Cauda Equina Syndrome:

The Recommended MSK Physiotherapy Management of Patients with Suspected Cauda Equina Syndrome within Greater Glasgow & Clyde

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Document Overview

This document sets out evidence based recommendations to provide a consistent pathway and facilitate best practice in clinical decision making and timely action by musculoskeletal Physiotherapists when assessing patients with potential Cauda Equina Syndrome (CES).

Quick Reference Guide:

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Content

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Summary of Clinical Recommendations:

i. The term CES will be used in relation to a combination of clinical features resulting from dysfunction of the multiple sacral and lumbar nerve roots in the lumbar canal. These clinical features include impairment of bladder, bowel, and sexual dysfunction +/- perianal or 'saddle' numbness/paraesthesia.

ii. In circumstances where staff are uncertain, an immediate Physiotherapy second opinion from a senior member of staff should be sought.

iii. It is recommended that staff who are suspicious of CES use the 'MSK Physiotherapy assessment Cauda Equina Questioning" on ACN to assist in early recognition and allow for a more informed discussion when seeking a second opinion, Appendix 2, page 12.

iv. Detailed clinical examination of neurological integrity should be carried out whenever possible (including signs/symptoms of nerve root involvement).Table 2 page 7

v. Physiotherapists are **not** routinely trained to perform 'saddle', rectal or bladder examination therefore this would not be carried out by MSK Physiotherapy staff.

vi. The rare signs and symptoms of potential CES should be discussed with all patients presenting with **worsening** low back pain with unilateral or bilateral leg pain. It is recommended this subgroup of patients be issued with a CES Patient Information Leaflet, Appendix 3, page 13.

vii. All suspected cases of CES with symptom duration or progression of 4 weeks or less should be managed as an emergency in accordance with the CES Triage Charts, Appendix 1, page 11.

viii. The detailed patient history, examination, advice and action taken should be documented accurately.

1. Introduction

The aim of this document is to set out evidence based recommendations to facilitate best practice in clinical decision making and timely action by MSK Physiotherapists, within Greater Glasgow & Clyde, when assessing patients with potential Cauda Equina Syndrome (CES).

2. Definition

As CES is a constellation of symptoms rather than one distinct disorder the definition has been shown to be varied and problematic. The definitions vary in terms of pathomechanical cause and the features of its clinical presentation.

Term	Descriptor
Cauda Equina Syndrome	Neurological dysfunction, that most commonly follows a large central or centro-lateral disc prolapse at L4/5 or L5/S1, resulting in the disturbance of the parasympathetic supply to the pelvic viscera and the sensory nerves to the perineum CES results from the dysfunction of the multiple sacral and lumbar nerve roots in the lumbar canal. Such dysfunction can cause a combination of clinical features which include, impairment of bladder, bowel, sexual dysfunction +/- perianal or 'saddle' numbness/paraesthesia

3. Clinical Presentation

Most commonly CES symptoms occur following an acute central disc herniation resulting in low back and unilateral/bilateral leg pain and the onset of perianal sensory loss and sphincter disturbance which evolves over a few days to a week. However, CES has also been shown to develop more slowly over weeks or months in patients with chronic degenerative lumbar conditions.

(**NB.** Sphincter disturbance refers to the motor and sensory supply of bladder and bowel and not just anal sphincter).

A recent study by Woodfield et al (2022) has been helpful in specifically analysing the initial early symptoms of CES and the main patterns of progression of this condition. The authors concluded, "*…that the most common initial CES symptoms were back pain and sciatica, Bladder dysfunction and saddle numbness"* Table 1

Table 1. Analysis of the Initial Symptoms of CES cases, Woodfield et al (2022)

Analysis of the Initial Symptoms in CES Cases	Cases (n=621)
Back pain	96%
Paraesthesia in perineal region	81%
Sciatica	93%
Bladder dysfunction	83%
Bowel and anal dysfunction	39%
Reduction in sexual function/sexual dysfunction	38%

3.1 Evolution of Symptoms

- Development of increasing back pain and sciatica
- Progression from unilateral to bilateral sciatica
- Motor and/or sensory deficit in one or both legs
- Subjective saddle area sensory changes
- Urinary changes – frequency, difficulty initiating/passing, loss of desire to void
- Objective saddle area sensory changes
- Loss of sexual function (Erectile Dysfunction/Sensory loss of external genitalia)
- Decreased sensation or appreciation of passing urine or faeces
- Urinary retention (painful progressing to painless)
- Incontinence – typically dribbling overflow urinary incontinence and/or faecal incontinence

CES scenarios are available in Appendix 5, page 15.

