Multi Shades of Grey

Cauda Equina Syndrome

Authors: Laura Finucane, Sue Greenhalgh, Chris Mercer

Multi shades of grey
Cauda Equina Syndrome

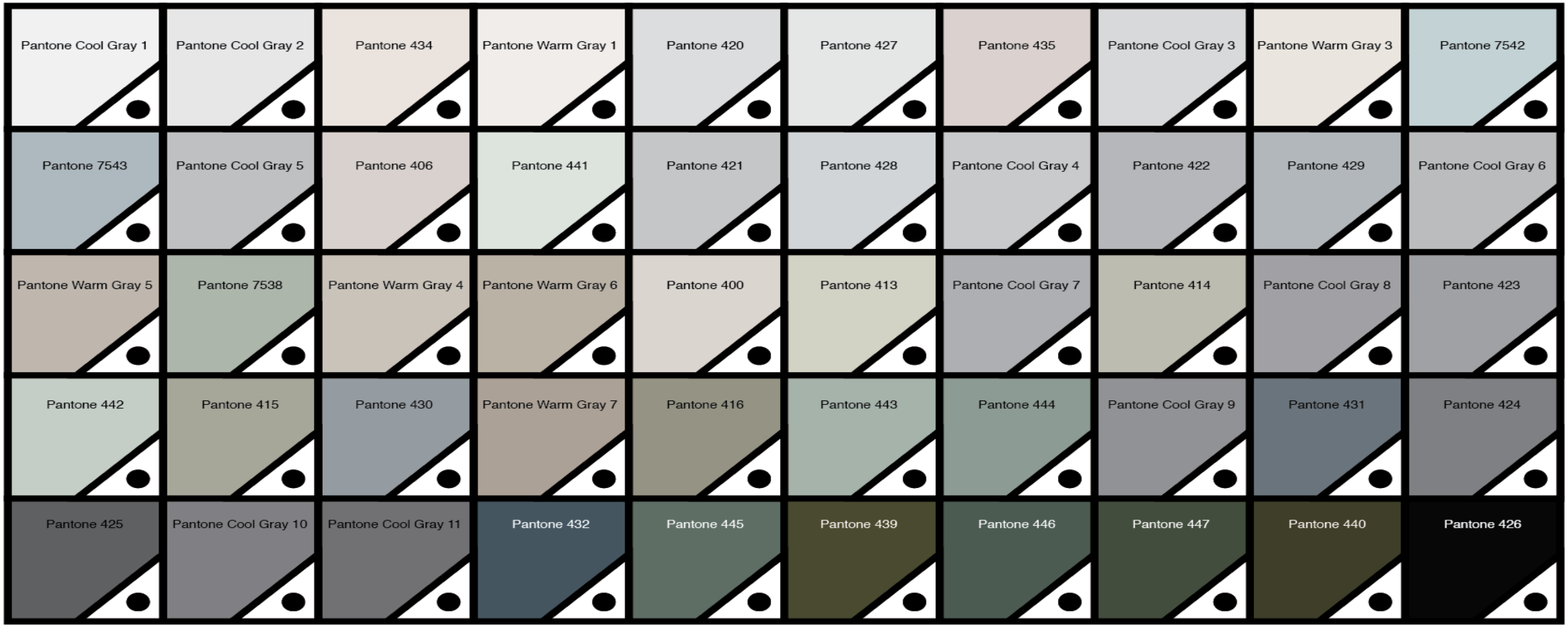
What time did you see Mrs X. as time scales are unclear?

How long had the patient had pain down both legs as some of the documentation is illegible?

This patient should have been sent for an urgent MRI and surgical opinion that day. Please comment

Your notes suggest you gave 'advice'. What advice exactly did you give to Mrs X'

Multi shades of grey
Cauda Equina Syndrome



MULTI-SHADES OF GREY

- Rare
- Devastating consequences
- Serious medico legal implications
- Patients self report symptoms of bladder and bowel dysfunction that are NOT related to CES

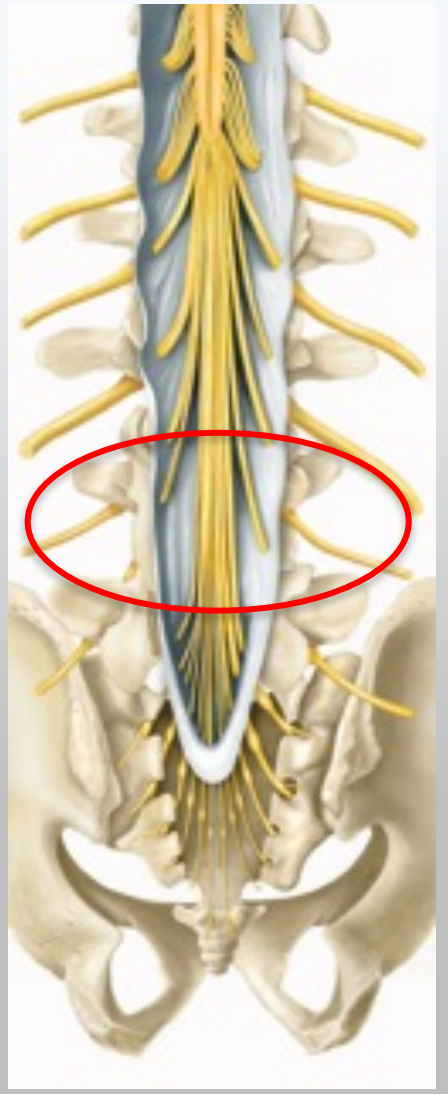
How much black and white is there ?

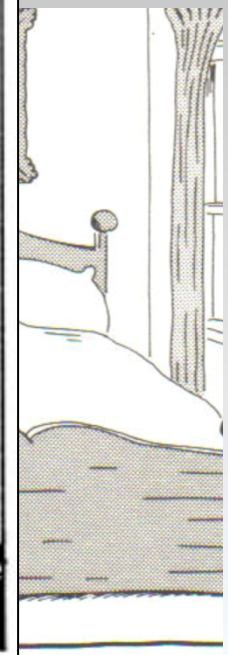
Definition

‘A patient presenting with acute back pain and/or leg pain with a suggestion of a disturbance of their bladder or bowel function and/or saddle sensory disturbance should be suspected of having a CES.’

(BASS 2015)

Anatomy





"Well, here we are, my little chickadee."

