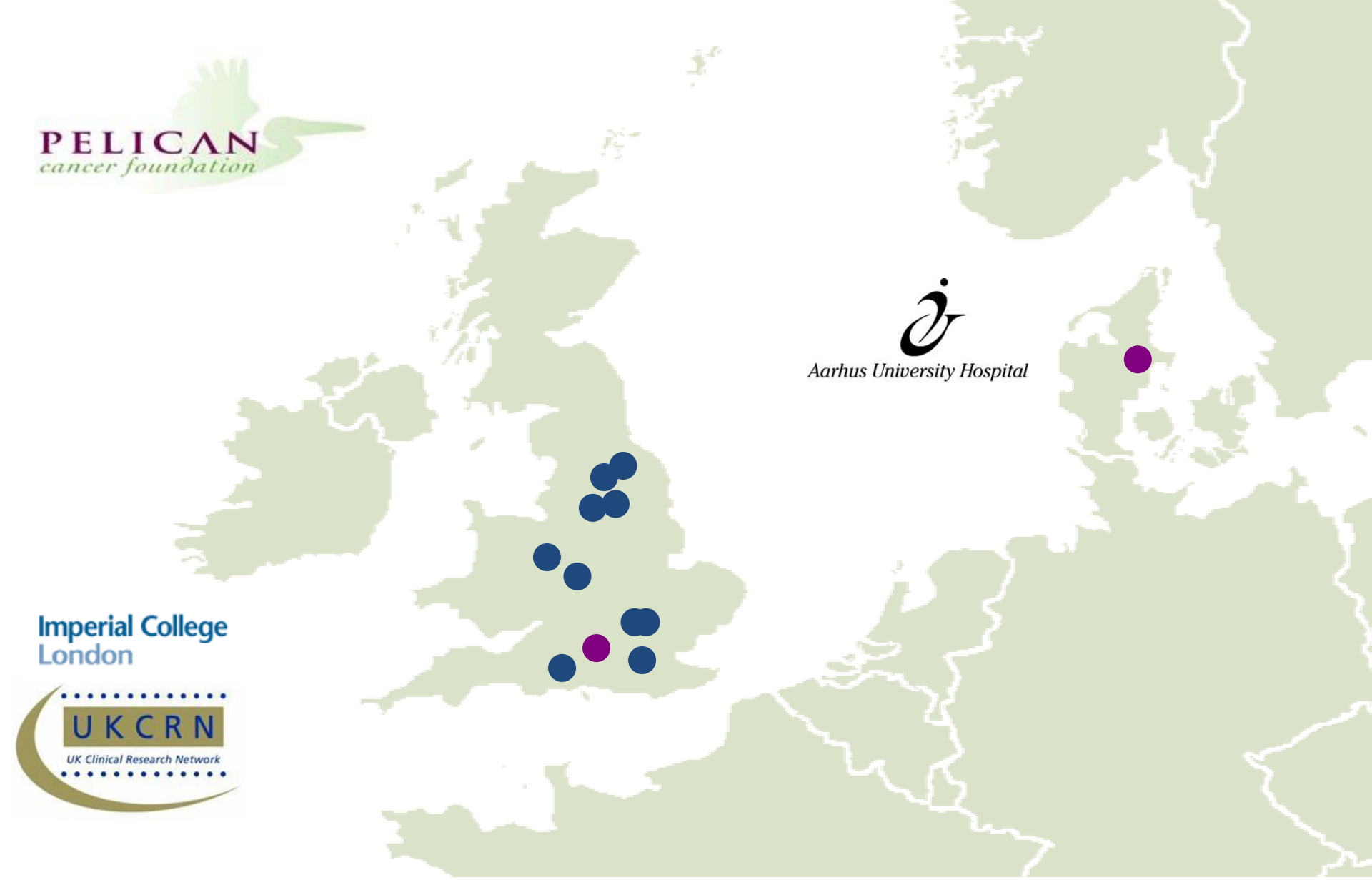
INFORMED CONSENT BEFORE TREATMENT

Pre-Operative Low Anterior Resection Syndrome Score

Nick Battersby



LARS Study Group PIs: R Basit Khan, G Branagan, R Glynne-Jones, D Jayne, J Lacy-Colson, Leinhardt, N Mawdsley, N Mirza, BJ Moran, N Narula, JG Williams, N Woodcock.

NEWS

11 March 2015 | Glasgow & West Scotland

Nadine Montgomery wins £5m from NHS Lanarkshire over brain damage to son

Landmark decision UK Supreme Court on 11 March 2015

Montgomery v Lanarkshire Health Board

When obtaining consent – consider†:

1) The risks a reasonable person in the patient's circumstances would want to know?

1) The risks *this particular* patient wants to know?

1) Does the patient know about reasonable alternative treatments?

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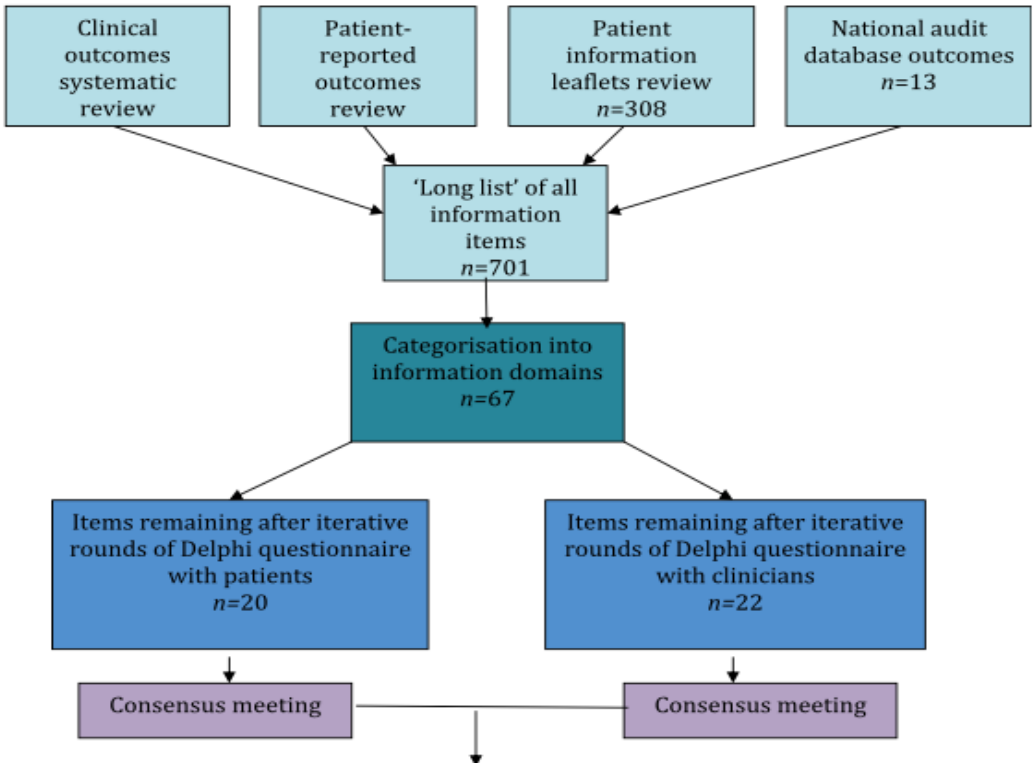
†*Sokol, Update on the UK law on consent, BMJ, 2015*

What sort of risks would a reasonable person in the patient's circumstances want to know…

about rectal cancer treatment?

‘Core information set’ for consenting in cancer surgery

- Patient and Clinician involvement
- This example is for Oesophageal cancer but ‘Core information Set’ proposed for coloretcal cancer



Items retained in final core information set (*n*=8):

1. Expected in-hospital experiences and milestones to recovery
2. Chances of inoperability
3. Information about major complications (e.g. re-operation)
4. In-hospital mortality
5. Expected recovery milestones after discharge
6. Impact on eating and drinking in the longer term
7. Long term overall quality of life data
8. Long term survival

Blazeby, BJS. 2015;102:936–943

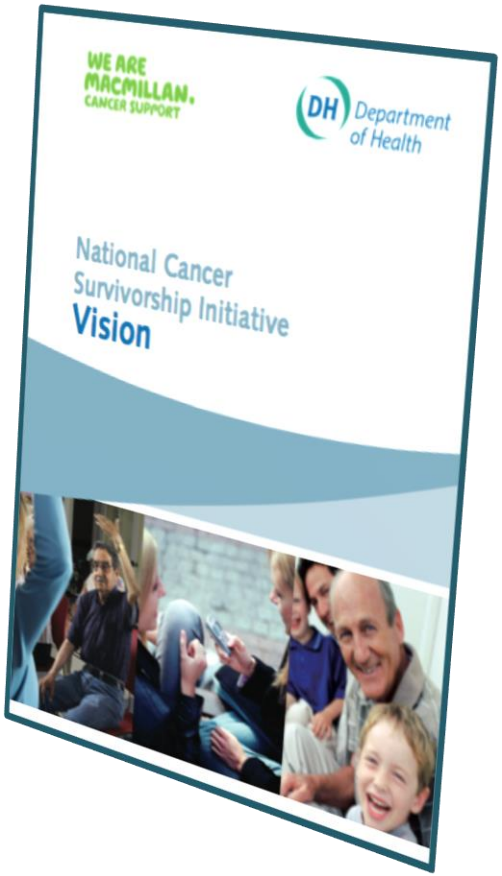
National Cancer Survivorship Initiative

Department of Health

January 2010

A cultural shift in the approach to cancer care:

- greater focus on well-being after cancer treatment
- tailored support - preparation for and early recognition of the consequences of treatment
- a new emphasis on PROMs in aftercare services.



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May 2012

Low Anterior Resection Syndrome Score

Annals of Surgery • *Katrine J. Emmertsen, MD,*† and Søren Laurberg, MD**

Five Questions:

1. Continence of flatus
2. Continence of liquid stool
3. Frequency of bowel habit
4. Clustering
5. Urgency

Annals of Surgery ORIGINAL ARTICLE 2014

International Validation of the Low Anterior Resection Syndrome Score

Therese Juul, MHSc, Madelene Ahlberg, MHSc,‡ Sebastiano Biondo, MD, PhD,† Katrine Jøssing Emmertsen, MD,* Eloy Espin, MD, PhD,§ Luis Miguel Jimenez, MD,§ Klaus E. Matzel, MD, PhD,‖ Gabriella Palmer, MD, PhD,‡ Anna Sauermann, MD,‖ Loris Trenti, MD,† Wei Zhang, MD,‖ Søren Laurberg, MD, PhD,* and Peter Christensen, MD, PhD, DMSc**

Colorectal Disease

Validation of the English Translation of the Low Anterior Resection Syndrome (LARS) Score

Juul et al, 2015

SCORE 0 - 42

0-20 = **No LARS** 21-29 = **Minor LARS** 30-42 = **Major LARS**

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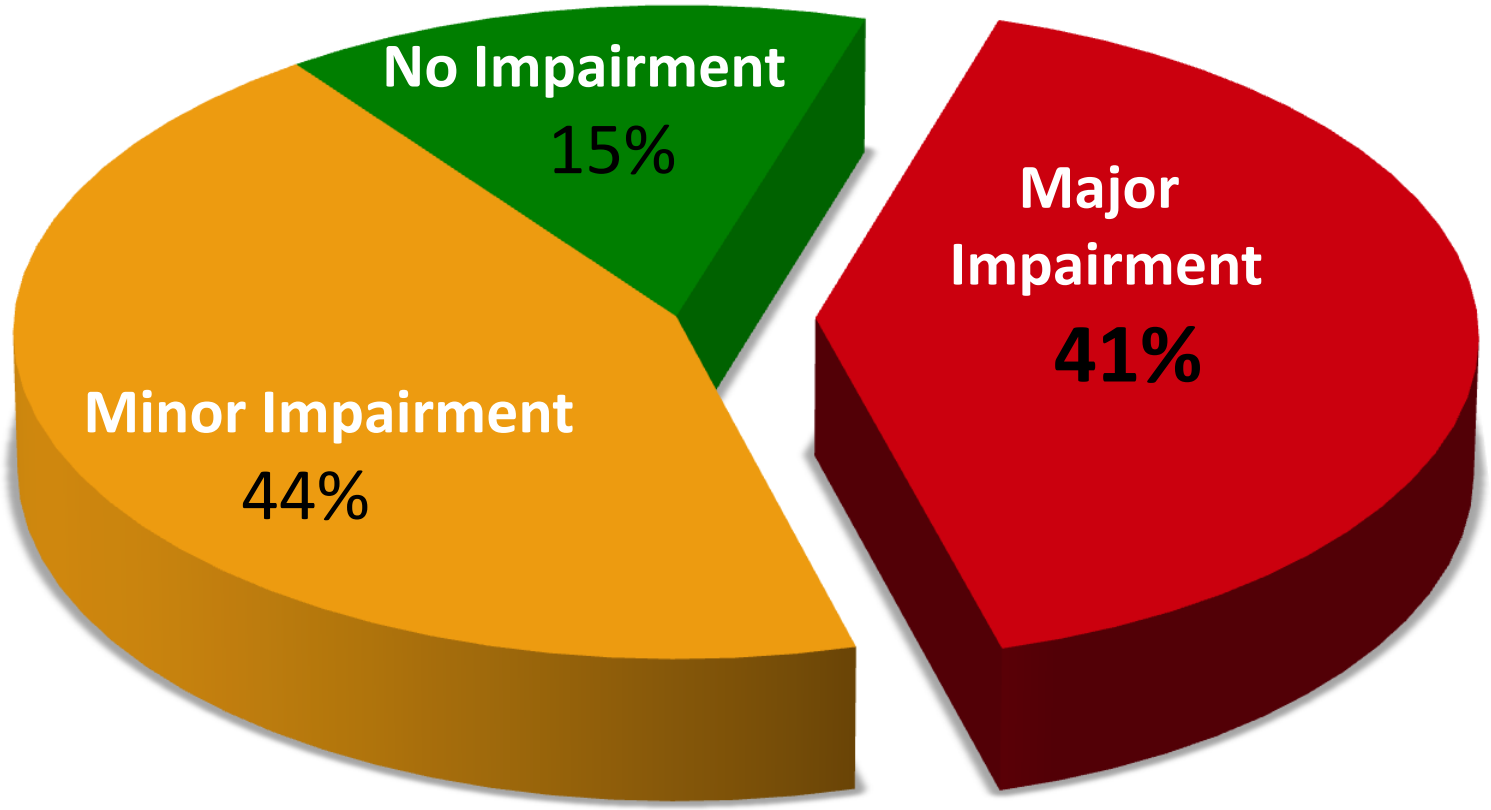
How does bowel function affect your quality of life?

