West of Scotland Guidelines

for

Malignant Spinal Cord Compression

Updated Version Prepared by	West of Scotland Cancer Consultant Nurses
Approved by	West of Scotland Cancer Clinical Leads Group
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EXECUTIVE SUMMARY

1. Introduction

Malignant Spinal Cord Compression (MSCC) is believed to occur in approximately 5% of all patients with cancer and is a major cause of morbidity.[1,2] The presentation of MSCC may vary but early identification and prompt referral for investigation and treatment are paramount to optimise patient outcomes.

Studies carried out in the United Kingdom (UK) have highlighted that unacceptable delays in diagnosis and referral are common, and that inconsistencies in patient management and care exist across all care settings.[2] Consequently, these guidelines were commissioned by the West of Scotland Regional Cancer Advisory Group (RCAG). A multi-professional Guideline Development Group was co-ordinated through the West of Scotland Cord Compression Steering Group *(Appendix 1)*, to develop the guidelines, with funding in 2007 from Macmillan Cancer Support. The original guidelines were available for implementation in February 2007 and have been updated in May 2013 by the West of Scotland Cancer Nurse Consultants and the Oncology Senior Physiotherapist at the Beatson West of Scotland Cancer Centre, following multi-professional consultation across the West of Scotland Cancer Network *(Appendix 2)*. During this time the National Institute for Health and Care Excellence MSCC guidelines have also been published (NICE 2008).[10]

2. Aims of the Guidelines

- To provide evidence-based guidance, or best practice in the absence of evidence, on all aspects of MSCC care to promote a consistent approach across the WoS.
- To provide clear referral and investigative pathways for patients with suspected or actual MSCC presenting in the West of Scotland (WoS).
- To encourage prompt referral and treatment to optimise patient outcomes in relation to quality of life and survival.
- To assist with appropriate patient selection for treatment.
- To inform and educate multidisciplinary staff regarding referral, management and rehabilitation of patients with MSCC.
- To encourage staff to involve patients in the early identification of this potentially disabling condition.

3. Referral & Diagnosis

3.1 Signs and Symptoms

- Pain is usually the first presenting symptom and has often been present for a number of weeks before MSCC is diagnosed.
- Pain may be new, or may present as a significant change in the character of longstanding pain. It is often described as unremitting, and is associated with feelings of anguish and despair. These may be classed as early presentation triggers.
- Pain is usually in the back but can be radicular, often described as a tight band around the chest or abdomen.

- Later presenting symptoms are motor deficits (e.g. muscle weakness, loss of coordination, paralysis), sensory deficits (e.g. parasthesia, loss of sensation) or autonomic dysfunction (bladder or bowel problems).

3.2 Referral

- Early identification and referral of patients with MSCC is crucial in determining good patient outcomes.
- Referral can be from primary care (home, care home) or from Glasgow and West of Scotland District General Hospitals as well as from within Glasgow teaching hospitals and hospices.
- The MSCC section of the Scottish Referral Guidelines for Suspected Cancer[3] and the Royal College of General Practitioners RED FLAGS for Serious Spinal Pathology[4] should assist General Practitioners in determining a provisional diagnosis of MSCC.
- Referral and management pathways are provided for the following categories of patient:
  - Patients with a known cancer diagnosis and early presentation triggers.
  - Patients without a cancer diagnosis.
  - Patients with a known cancer diagnosis and late presentation.

3.2.1 Urgent Referral and Initial Management

3.2.1.1 Patients presenting with a known cancer diagnosis and early presentation triggers. (more commonly lung, prostate, breast, myeloma, but not exclusively)

- Commence patient on Dexamethasone 16 milligrams/day (16mg/day).
- Suggest patient lies flat.
- Arrange emergency admission to the patient's **local** hospital.
- Urgent MRI (Magnetic Resonance Imaging scan of whole spine to confirm diagnosis within 24 hours.
- Using the criteria below, on completion of a full clinical and radiological assessment, telephone the on-call Oncology Registrar at The Beatson West of Scotland Cancer Centre or the on-call Neurosurgical Registrar at the Southern General Hospital to discuss appropriate management.

Neurosurgery	Oncology
One area of compression	Multiple levels of cord compression
Radio-resistant tumours (e.g. renal)	Radio-sensitive tumours (e.g. breast)
Ambulant / paraparetic	Preferably ambulant or with an established paralysis of < 72 hours
Life expectancy minimum of 6 months	Life expectancy of > 4 weeks (although single fraction of radiotherapy can be given if <4 weeks)

3.2.1.2 Patients without a cancer diagnosis.

- Commence patient on Dexamethasone 16mg/day.
- Suggest patient lies flat.

- Arrange emergency admission to the patient's **local** hospital.
- Urgent MRI of whole spine to confirm diagnosis (within 24 hours).
- Once full clinical and radiological assessment has been performed, telephone the on-call Neurosurgical Registrar at the Southern General Hospital, and discuss appropriateness for surgical intervention.

3.2.2 Non urgent Referral and Initial Management

(Only relevant for patients with a known cancer diagnosis).

3.2.2.1 Patients with a cancer diagnosis and late presentation.

- A collaborative decision on the most appropriate palliative approach and place of care should be agreed by the GP and the patient's known Oncologist or Palliative Medicine Consultant. This decision should include the expressed wishes of the patient and family.
- If agreed, a combined multidisciplinary and multiagency package of care should be co-ordinated following discussion with the patient and their family support network.
- Where the level and type of support is not available at home, admission to hospital or hospice may be necessary.
- A trial of steroids may be suggested, but if no improvement identified within five days these should be discontinued.

3.3 Investigation

- Following admission to a local hospital, the investigation of choice for suspected cord compression is a MRI of the whole spine.
- This should be requested on an urgent basis, to be carried out within 24 hours of admission.
- The MRI should be prioritised and not be delayed by other non-essential radiological investigations.

4. Treatment

4.1 Steroid Therapy

- If MSCC is suspected, the patient should be commenced on Dexamethasone 16mg/day as soon as possible.
- Dexamethasone should be prescribed at 8mg twice a day (morning and lunchtime).
- By day 16 the patient should be receiving low dose oral steroids (Dexamethasone 4mg or less/day).

4.2 Radiotherapy

- Radiotherapy is the most common primary treatment for MSCC (combined with steroid therapy), but can also be used as an adjuvant to decompressive surgery and chemotherapy when these are the initial preferred treatments.
- Radiotherapy should be initiated as soon as possible following diagnosis of MSCC.
- An optimal radiotherapy regime is not indicated within the literature[5] however most patients usually receive 20 Gray (Gy) in 5 daily fractions to a radiation port extending 1-2 vertebrae above and below the area of compression.

- No treatment or an 8Gy single fraction should be considered for patients who have a short life expectancy (<4 weeks), those who are paraplegic and in whom neurological improvement is unlikely, and patients where pain management is poor despite analgesia.[6.7]

4.3 Systemic Anti-Cancer Therapy (SACT)

The role of SACT in MSCC is limited to patients who have chemo-sensitive tumours. It is the primary treatment for localised non-Hodgkin's lymphoma of the spine and germ cell tumours. In instances where patients are already receiving chemotherapy for their primary diagnosis the oncologist will advise on whether this treatment should be continued, discontinued or delayed.

4.4 Surgery

- Patients with symptomatic spinal metastases should receive early surgical consultation as part of a multidisciplinary approach to their disease process.
- The Tokuhashi Revised Evaluation System for the Prognosis of Metastatic Spine Tumours[8] or an equivalent pre-operative scoring system should be used to assist surgeons when assessing the patient for MSCC surgery.
- Decompressive surgery and stabilization should be considered as first line treatment for patients who:
    - Have a reasonable general medical health sufficient for surgical intervention.
    - Are ambulant or paraparetic.
    - Have cord compression restricted to a single area, although this can include several contiguous spinal or vertebral segments.
    - Have no pre-existing or concurrent neurological problems, other than those directly related to their MSCC.[9]
    - Have an expected survival of a minimum of six months due to the significant morbidity associated with surgery.[5]

4.5 General Palliative Care

A holistic, patient-centred approach to care will enable staff to better identify the range of issues that patients with suspected or actual MSCC may present with. These may include the following:

- Pain and symptom management.
- Emotional and psychological support.
- Family support.
- Rehabilitation / maximising potential.
- Discharge planning.
- Assessment for hospice admission.

Referral to Specialist Palliative Care may be appropriate at any stage from suspicion of MSCC, through diagnosis, treatment and rehabilitation, to end of life care. This is particularly important when the issues are complex and are not able to be managed locally, or when a multidisciplinary team approach to care has not been available but is required.

5. Clinical Care

Key points

- Appropriate clinical care is crucial to the management of patients with MSCC and should be part of a multidisciplinary approach to patient care.
- Assessment of the patient's physical, psychosocial and emotional needs should be initiated at the first point of contact and be continued throughout the episode of care (regardless of the care setting) to allow actual and potential problems to be elicited and shared between all members of the healthcare team.
- Prompt referral to appropriate professionals is necessary e.g. physiotherapy, occupational therapy and social work.
- Clinical care should be based on thorough risk assessment of presenting signs and symptoms for each individual, using valid and reliable tools where available.
- A plan of care should be developed which is patient-centred and should be re-evaluated on a continual basis to reflect changes in the patient's clinical/physical condition, and/or treatment plan.

6. Rehabilitation / Maximising Potential

Key points

- Referral should be made to both the Physiotherapist & Occupational Therapist within 24 hours of admission and all patients assessed within 24–48 hours, wherever possible.
- Initial physiotherapy and occupational therapy assessments and management should be performed following discussion with the medical team regarding spinal stability and mobility status.
- Rehabilitation should be patient-centred with short-term, realistic goals, which focus on functional outcomes in order to achieve the best quality of life for each individual patient.
- All patients with MSCC should have regular re-assessment for changes in their condition and the treatment plan revised accordingly.
- Even if functional outcome is limited, quality and affirmation may be achieved by providing patients with physical, social and emotional opportunities and a sense of control.

7. Patient Information

Key points

- Written information on MSCC should be given to all patients with a diagnosis of MSCC (e.g. West of Scotland Cancer Network / Macmillan Cancer Support fact sheet on Malignant Spinal Cord Compression, in addition to any relevant cancer site specific or treatment information).
- Written information on MSCC should be given to patients with a diagnosis of breast, lung or prostate cancer who have bone metastases and to any other patient considered by their clinician to be at a high risk of developing MSCC. The WoS MSCC alert card is recommended. This contains information on symptoms to look out for and who to contact should they experience them.

- Systems should be in place within the Cancer Centre and in local health care settings to respond to and action patient calls both within and out with normal working hours.

8. Discharge Planning

Key points

- The majority of patients treated for MSCC will continue to require some degree of ongoing support, often dependent upon functional ability. Where this support is provided will depend on various factors e.g. patient's identified needs, available health and social support within the patient's home geographical area as well as the patient's own support network. Locations of care include home, local hospital, Cancer Centre, Neurological Institute, hospice, care home or equivalent (e.g. Community Hospital).
- Discharge planning should commence as soon as the diagnosis is confirmed as the co-ordination required to discharge and support these patients with MSCC, whether at home or in continuing care, may be complex and challenging.
- Discharge planning should involve the full multi-professional team in addition to the patient and family. Good communication between team members is crucial in ensuring the patient and their support network is able to achieve the best quality of life within the limitations of the disability.
- Benefits assessment and processing should be commenced prior to discharge.
- Pre-discharge home visits may be necessary to assess environment and co-ordinate equipment or home modifications as appropriate.
- As early as possible, referral should be made to community based professionals for care, ongoing assessment and follow-up of functional and quality of life issues.
- All patients should be accompanied by documentation which should be thorough and detailed, according to local guidelines.

9. Conclusion

These guidelines have been developed to provide guidance but cannot be prescriptive and the recommendations may require adaptation to address the unique needs of the individual patient. If used by the multi-professional team as intended, patients should be referred earlier for diagnosis and treatment and the quality and consistency of care for patients with MSCC in the West of Scotland should be improved. The appendices contain further information and quick reference guides to aid practice.

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Guidelines for Referral, Management and Rehabilitation of Adults with Suspected or Actual Malignant Spinal Cord Compression in the West of Scotland

1. INTRODUCTION

1.1 Background

Malignant Spinal Cord Compression (MSCC) includes compression of the spinal cord or the nerve roots in the cauda equina. Cauda Equina Compression Syndrome (CECS) will be included under the heading of MSCC in these guidelines as the symptoms and prognosis are similar to that of cord compression.[1] MSCC is a major cause of morbidity and is believed to occur in approximately 5% of all patients diagnosed with cancer.[1,2] In approximately 85% of cases it results as a consequence of metastases from a primary tumour[3,4] with cancers of the lung, prostate and breast accounting for around 50% of cases.[3,5,6] Other cancers frequently associated with MSCC include lymphoma, renal, multiple myeloma, melanoma and sarcoma.[7,8]

1.2 The need for guidelines

Early diagnosis of MSCC whilst the patient is still ambulant is crucial in optimising patient outcomes.[9] Studies carried out in the United Kingdom (UK) over the last 10-15 years identified several areas where increased awareness of this condition and specific aspects of treatment and rehabilitation could be improved.[10,11,12] The main issues identified were that:

- Unacceptable delays in diagnosis and referral were common.
- Clinicians failed to consider a diagnosis of spinal cord compression resulting in delayed investigation and referral.
- there was a lack of formal referral procedures for patients with MSCC.[10.11,12]

The necessity for early identification and prompt referral for investigation and treatment of patients with suspected or actual MSCC was strongly emphasised by these reports. Inconsistencies in patient management and care have also been identified throughout the MSCC patient journey.[12]

There is a need to address these issues across all care settings to enable the multidisciplinary team to better manage patients who present with suspected or actual MSCC. Consequently, these guidelines were commissioned by the West of Scotland Regional Cancer Advisory Group. A multi-professional Guideline Development Group was co-ordinated through the West of Scotland Cord Compression Steering Group *(Refer to Appendix 1)* to develop the guidelines, with funding from Macmillan Cancer Support. In 2008, the National Institute for Health and Care Excellence (NICE) published guidelines on the management of Metastatic Spinal Cord Compression.[81] This regional update followed in 2013 by the West of Scotland Cancer Nurse Consultants and the Oncology Senior Physiotherapist at the Beatson West of Scotland Cancer Centre, following multi-professional consultation across the West of Scotland Cancer Network (WoSCAN) *(Refer to Appendix 2).*

1.3 Aims of the guidelines

The main aims of the guidelines are:

- To provide clear referral and investigative pathways for patients with suspected or actual MSCC who present in the West of Scotland (WoS).
- To encourage prompt referral and treatment in order to optimise patient outcomes in relation to quality of life and survival.
- To assist with appropriate patient selection for treatment.
- To provide evidence-based guidance, or best practice in the absence of evidence, on all aspects of MSCC care to promote a consistent approach across the West of Scotland.
- To inform and educate multidisciplinary staff regarding referral, management and rehabilitation of patients with MSCC.
- To encourage staff to involve patients in the early identification of the signs and symptoms of MSCC.

1.4 Use of the guidelines

These guidelines have been developed utilising research evidence, expert opinion and professional consensus to assist in the clinical management of patients with MSCC. They provide guidance on referral, diagnosis, treatment and care without being prescriptive due to the variation of needs between individual patients. Much of the clinical care delivered to patients with MSCC requires a collaborative approach with the involvement of the multidisciplinary team. The guidelines should therefore be used within this context.

2. REFERRAL AND DIAGNOSIS

2.1 Introduction

Early identification and referral of patients with MSCC is crucial in determining good patient outcomes. This section of the guidelines will provide clinicians with a brief introduction to the aetiology of MSCC and the key signs and symptoms. The clinician, whether in primary, secondary or tertiary care, then needs to know how to proceed to prevent any unnecessary delay in the confirmation of diagnosis and commencement of treatment. Immediate Referral and Management Pathways, including an Investigation Protocol, have therefore been provided for specific categories of patient to assist this process.

An initial pathway for the patient, who presents with similar signs and symptoms of cord compression, but with no cancer diagnosis, is briefly described. This is necessary because in approximately 20% of patients with MSCC, cord compression is the first indication of them having cancer[13]. Severe back pain is the most significant presenting symptom of cord compression; however, it is also a very common problem in the general population. An awareness of the Royal College of General Practitioners (RCGP) RED FLAGS for Possible Serious Spinal Pathology[14] should assist the clinician in determining the more likely origin of the presentation and therefore the most appropriate treatment pathway for the patient *(Refer to Table 1)*.

