NHS
Purchasing and Supply Agency

Centre for Evidence-based Purchasing

Buyers' guide

Night time postural management equipment for children

CEP 08030

June 2009

Informing procurement - Encouraging innovation

Contents

Introduction

General

Specialist equipment is regularly used by children with neurological impairment as part of a postural management programme. Postural management devices are designed to support an individual in a symmetrical position when sitting, standing or lying. The devices have a number of objectives including:

- the improvement of function, communication and cognitive skills
- enhanced participation within the environment
- maximising comfort
- helping to reduce muscle contractures and joint problems such as subluxation (partial dislocation) or dislocation.

There have been significant advances in postural care for children over the last decade, not only with improved seating and standing equipment but with the availability of innovative night time postural management equipment (NTPME) to control the lying posture. This equipment, sometimes referred to as 'sleep systems', aims to keep the body in a symmetrical posture, prevent or delay the development of contractures, and ultimately avoid the need for corrective surgery.

Night time postural management equipment

At the time of publication, there are six commercially available systems which provide night time postural management for children. The definition of NTPME in this guide is a postural support system which may contain one or more component parts that are held in position by a base layer or sheet. Other forms of positioning support, such as wedges, cushions/pillows and rolls, may also be used to provide the support required to position a child in bed. They have been excluded from this guide as they are not linked together by a base layer. Whilst the NTPME systems are intended to have the same therapeutic aims, there are feature variations across the product range which might impact on both effectiveness and acceptability. Each child who might benefit from such equipment will have unique and often complex needs. This guide aims to inform those considering the use of NTPME and to assist them in matching user needs with specific system characteristics.

24 hour postural management

Children spend approximately one third of their time in bed [1], therefore equipment which supports a symmetrical lying position is an integral part of 24 hour postural management programmes. Such programmes include day and night time postural management, which may consist of a combination of seating, standing, orthoses, therapy and exercise. NTPME provides the opportunity for support over an extended

period of time when the body is less influenced by muscle tone, making it more susceptible to corrective forces [2]. Day time intervention is likely to be less successful if the child is left to adopt poor, asymmetrical postures during the hours spent in bed. Positioning at night should be both neutral (mid range position) and symmetrical to help prevent the development of muscle length imbalances. This is crucial to the reduction of spasticity and consequent deformity [3]. Night time postural management systems can provide periods of passive stretching in excess of 6 hours duration, which is widely accepted as being necessary to maintain muscle extensibility (length) [4].

The wider consequences of poor postural management impact on the quality of life of the child (and their carers) and may affect many body systems and functions, for example:

- the musculoskeletal system (contractures, loss of joint integrity e.g. hip dislocation, decreased bone density, reduced range of joint motion and deformity e.g. spinal scoliosis)
- the neurological system (spasticity/muscle tone, primitive reflexes, altered sensation and joint position sense, pain, weakness)
- respiratory function
- digestion (including swallowing and choking, both of which are compromised by poor head to neck posture) and kidney/renal function
- personal hygiene, ease of toileting and changing
- functional ability (e.g. weight bearing, transfer and hand function)
- environment interaction (sensory perception, body aesthetics, learning, communication)
- sleep pattern and irritability.

Cerebral palsy hip subluxation

Reducing or preventing hip subluxation is particularly important for children with bilateral cerebral palsy (CP), as those children who are not walking independently at 5 years of age have a 30-60% risk of developing hip subluxation [5, 6]. Once the hip is over 50% subluxated, progress to hip dislocation is rapid [7]. The risk of hip displacement is reported to be directly related to gross motor function, with those children with the lowest level of functional ability having the greatest risk of hip displacement [8].

Asymmetrical muscle activity around the pelvis (most often adductor or inner thigh muscle spasticity), combined with a lack of load bearing, disrupts the femoral head contact with the hip acetabulum, which may lead to hip subluxation and in some cases dislocation. The lack of joint integrity causes pain, hygiene problems, further

positioning difficulties and reduction in functional capacity of the child, and may require surgical correction. Conservative (non-operative) management of the problem to fully prevent hip subluxation or dislocation has not yet been achieved [9-11].