3.2 Categories of Cauda Equina Syndrome

It is widely accepted that Cauda Equina Syndrome can be divided into three categories according to the patient's clinical presentation. (Todd N.V 2016)

1. **Cauda Equina Syndrome with Retention (CESR)** – Back pain with unilateral or bilateral sciatica, motor weakness of the legs, sensory disturbance in the saddle region, loss of anal tone and established loss of urinary control i.e. Painless retention and overflow.

2. **Incomplete Cauda Equina Syndrome (CESI)** – Back pain with unilateral or bilateral sciatica, motor weakness of the legs, sensory disturbance in the saddle region (often unilateral) and altered urinary sensation e.g. Loss of desire to void, diminished sensation, poor stream and need to strain. Painful retention may precede painless retention in some cases.

3. **Suspected Cauda Equina Syndrome (CESS)** – Cases of severe back and leg pains with variable neurological signs and symptoms and a suggestion of sphincter disturbance

3.3 Differential Diagnosis of Bladder Dysfunction

There are numerous other causes of bladder dysfunction which need to be considered when assessing a patient with potential CES, such as severe pain, medication and pre-existing genito-urinary problems. These can be found in more detail in Appendix 6, pages 16-17.

4. Clinical Examination

A detailed subjective history and neurological assessment is crucial for early identification of patients who have developed or are at risk of developing CES. The whole clinical picture needs to be considered on clinical decision making.

Table2. Components of Lumbar & Sacral Nerve Roots

Motor, Sensory & Reflex Components of Lumbar & Sacral Nerve Roots

Nerve Level	Motor Innervation	Sensory Innervation	Reflexes
L2	Hip flexors, thigh adductors	Upper thigh	
L3	Quadriceps, knee extensors	Anterolateral thigh	Patella
L4	Knee extensors, ankle dorsiflexors	Anteromedial calf	
L5	Foot and toe dorsiflexors (EHL)	Lateral calf, dorsum of foot	
S1/S2	Foot and toe plantaflexors	Lateral side and sole of foot	Ankle
S2/S3/S4/S5	Sphincters	Perianal and saddle area	Bulbocavernous

4.1 'Saddle' (Perineal & Perianal), Rectal & Bladder Examination

Physiotherapists are **not** routinely trained to perform 'saddle', rectal or bladder examinations, therefore, **this is not required prior to onward referral.**

5. Timing of Surgery & Prognosis

The timing of surgery remains controversial for two main reasons:

- It is difficult to determine the exact time of onset of symptoms, therefore, delay between symptoms and surgery is difficult to define.
- The current literature commonly relates to a mixture of patients with CESR and CESI.

Retrospective evidence would suggest urgent surgery especially in patients with early symptoms. Therefore, all suspected cases should be managed as an emergency due to the complexities of timing of symptom onset and devastating consequences of complete CES.

Prognosis

Whilst it is accepted that patients with painless urinary retention and overflow incontinence have a poorer prognosis around 70% of these patients will benefit from decompression. (GIRFT National Suspected CES Pathway 2023).

6. Minimising the Risks of Missed or Delayed Diagnosis

The clinical diagnosis of CES is difficult, but the consequences of delay or missed diagnosis may be catastrophic for the patient.

Therefore, the rare signs and symptoms of CES should be discussed with all patients presenting with progressive back pain with unilateral or bilateral leg pain. Moreover, it is recommended that patients who present with progressive back pain with unilateral or bilateral leg symptoms, **with or without** bladder/bowel dysfunction, be issued with a CES Patient Information Leaflet which highlights important warning signs, Appendix 3, page 13.

Patients will be advised that in the event of developing CES symptoms it is recommended they seek emergency opinion via their local A&E Department.

7. Documentation

The delay or missed diagnosis of CES, resulting in the patient having residual symptoms, is a common source of litigation.

