Guidelines for Malignant Spinal Cord Compression
GUIDELINES FOR REFERRAL, MANAGEMENT AND REHABILITATION OF ADULTS WITH SUSPECTED OR ACTUAL MALIGNANT SPINAL CORD COMPRESSION IN THE WEST OF SCOTLAND

Produced by West of Scotland Malignant Spinal Cord Compression Guidelines Development Working Group on behalf of the West of Scotland Cancer Network

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1 Introduction

1 INTRODUCTION
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. MSCC is a major cause of morbidity and is believed to occur in approximately 5% of all patients diagnosed with cancer. In approximately 85% of cases it results as a consequence of metastases from a primary tumour with cancers of the lung, prostate and breast accounting for around 50% of cases. Other cancers frequently associated with MSCC include lymphoma, renal, multiple myeloma, melanoma and sarcoma.

The need for guidelines
Early diagnosis of MSCC whilst the patient is still ambulant is crucial in optimising patient outcomes. Studies carried out in the United Kingdom (UK) over the last 10 years have identified several areas where increased awareness of this condition and specific aspects of treatment and rehabilitation could be improved. The main issues identified were:

- Unacceptable delays in diagnosis and referral are common.
- Clinicians failed to consider a diagnosis of spinal cord compression resulting in delayed investigation and referral.
- There is a lack of formal referral procedures for patients with MSCC.

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

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, with funding from Macmillan Cancer Support.
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.
- 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.

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

2.2 Aetiology of MSCC

2.3 Key signs and symptoms

2.4 Referral pathways

2.5 Investigation protocol for suspected MSCC
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. 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’ should assist the clinician in determining the more likely origin of the presentation and therefore the most appropriate treatment pathway for the patient (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 (RTA).
- Constant, progressive, non-mechanical pain.
- Thoracic pain.
- Past Medical History (PMH) 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 lumbo-sacral (20%) and cervical (10%).

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. 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. Intradural spinal cord neoplasms (intramedullary and extramedullary) or metastases (intramedullary) can also present with symptoms of spinal cord compression but these guidelines will focus on extradural MSCC.

Figure 1 shows the different types of malignant invasion of the spinal cord.
Guidelines for malignant spinal cord compression

MSCC can be the presenting manifestation of a cancer or can be the sole site of recurrence. It is however, more common for it to occur where there is widely disseminated disease. 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. 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.
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 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 and the RCGP ‘Red flags for possible serious spinal pathology’ table 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.

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 and has often been present for a number of weeks before MSCC is diagnosed (median 6-8 weeks).
- 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.
- Changes in the character of back pain, including ‘burning’ or ‘shooting’ pain, warrants close assessment.
Pain can be localised over the area of tumour due to vertebral destruction so that the vertebra is tender on palpation. Multiple spinal levels are affected in 30% of patients therefore more than one vertebra may be tender on examination.

Pain may be increased by lying down and relieved by sitting in contrast to back pain from degenerative joint disease.

Typically pain is worse at night.

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) metastases causing pain over the sacroiliac joint.

Referred pain may be mistaken for a false localising sign.

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. 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.

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.

Motor deficits

Specific muscle weakness may emerge initially in the legs regardless of the level of compression. 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.

The development of ataxia, loss of co-ordination or paralysis are usually late findings.
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

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 healthcare 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: chart A

**Urgent referral:**
- Patients with a known cancer diagnosis and early presentation triggers.
- Patients without a cancer diagnosis.

**Non-urgent referral:**
- Patients with a known cancer diagnosis and late presentation.

**Patients with a known cancer diagnosis and early presentation triggers**
This will more commonly relate to patients with cancer of lung, prostate, breast and myeloma, but not exclusively.

**A patient presenting:**
- with previously diagnosed bone metastases
- complaining of new spinal pain, particularly thoracic/nerve root pain
- 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 of a patient with suspected spinal cord compression includes identification of risk factors, symptom evaluation of pain, sensory and motor function, and bowel and bladder function. *appendix 4*

- Commence patient on steroids (Dexamethasone – 16 milligram/day (mg/d)). *section 3.2*

- 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 24-48 hours. A Multidetector Computed Tomography (MDCT) scan is an acceptable alternative if urgent MRI is not possible. *section 2.5* 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.