Bony changes in the acetabulum and the femoral head associated with subluxation have been documented in children with bilateral CP, who showed significant bony changes on X-rays at 18 months and 30 months, and clear differences from normally developing infants. From these data, a prediction of hip status at 5 years can be made [6]. The rate of hip migration helps determine the risk of subluxation or dislocation and correlates with the later inability to walk [12]. Soft tissue and bony surgery have been the traditional treatment approaches for hip subluxation, with some recommending early preventive soft tissue surgery to reduce levels of reconstructive surgery at a later date [13].

More recently, conservative approaches have been introduced to try to reduce the risk of hip subluxation, including botulinum toxin injections and 24 hour postural management programmes. Positive outcomes [14], including reduced hip subluxation, have been reported in children who adopt a 24 hour approach to postural management, when support is provided in all three positions (standing, sitting and lying) [11].

Other pathologies

In addition to hip subluxation and dislocation problems for children with bilateral CP, NTPME may be utilised to help prevent other joint contractures and the development of asymmetrical deformity elsewhere in the body. For example, spinal scoliosis which may compromise respiratory and cardiac function, can require postural management for the trunk to help control spinal rotation. Knee and ankle contractures which alter ability to bear and transfer weight may also be reduced with postural management of the lower limbs. For some children the primary reason for provision of NTPME is to reduce sleep disturbance. The complexity of sleep disturbance among children with neurological impairments is well recognised [14], as is the impact of sleep disturbance on the family unit. Disorders of initiation and maintenance of sleep are more frequent in children with spastic quadriplegia, with both medical and environmental factors contributing to increased frequency of chronic sleep disorders in these children [15].

Precautions

Consideration should be given to medical conditions which may restrict positioning of a child using NTPME, for example nocturnal seizures, opisthotonus, vomiting, aspiration, breathing problems, or swallowing difficulties. Where reflux is a problem, the bed may need to be tilted, but kept as low as possible to prevent the child slipping down the bed.

Published studies on night time postural management equipment

A small study which investigated the efficacy of one product (Jenx Dreama) supported the use of lying postural management equipment [14]. Outcome measures included a hip migration index, parental questionnaire and a sleep chart. The authors reported an overall improvement in the rate of hip migration at the right hip, but the left hip showed non-significant changes. Average sleep time increased but not significantly, and the results from a parental questionnaire showed there were significant improvements for seating and sleeping, ease of hip abduction for washing (personal care) and pain reduction.

Positive feedback has been reported from children and their families who used a second device (Helping Hand Symmetrisleep) [2]. Feedback was by interview and was supportive of the use of NTPME. The authors acknowledged the need for a large degree of commitment when providing a night time postural management service, including efficient equipment provision, training and parental support. Appropriate support by the therapist and adequate training was reported to influence the degree of compliance. In addition, user feedback is also reported in a product focus document for the Moonlite system, common themes being improved quality of sleep, less requirement for repositioning, reduced pain and improved pressure relief [16].

Pountney et al conducted a retrospective study of postural management and hip deformity using another system (Chailey Lying Support) [11]. Children using a 24 hour postural management approach (support provided in lying, sitting and standing) before hip subluxation occurred, maintained significantly more hip integrity than those who only used lying/sitting or sitting/standing support or those who only used seated support and/or other postural support. The authors concluded that postural management interventions have an important role in the prevention of hip subluxation.

Overall, the evidence for 24 hour postural management programmes is limited and further long term research is needed [17].

National guidance

The Mac Keith postural management consensus statement [18] specifies that whilst the nature of any postural intervention is dependent on individual circumstances, a child's level of function may be used as a guide for the provision of equipment. The authors refer to the Gross Motor Function Classification System (GMFCS) [19], a five level ranking tool which classifies the motor involvement of children on the basis of their functional ability, and recommend that children in GMFCS groups IV-V (the two lower functional ability levels) should start 24 hour postural management programmes in lying as soon as appropriate after birth, in sitting from 6 months, and in standing from 12 months.