Catastrophic Pain

Catastrophic Pain

Cauda Equina Syndrome Groups

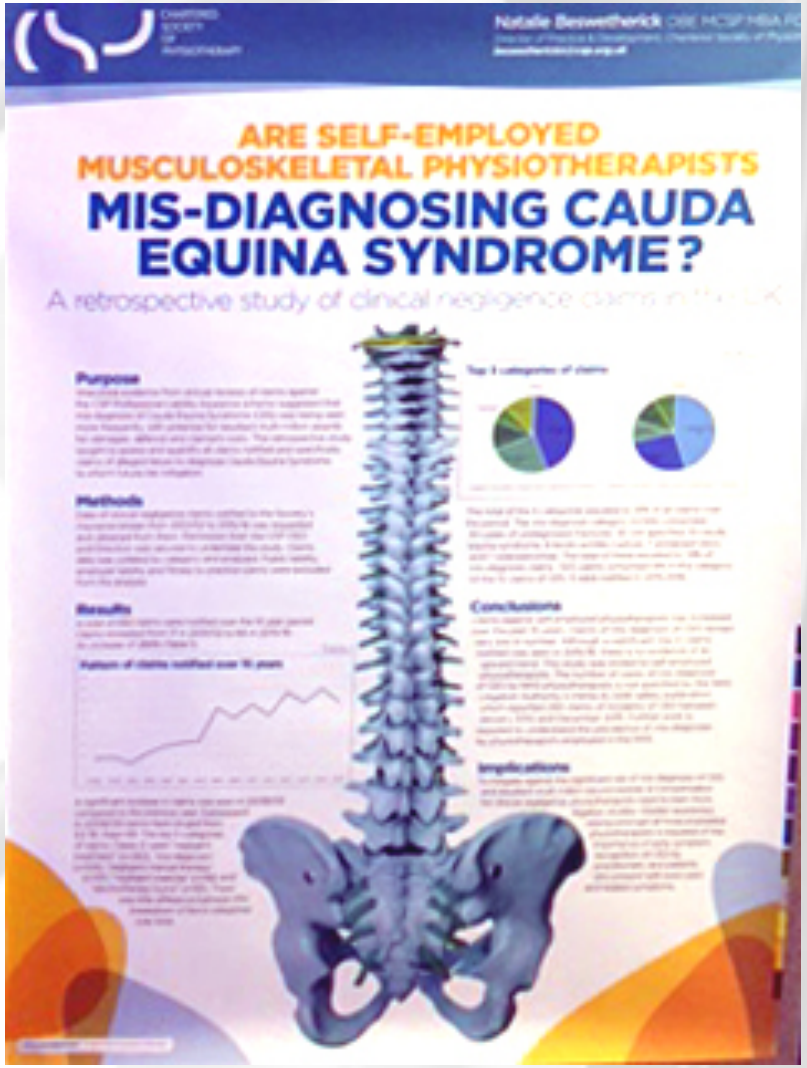
(Todd & Dickson, 2016)

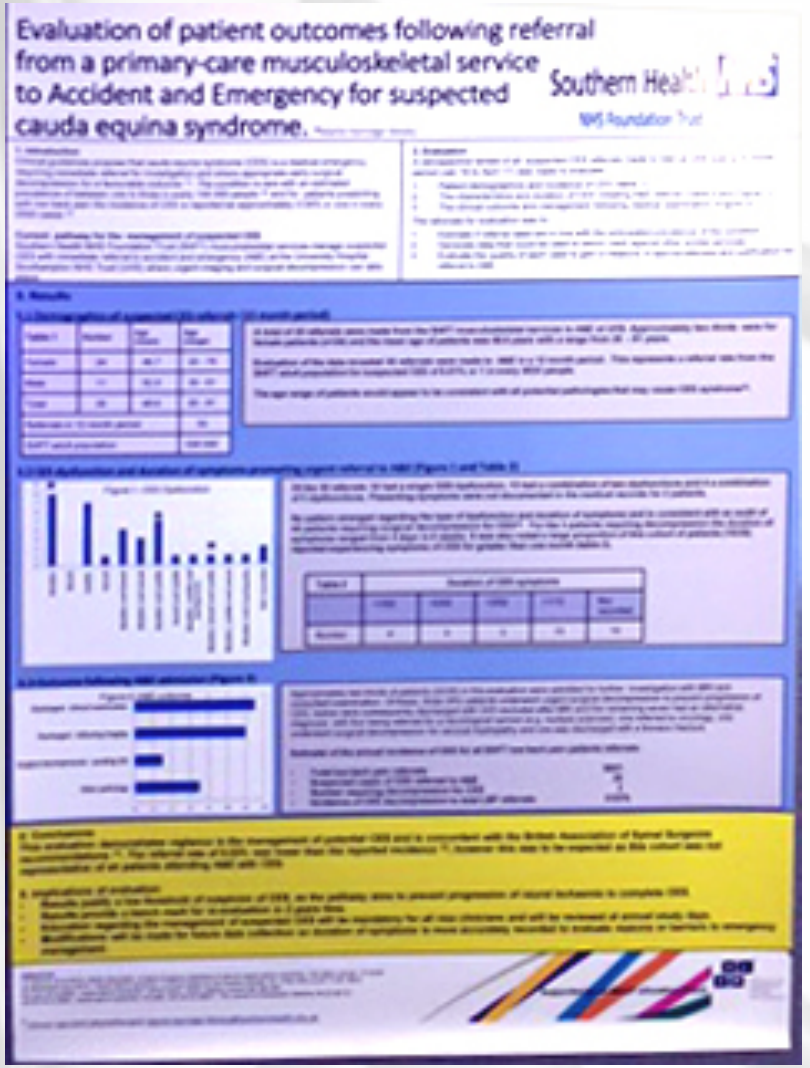
CESS suspected	Bilateral radicular pain (progressing unilateral)
CESI incomplete	Urinary difficulties of neurogenic origin, altered urinary sensation, loss of desire to void, poor urinary stream, need to strain to micturate
CESR retention	Painless urinary retention and overflow incontinence
CESC complete	Loss of all CE function, absent perineal sensation, patulous anus, paralysed insensate bladder and bowel

**'The probability of a CES patient deteriorating,
with what speed and to what level is not predictable**

Litigation

- MDU 2016 (Taylor)
  - 150 claims from 2005-16
  - 92% against GPs 70% defended
  - 8 million paid out 12% of claims over 500K
- NHSLA 2016
  - 293 claims for CES 2010-15
  - 70% 31-50 y/o
  - 25 million paid out
- Fairbank 2014
  - 30-40 cases per year go to litigation
  - Average compensation 336,000
  - 1000 operations per annum for CES


Natalie Bessenthérick
ARE SELF-EMPLOYED MUSCULOSKELETAL PHYSIOTHERAPISTS
MIS-DIAGNOSING CAUDA EQUINA SYNDROME?
A retrospective study of clinical negligence claims in the UK
Purpose
Methods
Results
Conclusions
Implications


Evaluation of patient outcomes following referral from a primary-care musculoskeletal service to Accident and Emergency for suspected cauda equina syndrome.
Southern Health
NHS Foundation Trust

Quraishi et al (2012)
European Spine Journal

- NHSLA data for all spinal disease 2002-10
- 235 cases-144 trauma/acute
- Missed fractures 41%
- Missed CES 24%
- Missed infection 12%
- Cord damage 20%

Quraishi et al (2012) European Spine Journal

- NHSLA data for all spinal disease 2002-10
- 235 cases-144 trauma/acute
- Missed fractures 41% 75000
- Missed CES 24% 268,000
- Missed infection 12% 433,000
- Cord damage 20% 367,000

Daniels et al (2012)

- Review of 15 US court cases for CES and features of successful litigation
- Timing to surgery >48 hours
- Bladder and bowel symptoms at presentation
- Sexual dysfunction at presentation
- Time to appointment
- Time to imaging
- Setting for appointment

Daniels et al (2012)

- Review[illegible]S court cases for CES and feat[illegible]uccessful litigation
- Timing to surgery[illegible]urs
- Bladder and bowel sym[illegible]t presentation
- Sexual dysfunction at presen[illegible]
- Time to appointment
- Time to imaging
- Setting for appointment

NONE HAD DRE PERFORMED

A Qualitative Investigation into Patients Experience of Cauda Equina Syndrome

Greenhalgh S, Truman C, Webster V, Selfe J (2015)

Physiotherapy Research Foundation (PRF) Grant

Aim

To identify how CES symptoms may be effectively shared between patients and clinician