- In general, a patient with the following criteria should be initially referred to Neurosurgery (Institute of Neurological Science (INS), Southern General Hospital): *section 3.5* one area of compression radioresistant tumours (e.g. renal) ambulant a life expectancy of a minimum of six months.
A patient with the following criteria should be initially referred to Oncology (Beatson West of Scotland Cancer Centre), usually for radiotherapy: section 3.3
- 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 INS (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.

Patients without a cancer diagnosis
A patient presenting with:
- signs and symptoms of cord compression. section 2.3

Management pathway
A clinical neurological assessment and examination of the patient with suspected spinal cord compression includes identification of risk factors (consider RCGP ‘Red flags for possible serious spinal pathology’ table 1), symptom evaluation of pain, sensory and motor function, and bowel and bladder function. appendix 4

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.
Guidelines for malignant spinal cord compression

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Appendices

- Commence patient on steroids – Dexamethasone: 16mg/d. **section 3.2**
- 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), 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.

**Patient with a known cancer diagnosis and 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 >2 prior to paralysis – ECOG scale). **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 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 (SPCT) 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 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. If a patient has signs or symptoms suggestive of MSCC, this should be requested on an urgent basis. In the acute situation, pursuing bone scans and plain X-rays only results in delay in diagnosis and localisation of pathology.

Access to MRI
MRI is not yet routinely available out of hours (including weekends) in the West of Scotland (2006). The only alternative to this is where the patient is assessed as requiring neurosurgical intervention and is transferred to the Institute of Neurological Sciences (INS) for treatment. Twenty-four hour access to MRI investigation is available on special request in this location.

Where MRI is not available a possible alternative, if available locally, is MDCT. MDCT (16 slice or more) allows much greater coverage of the body in a short time. 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.

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.
Referral information required
The referral details should include:
- patient demographic details (name, address, DoB, CHI number)
- patient location
- clinical history appendix 4
- primary tumour diagnosis (if known)
- previous surgery or radiotherapy
- previous relevant imaging results.

The MRI examination
Patients with 'saddle anaesthesia', motor weakness, bowel or bladder dysfunction should be scanned the same day, or immediately the following morning if outwith 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.

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, for example, prostate.

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
3.2 Steroid administration
3.3 Radiotherapy
3.4 Chemotherapy
3.5 Surgery
3.6 General palliative care
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
- 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/d in divided doses has been identified in the recent Scottish Audit as the most common starting dose regimen in patients with this condition. 10 Dexamethasone related toxicity is a consequence of both dose and 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**

<table>
<thead>
<tr>
<th>Day</th>
<th>Dexamethasone daily dose</th>
<th>Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1-4 (4 days)</td>
<td>16mg</td>
<td>8mg BD</td>
</tr>
<tr>
<td>Day 5-8 (4 days)</td>
<td>12mg</td>
<td>6mg BD</td>
</tr>
<tr>
<td>Day 9-12 (4 days)</td>
<td>8mg</td>
<td>4mg BD</td>
</tr>
<tr>
<td>Day 13-16 (4 days)</td>
<td>4mg</td>
<td>2mg BD</td>
</tr>
<tr>
<td>Day 17-20 (4 days)</td>
<td>2mg</td>
<td>2mg OD</td>
</tr>
</tbody>
</table>

OD – Once daily (8am)  BD – Twice daily (8am and 2pm)

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.

**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. [section 4.11](#section)
- 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 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) 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 useful 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 6.

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 subclinical 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

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

**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 20Gy 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 paraspinal 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.
**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 Chemotherapy

The role of chemotherapy in MSCC is limited to those patients who have chemo-sensitive tumours where treatment with appropriate cytotoxic drugs 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 chemotherapy 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.

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 Tokuhashi’s ‘Revised evaluation system for prognosis of metastatic spine tumours’. 39 appendix 6

This 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 extraspinal 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 preoperative prognostic score.

- Patients with a score of 0-8 (predicted survival less than six months) – conservative or palliative procedures selected.
- A total score of 12-15 (predicted survival of ≥1 year) – excisional procedures selected.
- Scores 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.

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.
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.

The surgical approach taken is tailored to the patients needs. The posterior approach is most common but other options are anterior, transthoracic and retroperitoneal.
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.