Table 1: RCGP RED FLAGS for Possible Serious Spinal Pathology

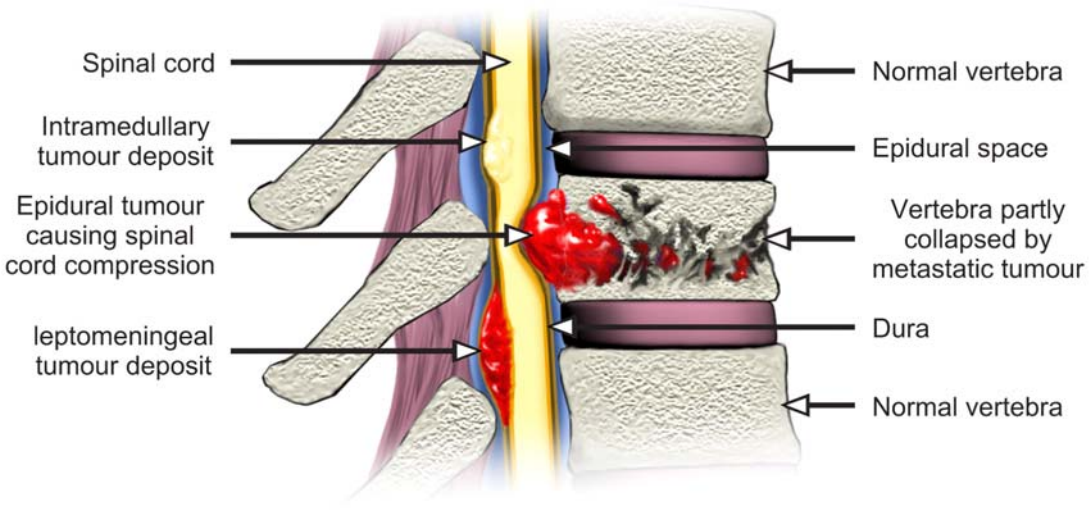
- Presentation under age 20 or onset over the age of 55.
- Violent trauma: e.g. fall from a height, road traffic accident.
- Constant, progressive, non-mechanical pain.
- Thoracic pain.
- Past medical history of carcinoma.
- Systemic steroids.
- Drug abuse, HIV.
- Systemically unwell.
- Weight loss.
- Persistent severe restriction of lumbar flexion.
- Widespread neurological signs and symptoms.
- Structural deformity.

2.2 Aetiology of MSCC

The spinal column is the most common site of bony metastases with the thoracic spine being most frequently affected (70%), followed by lumbosacral (20%) and cervical (10%) *(Refer to Appendix 3(a))*.[15,16,17] Extradural compression of the spinal cord occurs due to tumour expansion into the epidural space, usually from dissemination of malignant cells to the vertebral bodies or surrounding tissues via the vascular circulation.[18] Direct extension from an intra-abdominal or intra-thoracic primary adjacent to it, or a primary malignancy arising in the vertebral body can also occur.[19] Intradural spinal cord neoplasms (intramedullary and extramedullary) or metastases (intramedullary) can also present with symptoms of spinal cord compression[20]

but **these guidelines will focus on extradural MSCC.** Figure 1 shows the different types of malignant invasion of the spinal cord.

Figure 1: Malignant Invasion of the Spinal Cord



MSCC can be the presenting manifestation of a cancer or can be the sole site of recurrence.[21] It is however, more common for it to occur where there is widely disseminated disease.[21] Spinal metastases may occur in all age groups, but the period of highest prevalence coincides with the relatively high cancer risk period of 40-65 years of age.[21] Most patients will die as a result of their underlying cancer within a year of the diagnosis of spinal cord compression; however patients with more favourable prognostic factors can survive beyond two years.[22]

2.3 Key signs and symptoms

It is the **non-specialist** in primary, secondary or tertiary care who has to be alert to the possibility of MSCC in their own setting. Making this diagnosis however is challenging when you consider that, from a patient population of 1500, an individual GP is likely to see no more than 7 or 8 new cases of cancer a year[23] and even less MSCC.

Practitioner awareness of the key signs and symptoms of spinal cord compression and its management could ensure a better quality of life for patients and, in some cases, longer survival. When a patient presents with signs or symptoms suggestive of MSCC, a comprehensive assessment of their immediate physical (including a full neurological assessment), psychosocial and emotional needs is required. Knowledge of the MSCC section of the Scottish Referral Guidelines for Suspected Cancer[23] and the RCGP RED FLAGS for Possible Serious Spinal Pathology[14] (Table 1) should assist the clinician in determining their initial diagnosis. Further guidance on patient assessment and examination can be found in *Appendix 4*. The key signs and symptoms will now be described.

2.3.1 Pain

Thoracic spinal pain must be treated as significant and should not be assumed to be degenerative disc disease. Radicular pain in a patient with cancer is a major cause of concern.

- Pain is usually the earliest presenting symptom[24] and has often been present for a number of weeks before MSCC is diagnosed (median 6-8 weeks).[17,25]
- Pain may be new or may present as a significant change in the character of longstanding pain. It is often described as unremitting and is associated with feelings of anguish and despair.
- The onset of pain can be mild but often escalates and escapes pain control even with increases in opioids.[26]
- Changes in the character of back pain, including "burning" or "shooting" pain, warrants close assessment.[27]
- Pain can be localised over the area of tumour due to vertebral destruction so that the vertebra is tender on palpation.[13,27] Multiple spinal levels are affected in 30% of patients therefore more than one vertebra may be tender on examination.[25]
- Pain may be increased by lying down and relieved by sitting[17,28] in contrast to back pain from degenerative joint disease.
- Typically pain is worse at night.[25]
- Referred pain is often of a burning or shooting nature (numbing and tingling are other descriptors used) and may be seen in lumbar epidural spinal cord compression with metastases of the first lumbar vertebra (L1) causing pain over the sacroiliac joint.[24] Referred pain may be mistaken for a false localising sign.[25]
- Nerve root compression may present with radicular symptoms only, although it usually follows back pain. Radicular pain follows the distribution of the involved segmental dermatome[19] (*Refer to Appendix 3(b)*). Compression by a thoracic lesion usually radiates in a band around the chest or upper abdomen often bilaterally and is frequently described as a tight band around the chest or abdomen that causes the patient to feel as if they are being squeezed. Radicular pain is exacerbated by activities involving the valsalva manoeuvre, such as: coughing, sneezing, straining, straight leg raising and neck flexion.[15,25]
- Radicular pain from a cervical or lumbar region usually radiates down one or both of the respective innervated extremities (arms and/or legs).

Remember: Taking to bed or needing a catheter, even in the absence of pain, should raise the possibility of MSCC.

2.3.2 Motor deficits

- Specific muscle weakness may emerge initially in the legs regardless of the level of compression.[24,25] Compression of the lower cervical and upper thoracic nerve roots can present with upper limb weakness.
- The patient may complain of "heavy" or "stiff" limbs causing, for example, difficulty climbing stairs.[19]
- The development of ataxia, loss of co-ordination or paralysis are usually late findings.[25,29]

2.3.3 Sensory deficits

- L'Hermitte's sign - a tingling, shock-like sensation passing down the arms or trunk when the neck is flexed - can indicate compression of the cervical or thoracic regions.[17,27,29]
- Paraesthesia and loss of sensation may develop progressing upwards from the toes in a stocking-like fashion eventually reaching the level of the lesion[25] but is poorly localized to the site of the lesion.
- The patient may experience altered sensation to touch, pain and temperature.[19]

2.3.4 Autonomic dysfunction (usually late presenting symptoms)

- Sphincter disturbances can increase the tendency to constipation and/or urinary retention[29] and this can progress to double incontinence.[27]
- Male patients can experience decreased power of erection.[30]

2.4 Referral Pathways

It has already been stated that patients with actual or potential MSCC may present in a variety of settings to any health care professional. The individual's presenting signs and symptoms and general physical condition will influence the likely referral and treatment pathway. The pathways for the following categories of patient will now be described:

Urgent Referrals

- Patients with a known cancer diagnosis and early presentation triggers.
- Patients without a cancer diagnosis.

Non-urgent Referrals

- Patients with a known cancer diagnosis and late presentation.

2.4.1 Urgent referral and initial management

2.4.1.1 Patients with a known cancer diagnosis

This will more commonly relate to patients with cancer of the lung, prostate, breast, and myeloma, but not exclusively.

Early presentation triggers

A patient presenting:

- With previously diagnosed bone metastases.
- Complaining of new spinal pain, particularly thoracic/nerve root pain.[10]
- Using descriptors such as 'tight band around chest' or 'nerve-like pain in upper thighs'.
- With significant change in the nature of longstanding pain (unremitting, feelings of despair).
- With new difficulty with 'getting up stairs'.

Management pathway

- Clinical assessment and examination (*Refer to Appendices 4 and 5*). A clinical assessment of the patient with suspected spinal cord compression includes identification of risk factors, symptom evaluation of pain, sensory and motor function, and bowel and bladder function.
- Commence patient on Steroids (Dexamethasone 16milligram per day (mg/d)) (*Refer to Section 3.2 Steroid Administration*).
- Suggest patient lies flat and advise that they will require to maintain this position until they are admitted to hospital and are reassessed.
- An emergency two-person ambulance with stretcher should be requested to enable transfer of the patient from home to hospital.
- Admit direct to local hospital (avoiding Accident and Emergency, if possible).
- An urgent Magnetic Resonance Imaging (MRI) scan should be organised locally within 24 hours. A Multi-detector row Computerized Tomography scan (MDCT) is an acceptable alternative if urgent MRI is not possible (*Refer to Section 2.5 Investigation Protocol*).
- If the individual is a hospice in-patient at the time of initial suspicion of MSCC, it would be preferable if an urgent local out-patient MRI could be arranged rather than the patient having to be transferred as an in-patient to the local hospital. The most appropriate treatment pathway can then be agreed by the hospice multidisciplinary team (MDT) once in receipt of the MRI report.
- A telephone discussion with the on-call Oncologist or Neurosurgical Registrar is advised once clinical and radiological assessment has been performed.

    1. In general, a patient presenting with the following criteria should be initially referred to **Neurosurgery** (Institute of Neurological Science, Southern General Hospital) *(Refer to Section 3.5 Surgery)*.
        - One area of compression.
        - Radio-resistant tumours (e.g. renal).
        - Ambulant / paraparetic.
        - A life expectancy of a minimum of 6 months.

    2. A patient with the following criteria should be initially referred to **Oncology** (The Beatson West of Scotland Cancer Centre), usually for radiotherapy *(Refer to Section 3.3 Radiotherapy)*.
        - Multiple levels of cord compression.
        - Radio-sensitive cancer (e.g. breast).
        - Preferably ambulant (but also with an established paralysis of less than 72 hours).
        - Life expectancy of greater than 4 weeks.

- If there is likely to be a delay of greater than 24 hours in performing the MRI scan locally, the on-call Oncology/Neurosurgical Registrar should be informed.
- If surgical intervention is decided as the preferred treatment option, this may be performed by a Spinal Surgeon (Neurosurgical or Orthopaedic). Patients from the West of Scotland will be treated in Glasgow, either at the Institute of Neurological Sciences (Southern General Hospital) or the Western Infirmary Orthopaedic Department. A percentage of patients from Forth Valley are currently treated in Edinburgh Western General but this may be reviewed in the future.

- If the Specialist Palliative Care Team (SPCT) is not already involved, referral could be made to maximise the multidisciplinary team management of the patient and their family. The patient may have complex physical needs, depending on the level of compression, in addition to psychological, social and spiritual needs.

2.4.1.2 Patients without a cancer diagnosis

A patient presenting with:
Signs and Symptoms of Cord Compression *(Refer to Section 2.3 Signs and Symptoms).*

Management Pathway

- Clinical assessment and examination *(Refer to Appendices 4 and 5).* A clinical neurological assessment and examination of the patient with suspected spinal cord compression includes identification of risk factors (consider 'RCGP RED FLAGS' for serious spinal pathology Table 1), symptom evaluation of pain, sensory and motor function, and bowel and bladder function.
- If serious spinal pathology is considered co-ordinate urgent admission to the local District General Hospital (DGH) requesting direct ward admission, avoiding Accident and Emergency.
- Commence patient on Steroids (Dexamethasone 16mg/d) (*Refer to Section 3.2 Steroid Administration*).
- Suggest patient lies flat and advise that they will require to maintain this position until they are admitted to hospital and are reassessed.
- An emergency two-person ambulance with stretcher should be requested to enable transfer of the patient from home to hospital.
- Urgent MRI Scan to confirm diagnosis (MDCT is not an acceptable alternative for patients without a cancer diagnosis).
- Some of the following investigations may assist in identifying whether the patient does have an underlying cancer diagnosis which could influence the management pathway:
    - Chest X-Ray.
    - Full Blood Count (FBC), Erythrocyte Sedimentation Rate (ESR), C Reactive Protein (CRP) and biochemical profile including Urea and Electrolytes (U&Es) Liver Function Tests (LFTs), bone and (in males) Prostate Specific Antigen (PSA).
    - Immunoglobulins.
    - Urinalysis for Bence Jones protein.
    - Prostate or breast examination.
- Telephone call to the on-call Neurosurgical team is advised once clinical and radiological assessment has been performed. The Oncology team should be contacted if malignancy confirmed (*Refer to Appendix 6*).

2.4.2 Non-urgent referral and initial management

Only relevant for patients with a known cancer diagnosis.

Late presentation

A patient presenting with:

- Advanced signs of spinal cord compression e.g. complete paralysis for 72 hours or more, sphincter disturbance.
- Condition deteriorating daily.
- Poor prognosis (life expectancy less than (<) 4 weeks).
- Poor performance status (PS) - PS >2 **prior to paralysis** (ECOG* scale)

*****ECOG: European Co-operative Oncology Group System (*Refer to Appendix 4*).

Management pathway

- If the patient is not already in hospital, admission to hospital may not be appropriate. A collaborative decision on the most appropriate palliative approach and place of care should be agreed by the GP and the patient's known Oncologist or Palliative Medicine Consultant. This decision should include the expressed wishes of the patient and family.
- At home, if agreed, a combined multidisciplinary and multi-agency package of care should be co-ordinated following discussion with the patient and their family/support network.
- Where the level and type of support required is not available at home, admission to hospital or hospice may be necessary.
- In hospital, referral to the Specialist Palliative Care Team would be appropriate due to the likely complex physical and psychological management needs of the patient and their family.
- A trial of steroids may be suggested but if no improvement is identified within five days these should be discontinued abruptly.

2.5 Investigation protocol for suspected MSCC

MRI of the whole spine is the investigation of choice in suspected cord compression[32]. If a patient has signs and symptoms suggestive of MSCC, this should be carried out within 24 hours.

In the acute situation, pursuing bone scans and plain X-rays only results in delay in diagnosis and localisation of pathology.[31]

2.5.1 Access to MRI

MRI is currently available for imaging of possible MSCC within 24 hours at two locations in the West of Scotland. Patients being considered for emergency radiotherapy can be scanned at the Beatson Oncology Centre at weekends on restricted bases, referrals accepted via the on-call oncology team in line with the Standard Operating Procedure documentation. 24 hour access is also available at the Institute of Neurological Sciences at the

Southern General Hospital for patients being considered for neurosurgical intervention.

Where MRI is not available or patient is unsuitable a possible alternative, if available locally, is MDCT. MDCT (16 slice or more) allows much greater coverage of the body in a short time.[33] Sagittal reconstructions of the spine will give sufficient bone detail to identify areas of metastatic destruction and possible MSCC. This would be co-ordinated through the Consultant, already involved with the patient, and the on-call Radiologist. Even if 24 hour cover is available, and depending on the time of referral, it may be deemed appropriate to perform the scan the next morning. This type of imaging could also be utilised where there is a contraindication for MRI e.g. the patient suffers from claustrophobia or has a pacemaker.

The advent of multi-detector row CT (MDCT (16 slice or more) allows much greater coverage of the body in a short time and should now be considered as an acceptable alternative if MRI is not available. [33]

2.5.2 Contraindications to MRI scanning

Currently: pacemakers, intracranial aneurysm clips, electronic implants such as a cochlea implant and some early artificial heart valves are absolute contraindications to MRI. Some imaging problems may also arise from metallic implants e.g. those used in spinal fusion. The referring clinician, if unsure how to progress, is advised to discuss the safety and suitability of MRI with a radiologist in such clinical situations.

2.5.3 Referral information required

The referral details should include:

- Patient demographic details (name, address, DoB, CHI number).
- Patient location.
- Clinical history *(Refer to Assessment and Examination Guidance in Appendix 4)*.
- Primary tumour diagnosis (if known).
- Previous surgery or radiotherapy.
- Previous relevant imaging results.

2.5.4 MRI examination

Patients with 'saddle anaesthesia', motor weakness, bowel or bladder dysfunction should be scanned the **same day** or immediately the following morning if out with Radiotherapy treatment hours.

Patients with no motor loss and/or retained sphincter control and only mild sensory disturbance can be scanned within 48 hours if no neurological progression is occurring.

2.5.5 Suggested MRI protocol

Sagittal T1 and T2 weighted images of the entire spine (base of skull to sacrum) is the minimum requirement, assuming the patient is able to co-operate.

It is advisable to image the thoraco-lumbar region first as this will detect the largest number of metastatic lesions causing MSCC. Some patients become restless due to discomfort and pain and later scan sequences may be degraded by movement artefact.

Axial T1 or T2 images through relevant areas of compression, including any normal vertebrae on either side of the compression level, are particularly relevant if spinal surgery is proposed.[16] In patients with vague sensory levels and limb weakness and where no massive compression is seen, consider leptomeningeal metastases. These may be visible on the T2 sagittal images as a nodularity of the lumbar roots but will be better visualised on a T1 post contrast sequence. This situation is most commonly seen in metastatic cancers of breast, melanoma, lung and lymphoproliferative disorders, and is very rare in some other tumour types e.g. prostate.[32]

If patients are unable to lie flat for any length of time, prior sedation may be necessary. This should be discussed with the department in advance of the examination. Medication will require to be prescribed and administered at ward level.

The report should be conveyed to the referring clinician as soon as possible following the examination. With the implementation of voice activated reporting, a formal verified report can be issued directly on to the Recording Information System (RIS).