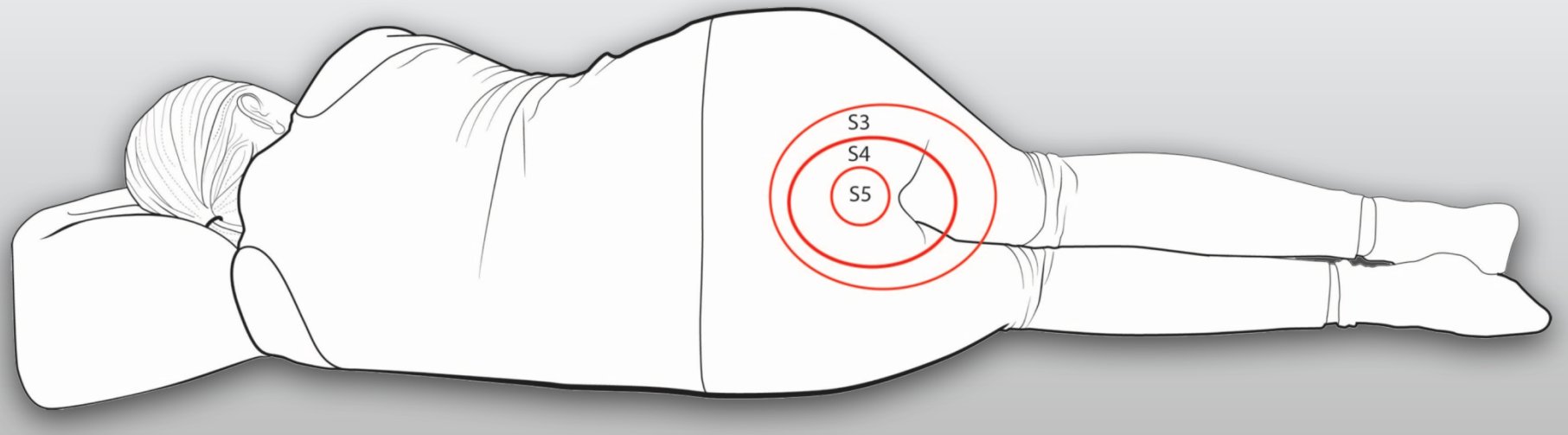
Objectives

Drawing upon patient experience of signs and symptoms associated with CES including changes in bladder, bowel and sexual function

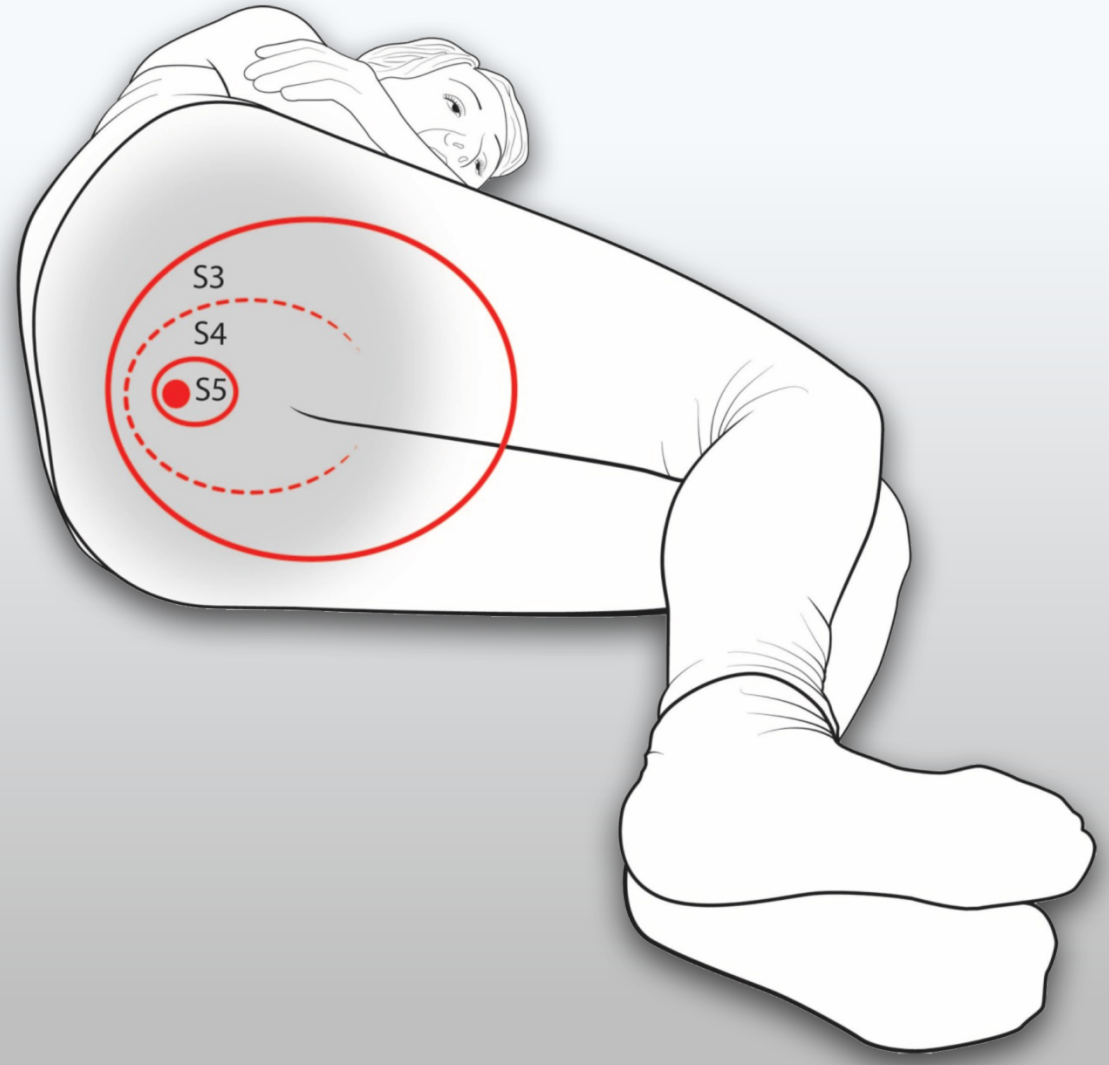
- what symptoms patients actually suffer
- patients own reasoning of these symptoms
- the patient experience of divulging this information

What can we learn from our patients?

Dermatomes S3,4,5



Dermatomes S3,4,5



Themes

- Catastrophic Pain
- Impact on Life
- Common Symptoms / Varying Chronology
- Sense of change / Seriousness
- Contact with Health Professionals
- Carers Experience
- Suggestions to aid early diagnosis

Catastrophic Pain

- *'…. The woman who was doing the MRI said oh gosh. I was all screaming and hyperventilating and she said are you ok, are you claustrophobic? I said I'm in bloody agony-Strong pain, pain in whole pelvis, real agony'*

- *'I don't think his questions weren't clear, I think that it was impossible to concentrate on anything other than pain management'.*

Common Symptoms / Varying Chronology

'……It was like you could not tell where your feet were in space' 'I was sort of losing control… my legs weren't working properly like they were made of rubber.' 'it was as if I had been riding a horse for a week or something and obviously that was to do with the saddle numbness.

'The first thing to go was my bladder function'

Sense of change / Seriousness

'I had no comprehension that this could have permanently affected my mobility and my life…through all of this and through all the pain, and through all the people that; the ambulances, the GP I'd seen at night, it was only when the Consultant said to me just before the surgery you're within the forty eight hour window so your prospects are quite good. I didn't appreciate there was anything but all they had to do was take this pain away'