**Specialist palliative care**

Referral to the Specialist Palliative Care Service may be appropriate at any stage, from suspicion of MSCC, section 2.4 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 multidisciplinary team approach to care has not been available but is required.
4 CLINICAL CARE

4.1 INTRODUCTION
4.2 ADMISSION ASSESSMENT
4.3 PATIENT POSITIONING
4.4 MOVING AND HANDLING
4.5 PAIN ASSESSMENT AND MANAGEMENT
4.6 PRESSURE AREA CARE
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4.8 ANTICOAGULANT THERAPY
4.9 BLADDER FUNCTION
4.10 BOWEL FUNCTION
4.11 MONITORING AND MANAGEMENT OF TREATMENT SIDE EFFECTS
4.12 PSYCHOLOGICAL CARE AND SUPPORT
4.13 REHABILITATION AND MULTI-PROFESSIONAL REFERRAL
4.14 DISCHARGE PLANNING
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. 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.
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 is a significant lack of documented evidence in relation to the positioning of patients with suspected or actual spinal cord compression resulting from malignancy. 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. Further advice on the positioning of patients, with a stable or unstable spine, is provided in the Rehabilitation chapter. *section 5.2*
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 section 5.2
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 section 2.3

Pain assessment

Pain assessment should be carried out on admission and reassessed 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 and 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

Pain management

- Following pain assessment prompt pain management should be initiated to maximise pain relief.
- It is recommended that the principles of the 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, for example, Allied Health Professionals (AHPs), Anaesthetist, Clinical Psychologist, Nurses, Oncologists, Palliative Care Specialists, Pharmacists and Surgeons.
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 or sensation.

- Formal (assessment tool) and informal (clinical judgement) 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 Clinisan foam cleanser (not 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.
4.7 Anti-embolic stockings

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 three days or more, the following prophylactic measures should be carried out:

- If immobile, passive limb exercises should be carried out twice each day. These will usually be carried out by the Physiotherapist with the exception of weekends when these should be initiated by nursing staff.
- If ambulant, active limb exercises should be encouraged twice each day.
- Above knee Graduated Elastic Compression Stockings (GECS) should be worn continually except when personal hygiene needs are being attended to.
4.8 Anticoagulant therapy

There is limited evidence to support the routine prescribing of prophylactic anticoagulant therapy but there are a number of factors that should be considered when assessing a patient with MSCC for treatment. Thrombosis is a common complication of malignancy 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. LMWH is preferred because it leads to fewer thrombotic events and fewer bleeding complications compared with unfractionated heparin.

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.
4.9 Bladder function

MSCC can cause progressive nerve compression that can result in urinary retention, incontinence or large post-voiding residual volumes. 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.

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.

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

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
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.
4.10 Bowel function

Altered bowel function is a common problem in patients with spinal cord compression or cauda equina syndrome. 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

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
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.

The following protocol can be adapted to suit individual patients’ needs.

- With consent from the patient, carry out an initial rectal examination to determine the patient’s present bowel activity.
- Prescribe senna (tablets or liquid) and lactulose solution to be taken twice daily (morning & evening) on Tuesday, Thursday, Saturday and Sunday.
- On Monday, Wednesday and Friday, carry out bowel intervention (to achieve rectal emptying) using:
  - for hard loading – 1 x 10mg bisacodyl, + 1 x 4g glycerin (adult) suppository
  - for soft loading – 2 x 10mg bisacodyl suppositories
- Regularly evaluate laxatives in order to maintain a manageable consistency of bowel activity.
- Document bowel activity results daily in an appropriate chart.

Follow the above protocol for a minimum of 3-5 times 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 and suppositories)
- patient preferences.
4.11 Monitoring and management of treatment side effects

**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.

**Chemotherapy**

Prior to treatment, 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.

**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 anti-acids 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.
- **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 dietician 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 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.
Fatigue
Fatigue is common 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 a level of advice/information e.g. the benefits of rest periods.

Steroids
The majority of patients being treated for MSCC will receive steroid therapy. 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).
- If glycosuria is detected, medical staff should be informed immediately.
- If the patient has symptoms of Gastro-Intestinal (GI) irritation (indigestion, heartburn, gastric reflux), the prescribing of gastric protection should be discussed with medical staff.
- 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.
4.12 **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. 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.  