The Mac Keith Consensus Panel advises that close surveillance should be undertaken to detect the development of postural or positional deformity of soft tissues and bony structures. The panel recommends that all children who are unable to walk more than 10 steps by the age of 30 months should have a hip X-ray to measure the migration percentage of each hip (the extent of hip subluxation). If the hip migration is more than 14% at 30 months, then postural management at night and on-going radiological monitoring are recommended. Hip X-ray should be repeated every 6-12 months until the age of 7 years, or when deformity is unlikely. For all children in GMFCS groups IV and V unable to stand by the age of 5 years, spinal X -rays should be carried out at 5 years, and 10 years as a minimum requirement.

In 2004, a group of paediatric chartered physiotherapists and children's occupational therapists across the North West of England developed "Guidelines for the Provision of Night Time Postural Management Equipment" [20]. Members of this group felt that recommendations would only be effective if the posture of the children with neurological impairments was managed on a 24 hour basis. The group has subsequently produced a further document 'Good Practice Guidelines to 24 hour Postural Management 2008' [21] which is a consensus of 'good practice' in the provision of 24 hour postural management. Further assessment tools are documented within this guidance. The Chailey Levels of Ability [22], a ranking tool for levels of functional ability, used to identify children who are at risk of developing hip dislocation and / or spinal curvature, is included. Validity has been established for this tool [23]. Those achieving Chailey Levels of Ability of less than 2 in sitting are recommended for 24 hour postural management [24].

Scope

CEP buyers' guides are intended to inform the procurement process. They are not a substitute for fundamental clinical research. This buyer's guide provides information on six commercially available NTPME systems. See Table 18 for the specification details of the systems evaluated.

Stakeholder opinions have been sought from both a national survey and by participation in heuristic ergonomic trials. Full local and multi-centre ethical approval was obtained from the National Research Ethics Service (NRES) in order to conduct these aspects of the work. The ergonomic trials evaluated each system's usability, set-up, and adjustability. Both sets of results are reported in the operational considerations section. We had intended to seek feedback also from parents and carers, but recruitment rates were too low to provide valid data. Details on the project approach are available from the authors on request.

The economic considerations section includes funding issues and training requirements, whilst sustainability information and market preferences are discussed in the purchasing section. The final market review section summarises the key features of the six commercially available NTPME systems and provides an indication of costs and manufacturers' warranty periods.

Table 1 outlines the technical considerations which might influence the selection of NTPME.

Table 1. Technical considerations for NTPME

ISO / British / European Standards	▪ All systems must comply with the Medical Devices Regulations 2002 [25]. ▪ Mattresses, cushions, pads and foams should meet applicable European standards (eg BS7176 [26], BS7177 [27], BS6807 [28], BS5852 [29], BS EN597-1 [30], BS EN597-2 [31]).
Labelling	▪ All parts of the system should have the following permanently and prominently affixed: ○ CE mark according to the appropriate class from MDD 93/42 EEC [32] ○ name of the manufacturer (and/or supplier if different); ○ serial/batch number ○ year of manufacture ○ safe working load.
Flame retardancy	▪ Foam should be “combustion modified high resilience” Flame Retardancy Ignition Source 5 (BS5852) [33]. ▪ Covers should meet Flame Retardancy Ignition Source 5 (BS5852) [33]. ▪ For supply to the NHS all products must comply with the NHS Firecode Document HTM 87 [34]. This requires compliance with BS 7177 [27] – the specification for resistance to ignition of mattresses, divans and bed bases.
Mattresses	▪ Covers should be vapour permeable and should not contain latex. ▪ Minimum and maximum patient weight should be clearly specified. ▪ Life expectancy of the product should be stated.
Cushions	▪ There should be a clear indication of ‘life cycles’ or number of advisable ‘cleaning cycles’. ▪ Foam should be minimum class S with V being preferred (BS3379) [35].