N.B Importance of safety netting those at risk

Contact with Health Professionals

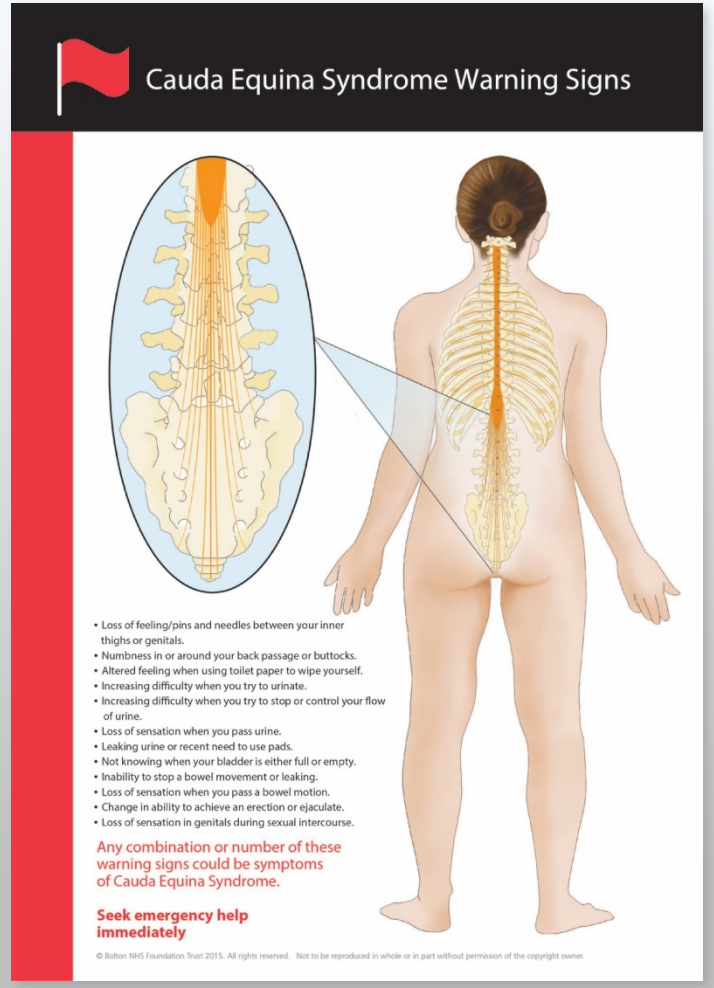
Usually already under health professionals care

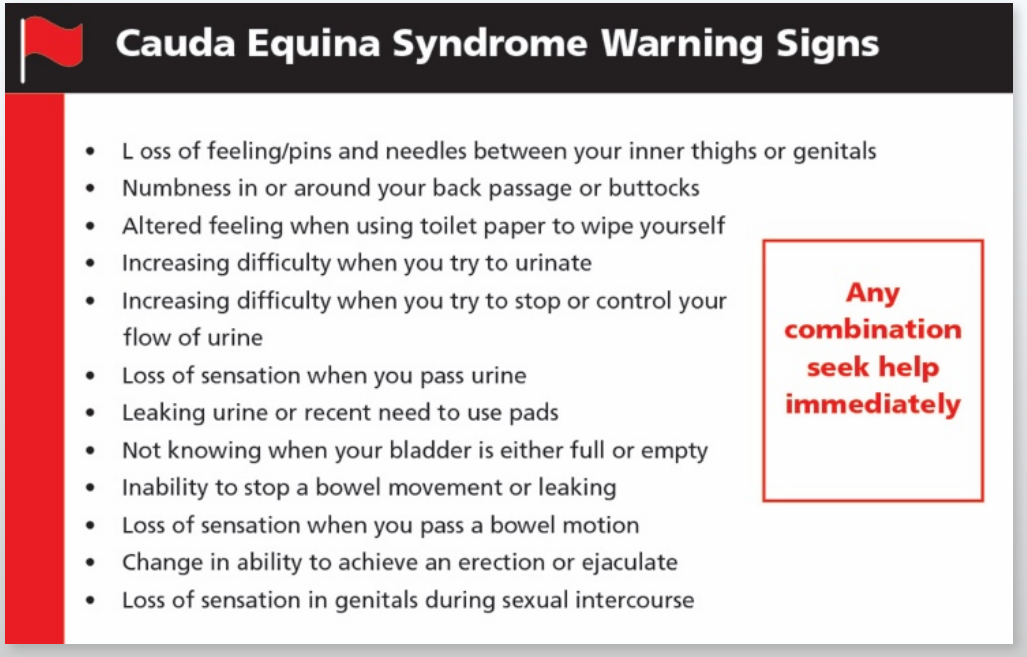
They really do need to listen to you and they need to listen to your individual circumstances.

"If I had been told numbness around back passage or genitals…everyone I saw who was medically trained called it saddle numbness"