Following a cancer diagnosis, the presence of one or a number of the following factors have been identified as increasing patient risk of severe distress or a clinically significant psychological disorder. 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.
Risk assessment protocols 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.
- Referring 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.
4.13 **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. [Chapter 5](#)

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

- Physiotherapist (within 24 hours of admission)
- Occupational Therapist (within 24 hours of admission)
- Social Worker
- Specialist Palliative Care Team
- Dietician
- Speech and 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.
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 have 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. \textit{chapter 7}
5 Rehabilitation/maximising potential

5.1 Introduction
5.2 Physiotherapy
5.3 Occupational therapy
5.1 Introduction

Spinal cord compression, secondary to advanced malignancy, can be a devastating and highly disabling condition, which leaves patients “...living with advanced cancer and living with a disability.” Rehabilitation therefore is a major component of the management of this patient group.

Evidence suggests that the rehabilitation approach which best suits these patients is the palliative care approach of adaptive rehabilitation, as defined by Dietz. 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.” Whilst this honest discussion may initially be distressing for the patient “...it encourages early adjustment and realistic expectations [of rehabilitation].” It is important however to note that although actual symptomaticity 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

Referral
Referral should be made to the 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.

Initial assessment
This should be performed following discussion with the Consultant/Oncologist in relation to spinal stability. 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. 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. appendix 8

Subjective assessment
- history of present condition
- past medical history including previous physiotherapy input
- drug history
- social history.

Objective assessment
- respiratory function
- pain – body chart, Visual Analogue Scale (VAS)
- sensation appendix 5
  - light touch
  - sharp/blunt – pin prick
  - joint proprioception
- muscle power – record using Oxford Classification 71
- muscle tone – record using modified Ashworth Scale 72 to quantify increased tone. appendix 7

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

Physiotherapy treatment will now be described in detail under the following three categories:

- unstable spine prior to radiotherapy or stabilisation
- stable spine prior to and during radiotherapy
- physiotherapy post radiotherapy and/or stabilisation.

Unstable spine prior to radiotherapy or stabilisation

- The patient should be maintained on bed-rest until stabilisation is achieved or radiotherapy is completed.
- The patient should be advised to lie in a supine position (flat) with one pillow, maintaining neutral spine alignment.
- 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.
- Ensure cot-sides are in place and utilised for patient safety.
- Management pathway should be clearly documented and communicated.

Respiratory function

- Breathing exercises as able to increase air entry.
- Autogenic drainage to aid clearance of secretions.
- Assisted coughing.
- Suction as indicated.

Passive movements and positioning

- Passive movements performed twice a day.
- If the cervical spine is unstable avoid unilateral arm movement of over 90 degrees and no resisted arm movements should be attempted.
- Ensure the correct intervention is provided for heel pressure relief and prevention of ankle contracture by referring to local ‘Heel Pressure Relief Protocol’ or through consultation with the Consultant and local Orthotist.
- Ensure above knee Graduated Elastic Compression Stockings (GECSs) are fitted to prevent thrombosis.
- Hip flexion – move within pain free range. With lesions at the tenth thoracic vertebra (T10) and below, restrict hip flexion to 30 degrees.
- Hip abduction – restrict to less than 45 degrees. Do not abduct leg to beyond the edge of the bed.
- Static quadriceps and hamstring exercises as able.

**Stable spine prior to and during radiotherapy**
Where there is multidisciplinary agreement that the spine appears stable, the following is suggested:

- Gentle mobilisation should commence as soon as possible. 67
- The patient elevated in bed to 45 degrees initially.
- If position tolerated for an hour, further elevation to 90 degrees can occur.
- A gentle rehabilitation programme should be agreed.
- If any significant deterioration in pain and/or neurological status, patient should be returned to the supine position and re-evaluated.

This management plan should be clearly communicated and documented.

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

**Respiratory function**
- thoracic expansion exercises
- Active Cycle of Breathing Techniques (ACBT)
- autogenic drainage
- assisted coughing.
Exercises

- Active, active assisted or passive exercises involving all muscle groups should be performed, depending on patients’ ability, to maintain range of movement and muscle power.

- Mobilise as condition allows and in consultation with the patient’s Consultant. If there is any significant deterioration in the patient’s neurological status and/or increase in pain, the patient should lie flat and medical advice sought.

Physiotherapy post radiotherapy and/or stabilisation

- 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. Provide a monkey pole and the use of cot sides to facilitate this.

- 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 for one hour, increase to 90 degrees.

- Should the patient require a collar or brace, this should be agreed in consultation with the Consultant and the local Orthotist.

- Assess sitting balance in bed once ability to be upright in bed is established.

- If the 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 static and dynamic sitting balance but is unable to stand, transfer using a transfer board.

