

Standing Enhances the Behavioural Repertoire of Minimally Conscious and Vegetative State Patients

Developments in medical and surgical care have led to improved survival following injuries that would previously have been fatal, and means that those suffering with severe brain injuries (GCS<8) are more prevalent in our hospitals and rehabilitation units. The use of generally agreed terminology for unresponsive patients will allow study populations to be described more consistently, and their implications to be generalised with more confidence.^{1,2,3} Functional MRI provides physiological evidence to support, or refute, clinical beliefs about patients awareness.^{4,5} Assessments should be repeated regularly, and reports of all those participating in the care of the patient, including family, should be noted. Prognostic decisions should be made by physicians and professionals with experience working in assessment of those with impaired consciousness.¹

Previous descriptions of the assessment and diagnosis of those in vegetative and minimally conscious states can be found in earlier editions of this journal. It is imperative that diagnosis is accurate and secure as this will affect decisions about rehabilitation potential and therefore the level of rehabilitation input. The question of where patients should go for further rehab or long-term care must be considered by the whole team. The importance of therapist input to this process has been recognised but, until recently there has been little evidence of effectiveness of rehabilitation in this patient group.

Early rehabilitation is accepted as having positive effects upon facilitating patient recovery.^{6,7} Active therapy may reduce their stay in the critical care unit and avoid the secondary effects of spasticity and contractures, which will reduce cost of care overall.⁸ Critical care units that have a therapeutic ethos can start observations of patients in low arousal states, and information about timing of emergence from coma has useful prognostic

value. The Glasgow Coma scale is not sensitive enough to detect change within this group, and more specific measures have been developed for this purpose: the Sensory Modality Assessment and Rehabilitation Technique (SMART), the JFK Coma recovery scale and the Wessex Head Injury Matrix (WHIM). In our experience the WHIM is sensitive to subtle behaviour changes and is easy for staff to learn to administer.⁹

Therapists may observe behaviours in response to passive movements as part of respiratory management⁷ or maintaining joint range of movement. Often, rolling a patient is enough to stimulate some eye opening, or other behavioural response previously un-witnessed. This is presumed to be due to activation of the reticular system by patient movement.¹⁰ These passive movements are usually accompanied by verbal or visual stimuli, which may provoke some responses. Positioning of the patient with a neutral and well supported posture will reduce tone and aid comfort,¹¹ but also augments the potential for interaction as active movement is more readily accessible.

Gradually standing patients from horizontal to vertical on a tilt table enhances visual stimuli, stretches calf muscles, and is thought to reduce loss of bone density.^{10,12}

Tilt tabling also offers a number of key benefits to the assessment and therapeutic stimulation of patients with impaired consciousness. Pilot work by Elliott et al¹³ found that standing patients using a tilt table revealed behaviours not observed in the supine position. This effect was significant in both vegetative and minimally conscious patients. However, the behaviours observed in vegetative patients remained reflexive and the act of standing patients did not reveal behaviours suggestive of awareness of self or environment.

We have now documented the outcome of tilt tabling in



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Acknowledgements
This research has been developed with the support of Dr Coleman, Mrs Baker (nee Elliott), Dr Shiel, Professor Wilson and Professor Pickard.



Results: VS Patient Group

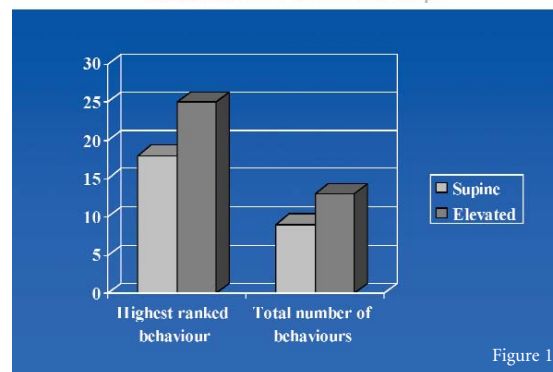


Figure 1

Results: MCS Patient Group

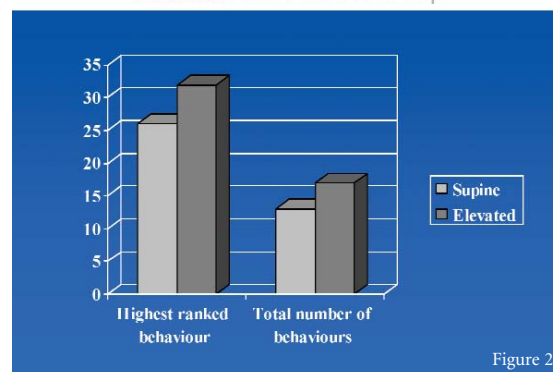


Figure 2

Table 1: Highest ranked behaviours recorded in the supine and standing positions for each patient. Patient classification at the time of recruitment is denoted VS (vegetative state) or MCS (minimally conscious state).