No clear safety net advice

Suggestions to aid early diagnosis

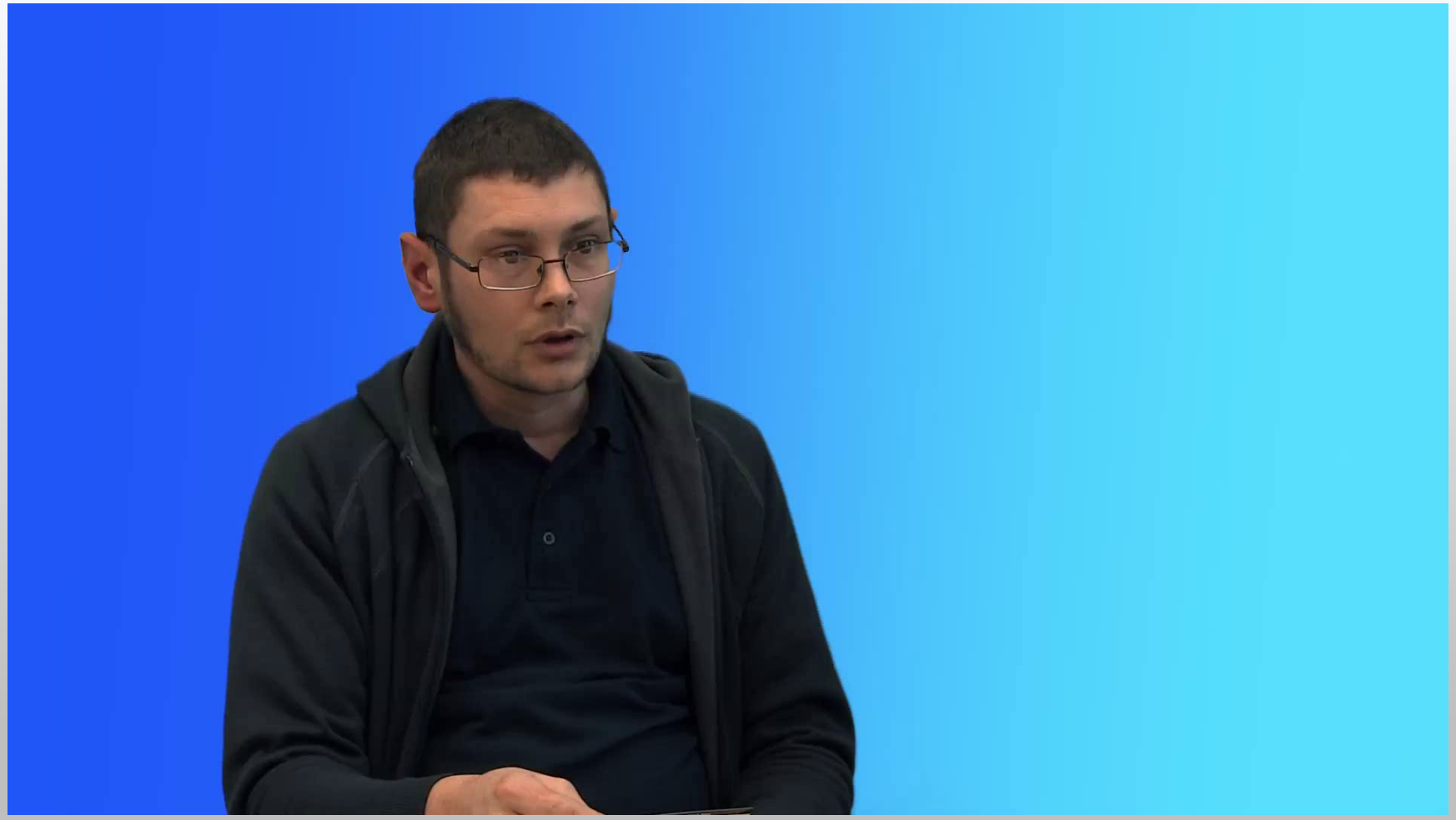




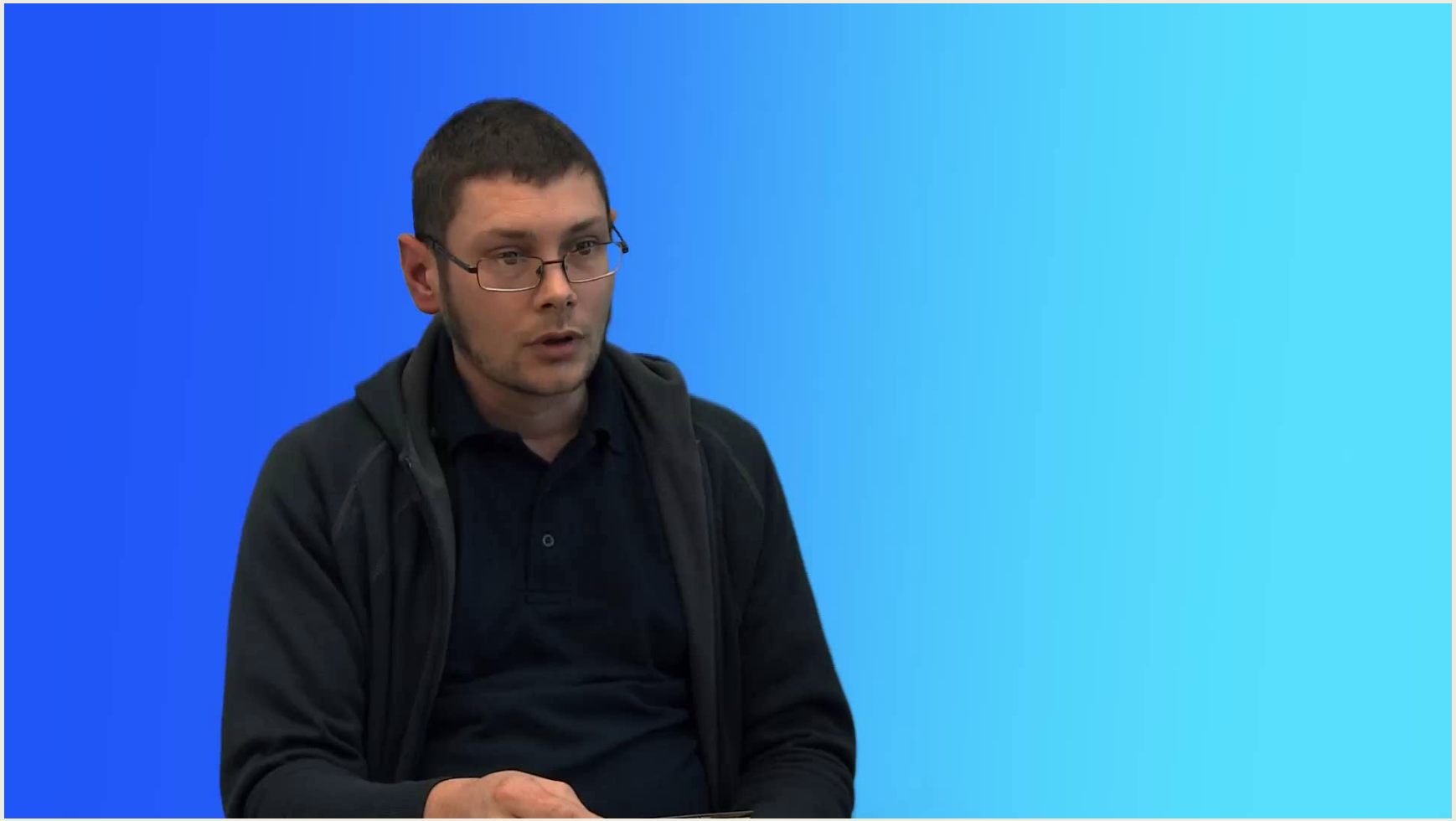
Safety netting is key

Pain is easier to communicate!

Safety Netting



Safety Netting



Multi Shades of Grey

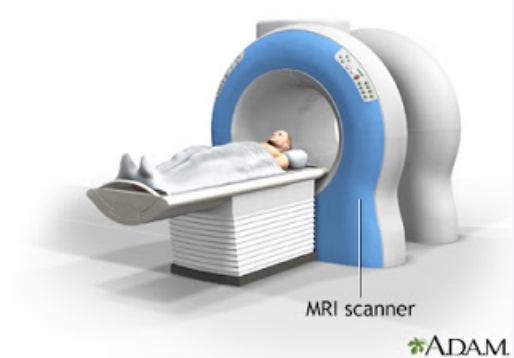
Significantly more patients are referred on for further investigation compared with those having a radiologically confirmed diagnosis of CES

(90% negative 10% positive for CES)

Bladder and bowel dysfunction, saddle anaesthesia and sexual dysfunction are all multifactorial in their causes e.g.

Comorbidities, medication, pain

(Woods et al, 2015)



Multi Shades of Grey
Urinary symptoms

Cause	Men	Women	Both
Obstructive	Benign prostatic hyperplasia, meatal stenosis, paraphimosis, penile constricting bands, phimosis, prostate cancer	Organ prolapse (cystocele, rectocele, uterine prolapse); pelvis mass (gynaecological malignancy, uterine fibroid, ovarian cyst); retroverted impacted gravid uterus	Aneurysmal dilation; bladder calculi; bladder neoplasm; faecal impaction; gastrointestinal or retroperitoneal malignancy/mass; urethral strictures, foreign bodies, stones, edema
Infectious or inflammatory	Balanitis, prostatic abscess, prostatis	Acute vulvovaginitis; vaginal lichen planus; vaginal lichen sclerosis; vaginal pemphigus	Bilharziasis; cystitis;echinococcosis; Guillain-Barre syndrome; herpes simplex virus; Lyme disease; periurethral abscess; transverse myelitis; tubercular cystitis; urethritis ; varicella zoster virus
Other	Penile trauma, fracture, laceration	Postpartum complication; urethral sphincter dysfunction (Fowler's syndrome)	Disruption of posterior urethra and bladder neck in pelvic trauma; postoperative complication; psychogenic

Multiple Shades of Grey
Saddle sensory changes

Lesion type	Causes
Autonomic or peripheral nervous system	Autonomic neuropathy; Guillian-Barre Syndrome, herpes zoster virus; Lyme disease; pernicious anaemia; poliomyelitis; radical pelvis surgery; spinal cord trauma; tabes dorsalis
Brain	Cerebrovascular disease; concussion; neoplasm or tumour; normal pressure hydrocephalus; Parkinson's disease, Shy-Drager Syndrome
Spinal cord	Dysraphic lesions; invertebral disc disease; meningomyelocele; multiple sclerosis; spina bifida occulta; spinal cord hematoma or abscess; spinal cord trauma; spinal stenosis; spinovascular disease; transverse myelitis tumours or masses of conus medullaris or cauda equina

Multiple Shades of Grey; medication

- Many medications can cause or exacerbate urinary retention, incontinence and sexual dysfunction.