- If the patient has no sitting balance, a hoist will require to be used to transfer the patient. A supportive sling with head support is likely to be required. (Prior discussion with the moving and handling trainer may be necessary to ensure a suitable sling is available.) 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.

Continue to perform passive movements to all muscle groups, which are unable to be exercised actively.

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, for example, 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.

Wheelchair provision. This will necessitate referral to Westmarc, at the Southern General Hospital, for provision of a suitable wheelchair for each individual patient. It is likely that a pressure relieving chair cushion will be required.

Teach the importance of frequent change of position to relieve pressure when sitting in a wheelchair.

Increase exercise tolerance and reduce fatigue by using a graded exercise programme and introducing the patient to the concept of pacing.

Education of patient, family and carers in relation to physiotherapy management on discharge:

- Maintenance exercises and passive movements to be done daily (give written instructions to each patient)
- Transfers and handling
- Positioning
- Instruction in use of any walking aids or appliances the patient may require
- Instruction in stair mobility technique as appropriate.
Discharge planning

- Work closely with all members of the MDT to facilitate discharge.
- Participate in home visits with the Occupational Therapist (OT) to assess home regarding mobility issues.
- Organise referral to appropriate agency for the provision of appropriate equipment for use at home.
- Referral to local physiotherapy department for out-patient physiotherapy or domiciliary physiotherapy to continue/maintain rehabilitation achieved following discharge home.
- Progressive completion of discharge documentation.

If any further advice is required regarding the physiotherapy management of MSCC contact the Physiotherapist in the local Specialist Palliative Care Team or the Oncology Physiotherapist at the Beatson West of Scotland Cancer Centre.
5.3 **Occupational therapy**

**Referral**

Referral should be made to Occupational Therapy within 24 hours of admission to allow early screening for potential functional problems during admission and early investigation regarding discharge potential/needs.

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 therapist intervention is quality of life. For many people with cancer helped by occupational therapists, one of the most important means to achieving this will be independence. 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.*

**Initial assessment**

An initial assessment should be performed following discussion with medical staff regarding spinal stability.

Through assessment the Occupational Therapist can identify areas of need allowing the person 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.

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 person and their family. It may be carried out over one or more sessions depending on the medical condition and tolerance of the patient.
Physical assessment
- motor control – including range of movement, muscle strength, tone, functional use, gross and fine motor skills
- sensory awareness – to determine areas of absent, impaired and intact sensation
- positioning – current dynamic and static sitting balance
- pain
- endurance
- bladder and bowel status.

Assessment of cognitive functioning
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 or spatial awareness, this may impact on their ability to carry out any activity.

Assessment of psychological functioning
Includes emotions (state/feelings), coping techniques, self-identity, and possible impact of these on the patient’s performance.

Functional assessment
Will identify if the patient requires assistance with regards to feeding, self care and toileting.

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:
- unstable spine prior to stabilisation while patient is being nursed flat
- post radiotherapy and/or stabilisation.

Unstable spine prior to stabilisation while 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.

**Post radiotherapy and/or stabilisation**

**Functional assessments**

These may include any or all of the list below if appropriate, 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 and childcare
- leisure and social activities
- communication – use of telephone, laptop
- transport – use of public transport, return to driving.

**Immediate goals**

- To enable the person 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 in conjunction with physiotherapy to improve balance, muscle strength, functional mobility and to adapt techniques to facilitate independence or reduce energy expenditure.
- To provide advice on fatigue management as appropriate.
- To assess for wheelchair and seating needs. (This may be carried out by the Occupational Therapist, Physiotherapist or both.)
- To participate in early discharge planning to identify potential to return home or necessity for further in-patient care, if required.
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 support and educate carers in safe transfers, handling and care 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.

**Longer term goals**

This intervention is likely to be carried out by community or primary care or hospice based occupational therapists (if available).

- Promote quality of life for the person and their family for the remaining time of their illness.
- Provide assistive equipment or appropriate adaptations to enable person to remain at home for as long as possible.
- Support the family and other members of the 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.

**Discharge planning**

Work closely with all members of the MDT to facilitate discharge.

- Home assessment – see above.
- Provision of or referral for essential equipment required for discharge.
- Referral to community based occupational therapists for further assessment and follow up of functional and quality of life issues after discharge.

