stool

Definitions

- Faecal incontinence:

  Involuntary loss of liquid or solid stool that is a social or hygienic problem

- Anal incontinence:

  Involuntary loss of flatus, liquid or solid stool that is a social or hygienic problem

- *Faecal urgency & anal mucoid seepage are not included*

ICI 2005

Classification of 3rd / 4th degree tears

Sultan AH, Clinical Risk 1999;5:193-6
RCOG GreenTop Guidelines 2001
International Consultation on Incontinence 2002
NICE 2007

1st degree = vaginal epithelium

+

2nd degree = perineal muscles

+

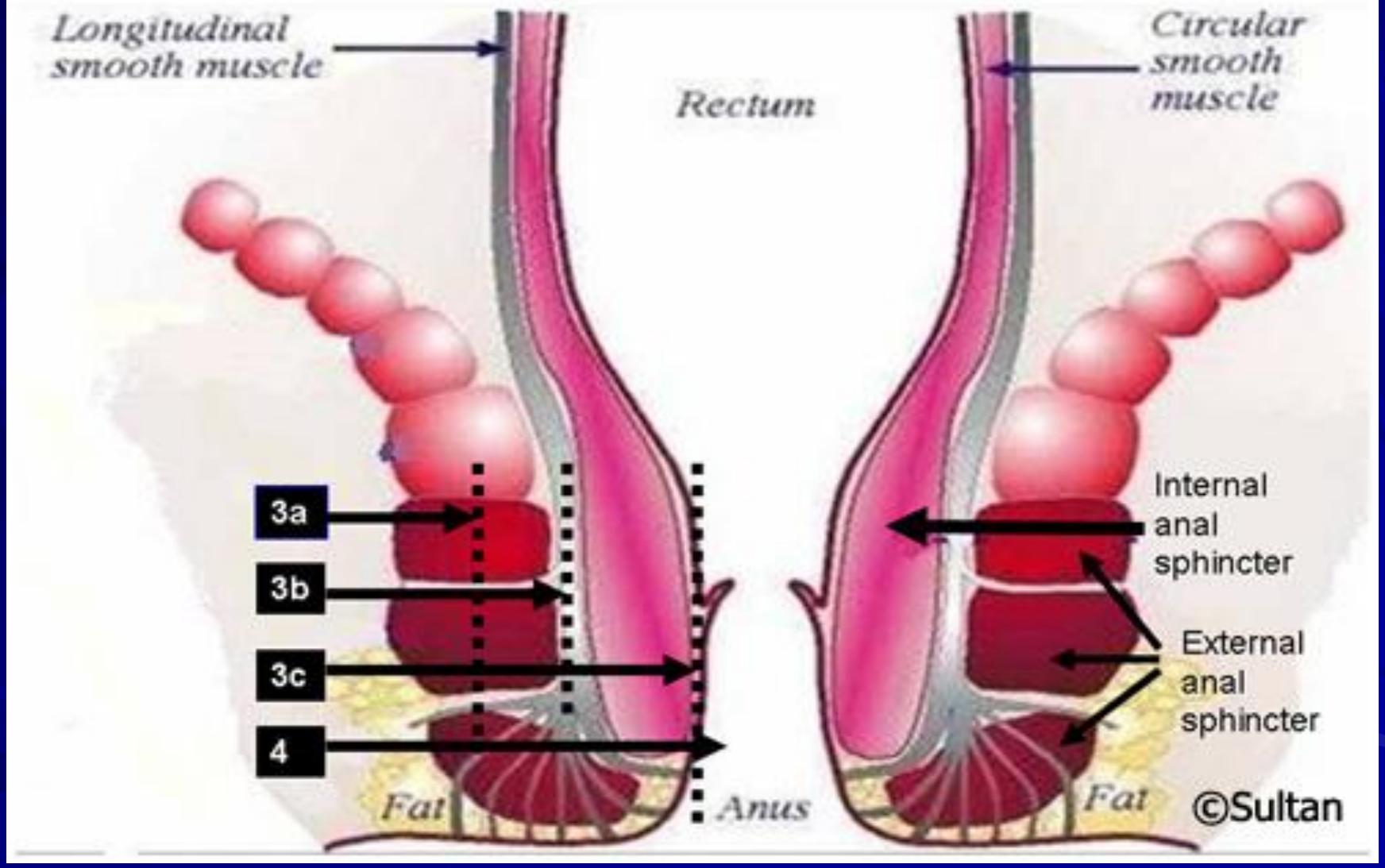
3rd degree = anal sphincter

- 3a = <50% external sphincter thickness
- 3b = > 50% external sphincter thickness
- 3c = internal sphincter torn