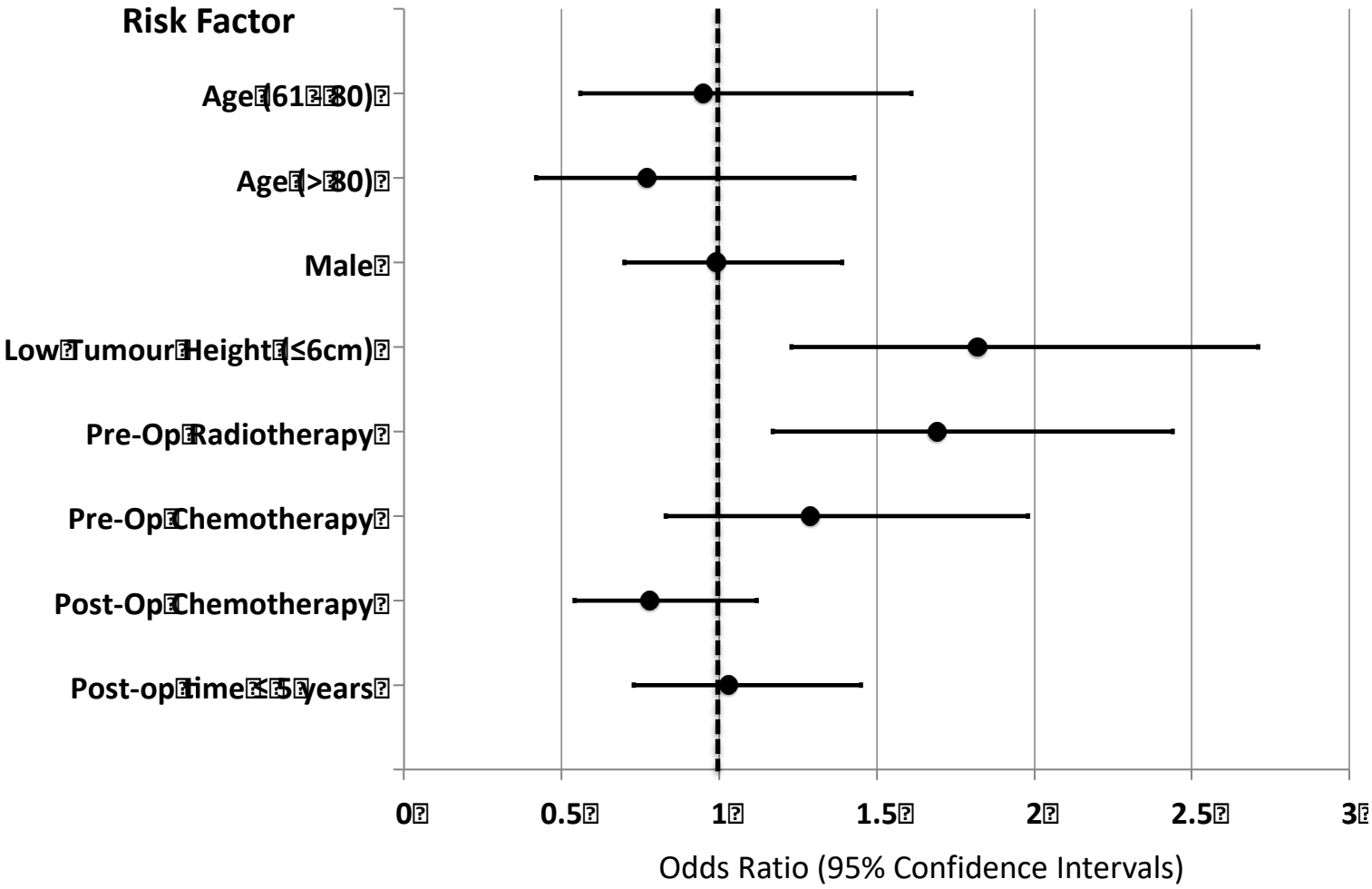


Risk Factors for Bowel Dysfunction

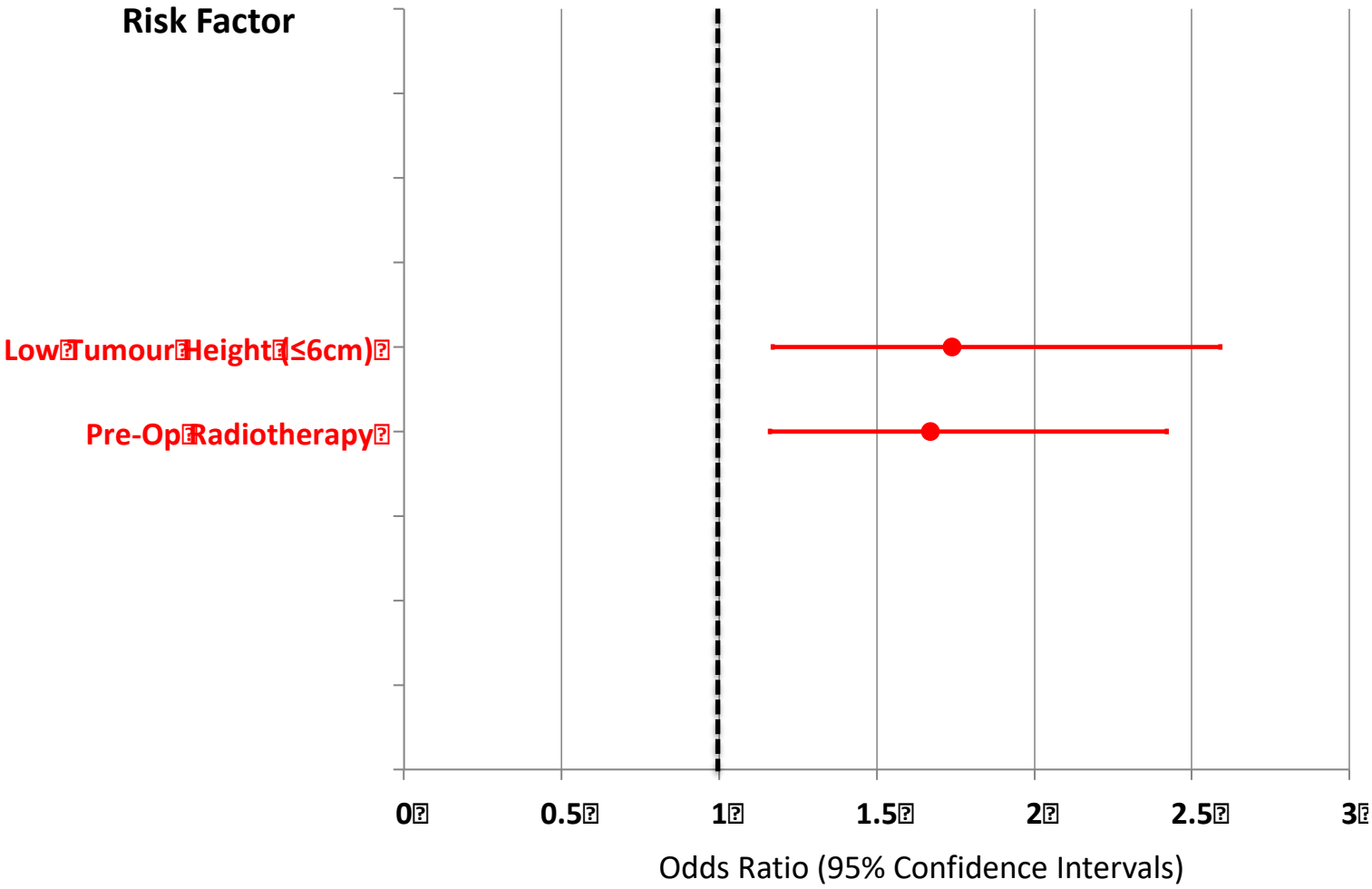
- Tumour Height / Low → intersphincteric anastomosis
- TME over PME
- Neoadjuvant therapy
- Straight anastomosis*
- Anastomotic leakage
- Previous sphincter injury or history of incontinence
- Less than 1 year from restored continuity
- Defunctioning ileostomy +/- time to reversal

1) Bryant CL, Lunniss PJ, Knowles CH, et al. Anterior resection syndrome. Lancet Oncol 2012;13:e403-8.
2) Emmertsen KJ, Laurberg S. Impact of bowel dysfunction on quality of life after sphincter-preserving resection for rectal cancer. BJS. 2013; 100: 1377 – 1387
3) *Brown CJ, Fenech DS, McLeod RS. Reconstructive techniques after rectal resection for rectal cancer. Cochrane Database Syst Rev 2008:CD006040.
4) Engel J. Quality of life in rectal cancer patients: a four-year prospective study. Ann Surg 2003;238:203-13.

Considering Risk Factors For Bowel Related Quality Of Life (BQoL) Impairment
(**Univariate** Ordinal Regression Analysis)



Considering Risk Factors For Bowel Related Quality Of Life (BQoL) Impairment
(**Multivariate** Ordinal Regression Analysis)



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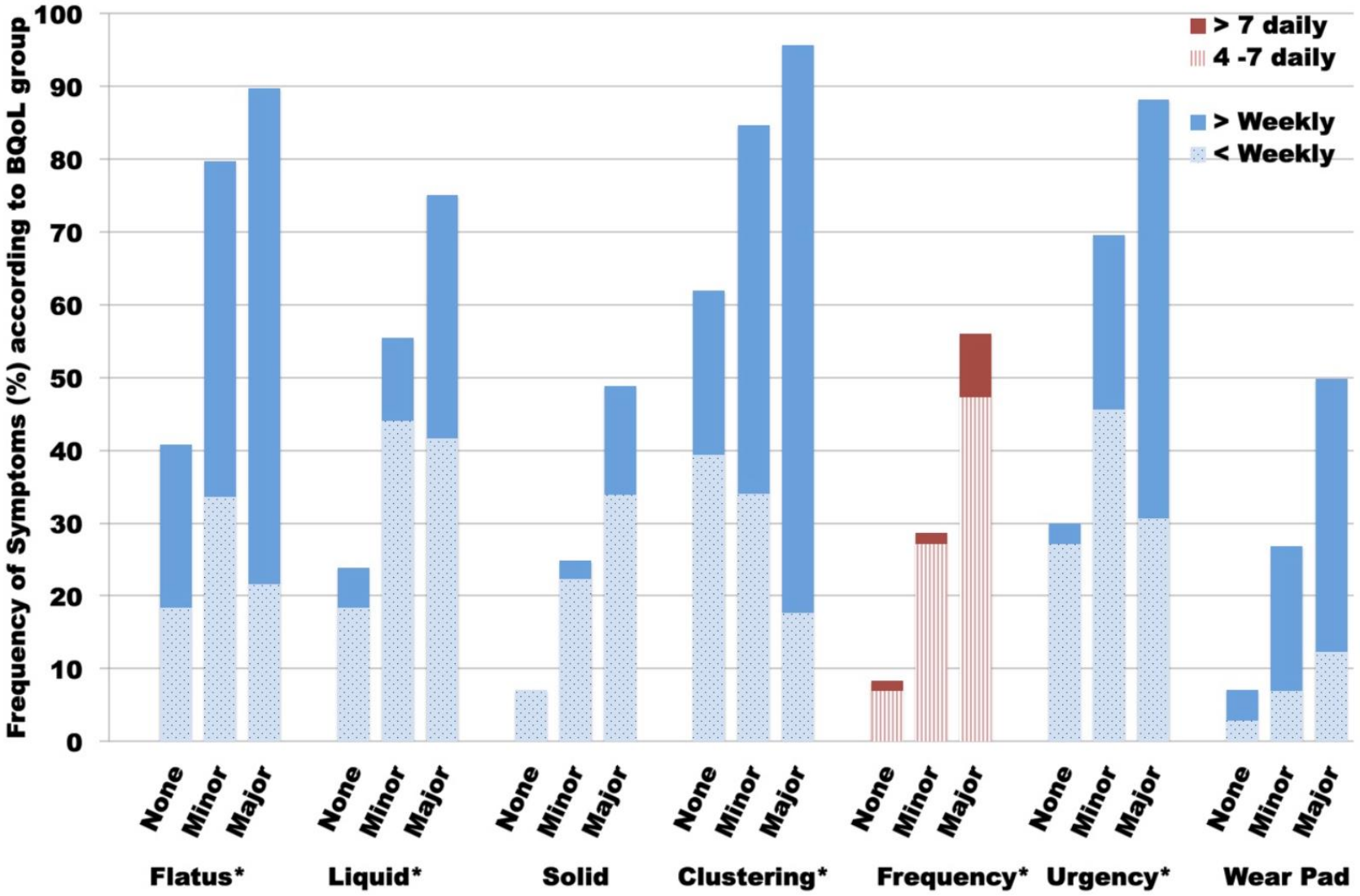
Battersby et al, DC&R, April 2016

Reported Bowel Symptoms By Bowel Related Quality Of Life (BQoL) Category.



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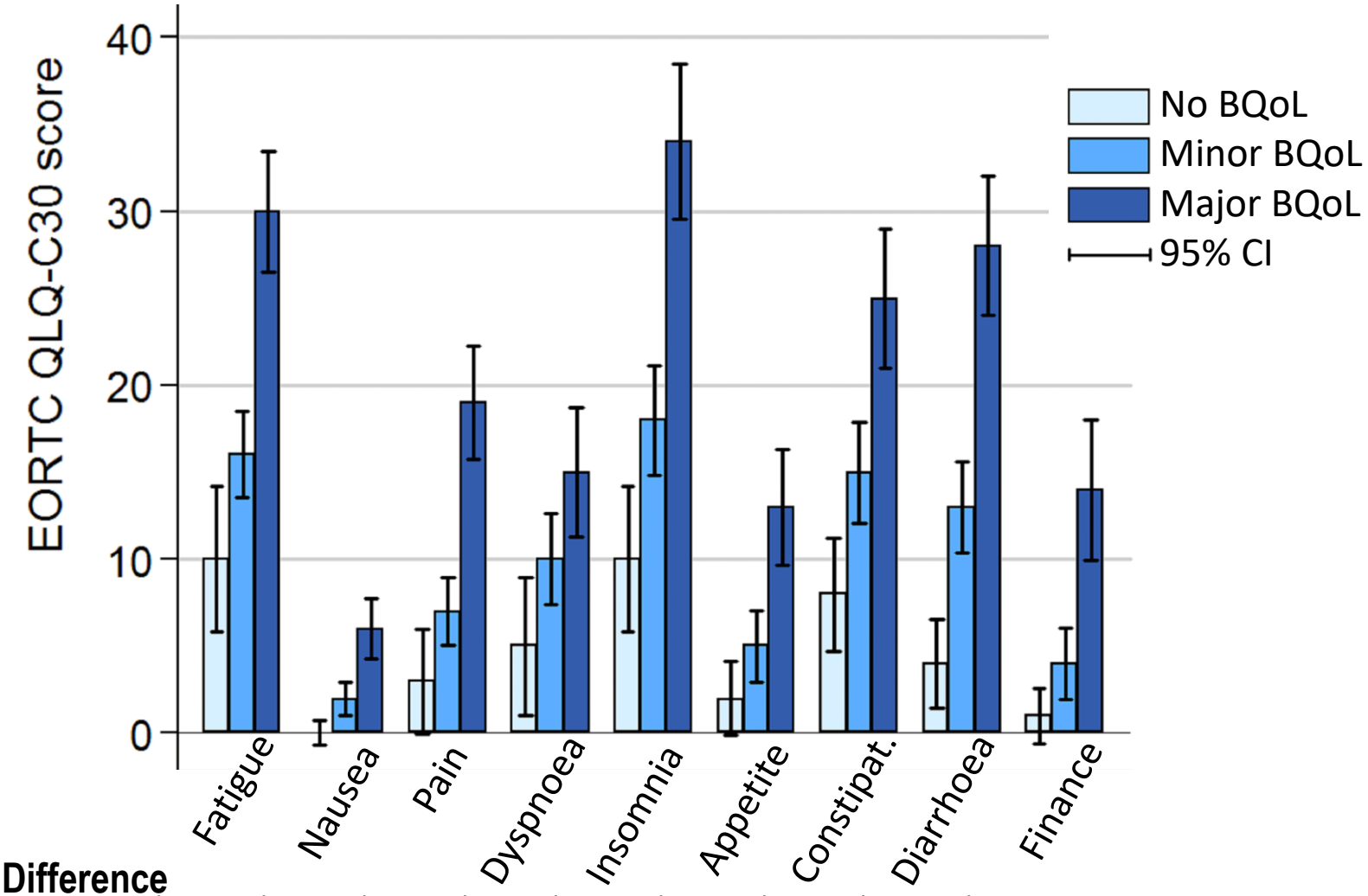
Battersby et al, DC&R, April 2016

Reported EORTC Symptoms By Bowel Related Quality Of Life (BQoL) Category.



Score Difference	Fatigue	Nausea	Pain	Dyspnoea	Insomnia	Appetite	Constipat.	Diarrhoea	Finance
None v Minor	7*	2†	4†	5	8†	3	7†	9*	3
None v Major	20*	6*	16*	10*	24*	10*	18*	25*	12*

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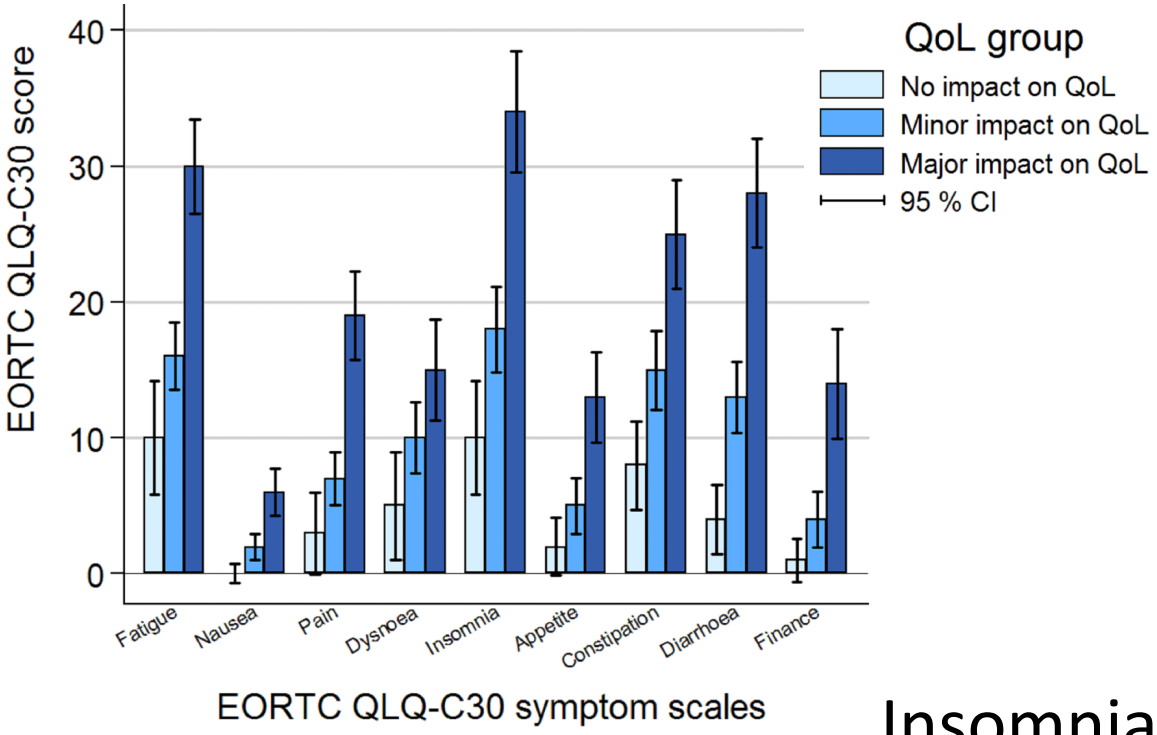
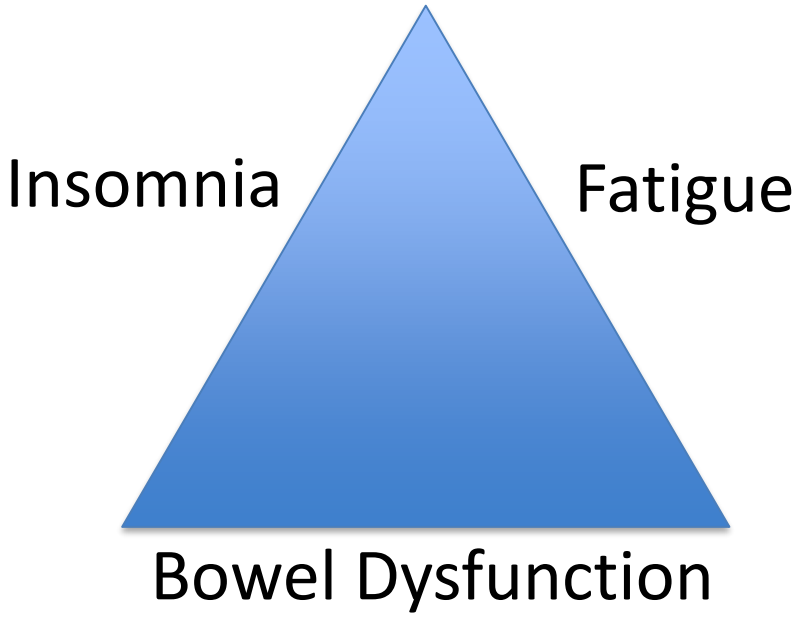
Battersby et al, DC&R, April 2016

Reported EORTC Symptoms By Bowel Related Quality Of Life (BQoL) Category.