For further advice contact the Occupational Therapist working in oncology/palliative care services at the Beatson West of Scotland Cancer Centre, your local Hospital or Hospice.
6 Patient Information and Education

6.1 Introduction

6.2 General Principles of Patient Information and Education

6.3 Specific Recommendations
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. 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. 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.
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 patients’ needs in relation to cultural issues, learning disabilities, language or any hearing and 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 patient information is given to patients in two main groups:

**Patients with a diagnosis of MSCC**

The Cancerbackup fact sheet on ‘Malignant spinal cord compression’ should be given (helpline 0808 800 1234 [www.cancerbackup.org.uk](http://www.cancerbackup.org.uk)) in addition to any relevant cancer site specific or treatment information.

**Patients considered being at increased risk of developing 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 in advance to enable them to identify early symptoms and contact an identified health care professional to initiate prompt treatment and optimise prognosis and treatment outcomes. The Cancerbackup fact sheet on ‘Malignant spinal cord compression’ could be used, supplemented by a local contact number for the patient to phone, should symptoms develop or an alert card, such as that shown here, 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.

If you develop any of the symptoms on the back of this card, please contact the number below urgently

During working hours (9am-5pm)

Name: 

Number: 

All other times

Name: 

Number:
Discharge planning

7.1 Introduction
7.2 Pre-discharge
7.3 Pre-discharge home visits
7.4 Discharge
7.5 Post discharge
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. chart D
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 (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 INS (Southern General) and, depending on their treatment pathway, could either be discharged, or 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 INS.

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. See section 7.4 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. 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 briefly referred to before section 4.12 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 report). This should ensure their 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, for example, ‘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 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. These home visits, performed by various members of the multidisciplinary team, but usually facilitated by the Occupational Therapist, 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 other needs that the patient or carers may have. section 5.2

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 prior to discharge.
7.4 Discharge

This section of the guideline has been adapted from SIGN 64 Management of Patients with Stroke: Rehabilitation, Prevention and Management of Complications, and Discharge Planning.

Discharge planning and transfer of care documentation

The discharge document should be progressively completed. This can be a paper document or electronic, for example 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 Resuscitation’ (DNAR) 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 and 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.
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 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. Prompt re-referral for assessment and management is encouraged if this is thought to be the case.
APPENDICES

1. West of Scotland malignant spinal cord compression guidelines development group
2. West of Scotland cord compression steering group
3. Right lateral view of vertebral column and spinal nerves
4. Guidance for patient assessment and examination
5. Dermatone body charts
6. Physiotherapy assessment scales
7. Tokuhashi’s revised prognostic scoring system
8. Identifying spinal instability
1 West of Scotland malignant spinal cord compression guidelines development group

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Guidelines for malignant spinal cord compression

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Appendices

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2 West of Scotland cord compression steering group
3 Right lateral view of vertebral column and spinal nerves
4 Guidance for patient assessment and examination
5 Dermatone body charts
6 Tokuhashi’s revised prognostic scoring system
7 Physiotherapy assessment scales
8 Identifying spinal instability
Guidelines for malignant spinal cord compression

2 West of Scotland cord compression steering group

Chair
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3 Right lateral view of vertebral column and spinal nerves

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<table>
<thead>
<tr>
<th>Nerve pair</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Cervical region 10%</td>
</tr>
<tr>
<td>C2</td>
<td></td>
</tr>
<tr>
<td>C3</td>
<td></td>
</tr>
<tr>
<td>C4</td>
<td></td>
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<tr>
<td>C5</td>
<td></td>
</tr>
<tr>
<td>C6</td>
<td></td>
</tr>
<tr>
<td>C7</td>
<td></td>
</tr>
<tr>
<td>C8</td>
<td></td>
</tr>
<tr>
<td>T1</td>
<td>Thoracic region 70%</td>
</tr>
<tr>
<td>T2</td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td></td>
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<td>T4</td>
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<td>T8</td>
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<td>T9</td>
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<td>T10</td>
<td></td>
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<tr>
<td>T11</td>
<td></td>
</tr>
<tr>
<td>T12</td>
<td></td>
</tr>
<tr>
<td>L1</td>
<td>Lumbo-sacral region 20%</td>
</tr>
<tr>
<td>L2</td>
<td></td>
</tr>
<tr>
<td>L3</td>
<td></td>
</tr>
<tr>
<td>L4</td>
<td></td>
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<tr>
<td>L5</td>
<td></td>
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<tr>
<td>S1</td>
<td></td>
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<td>S2</td>
<td></td>
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<td>S3</td>
<td></td>
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<tr>
<td>S4</td>
<td></td>
</tr>
<tr>
<td>S5</td>
<td></td>
</tr>
<tr>
<td>CO1</td>
<td></td>
</tr>
</tbody>
</table>

The eight pairs of cervical spinal nerves interconnect, forming two networks, the cervical plexus (C1 to C4) and the brachial plexus (C5 to C8 and T1). These innervate the back of the head, the neck, shoulders, arms and hands as well as the diaphragm.