+

4th degree = anal epithelium torn

Classification of 3rd / 4th degree tears



EUROPEAN PERINATAL HEALTH REPORT

better statistics for better health for pregnant women and their babies

Executive Agency for Health and Consumers

Directorate-General for Health & Consumers

EURO Peristat

SCPE Surveillance of Cerebral Palsy in Europe

Eurocat European Surveillance of Congenital Anomalies

EuroNeoNet

Figure 5.1 Percentage of births by mode of delivery in 2010

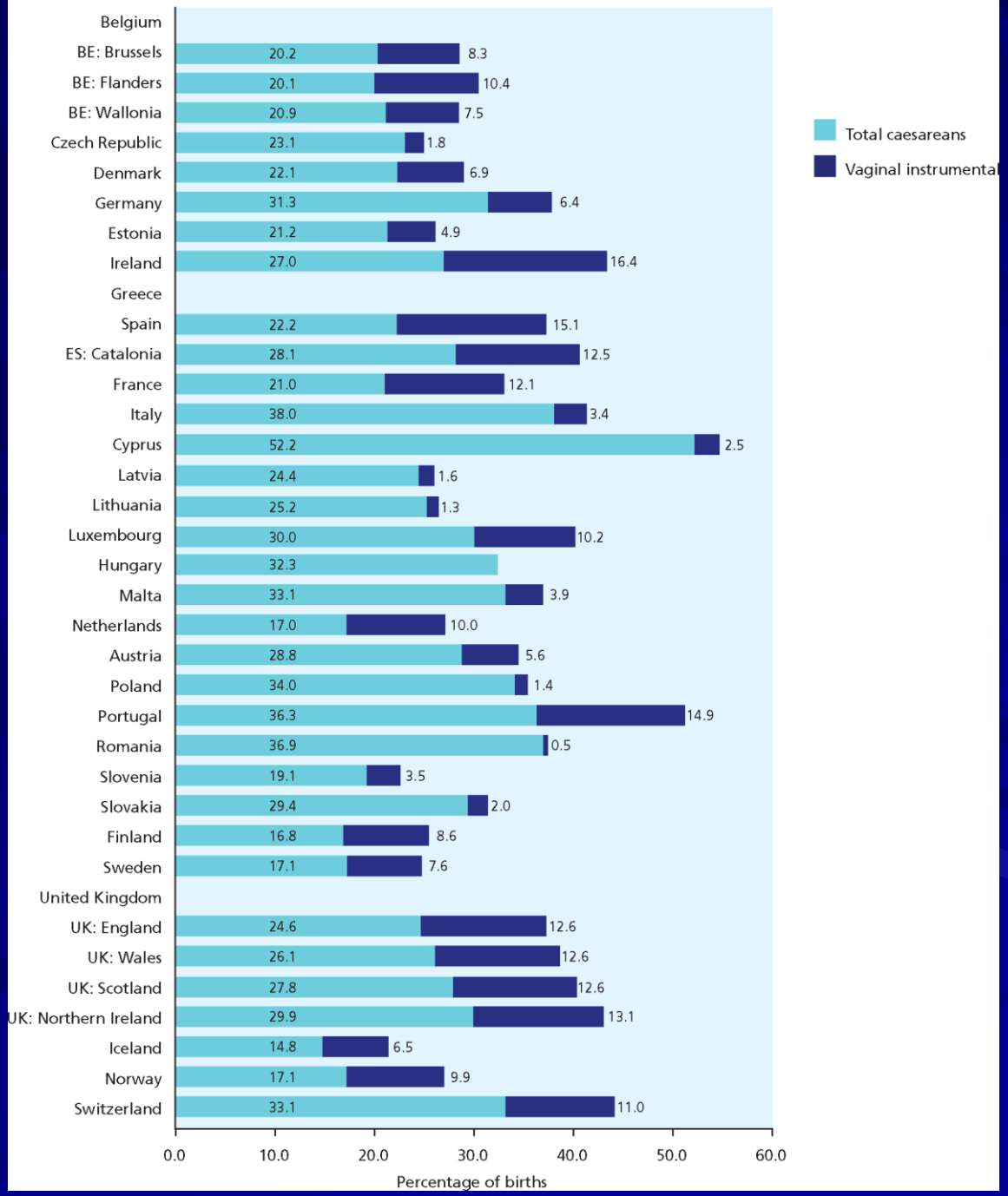


Figure 5.2 Percentage of births by type of caesarean section in 2010

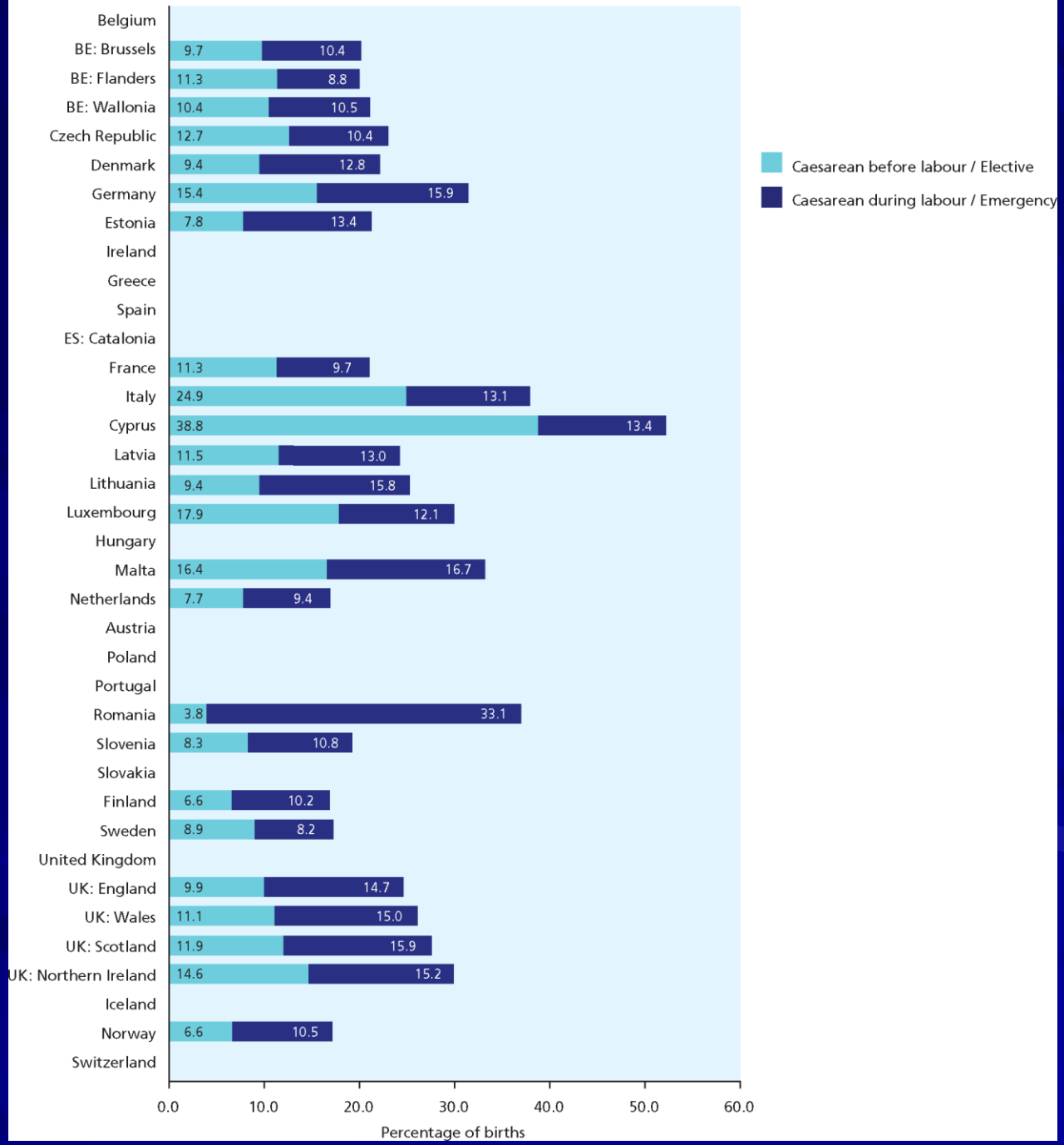


Figure 5.10 Percentage of women who had episiotomies among women with vaginal deliveries in 2010

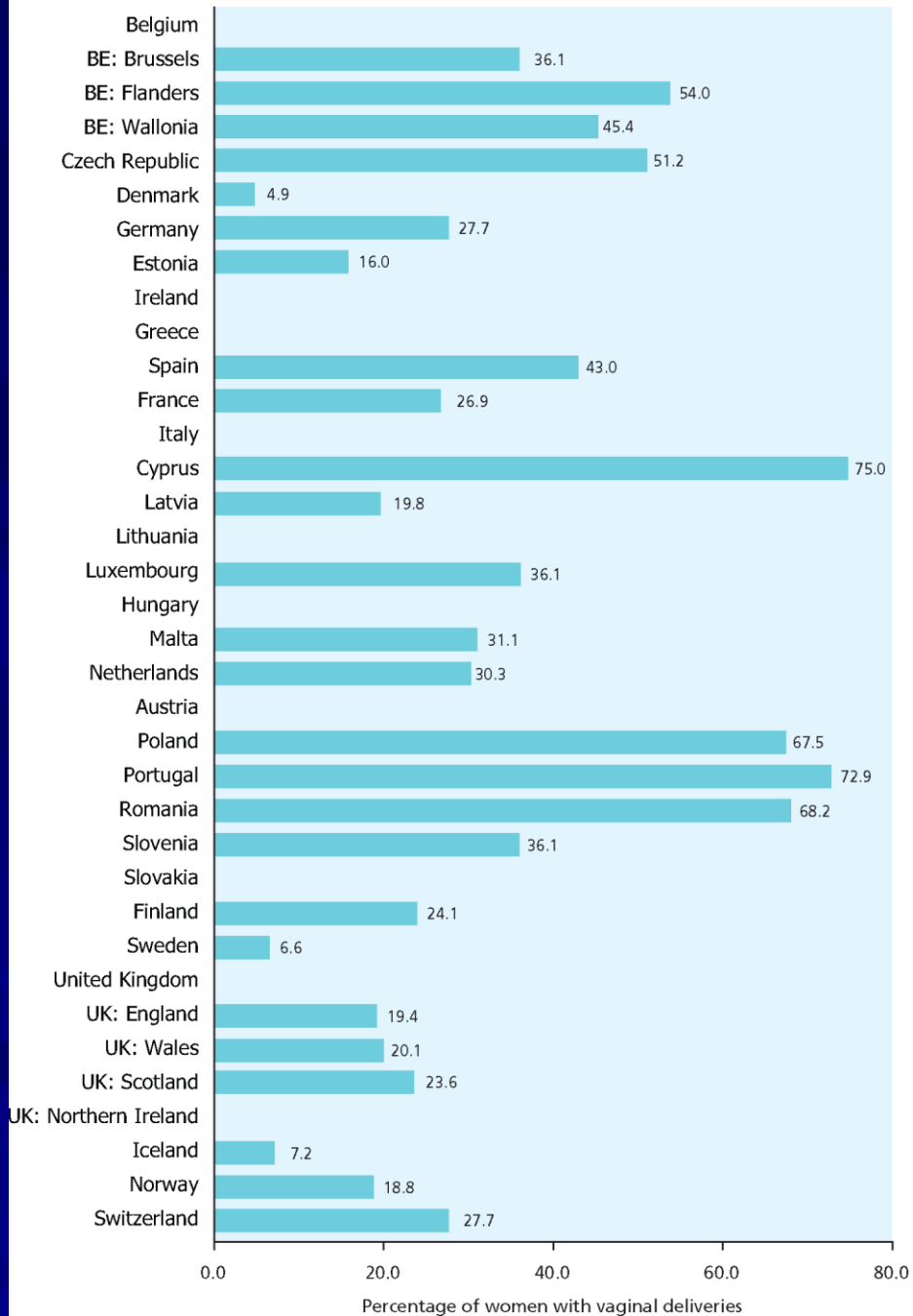
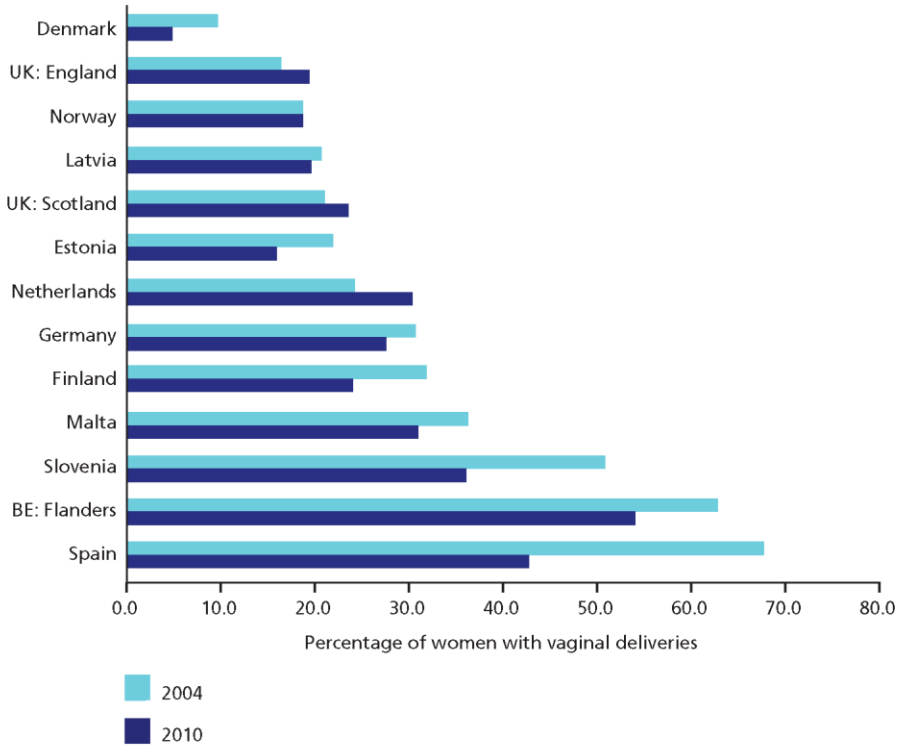
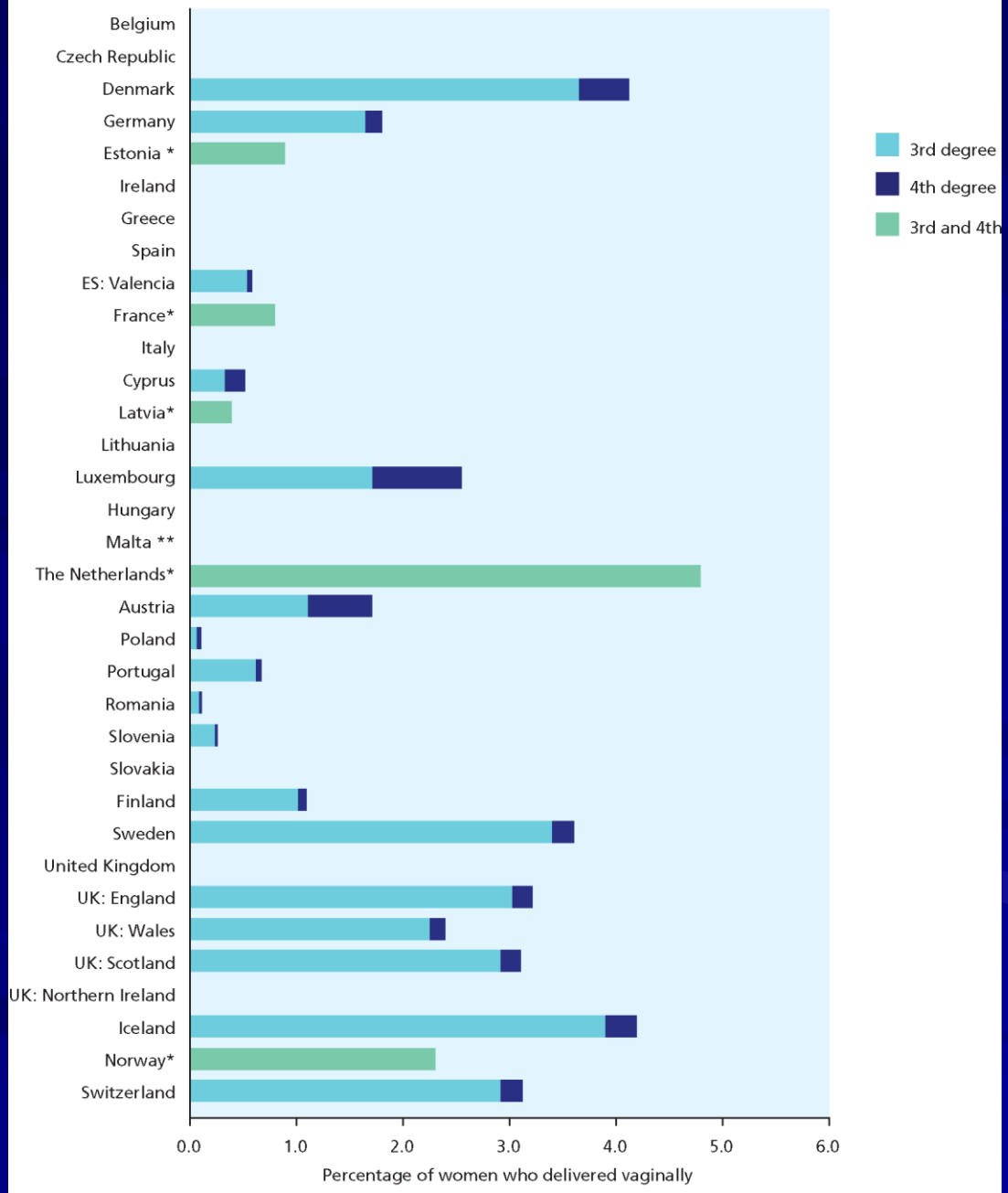