3. TREATMENT

3.1 Introduction

The primary objectives of treatment for MSCC are to restore spinal cord function and to relieve pain and distress. A comprehensive patient assessment and examination will provide the evidence to make the necessary decisions about treatment. Primary diagnosis, functional ability and performance status (PS) are all important in treatment selection. Patients may receive one or a combination of treatments. These include; steroid administration, radiotherapy, chemotherapy and surgery. A brief description of each of these potential treatments will now be provided, followed by a brief section on general palliative care.

3.2 Steroid administration

Corticosteroids are often commenced immediately MSCC is strongly suspected or confirmed. They are administered in an attempt to prevent further neurological deterioration and for their analgesic effect. These effects are thought to be achieved by decreasing spinal cord oedema and a possible oncolytic effect on some tumours, in particular lymphoma and breast cancer.[1]

Despite the regular use of steroids in patients with MSCC, there is a paucity of research evidence to guide clinicians on the optimal starting dose to produce maximum benefit without inducing serious side effects. A randomised controlled trial provides some evidence to support the use of high dose dexamethasone (96mg/d initially) as an adjunct to radiotherapy in restoring or preserving gait in patients with MSCC.[34] There were, however, significant side effects such as hypomania, psychosis and gastric ulcer perforation reported in 11% of patients. Expert opinion and experience, in addition to other reported evidence, suggests that the side effect profile of this dose of steroid is too great and therefore the recommendation is to use a much reduced dose.[35]

> Dexamethasone 16mg per day in divided doses has been identified in a previous Scottish Audit as the most common starting dose regimen in patients with this condition.[10]

Dexamethasone-related toxicity is a consequence of both the dose and the duration of treatment.[36] This can be minimised by ensuring that the dose is reviewed and duration is kept as short as possible. However, not all patients will be able to stop steroids and a maintenance dose may be required to preserve neurological function.

The findings of a case series suggest that in patients who are ambulatory at the time of diagnosis, steroids provide no additional benefit to radiotherapy alone.[37] These West of Scotland guidelines suggest that all patients with suspected MSCC should be commenced on Dexamethasone 16mg/d and the specialist involved will make the decision on whether to discontinue or adjust treatment. Once the appropriate treatment has been decided, an instruction to discontinue steroids or to continue on a dose reduction regimen is required. A potential dose reduction schedule is provided in Table 2.

Table 2: **Steroid reduction schedule**

Day	Dexamethasone Daily Dose (milligram = mg)	Administration
Day 1-5 (5 days)	16mg	8mg B.D*
Day 6-10 (5 days)	12mg	6mg B.D*
Day 11-15 (5 days)	8mg	4mg B.D*
Day 16-20 (5 days)	4mg	2mg B.D*
Day 21-25 (5 days)	2mg	2mg O.D**

*B.D. = Twice Daily (8am & 2pm) **O.D. = Once Daily (8am)

If the treatment modality is radiotherapy alone there may be some alteration to the above schedule i.e. 16mg daily dose should be continued until the second fraction of radiotherapy has been given and the 12mg daily dose should normally continue until the final fraction of radiotherapy (if 4 or 5 fractions).

Following surgery if adjuvant radiotherapy is not to be given, a quicker dose reduction schedule may be used in order to discontinue steroids by day 14.

3.2.1 Additional information

- Prophylactic gastric protection should be considered at the same time as starting steroids.
- Patients should be observed for side effects throughout the course of steroid treatment, *(Refer to Section 4.10.4)*.
- Daily urinalysis should be carried out for presence of glycosuria whilst the patient is in hospital. If glycosuria is present, a blood glucose sample should be checked (BM Stix).
- Steroids should be administered no later than 2pm to avoid insomnia.
- If at any point in the dose reduction neurological symptoms deteriorate, return to previous dose schedule and seek medical advice.
- If no improvement in neurological symptoms after the first five days, discuss discontinuing steroid therapy.

3.3 Radiotherapy

Palliative radiotherapy is the most common treatment in the management of patients with MSCC. It aims to reduce the tumour size, relieve pain and prevent both progression of neurological deficits and recurrence. There are substantial challenges surrounding the need to deliver treatment for adequate palliation without undue toxicity, weighed against the performance status and expected survival of these patients. Prognostic factors may influence the need for treatment, type of treatment and treatment schedule.[22] Potential prognostic factors that might help to determine a positive functional outcome after treatment include:

- Performance status (ECOG PS 0-2).
- More favourable histology (lymphoma, myeloma, seminoma, breast, prostate and gastrointestinal).
- Still ambulatory.[22]
- More than two years since original diagnosis.[38]
- Slow development of motor deficit.[22,38]

Tokuhashi's 'Revised Evaluation System for the Prognosis of Metastatic Spine Tumours' may be a useful tool in evaluating a patient's suitability for this mode of treatment[39]. This system utilises the Karnofsky Performance Status Scale and not ECOG. A table containing and comparing both scales is provided in Appendix 7.

3.3.1 Factors affecting outcome of care

Radio-sensitivity
Motor function is more likely to improve if the tumour is radio-sensitive (lymphoma, breast) than radio-resistant (renal and melanoma).

Pre-treatment mobility
The majority of patients treated with radiotherapy for sub-clinical cord compression or who are ambulant on commencement of radiotherapy remain ambulatory. However if they are paraplegic less than 10% will regain the ability to walk. Motor function remains stable in about 60% of patients and about one-third experience an improvement.[22]

Bone compression
Patients with bony compression (even those with mild to moderate paresis), who are treated with radiotherapy, seem less likely to recover ambulation compared with paretic patients without bony compression.[22,31,40,41]

3.3.2 Adjuvant therapy
Radiotherapy can also be used as an adjuvant to both decompression surgery and to chemotherapy, when either is the primary MSCC treatment.

3.3.3 Palliative radiotherapy regime and planning
Having diagnosed MSCC, radiotherapy should be initiated as soon as possible. An optimal radiotherapy regime is not indicated within the literature; however, most patients usually receive 20 Gray (Gy) in 5 daily fractions. Radiation should be centred on the site of epidural compression to a radiation port extending 1-2 vertebrae above and below the area of compression, as further compression commonly occurs within 2 vertebral bodies. The posterior field is centred on the spinal processes and is usually 6-9 cm wide. It may be extended laterally to encompass para-spinal masses as a cause of compression.

No treatment or an 8Gy single fraction should be considered for patients who have a short life expectancy, those who are paraplegic and in whom neurological improvement is unlikely, and for patients where pain management is poor despite analgesia.[22,42,43]

To minimise dose to the pharynx, treatment of the cervical region is with lateral opposed fields. Thoracic radiotherapy is usually delivered using a single posterior beam. Depending on the depth of the spine in the lumbar region, radiotherapy is delivered either through a direct posterior beam or an anterior-posterior parallel pair. Megavoltage radiotherapy is then usually given at 6MeV. For doses of 40Gy or more, CT planning may be appropriate.

3.3.4 Curative radiotherapy

Although treatment is usually palliative, there are indications where radiation should be delivered with curative intent. These include solitary plasmacytoma, germ cell tumours and early stages of lymphoma which have caused extradural spinal cord compression. Radiotherapy could be either as a single modality treatment or in combination with either surgery or chemotherapy. Not only is the radiotherapy dose likely to be higher but radiotherapy planning may include more specialised techniques such as conformal CT planning and stereotactic radiotherapy.

Primary spinal tumours can present as malignant spinal cord compression and if radiotherapy is required the patient should be treated by a Clinical Oncologist with a special interest in neuro-oncology.

3.4 Systemic Anti-Cancer Therapy (SACT)

The role of SACT in MSCC is limited to those patients who have chemo-sensitive tumours where treatment with appropriate cytotoxic medicines may be considered. It is the primary treatment of choice for localised non-Hodgkin's lymphoma of the spine and germ cell tumours. In instances where patients are already receiving SACT for their primary cancer diagnosis, the oncologist will advise on whether this treatment should be continued/discontinued/delayed.

3.5 Surgery

Advances in surgical techniques for tumour decompression and spine stabilization, neurophysiologic monitoring and anaesthetic expertise have allowed surgeons to perform more extensive procedures with improved patient outcomes and reduced morbidity. There is, however, very little reported good quality evidence on the most appropriate surgical interventions for patients with MSCC, although it is generally agreed that improved surgical outcomes are achieved when decompression is combined with internal fixation and fusion.[40,44,45]

The results of a recent randomised, multi-institutional, non-blinded trial provide important evidence to suggest that decompressive surgery plus postoperative radiotherapy is superior to treatment with radiotherapy alone.[46] This suggests a potential reversal in the current philosophy of radiotherapy as the primary treatment for patients with MSCC. Surgery that frees the spinal cord at the site of compression in addition to reconstructing and stabilising the spinal column was shown to be more effective at preserving and regaining neural function, notably ambulatory function and sphincter function, than conventional radiotherapy. It is also highly effective in relieving pain.

3.5.1 Selecting patients for surgical intervention

Collaboration and multi-professional assessment of patients with MSCC is essential in determining the patient's suitability for surgical intervention. Criteria for patient selection for surgery in the West of Scotland are described below.

Patients should:

- Have reasonable general medical health sufficient for surgical intervention.[46]
- Be ambulant, or paraparetic, or have been paraplegic for less than 48 hours.[46]

- Have cord compression restricted to a single area (this can include several contiguous spinal or vertebral segments).[46]
- Have no pre-existing or concurrent neurological problems, other than those directly related to the MSCC.[46]
- Have an expected survival of a minimum of six months due to the significant morbidity associated with surgery.[41]

Pre-operative prognostic scoring system

Life expectancy can be estimated using a prognostic scoring system such as the Tokuhashi 'Revised Evaluation System for the Prognosis of Metastatic Spine Tumours'[39] *(Refer to Appendix 7)*. This system has been utilised by a number of surgeons with reported benefit.[42]

This scoring system takes six variables into consideration:

- General medical condition.
- Number of extra-spinal metastases.
- Number of metastases in the vertebral body.
- Presence or absence of metastases to major internal organs.
- Site of primary lesion.
- Severity of palsy.

The total score of this revised evaluation system is 15. Prognosis is based on the opinion of the specialist and the pre-operative prognostic score. Patients with a score of 0-8 (predicted survival < six months): conservative or palliative procedures selected. A total score of 12-15 (predicted survival of ≥ 1 year): excisional procedures selected; scores between 9-11 (predicted survival of ≥ 6 months): palliative surgery or, rarely, excisional surgery for patients with a single lesion and no metastases to internal organs[39] (*Refer to Appendix 7*).

3.5.2 Bone biopsy

If there is the slightest doubt as to the underlying pathology, particularly where there is a solitary bony lesion, further investigations including percutaneous bone biopsy should be carried out before definitive surgery. Biopsies should normally be performed by trephine and usually require imaging control in the form of CT or bi-planar image intensifier. It is recommended that multiple samples are obtained particularly with blastic lesions. Most biopsies can be performed using local anaesthesia with mild sedation being given as required. The Spinal Surgeon (neurosurgical or orthopaedic) will often perform the biopsy or the Radiologist following discussion with the Surgeon.

3.5.3 Surgical technique

There are a number of factors which influence the surgical approach and technique used. These include:

- Extent of pathology.
- Location of tumour in relation to the spinal cord.
- Degree of instability.
- The access required to allow safe decompression and adequate instrumentation.[47]

The surgical approach taken is tailored to the patients needs. The posterior approach is most common but other options are anterior, trans-thoracic and retroperitoneal.[47]

3.6 General palliative care

A holistic, patient-centred approach to care will enable staff to better identify the range of issues that patients with suspected or actual MSCC may present with. These may include the following:

- Pain and symptom management.
- Emotional/psychological support.
- The need to consider spiritual needs and care.
- Family support.
- Rehabilitation/maximising potential.
- Discharge planning.
- Assessment for hospice admission.

3.6.1 Specialist palliative care

Referral to the Specialist Palliative Care service may be appropriate at any stage from suspicion of MSCC *(Refer to Section 2.4 Initial Referral Pathway*), through diagnosis, treatment and rehabilitation to end of life care. It is particularly important when the issues are complex and are not able to be managed locally or when a MDT approach to care has not been available but is required.

4. CLINICAL CARE

4.1 Introduction

Nurses working in a variety of healthcare settings may be the first people who recognise the signs and symptoms of MSCC and should assist prompt diagnosis and initiation of treatment.[19] It is therefore important for nursing staff who come into contact with patients with cancer to have an understanding of these signs and symptoms[82]. Much of this care however will be a collaborative approach involving a variety of members in the multidisciplinary team. This section provides guidance for all aspects of clinical care without being prescriptive due to the variation of needs between each individual *(Refer to Appendix 8)*.

4.2 Admission assessment

Patients should undergo a comprehensive assessment of their immediate physical, psychosocial, spiritual and emotional needs. This process should be ongoing to allow actual and potential problems to be elicited and the appropriate support to be initiated and communicated within the healthcare team. Multidisciplinary assessment and clearly described documentation will assist communication and prevent unnecessary duplication. It is recognised that these patients often have great psychosocial and spiritual needs that require to be addressed concurrently with physical needs.

4.3 Patient positioning

It is important to state that there continues to be a significant lack of documented evidence in relation to the positioning of patients with suspected or actual spinal cord compression resulting from malignancy[83]. It is suggested that until there is multidisciplinary agreement as to whether the spine is stable or not, the patient should be nursed in the supine position. This complies with NICE Guidance (2008)[81]. Further advice on the positioning of patients, with a stable or unstable spine, is provided in *Section 5.2.3*, in the Rehabilitation chapter.

4.4 Moving and handling

A comprehensive multi-professional moving and handling assessment, including the patient's ability to mobilise, should be carried out on admission to provide information for planning safe and effective patient manoeuvres.

A comprehensive moving and handling plan should be developed and updated/reviewed daily in accordance with any changes in the patient's condition. This written plan will ensure all staff are aware of the safest moving and handling management for the individual patient and the appropriate equipment to be used[48] *(Refer to Section 5.2 Physiotherapy)*.

4.5 Pain assessment and management

Patients with MSCC may experience a variety of types of pain. At the outset, pain is generally localised in the back near the midline and is frequently accompanied by referred or radicular pain[19] (*Refer to Section 2.3 Key signs and Symptoms)*.

4.5.1 Pain assessment

Pain assessment should be carried out on admission and re-assessed daily or more frequently depending on the severity of pain or level of distress.[49,50] All members of the multidisciplinary team involved with the patient can contribute to this assessment. A formalised pain assessment tool should be used in partnership with the patient to obtain a comprehensive assessment of each individual site of pain identified. This should take account of the following:

- Location & type of pain.
- Onset of the pain.
- Duration of pain.
- Character of the pain - is it constant or intermittent?
- Description of pain ("burning", "shooting", "a tight band").
- Severity/intensity.
- Aggravating factors (lying down, coughing, sneezing, straining).
- Relieving factors (positional, sitting up or lying down, medication).
- Functional effects (i.e. interference with activities of daily living).
- Psychosocial factors.
- Current medication and any toxicity.[49,50]

4.5.2 Pain management

- Following pain assessment, prompt pain management should be initiated to maximise pain relief.
- It is recommended that the principles of the World Health Organisation (WHO) Analgesic Ladder (three steps) for pharmacological management of pain should be combined with other non-pharmacological modalities such as relaxation and gentle massage to achieve effective pain relief.
- Care should be taken to identify and effectively manage 'incident pain', for example, prior to repositioning or transferring the patient to a trolley or treatment couch.
- Patients with complex and/or poorly controlled pain should be referred for specialist palliative care advice.
- A multi-professional approach to pain management is recommended involving any or all of the following as required e.g. Allied Health Professionals (AHPs), Anaesthetist, Clinical Psychologist, Nurses, Oncologists, Palliative Care Specialists, Pharmacists and Surgeons.[49,50]

4.6 Pressure Area Care

Patients with advanced cancer and MSCC are at increased risk of impaired skin integrity as a result of altered bowel or urinary elimination and/or impaired mobility[15,51] or sensation. Implementation of the SSKIN Bundle[84] is recommended as best practice in the prevention of pressure ulcers and should be used for this patient group *(Refer to Appendix 9)*.

S surface support (use appropriate pressure relieving equipment).

S skin inspection (assess within 6 hours of admission and at regular intervals thereafter).

K keep moving (positional changes).

I incontinence (management according to local policy).

N Nutrition and hydration.

Application of the SSKIN Bundle will include using a formal assessment tool such as Waterlow or Braden alongside clinical judgement. For further information refer to preventing *Pressure Ulcer Driver Diagram and Change Package* [84]. Risk assessment should take place within 6 hours of admission and at regular intervals thereafter if their condition or treatment alters.

- Individuals with incontinence should have their skin cleansed with soap and water and the cause addressed.
- Devices to assist with the repositioning of patients in bed such as profiling beds and electric bed frames are of benefit.
- Patients requiring pressure-reducing equipment (mattress or cushion) should receive it as soon as possible.
- Patients should be nursed on a pressure relief mattress and/or cushion which is appropriate to their physical status and risk assessment score.
- Advice should be sought from the Tissue Viability Specialist Nurse for patients who require management of complex pressure ulcers.[52]

4.7 Prevention of Deep Vein Thrombosis (DVT)

Thrombosis is a common complication of malignancy[54] and thought to be related to increased activity of the coagulation system, evidenced by markers of accelerated thrombin generation and increased platelet reactivity. The presentations can be variable and may be venous or arterial. Patients with spinal cord injury (SCI) are also considered at risk for deep venous thrombosis (DVT) and low molecular weight heparin (LMWH) has been recommended for prophylaxis in patients with complete SCI[55]. SIGN 122 states that "patients with cancer are generally at high risk of VTE and should be considered for prophylaxis with LMWH, UFH or Fondaparinux whilst hospitalised."[53] LMWH is preferred because it leads to fewer thrombotic events and fewer bleeding complications compared with unfractionated heparin.[55] Treatment therefore should be decided by medical staff and prescribed on an individual basis, dependent on risk and any contraindications and local policy for bed bound patients. All West of Scotland health boards have local guidelines/policy for VTE risk assessment and prevention which should be followed.

