The Christie
NHS Foundation Trust

GUIDELINES FOR ASSESSMENT OF SPINAL STABILITY IN IMPENDING AND CONFIRMED MSCC

THE CHRISTIE, GREATER MANCHESTER & CHESHIRE

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Spinal instability refers to the ongoing or potential for neurological damage as a result of movements of the diseased spine. It is a major concern in management of traumatic spinal injury. Spinal column infiltrated by metastatic tumour is likely to be weakened and therefore potentially less stable. *However, in metastatic spine disease, whether the spine is stable or not can be difficult to decide.* Clinical studies in this subject are too few to support the formation of evidence-based guidelines. Even patients judged to have a stable spine may develop instability following minor trauma or further tumour growth along the spinal column.
A frequently reported dilemma is when and how to mobilise a patient with MSCC. The aim of this document is to provide guidance to assist with making those decisions based on NICE Guidance and the best available other evidence.
Results of the only study assessing timing of mobilisation (Pease, et al 2004), shows that early mobilisation of appropriate patients leads to a decreased complication rate and a significant increase in patient survival at 60 weeks. Neurological function was not compromised by implementation of early mobilisation by appropriately skilled professionals.

Spinal stability in patients with metastatic disease of the spine is dependent on several factors:

1. *Site of disease (cervical, thoracic or lumbar):* For example, in the thoracic spine the presence of ribs and chest wall provide added support to the spinal column affected by metastatic disease. This is lacking in the cervical spine. The SINS score suggests that lesions in junctional sites (occiput-C2, C7-T2, T11-L1, L5-S1) pose a higher risk of instability than in less mobile areas (see below, item 5)

2. *Extent of tumour infiltration:* In general, the greater the tumour involvement of the vertebrae, the more likely it is that stability is compromised. Collapsed vertebrae are also less likely to be stable.

3. *Co-morbidity*: For example, pre-existing osteoporosis of the vertebrae (related to old age, chronic steroid use etc) will lead to weakened bones, which when infiltrated by tumour is likely to be less stable.

4. *Effect of open surgery or disease progression:* Decompressive surgery alone may alter the stability status of the spine fixation. Spinal stability may also be compromised in some patients managed non-surgically, due to tumour progression.

5. *Radiological evidence:* Imaging and particularly MR and CT scans are a helpful adjunct in determining spinal stability. Criteria which aid the decision include the following:
   - location of lesion (more mobile areas of the spine, e.g. junctional lesion in the Cervico-Thoracic spine at higher risk of instability)
   - bone quality (lytic lesions at higher risk)
   - structural deformity (vertebral body collapse, kyphosis, subluxation)
   - 3-column model of spinal stability (Denis 1983) – disruption of 2 or 3 columns creates spinal instability
   - radiographic alignment and posterolateral involvement.

6. *In the absence of clear radiological evidence of instability:* A combination of factors help with the decision making, i.e. radiology and clinic symptoms. Where there is no clear radiological evidence, be guided by the clinical symptoms, i.e. severe pain at the site of the lesion, increasing on movement or worsening neurology when commencing mobilisation may indicate instability. The mobility assessment will usually be undertaken by the physiotherapy and occupational therapy teams. If the above signs and symptoms indicate instability, resume flat bed rest and discuss with the medical team.

7. *Instability of the spine is rare in the cancer setting:* The evidence suggests that instability occurs in a small number of patients only – 10%. The remaining 90% of patients will benefit from resuming mobility ASAP once stability has been assessed.

8. *SINS (Spinal Instability Neoplastic Score):* a classification system which can help as an adjunct in the decision making for potentially unstable or unstable lesions (see table 1):

Table 1. SINS

SINS Component	Score
Location	
Junctional (occiput-C2, C7-T2, T11-L1, L5-S1)	3
Mobile spine (C3-C6, L2-L4)	2
Semirigid (T3-T10)	1
Rigid (S2-S5)	0
Pain*	
Yes	3
Occasional pain but not mechanical	1
Pain-free lesion	0
Bone lesion	
Lytic	2
Mixed (lytic/blastic)	1
Blastic	0
Radiographic spinal alignment	
Subluxation/translation present	4
De novo deformity (kyphosis/scoliosis)	2
Normal alignment	0
Vertebral body collapse	
> 50% collapse	3
< 50% collapse	2
No collapse with > 50% body involved	1
None of the above	0
Posterolateral involvement of spinal elements†	
Bilateral	3
Unilateral	1
None of the above	0

NOTE. Data adapted.[14]
Abbreviation: SINS, Spinal Instability Neoplastic Score.
*Pain improvement with recumbency and/or pain with movement/loading of spine.
†Facet, pedicle, or costovertebral joint fracture or replacement with tumor.

Scoring: Tumour-related instability is assessed by adding together six individual component scores: spine location, pain, lesion bone quality, radiographic alignment, vertebral body collapse, and postero-lateral involvement of the spinal elements. The minimum score is 0, and maximum is 18. A score of 0 to 6 denotes stability, 7 to 12 denotes indeterminate (possibly impending) instability, and 13 to 18 denotes instability. A surgical consultation is recommended for patients with SINS scores greater than 7.

If information regarding bone texture and pain is not available, it can still be scored in the 4 radiological categories as an indication to possible instability.