Figure 5.11 Episiotomy rates in 2004 and changes between 2010 and 2004 among women with vaginal deliveries

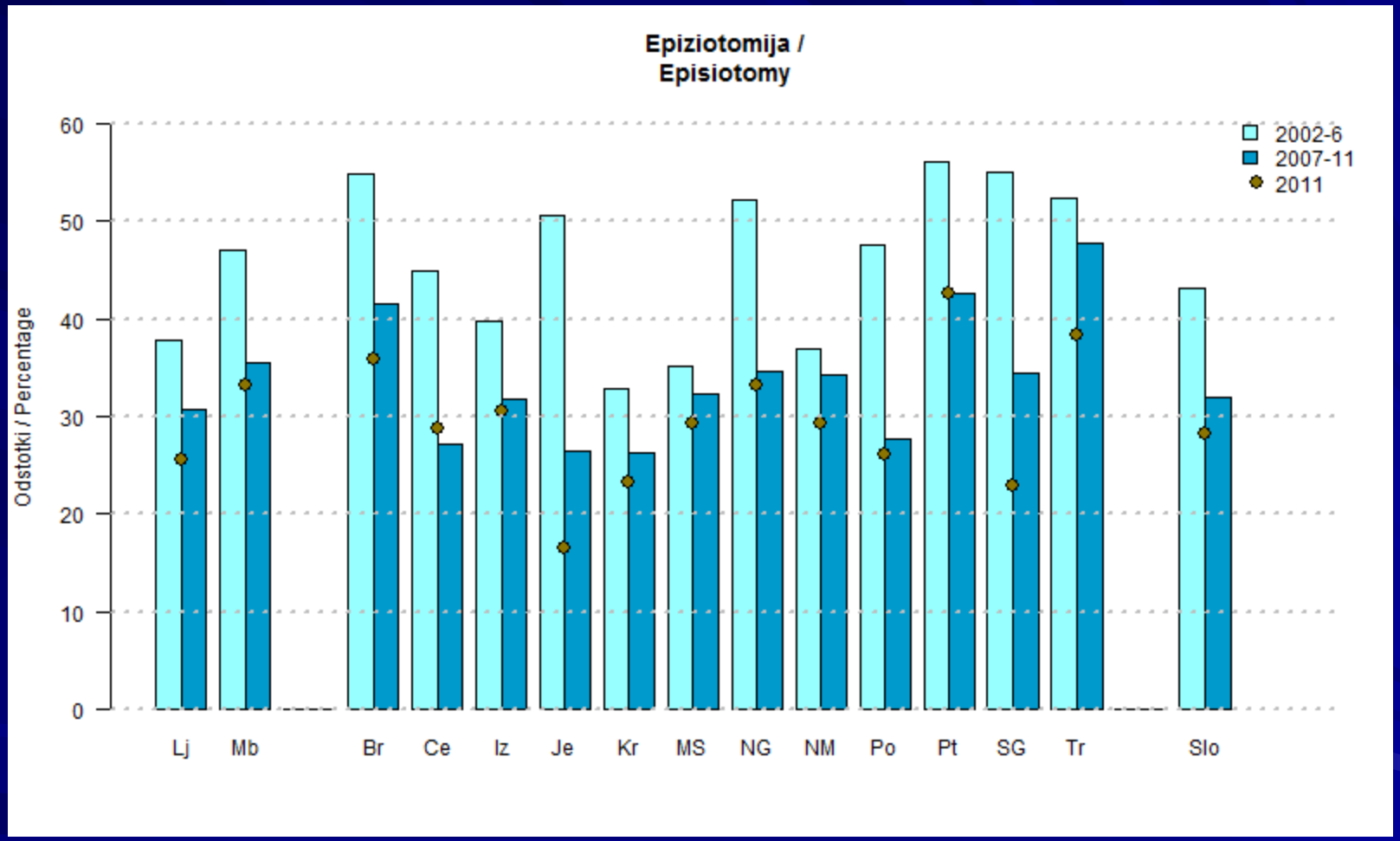


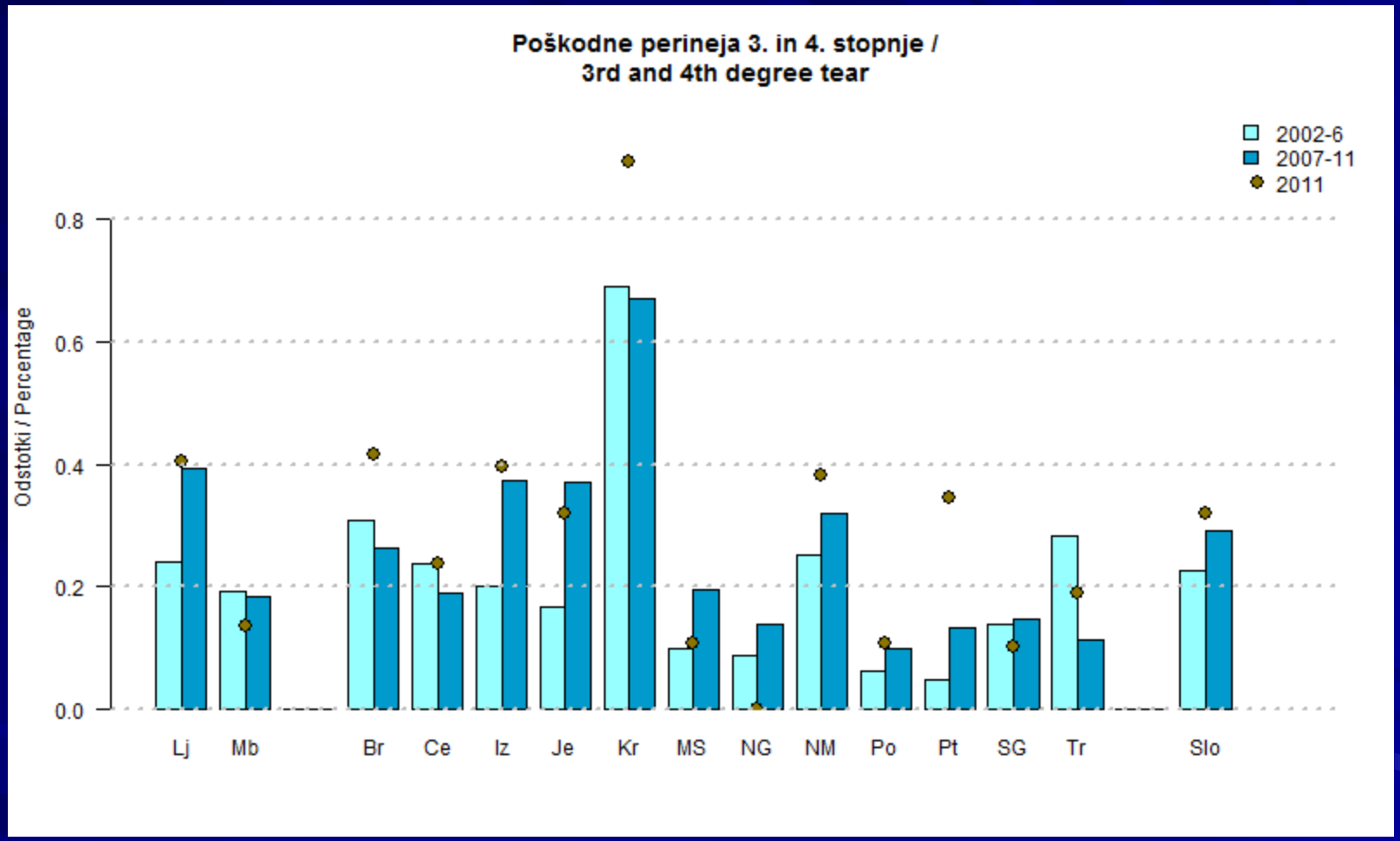
NOTE: Countries ordered by ascending episiotomy rates in 2004.