The twelve pairs of thoracic spinal nerves (T1 to T12) are directly connected to the muscles between the ribs, the deep back muscles and regions of the abdomen and thorax. T1 also contributes to the brachial plexus.

Four of the five pairs of lumbar spinal nerves (L1 to L4) form the lumbar plexus, which supplies the muscles of the lower limbs and trunk, the external genitalia and the skin of the groin area and lower limbs. L4 and L5 also interconnect with the first four of the sacral nerves (S1 to S4).

The spinal nerve pairs in the sacral region form two nerve networks, the sacral plexus (L5 and S1 to S3) and the coccygeal plexus (S4, S5 and the coccygeal nerve (CO1). These networks innervate the thighs, the buttocks, the legs and feet, and the anal and genital area. CO1 supplies the skin in the coccyx region.
Guidelines for malignant spinal cord compression

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.

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.

Physical examination
The examination should include the following points as well as targeted motor, sensory and autonomic nervous system assessment techniques:
- Back exam  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 paraesthesias? 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?
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. chart C

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

<table>
<thead>
<tr>
<th>Grade</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Fully active, able to carry on all pre-disease performance without restriction.</td>
</tr>
<tr>
<td>1</td>
<td>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.</td>
</tr>
<tr>
<td>2</td>
<td>Ambulatory and capable of all self-care but unable to carry out any work activities. Up and about more than 50% of waking hours.</td>
</tr>
<tr>
<td>3</td>
<td>Capable of only limited self-care, confined to bed or chair more than 50% of waking hours.</td>
</tr>
<tr>
<td>4</td>
<td>Completely disabled. Cannot carry on any self-care. Totally confined to bed or chair.</td>
</tr>
<tr>
<td>5</td>
<td>Dead.</td>
</tr>
</tbody>
</table>
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
5 Dermatone body charts
© Armstrong J, 2005
6 Tokuhashi’s revised prognostic scoring system

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

Patients with a score of 0-8
- predicted survival less than six months
- conservative treatment.

Patients with a score of 9-11
- predicted survival six months or more
- palliative surgery or, rarely,
- excisional surgery for patients with a single lesion and no metastases to internal organs.

Patients with a score of 12-15
- predicted survival of one year or more
- excisional surgery.

---

### Table 4 Tokuhashi’s revised prognostic scoring system

<table>
<thead>
<tr>
<th>Score</th>
<th>General condition (Karnofsky - see below)</th>
<th>Number of extra-spinal bone metastases</th>
<th>Number of metastases in the vertebral body</th>
<th>Metastases to major internal organs</th>
<th>Palsy (Frankel see below)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>poor (10%-40%)</td>
<td>0</td>
<td>0</td>
<td>unremovable</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>moderate (50%-70%)</td>
<td>1</td>
<td>1</td>
<td>removable</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>good (80%-100%)</td>
<td>2</td>
<td>2</td>
<td>no metastases</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td></td>
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<td>5</td>
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<tr>
<td>6</td>
<td></td>
<td></td>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Karnofsky: 0 poor (10%-40%), 1 moderate (50%-70%), 2 good (80%-100%)
- Frankel: 0 complete (A, B), 1 incomplete (C, D), 2 none (E)
Guidelines for malignant spinal cord compression

Table 5  Combined ECOG and Karnofsky performance status scales

<table>
<thead>
<tr>
<th>ECOG</th>
<th>Description</th>
<th>Karnofsky</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Fully active; able to carry on all pre-disease performance without restriction</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>Ambulatory and capable of all self-care but unable to carry out any work activities.</td>
<td>60</td>
</tr>
<tr>
<td>3</td>
<td>Capable of only limited self-care, confined to bed or chair more than 50% of waking hours.</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>Completely disabled. Cannot carry on any self-care. Totally confined to bed or chair.</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 6  Frankel scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Complete  No sensory or motor function below level of neurologic deficit level.</td>
</tr>
<tr>
<td>B</td>
<td>Incomplete Sensory only function below neurologic deficit level.</td>
</tr>
<tr>
<td>C</td>
<td>Incomplete Motor and sensory function below neurologic deficit level, but motor function useless.</td>
</tr>
<tr>
<td>D</td>
<td>Incomplete Useful motor, but not normal function below neurologic deficit level.</td>
</tr>
<tr>
<td>E</td>
<td>No motor, sensory or sphincter disturbance.</td>
</tr>
</tbody>
</table>
7 Physiotherapy assessment scales