The detailed patient examination, explanation and action taken should be documented accurately. If a junior member of staff contacts a senior member of staff or Back Pain Specialist over the phone for advice on a patient with suspected CES, the relevant section of the ACN CES assessment proforma should be completed (See Appendix 2. MSK Physiotherapy ACN Assessment Cauda Equina).

If they are unable to contact a senior member of staff/back pain APP, they should follow the MSK CES pathway and discuss with the local on call Orthopaedic registrar immediately (See Appendix 1. Suspected Cauda Equina Triage Chart- page 11)

8. Training

All new static, rotational and locum musculoskeletal Physiotherapists working within GG&C should complete the Learnpro Cauda Equina Syndrome Module as part of their induction process (https://nhs.learnprouk.com/lms/login.aspx?ReturnUrl=%2flms%2fuser_level%2fwelcome.aspx). Permanent, static MSK members of staff are advised to complete the CES module on a biennial basis. Ongoing training will continue through observed practice and case discussion with Senior Staff and local Back Pain Specialists.

9. References

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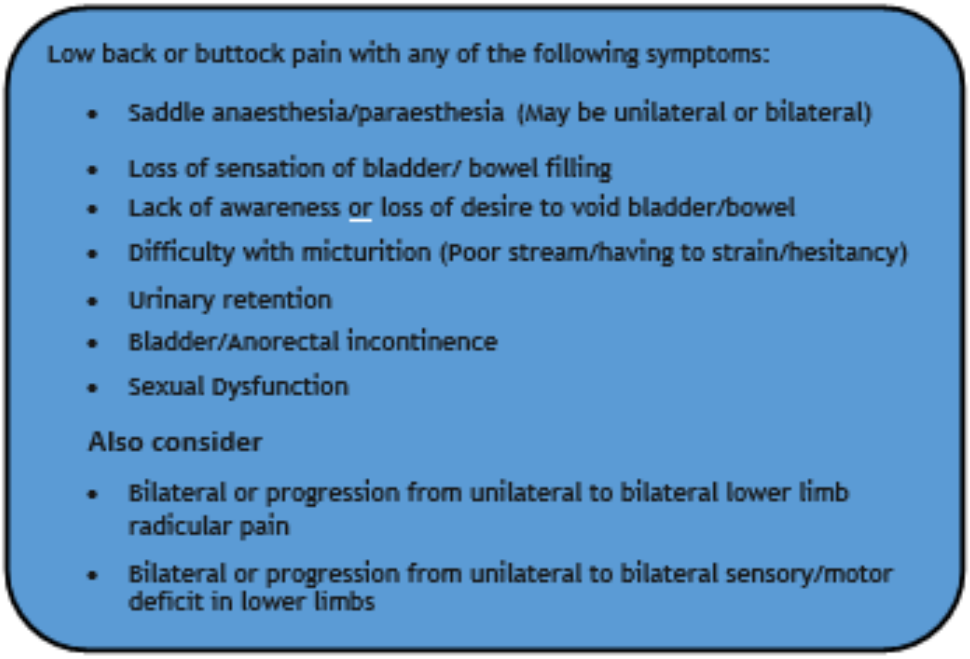
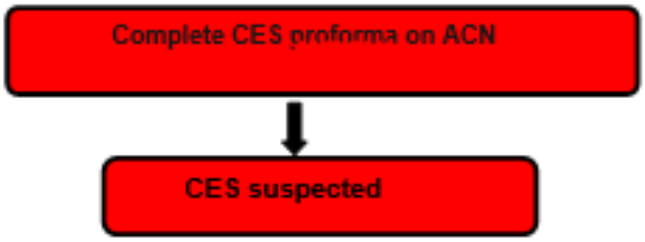
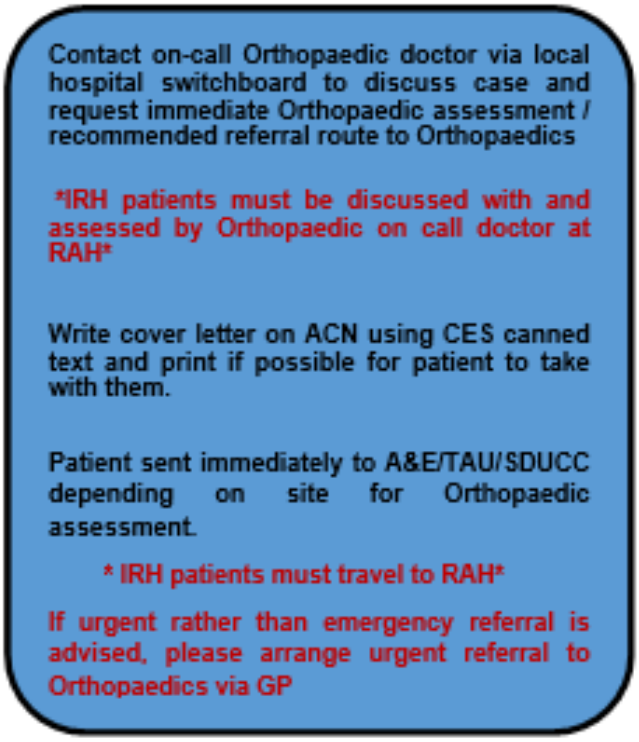
Musculoskeletal Science & Practice, Volume 45, 102049
SHADES of grey – The challenge of 'grumbling' cauda equina symptoms in older adults with lumbar spinal stenosis - Musculoskeletal Science & Practice (mskscienceandpractice.com)