Figure 6.6 Incidence of third- and fourth-degree tears to the perineum in 2010



NOTE: * data for 3rd and 4th degree tears combined; ** only data for all tears


Epiziotomija /
Episiotomy
Odstotki / Percentage
0
10
20
30
40
50
60
2002-6
2007-11
2011
Lj
Mb
Br
Ce
Iz
Je
Kr
MS
NG
NM
Po
Pt
SG
Tr
Slo


Poškodne perineja 3. in 4. stopnje /
3rd and 4th degree tear
2002-6
2007-11
2011
Odstotki / Percentage
0.0
0.2
0.4
0.6
0.8
Lj
Mb
Br
Ce
Iz
Je
Kr
MS
NG
NM
Po
Pt
SG
Tr
Slo

Anal sphincter trauma

deLeeuw JW et al 2001

3rd /4th degree tears

FU = 14years

	Faecal Incontinence
Grade IIIa	21%
Grade IIIb	31%
Grade IV	64%

Anal sphincter disruption during vaginal delivery

Sultan AH et al 1993 (N Engl J Med)

Primiparae

- 33% occult anal sphincter injuries
- 13% developed new defaecatory symptoms
- 5% developed anal incontinence
- Forceps was an independent risk factor

"Occult" anal sphincter injury - *prospective studies in primiparae before and after childbirth*

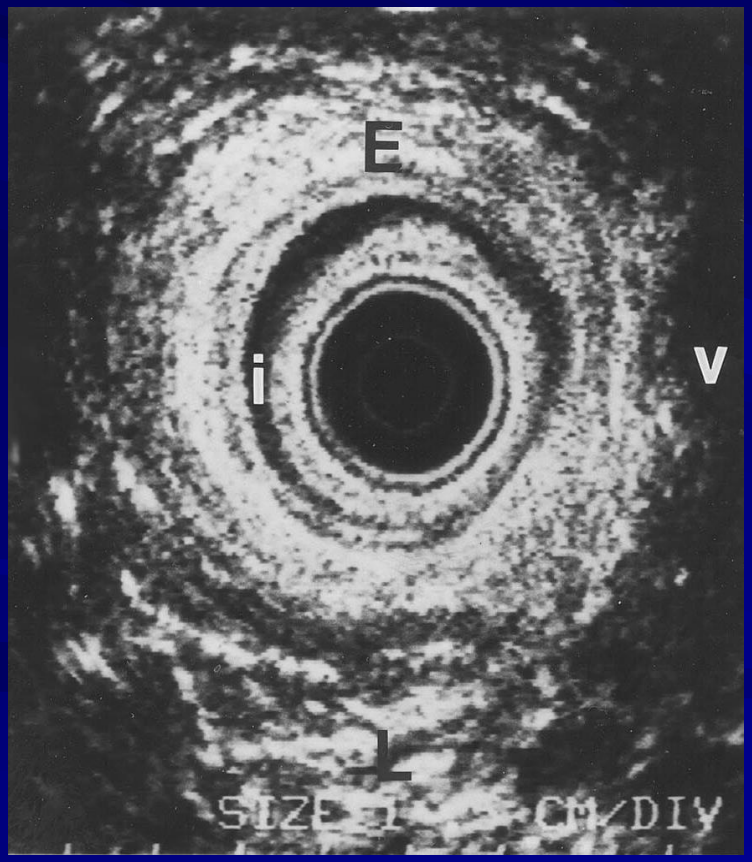
Belmonte-Montes et al 2001	13%
Nazir et al 2002	19%
Willis et al 2002	19%
Zetterstrom et al 1999	20%
Abramowitz et al 2000	26%
Faltin et al 2000	28%
Sultan et al 1993	33%
Donnelly et al 1998	35%
Chaliha et al 2001	38%
Rieger et al 1998	41%
Our results 2009	43%

Mean 27%

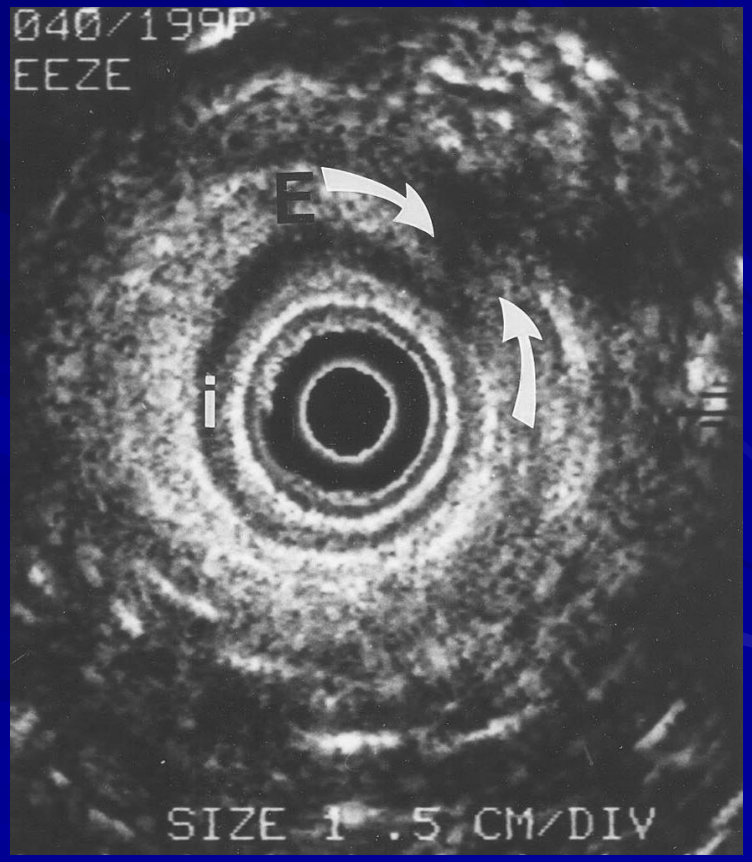
Occult external anal sphincter defect

Sultan AH et al (NEJM) 1993

Antenatal



Postnatal



Unrecognised anal sphincter INJURY

Occult ???

Ultrasound

Under-reported ???

- Misclassified
- Ignorance

How do you classify a third degree tear?

Fernando R et al 2002

	Trainees (n=148)	Consultants (n= 672)
EAS partially torn	22%	33%
EAS completely torn	7%	13%
IAS exposed	23%	29%

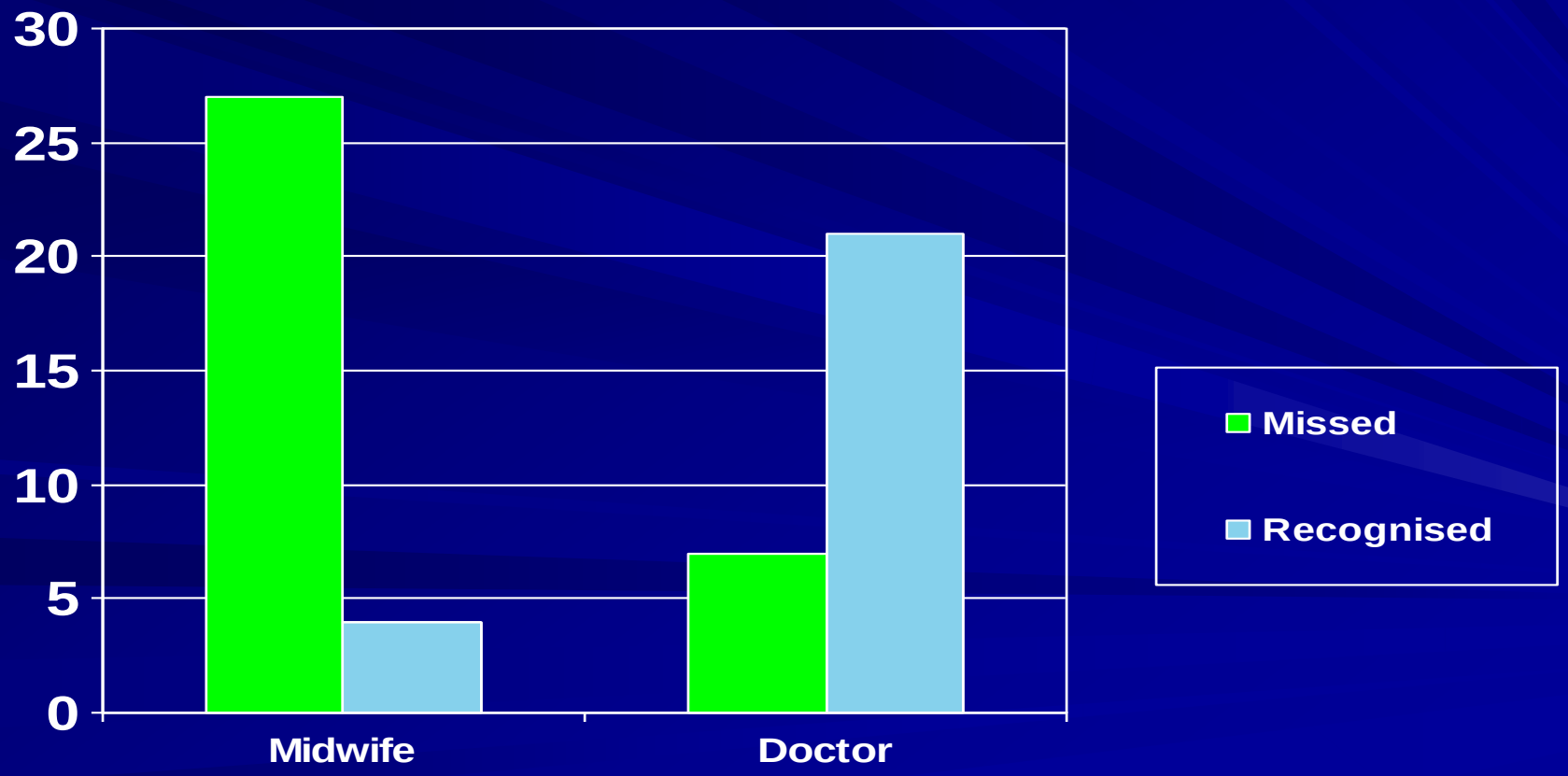
Wrongly classified as a second degree tear

Sultan AH, Thakar R. Third and fourth degree tears. In: Sultan AH, Thakar R, Fenner D, eds. Perineal and anal sphincter trauma. London: Springer-Verlag; 2007; 33-51.