Principles of assessing spinal stability:
(Refer to 'Stability and mobilisation pathway' below)

Key points

1. **Assume the patient has spinal cord compression and spinal instability until investigations (MR scan) and clinical assessment prove otherwise.**

Referral should be made to the Physiotherapist and Occupational Therapist within 24 hours of admission or first suspicion of MSCC. (At the Christie contact should be made via bleep 12572 8am-4pm Mon-Fri.)

2. **The spine should be assumed to be 'unstable' until Multi-Disciplinary Team (MDT) decision agrees otherwise.**
   N.B. This decision should be made in the patient's local hospital.

Initial assessment must include presentation of symptoms - pain and full baseline neurological assessment whilst still on flat bed rest.
Once the MR scan has been reported & SIN Score calculated where possible a prompt discussion must take place to determine whether the spine is stable or if there are concerns of potential instability. This should involve a multidisciplinary discussion between the medical (acute oncology/oncologist where available) and the physiotherapy team with comprehensive radiological information taken from the MR scan report. If unclear, the radiologist should be contacted for advice. If the patient in question has already been discussed with the Spinal team, and there is concern about instability, advice can be sought from the on-call Spinal ST.

- Positioning (for example lying flat, sitting up, standing or walking) and the use of spinal braces needs to be balanced against the patient's wishes, ensuring their comfort and individual preferences (Lee et al 2015). Spinal bracing may be supportive and reduce pain and risk of collapse. However, spinal bracing may not prevent further collapse and spinal cord damage and may be uncomfortable. If life expectancy is short, then a palliative care approach focusing on patient preferences and priorities is appropriate (Lee et al 2015). In the absence of clear evidence, health care professionals and patients need to discuss the options to decide what is best for the individual patient (Lee et al 2015).

- In most cases and in order to protect bony and neurological function, patients with severe mechanical pain suggestive of spinal instability, or any neurological symptoms or signs suggestive of MSCC, should be nursed flat with neutral spine alignment (NICE 2008). One or no pillows should be used with suspected unstable CSP (GAIN 2014). The aim is to prevent further neurological deterioration. They must be kept in supine lying and log-rolled for all nursing procedures.

- Stabilisation with a hard collar (e.g. Aspen Vista, Miami-J, Philadelphia or similar) should be considered for patients with suspected cervical spinal cord compression and / or instability of the cervical spine.

- MR scan of the whole spine should be done and reported within 24 hours.

- Once diagnosis of MSCC is made, the patient should be referred to the MSCC Coordinator Service at The Christie on 0161 446 3658 for advice, triaging and decision regarding management (spinal surgery or radiotherapy)

- Patient's suitable for surgery, whilst waiting for transfer to Salford Royal, must continue to be nursed on supine bed rest (unless the spinal surgeon advises differently).
- If treatment decision is for radiotherapy or for 'best supportive care' only, careful and controlled mobilisation may start as soon as the MR scan has been reported

and stability of the spine discussed by the local team and documented. If spine is considered to be stable, or alternatively if uncertainty remains, careful graded sitting should commence. Unnecessary flat bed rest will be detrimental to the patient therefore this process must commence ASAP. Graded sitting may aid the decision making and if severe pain is experienced and this appears to be mechanical, the spine may be unstable. In this situation appropriate measures to identify and fit spinal orthotic devices should be undertaken prior to further mobilisation, providing this adds quality of life to the patient. Graded sitting should be led by the Physiotherapy team, however, if out of hours, nursing staff or any other members of staff should have the competency to initiate graded sitting providing continued assessment of pain and neurology is undertaken with each progressive movement increase.

- Spinal instability should be considered if there are new neurological signs and symptoms on initial attempts at mobilisation of the patient. Patients with cord compression, who have received radiotherapy, may subsequently develop instability due to tumour progression. All patients with metastatic disease in the spine considered initially stable, need to be educated with respect to the warning signs of progression of instability / cord compression and should be given the patient information leaflet.

- During rehabilitation it is necessary to continue to monitor for signs of spinal instability and potentially return to bed rest and / or request a brace if indicated. In the situation where the spine is considered to be unstable in association with severe pain, and surgery is not indicated, referral to Orthotics or Physiotherapy for a spinal brace may be considered. Mobilisation should be discontinued until the brace is fitted. These decisions will usually be made jointly by the therapy and medical/oncology team with advice from the radiologist and / or orthopaedic / spinal team. **NB - In the palliative stages, careful clinical decision making is vital, and despite spinal instability, quality of life is the priority and careful mobilisation as tolerated may be in the best interest of the patient. This requires sensitive counselling to warn the patient regarding potential unavoidable progressive weakness and maybe even paralysis.**

- Prior to physical assessment and mobilisation, explanation and adequate analgesia should be given. Pain in patients with spinal disease can often be difficult to manage, even when the spine is considered to be stable. In these cases, referral to the Palliative / Supportive Care Team should be done and careful rehabilitation should continue within the comfort limits of the patient.

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***For more information and protocols on management of MSCC see: http://www.christie.nhs.uk/MSCC**

CONSULTATION, APPROVAL & RATIFICATION PROCESS

All documents must be involved in a consultation process either locally within a department or division or throughout the trust at relevant board/committee meetings before being submitted for approval.

VERSION CONTROL SHEET

Version	Date	Author	Status	Comment
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V2	Dec 2010	Vivek Misra Lena Richards	Update Review	Updated document Reviewed content
V3	Nov 2013	Lena Richards Vivek Misra	Update Review	Updated document Reviewed content
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Spinal stability and mobilisation pathway – Manchester Cancer