Appendix 1. Suspected Cauda Equina Triage Chart

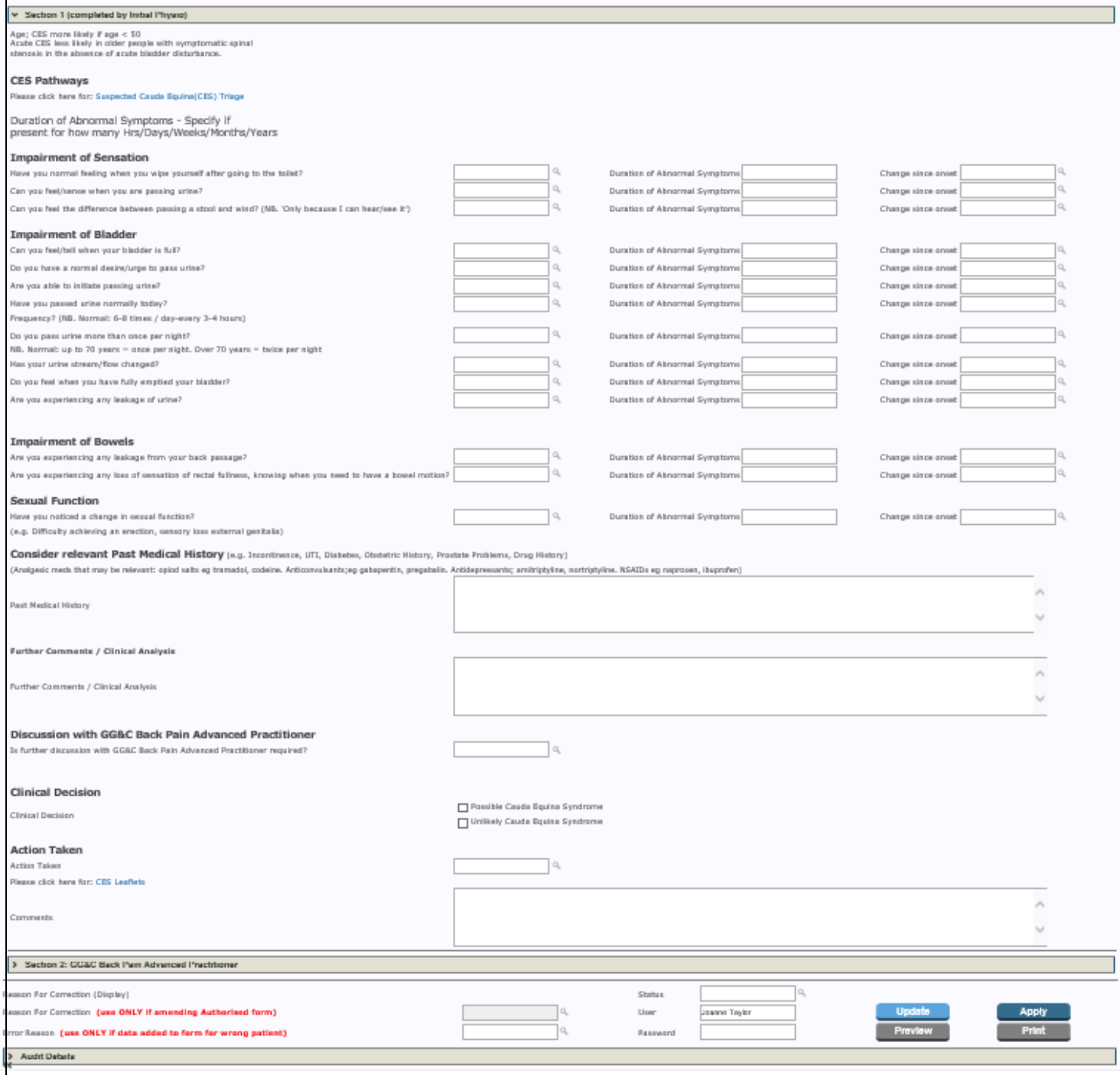






QEUH	0141 201 1100
GRI	0141 211 4000
RAH	0141 314 7294

Appendix 2. MSK Physiotherapy ACN Assessment Cauda Equina



Section 1 (completed by Initial Physio)

Age; CES more likely if age < 50
Acute CES less likely in older people with symptomatic spinal stenosis in the absence of acute bladder disturbance.

CES Pathways

Please click here for: Suspected Cauda Equina(CES) Triage

Duration of Abnormal Symptoms - Specify if present for how many Hrs/Days/Weeks/Months/Years

Impairment of Sensation

Have you normal feeling when you wipe yourself after going to the toilet? | Duration of Abnormal Symptoms | Change since onset
Can you feel/sense when you are passing urine? | Duration of Abnormal Symptoms | Change since onset
Can you feel the difference between passing a stool and wind? (NB. 'Only because I can hear/see it') | Duration of Abnormal Symptoms | Change since onset

Impairment of Bladder

Can you feel/tell when your bladder is full? | Duration of Abnormal Symptoms | Change since onset
Do you have a normal desire/urge to pass urine? | Duration of Abnormal Symptoms | Change since onset
Are you able to initiate passing urine? | Duration of Abnormal Symptoms | Change since onset
Have you passed urine normally today? | Duration of Abnormal Symptoms | Change since onset
Frequency? (NB. Normal: 6-8 times / day-every 3-4 hours)