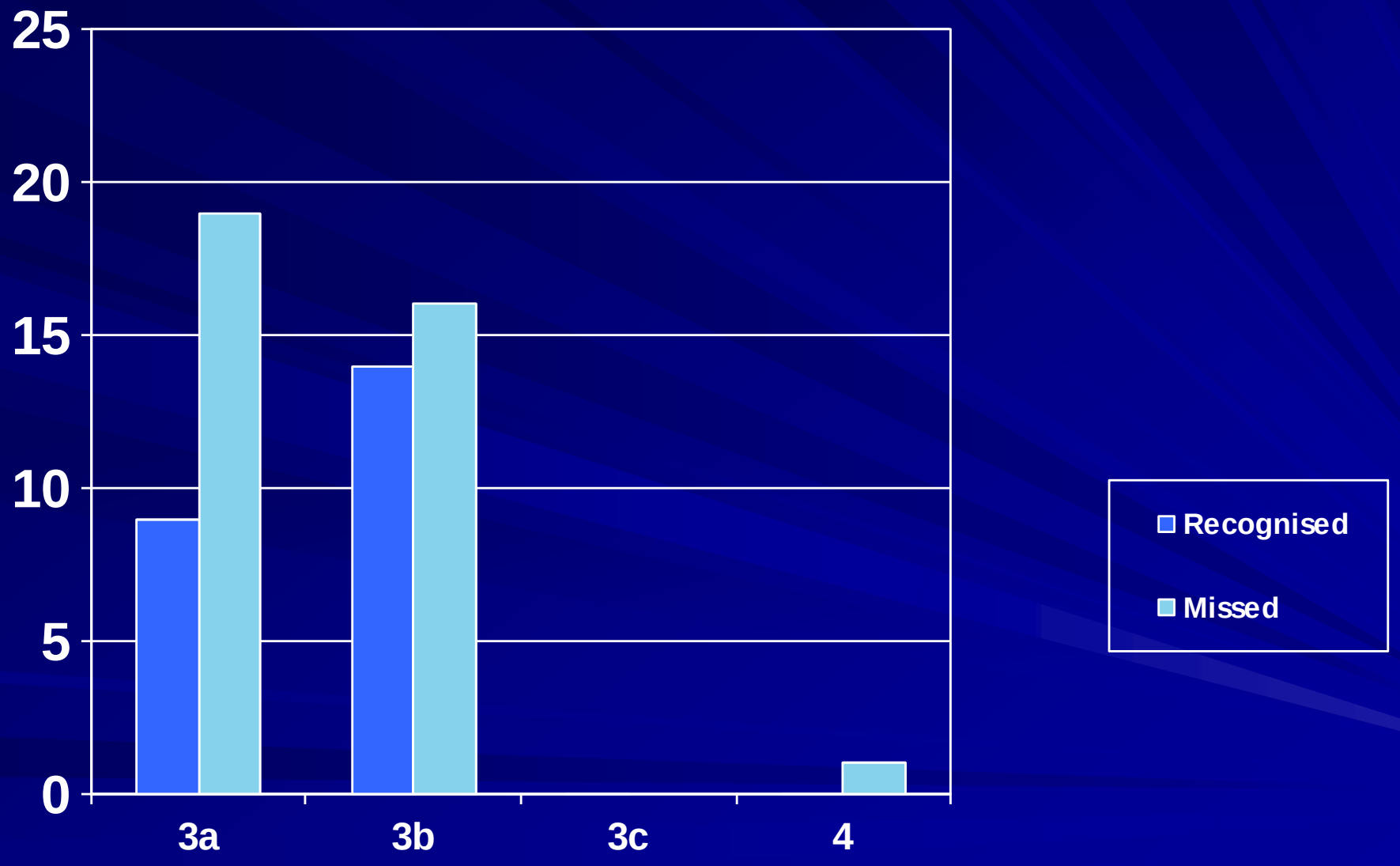
Recognisable anal sphincter injuries N=59 (25%)

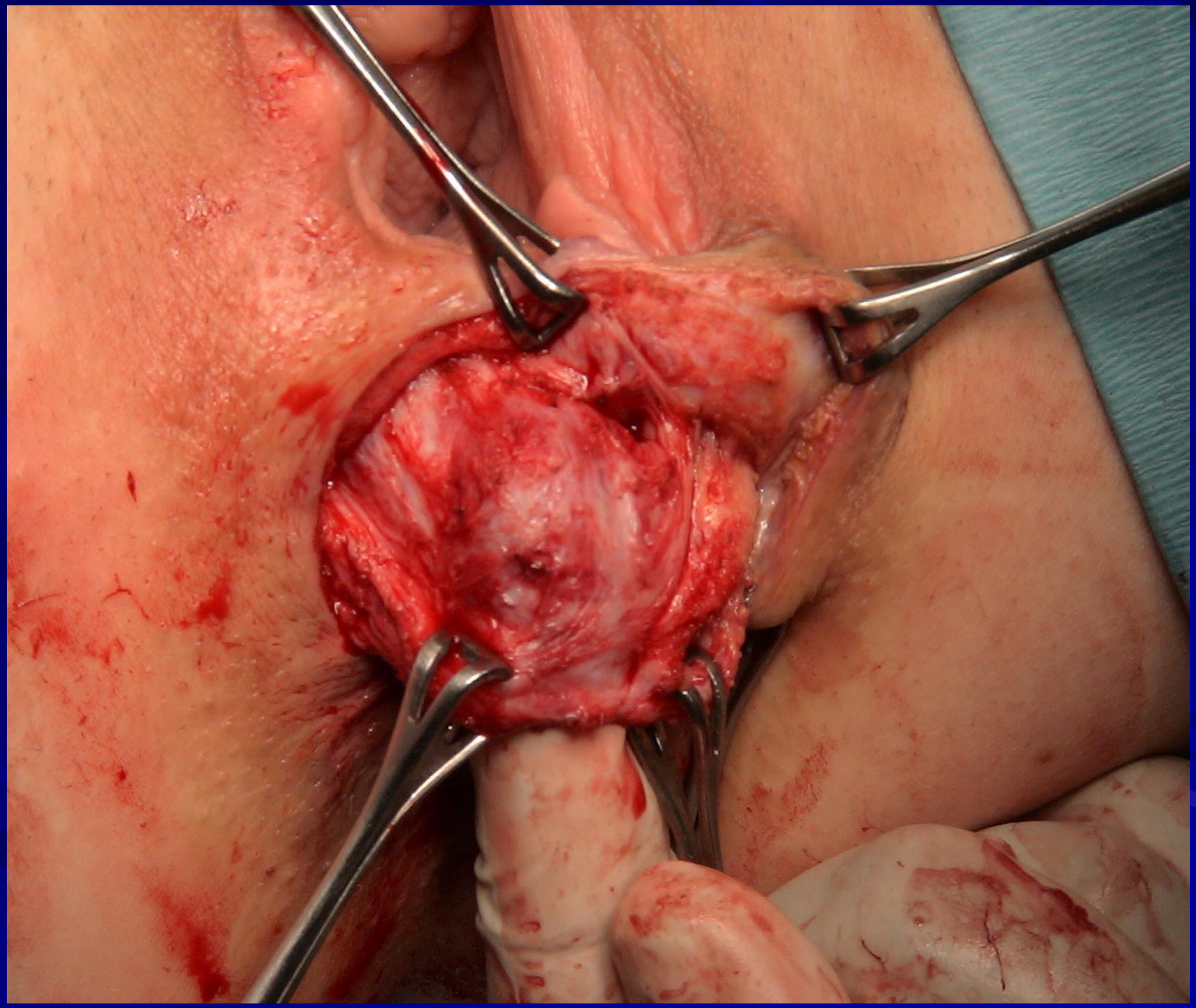
87% missed by midwife

25% missed by doctor

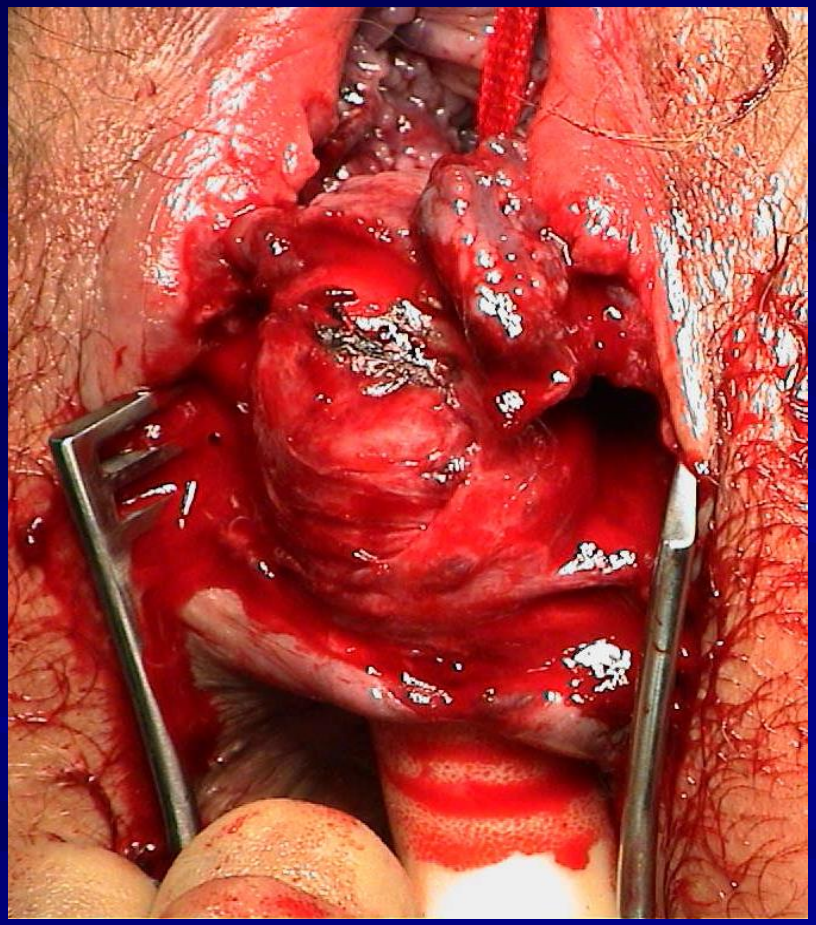


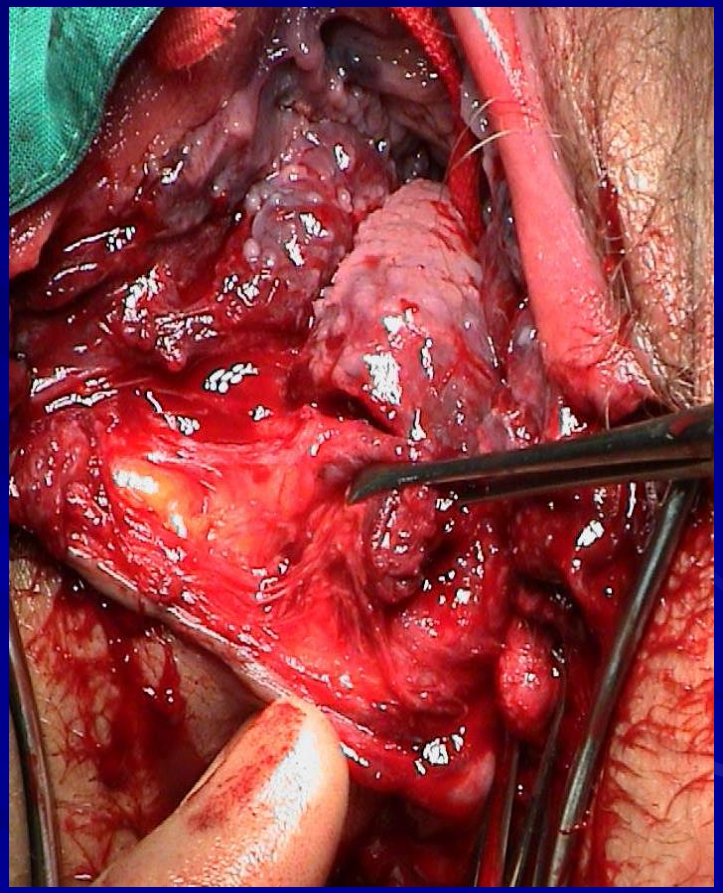
Grade of anal sphincter injury





Identify the EAS





ANAL SPHINCTER INJURY AND FAECAL INCONTINENCE

DAMAGE TO IAS AND EAS INERVATION

75% of women suffering of FI has histologically proved denervation during labour.