+ PAIN

+ FINANCIAL IMPACT

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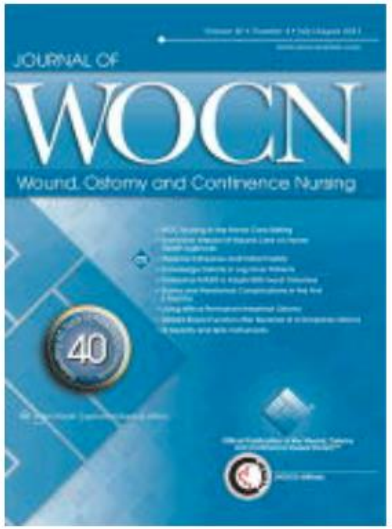
Reported Functional Outcomes By Bowel Related Quality Of Life (BQoL) Category.

	Total	Extent of BQoL Impairment: Score Difference	†p-value	Clinical relevance of score difference to QoL
Functional scales				
Global**	77 (19)			
None v Minor		10	<0.001	Moderate
None v Major		22	<0.001	Large
Physical	87 (18)			
None v Minor		5	<0.001	Small
None v Major		13	<0.001	Moderate
Role**	86 (24)			
None v Minor		6	0.002	Small
None v Major		21	<0.001	Large
Emotion	85 (19)			
None v Minor		7	<0.001	Small
None v Major		18	<0.001	Moderate
Cognitive	86 (18)			
None v Minor		4	0.024	
None v Major		11	<0.001	Moderate
Social**	82 (25)			
None v Minor		8	<0.001	Small
None v Major		30	<0.001	Large

Battersby et al, DC&R, April 2016

Tied to the Toilet: Lived Experiences of Altered Bowel Function (Anterior Syndrome) After Temporary Stoma Reversal



Taylor & Bradshaw

- Qualitative study. 8 patients.
- 6 weeks post closure of stoma

“toileting habits determined their daily routine and restricted their activities”

“leaving home necessitated planning toilet stops en route and insurance of toilet availability at their destination”

“urgency and fear of faecal incontinence limited the hours they could work and they worried about work performance ”

“unable to work through the day after having to get up every night to open his bowels”

J Wound Ostomy Continence Nurs. 2013, 40(4):415-21

The risks *this particular* patient wants to know?

More individualised discussion?

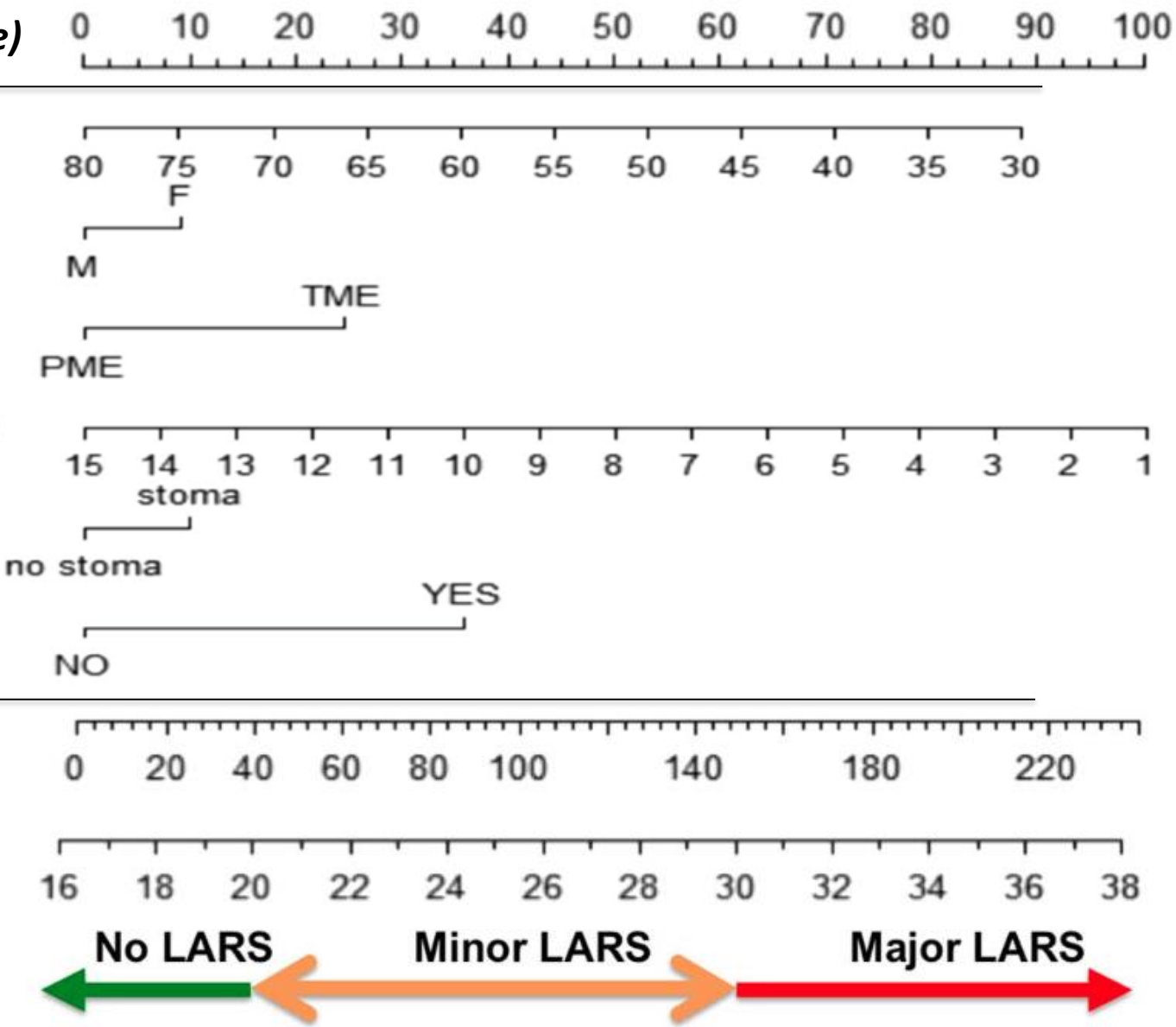
Nomogram

POLARS

Pre-Operative Low Anterior Resection Syndrome Score

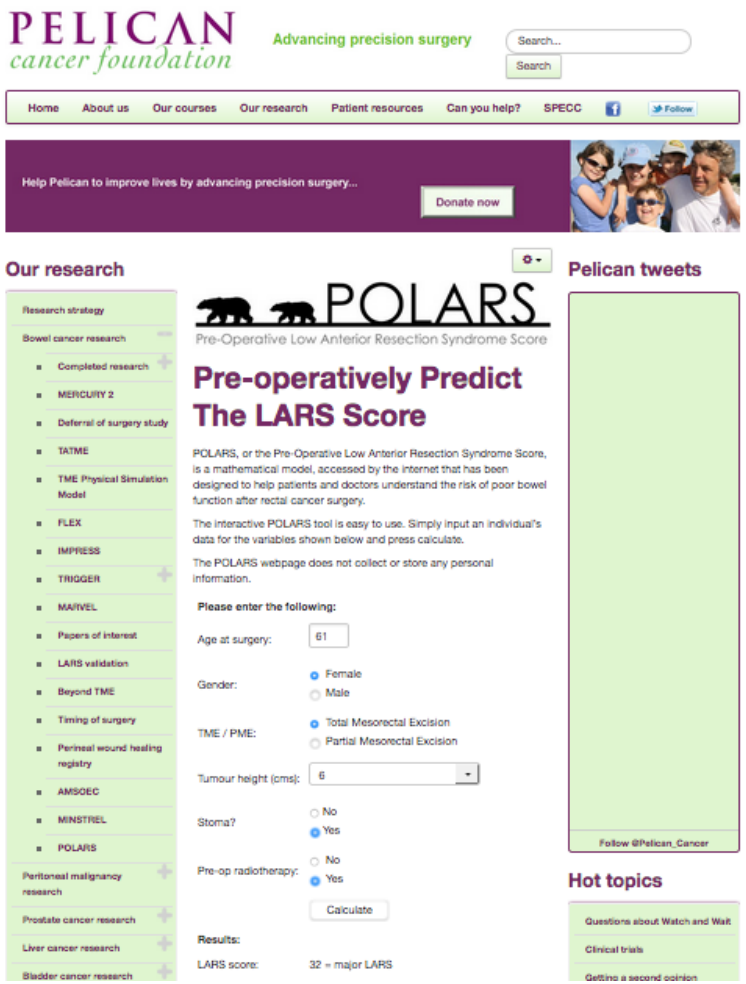
TRIPOD

http://www.tripod-statement.org



POLARS

Pre-Operative Low Anterior Resection Syndrome Score



Please enter the following:

Age at surgery: 61

Gender: Female / Male

Results:

LARS score: 32 = major LARS

Stoma? No / Yes

Pre-op radiotherapy: No / Yes

Calculate

http://www.pelicancancer.org/bowel-cancer-research/polars

Battersby NJ, et al. Gut 2017;0:1–9

Scenario 1

70 year old male

Tumour Height - 13cm from Anal Verge

Plan:

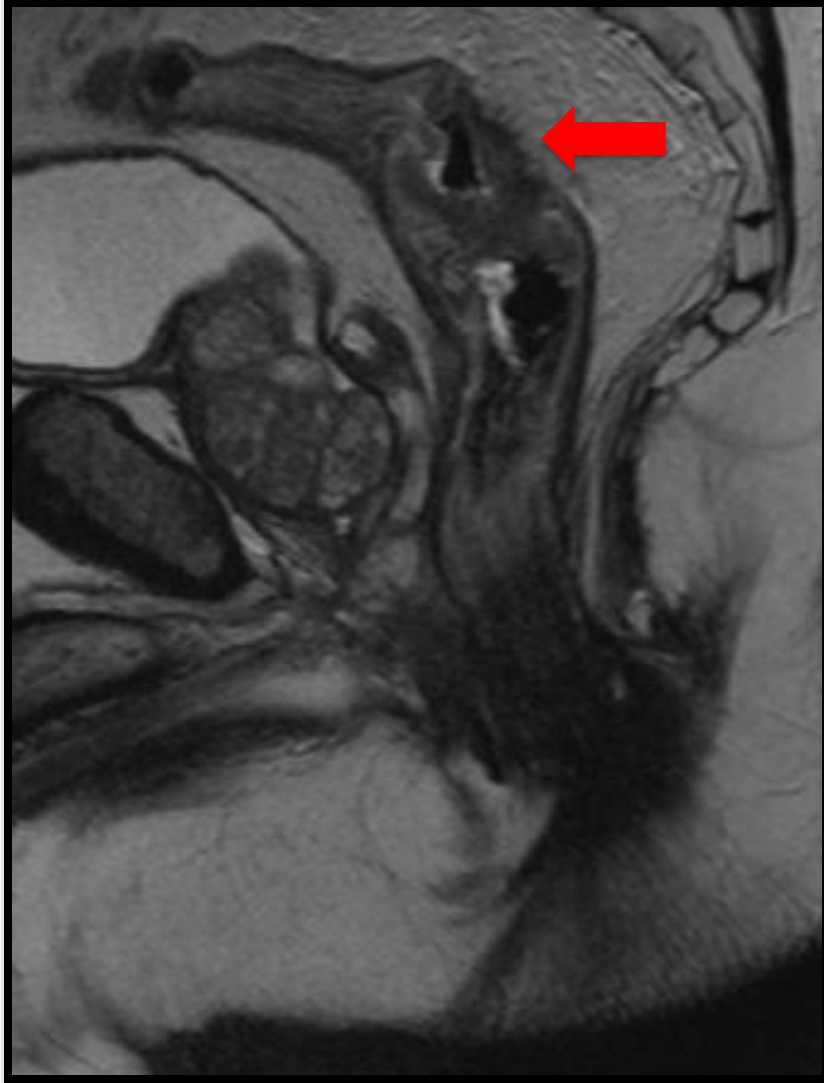
- No Radiotherapy
- TME Surgery

Predicted LARS Score

20 (95% CI 19.0 – 21.2)

No LARS

Upper Rectal Cancer



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POLARS

Scenario 2

65 year old male

Tumour Height - 4cm from Anal Verge

Plan:

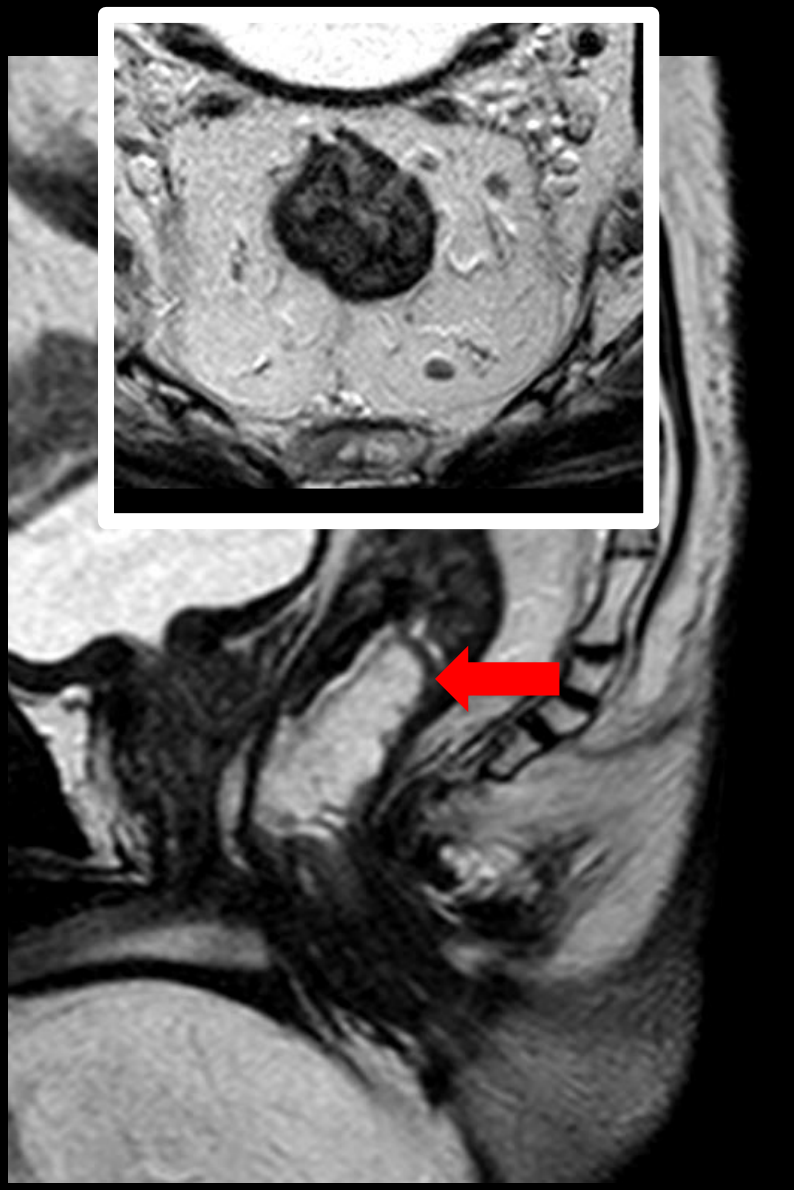
- Radiotherapy (CRT)
- TME Surgery
- Defunctioning ileostomy

