## Electronic Annex 3c Physical management of people in a disorder of consciousness

#### Aims, scope and definitions

To promote best practice in the use of physical and postural interventions for management of posture and prevention of secondary complications in adults with a disorder of consciousness (DOC).

**Definitions:** The terms 'global' and 'focal' management will be used to define the two broad elements of postural management.

- > **Global:** refers to whole body approaches (eg treatment to maintain posture).
- > Focal: refers to interventions specific to a localised body area (eg a joint).

#### 24-hour posture management

An important part of rehabilitation and long-term care in this group is 24-hour posture management (including positioning in bed and wheelchairs). There is very little published literature on the effective management strategies used in patients in a DOC. The majority of literature discusses issues related to diagnosis, neuropathology or the assessment of low awareness states, but although not well researched, there is a great need to prevent physical deterioration in this group over time.

People in a DOC suffer frequent medical complications secondary to their brain injury and severe physical disability, which can negatively affect health, rehabilitation outcomes and contribute to complications in care.<sup>1</sup> Regular changes in posture have been shown to alter muscle length, redistribute pressure, facilitate the respiratory system, help in improving alertness and orientation as well as providing comfort.<sup>2–4</sup> Immobility and sustained postures will lead to soft tissue shortening which is a major secondary complication with this group of patients.<sup>5</sup>

#### **Contracture management**

Contractures arising through inappropriate positioning can hinder effective seating and provision of care/hygiene needs.<sup>6</sup> This could lead to pain, discomfort and can make personal care difficult.

Once again there is very limited evidence for the effectiveness of conservative management of contractures with stretch interventions.<sup>7, 8</sup> A preventative approach is likely to be more effective than restoring range once a contracture is present. Alternatively, if loss of passive joint range is identified early, it may be possible to reverse initial changes.<sup>9–11</sup> However, consistent with all management in this area of practice, the best interests of the individual should be the primary focus and intervention may not always be indicated.<sup>12</sup>

#### **Prevention of pressure ulcers**

A further serious secondary complication for those in a DOC is pressure ulcer formation associated with prolonged static positioning.<sup>13</sup> These complications are common and are observed in patients admitted to rehabilitation and long-term units. Pressure ulcer occurrence has been reported to occur in 56% of people in a DOC within the first 6 months of brain injury.<sup>1</sup>

### Algorithm

The physical management care algorithm on page 3 provides an overview to consider physical and postural management provision for patients in DOC.

### Physical management for people in a DOC

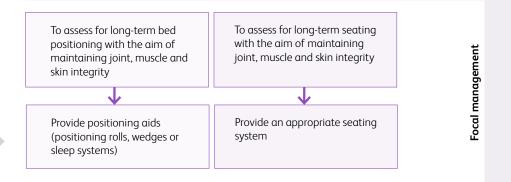
Acute: maintain joint, muscle and skin integrity to enable ongoing positioning in bed and wheelchair

- Record range of movement at key joints (hips, knees, ankles, shoulders, elbows, wrists) and impact on personal care. \*1 or \*2
- > Implement global physical management regime with postural support in sitting and lying. Provide bed positioning and seating guidelines and orthotics instructions to be viewed readily
- > Consider need for focal interventions (eg orthotics or botulinum toxin injection)



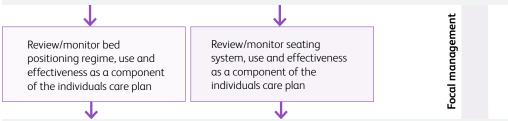
Post-acute: maintain joint, muscle and skin integrity to enable ongoing positioning in bed and wheelchair

- Record range of movement at key joints (hips, knees, ankles, shoulders, elbows, wrists) and impact on personal care. \*1 or \*2 compare to previous measures
- Implement global physical management regime with postural support in sitting and lying. Provide bed positioning and seating guidelines and orthotics instructions to be viewed readily
- > Consider need for focal interventions (eg orthotics or botulinum toxin injection)



Long-term management: translate physical management plan to community or care setting

- Provision of photographic guidelines for optimal position in bed and seating system(s) and focal management such as orthotics
- Monitor range of movement at key joints (hips, knees, ankles, shoulders, elbows, wrists) and impact on personal care \*1 or \*2 compare to previous measures



**Review and monitoring:** To maintain physical management programme for the maintenance of joint, muscle and skin integrity

 Formally review physical management plan (seating and bed positioning) every 3–6 months using comparison to baseline. \*1 or \*2 compare to previous measurescare \*1 or \*2 compare to previous measures

For measurement of ROM, the 'Neutral-0-method' should be ideally be applied,17 to enable consistent communication across services

For \*1 Care (Passive function): Arm activity measure and/or leg activity measure (passive function sub-scales). Range-of-movement (ROM): Rapid deterioration in range of movement at a joint (eq wrist and fingers) such as 10% loss in range within a month14–16

For \*2 Range-of-movement (ROM): Rapid deterioration in range of movement in multiple joints, such as 10% loss in joint ranges within a month. Skin integrity: Occurrence of pressure sores (document location and severity)

# Checklist guidance on physical management for individuals with a disorder of consciousness

To help prevent secondary complications and resultant challenges with care the following monitoring regime is recommended (review in conjunction with the algorithm presented on page 3):