Do you pass urine more than once per night? | Duration of Abnormal Symptoms | Change since onset
NB. Normal: up to 70 years = once per night. Over 70 years = twice per night
Has your urine stream/flow changed? | Duration of Abnormal Symptoms | Change since onset
Do you feel when you have fully emptied your bladder? | Duration of Abnormal Symptoms | Change since onset
Are you experiencing any leakage of urine? | Duration of Abnormal Symptoms | Change since onset

Impairment of Bowels

Are you experiencing any leakage from your back passage? | Duration of Abnormal Symptoms | Change since onset
Are you experiencing any loss of sensation of rectal fullness, knowing when you need to have a bowel motion? | Duration of Abnormal Symptoms | Change since onset

Sexual Function

Have you noticed a change in sexual function? | Duration of Abnormal Symptoms | Change since onset
(e.g. Difficulty achieving an erection, sensory loss external genitalia)

Consider relevant Past Medical History (e.g. Incontinence, UTI, Diabetes, Obstetric History, Prostate Problems, Drug History)
(Analgesic meds that may be relevant: opiod salts eg tramadol, codeine. Anticonvulsants;eg gabapentin, pregabalin. Antidepressants; amitriptyline, nortriptyline. NSAIDs eg naproxen, ibuprofen)

Past Medical History

Further Comments / Clinical Analysis

Further Comments / Clinical Analysis

Discussion with GG&C Back Pain Advanced Practitioner

Is further discussion with GG&C Back Pain Advanced Practitioner required?