Operational considerations

In matching the child's needs with the most appropriate NTPME system, purchasers should take into account the key operational considerations listed in Table 2.

Table 2. Key operational considerations for the use of NTPME

Key considerations	Description
Child and carer needs	Assessment of need is usually an inter-disciplinary or inter-agency team process. The carer should be fully involved in this process. Full written parent/carer consent must be obtained. Consider concurrent treatments and their inter-relationship with night time postural management. There will be training needs for the carer both prior to prescription and afterwards to ensure compliance.
Spatial constraints	Access to and egress from the bedroom should be considered, particularly if the system is to be transported regularly (e.g. respite care). Storage space can be an issue for the combination of night time and day time equipment.
Child's functional level	Use validated assessment tools to gauge need and monitor outcomes [6] [22] [36] [37] [38] [39] [40].
Manual handling and transportability	Manual handling risk assessments should be completed and documented. Interaction with hoists or other manual handling aids might be required. Transportation may include specific insurance risks. Consider loading and unloading the system from a vehicle and securing the system within the vehicle. There will be training needs for carers in line with manual handling risk assessment and the training should be documented.
Adjustability and ease of use	The system should accommodate the child's growth, and changing requirements over time for support, comfort, ease of positioning and re-positioning during the night. Some children require a profiling bed for medical reasons.
Aesthetics	Important for child, siblings, family and friends and may influence acceptance.
Issue and re-issue	A copy of the user guide must be supplied with instructions for use and maintenance. When re-issued, these instructions should be passed to the new user and documented. Cleaning and infection control measures are essential. Records need to be kept of the name of the prescribing therapist and the service/maintenance checks.
Maintenance	Check the manufacturer's instructions. Establish frequency of checks and who should perform them. Those involved need to be appropriately trained. Maintenance checks and repairs should be documented. Instructions for Integrated Community Equipment Stores (ICES) staff are available from some manufacturers.

Key considerations	Description
Safety	Check for relevant MHRA medical devices alerts. Consider any medical contraindications for use of NTPME. Refer to local medical devices management group for guidance. Ensure policy complies with MHRA guidance on managing medical devices [41].
Training and support	Training and support for carers can be substantial, but is vital to ensure effective use of equipment and compliance. Training is available from manufacturers (Table 15). Consider who requires training (parent/carer/therapists/ICES staff etc), and/or updates/refresher training. Prescribing therapist needs to be knowledgeable regarding assessment of child's needs, system limitations, and contraindications. Familiarity is required with the system for reporting adverse incidents to the MHRA, and with local policies and procedures. Procedures should be established to ensure that updates to manufacturers' instructions are disseminated to therapists and carers.
Funding	Local policies will apply for foundation, acute and primary care trusts, and social services, e.g. continuing care. Funding may be obtained from educational sources, local education authorities or individual schools. Charitable funding and self-funding by carers are also possibilities. Equipment may be available through ICES.
Cleaning/infection control	Cleaning instructions should be provided and any requirement for specific cleaning products stated. Consider materials used in construction, ease of removal for washing, and likely disturbance to child's sleep. Pads and covers should also be made water impermeable where continence is an issue. Antimicrobial coverings which are reported to kill MRSA bacteria are available. Understand the requirements and implications for maintenance, decontamination and re-issue, in line with manufacturer and relevant local policies. All products must comply with national infection control guidelines [42].
Thermal regulation	Some children benefit from the retention of warmth, others find the cocooning effect of the positional support causes overheating, and perspiration can be a problem. Many children with complex needs cannot regulate their own body temperature effectively, and cannot always rearrange bedclothes during the night to maintain a constant temperature. Adjustments to the weight of bed clothes, bed coverings and room temperature may be necessary. Most manufacturers recommend the use of sheepskin panels, overlays or materials which trap a layer of air around the child, allowing perspiration to evaporate. Gel pads or gel cooling sheets are also recommended by some manufacturers to aid thermal comfort.