80% of primiparas has partial denervation of IAS and EAS which later spontaneusly improove.

Allen RE, Hosker GL, Smith ARB, Warrell DW. Pelvic floor damage and childbirth: a neurophysiological study. Br J Obstet Gynaecol 1990; 97: 770–9.

Gilpin SA, Gosling JA, Smith ARB, Warrell DW. The pathogenesis of genitourinary prolapse and stress incontinence of urine: a histological and histocemical study. Br J Obstet Gynaecol 1989; 96: 15–23.

LISiN

LABORATORIO DI INGEGNERIA DEL SISTEMA NEUROMUSCOLARE

LABORATORY FOR ENGINEERING OF THE NEUROMUSCULAR SYSTEM

POLITECNICO DI TORINO

Via Cavalli 22/H
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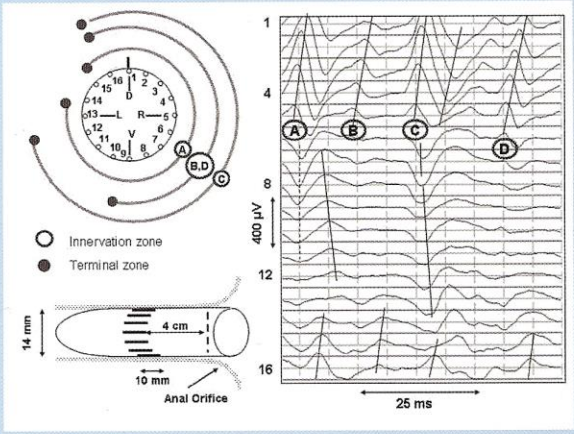
Three prototypes of external anal sphincter probes: with one array of 16 contacts, with three arrays of 16 contacts each, with one array and a pressure sensor. Diameter is 14 mm. Patents pending.



Anatomy of the motor units of an external anal sphincter (EAS). The location of the innervations zone of individual motor units can be identified with the cylindrical electrode array. In this case the identified motor unit are all innervated under electrode pairs 5-6, in the ventral-right area. A lesion in this area may cause significant denervation of the EAS.

COREP

COLLABORATIVE AGREEMENT

within the Project "Technologies for Anal Sphincter analysis and Incontinence (TASI-2)"

By and between

COREP-LISiN
Corso Duca degli Abruzzi, 24
10129 Torino, Italy
Hereinafter referred to as "**LISiN**"

and

University Medical Centre Ljubljana
Šlajmerjeva 3 in Zaloška 7, Ljubljana
Slovenia
Hereinafter referred to as "**University Medical Centre Ljubljana**"

Granted that:

a) LISiN has research funds available for the Project TASI-2 whose object is the study of the child delivery effects on the external anal sphincter (EAS);

b) LISiN's activities are funded by public/private, national/international institutions and agencies of great reputation and prestige; and such activities are financially managed by the Consorzio per la Ricerca e l'Educazione Permanente (COREP) at the Politecnico di Torino;

c) five Clinical Partners (Hospitals of Cagliari, Cantù, Ferrara, Hildesheim, Ljubljana) have been identified and are interested in carrying out the research which will last one year (October 2009-October 2010, with a probable extension to December 2010);

d) the Partners attended the Kick-off Meeting which took place in Torino on 17th October 2009; they are interested in participating in this project and gave their approval to draw up the following agreement;

e) two additional Clinical Partners (Hospitals of Berlin and Riga) were identified during the second meeting held in Ljubljana on 26th November 2009, while the Hospital of Ferrara left the Project.

LIST OF TASI-2 PARTNERS

Coordinator

- Roberto Merletti — LISiN, COREP

Clinical Partners :

- Wolfgang Kauffels — Frauenklinik Klinikum Hildesheim
- Adolf Lukanovic — University Medical Centre Ljubljana
- Anna Maria Paoletti — University of Cagliari
- Diego Riva — Ospedale S. Anna Como, presidio Cantù
- Kaven Baessler — Charité Hospital Berlin
- Vita Zacesta — Riga Maternity Hospital

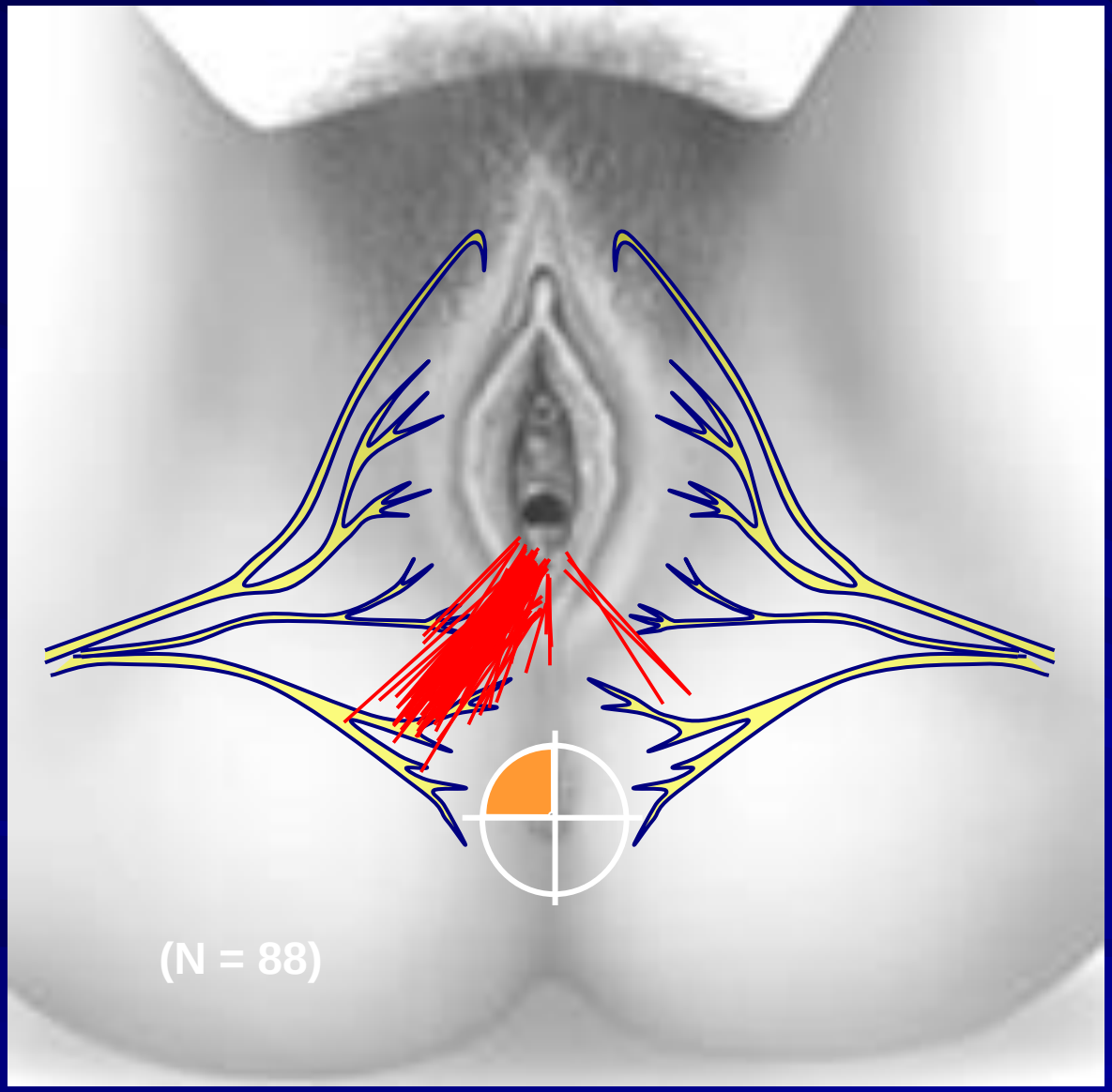
TASI-2 partners

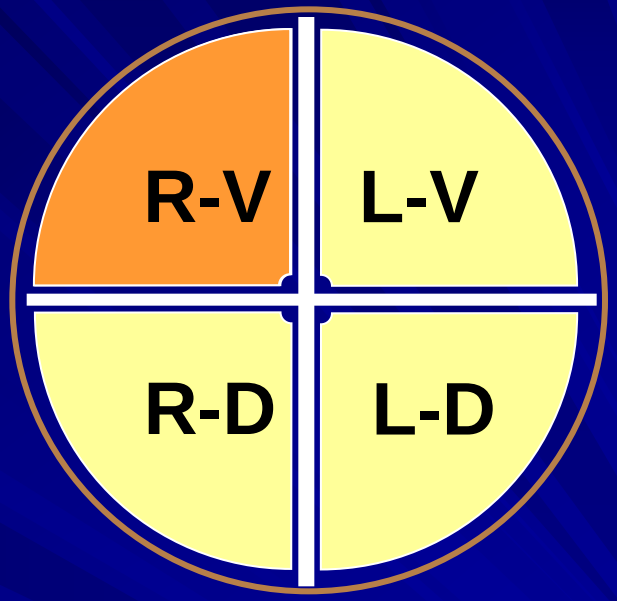
Probe with one circular electrode array for clinical use.

Probe with a 2D electrode grid with 16x7 electrodes providing ann image of EMG activity in the anal canal.