Clinical Decision

Clinical Decision
- Possible Cauda Equina Syndrome
- Unlikely Cauda Equina Syndrome

Action Taken

Action Taken
Please click here for: CES Leaflets
Comments

Section 2: GG&C Back Pain Advanced Practitioner

Reason For Correction (Display) | Status
Reason For Correction (use ONLY if amending Authorised form) | User: Joanne Taylor | Update | Apply
Error Reason (use ONLY if data added to form for wrong patient) | Password | Preview | Print

Audit Details

Appendix 3. Cauda Equina Syndrome – Important Warning Signs

Cauda Equina Syndrome – Important Warning Signs

NHS Greater Glasgow and Clyde

Low back pain is common and can include a mix of back pain, leg pain, leg numbness and weakness. This can be very difficult but does not necessarily require emergency medical attention.

Cauda Equina Syndrome is a rare **emergency** condition that can happen with low back pain. If not treated as an **emergency** it can lead to permanent damage or disability. The Cauda Equina is a group of nerves that control the bladder, bowel, legs and also supply feeling to the skin around the back passage and genital (sex organ) area.

If you notice **any new onset** or **worsening** of any of the warning signs listed below, since your low back and, or leg pain has started or got worse, you **should go to the nearest Accident and Emergency Department as an emergency** for a medical assessment.

Loss of feeling and or pins and needles

- Between your back passage and genital (sex organ) area. For example, unable to feel the toilet paper when wiping yourself.

Changes to your Bladder

- Increasing difficulty when you try to start passing water (urine)
- Increasing difficulty when you try to stop or control your flow of water (urine)
- Loss of feeling (sensation) when you are passing water (urine)
- New leaking of water (urine) or recent need to use pads
- Not knowing when your bladder is either full or empty

Changes to your Bowel

- Loss of feeling of when you need to have a bowel motion (stool).
- Not being able to tell the difference between having a bowel motion and passing wind
- Not being able to stop a bowel movement (stool) or recent leaking from back passage
- Loss of feeling of when you are having a bowel motion or stool

Sexual Problems

- Recent change in ability to achieve an erection or ejaculate
- Loss of feeling in genitals (sex organs) during sexual intercourse

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Appendix 4 - Suspected CES Canned Text Template Letter to Orthopaedics on TRAK

Further to my telephone conversation with [Insert Name of Orthopaedic Consultant/Registrar] I would appreciate your opinion on this patient who presents with symptoms suggestive of possible Cauda Equina Syndrome – see CES proforma which is available on TrakCare – Patient Clinical Record – Questionnaires - MSK Physiotherapy Assessment Cauda Equina.

This patient presented to Physiotherapy today reporting [Insert brief history & relevant clinical information including neurological status].

PMH: [delete as appropriate]
-Insert relevant PMH or
-Is available on TRAK-Patient Clinical Record – Questionnaires - MSK Physiotherapy Subjective Assessment

DH: [delete as appropriate]
-Insert DH if known
-Is available on TRAK-Patient Clinical Record – Questionnaires - MSK Physiotherapy Subjective Assessment

Many thanks for your assistance in this matter.

Yours sincerely
Physiotherapist Name
Physiotherapist Grade

NB – For the CES letter only, in the salutation box should be the name of the doctor that was spoken to and in the cc box the name of the GP.
This letter should be typed and authorised fully on TrakCare, then a copy printed and put in an envelope for the patient to take to A&E.

Appendix 5. Cauda Equina Syndrome Scenarios

Scenario 1. Common Presentation

Most cases are people between the ages of 20-40 years of age who present with back pain and sciatica; most commonly due to a lumbar disc prolapse; but whom deteriorate. Often the patient develops increasing pain in their back and leg which then begins to affect the other leg (bilateral sciatica) = risk factor for progression CES. Then they may complain that it does 'not feel right' in the saddle area = symptoms of developing CES. Sensory disturbance in the saddle area in early stages is subjective e.g. patient feels that it is 'not right' and they may complain that it 'felt odd' when sitting on the toilet. In early stages sensory testing may reveal intact pinprick and light touch sensation although the patient has a subjective change. Objective signs may develop and initially saddle sensory impairment is often unilateral but becomes bilateral. Soon after this the patient may develop problems with bladder function. This may include frequency, difficulty initiating passing, loss of desire to void, poor stream and lack of a full feeling when passing urine.

In CES with retention the patient is unable to pass urine and then becomes incontinent but does not have a sensation of passing urine. The patient usually complains of bladder problems before bowel problems. Sexual function is also lost. Not infrequently when the sensory disturbance becomes established (objective) the patient may describe that the pain in the legs decreases but the feeling in their legs becomes more 'abnormal', 'feeling like jelly'.