National stakeholder survey

A national survey of key stakeholders (members of the Association of Paediatric Chartered Physiotherapists) was conducted by postal questionnaire to identify the key prescribing issues and limitations of NTPME (n =1900, response rate 448 = 24%). The survey data provides insight into prescription patterns at the time (Oct 05-Feb 06), therapist experiences, and the key reasons for non-use.

66% of therapists used at least one NTPME system within their caseload, and they were generally very positive about their effectiveness (Table 3).

Overall, there were 54% of survey respondents with at least one child in their caseload that would benefit from a system but currently did not have access. Reasons given for non-access were:

- parents/carers did not want to use the equipment (55%)
- therapists/parents/carers were unable to obtain funding for the equipment (48%)
- parents/carers found the systems too difficult to use (40%)
- the available systems did not meet the child's needs (13%).

The primary reason for poor uptake of the equipment was parent/carer rejection. Respondents with experience of using the systems were more likely to report that the systems were too difficult for parents/carers than those respondents who had no experience of using the systems (yet were aware of the systems through demonstrations). Respondents commented that poor parental/carer uptake was often due to a reluctance to alter the child's sleep pattern, concerns about the child's comfort in the system, the lack of immediate tangible benefit, and worries about further postural control in addition to daytime postural management. The aesthetics influenced the willingness to use NTPME systems, with concerns over the 'off-putting' appearance of some of the systems.

The second most commonly cited reason why NTPME systems were not in use, despite therapists assessing a need, was funding; this issue is explored further within the economic considerations section.

The third most common reason given for non-use, despite a therapist assessing a need, was that parents/carers found the systems too difficult to use. This finding highlights the importance of carer support and training in achieving compliance. Qualitative comments showed there was concern over portability for most systems. Weight and bulkiness meant that transportation for respite care, or when visiting relatives, could be problematic and these difficulties influenced acceptance.

The survey asked respondents to rank (Likert scale) their answers to ten key questions about the five NTPME systems available at the time of the survey. The results are summarised in Table 3.

Table 3. Results of national stakeholder survey

% of respondents answering strongly agree/agree	Chailey Lying Support (n=178)	Dreama (n=159)	Moonlite (n=21)	Snoooooze (n=11)	Symmetrisleep (n=290)
This equipment generally provides effective support	89	88	80	82	93
This equipment is generally easy to set up & adjust	75	65	57	82	84
This equipment can be adjusted sufficiently to provide a comfortable position	57	83	62	91	91
This equipment can easily be used by parents/carers	67	63	75	55	73
This equipment enables a consistent position to be achieved by a child at night	83	81	80	64	80
This equipment is generally easy to position on a bed	72	65	80	82	86
This equipment is easy to transport	27	20	40	55	56
I can easily access this equipment to facilitate assessment of suitability prior to purchase	58	77	89	73	78
Manufacturers offer adequate training for therapists, parents & carers to ensure effective use of equipment	63	55	61	45	75
Suppliers offer adequate literature & instructions to support continued effective use of equipment	53	47	44	36	61

NB: Leckey Sleepform not released to market at the time of this survey

Overall, 67% of physiotherapists treating children who would benefit from a system, but did not have access, stated that parents/carers found the equipment too difficult and/or did not wish to use it. The survey outcomes clearly identified that ergonomic issues were a significant barrier to night time postural management system acceptance by parent/carers. The results informed the design of a subsequent heuristic ergonomic evaluation.

Heuristic ergonomics evaluation

The heuristic evaluation (a study using experienced individuals as a proxy for extensive user testing) involved the ergonomics assessment of all NTPME systems by a number of expert therapists. Whilst their shared knowledge allows each of them to identify common problems, their individual experience and expectations permit the identification of less common problems. Six NTPME systems were evaluated in a randomised order by six therapists. Since the survey was conducted (Oct 05-Feb 06), a further system has been added to the market (Sleepform James Leckey Design) and the Jenx Dreama has been amended with changes to the aluminium base and mattresses (Dreama 2).