Guidance is also available in SIGN 122 - Prevention and Management of Venous Thromboembolism.[53]

4.7.1 Anti-embolic stockings (AES)

Many patients with MSCC will be at increased risk of developing thrombosis. If the patient is anticipated to be on bed rest and/or immobile for 3 days or more, leg exercises should be encouraged with early mobilisation wherever possible. Immobility increases the risk of DVT about 10 fold.[53] Anti-embolic stockings should be worn continually except when personal hygiene needs are being attended to. Most controlled trials have used above knee stockings, and studies comparing above and below knee stockings have been too small to determine whether or not they are equally effective, however, a meta analysis suggested no major difference in efficacy in surgical patients.[85]

4.8 Bladder function

MSCC can cause progressive nerve compression that can result in urinary retention, incontinence or large post-voiding residual volumes.[56,57] The type and degree of bladder dysfunction depends on the site and extent of damage to the sensory and motor tracts of the spinal cord.

Reflex bladder (automatic or spastic bladder)
If the spinal cord compression is above the level of the twelfth thoracic vertebra (T12), the patient will have an upper motor neurone bladder or a reflex bladder. The bladder reflexes are still intact and so when the bladder is full it may empty automatically. Since the nerves above the sacral section of the spinal cord are no longer connected to the brain, the patient will not have any awareness of the full bladder and will not have voluntary control. The reflex can be triggered by tapping the lower abdomen but may also be triggered by involuntary spasms or movement.[58]

Flaccid bladder (floppy or areflexic bladder)
When the spinal cord compression is below the level of the twelfth thoracic vertebra (T12) and affects the sacral section of the spinal cord, all reflexes are destroyed and the bladder will have no muscle tone. When the bladder is overfilled, dribbling incontinence may occur along with back pressure. Patients will not be aware of a full bladder and will have no voluntary control of bladder function.[56]

Some patients may have a "mixed" bladder when there is only partial compression of the spinal nerves.

4.8.1 Assessment

An accurate history and assessment is essential for effective bladder care management. Assessment should include details of the following:

- When urine was last voided.
- Any incontinent episodes.
- Any symptoms of urgency or frequency.
- Any associated abdominal pain.
- Any obvious abdominal distension and/or discomfort.
- Fluid intake / output.
- Routine urinalysis.
- Any other symptoms.[59,60]

4.8.2 Management

- Early urinary catheterisation is often indicated for the management of urinary incontinence and urinary retention.
- When appropriate the patient and their carers should be given instruction on catheter care.
- Where a urinary catheter is permanent, consideration should be given to the use of a catheter valve and intermittent urinary catheterisation for patients who have sufficient manual dexterity, cognitive awareness and bladder capacity.

4.9 Bowel function

Altered bowel function is a common problem in patients with spinal cord compression or cauda equina syndrome.[61] The patient may become severely constipated due to decreased mobility, loss of rectal sensation, poor anal and colonic tone, use of opioids and other analgesics and anorexia. This can result in constipation with overflow and variable degrees of abdominal distension, nausea and vomiting.[61]

Spastic / reflexic bowel
In upper neurone damage (twelfth thoracic vertebra (T12) and above), reflex activity is maintained; the bowel will contract and empty when stimulated and anal sphincter tone is maintained.[58]

Flaccid / areflexic bowel
When lower neurone damage occurs (first lumbar vertebra (L1) or below), although peristalsis will return, these movements are ineffective without the support of the spinal reflex. Faecal retention and overflow of faecal fluid may occur and the anal sphincter will be flaccid.[58]

4.9.1 Assessment

An accurate history and assessment is essential for effective bowel management. Assessment should include details of the following:

- Frequency of stools/bowel motions.
- Consistency of stools.
- Any associated nausea/vomiting.
- Any associated abdominal pain.
- Any obvious abdominal distension and/or discomfort.
- Dietary history.
- Medication history.
- Any other symptoms.

In patients who have a history of loose or liquid bowel motions, care should be taken to distinguish between actual diarrhoea and overflow due to faecal impaction.[61]

4.9.2 Management

The immediate and ongoing aim of bowel care in patients with MSCC is to attain a "controlled continence". In patients who become paraplegic and have loss of rectal sensation, introduction of a 'paraplegic bowel regime' helps to control and maintain a normal bowel pattern and prevent complications i.e. constipation, diarrhoea and incontinence.[61]

The protocol described here can be adapted to suit each individual patient's needs.

1. With consent from the patient, carry out an initial rectal examination to determine the patient's present bowel activity.
2. Prescribe senna (tablets or liquid) and lactulose solution to be taken twice daily (morning & evening) on Tuesday, Thursday, Saturday and Sunday.
3. On Monday, Wednesday and Friday, carry out bowel intervention (to achieve rectal emptying) using:
   - For hard loading – 1x10mg bisacodyl, + 1x4g glycerin (adult) suppository.
   - For soft loading – 2x10mg bisacodyl suppositories.
4. Regularly evaluate laxatives in order to maintain a manageable consistency of bowel activity.
5. Document bowel activity results daily in an appropriate chart.[62]

Follow the above protocol for a minimum of 3-5 times whilst monitoring its effectiveness. Modification should be made to one element at a time as necessary. Other aspects to consider in evaluation are:

- Dietary intake.
- Fluid intake.

- Activity.
- Frequency and consistency of bowel motion.
- Ambulatory status.
- Type of rectal stimulant (oral & suppositories).
- Patient preferences. [62]

4.10 Monitoring and management of treatment side effects

4.10.1 Surgery

Prior to treatment provide the patient with verbal and written (where available) information regarding their surgery and any pre- and post-operative management, including:

- Pain and symptom management.
- Physiotherapy.
- Mobilisation plans.
- Wound management.
- Pressure area care.

Patients who will also be receiving adjuvant radiotherapy following their surgery should have this explained to them. Further verbal and written information should be provided at a time suitable for the patient.

4.10.2 Systemic Anti-Cancer Therapy (SACT)

Prior to treatment commencing, provide the patient with written and verbal information regarding the treatment and potential side effects. These may impact on the rehabilitation process due to fatigue, bone marrow depression, diarrhoea, constipation and altered appetite.

4.10.3 Radiotherapy

Prior to treatment commencing, provide the patient with written and verbal information regarding the treatment and potential side effects (this may not always be possible when radiotherapy is given in an emergency situation but should be initiated at the earliest convenience once the patient is stabilised).

Potential / actual side effects of radiotherapy are dependent on the following:

- Area being treated & the volume of tissue irradiated.
- Treatment intent.
- Duration of treatment.
- Total dose given.
- Size of radiation treatment field.
- Individual susceptibility.
- Site of radiotherapy *(see below).*

Side effects and site of radiotherapy

Cervical and Thoracic

Oesophagitis – if experienced, administer analgesia and antacids as prescribed and alter consistency of oral diet in accordance with patients' symptoms. Exclude candida infection.

Lumbar

Nausea and vomiting – administer anti-emetics as prescribed/required.[56]
Diarrhoea – administer anti-diarrhoeal agents as prescribed. Caution should be made to ensure that the patient does not have constipation with overflow. Liaise with the dietitian regarding the appropriate fibre content of oral diet.
Dysuria/radiation cystitis – exclude urinary tract infection by culturing a midstream specimen of urine (MSU). Encourage fluid intake.

Sacral

Diarrhoea – if this occurs provide a low fibre diet and administer anti-diarrhoeal agents as prescribed. Caution should be made to ensure that the patient does not have constipation with overflow.

Skin

All patients who receive radiotherapy may experience a degree of skin reaction at the site being treated.

- Basic skincare guideline for patients receiving radiotherapy should be followed at all times.
- Aqueous cream or a similar unperfumed proprietary preparation may be applied to the skin to maintain soft, supple, clean, odour-free and intact skin.
- Observe for any erythema or dry desquamation and oedema at the irradiation site and apply aqueous cream as above.
- If moist desquamation occurs, this should be treated daily with a hydrofibre or silicone dressing to the affected area. [63]

Fatigue

Fatigue is common in patients with cancer and may be related to a radiobiological action, with metabolites from cell destruction and normal tissue damage accumulating. Anaemia should be excluded. The Occupational Therapist is able to offer advice on fatigue management but all staff should be able to provide patients with a level of advice / information on fatigue management.

4.10.4 Steroids

The majority of patients being treated for MSCC will receive steroid therapy. It should be noted that the elderly are at increased risk of side effects of steroids.[86] However; all patients should be closely monitored for side effects, which include:

- Increased risk of infection.
- Hyperglycaemia.
- Gastrointestinal irritation.
- Hypomania and/or psychosis.
- Fluid retention.
- Impaired wound healing.

Monitoring

- Daily urinalysis should be monitored while receiving steroids to detect glycosuria. If glycosuria is present, a Blood glucose sample should be checked (BM Stix) at least twice weekly in the non – diabetic patient. Specialist advice should be sought for the diabetic patient.
- If glycosuria is detected, medical staff should be informed immediately.

- If the patient has symptoms of gastro-intestinal irritation (indigestion, heartburn, gastric reflux), a review of gastric protection should be discussed with medical staff.
- Patients should be prescribed a gastric protector whilst on high dose steroids.
- Patients should be closely observed for any neurological deterioration during steroid dose reduction (increased numbness, pins and needles) and medical staff informed immediately if this occurs.

4.11 Psychological care and support

It is increasingly recognised that a substantial proportion of patients experience psychological problems that have a significant negative impact on functioning and quality of life. Experiencing MSCC, will be a particularly traumatic time for patients and those close to them. An awareness of the concept of cancer-related distress, now recognised by many clinicians, can assist in assessing patients. Cancer-related distress is defined as '…an unpleasant emotional experience of a psychological, social, or spiritual nature that may interfere with a patient's ability to cope with cancer and its treatment.' Distress extends along a continuum ranging from common normal feelings of vulnerability, sadness and fear to problems that can become disabling, such as depression, anxiety, panic, social isolation and spiritual crisis. [64]

Following a cancer diagnosis, the presence of one or more of the following factors have been identified as increasing patient risk of severe distress or a clinically significant psychological disorder. [65] These factors are also relevant to consider when assessing patients who present with an extension to their disease such as MSCC or other metastatic involvement. These factors include:

- Past history of psychological problems.
- Younger age.
- Single status (including being separated or widowed).
- Non-adult children.
- Poor marital support.
- Alcohol or substance abuse.
- Financial strain.
- Poor prognosis.
- Pain, fatigue or lymphoedema.

Patients and their families need to be provided with the opportunity to express the emotions associated with their current situation but also taking into consideration any other risk factors identified. Family risk factors may include pre-morbid coping strategies and practical issues such as the proximity of family/support networks to the patient. It would also be beneficial to use this situation as a trigger to initiate advance care planning if not already done[87].

Performing a holistic needs assessment and using tools such as the Concerns Checklist[88] can be helpful by assisting staff in identifying the potential level of distress but also in then guiding them towards the most appropriate management and where that can be accessed locally. This will include contact/referral information for psychological and psychiatric services. The level of support and management required may include:

- Providing appropriate information in a staged manner during investigation, treatment and rehabilitation to enable patients and families to make informed decisions.
- Encouraging the use of a variety of coping techniques such as relaxation, visualisation and deep breathing exercises.
- Encouraging and negotiating realistic goal setting as part of the rehabilitation process to maximise independence and control.
- Referral to the Specialist Palliative Care Team, Clinical Psychologist, Psychiatrist, Macmillan Counsellor (or similar).
- Psychological therapies such as: Cognitive Behavioural Therapy, Supportive-expressive therapy, Psycho-education and Pharmacological management.

Identifying the source of a patient's distress, and ensuring that all members of the multidisciplinary team are aware of it (unless otherwise requested by the patient), is vital to ensuring that the patient feels safe and cared for.[66]

4.12 Rehabilitation and multi-professional referral

The aim of rehabilitation is to improve quality of life, maintain or increase functional independence, prolong life by preventing complications and to return the patient to the community wherever possible.

Rehabilitation should commence on diagnosis, encompassing the skills of various healthcare professions as appropriate *(Refer to Chapter 5 for more detailed guidance on rehabilitation).*

Referrals should be considered to the following multi-professional staff:

- Physiotherapist (within 24 hours of admission).
- Occupational Therapist (within 24/48 hours of admission).
- Social Worker.
- Specialist Palliative Care Team.
- Dietitian.
- Speech & Language Therapist.
- Clinical Psychologist or Counsellor.
- Hospital Chaplain.

Family members and friends (with the patient's permission) should be given the opportunity to be involved in the patient's care. This may include personal hygiene needs, assistance with feeding at meal times and scheduling of medication.

4.13 Discharge planning

Discharge planning should commence as soon as possible following admission and certainly as soon as the diagnosis has been confirmed. The patient and their carers should be involved in all discussions to ensure their wishes are respected and that the goals of discharge planning are realistic and achievable. Where community staff has already been involved they should also be contacted for both a background report and to provide an update on the patient's status. A patient with MSCC may be discharged/transferred between various healthcare settings during their episode of care and therefore effective communication strategies must be ensured to facilitate a seamless process *(Refer to Chapter 7 for more detailed guidance on discharge planning)*.

5. REHABILITATION / MAXIMISING POTENTIAL

5.1 Introduction

Spinal cord compression secondary to advanced malignancy can be "a devastating and highly disabling condition"[67] which leaves patients "living with advanced cancer and living with a disability".[68] Rehabilitation therefore is a major component of the management of this patient group *(Refer to Appendix 10)*.

> Evidence suggests that the rehabilitation approach that best suits these patients is the palliative care approach of adaptive rehabilitation, as defined by Dietz.[69] This is achieved by the use of patient-centred, short term, realistic goals which focus on functional outcomes in order to achieve the best quality of life for each individual patient.

To assist in the setting of these goals it is important that the care team are honest with the patient about the potential for improvement in mobility. This should be discussed from an early stage in the patient's management. Studies have shown that "functional outcome is dependent on function at the time of treatment; 70% of patients who are ambulatory at the time of treatment will maintain this, whereas paraplegia pre-treatment will probably not change post-treatment".[70] Whilst this honest discussion may initially be distressing for the patient "it encourages early adjustment and realistic expectations" of rehabilitation.[28] It is important however to note that although actual symptomatology may not change through rehabilitation, adaptive techniques and facilitation of independence, patients can achieve their goals and experience the best potential quality of life.

5.2 Physiotherapy

5.2.1 Referral

- Referral should be made to physiotherapist within 24 hours of admission.
- All patients should be assessed within 24-48 hours of admission unless this coincides with a time when there is no routine physiotherapy input or the patient's condition makes it inappropriate.

5.2.2 Initial assessment

This should be performed following discussion with the Consultant/Oncologist in relation to spinal stability and decisions regarding mobilisation. It is suggested that the most reliable indicators for assessing spinal stability include radiological findings and clinical features such as mechanical pain and changing neurological features.[67] Explanation and adequate analgesia will usually result in a comfortable patient. Where the pain is uncontrolled or exacerbated by movement or neurological function deteriorates, the presence of MSCC may be complicated by spinal instability (*Refer to Appendix 11*).

5.2.2.1 Subjective assessment

- Present condition.
- History of present condition.
- Past medical history including previous physiotherapy input.
- Drug history.
- Social history.

5.2.2.2 Objective assessment

- **Pain**
  Many MSCC patients have issues with pain and all physiotherapy assessment should be carried out within pain limitations. If physiotherapy assessment and progress is limited by pain then discussion should be made with the medical staff and may require further discussion with the palliative care team.

- **Respiratory Function**
  The physiotherapist should monitor the patients' respiratory function and treat as appropriate. If the patient's respiratory function is a problem then an MDT decision is required with regards positioning. The patient's respiratory function may require consideration over concerns of spinal stability.

- **Neurological Assessment of all limbs**
  The physiotherapist should carry out a full neurological assessment including:
  - Passive range of movement.
  - Tone - if this is increased and causing difficulties with function/self care then discussion should be made with medical staff regarding anti-spasticity drugs. You may wish to consider using the Modified Ashworth Scale [72] to quantify increased tone (*refer to Appendix 5)*;
  - Active range of movement.
  - Muscle power- record using Oxford classification[71] *(Refer to Appendix 5).*
  - (N.B If the cervical spine is unstable, avoid unilateral upper limb movement of over 90 degrees and avoid resisted upper limb movements. If spine is unstable at tenth thoracic vertebrae (T10) or below, restrict hip flexion to 30 degrees and avoid resisted lower limb movements. Restrict hip abduction to 45 degrees).
  - Sensation.
  - Co-ordination.
  - Proprioception.

All patients with MSCC should have daily re-assessment for changes in their condition and their treatment should be altered accordingly.

5.2.3 Further physiotherapy assessment and treatment

Physiotherapy treatment will now be considered under the following three categories:

1. Patient is being considered for stabilisation surgery.
2. Patient is not being considered for stabilisation surgery but is being considered for an orthotic device such as a neck brace or collar.
3. Patient is not being considered for surgery or an orthotic device.