Predicted LARS Score

32 (95% CI 29.0 – 34.2)

Major LARS

Low Rectal Cancer



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POLARS

Scenario 2

65 year old male

Tumour Height - 4cm from Anal Verge

Plan: **No Radiotherapy**

- ~~Radiotherapy (CRT)~~
- TME Surgery
- Defunctioning ileostomy

Predicted LARS Score

28 (95% CI 26.5 – 31.7)

Minor LARS

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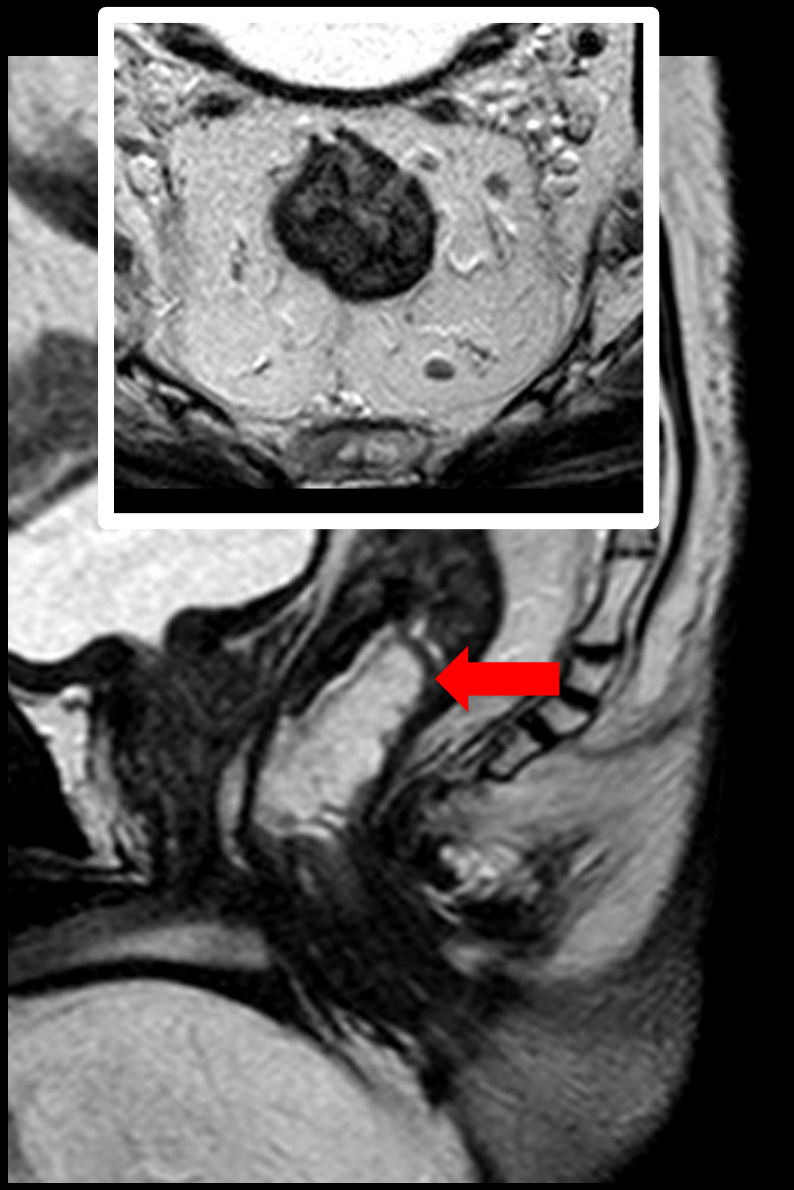
POLARS

Low Rectal Cancer



The purpose of POLARS

- Personalised pre-operative information. Informed consent.
- Used in conjunction with the consent aid.

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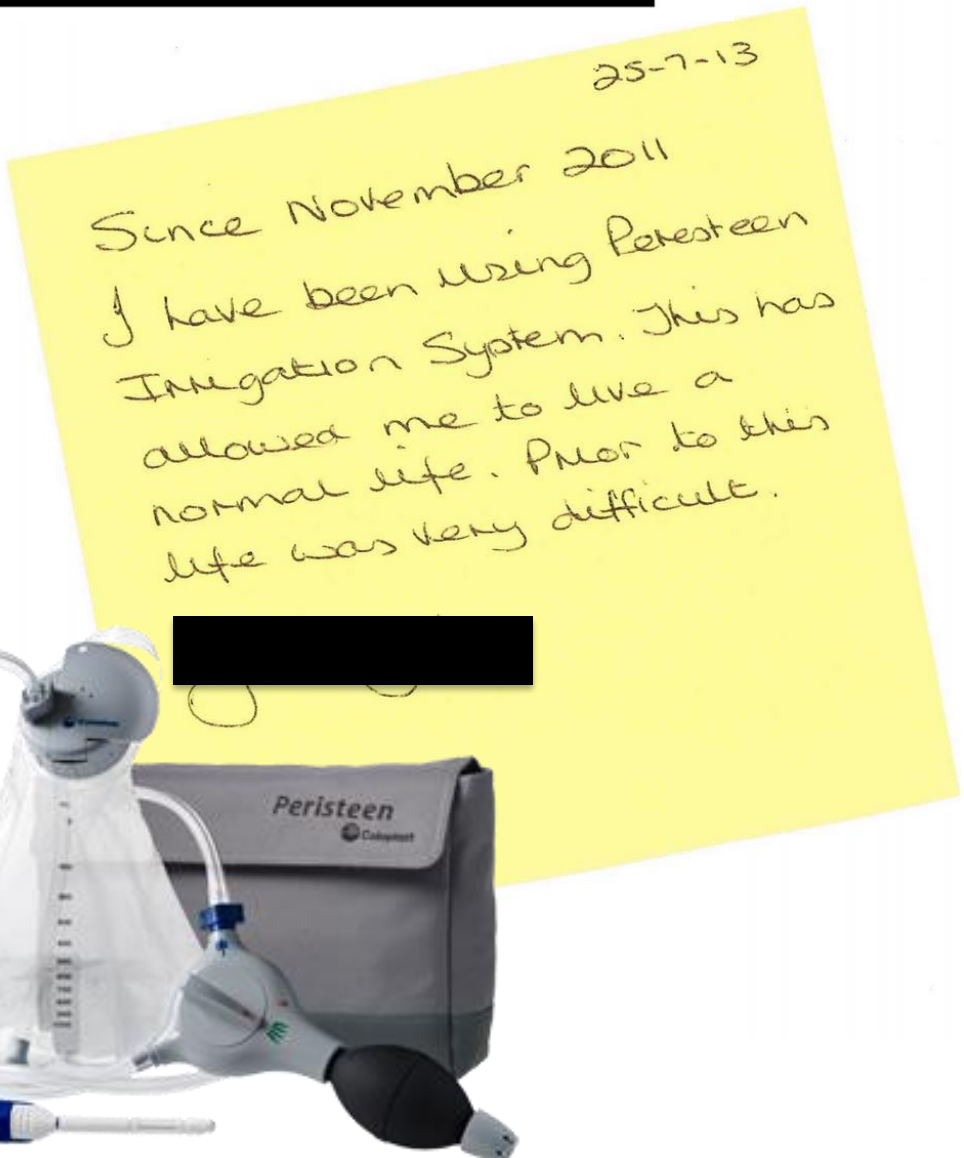
- Personalised pre-operative information. Informed consent.
- Used in conjunction with the consent aid.
- Raising patient awareness. Seek help – investigate and treat symptoms more swiftly.



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The purpose of POLARS

- Personalised pre-operative information. Informed consent.
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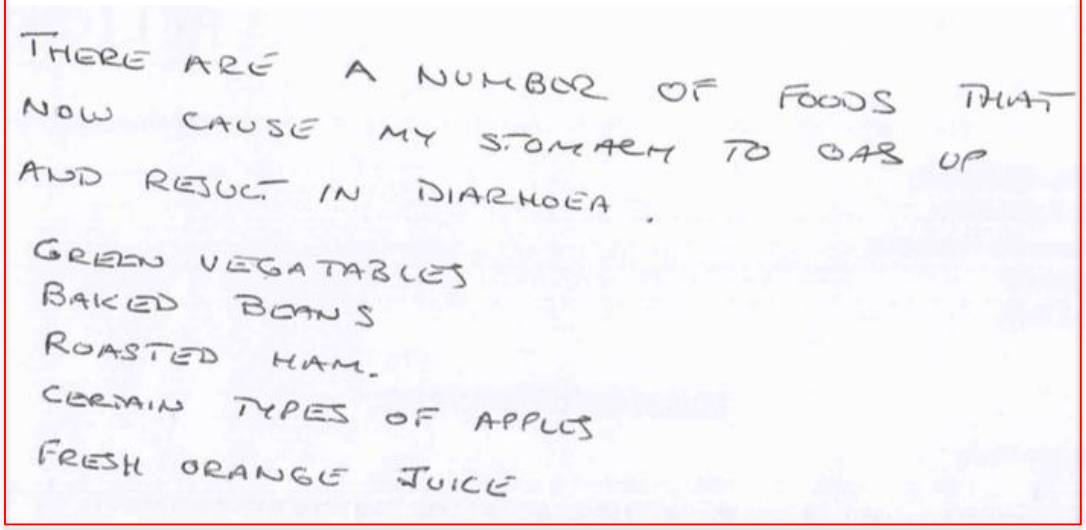
- Raising patient awareness. Seek help – investigate and treat symptoms more swiftly.

Dietary Changes


THERE ARE A NUMBER OF FOODS THAT NOW CAUSE MY STOMACH TO GAS UP AND REJECT IN DIARHOEA.

GREEN VEGATABLES
BAKED BEANS
ROASTED HAM.
CERTAIN TYPES OF APPLES
FRESH ORANGE JUICE

The purpose of POLARS

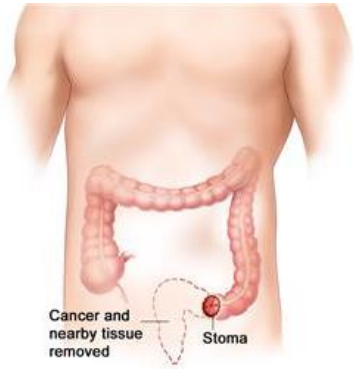
[redacted] Name of Participant

2/10/13 Date

[redacted] Signature

I am at present in hospital having had a colostomy bag fitted. I will answer the questionaire as I was befor the operatio

versus



Anterior Resection Restorative

Abdominoperineal Excision (Colostomy)

Successful LAR = intestinal continuity is restored with reasonable bowel function

Meta-Analysis of QOL for APE Vs AR

(Cornish et al, 2007, Annals of Surgical Oncology)

OUTCOME MEASURED	COMPARISON OF AR Vs APE
General Health Score	Equivalent
Physical Function	AR better than APE
Role Function	AR better than APE
Cognitive Function	APE better than AR
Emotional Function	APE better than AR
Future Perspective	APE better than AR
Sexual Function	AR better than APE

For lower rectal tumours (<8cm from a/v)
300 LARs & 486 APEs
Mean follow up: 43.9 months (APE) & 46.1 months (AR)

MERCURY II DATA (Peter How et al)
Post-op EORTC QLQ C30 Scores (1 YEAR)

		APE (n=30)	LAR (n=32)	P value
FUNCTIONAL SCALES	Physical	90 (7-100)	87 (13-100)	0.426
	Role	91.5 (0-100)	75 (0-100)	0.185
	Emotional	87.5 (25-100)	75 (0-100)	0.306
	Cognitive	100 (33-100)	83 (0-100)	0.018
	Social	100 (0-100)	67 (0-100)	0.012
	Global QOL	79 (33-100)	71 (33-100)	0.225
SYMPTOMS	Fatigue	22 (0-56)	27.5 (0-89)	0.235
SINGLE ITEMS	Sleep Disturbance	0 (0-67)	33 (0-100)	0.013
	Appetite loss	0 (0-67)	0 (0-67)	0.936
	Diarrhoea	0 (0-67)	33 (0-100)	0.017
	Financial impact	0 (0-67)	0 (0-100)	0.087

National Danish Registry QoL for APE Vs AR

Unpublished work by *Thyo, Emmertsen et al. ESCP Milan 2016*

- EORTC QLQ C30 – compared LAR (n=346) versus APE (n=1127)
- All functional domains were equivalent for both groups
- However radiotherapy sub-group
  - (LAR, n= 157 [45%] v APE, n=719 [63%])
  - global quality of life - Scores 71 v 76 [p=0.002]
  - social function - 78 v 85 [p=0.003] respectively).
- Irradiated patients - APE group better QoL than LAR group.

Summary

POLARS
Pre-Operative Low Anterior Resection Syndrome Score

- Discuss Bowel (as well as Bladder & Sexual) Dysfunction Routinely
- Consent Tools/discussions aids - http://www.pelicancancer.org/bowel-cancer-research/polars
- POLARS - Informed Consent with a quantified risk
  - Medicolegal role – evidence based discussion
  - Research – Patient selection in clinical trials
  - Influence treatment at MDT
- Aid post-operative awareness of LARS

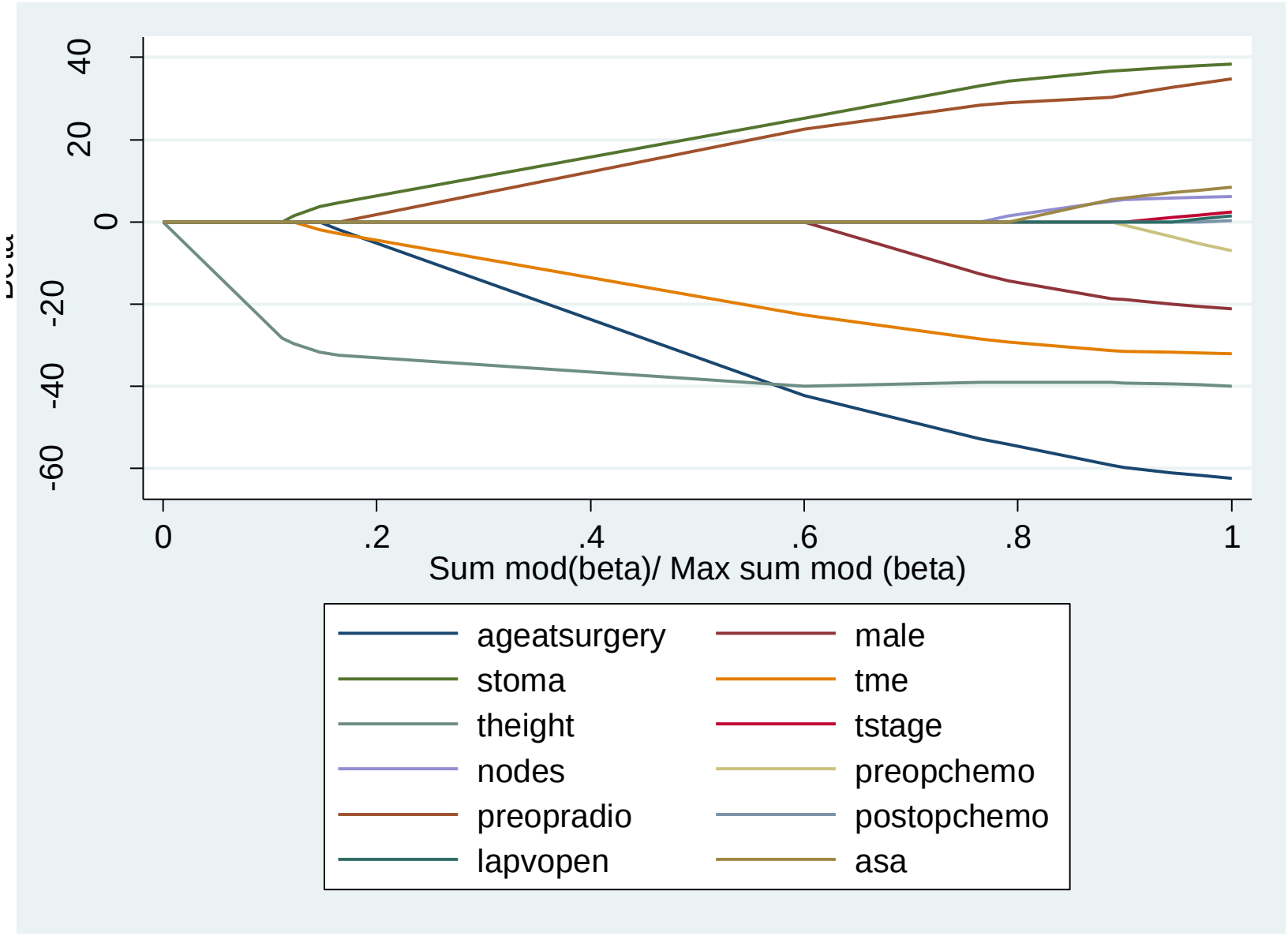
A careful social history is still crucial

A physician is obliged to consider more than a disease organ, more even than the whole (wo)man – they must view the (wo)man in his world.