Disposable prototipes of intra-anal probes for the investigation of the innervation zones of the EAS for planning of episiotomy and prevention of child delivery related lesions.
Diameter =14 mm, 16 electrodes

Location of episiotomies





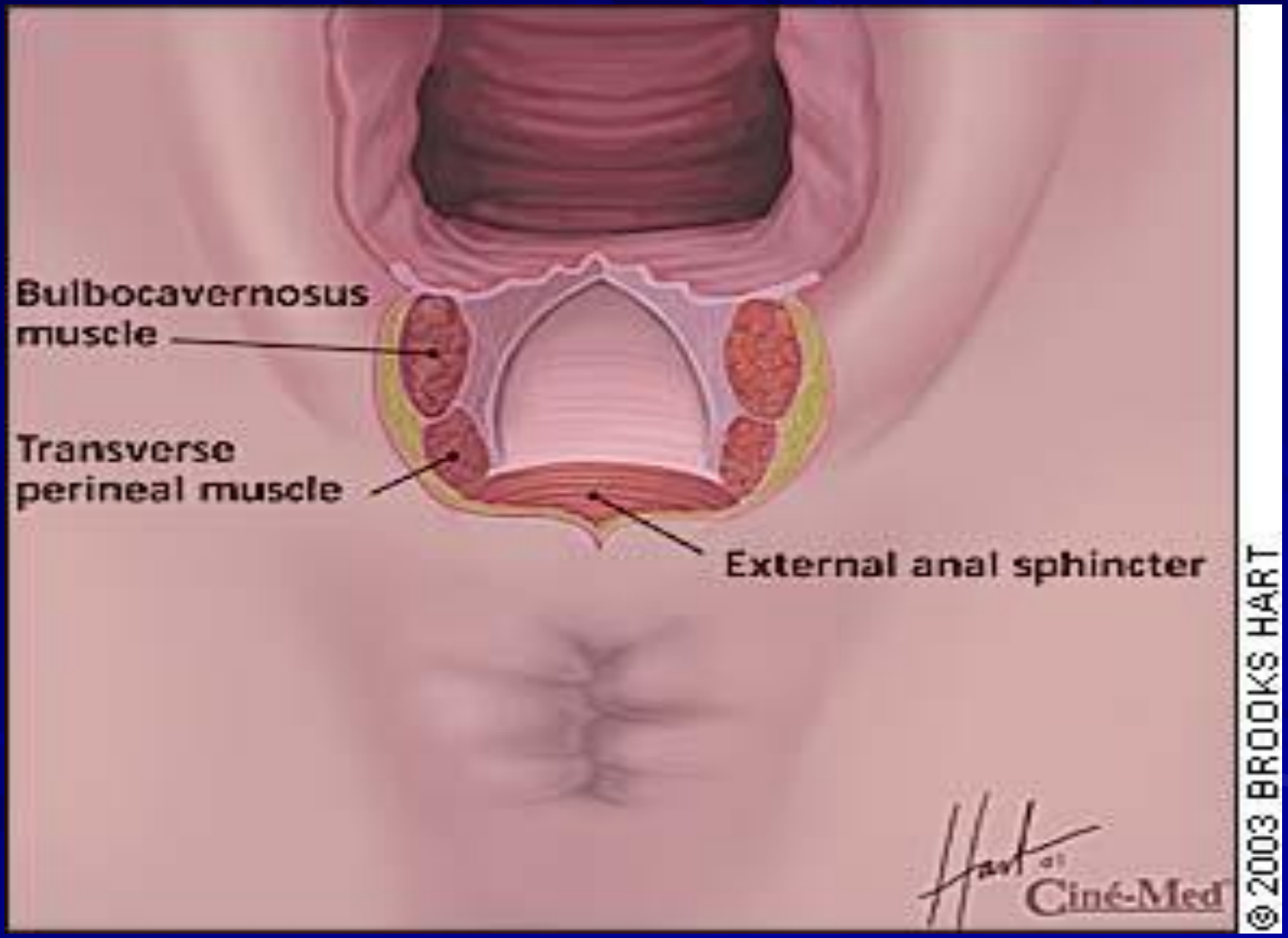
Out of 88 episiotomies 86 were performed on the right side and two in the left side.

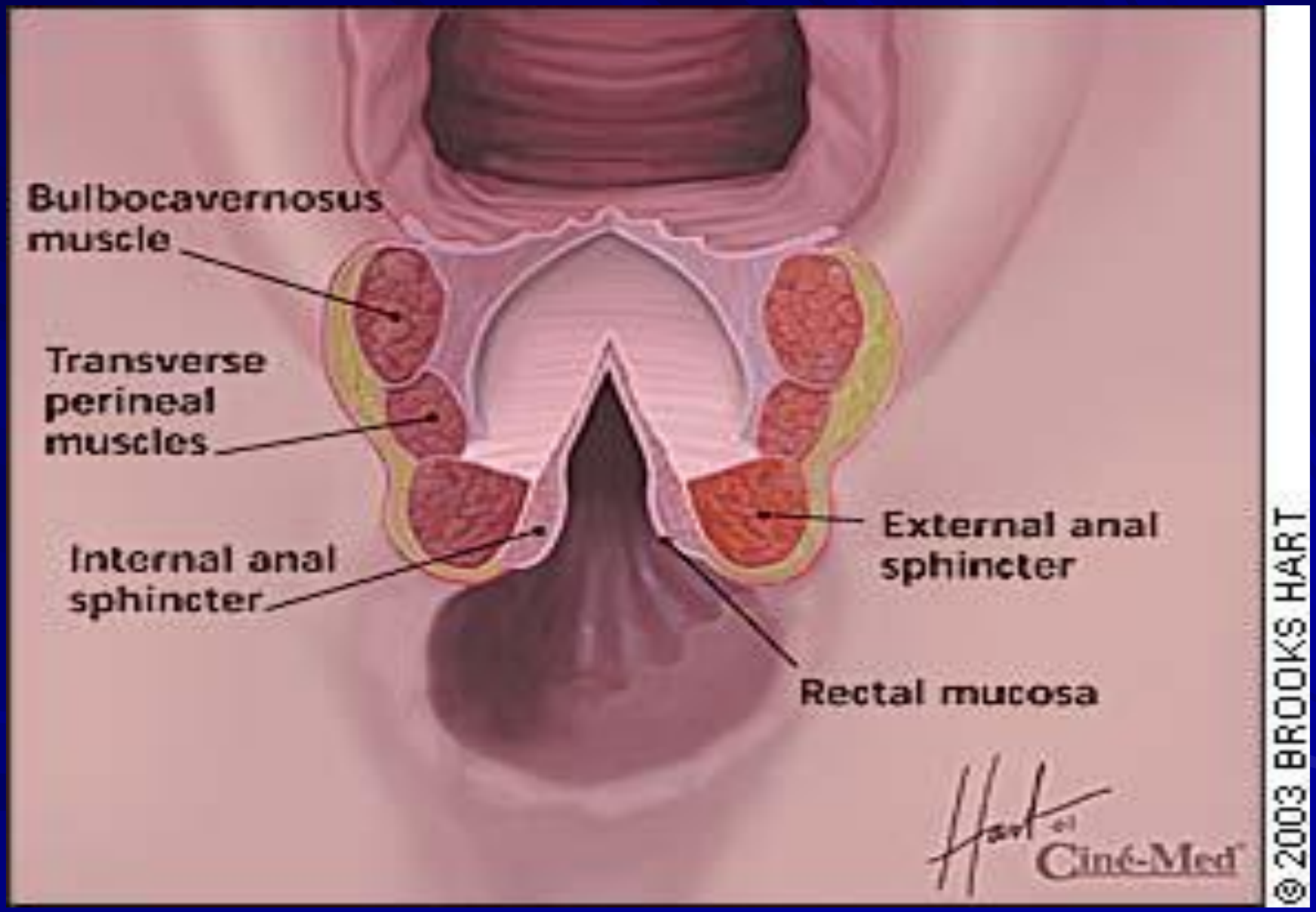
Project TASI

Effect of vaginal delivery on external anal sphincter muscle inervation pattern evaluated with multichannel surface EMG