- Establish the physical and postural management needs of individuals through a plan for positioning in lying (bed) and sitting (wheelchair), with regular changes of position (repositioning). The development of the plan should involve (as a minimum) physiotherapist, occupational therapist and nurse.
- > Assessment and provision of the appropriate bed positioning system including skin pressure relief management as needed. Simple bed positioning aids should be considered first, followed by more complex positioning aids dictated by patient need. Appropriate training should be provided on use to family,\* carers and professionals, and should be incorporated into the care plan (eg photographic guidelines).
- Provision of seating system following assessment including provision for pressure relieving cushion to achieve optimum seated position. Appropriate training should be provided on use to family,\* carers and professionals, and should be incorporated into the care-plan (eg photographic guidelines).
- > Sitting tolerance should be gradually increased and carefully monitored to maintain the individual's skin integrity and optimal posture. Sitting tolerance of 6–8 hours is feasible if no issues occur.
- > Community-based assessment: Individuals transferred into community care should be reassessed by a therapist (physiotherapist or occupational therapist) and other relevant professionals within 3 months of their discharge from the hospital setting. This initial assessment should check that the patient remains stable and that the care plan established in the hospital remains appropriate.
- Initial quarterly review: During the first year living in the community, the individual should be reviewed by a therapist at 3-month intervals to help adapt their care plan as they settle into their new home. The frequency of reviews over subsequent years may be reduced provided the person is stable.
- > Annual review and assessment: Individuals who are established in a long-term care environment, who are stable and remain well managed, should receive an annual review of their physical and postural management plan. This should encompass a review of their posture in the wheelchair and bed, re-examination of joint range of movement, repeat assessment through validated outcome measures (ie range of movement at key joints, arm activity measure (ArmA) and leg activity measure (LegA) for passive function/care and a review of their skin care and continence regimes.<sup>14–16</sup>
- Re-referral: Any change in physical or postural status must initiate a referral to the appropriate therapy or nursing team.<sup>12</sup> External referrals to appropriate specialists should be made by the treating/reviewing therapists once a problem is identified, examples could include:
  - referral to a specialist spasticity management service. Systemic, regional (eg intrathecal) and focal (eg botulinum toxin) should be available options
  - a posture management service (specialist in posture and mobility)
  - splinting/orthotic service.

\*Family members should be offered appropriate training and support provided they want to be involved in these aspects of physical care.

#### **Physical Management Guidance Development Group:**

Rasheed Meeran, Stephen Ashford, Teresa Clark, Karen Hoffman, Dave Long, Macarena Montesinos Ruiz, Anand Pandyan, Diane Playford, Helen Gill-Thwaites, Karen Elliott Meetings of the Physical Management Guidance Development Group were supported by Holy Cross Hospital and Brain Injury is BIG in developing materials to guide physical management for those with DOC. These materials have been used to inform the summary provided in this annex.

#### References

- 1 Estraneo A, Loreto V, Masotta O, Pascarella A, Trojano L. Do medical complications impact long-term outcomes in prolonged disorders of consciousness? *Arch Phys Med Rehabil* 2018;99:2523–31.
- 2 Hough A. *Physiotherapy in respiratory care*. London: Chapman & Hall; 2001.
- 3 Morgan C, Cullen G, Stokes M, Swan A. Effects of knee joint angle and tilt table incline on force distribution at the feet and supporting straps. *Clin Rehabil* 2003;17:871–8.
- 4 Wenger P. Early ambulation. *Adv Cardiol* 1982;31:138–41.
- 5 Singer B, Singer K, Alison G. Serial plaster casting to correct equinovarus deformity of the ankle following acquired brain injury in adults. *Disabil Rehabil* 2001;23(18):829–36.
- 6 Edwards S, Charlton P. Splinting and the use of orthoses in the management of patients with neurological disorders. In: Edwards S, editor. *Neurological Physiotherapy*, 2nd edn. London: Churchill Livingstone, 2002;219–53.
- 7 Katalinic O, Harvey L, Herbert R *et al*. Stretch for the treatment and prevention of contractures. *Cochrane Database Syst Rev* 2010;9:(CD007455).
- 8 Prabhu R, Swaminathan N, Harvey L. Passive movements for the treatment and prevention of contractures. *Cochrane Database Syst Rev* 2013;12(CD009331).
- 9 Moseley AM, Hassett LM, Leung J *et al*. Serial casting versus positioning for the treatment of elbow contractures in adults with traumatic brain injury: a randomized controlled trial. *Clin Rehabil* 2008;22(5):406–17.
- 10 Moseley AM, Nicholson D, Riolo L, Wiggs L, Rothstein J. The effect of casting combined with stretching on passive ankle dorsiflexion in adults with traumatic head injuries. Conference... including commentary with author response. *Phys Ther* 1997;77:240–59.
- 11 Moseley AM. The effect of a regimen of casting and prolonged stretching on passive ankle dorsiflexion in traumatic head-injured adults. *Physiother Theory Pract* 1993;9:215–21.

- 12 Royal College of Physicians and British Society of Rehabilitation Medicine. *Rehabilitation following acquired brain injury: national clinical guidelines*. London: RCP and BSRM, 2003.
- 13 Bennett G, Dealey C, Posnett J. The cost of pressure ulcers in the UK. *Age Ageing* 2004;33(3):230–5.
- 14 Ashford S, Slade M, Turner-Stokes L. Conceptualisation and development of the Arm Activity measure (ArmA) for assessment of activity in the hemiparetic arm. *Disabil Rehabil* 2013;35(18):1513–8.
- 15 Ashford S, Slade M, Turner-Stokes L. Initial psychometric evaluation of the Arm Activity Measure (ArmA): a measure of activity in the hemiparetic arm. *Clin Rehabil* 2013;27(8):728–40.
- 16 Ashford S, Jackson D, Mahaffey P, Vanderstay R, Turner-Stokes L. Conceptualisation and development of the Leg Activity Measure (LegA) for patient and carer reported assessment of activity (function) in the paretic leg in people with acquired brain injury. *Physiotherapy Res Int* 2016;10.1002/pri.1660.
- 17 Ryf C, Wymann A. *Range of Motion AO Neutral-0 Method*, 1st edn. Germany: Thieme Stuttgart; 1999.