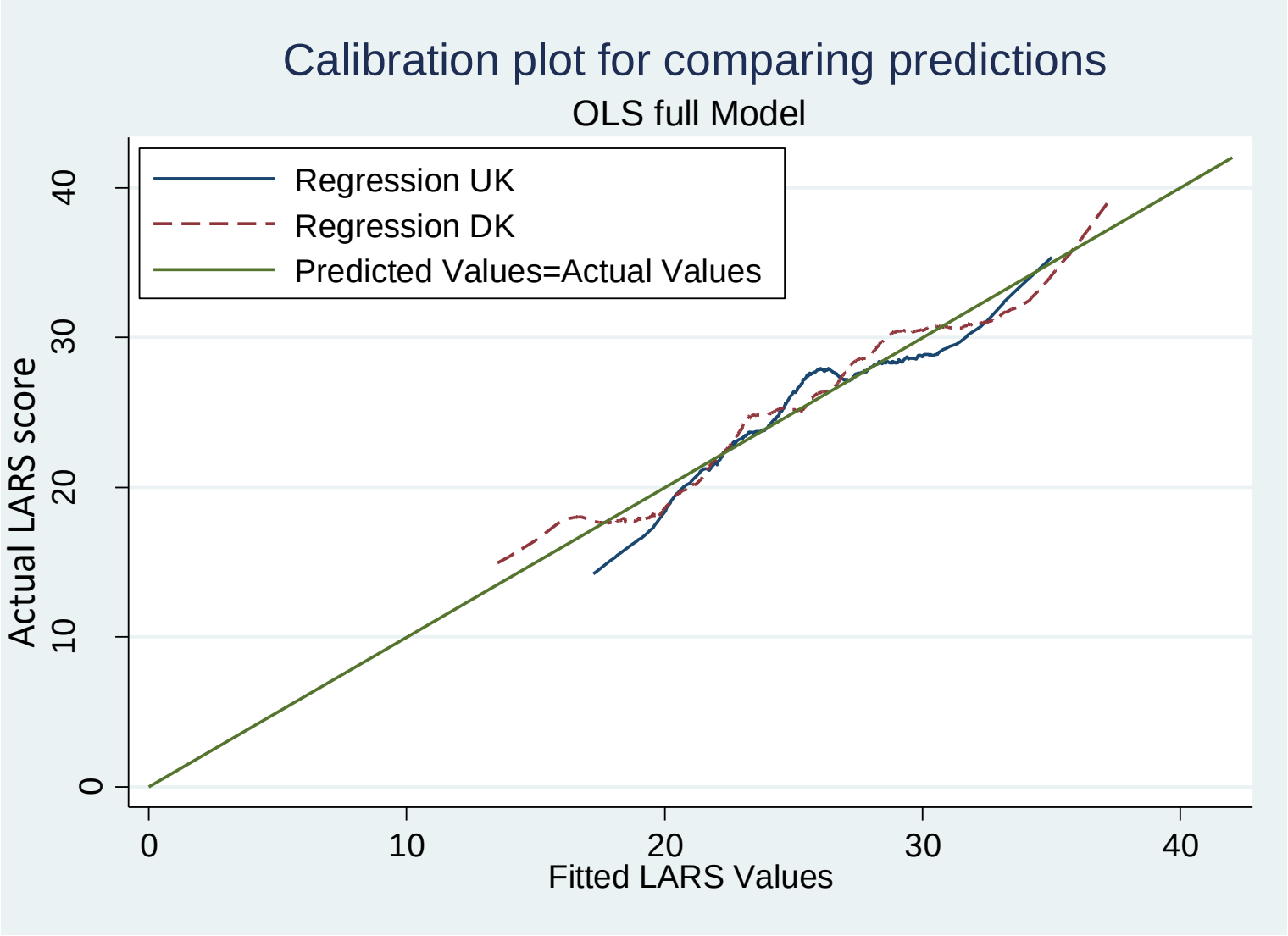
- Harvey Cushing -

April 8, 1869 – October 7, 1939

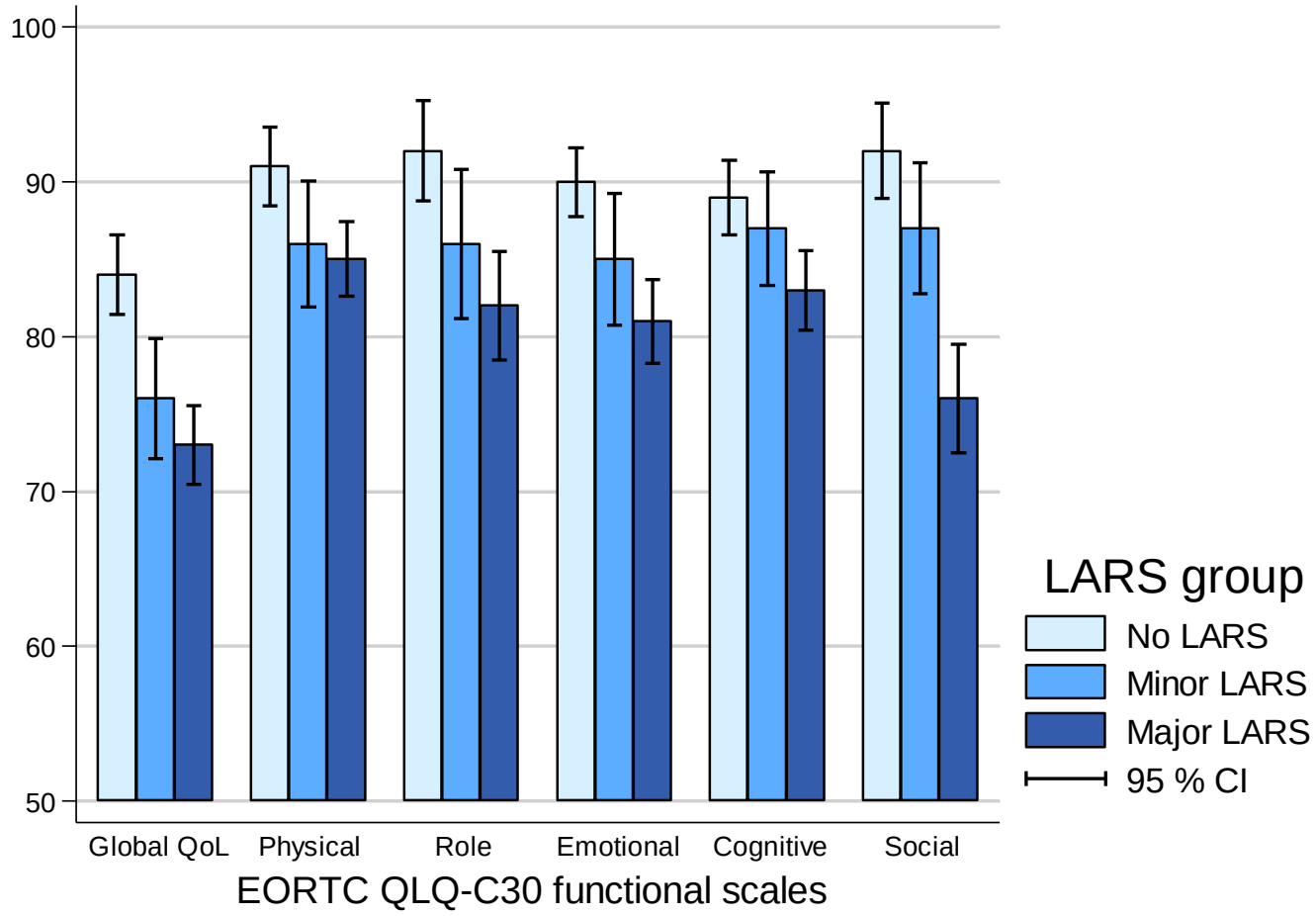
Support slides


40
20
0
-20
-40
-60
0
.2
.4
.6
.8
1
Sum mod(beta)/ Max sum mod (beta)
ageatsurgery
male
stoma
tme
theight
tstage
nodes
preopchemo
preopradio
postopchemo
lapvopen
asa

The calibration plot



High LARS score ≃ Impaired QoL



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Juul et al, Colorectal Disease 2015

Results: DK v UK

	UK	Denmark	
n	463	938	P value
LARS score mean (SD)	26.1 (11.3)	24.1 (11.6)	0.017
LARS categories			
No	134 (29.7)	334 (35.6)	0.043
Minor	103 (22.8)	221 (23.6)	
Major	214 (47.5)	383 (40.8)	
BQoL Category			
No	134 (29.7)	246 (26.6)	< 0.001
Minor	103 (22.8)	330 (35.6)	
Major	214 (47.5)	350 (37.8)	
EORTC QLQ-C30 Function¥, mean (SD)			
Global	76.5 (18.6)	78.1 (21.3)	0.18
Physical	86.9 (18.2)	87.5 (17.1)	0.50
Role	85.5 (24.3)	86.9 (24.2)	0.32
Emotion	84.5 (19.3)	88.8 (18.1)	<0.001
Cognitive	85.9 (17.7)	88.2 (17.9)	0.03
Social	83.2 (24.2)	88.9 (21.0)	<0.001

BQoL – bowel related quality of life. EORTC QLQ-C30 - Quality of Life Questionnaire – Core 30. ¥, The functional scales are graded 0 – 100 with 100 indicating optimal function.

Results: DK v UK

	UK (Develop)	Denmark (Validate)	
n	463	938	P value
pT-stage			
T1, n (%)	66 (14)	75 (10)	< 0.001†
T2, n (%)	168 (37)	205 (28)	
T3, n (%)	199 (43)	436 (59)	
T4, n (%)	18 (4)	21 (3)	
missing	8	201	
pN-Stage			
Negative	306 (69)	550 (74)	< 0.001
Positive	136 (31)	191 (26)	
missing	7	197	
Defunctioning Stoma			
n, (%)	362 (80)	513 (55)	< 0.001
missing	0	0	
Surgery¥			
TME	343 (80)	555 (59)	< 0.001
PME	90 (20)	383 (41)	
missing	30	0	
Radiotherapy , n (%)			
Pre-operative	145 (32)	191 (20)	< 0.001
Post-operative	3 (0.7)	2 (0.2)	
Pre-operative Radiotherapy	314 (68)	747 (80)	< 0.001
None	60 (13)	95 (10)	
Short course	85 (19)	96 (10)	
Long course	4	0	
missing			
Chemotherapy, n (%)			
Pre-operative	88 (19)	76 (8)	< 0.001
Post-operative	301 (32.2)	62 (7)	< 0.001

*14 missing values

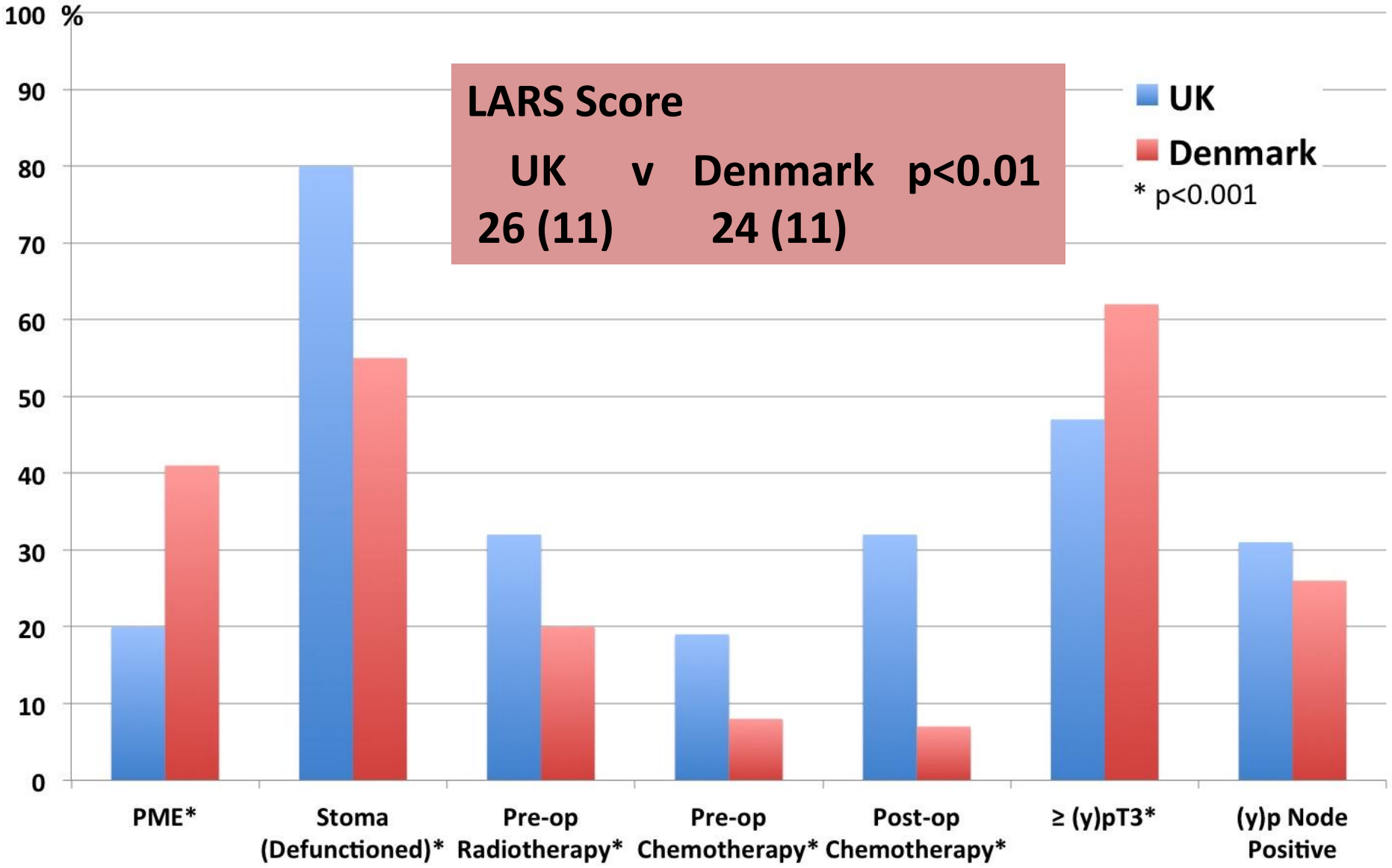
† Chi Square - p value by ≤pT2 v >pT2

Results: Cohort comparison UK v DK

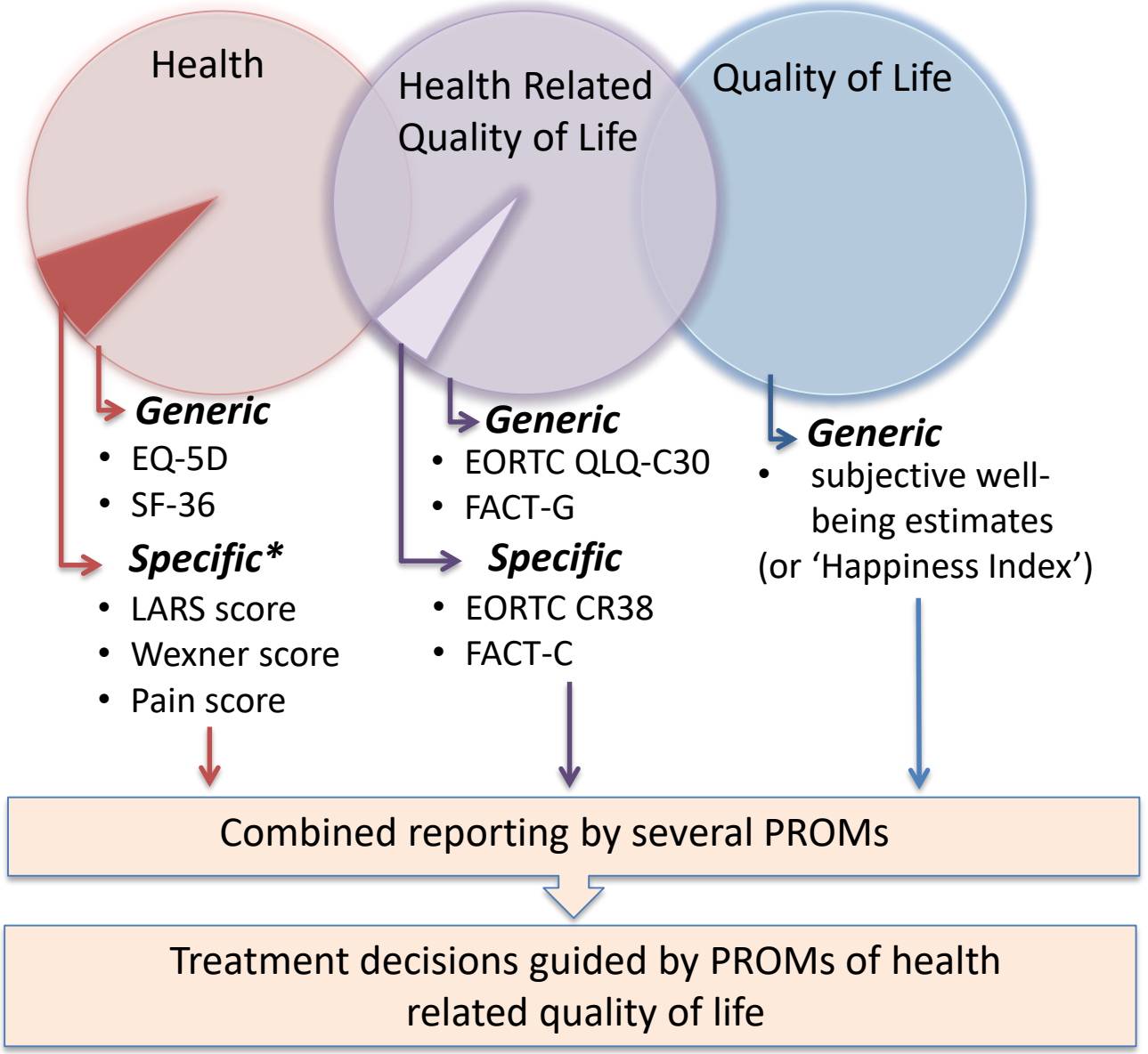
	UK (Development)	*Denmark (Validation)*	
n	**463**	**938**	P value
Recruitment Period	2001 – 2012	2001 – 2007	
Age at surgery			
mean (SD) years	64.9 (10.1)	63.6 (10.0)	0.026
Time from surgery to LARS score (years)			
Mean (SD)	5.2 (2.4)	4.7 (1.7)	< 0.001
Gender			
Males, n (%)	272 (60.3)	536 (57.1)	0.27
Tumour Height			
mean (SD)* cm	9.0 (3.3)	10.4 (2.9)	< 0.001
missi			