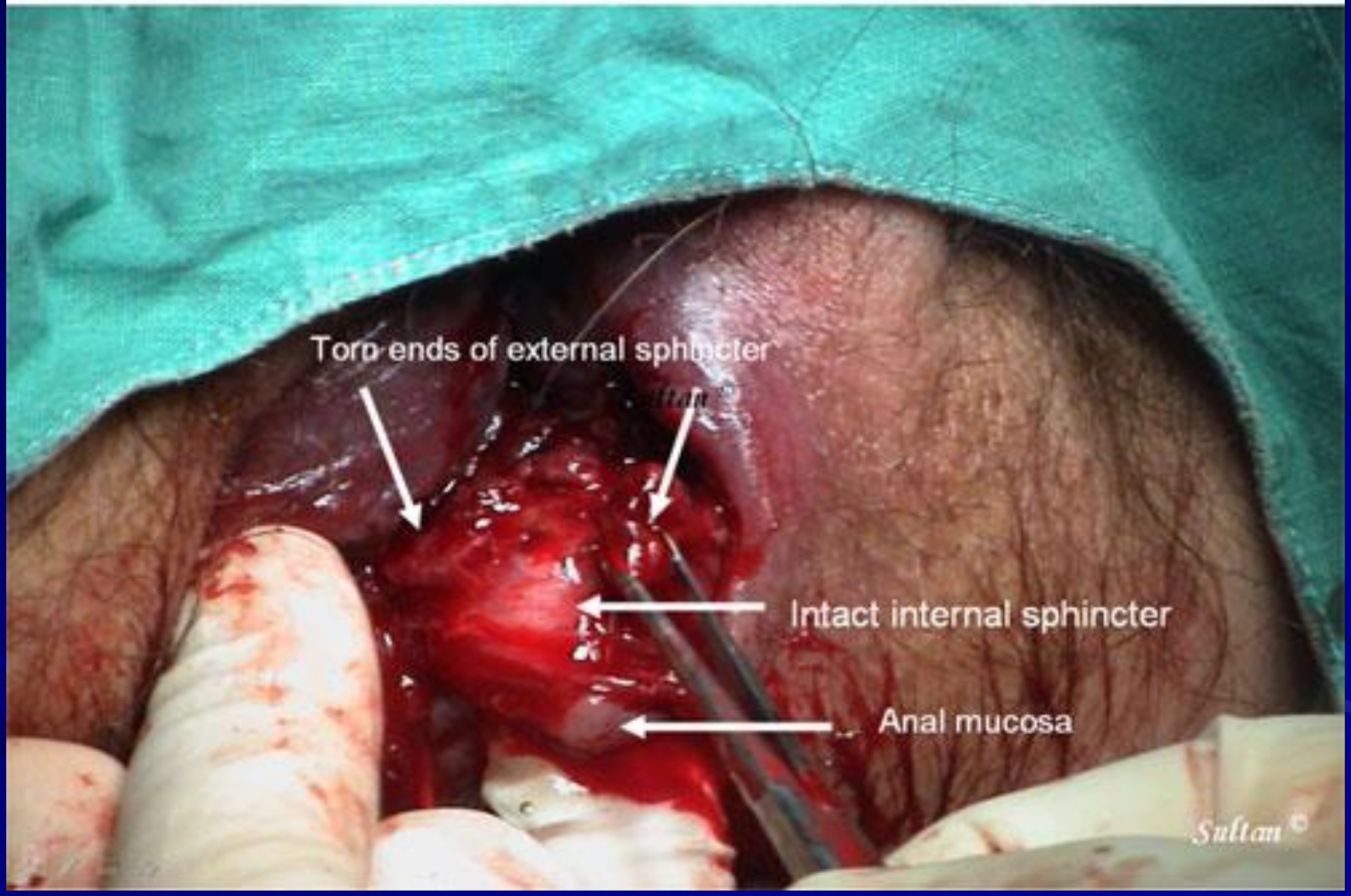
CONCLUSION

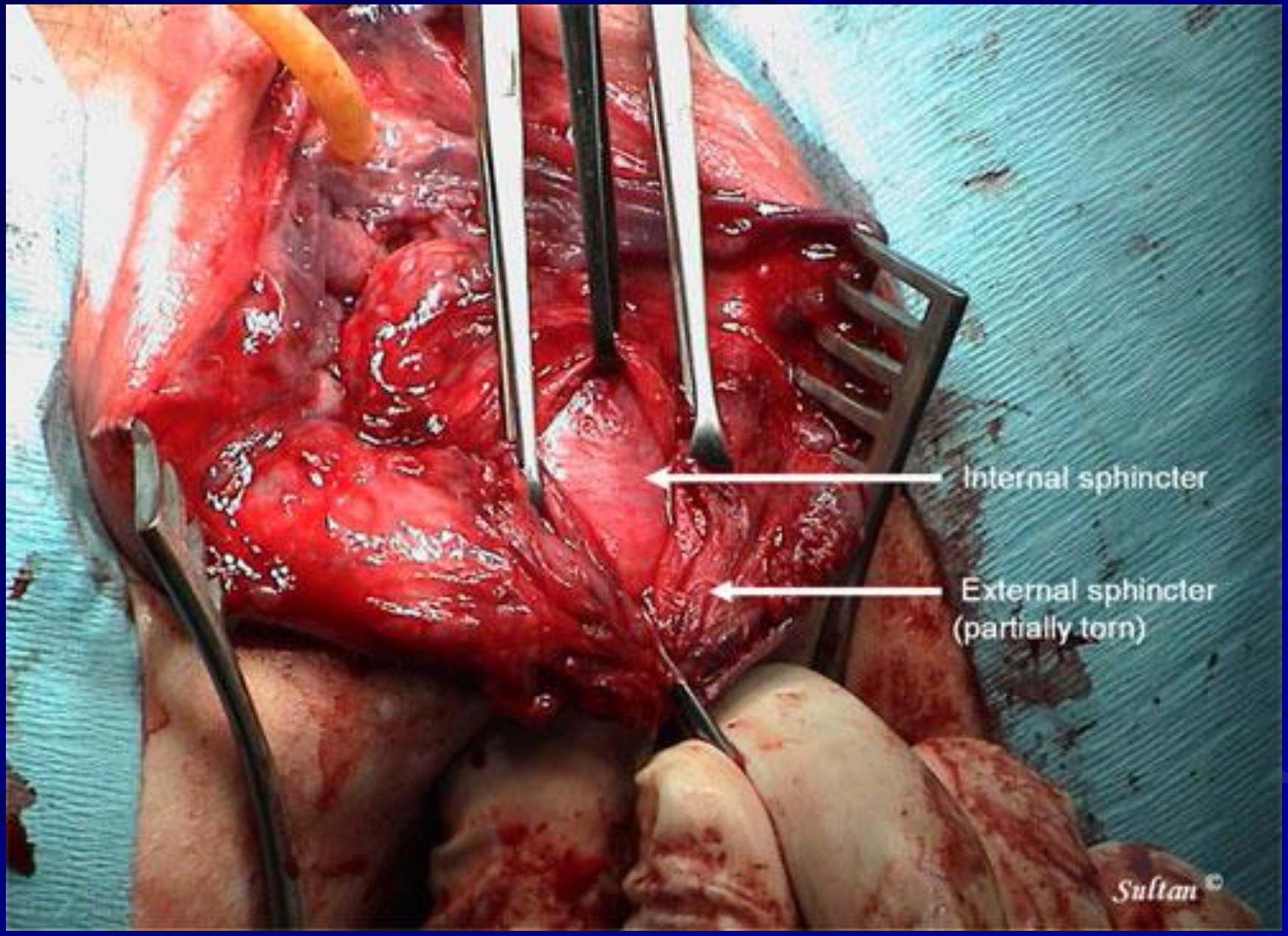
Statistically significant association between episiotomy and reduction of the number of active motor units in the right ventral quadrant of the external anal sphincter

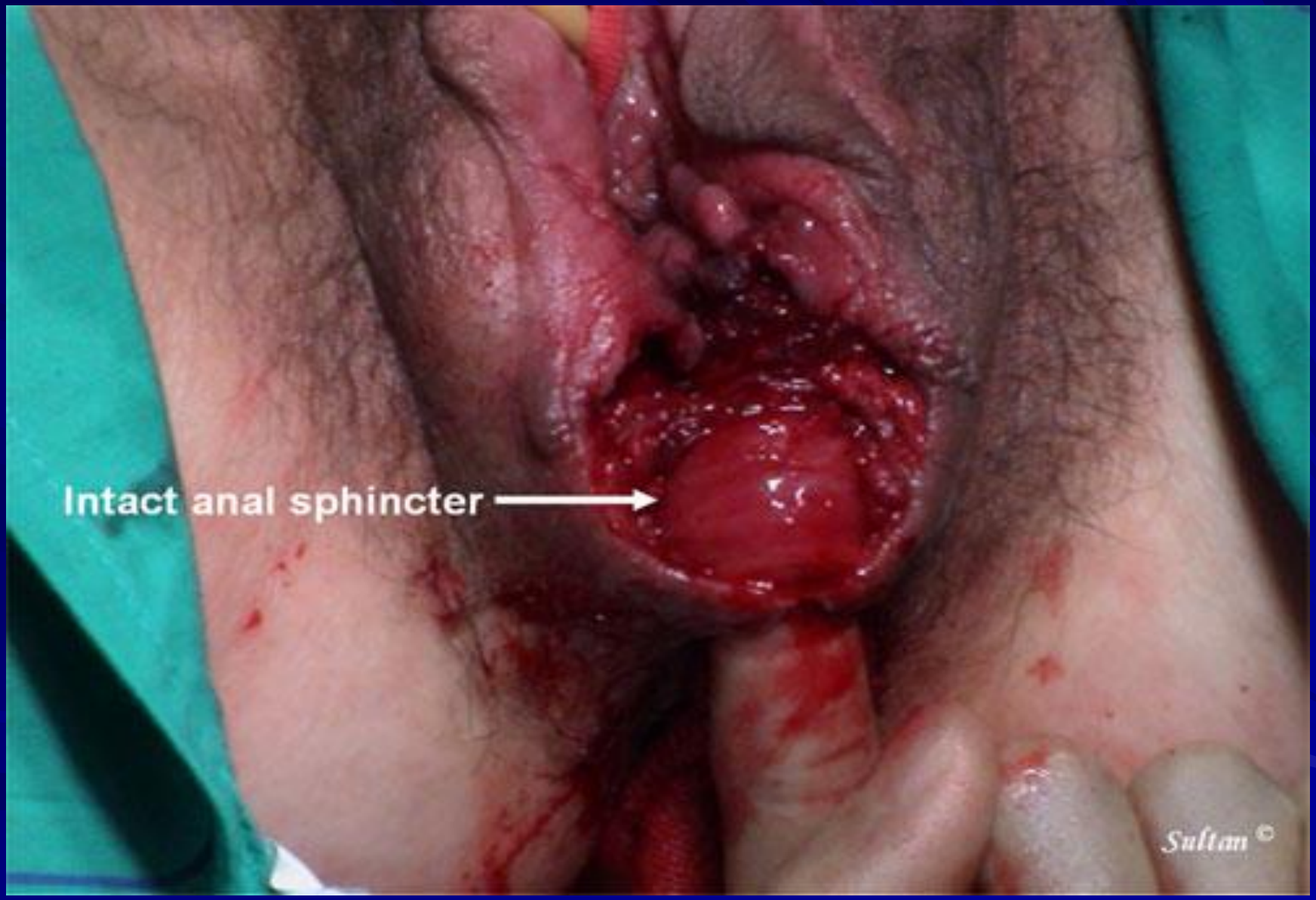

Bulbocavernosus muscle
Transverse perineal muscle
External anal sphincter
Hart at Ciné-Med
© 2003 BROOKS HART


Bulbocavernosus muscle
Transverse perineal muscles
Internal anal sphincter
External anal sphincter
Rectal mucosa
Hart et Ciné-Med
© 2003 BROOKS HART

Third degree tear (Grade 3b)




Internal sphincter
External sphincter
(partially torn)
Sultan ©


Intact anal sphincter
Sultan ©

Take home message I.

- Always digitorectal examination after every vaginal delivery
- Perineal tear is considered as 3rd degree unless is not proved differently.
- Use endoanal ultrasound immediately after delivery
- Best results with primary repair
- Repair can be delaied max 12 hours

Take home message II.

RECOMMENDED PRACTICE

- Rectal examination before repair
- Repair to be done by experienced doctor
- Repair in OR with regional anesthesia
- IV antibiotics
- EAS → End-to-end or overlap
- IAS → End–to end mattress
- Foleys catheter for at least 12 hours
- No restriction on diet
- Lactulose (Portalak) 15mls bd for 7-10 days
- Ensure bowels opened
- Follow-up by a clinician with a special interest

LJUBLJANA SLOVENIA

Thank you!