Scenario 2. Less Common Presentation

Older Patients with lumbar spinal stenosis (LSS) may present with much slower, gradual progression of symptoms. With LSS the spinal canal becomes gradually compromised due to a combination of fibrosis of the ligamentum flavum, hypertrophy of the facet joints and loss of disc height with or without associated disc bulging.
These patients may present with recurrent, increasing low back pain with insidious onset of unilateral or bilateral lower limb sensory and/or motor weakness. Symptoms may be vague or inconsistent and of a "grumbling "rather than acute onset. Distinguishing symptoms that are potential indicators of CES in the older population is compounded by an increased prevalence of bladder, bowel and sexual dysfunction due to other age

related pathology (Shades of Grey- The challenge of "grumbling cauda equina symptoms in older adults with lumbar spinal stenosis ;Comer et al 2020).

Appendix 6. Differential Diagnosis of Bladder Dysfunction

It is estimated that 33% of people over the age of 40 years have significant urinary symptoms (NICE, 2006). Therefore, it is not uncommon for patients with severe low back pain and leg pain to complain of bladder dysfunction due to a number of other possibilities.

- **Severe pain** – Can inhibit or disrupt bladder function and limit mobility. In general these patients are aware of bladder filling but due to severe pain and fear associated with low back pain can often have difficulty initiating **or** find it difficult to reach the toilet in time
- **Medication** - Strong opiates, such as Morphine, and medications used in the treatment of neuropathic pain, such as Tricyclic Antidepressants (Amitriptyline), Antiepileptic's (Gabapentin) and Anticonvulsants (Pregabalin) can affect bladder sphincters and sexual function.
- **Pre-existing Genito-Urinary problems** e.g. stress/urinary incontinence

Normally the above causes of bladder dysfunction are temporary, intermittent or short lasting. In the case of pre-existing genito-urinary problems their symptoms will have been established before the recent onset of back and leg pain. Anxiety plays a part in bladder function problems and usually with adequate pain control and relaxation the patient can pass urine.

NB. Often the bladder problem is in isolation in these cases. These patients do not usually have a significant complaint of sensory impairment in the saddle region.

Urinary Retention

There are many causes of urinary retention, including obstruction of the urinary tract or problems of the nervous system. The following should be considered:

- **Nerve disease or injury** – E.g. Vaginal childbirth, infections to brain/spinal cord, Diabetes, Stroke, injury to nervous system/spine/pelvis, Multiple Sclerosis, heavy metal poisoning
- **Prostate Enlargement** – E.g. Benign prostatic hyperplasia or consider malignancy. As prostate enlarges it presses against Urethra resulting in bladder wall becoming thicker and irritable. The bladder may then contract, resulting in it only holding a small amount of urine. Eventually, the bladder may weaken and lose the ability to empty itself, resulting in retention.
- **Infection** – Urinary tract infection can cause Urethra to become inflamed and swells shut.
- **Surgery –** Post-operative temporary urinary retention is not uncommon due to anaesthetic nerve block.
- **Medication –** Some medications work by calming overactive nerve signals resulting in retention For example, Antihistamines, Anticholinergics/Antispasmodics to treat stomach cramps/muscle spasms; Tricyclic Antidepressants.
- **Bladder Stone –** Urinary tract blockage
- **Prolapse of anterior/posterior Vaginal Structures**
- **Constipation –** Hard stool in rectum can 'pinch' shut the Urethra
- **Urethral Stricture –** Narrowing or closure of Urethra e.g. Trauma/Infection

Types of Urinary Incontinence

- **Stress Incontinence –** A physical stress causing leakage e.g. cough/sneeze/laugh
- **Urge Incontinence –** Associated with urinary urgency, not getting to the toilet in time.
- **Mixed Incontinence –** Mix of both stress and urge incontinence
- **Postural Incontinence –** Involuntary loss of urine associated with change in body position
- **Continuous Incontinence –** Constant leakage of urine both day and night

- **Nocturnal Enuresis** – Involuntary loss of urine during sleep
- **Insensible Incontinence** – Urinary incontinence where the person is unaware of how it occurred
- **Coital Incontinence** – Involuntary loss of urine during sexual intercourse