UK patients – tumours 1.4cm lower

Results: Cohort comparison UK v DK



Patient Reported Outcome Measures (PROMs): the relationship between measures of interest



Adapted from Søreide K, 2013, Frontiers in Oncology

1996

Randomized Comparison of Straight and Colonic J Pouch Anastomosis After Low Anterior Resection

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Steven D. Wexner, M.D., F.A.C.S., F.A.S.C.R.S.,§ and Rune Sjödahl, M.D., Ph.D.*

From the Department of Surgery, University Hospital, Linköping, Sweden; the Department of Surgery, Academic Hospital,† Uppsala, Sweden; the Department of Surgery, Central Hospital,‡ Gävle, Sweden; and the Department of Colorectal Surgery, Cleveland Clinic Florida,§ Ft. Lauderdale, Florida*

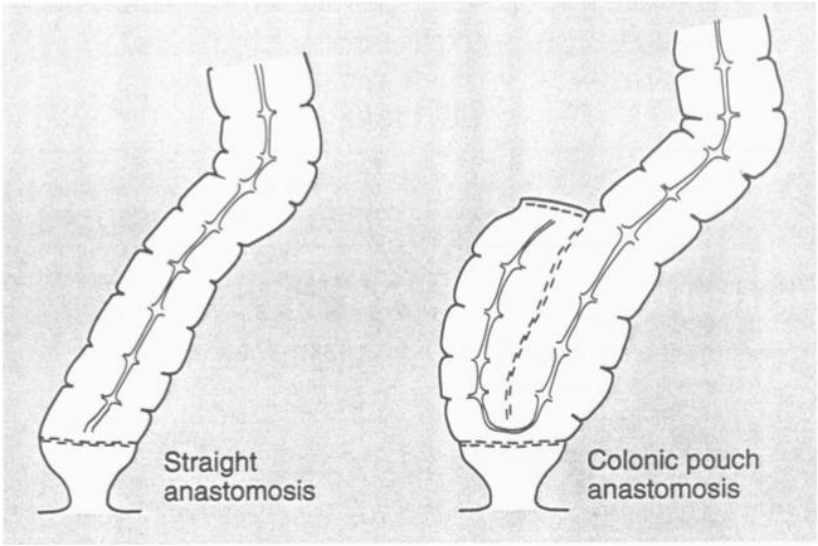


Figure 1. The patients were randomly allocated to reconstruction with either a straight or a colonic J pouch anastomosis.

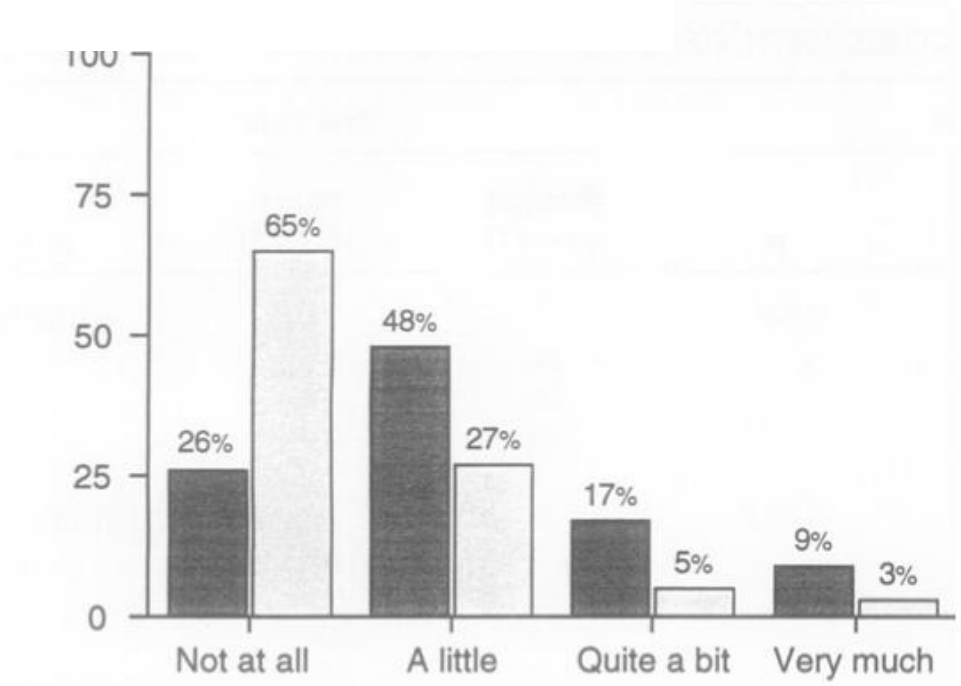
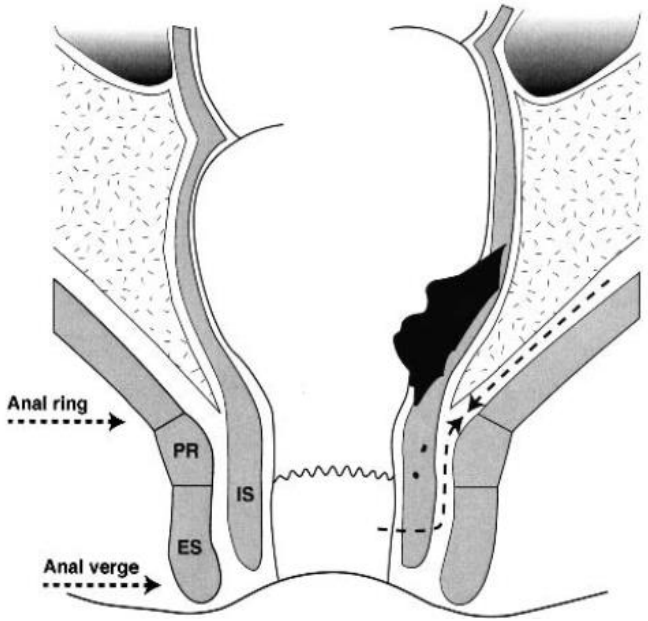


Figure 4. The patients were asked if the bowel function adversely affected their overall well-being. The proportions (%) of the patients' ratings after 1 year are shown. The difference between the groups (straight anastomosis [dark gray], n = 47; pouch anastomosis [light gray], n = 42) was significant ($p < 0.001$, Wilcoxon's rank sum test).

Low Rectal Cancer - Impaired Bowel Related Quality of Life

Comparison of Functional Results and Quality of Life Between Intersphincteric Resection and Conventional Coloanal Anastomosis for Low Rectal Cancer

Frédéric Bretagnol, M.D.,[1] Eric Rullier, M.D.,[1] Christophe Laurent, M.D.,[1]
Frank Zerbib, Ph.D.,[2] Renaud Gontier, M.D.,[1] Jean Saric, M.D.[1]



PELICAN
cancer foundation

Aarhus University Hospital

Bowel dysfunction

Low Anterior Resection Syndrome Score (LARS Score)

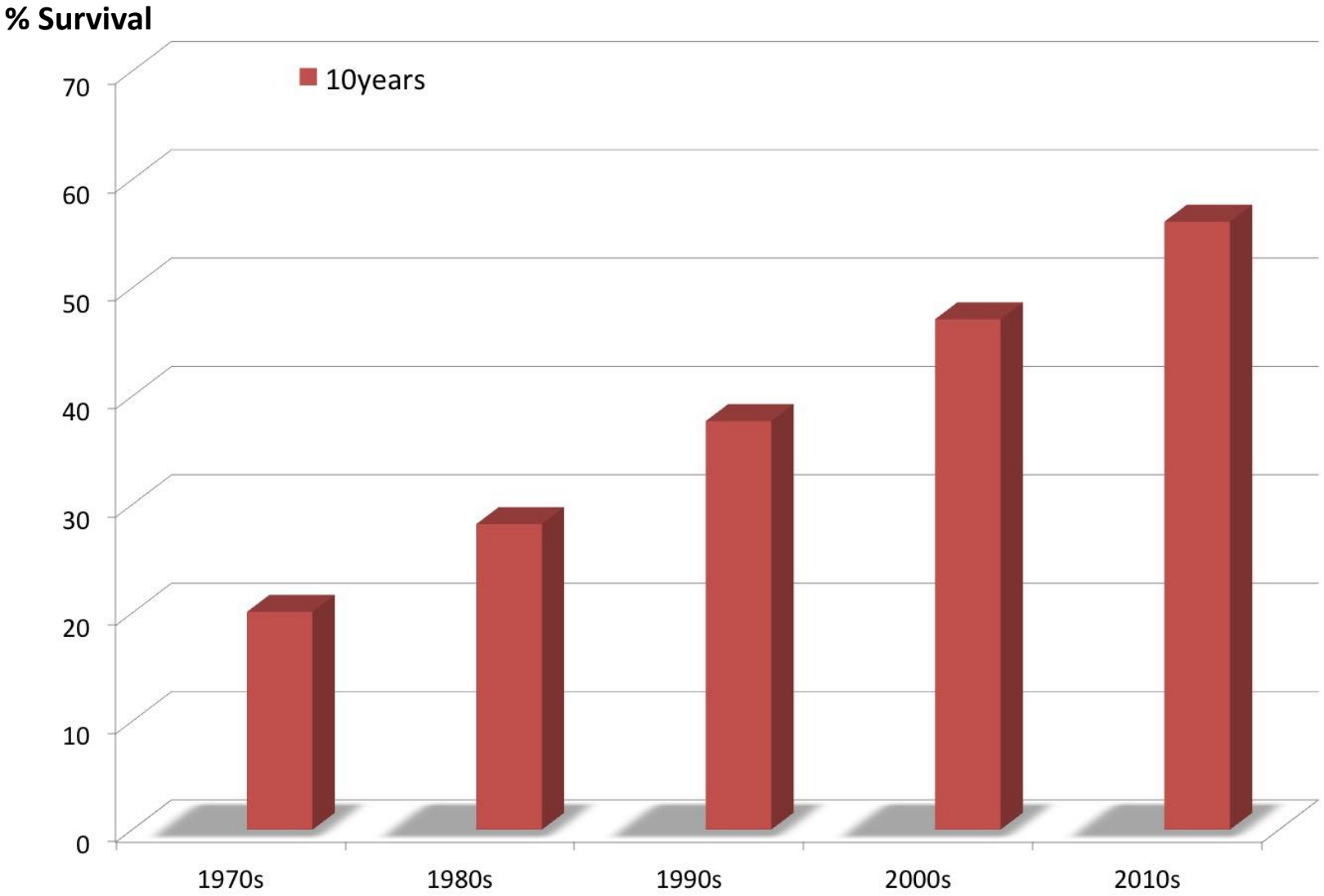
• **Do you ever have occasions when you cannot control your flatus (wind)?**	□ No, never	0
	□ Yes, less than once per week	4
	□ Yes, at least once per week	7
• **Do you ever have any accidental leakage of liquid stool?**	□ No, never	0
	□ Yes, less than once per week	3
	□ Yes, at least once per week	3
• **How often do you open your bowels?**	□ More than 7 times per day (24 hours)	4
	□ 4-7 times per day (24 hours)	2
	□ 1-3 times per day (24 hours)	0
	□ Less than once per day (24 hours)	5
• **Do you ever have to open your bowels again within one hour of the last bowel opening?**	□ No, never	0
	□ Yes, less than once per week	9
	□ Yes, at least once per week	11
• **Do you ever have such a strong urge to open your bowels that you have to rush to the toilet?**	□ No, never	0
	□ Yes, less than once per week	11
	□ Yes, at least once per week	16

0-20 = **No LARS** 21-29 = **Minor LARS** 30-42 = **Major LARS**

EORTC QLQ-C30 (version 3)

FUNCTIONAL SCALES	SYMPTOM SCALES / ITEMS
PHYSICAL (Q1-5)	FATIGUE (Q10,12,18)
ROLE (Q6 & 7)	NAUSEA & VOMITING (Q14,15)
EMOTIONAL (Q21-24)	PAIN (Q9 & 19)
COGNITIVE (Q20 & 25)	DYSPNOEA (Q8)
SOCIAL (Q26 &27)	INSOMNIA (Q11)
OVERALL QOL (Q29,30)	APPETITE LOSS (Q13)
	CONSTIPATION (Q16)
	DIARRHOEA (Q17)
	FINANCIAL DIFFICULTIES (Q28)

Improved Survival from Rectal Cancer



Quaresma et al. 40-year trends in survival, Lancet 2015

PELICAN cancer foundation

Morbidity after LAR

- Acute morbidity to surgery, radiation & chemo
- Long-term morbidity:
  - Incisional hernia
  - Adhesions
  - Chronic pain
  - Pelvic organ dysfunction
    - Bowel
    - Bladder
    - Sexual
  - Quality of life

Chronic pain

Chronic pain (pelvic area or lower extremities):

- 31% of all patients

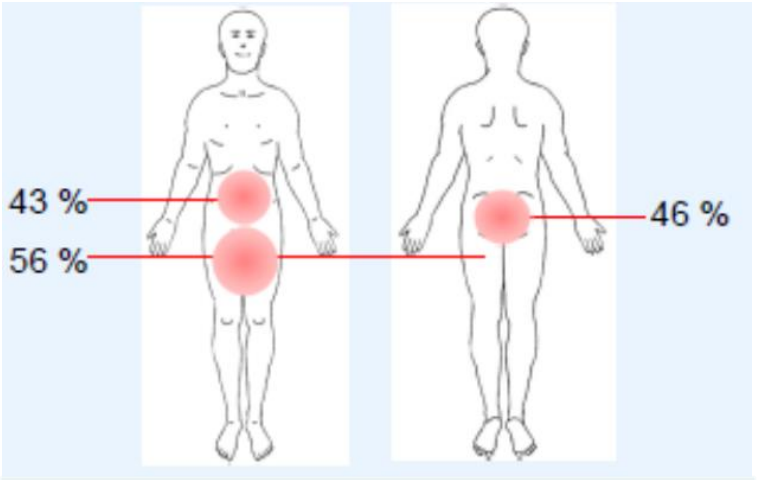
Pain intensity:

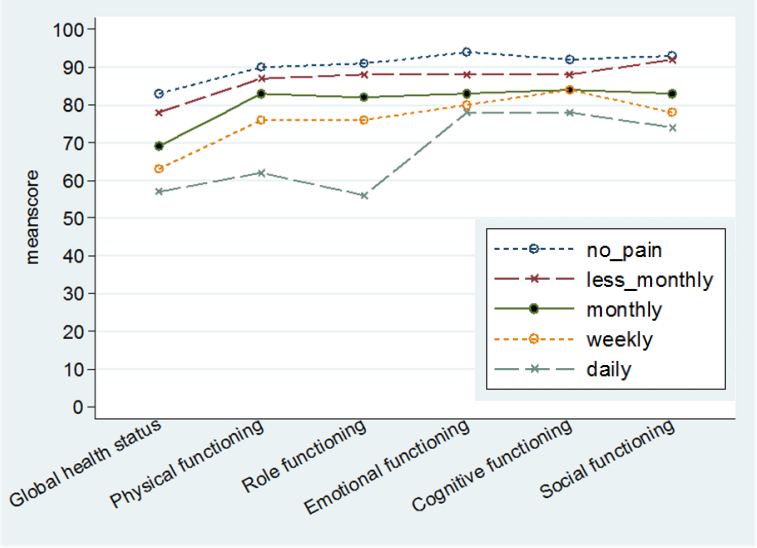
- Moderate-severe in 55%

Risk of pain (OR):

- PME 1.00
- TME 1.39
- APE 1.73

Significantly affecting QoL





Chronic pain in the pelvic area or lower extremities after curative rectal cancer treatment and its impact on quality of life: a population-based cross sectional study. Feddern et al, Under review with Pain

Pelvic organ dysfunction

- Bowel dysfunction
  - Low anterior resection syndrome - LARS
- Bladder dysfunction:
  - Incontinence
  - Emptying difficulties
- Sexual dysfunction
  - Male
  - Female

Urinary dysfunction

Urinary dysfunction after rectal cancer treatment is mainly caused by surgery

British Journal of Surgery 2008; **95**: 1020–1028

M. M. Lange[1], C. P. Maas[2], C. A. M. Marijnen[3,4], T. Wiggers[5], H. J. Rutten[6], E. Klein Kranenbarg[1] and C. J. H. van de Velde[1], cooperative clinical investigators of the Dutch Total Mesorectal Excision trial

Conclusion: UD is a significant clinical problem after rectal cancer treatment and is not related to PRT, but rather to surgical nerve damage.