**Sensation – key levels**

<table>
<thead>
<tr>
<th>Nerve</th>
<th>Sensation</th>
</tr>
</thead>
<tbody>
<tr>
<td>C4</td>
<td>shoulders</td>
</tr>
<tr>
<td>C6</td>
<td>thumbs</td>
</tr>
<tr>
<td>T10</td>
<td>umbilicus</td>
</tr>
<tr>
<td>T12</td>
<td>groin</td>
</tr>
<tr>
<td>L3</td>
<td>front of knee</td>
</tr>
<tr>
<td>L5</td>
<td>big toe</td>
</tr>
<tr>
<td>S1</td>
<td>little toe</td>
</tr>
<tr>
<td>S3</td>
<td>genitalia</td>
</tr>
</tbody>
</table>

**Muscle groups nerve roots**

<table>
<thead>
<tr>
<th>Nerve</th>
<th>Muscle Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>C3 (4)</td>
<td>trapezius</td>
</tr>
<tr>
<td>C5</td>
<td>deltoide</td>
</tr>
<tr>
<td>C5 (6)</td>
<td>biceps</td>
</tr>
<tr>
<td>C6 (7,8)</td>
<td>pectorals</td>
</tr>
<tr>
<td>C6 (7,8)</td>
<td>wrist extensors</td>
</tr>
<tr>
<td>C7 (8)</td>
<td>finger extensors</td>
</tr>
<tr>
<td>C7 (8)</td>
<td>wrist flexors</td>
</tr>
<tr>
<td>C8 (T1)</td>
<td>triceps</td>
</tr>
<tr>
<td>C9 (T1)</td>
<td>finger flexors</td>
</tr>
<tr>
<td>T1</td>
<td>interossei</td>
</tr>
<tr>
<td>L1 (2)</td>
<td>hip flexors</td>
</tr>
<tr>
<td>L3 (4)</td>
<td>quadriceps</td>
</tr>
<tr>
<td>L4 (5), S1</td>
<td>dorsi-flexors and hip abductors</td>
</tr>
<tr>
<td>L2 (3)</td>
<td>hip adductors</td>
</tr>
<tr>
<td>L5, S1</td>
<td>internal and external rotators, and hamstrings</td>
</tr>
<tr>
<td>S1 (2)</td>
<td>plantar flexors</td>
</tr>
<tr>
<td>L5, S1, S2</td>
<td>gluteals</td>
</tr>
</tbody>
</table>

**Muscle power**

Muscle groups are charted using the Oxford Classification.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>complete paralysis</td>
</tr>
<tr>
<td>1</td>
<td>flicker of contraction</td>
</tr>
<tr>
<td>2</td>
<td>contraction with gravity eliminated</td>
</tr>
<tr>
<td>3</td>
<td>contraction against gravity</td>
</tr>
<tr>
<td>4</td>
<td>contraction against gravity and resistance (weaker than normal)</td>
</tr>
<tr>
<td>5</td>
<td>normal contraction</td>
</tr>
</tbody>
</table>
## Muscle tone

To quantify increased tone, the modified Ashworth Scale can be used.

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>rigidity</td>
</tr>
<tr>
<td>3</td>
<td>movement difficult, considerable tone</td>
</tr>
<tr>
<td>2</td>
<td>more marked increase in tone, still easily moved</td>
</tr>
<tr>
<td>1+</td>
<td>slight increase in tone, catch and resistance throughout range of movement</td>
</tr>
<tr>
<td>1</td>
<td>slight increase in tone, catch and minimum resistance at end of range</td>
</tr>
<tr>
<td>0</td>
<td>no increase in tone</td>
</tr>
</tbody>
</table>
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:

- Severe pain at site of lesion, increasing on movement.
- The tumour involves two or more adjacent vertebral bodies.
- Both anterior and posterior elements at the same level are involved.
- Involved vertebral bodies have collapsed to less than 50% of their original height.
- 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.

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