Multi Shades of Grey; medication

- Cholinergic and anticholinergic drugs have an influence on the parasympathetic nervous system;

Cholinergic; voiding of urine

Anticholinergic; retention of urine

(MTUI et al 2016)

Medications that cause urinary retention

- NSAIDS (x2 more likely in men)
- Opioids
- Calcium channel blockers
- Alpha-adrenergic antagonists
- Sedative-hypnotics
- Antipsychotics
- Antiparkinsonian agents

Pharmacology causes of Sexual Dysfunction

Class	Drug
Hypnotics	Benzodiazepines
Antihypertensive	Beta blockers
Antidepressants	Tricyclic antidepressants; Selective serotonin reuptake inhibitors e.g fluoxetine; Monoamine oxidase inhibitors; Viloxazine and L-tryptophan; Nefazodone; Vanlafaxine; Reboxetine; Mirtazepine; Trazodone; Duloxetine
Diuretics	Bendroflurazide,
Anti-epileptics	Carbamazepine; Phenytoin; Sodium valproate
Antipsychotics	Thioridazine; aliphatic phenothiazines e.g chlorpromazine, sulprides atypical antipsychotic risperidone
Prostate medications	Finasteride (BPH); Anti androgens e.g. cyproterone acetate, flutamide (Prostate Cancer); Gonadotrophin releasing hormone analogues e.g goserelin, leuprorelin (Prostate Cancer)
Anti-parkinsonian drugs	L-dopa
Recreational drugs	Psychstimulants, Amphetamine, Ecstacy, Crystal methamphetamine, Alcohol, Anabolic steroids, cannabis, Opiates (Heroin, Methadone, Buprenorphine), Poppers, Tobacco

Multi Shades of Grey; medication

- Amphetamines,
- decongestants,
- over the counter cold remedies (esp in men with enlarged prostate)
- Recreational drugs e.g Ecstasy

Multi Shades of Grey; medication

- **Opioid Salts;** constipation, retention, reduced gastric motility, reduced bladder sensation

  (e.g. Tramadol, Codeine)
- **Anticonvulsants** (Cholinergic); urinary incontinence

  (e.g. Gabapentin, Pregabalin)
- **Antidepressants** (Anticholinergic); retention, sexual dysfunction (e.g. Amitriptyline, Nortriptyline)
  Antidepressants can decrease awareness of needing to pass urine
- **NSAIDS;** Retention

Physical Assessment

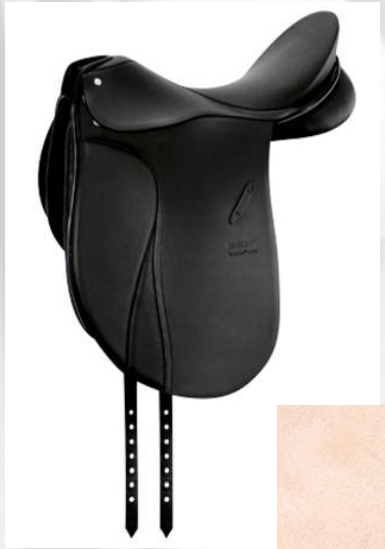
- If CES is suspected a careful objective neurological examination should be carried out to evaluate and segmental neurological deficit
- Sensation of the perineum to pin prick and light touch
- Anal tone and anal “wink” reflex should be tested
- Residual bladder volume using ultrasound

Perineal sensation

Cauda Equina Syndrome: A Comprehensive Review

Alex Gitelman, MD, Shuriz Hishmeh, MD, Brian N. Morelli, MD, Samuel A. Joseph, Jr., MD, Andrew Casden, MD, Paul Kuflik, MD, Michael Neuwirth, MD, and Mark Stephen, MD

- 76% CES pts have SA



Eur Spine J (2017) 26:894–904
DOI 10.1007/s00586-017-4943-8

CrossMark

ORIGINAL ARTICLE

Cauda Equina Syndrome: presentation, outcome, and predictors with focus on micturition, defecation, and sexual dysfunction

N. S. Korse[1] · J. A. Pijpers[2] · E. van Zwet[3] · H. W. Elzevier[4] · C. L. A. Vleggeert-Lankamp[1]

- 93% of 75 had SA

Digital rectal examination

Research Article

Does rectal examination have any value in the clinical diagnosis of cauda equina syndrome?

Benjamin W. T. Gooding, Mark A. Higgins & Denis A. D. Calthorpe

Pages 156-159 | Received 02 Jun 2012, Accepted 17 Sep 2012, Published online: 01 Nov 2012

- 57 patients-23% c/f CES on MRI
- DRE 51% accurate in those with +ve MRI

Eur Spine J (2017) 26:894–904
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CrossMark

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Cauda Equina Syndrome: presentation, outcome, and predictors with focus on micturition, defecation, and sexual dysfunction

N. S. Korse[1] · J. A. Pijpers[2] · E. van Zwet[3] · H. W. Elzevier[4] · C. L. A. Vleggeert-Lankamp[1]

- 75 patients with CES
- ↓Anal tone ↓Saddle sensation
- Tudose et al 2017 (Br J Neurosurg Conf)
- Variable use, variable recording, variable interpretation in 173 patients

Residual Bladder Volume

European Journal of Neurology 2009, **16:** 416–419 doi:10.1111/j.1468-1331.2008.02510.x

SHORT COMMUNICATION

Predictive value of clinical characteristics in patients with suspected cauda equina syndrome

P. M. Domen[a], P. A. Hofman[b], H. van Santbrink[c] and W. E. J. Weber[a]

Departments of [a]Neurology, [b]Neuroradiology, and [c]Neurosurgery, Maastricht University Medical Centre, AZ Maastricht, the Netherlands

- >500ml retention correlates with +ve MRI in CES
  (bilat sciatica , retention)

13. Is post-void bladder scan a useful adjunct to the clinical examination for prediction of cauda equine syndrome?

Muralidharan Venkatesan, Luigi Nasto, M.P. Grevitt, Magnum M. Tsegaye; The Centre for Spinal Studies and Surgery, Queen's Medical Centre, Derby Rd, Nottingham NG7 2UH

- >400ml per void
- >200ml post void

(P09)

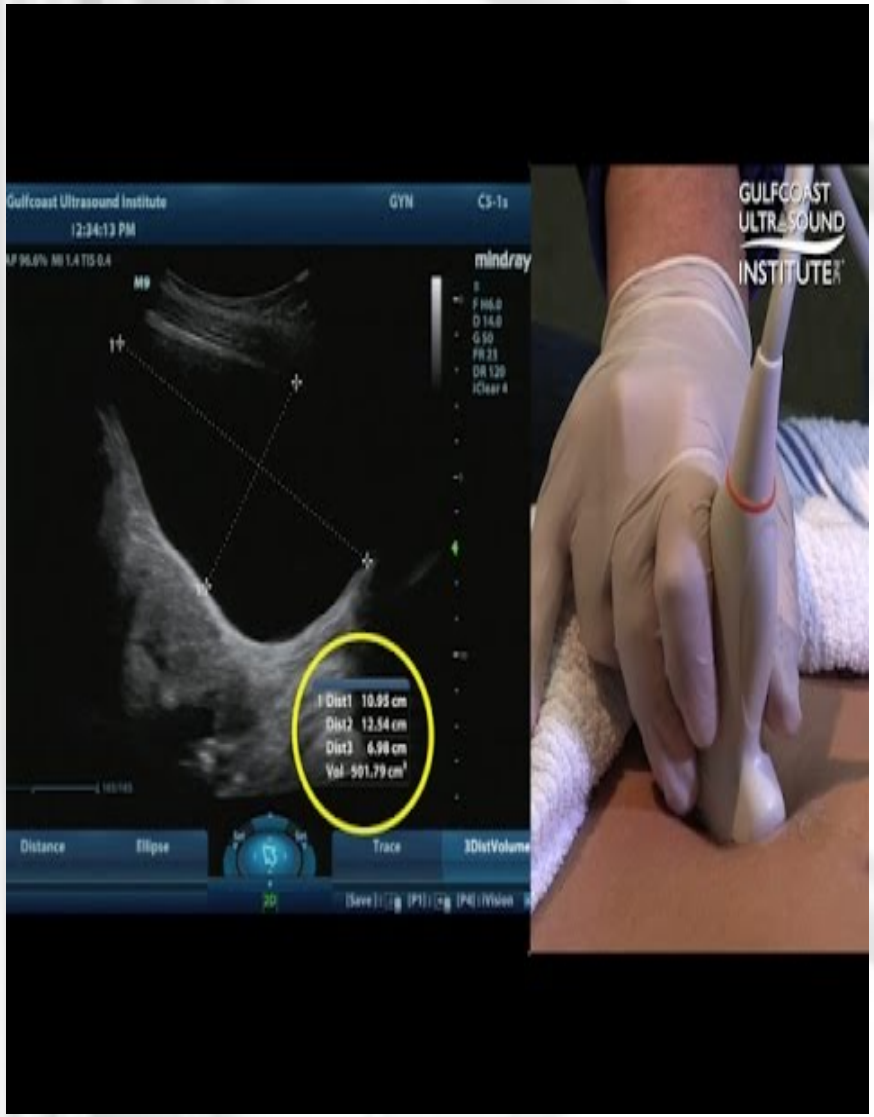
The utilisation of post micturition bladder scan in the assessment of patients with suspected cauda equina syndrome (CES)