Large study (n:785)
Prospective - including pre-OP data
Randomised +/- RT
Good quality data (response rate>80%)

Urinary dysfunction

Incontinence:

- Pre-OP: 16.7%
- 3 months Post-OP: 25.8% ($p<0.001$)
- 5 years Post-OP: 38.1% (de novo 72%)
  - Incontinence aggravation: 22.6 %
- Risk factors:
  - Pre-OP incontinence (RR: 2.75)
  - Female (RR: 2.77)
- **Pre-OP Radiotherapy**
  - Not a risk factor

Urinary dysfunction

Emptying difficulties:

- Pre-OP: 22.5 %
- 3 months Post-OP: 36.0 % ($p<0.001$)
- 5 years Post-OP: 30.6 %
  - Aggravation of emptying: 6%
- Risk factors:
  - Pre-OP emptying difficulties (RR =2.78)
  - Peri-operative blood loss (RR = 1.62)
  - Autonomic nerve damage (RR = 3.28)
- **Pre-OP Radiotherapy**
  - Not a risk factor

Sexual dysfunction

Men

- Erectile dysfunction
- Ejaculatory dysfunction
- Decreased Libido

Women

- Dryness of vagina
- Dyspareunia
- Impaired ability to reach orgasm
- Decreased libido

Urinary Dysfunction?

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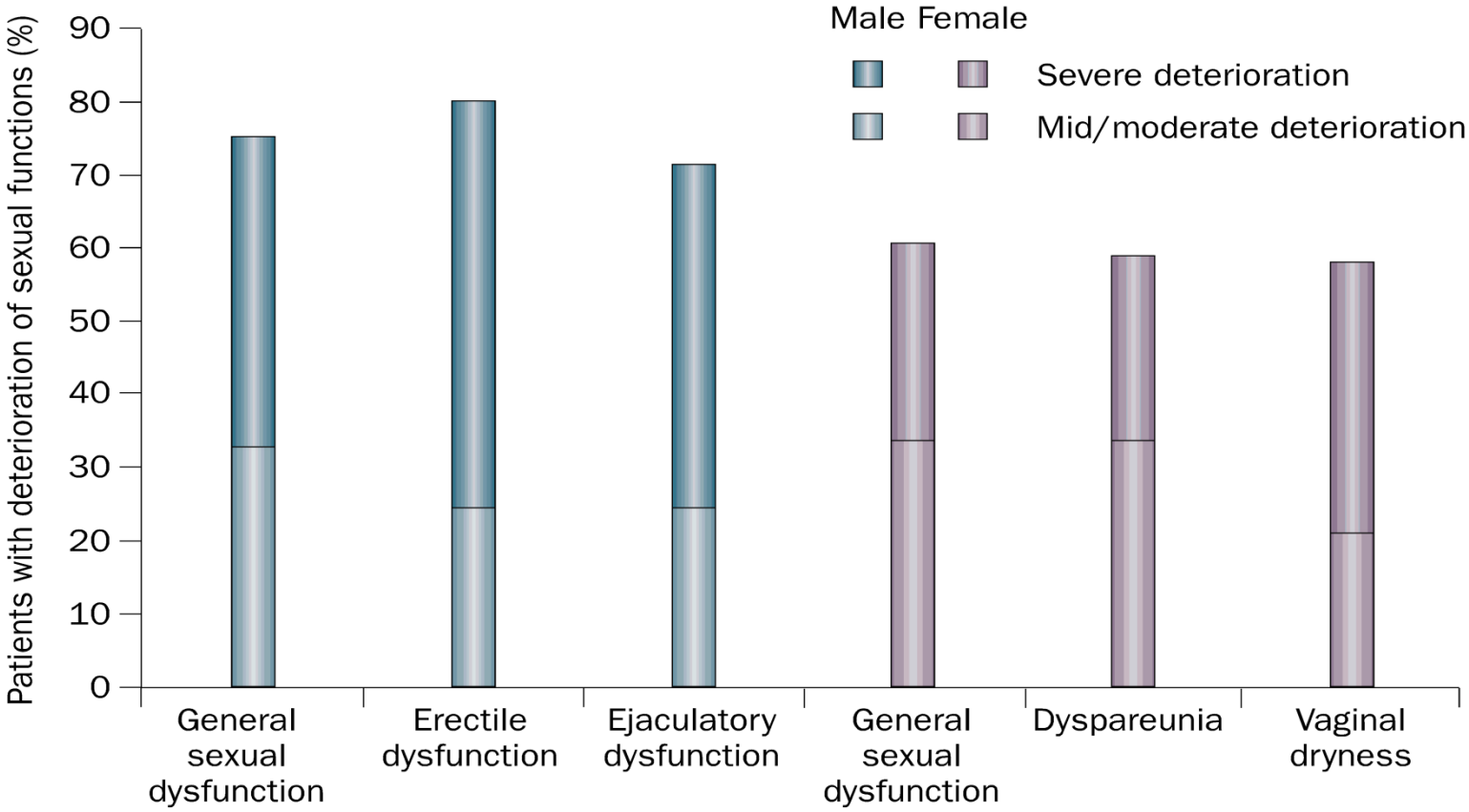
Sexual Dysfunction?

Urinary and sexual dysfunction after rectal cancer treatment

NATURE REVIEWS | UROLOGY

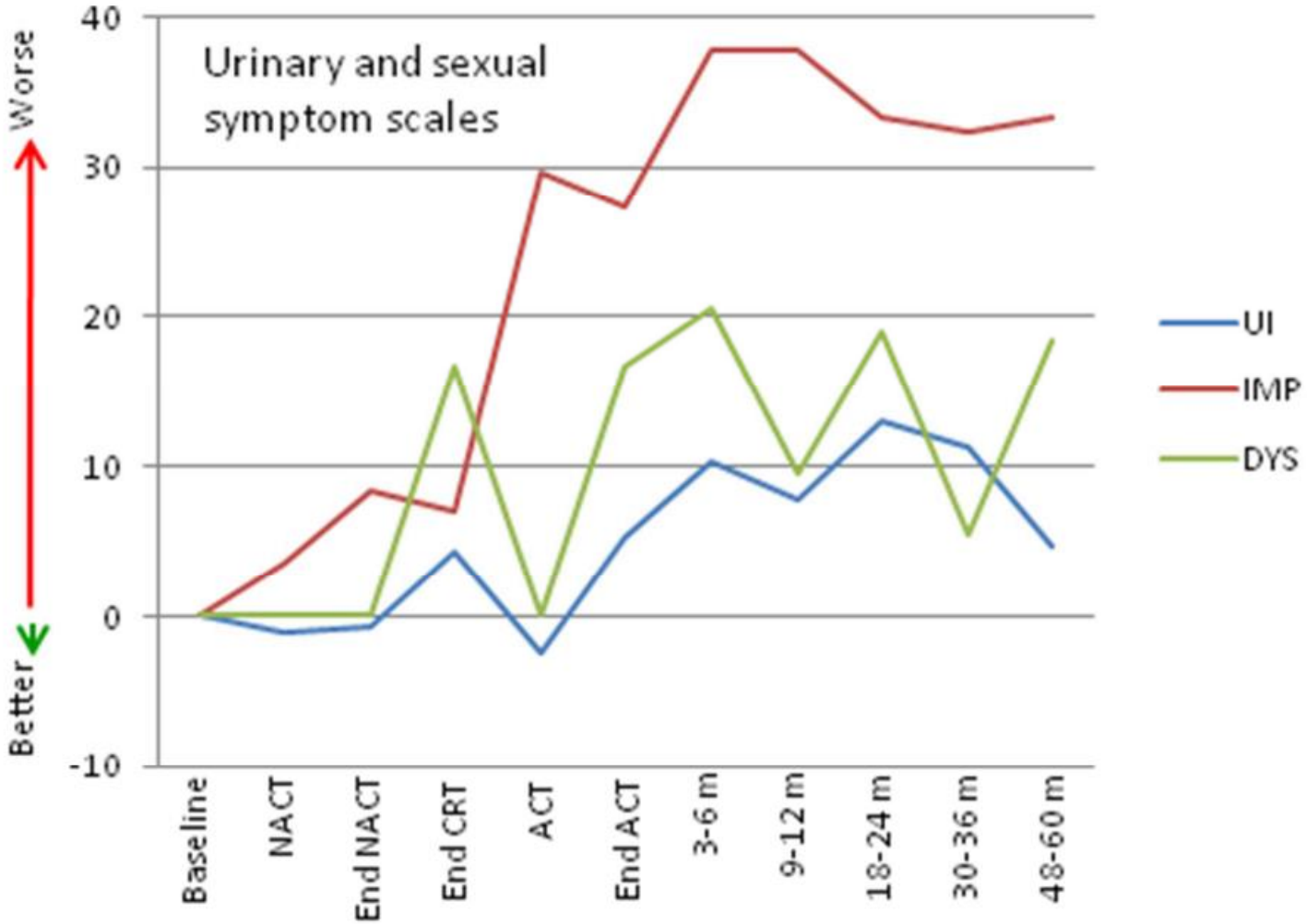
VOLUME 8 | JANUARY 2011

Marilyne M. Lange and Cornelis J. H. van de Velde



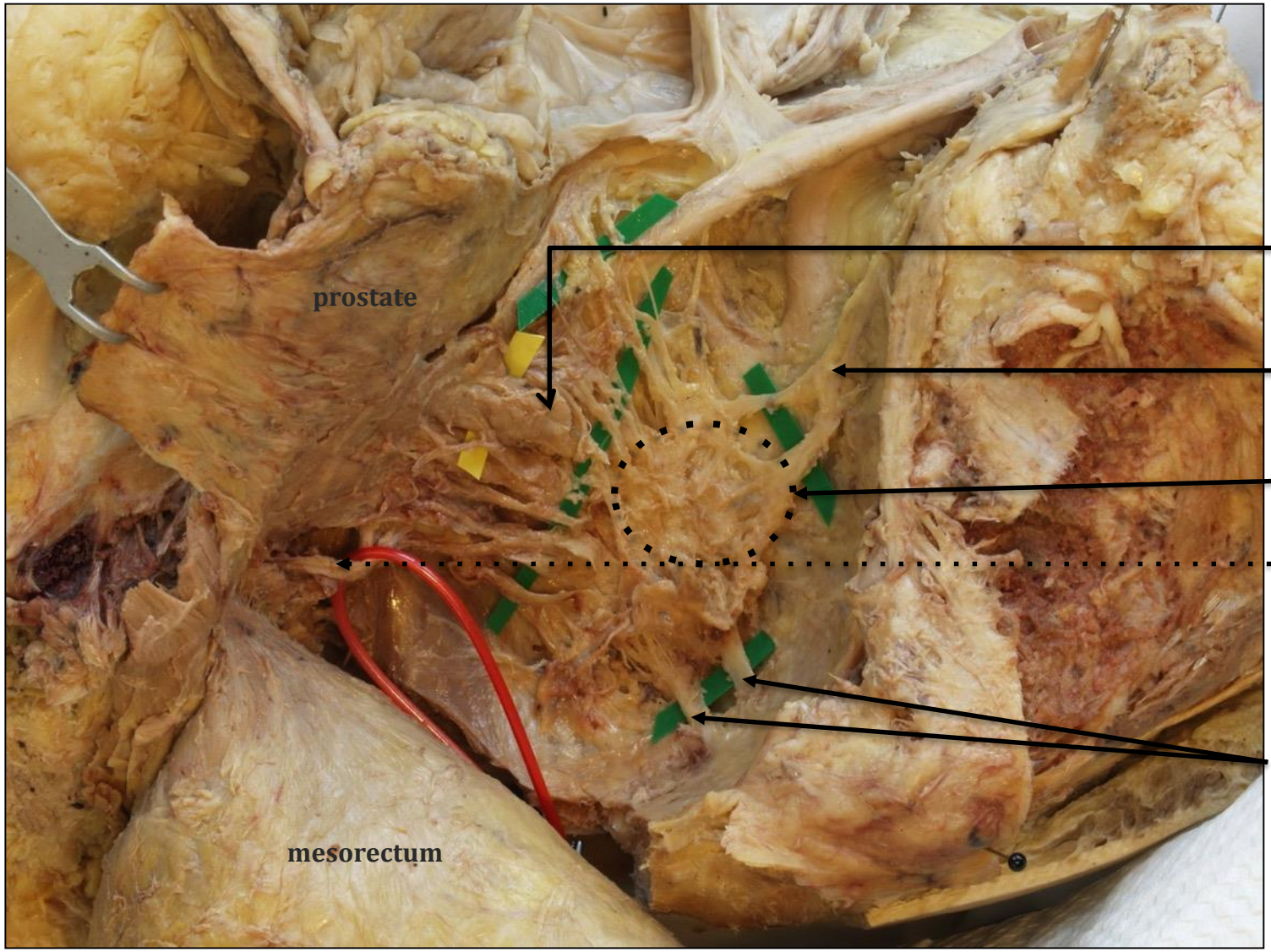
International Journal of Radiation Oncology biology • physics

Short- and long-term quality of life – EXPERT –C trial



Sclafani F et al, 2015

Course of the Autonomic Nerves at the Pelvic Side Wall



Urinary and sexual dysfunction after rectal cancer treatment

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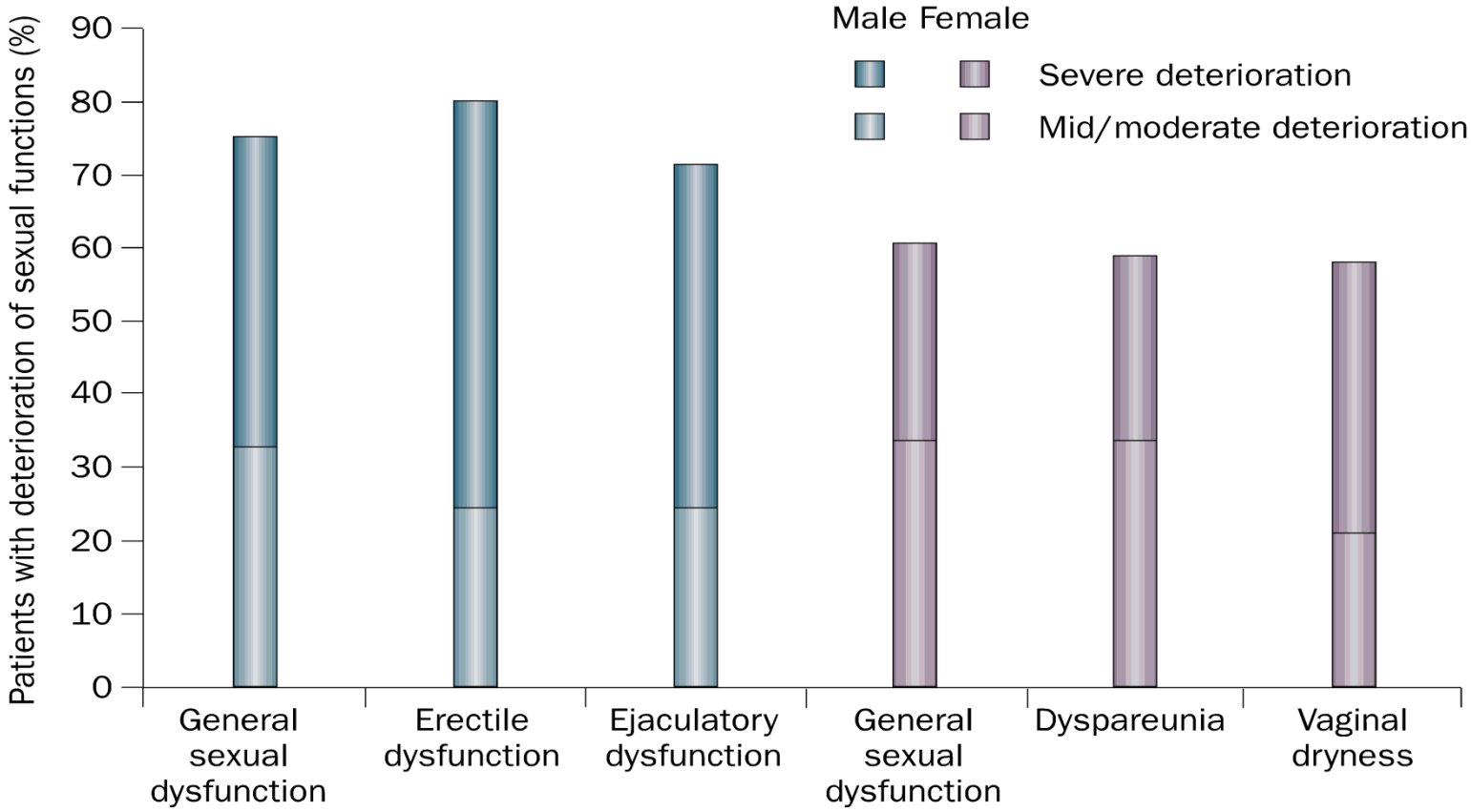
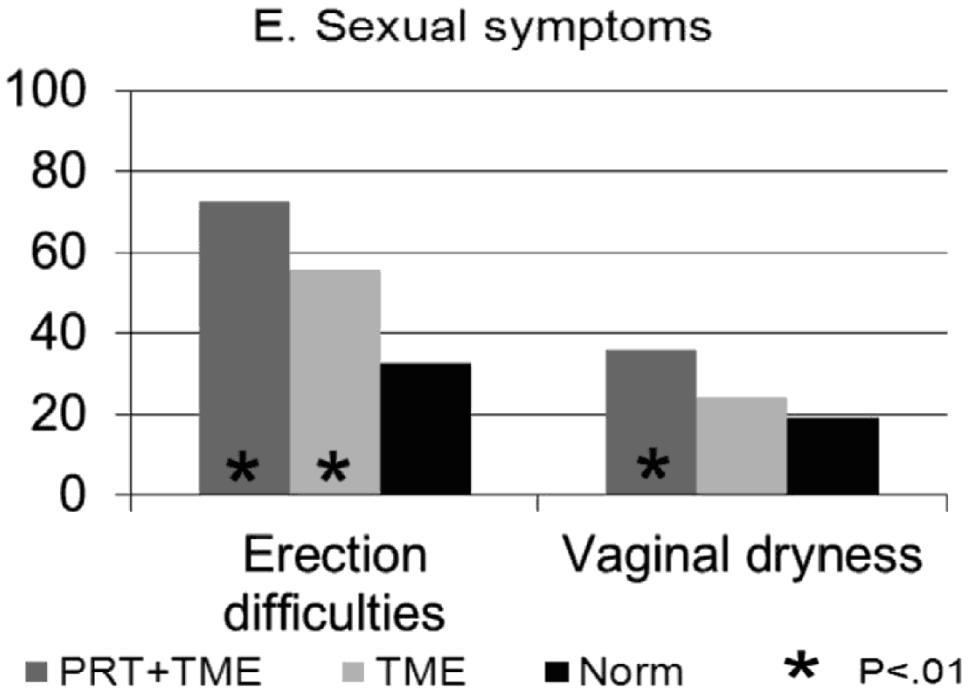