Patient is being considered for stabilisation surgery

- Until a decision is made from the orthopaedic or neurosurgical team, the patient should be nursed flat with neutral spine alignment.
- Slipper pan or pads should be used for toileting.
- When needing to be moved, sufficient staff should be deployed to perform a "log roll" technique to avoid any twisting or torsion of the neck/spine.[73]
- Ensure cot sides are in place to maintain patient safety.

Patient is not being considered for stabilisation surgery but is being considered for an orthotic device such as a neck brace or collar.

The decision about whether or not an orthotic device is appropriate should be a MDT decision and include the patient.

Points to consider for the MDT:

- Prognosis.
- Quality of life.
- How unstable is the area of the spine?
- Is the purpose of the collar/brace for comfort or is it essentially required for stability? (this will influence how the collar is donned on and off).
- Will there be further 'functional' loss if stability is not preserved?
- Skin integrity.
- Compliance.
- Careful consideration has to be given regarding the social circumstance including, who is available to assist putting the device on/off and assisting with activities of daily living.

Purpose of the device

1. Pain Relief

If an orthotic device, most likely a collar, is being used for pain relief but not stability, the patient should be allowed to mobilise as deemed appropriate following assessment from their physiotherapist. Following initial physiotherapy assessment, further assessment can take place after MDT decision. The assessment should include the points listed in *Section 5.2.4.2.*

2. To minimise mobility to prevent further neurological damage +/- pain relief

Decisions for this group of patients should be made with the patient and the MDT (including physiotherapist, orthotist and medical staff). While awaiting assessment for an orthotist device or when the orthotic device is not in place:

- The patient should be nursed flat and all attempts made to maintain neutral alignment.
- Slipper pan or pads should be used for toileting.
- When needing to be moved, sufficient staff should be deployed to perform a "log roll" technique to avoid any twisting or torsion of the neck/spine.

N.B In some situations patients will be able to lie at a 45 degree angle without an orthotic device in situ but this will depend on the level and degree of instability and will need consultation between orthotist, medical staff and physiotherapist. Once an orthotic device is fitted, further physiotherapy assessment should be carried out as described in *Section 5.2.4.2.*

Patient is not being considered for stabilisation surgery or for an orthotic device such as a neck brace or collar.

This may be because the spine is stable or because the patient is deemed unsuitable for an orthotic device. There should be an MDT decision to determine when the patient can begin to sit up/mobilise.

A full physiotherapy assessment should begin following this decision as described in *Section 5.2.4.2* .

5.2.4 Further physiotherapy assessment

5.2.4.1 While on bed rest

The aims of physiotherapy during time on bed rest should include:

- Continual monitoring of all aspects of neurological assessment. Informing the MDT of changes.
- Monitoring of respiratory function.
- Maintaining range of movement at all joints to prevent shortening and contracture.
- Encouraging active exercise to try and maintain existing muscle strength and endurance.

5.2.4.2 Once an orthotic device is in place or when MDT decision has deemed mobilisation appropriate a full physiotherapy assessment should be carried out.

Early mobilisation of patients is believed to reduce the complications of prolonged bed rest which are thought to contribute to increased morbidity and early mortality in these patients.[67]

- Full re-assessment of the patient should be carried out in line with the initial assessment.
- Bed mobility - rolling and moving about in bed should be assessed as able.
- If the patient has been nursed flat for a period of time it may be necessary to gradually bring the patient up into a seated position in bed. Initially elevate to 45 degrees and, if tolerated, gradually, increase to 90 degrees. Pain, neurological symptoms and blood pressure should be monitored during this time.
- Assess sitting balance in bed once ability to be upright in bed is established;
- If patient has independent sitting balance and Grade 3+/4 muscle power, assess 'sit to stand' ability. If the patient is capable, progress to dynamic standing and mobilising with a suitable walking aid.
- If the patient has independent sitting balance and an average of grade 3 muscle power in their lower limbs, you may wish to consider assessing standing using a stand aid.
- If the patient has static and dynamic sitting balance but is unable to stand, consider transfer using a transfer board. Factors to consider would be general health of the patient, body composition/proportions, age, and pain.
- If the patient has no sitting balance or is unable to use a transfer board, a hoist will be required to transfer the patient. A supportive sling is likely to be required A full and sensitive explanation will need to be given to the patient regarding the need for the use of the hoist.
- Facilitate recovery in weak muscles using active assisted/active or active resisted exercises and functional activities.
- Strengthen unaffected muscle groups taking care not to increase spasticity or increase muscle imbalance which could lead to contractures.
- Re-education should be given on both static and dynamic balance in relation to sitting/standing as able.
- Control spasticity if present by e.g. positioning or consider use of muscle relaxants such as baclofen.
- Re-education should be given on gait, using appropriate walking aids and stair mobility if appropriate.

5.3 Occupational Therapy

5.3.1 Referral

- Referral should be made to Occupational Therapy within 24 hours of admission, unless this coincides with a time when there is no routine occupational therapy input, to allow early screening for potential functional problems during admission and early investigation regarding discharge potential/needs.
- Consideration of discharge planning will begin as an outcome of the initial assessment once realistic expectations have been discussed, patient and family wishes have been taken into consideration and initial objectives have been set. This will enable early liaison with community-based services for necessary adaptations or equipment, if required.

At its simplest, the key outcome of occupational therapy is quality of life. For many people with cancer, achieving optimum functional independence will assist this. OT can help with this. However, for people who are receiving palliative care, this may not always be the first priority.

> Quality of life may have more to do with affirming life – providing people with physical, social and emotional opportunity and a sense of control in their own lives.[74]

5.3.2 Initial assessment

An initial assessment should be performed following discussion with MDT regarding spinal stability and mobilisation. Through assessment the OT can identify areas of need allowing the patient and their family to make informed appropriate choices regarding rehabilitation and discharge management. The short duration of treatment does not always facilitate this process but it is vital to address perceived and actual needs.[75]

The initial assessment is undertaken to establish details of current and previous level of functioning, home environment, life roles, life style and the expectations and understanding of the patient and their family. It may be carried out over one or more sessions depending on the medical condition and tolerance of the patient.

Physical and Functional Assessment

This should incorporate assessment of all Activities of Daily Living (ADL) considering motor control, sensory awareness and endurance.

Assessment of Cognitive and Psychological Function

The impact of metastases, medication, toxicity or infection may lead to temporary or long term cognitive impairment. If the patient has problems with memory, perception, planning and/or spatial awareness, this may impact on their ability to carry out any activity. Factors which may affect ADL participation include emotional state. Consideration should be given to coping techniques, self-identity, and possible impact of these on the patient's performance.

5.3.3 Occupational therapy intervention

All assessment and intervention should be carried out in close liaison with Physiotherapy and other members of the multidisciplinary team to ensure goals are realistic and shared. Potential interventions will be described under the following two categories:

1. Patient is being nursed flat in bed.
2. Patient is upright and/or mobilising.

Patient is being nursed flat

- Advise on positioning to enable participation in limited functional activities.
- Provide adaptive equipment to facilitate feeding, drinking, self-care and leisure activities while on bed rest.
- Provide support, advice and information to promote psychological adjustment to disability, encouraging realistic expectations and enabling early choices.
- Ensure early discussion around the potential and purpose of rehabilitation, if appropriate.

Patient is upright and/or mobilising
Functional assessments

- These may include any or the entire list below depending on the impact of the disability, the stage of the rehabilitation process and the expected outcome and prognosis.
- Feeding and drinking.
- Personal hygiene, dressing and bathing.
- Transfers – sit to stand, lying to sitting, bed to chair or wheelchair, on/off toilet, in/out bath, in/out car.
- Functional mobility – indoor and outdoor, wheelchair mobility.
- Meal preparation / home management / childcare.
- Leisure and social activities.
- Communication – use of telephone, laptop.
- Transport – use of public transport, return to driving.

5.4 Joint Physiotherapy and Occupational Therapy Goals

- To enable the patient to achieve their best level of function despite the physical, psychological and emotional limitations of MSCC.
- To assist with psychological adjustment to loss of function and lifestyle.
- To work jointly to improve/maximise balance, muscle strength, functional mobility and to adapt techniques to facilitate independence or to reduce energy expenditure.
- To increase exercise tolerance and reduce fatigue by using a graded exercise programme and introducing the patient to the concept of pacing.
- To assess for wheelchair and seating needs. This may include a referral to WESTMARC based at the Southern General Hospital (this may be carried out by the Occupational Therapist/Physiotherapist or both).
- To assess the need for specialist cushions and advice on pressure relieving.
- For all patients with an orthotic device, patient and family members need to be shown how to put the device on and off. Several points need to be considered and this should be an MDT approach.
    - Do they have to wear the device for life? Are they aware of this and do they have contact details should something go wrong with the device?

  - Who is available to put the device on and off?
  - Do they sleep with it on?
  - Toileting.
  - Showering.
  - Eating.
  - Have they been informed that they should not drive and what care to take while in a car?
  - Advice on things to avoid, i.e. avoiding lifting heavy objects.
  - Discussion about sexual activity.
- To participate in early discharge planning to identify potential to return home or necessity for further in-patient care if required.
- If appropriate, liaise with MDT for consideration of a further period of rehabilitation. Consideration needs to be given to functional gains versus prognosis. For those with a good prognosis, referral to a neurological rehabilitation unit should be considered. Others may benefit from further rehabilitation at their local hospital or hospice.
- If appropriate, assessment of home environment and potential risks or possibilities. (this may require a home visit with or without the patient).
- Early liaison with community health and social care staff to provide equipment and adaptations to enable optimum independence or appropriate care.
- To provide advice for carers in safe transfers, handling and care as appropriate.
  - Give advice on maintenance exercises and passive movements as appropriate.
  - Where appropriate give advice on increasing muscle power and exercise endurance.
  - Advice on use of any walking aids or appliances the patient may require.
  - Instruction in stair mobility technique as appropriate.
- Liaison and seamless transfer of information to other rehabilitation workers in the event of a transfer on to alternate setting for further rehabilitation.
- Where appropriate, referral to local services or community teams for further input from Physiotherapy and Occupational Therapy.

Longer term goals

This intervention is likely to be carried out by community or primary care or hospice-based OT/PT (if available).

- Promote quality of life for the patient and their family for the remaining time of their illness.
- Provide assistive equipment or appropriate adaptations to enable patient to remain at home for as long as possible.
- Support the family and other members of MDT to prevent further admission as appropriate.
- Ongoing support via the specialist palliative care team i.e. involvement in activities to promote well-being and self-worth.

For further advice, contact the Physiotherapist or Occupational Therapist working in oncology/palliative care services at The Beatson West of Scotland Cancer Centre, your local hospital or hospice.

5.4.1 Community based Physiotherapists and Occupational Therapists

There are two referral pathways for clinicians to access if they have a patient with suspected MSCC. The appropriate pathway is dependent on whether the patient has a known or unknown diagnosis of cancer.

5.4.1.1 Known Diagnosis of Cancer

If a patient presents with signs and symptoms suggestive of MSCC and a **known diagnosis of cancer** the follow action is recommended:

- Contact the on call registrar at the Beatson via switchboard on 0141 301 7000 to discuss patients signs and symptoms. Following discussion, if admission and MRI is recommended, this should be arranged via local hospital by the patients GP. Establish whether the patient requires to be nursed flat and a two person ambulance called for immediate hospital admission.
- Inform and discuss with GP.

5.4.1.2 Unknown Diagnosis of Cancer

If a patient presents with signs and symptoms suggestive of MSCC and an **unknown diagnosis of cancer** the following pathway is recommended:

- Immediate phone call to patient's GP (out with normal working hours via NHS24).

West of Scotland MSCC guidelines should be consulted (www.woscan.scot.nhs.uk), under "Guidelines". If MSCC is suspected the patient should be nursed flat while awaiting a two person ambulance to the local Emergency Department.

6. PATIENT INFORMATION AND EDUCATION

6.1 Introduction

Patient information and education about Malignant Spinal Cord Compression is an important component of care at all stages of the patient journey. It is of particular significance:

- Once a diagnosis has been made, to help the patient understand their condition and to facilitate coping.
- As a tool to facilitate early referral in patients with symptoms suggestive of MSCC.

It has been suggested that the rate of early diagnosis and prevention of potential paralysis could be improved if oncology patients were taught the importance of contacting health service providers with complaints of pain, especially when the pain is accompanied by neurological signs and symptoms.[11,17,76] For patients to be able to do this, they need appropriate information. Breast, lung and prostate cancer are well known to be the most common primary cancers associated with MSCC. It was shown in the Scottish audit that in the majority of patients, MSCC arose from within a vertebra.[10] In view of this and since MSCC occurs in only a small percentage of patients, it would seem reasonable to target patient education to those at high risk, for example, those with breast, lung or prostate cancer with known bone metastases.[11]

6.2 General principles of patient information and education

- Verbal information should be given in addition to written information. Other methods, such as the audiovisual route, should also be considered.
- Ongoing assessment should be made to assess the patient's understanding of any information given by the multi-professional team.
- Information provision should include the family/significant others, wherever possible, as desired by the patient.
- Consideration should be given to individual patient's needs in relation to cultural issues, learning disabilities, language or any hearing/visual disabilities.
- Information provision should be ongoing and staged according to individual patients' need.
- Care should be taken in all cases to deliver information and education in a sensitive manner, in order to highlight the issues but to minimise additional anxiety.

6.3 Specific recommendations

It is recommended that written information is given to patients in two main groups:

6.3.1 Patients with a diagnosis of MSCC

The WoSCAN MSCC information sheet (www.woscan.scot.nhs.uk), click on 'guidelines') has been adapted from the Macmillan Cancer Support fact sheet on Malignant Spinal Cord Compression (www.macmillan.org.uk) and either can be used, in addition to any relevant cancer site specific or treatment information.

6.3.2 Patients considered to be at increased risk of MSCC

- Diagnosis of breast, lung or prostate cancer with bone metastases.
- Any other patient considered by his/her clinician to be at a high risk.

Since these patients are considered to be at an increased risk of developing MSCC, it is recommended that they are given information prophylactically to enable them to identify early symptoms and contact an identified health care professional to initiate prompt treatment and optimise prognosis and treatment outcomes.

It is recommended that this is in the form of an alert card, such as that shown below developed for the West of Scotland Cancer Network, containing information on symptoms to look out for and who to contact should they experience them.

The contact number patients are given should be directly to the Cancer Centre if the patient is receiving treatment there. For high risk patients being seen or treated in local health board areas, the contact number should be within an identified hospital in the board area, where there is oncology expertise to act appropriately. Systems should be in place, in both the Cancer Centre and local hospitals for the identified health care professionals/clinical areas to follow, should the patient be in contact to report symptoms.

FRONT OF CARD

Name:
DOB/CHI:
Consultant:

NHS
West of Scotland Cancer Network

Health board: **XXX**

Sometimes when people have cancer it can cause the nerves in the spine to be squeezed. This is quite rare. It is very important to pick it up quickly as the earlier treatments are started, the better the result usually is.

Symptoms to watch out for:

- Back pain in one bit of your back that is severe, distressing or different from your usual pain.
- Pain that is like a band squeezing your chest.
- A new feeling of weakness of the legs or difficulty walking.
- Numbness or pins and needles in your toes, fingers or over buttocks
- Problems passing urine or controlling your bowels.

PLEASE TURN OVER

BACK OF CARD

If you have any of the symptoms on the front of this card:

- Speak with a doctor, nurse or paramedic as soon as is practical (within 24 hours).
- Tell them that you have cancer, are worried about your spine and would like to see a doctor.
- Show the doctor this card.
- Try to bend your back as little as possible.

For Doctor / Health Care Professional

- This patient has metastatic cancer and is therefore at risk of malignant spinal cord compression (MSCC).
- If they have any of the symptoms on the front of this card then please consider MSCC as a possible diagnosis and discuss further management with XXXXXXX by phoning XXXXXX.
- If after discussion MSCC remains a possibility please
    - Give them Dexamethasone 8mg twice daily (unless contraindicated).
    - Advise them to lie flat as much as is practical until seen at hospital.

7. DISCHARGE PLANNING

7.1 Introduction

Discharge planning is very important and can be complex, depending on the degree of disability experienced by the patient, and their environmental and/or social circumstances. As has been previously referred to, the plan should include any family, carers or friends to whom the patient has given their permission for involvement. Due to the potentially complex nature of the discharge, planning should commence as soon as possible following admission, and certainly as soon as the diagnosis is confirmed. Discharge planning will require a multidisciplinary approach and therefore good communication between team members is crucial in ensuring the patient and their support network are able to achieve the best quality of life within the limitations of the disability *(Refer to Appendix 10 and 13)*.

7.2 Pre-discharge

Discharge planning for patients with MSCC may include transfers between hospitals or hospices depending on the treatment pathway assessed for each individual patient. A patient requiring radiotherapy will be transferred from their local hospital to the Cancer Centre (The Beatson West of Scotland Cancer Centre) for their treatment, unless only one fraction of treatment is suggested and this could be administered on an out-patient basis. Patients requiring surgery will usually be treated in the Institute of Neurological Sciences (Southern General Hospital) and depending on their treatment pathway could either be discharged, transferred back to the referring hospital post-operatively or to the Cancer Centre if adjuvant radiotherapy is planned. In summary, patients could be discharged either from their local hospital, the Cancer Centre or the Institute of Neurological Sciences.

Patients may also be discharged to a number of different locations: home, district general hospital, community hospital, hospice or care home, depending upon their needs, the degree of support required and the support networks available within their local community Refer to section 7.4.1 for advice on the type of information that is required on any transfer/discharge documentation.