Main Author: Michelle Angus

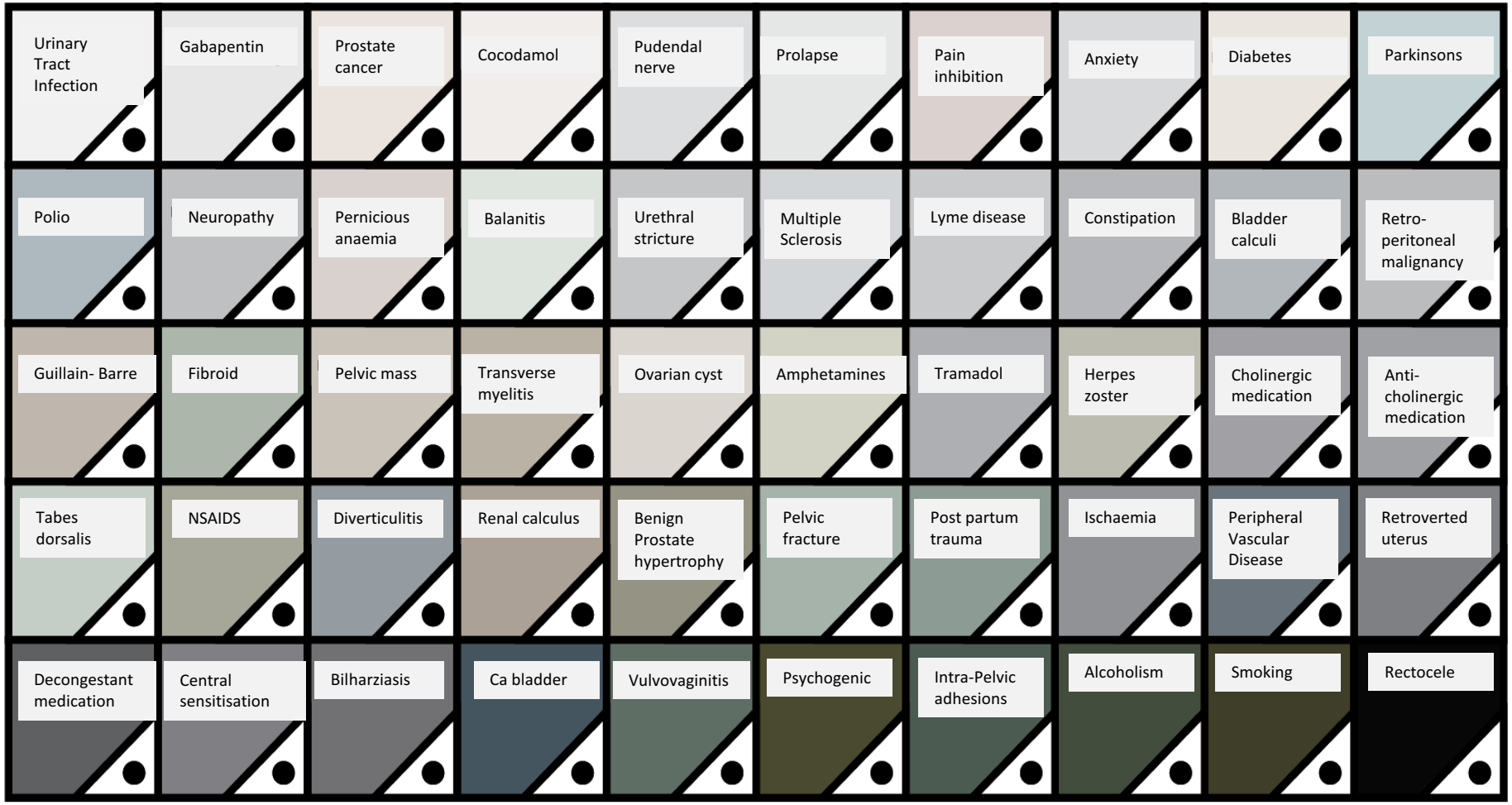
Co Authors: Mohammed Elmajee, Rajat Verma, Saeed Mohammad, Irfan Siddique

Affiliation: Salford Royal NHS Foundation Trust (SRFT), Stott Lane, Salford M6 8HD

- Stokes et al 2016 ….