Health-related quality of life 14 years after preoperative short-term radiotherapy and total mesorectal excision for rectal cancer: Report of a multicenter randomised trial ☆

European Journal of Cancer (2014) **50**, 2390–2398

Lisette M. Wiltink [a], Tina Y.T. Chen [d], Remi A. Nout [a], Elma Meershoek-Klein Kranenbarg [b], Marta Fiocco [c], Søren Laurberg [d], Cornelis J.H. van de Velde [b], Corrie A.M. Marijnen [a,*]



Sexual function in females after radiotherapy for rectal cancer

Acta Oncologica, 2010; 49: 826–832

KJERSTI BRUHEIM[1], KJELL MAGNE TVEIT [1,2], EVA SKOVLUND[3],
LISE BALTESKARD[4,5], ERIK CARLSEN[6], SOPHIE D. FOSSÅ[2,7] & MARIANNE G. GUREN[1]

Table IV. Odds ratio (OR) of sexual dysfunction and vaginal problems in RT+ patients compared to RT− patients, adjusted for age and the presence of stoma.

	RT+	RT−	OR	p	CI
Sexual interest (1)	44/15	78/24	1.2	0.5	0.5–2.8
Lack of lubrication (2)	10/10	8/26	3.5	0.04	1.03–12.1
Dyspareunia (2)	7/13	4/32	4.5	0.04	1.1–18.6
Reduced vaginal dimension (2)	7/13	2/32	8.9	0.01	1.6–50.3
Able to complete intercourse (3)	7/11	5/21	2.3	0.26	0.5–9.5
Reach orgasm (3)	9/10	9/23	2.5	0.1	0.7–8.8

SEXUAL FUNCTION IN MALES AFTER RADIOTHERAPY FOR RECTAL CANCER

Int. J. Radiation Oncology Biol. Phys., Vol. 76, No. 4, pp. 1012–1017, 2010

KJERSTI BRUHEIM, M.D.,* MARIANNE G. GUREN, M.D., PH.D.,* ALV A. DAHL, M.D., PH.D.,†‡
EVA SKOVLUND, PH.D.,§ LISE BALTESKARD, M.D., PH.D.,¶ ERIK CARLSEN, M.D., PH.D.,‖
SOPHIE D. FOSSÅ, M.D., PH.D.,†‡ AND KJELL MAGNE TVEIT, M.D., PH.D.*‡

Table 2. International Index of Erectile Function Scores in irradiated (RT+) and nonirradiated (RT–) patients

Domain (valid answers *n*, RT+/RT–)	Range	RT+ group Mean (SD)	RT- group Mean (SD)	*p**
Sexual desire (*n* = 104/130)	2–10	5.0 (2.0)	5.4 (2.0)	0.23
Erectile function (*n* = 100/125)	1–30	6.9 (7.9)	14.3 (11.1)	<0.001
Orgasmic function (*n* = 103/128)	0–10	2.9 (3.8)	5.2 (4.3)	<0.001
Intercourse satisfaction (*n* = 32/65)†	0–15	7.6 (3.5)	10.1 (2.8)	0.001
Overall satisfaction with sex life (*n* = 96/120)	2–10	4.3 (2.2)	5.7 (2.6)	<0.001

Urinary and sexual dysfunction after rectal cancer treatment

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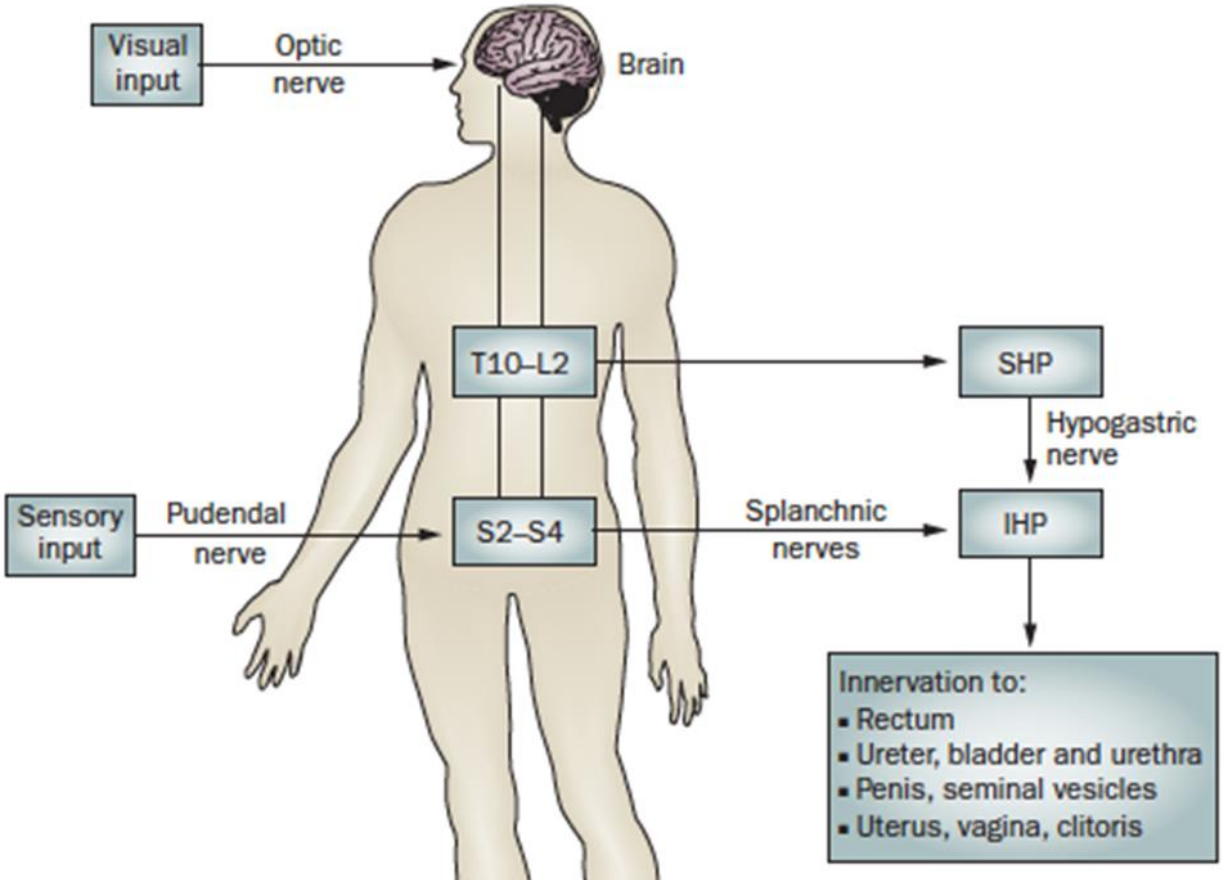

Incontinence:

- **Sympathetic damage:**

  Detrusor hyperactivity and/or ↓ bladder capacity

  → Urge

- **Parasympathetic damage:**

  ↓ Detrusor strength and impaired bladder sensation

  → Overflow

- **Anatomical changes:**

  Impaired support and strength in the pelvic floor

  → Stress

Emptying difficulties:

- **Parasympathetic damage:**

  Diminished detrusor strength and impaired sensation

  - Transient (<6 months): Partial damage and regeneration
  - Permanent (>12 months): Transection of nerves

- **Anatomical changes:**

  Impaired support

Neurological damage:

- Sympathetic nervous system
- Parasympathetic nervous system
- Mixed sympathetic/parasympathetic nervous system

Sexual and urinary dysfunction after proctectomy for rectal cancer

C. Eveno[a], A. Lamblin[b], C. Mariette[b], M. Pocard[a]

Journal of Visceral Surgery (2010) **147**, e21—e30

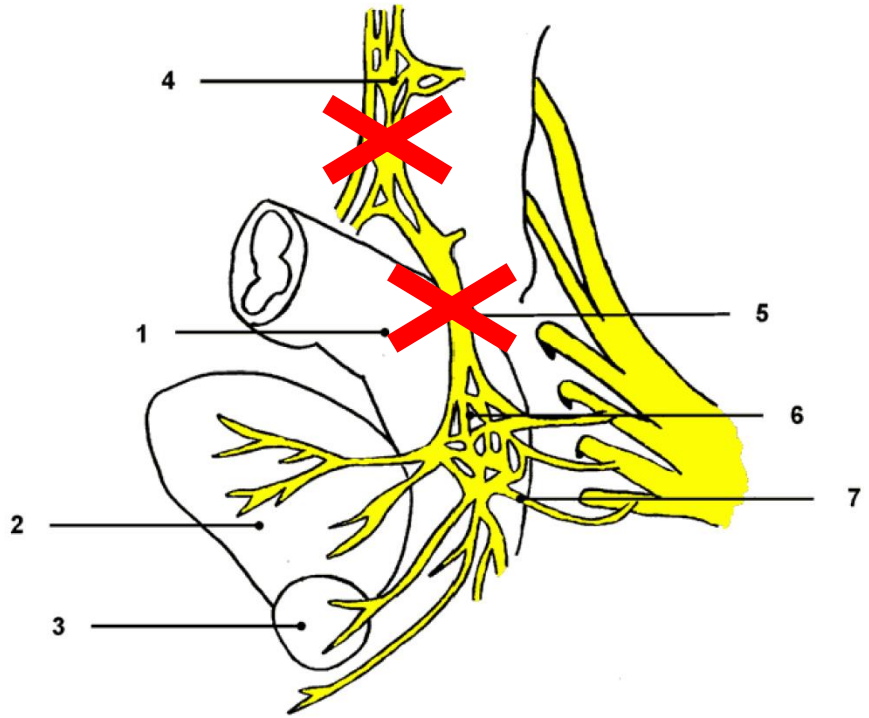

Figure 1. Autonomic nervous system: pelvic nerves and plexus. 1. Rectum. 2. Bladder. 3. Prostate. 4. Preaortic plexus. 5. Hypogastric nerves. 6. Lateral pelvic plexus. 7. Branches of parasympathetic anterior roots S2, S3 and S4.

Sympathetic damage:

Point of damage:

- Superior hypogastric plexus
- Hypogastric nerve

Consequence:

- Normal erection
- Retrograde/no ejaculation

- Dryness of the vagina

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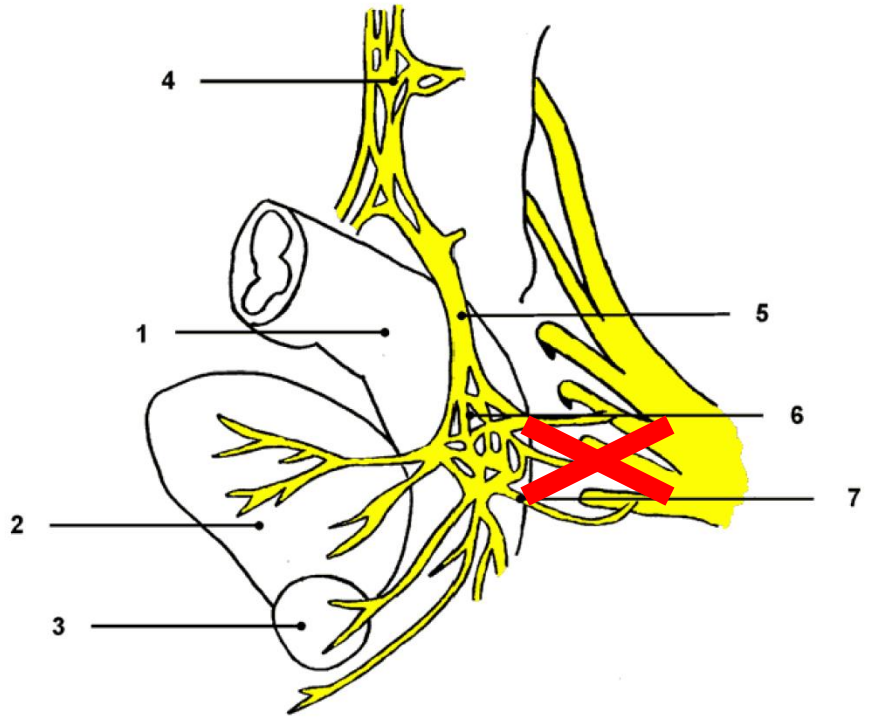

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Parasympathetic damage:

Point of damage:

- Pelvic nerves (nervi erigenti)

Consequence:

- Impotence
- Normal ejaculation

- Dryness in vagina
- Dyspareunia

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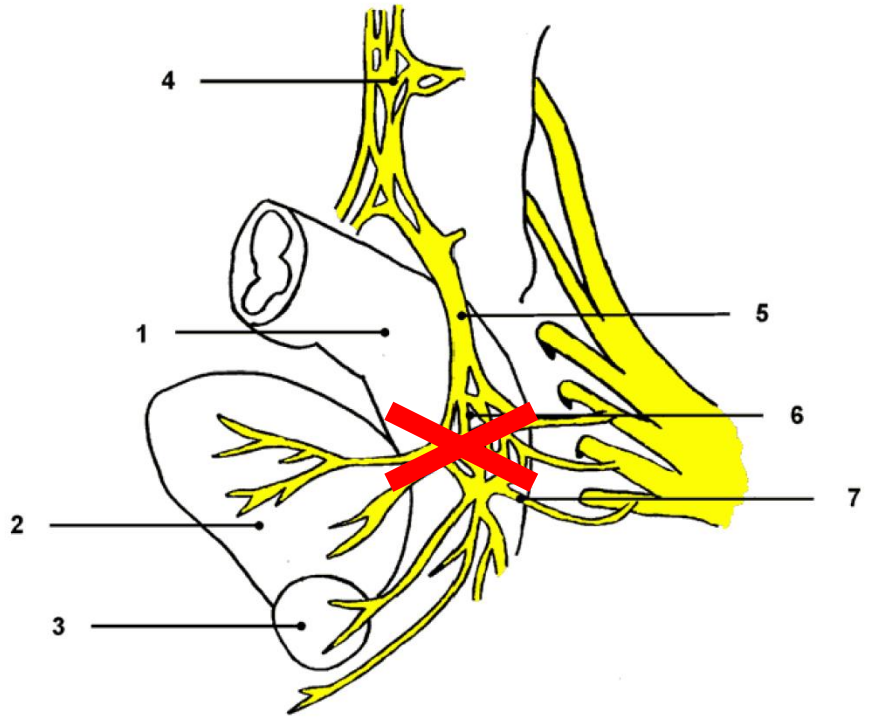

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Mixed damage:

Point of damage:

- Inferior hypogastric plexus

Consequence:

- Impotence

- Dyspareunia
- Impaired ability to reach orgasm