The pre-discharge process should involve the patient and carer(s) and all relevant practitioners: the primary care team, community palliative care (e.g. Macmillan Nurse), social services and Allied Health Professionals (AHPs). It should take account of the domestic circumstances of the patient or, if the patient lives in residential or sheltered care, the facilities available there. For many patients with MSCC and their carers, the transition between the protective environment of the hospital to independence at home can be an overwhelming and challenging experience.[77] Pre-discharge home visits could help alleviate some of the potential distress, by anticipating and responding to problems identified before discharge home takes place. More detail on the pre-discharge home visit is provided in the next section.

Psychosocial care and support has been referred to in section 4.11 and it is important that this support is continued following discharge home, irrespective of where this location may be.

With the likely increase in physical disability resulting from MSCC it is important that a patient and the family receive a full benefit assessment. The patient is likely to be eligible for the ‘Disability Living Allowance’ or ‘Attendance Allowance’,

depending on their age group. If the prognosis is thought to be six months or less, the patient should be encouraged to apply for the above benefit under the 'Special Rules' option (DS1500). This should ensure that the benefit would be processed more quickly. Patients with a cancer diagnosis can also apply for a 'Macmillan Grant'. This could be used, for example, to acquire an essential household item which could improve the patient's quality of life. Early processing of applications for these and other assessed benefits can help to reduce some of the stress being experienced by the patient and their family.

Other information which may benefit the patient includes details on e.g. 'Disabled Parking Badges' and Taxi cards. The hospital social worker is often the best member of the MDT to address these and other psychosocial issues.

A nominated key worker (e.g. liaison CNS, discharge co-ordinator, appropriate member of MDT) should be identified as early in the patient's journey as possible to enable a co-ordinated and collaborative discharge plan whilst ensuring the input of all the relevant disciplines involved.

7.3 Pre-discharge home visits

Pre-discharge home visits are often considered a vital part of the discharge planning process.[78] These home visits, performed by various members of the multidisciplinary team, but usually facilitated by the OT, aim to give staff (hospital and community), patient and carers the opportunity to identify actual and likely problems. It also provides an opportunity to address any further needs that the patient or carers may have.

Where home visits are not possible, a much more detailed assessment with the patient and carers will be required to enable the processing of appropriate, and often essential, equipment and adaptations to the home. Ideally, where essential, these would be completed and installed prior to discharge.

7.4 Discharge

7.4.1 Discharge planning and transfer of care documentation

This section of the guidelines has been adapted from Scottish Intercollegiate Guidelines Network (SIGN) 64; Management of Patients with Stroke, Rehabilitation, Prevention and Management of Complications, and Discharge Planning.[77]

The Discharge Document should be progressively completed. This can be paper or electronic (e.g. in Electronic Clinical Communications Implementation (ECCI) format).

The following information should be accurately and legibly displayed in the discharge document:

- The date of admission and discharge.
- Diagnosis of MSCC, cancer and other morbidities.
- Presenting symptoms, neurology and function.
- Investigations and results.
- Surgery, radiotherapy or chemotherapy details.
- Medication and duration of treatment, if applicable, including a dexamethasone reduction plan.
- Degree of rehabilitation achieved, and potential improvement.

- Details of what the patient understands of the condition and how he/she is coping.
- Details of any advanced care planning already discussed with the patient e.g. preferred place of death and Do Not Attempt Cardiopulmonary Resuscitation (DNACRP) decision.
- Team care plan.
- Further treatments needed at primary care level with dates.
- Further treatment planned at hospital or follow up appointment with dates.
- Transport arrangements.
- The hospital name, hospital telephone number, ward name or number, ward telephone number, Consultant's name, named nurse and key worker.
- Contact details for gaining further advice.
- Details of any onward referrals made.
- Details of any equipment ordered or supplied with appropriate contact numbers.

Consideration should be given to such information being retained by the patient as a patient held record to allow all members of the primary care team, AHPs and care agencies to clearly see what the care plan for the patient should be. The wishes of the patient in respect of the confidentiality of this record should be paramount. Evidence suggests that patient held records may enhance the patient's understanding and involvement in their care.[79]

At the time of discharge, copies of the discharge document should be sent (or provided) to all the relevant agencies and teams.

7.5 Post-discharge

The health and social services input during this period will be determined by the place of discharge and availability within the geographical location. These details would have been ascertained in the discharge planning process. The GP and all other agencies involved including local authorities, will continue to promote achievement of the best quality of life for the patient and their immediate support network.

A change of key worker may be appropriate at this time as the initial person is likely to have been hospital-based. This is probably best to be the health professional who is going to be most involved with the patient, and has the added knowledge of MSCC. The key worker could be responsible for referring the patient for further support from e.g. the voluntary sector or other charitable organisations. These agencies may be able to provide a variety of different support schemes including: day care, admission for symptom management or respite (hospice), and other community carer support (e.g. Macmillan Nurse, Crossroads).

If the patient is at home or in a care home, should a change in their physical condition be noted, frequently the General Practitioner will be the first point of contact. It has been identified that a new recurrence of spinal cord compression may occur in 10% of patients.[80] Prompt re-referral for assessment and management is encouraged if this is thought to be the case.

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9. APPENDICES

Appendix 1: Original West of Scotland Malignant Spinal Cord Compression Guideline Development Group and Steering Group (2007).

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Cancer Care Alliance
Macmillan Cancer Support
West of Scotland Regional Cancer Advisory Group

Appendix 2: 2013 Update

West of Scotland Cancer Consultant Nurses:

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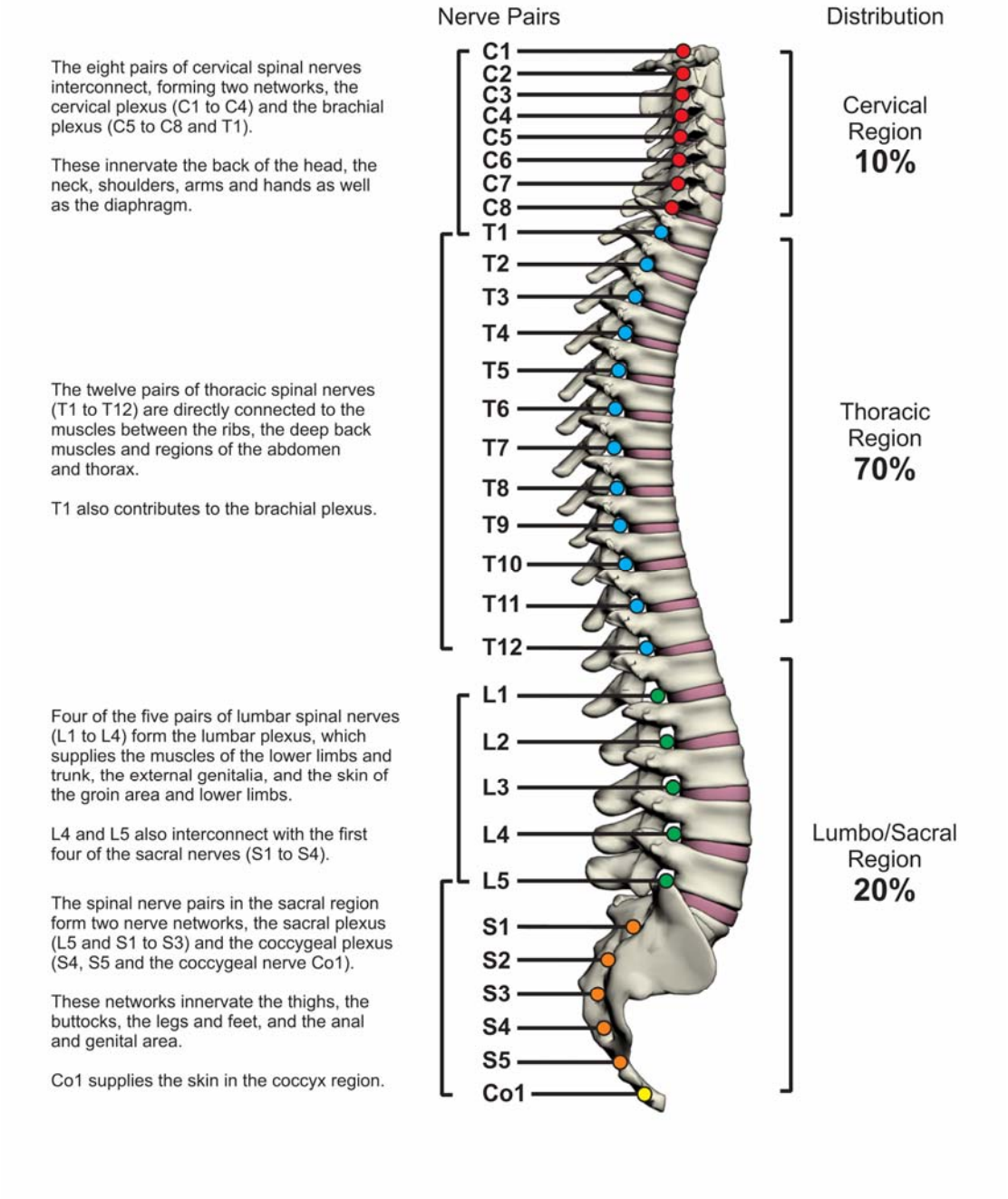
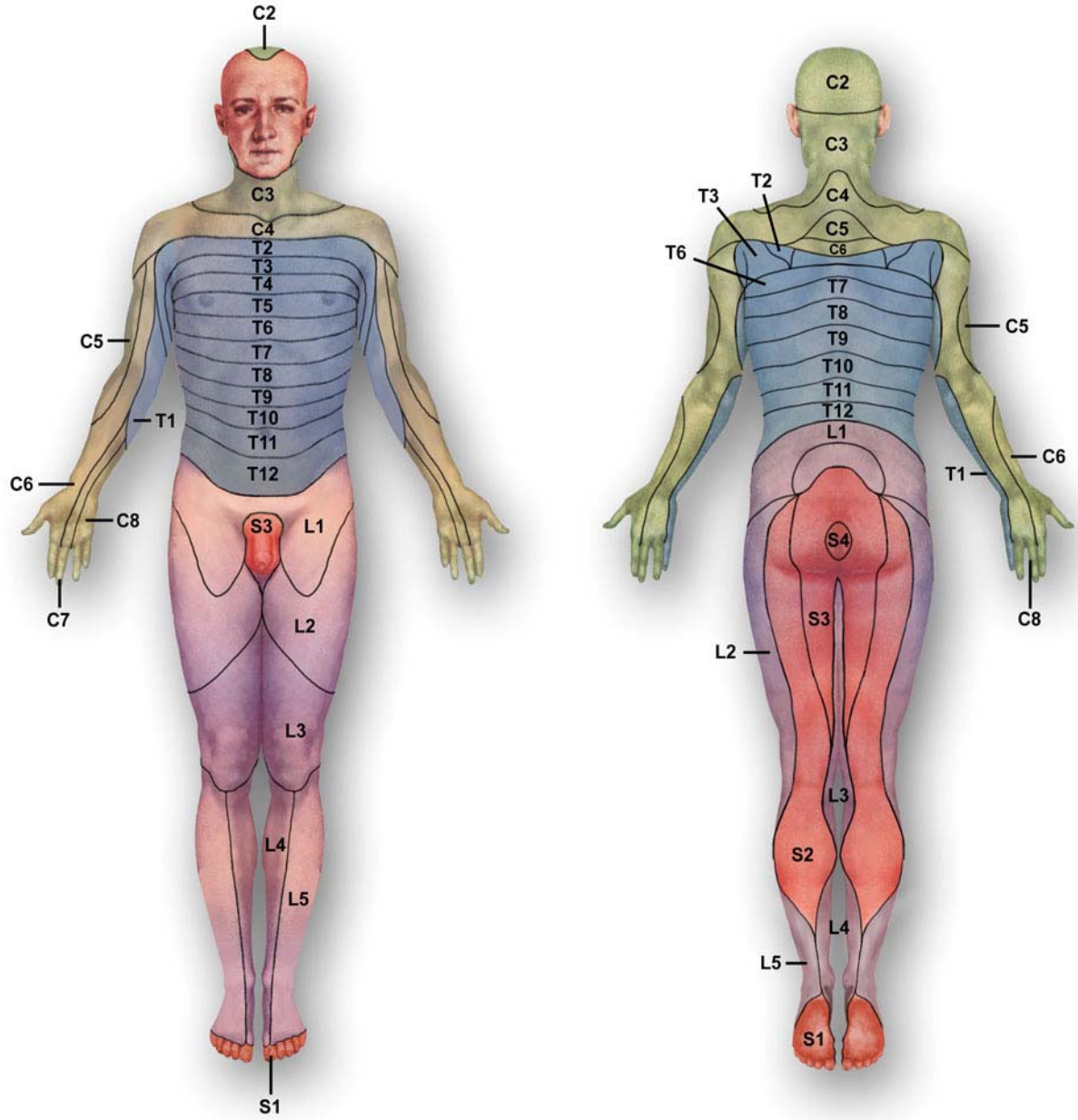
Appendix 3: Anatomy and Physiology

3a) Right lateral view of vertebral column and spinal nerves



3b) Dermatone body charts



Appendix 4: Guidance for Patient Assessment and Examination

A clinical neurological assessment of the patient with suspected spinal cord compression includes identification of risk factors, symptom evaluation of pain, sensory and motor function, and bowel and bladder function.

I. Physical Assessment

The history should include:

- Date of diagnosis.
- Stage of disease.
- Treatment history of cancer.
- Location of metastases, if any.
- Medication profile including prescribed and over-the-counter medications taken, plus any complementary substances such as herbs.
- Symptom assessment.
  For each symptom, a symptom analysis should be carried out including:
  - Onset.
  - Duration.
  - Intensity.
  - Continuous or intermittent.
  - Precipitating and relieving factors.
  - Associated symptoms.

II. Physical Examination

The examination should include the following points as well as targeted motor, sensory and autonomic nervous system assessment techniques:

- Back examination**:** percuss the spine and expect tenderness at the level of the compression.
- Straight leg raise**:** expect increased radicular pain if there is lumbar or thoracic compression.
- Neck flexion**:** expect pain if there is cervical compression.
- Evaluate motor strengths**:** assess skeletal muscles for size, tone, strength and any involuntary movements. Assess flexor and extensor strengths. Each side of the body should be compared for symmetry and equality of motor strength. Evaluate gait, involuntary movements and co-ordination. Abnormal findings may include ataxia or unsteady gait, decreased muscle co-ordination and decreased muscle strengths at level of the cord compression.
- Evaluate reflexes**:** look for hyperactive deep tendon reflexes or absence of superficial reflexes.
- Evaluate sensory function: any numbness or paraesthesia? Where? Obtain a description of the sensory symptoms. Are there any changes in sensation to touch or temperature? Any loss of position sense? Any areas of no sensation?
- Evaluate abdominal symptoms: perform abdominal examination. Assess any changes to normal patterns of elimination:
  - Are there any bladder difficulties - urgency, initiating voiding, retention, overflow incontinence?
  - When did these symptoms begin?
  - Expect distension if there is autonomic dysfunction. If suspected, check post-voided residual to evaluate bladder retention and, if there is autonomic dysfunction, expect >150mls.
  - Assess rectal sphincter tone.

- Are there any bowel difficulties: constipation, incontinence with loss of sphincter control, absence of sensation or numbness in the rectum.
- When did these symptoms begin?

III. Functional Assessment

An assessment should be made of the patient's performance status using a recognised tool such as the ECOG (Eastern Co-operative Oncology Group) performance status scale (see below). Their motor function should also be assessed (*Refer to Appendix 10*).

ECOG performance status

Grade	ECOG
0	Fully active, able to carry on all pre-disease performance without restriction.
1	Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature, e.g. light house work, office work.
2	Ambulatory and capable of all self-care but unable to carry out any work activities. Up and about more than 50% of waking hours.
3	Capable of only limited self-care, confined to bed or chair more than 50% of waking hours.
4	Completely disabled. Cannot carry on any self-care. Totally confined to bed or chair.
5	Dead.

IV. Pain Assessment

Patients with MSCC may experience a variety of types of pain. Pain is often the first presenting symptom of the condition. At the outset, pain is generally localised in the back near the midline and is frequently accompanied by referred or radicular pain.[19]

Localised Pain

Local pain occurring over the area of the tumour is constant and generally increases when the patient is lying down.[15]

Radicular Pain

Radicular pain stems from the nerve root compression and follows the distribution of the involved segmental dermatome.[19] Radicular pain from a thoracic lesion usually radiates in a band around the chest or abdomen almost always bilaterally and is often described as a tight band around the chest or abdomen that causes the patient to feel as if they are being squeezed. Radicular pain may be worsened by activities involving the valsalva manoeuvre such as coughing, sneezing or straining, straight leg raises and neck flexion.[15,29] Radicular pain, associated with nerve root compression, is less frequent but is highly localised. When root compression is the primary problem, the pain may be radicular only, although it usually follows local back pain. Radicular pain from a cervical or lumbar site usually radiates down one or both of the respective innervated extremities.