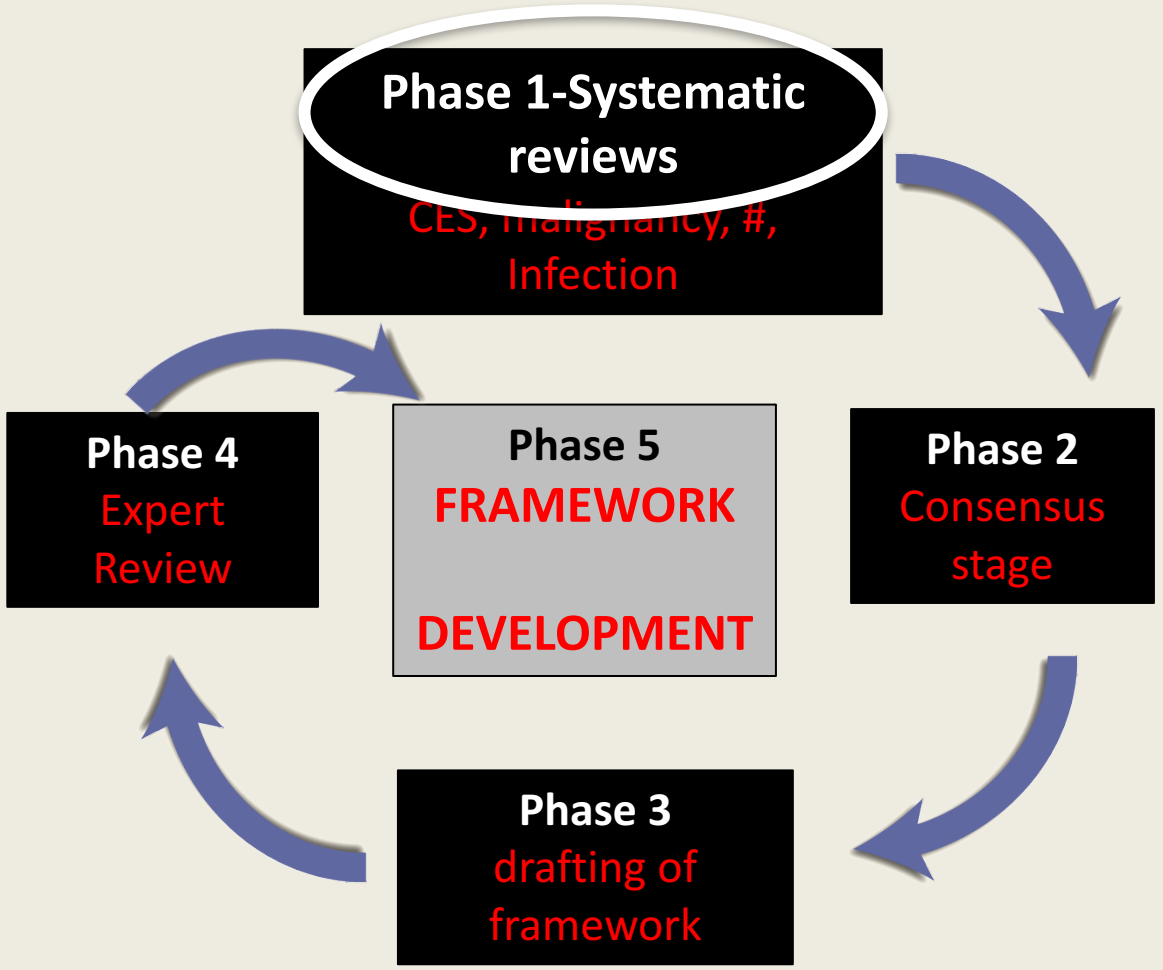


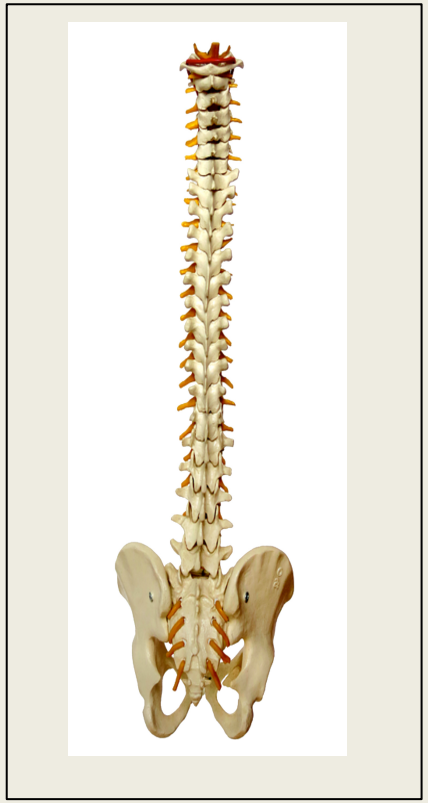
Multi shades of grey (between 49 and 51)
Cauda Equina Syndrome (thanks to Pantone paints!)



An evidence informed clinical reasoning framework for clinicians in the face of serious pathology in the spine

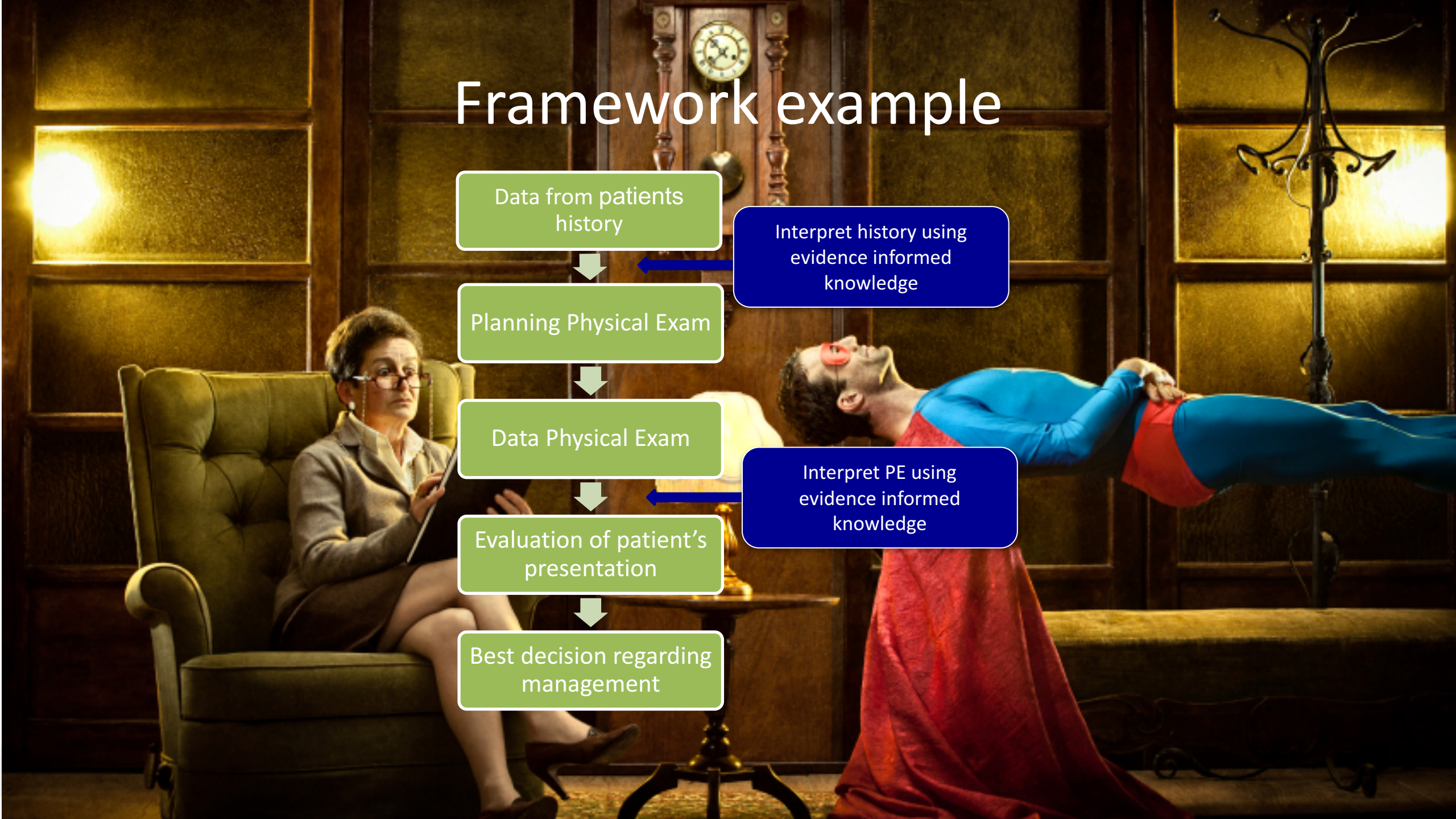
Finucane, Selfe , Mercer, Greenhalgh, Downie, Verhagen, Poole, Henschke, Boissonault, Beniuck



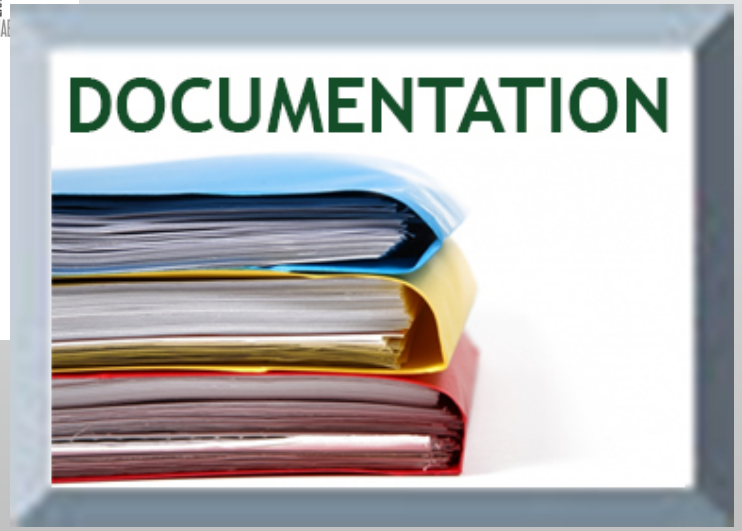


@laurafinucaneB

Framework example



We can make a huge difference



Cauda Equina a surgical emergency

https://www.youtube.com/watch?v=8rRq5QqoK3o

susan.greenhalgh@boltonft.nhs.uk laura.finucane@nhs.net christopher.mercer@wsht.nhs.uk