Patient	VS / MCS	Supine highest ranked score	Behaviour observed	Standing highest ranked score	Behaviour observed
1	VS	6	<i>Volitional vocalisation to express feelings</i>	6	<i>As Supine</i>
2	VS	43	<i>Smiles</i>	43	<i>As Supine</i>
3	VS	4	<i>Attention held by dominant stimulus</i>	4	<i>As Supine</i>
4	VS	43	<i>Smiles</i>	43	<i>As Supine</i>
5	VS	5	<i>Looks at person briefly</i>	26	<i>Frowns, grimaces etc. to show dislike</i>
6	VS	7	<i>Eyes open briefly</i>	49	<i>Vocalises to attract attention</i>
7	VS	14	<i>Mechanical vocalisation (yawn, sigh)</i>	26	<i>Frowns, grimaces etc. to show dislike</i>
8	VS	1	<i>Eyes open briefly</i>	1	<i>As Supine</i>
9	VS	14	<i>Mechanical vocalisation (yawn, sigh)</i>	14	<i>As Supine</i>
10	VS	43	<i>Smiles</i>	43	<i>As Supine</i>
11	VS	24	<i>Maintains eye contact over 5 seconds</i>	24	<i>As Supine</i>
12	MCS	57	<i>Names or indicates left and right on self</i>	57	<i>As Supine</i>
13	MCS	13	<i>Looks at person giving attention</i>	16	<i>Turns head/eyes to look when someone is talking</i>
14	MCS	20	<i>Vocalises to express mood or needs</i>	36	<i>Switches gaze from one person to another, spontaneously</i>
15	MCS	26	<i>Frowns, grimaces etc. to show dislike</i>	34	<i>Monosyllabic or single words in response to questions</i>
16	MCS	26	<i>Frowns, grimaces etc. to show dislike</i>	26	<i>As Supine</i>
17	MCS	15	<i>Performs physical movement on verbal request</i>	14	<i>Mechanical vocalisation (yawn, sigh)</i>
18	MCS	18	<i>Tracks for 3-5 seconds</i>	28	<i>Looks at object when requested</i>
19	MCS	8	<i>Makes eye contact</i>	23	<i>Shows selective response to preferred people</i>
20	MCS	42	<i>Can find a specific playing card</i>	43	<i>Smiles</i>
21	MCS	12	<i>from a selection of four Eyes follow person moving in line of vision</i>	24	<i>Maintains eye contact over 5 seconds</i>
22	MCS	26	<i>Frowns, grimaces etc. to show dislike</i>	26	<i>As Supine</i>
23	MCS	52	<i>Uses one or two gestures</i>	52	<i>As Supine</i>
24	MCS	33	<i>Seeks eye contact</i>	43	<i>Smiles</i>

a total of 24 patients (11 VS, 13 MCS, 15 male, average age 44, range 19-71; 11 TBI) in terms of the behaviours observed in the supine and standing position. These results incorporate the 12 patients in Elliott et al, 2005. Patients were assessed whilst lying in bed, during a 20-minute stand in a tilt-table at 85°, and again whilst lying in bed. The patient's behaviour was assessed using the WHIM.⁹ These observations were repeated over a one-week period, at 6 & 12 months post ictus, and the median highest ranked behaviour and median total number of behaviours observed, were recorded (Table 1).

Eleven patients (3 VS and 8 MCS) showed greater highest ranked behaviours (p=0.004) and total number of behaviours (p=0.001) in the standing position (Figures 1 and 2). Twelve patients (8 vegetative and 4 minimally conscious) showed no change and one minimally conscious patient showed a one point decrease in the highest ranked behaviour in standing. Although WHIM scores in 3 vegetative patients increased during standing, the behaviours observed did not reach a level suggesting awareness of self and/or environment. WHIM scores in the second supine period were the

same or lower than in the first.

This study demonstrates that simple interventions can enhance behavioural repertoires in some low awareness patients, and that consistent use of the WHIM can help identify changes over short periods of time. Making all nurses, therapists and staff aware of the sorts of behaviours to look out for, using the WHIM definitions, is a simple way of educating people and raising interest in the active management of this group of patients.

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