Referred Pain

Referred pain may be seen in lumbar epidural spinal cord compression with metastasis of the first lumbar vertebra (L1) causing pain over the sacroiliac joint[29] often of a burning or shooting nature. Referred pain may be mistaken for a false localising sign whereby pain may be mistaken for disease at the perceived site of pain.[29]

Appendix 5: Physiotherapy Assessment Scales

SENSATION - KEY LEVELS

C4 Shoulders
C6 Thumbs
T10 Umbilicus
T12 Groin
L3 Front of knee
L5 Big toe
S1 Little toe
S3 Genitalia

MUSCLE POWER –

Muscle groups are charted using the Oxford Classification[71]

0 = Complete paralysis
1 = Flicker of contraction
2 = Contraction with gravity eliminated
3 = Contraction against gravity
4 = Contraction against gravity and resistance (weaker than normal)
5 = Normal contraction

Muscle Groups Nerve Roots

Upper Limb		**Lower Limb**	
C3 (4)	Trapezius	L1 (2)	Hip flexors
C5	Deltoid	L3 (4)	Quadriceps
C5 (6)	Biceps	L4 (5), S1	Dorsi-flexors & Hip Abductors
C6 (7, 8)	Pectorals	L2 (3)	Hip Adductors
C6 (7, 8)	Wrist extensors	L5, S1	Internal & external rotators
C7 (8)	Finger extensors		Hamstrings
C7 (8)	Wrist flexors	S1 (2)	Plantar flexors
C7 (8)	Triceps	L5, S1, S2	Gluteals
C8 (T1)	Finger flexors	**Trunk**	
T1	Interossei	T6-L1	Abdominals
		C1-L5	Back extensors

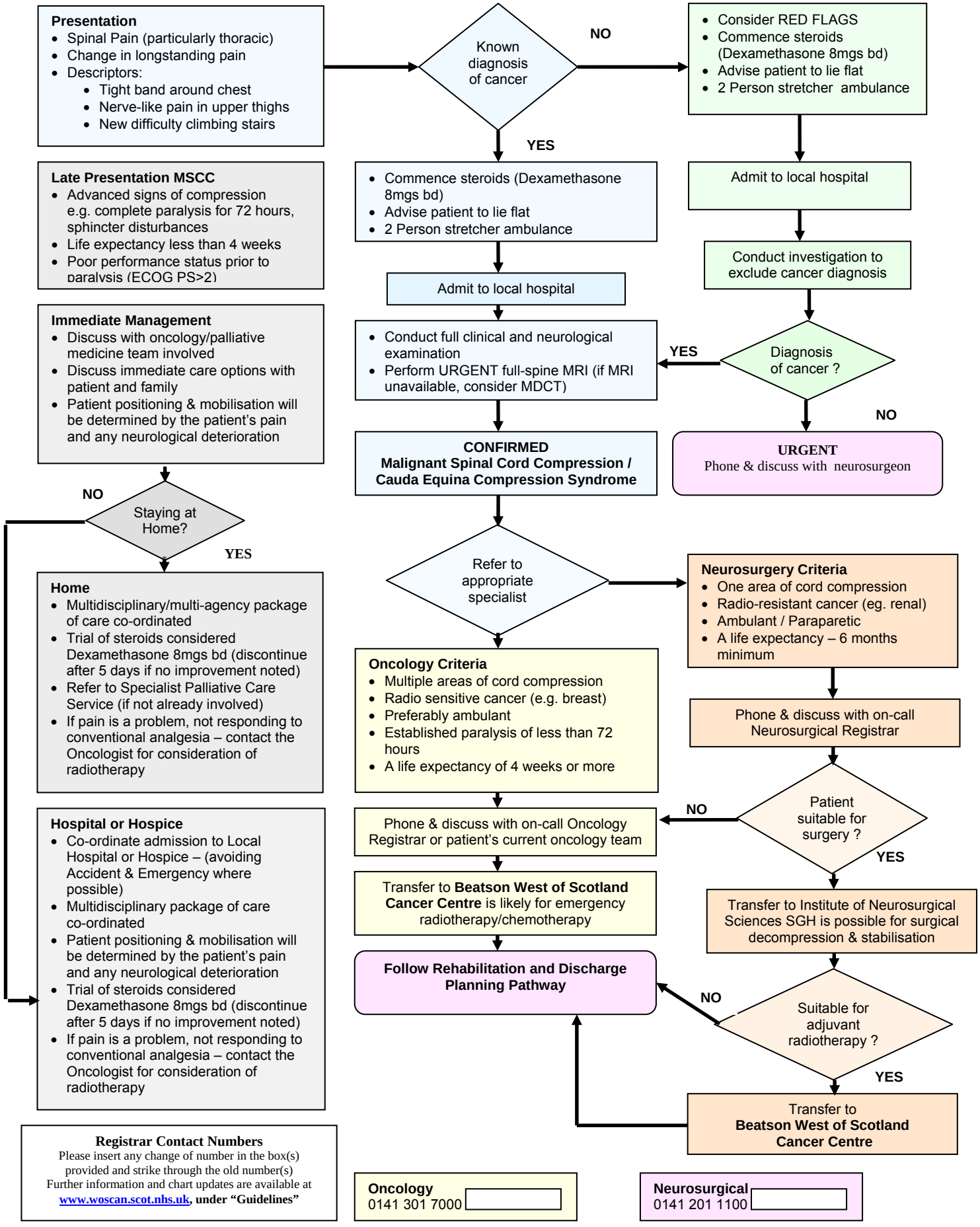
MUSCLE TONE –

To quantify increased tone, the modified Ashworth Scale[72] can be used

4 = Rigidity
3 = Movement difficult, considerable tone
2 = More marked increase in tone, still easily moved
1+ = Slight increase in tone, catch and resistance throughout range of movement
1 = Slight increase in tone, catch and minimum resistance at end of range
0 = No increase in tone

Appendix 6: Referral Flow Chart

Referral of Suspected & Actual Malignant Spinal Cord Compression (MSCC) Or Cauda Equina Compression Syndrome (CECS) in the West of Scotland.



Registrar Contact Numbers
Please insert any change of number in the box(s) provided and strike through the old number(s)
Further information and chart updates are available at www.woscan.scot.nhs.uk, **under "Guidelines"**

Oncology 0141 301 7000 _____

Neurosurgical 0141 201 1100 _____

Appendix 7: Prognostic Scoring System and Associated Performance Status and Neurological Assessment Scales

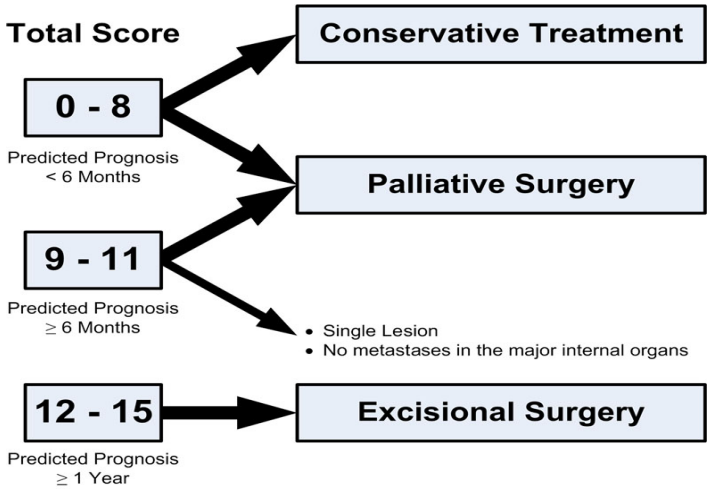
Tokuhashi Revised Prognostic Scoring System

	Score
1. General condition (Karnofsky)	
Poor (10%-40%)	0
Moderate (50%-70%)	1
Good (80%-100%)	2
2. Number of extra-spinal bone metastases	
≥3	0
1-2	1
0	2
3. Number of metastases in the vertebral body	
≥3	0
2	1
1	2
4. Metastases to major internal organs	
Unremovable.	0
Removable.	1
No Metastases.	2
5. Primary site of cancer	
Lung, osteosarcoma, stomach, bladder, oesophagus, pancreas.	0
Liver, gallbladder, unidentified.	1
Others.	2
Kidney, uterus.	3
Rectum.	4
Thyroid, breast, prostate, carcinoid tumour.	5
6. Palsy	
Complete (Frankel A, B).	0
Incomplete (Frankel C, D).	1
None (Frankel E).	2

The cumulative Tokuhashi score of each of these variables suggests a predicted life expectancy. Patients with a score of:

- 0-8 predicted survival < six months: conservative treatment.
- 9-11 predicted survival ≥ six months: palliative surgery or, rarely, excisional surgery for patients with a single lesion and no metastases to internal organs (shown diagrammatically below).
- 12-15 predicted survival of ≥ 1 year: excisional surgery.

Treatment Plan for Spinal Metastases Based on Tokuhashi Scores



a) Combined ECOG & Karnofsy Performance Status Scales

Performance Status Criteria			
ECOG		**Karnofsky**	
Score	Description	Score	Description
0	Fully active, able to carry on all pre-disease performance without restriction.	100	Normal, no complaints, no evidence of disease.
		90	Able to carry on normal activity.
1	Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature.	80	Normal activity with effort: some signs or symptoms of disease.
		70	Cares for self, unable to carry on normal activity or do active work.
2	Ambulatory and capable of all self-care but unable to carry out any work activities.	60	Requires occasional assistance, but is able to care for most of his/her needs.
		50	Requires considerable assistance and frequent medical care.
3	Capable of only limited self-care, confined to bed or chair more than 50% of waking hours.	40	Disabled, requires special care and assistance.
		30	Severely disabled, hospitalisation indicated. Death not imminent.
4	Completely disabled. Cannot carry on any self-care. Totally confined to bed or chair.	20	Very sick, hospitalisation indicated. Death not imminent.
		10	Moribund, fatal processes progressing rapidly.

b) Frankel Scale

Grade	Description
A	Complete: No sensory or motor function below level of neurologic deficit level.
B	Incomplete: Sensory only function below neurologic deficit level.
C	Incomplete: Motor and sensory function below neurologic deficit level, but motor function useless.
D	Incomplete: Useful motor, but not normal function below neurologic deficit level.
E	No motor: Sensory or sphincter disturbance.

Appendix 8: MSCC Clinical Care Key Points

The Clinical Care Plan should be patient-centred and re-evaluated on a continual basis to reflect changes in the patient's clinical/physical condition and/or treatment plan.

Assessment

Pain
- Location (localised/radicular or referred)
- Radiation
- Onset, duration & character (constant/intermittent?)
- Description
- Severity or intensity
- Aggravating/relieving factors
- Functional effects
- Psychological factors
- Current medication, effect & toxicity

Motor Deficits
- Limb weakness
- Altered ambulatory status
- MRI scan to assess spinal stability

Sensory Loss
- Tingling/shock-like sensation
- Paraesthesia
- Loss of sensation of touch, pain or temperature

Pressure Area Care
- Assess & monitor pressure areas using a validated tool i.e. Waterlow score

Moving & Handling
- Comprehensive moving & handling plan developed & updated daily to reflect change in patient condition

Autonomic Nervous System
- Bowel Function (frequency & consistency of bowel motion, associated nausea & vomiting, abdominal discomfort/pain/distension, dietary & medication history)
- Urinary function (last voiding of urine, urgency/frequency, incontinence episodes, abdominal discomfort/pain/distension, fluid intake/output & urinalysis)

Psychological Status
- Assess & monitor patients & family/carers emotional needs, support requirements, physiological distress & previous coping strategies utilised

SSKIN Care Bundle
- Surface
- Skin Inspection
- Keep Moving
- Incontinence
- Nutrition

Referrals
Referrals should be considered to the following:
- Physiotherapy (within 24 hours)
- Occupational Therapist (within 24 hours)
- Social Services (Hospital or Community)
- Specialist Palliative Care Team
- District Nurse
- Macmillan Nurse

If Required:
- Speech & Language Therapist
- Dietitian
- Counsellor
- Clinical Psychologist

Discharge Planning

Patients with MSCC may be discharged/transferred between various healthcare settings.

Discharge planning & Rehabilitation should always be multi-disciplinary and initiated early in all instances.

Follow Rehabilitation & Discharge Pathway

Clinical Care

Pain
- Follow principles of WHO analgesic ladder in addition to Non-pharmacological interventions
- Pain should be assessed using a recognised tool
- Ensure breakthrough analgesia prescribed for incident pain i.e. prior to re-positioning

Positioning Stable Spine (before & after treatment)
- Following MRI elevate in bed initially to 45° for an hour & if tolerated then elevate to 90° before sitting out of bed and initiating mobilisation plan
- Active limb exercises should be encouraged twice daily Physiotherapist or nursing staff

Positioning Unstable Spine (before & after treatment)
- Following MRI nurse on bed-rest in supine position (flat) with 1 pillow to maintain neutral spine alignment
- When movement required, perform 'log-roll' technique with sufficient staff
- If patient is unable to lie flat due to other medical complaints, pain or agitation discuss with medical staff
- Ensure cot sides are in place
- Passive limb exercises should be carried out
- Collar/brace applied as dictated by medical staff
- Physiotherapy following radiotherapy to assess mobility & sitting balance

Pressure Area Care
- Nurse on a pressure relief mattress and/or cushion appropriate to physical status and risk assessment score

Anti-embolic Stockings
- If bed rest/immobility planned for 3 days or more then apply above knee graduated stockings for use constantly except during personal hygiene

Anti-coagulant Therapy (SIGN 122)
- Should be initiated following local policy on care of the bedbound/immobile patient & reviewed as indicated

Treatment Side-effects
- Assess & manage in accordance with the treatment modality received

Psychological Care
- Provide appropriate information in staged manner
- Promote use of coping strategies
- Encourage/negotiate setting of realistic goals
- Refer to Specialist Palliative Care Team, Counsellor or Clinical Psychologist for advice & guidance if required

Appendix 9: SSKIN Care Bundle (2011)

KEY
Care delivered
✓- Yes
X - No (record why not)

Name																									
Frequency of care delivery (circle as appropriate) 1hrly 2hrly 3hrly 4hrly																									
Date																									
Time – record using 24 hour clock																									
Surface																									
Mattress appropriate (please state)																									
Cushion appropriate (please state)																									
Functionality/integrity check of equipment performed																									
Skin Inspection																									
All pressure areas checked																									
Redness present Y/N																									
Keep moving																									
B E D	Right side																								
	Left side																								
	Back																								
CHAIR																									
Incontinence																									
Urine																									
Bowels																									
Nutrition																									
Diet (please state)																									
Fluids (please state)																									
Supplement(s) (please state)																									
Initials																									

SSKIN Care Bundle (2011) – Continuation Sheet

Date & Time	Record Element	Reason for not Delivering Care	Initials

SSKIN Care Bundle (2011)

RISK AND SSKIN CARE BUNDLE PROCESS COMPLIANCE

Compliance		Non-compliance	

WARD: 1 DATE: 11.1.11 TIME: 11.00

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Total %
Risk Assessment	√	x	√	√	√	80%

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Total %
Surface	√	x	√	√	√	80%
Skin Inspection	√	x	√	√	√	80%
Keep Moving	√	x	√	√	√	80%
Incontinence	√	x	√	√	√	80%
Nutrition	√	x	x	x	√	80%
Compliance / Non- Compliance						
Total %	100%	0%	0%	0%	100%	**40%**

ANNOTATIONS

Record here when a deliberate change was introduced and/or an event took place. Use this information to annotate your run charts.

RISK AND SSKIN CARE BUNDLE COMPLIANCE

Compliance		Non-compliance	

WARD/CARE HOME: DATE: TIME:

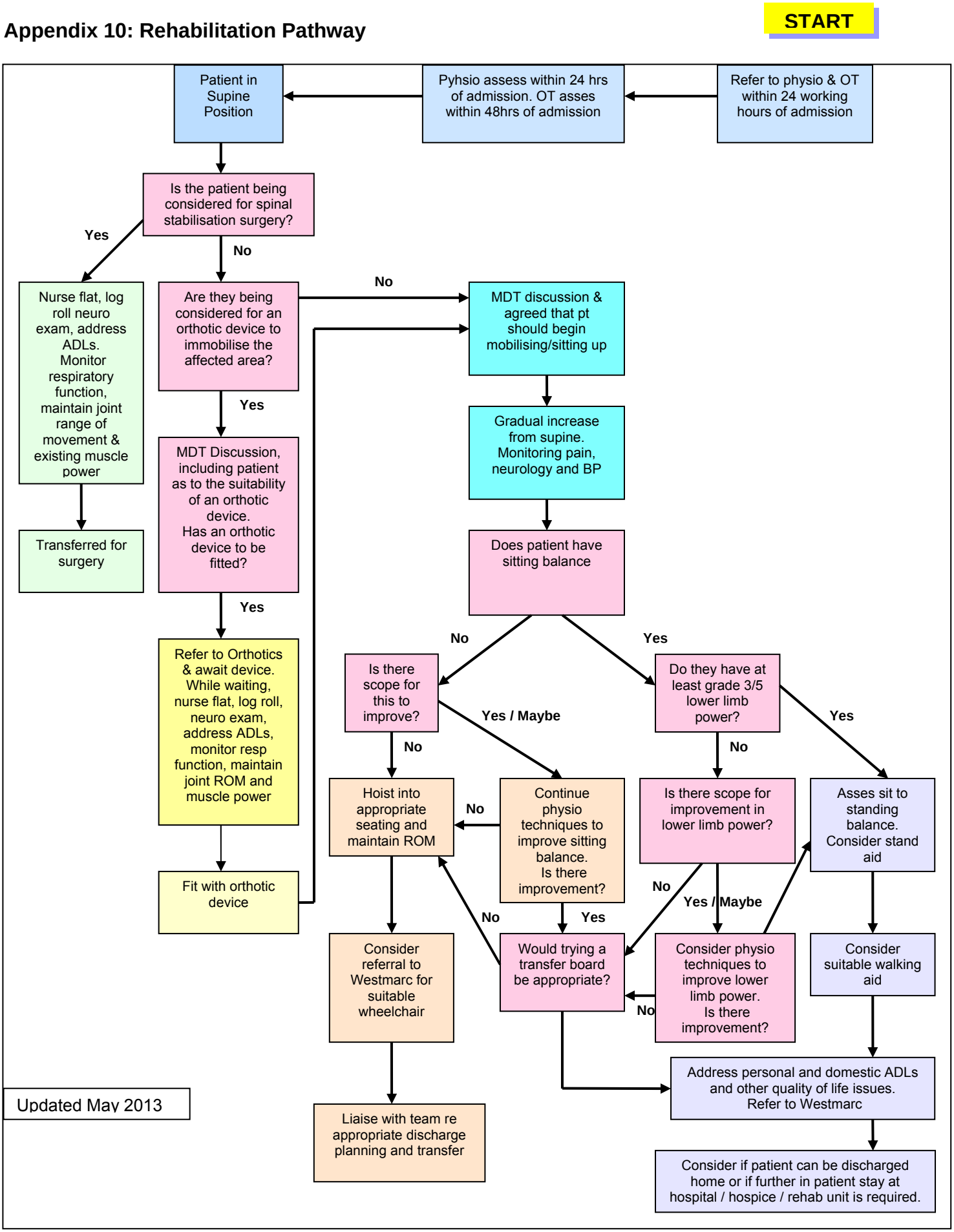
	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Total %
Risk Assessment						

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Total %
Surface						
Skin Inspection						
Keep Moving						
Incontinence						
Nutrition						
Compliance / Non- Compliance						
Total %						

ANNOTATIONS

Record here when a deliberate change was introduced and/or an event took place. Use this information to annotate your run charts.

Appendix 10: Rehabilitation Pathway



This flow chart is to assist and guide thought processing and clinical reasoning. Some patients are exceptions and should be considered individually.

Appendix 11: Identifying Spinal Instability

Spinal instability, often with subluxation, can result in progressive kyphosis with extrusion of bone and disc into the spinal canal. It is thought to account for the pain in about 10% of patients with vertebral metastases and is characterised clinically by severe pain at the site of the lesion on attempted movement. Instability is likely to be present if any of the following are present:

1. Severe pain at site of lesion, increasing on movement.
2. The tumour involves two or more adjacent vertebral bodies.
3. Both anterior and posterior elements at the same level are involved.
4. Involved vertebral bodies have collapsed to less than 50% of their original height.
5. The odontoid process has been destroyed, leading to possible atlanto-axial subluxation.

Patients may complain of severe pain when turning over in bed or attempting to get up especially when there is spinal instability at lower spinal levels. Such a patient may be unwilling to move the affected part and exhibits tenderness to palpation or percussion over the area.

Patients with odontoid fractures or atlanto-occipital dislocations may hold their neck stiffly and sometimes in a slightly awkward position. They may refuse to move it actively or allow themselves to be moved passively. Occasionally numbness is felt in the tongue where there is compression of afferent nerves which lead to the second cervical root. The subluxed vertebral column may compress the cord causing quadriparesis and respiratory embarrassment.

Plain radiographs of the spine will identify subluxation but spinal instability without major subluxation is much more difficult to diagnose. Flexion and extension views may be required but it is essential the patient should never be forced to move further than comfort allows.[1]

Remember: these guidelines recommend full spine MRI as initial investigation of choice to prevent delay in diagnosis.

Appendix 12: Patient Information Sheet

Malignant Spinal Cord Compression

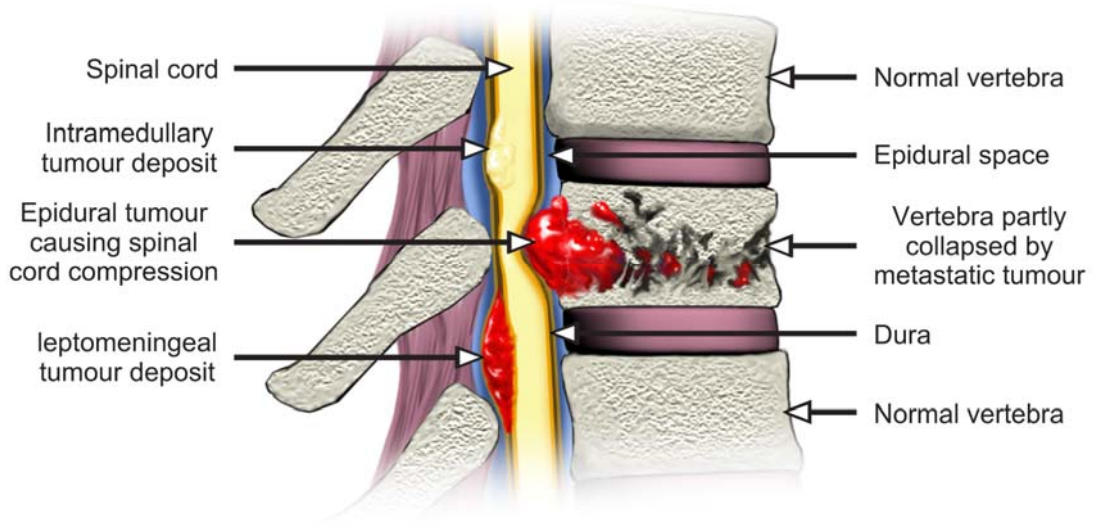
What is Spinal Cord Compression?

This information is about a rare condition called Malignant Spinal Cord Compression (MSCC). It occurs when cancer cells grow in or near the spine causing increased pressure (compression) of the spinal cord altering the blood supply to both the cord itself and nerve roots.

In most cases this is when the cancer has spread to the bones of the spine. Occasionally, cancer originates in the bones of the spine and causes the same signs and symptoms.

Any type of cancer can spread to the bones of the spine, which may lead to spinal cord compression. However, it is more commonly seen in people with cancers of the breast, lung, or prostate, and people who have lymphoma or myeloma. Remember, MSCC only occurs in a small number of people.

What Does it Look Like?



Signs and Symptoms

Your GP or oncologist may have told you that you are at risk of MSCC and have informed you to be aware of the symptoms below. If this is the case, or if you have a known diagnosis of cancer and develop the following signs and symptoms, you should contact your GP or NHS 24 immediately.

- Unexplained back or neck pain – this may be mild at first.
- A tight band sensation around your chest or waist which can go down the buttocks or legs.
- Unexplained pins and needles or numbness in arms, legs or groin/pelvic area.

- Pain may be worse when lying down and it may affect sleeping.
- Changes to your bladder function – either difficulty controlling or being unable to pass urine.
- Changes to your bowel function – either difficulty controlling or being constipated.
- Difficulty with walking/climbing stairs – legs feeling heavier or more unsteady.

These symptoms can also be caused by a number of other conditions. It is very important to let your doctor know if you have any of these symptoms so they can be investigated.

To optimise outcomes, MSCC should be diagnosed and treated as soon as possible. The earlier MSCC is diagnosed, the better the chances of the treatment being effective.

How is it Diagnosed?

Before your doctor can be sure whether these symptoms are caused by spinal cord compression, a number of tests will have to be done. Ideally an MRI scan will be performed.

MRI (Magnetic Resonance Imaging) Scan

This is the ideal test for determining a malignant spinal cord compression. This test uses magnetism to build up a detailed picture of areas of your body.

Before the scan you may be asked to sign a checklist and remove any metal belongings and jewellery. Some people may be injected with a dye into a vein in the arm to help images from the scan to show up more clearly. During the scan you will be asked to lie still on a bed, inside a long couch, inside a long tube for about 30 minutes. It is painless but can be uncomfortable, and some people feel a bit claustrophobic during the scan. It is also noisy, but you will be given earplugs or headphones.

CT (Computerised Tomography) Scan

Your doctor may decide that a CT is appropriate for you rather than an MRI. A CT scan takes a series of x-rays to build up a three dimensional picture of the inside of the body. The scan is painless and takes 10-30 minutes. CT scans use a small amount of radiation but is very unlikely to harm you and will not harm anyone you come into contact with. You will be asked not to eat for 4 hours before the scan. You will probably be given a drink or injection to allow parts of the scan to be seen more clearly.

Treatment

Treatment should be started as soon as feasibly possible once a spinal cord compression has been diagnosed. The aim of treatment is to minimise permanent damage to the spinal cord and to alleviate pain by shrinking the tumour and relieving pressure on the nerves. You are free to choose not to have the treatment and staff will explain what will happen if you do not have it. No medical treatment can be given without your consent.

Treatment usually involves the following:

Steroids

When spinal cord compression is suspected, most patients will be commenced on a steroid called Dexamethasone. The aim of this is to try and reduce pressure and

swelling in the area and help with pain. The dose of this will gradually be reduced by your doctor and stopped, depending on symptoms and after starting other treatment.

Radiotherapy

Generally the treatment will be radiotherapy but this will depend on the type of cancer and your general health. Radiotherapy is the use of high-energy rays to destroy cancer cells. You will initially attend CT simulator where your radiotherapy will be planned. This will be followed by 1 or a number of treatment sessions.

Surgery

A small number of people may be suitable for surgery to the spine to try and remove as much of the tumour as possible.

Chemotherapy

Chemotherapy is the use of ant-cancer (cytotoxic) drugs to destroy cancer cells. It is occasionally used to treat MSCC. It may be used for tumours that are sensitive to chemotherapy such as lymphoma or small cell lung cancer.

The various types of treatment mentioned can be used individually or in combination with one another depending on the type of cancer you have and your general health.

Mobility

You may be advised to lie flat until investigations have determined whether you have a spinal cord compression. This is to minimise movement to the affected area of the spine and prevent further increase in symptoms. If investigations confirm a malignant spinal cord compression then your doctor and physiotherapist will decide what movement is safe for you.

You will have frequent physical examinations by your doctor and physiotherapist. This is to examine your nervous system and includes assessing range of movement, sensation, muscle power and co-ordination.

Collars and Braces

Occasionally a collar or brace device may be advised to help stabilise the area affected in your neck or back. Your physiotherapist will discuss this with you.

Symptoms

Symptoms vary between individuals depending on the level of the compression and the severity of it. Common symptoms are:

- Pain

  If you are experiencing pain the doctor will prescribe you medication for this which will be reviewed on a daily basis.

- Problems with mobility and function

  These may both be affected by changes in muscle power, sensation and co-ordination due to pressure on the nerves in the affected area of your neck or back. Your physiotherapist will aim to maximise your function and an occupational therapist can provide advice and practical assistance for activities of daily living.

- Bladder symptoms

  Your doctor or nurse will monitor how well your bladder is working. If you are having problems passing urine, a thin flexible tube (catheter) may be inserted into the bladder to help drain it.

- Bowel symptoms

  Any changes in bowel function will be monitored by medical and nursing staff. Bowel symptoms can vary from constipation to a loss of control. You may be given medication to help with this.

After Treatment has Finished

Spinal cord compression can affect people differently. The care you will need after treatment will depend on the result of treatment and your level of mobility.

Some people who have lost the ability to walk or lost movement before treatment may not get this back. In this situation, your further care may be at your cancer centre, local hospital or at a hospice. This will involve a team of healthcare professionals who will work closely with you and your family to organise a plan of care to suit your needs.

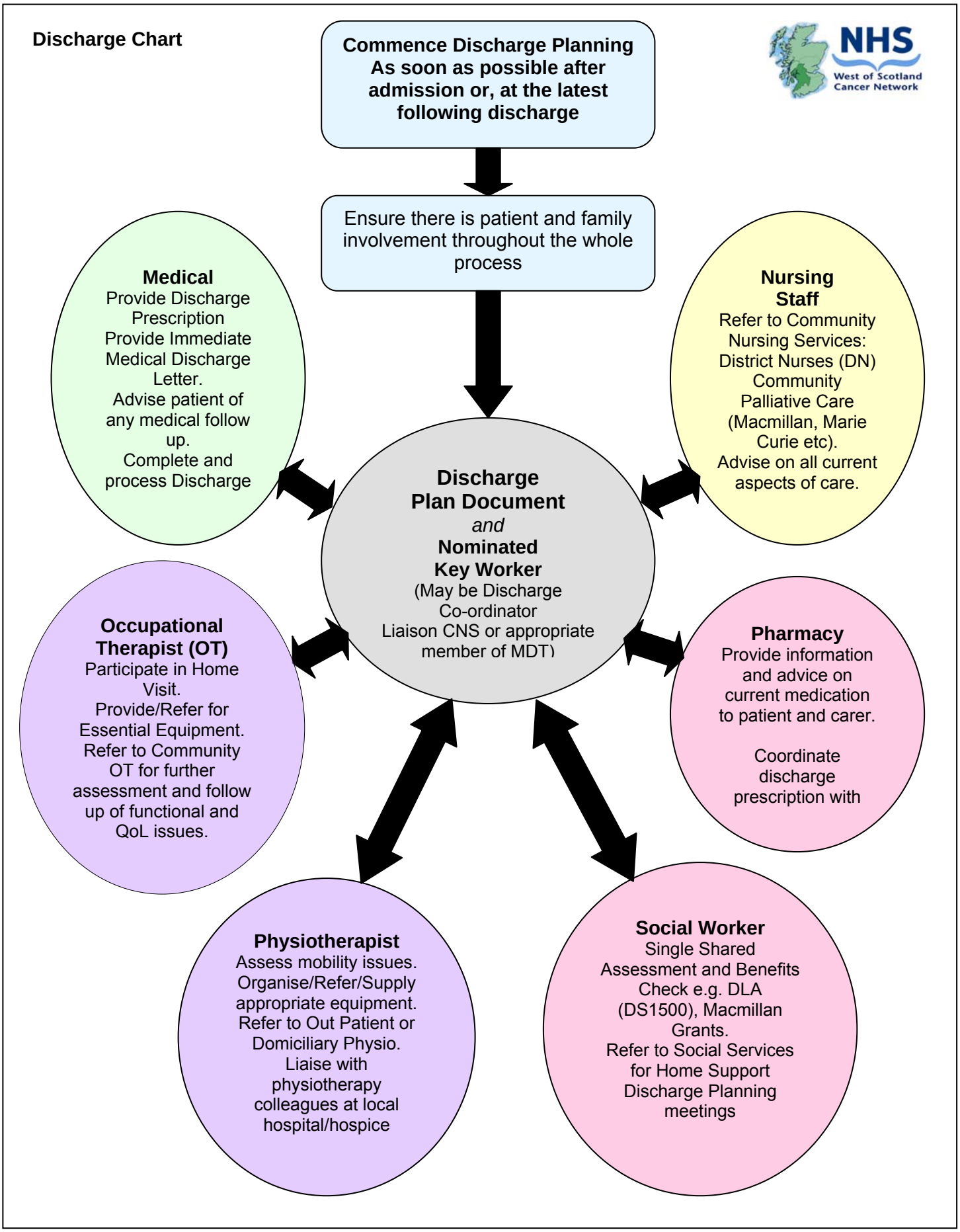
Before you leave hospital, the staff should organise any care you need at home. They may also supply you with equipment to assist you with activities of daily living and allow you to be as independent as possible.

Further Information / Questions

If you have any questions at all, please speak to any one of the health care team looking after you who will be happy to help.

This Information sheet is based on the Macmillan Cancer Support Malignant Spinal Cord Compression factsheet (2012)

Appendix 13: Discharge Chart



Appendix 14: Abbreviations and Acronyms

ADL	Activities of Daily Living
AHP	Allied Health Professional
BD	Twice Daily
BP	Blood Pressure
BWoSCC	Beatson West of Scotland Cancer Centre
CECS	Cauda Equina Compression Syndrome
CHI	Community Health Index
CNS	Clinical Nurse Specialist
CRAG	Clinical Resource and Audit Group
CRP	C-Reactive Protein
CT	Computerised Tomography
d	day
DGH	District General Hospital
DLA	Disability Living Allowance
DNAR	Do Not Attempt Resuscitation
DN	District Nurse
DoB	Date of Birth
DVT	Deep Venous Thrombosis
ECCI	Electronic Clinical Communications Implementation
ECOG	European Co-operative Oncology Group System
ESR	Erythrocyte Sedimentation Rate
FBC	Full Blood Count
GECS	Graduated Elastic Compression Stockings
GI	Gastro-Intestinal
GP	General Practitioner
Gy	Gray
LFTs	Liver Function Tests
LMWH	Low Molecular Weight Heparin
MDCT	Multi-detector row Computerised Tomography scan
MDT	Multidisciplinary Team
mls	Millilitres
MRI	Magnetic Resonance Imaging
MSCC	Malignant Spinal Cord Compression
MSU	Midstream Specimen of Urine
NICE	National Institute for Health and Clinical Excellence
OD	Once Daily
OT	Occupational Therapist
Physio	Physiotherapist
PMH	Past Medical History
PS	Performance Status
PSA	Prostate Specific Antigen
PT	Patient
QoL	Quality of Life
RCAG	Regional Cancer Advisory Group
RCGP	Royal College of General Practitioners
ROM	Range of Movement
RIS	Recording Information System
RTA	Road Traffic Accident
SCI	Spinal Cord Injury
SIGN	Scottish Intercollegiate Guidelines Network

SPCT	Specialist Palliative Care Team
U&Es	Urea and Electrolytes
UFH	Unfractionated Heparin
UK	United Kingdom
VAS	Visual Analogue Scale
VTE	Venous Thromboembolism
WoSCAN	West of Scotland Cancer Network
WHO	World Health Organisation
WoS	West of Scotland