For each system, the therapist was required to undertake four tasks, positioning two biofidelic mannequins on the bed, representing children of 3-4 years and 8-9 years of age. The task was to adjust the postural management system to provide symmetrical support in two positions for each mannequin (Table 4).

Table 4. Postural positions of biofidelic mannequins

Position	Biofidelic mannequin 3-4 yrs	Biofidelic mannequin 8-9 yrs
Side lying	✓	✓
Supine with 30º hip abduction	✓	✓

A written usability questionnaire was completed by each therapist upon completion of each positioning task. A further questionnaire was completed at the end of the assessment of each NTPME system. The written questionnaires required the therapist to provide subjective responses to a number of questions on a rating scale.

Results from heuristic evaluation

The heuristic evaluation data are presented as follows:

- usability of each system for side-lying position
- usability of each system for supine position with 30° bilateral hip abduction
- overall usability of each system.

Side-lying position

Each system was evaluated for ease of positioning patients in a side-lying posture and the acceptability of the adjustability provided for each body region. It should be noted that the Chailey Lying Support system could not be evaluated in this mode since is not intended to provide this facility. The data are broken down into ratings for performance variables (Table 5), and ratings for adjustability variables (Table 6).

Table 5. Rating of systems for side-lying performance

Rating variable	Dreama 2	Moonlite	Sleepform	Snoooooze	Symmetrisleep
System set-up	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★★
Adjusting the system for a side-lying position	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆
Positioning the child's lower limbs	★★★★☆	★★★★☆	★★★☆☆	★★★★☆	★★★★☆
Positioning the child so that the hips are level	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆
Positioning the child so that the spine is straight	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆
Positioning the child so that the knees are flexed	★★★☆☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆
Total score (%)	77%	63%	60%	80%	83%

★☆☆☆☆ = Very difficult ★★★★★ = Very easy

NB: Chailey Lying Support system cannot be configured into a side-lying position

The adjustability variables were assessed in two ways. Each therapist evaluated the adjustability of each system by body region, and recorded a score on a Likert scale. Each therapist then provided a score for the importance of adjustability for that body region in order to identify the critical design areas. The importance values were combined to generate a weighting factor that could be applied to all systems. Table 6 shows the weighting factors generated. Table 7 shows the weight-adjusted scores.

Table 6. Weighting factors for importance of side-lying adjustability for each body region

Body region	Weighting factor for importance
Head	★★★★★ (5)
Shoulders	★★★★☆ (4)
Elbows	★★★☆☆ (3)
Wrists	★★★☆☆ (3)
Trunk	★★★★★ (5)
Hips	★★★★★ (5)
Knees	★★★★☆ (4)
Ankles	★★★★☆ (4)

Table 7. Weighted rating of systems for side-lying adjustability

Body region	Dreama 2	Moonlite	Sleepform	Snoooooze	Symmetrisleep
Head	★★★★☆	★★★☆☆	★★★★☆	★★★★★	★★★★☆
Shoulders	★★★☆☆	★★☆☆☆	★★☆☆☆	★★★☆☆	★★★☆☆
Elbows	★☆☆☆☆	★☆☆☆☆	★☆☆☆☆	★★☆☆☆	★☆☆☆☆
Wrists	★☆☆☆☆	★☆☆☆☆	★☆☆☆☆	★★☆☆☆	★☆☆☆☆
Trunk	★★★★★	★★★★☆	★★★☆☆	★★★★☆	★★★★★
Hips	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★★
Knees	★★★☆☆	★★★☆☆	★★☆☆☆	★★★☆☆	★★★☆☆
Ankles	★★☆☆☆	★☆☆☆☆	★☆☆☆☆	★★☆☆☆	★☆☆☆☆
Total weighted score (%)	58%	45%	43%	63%	58%

★☆☆☆☆ = Very difficult ★★★★★ = Very easy

NB: Chailey Lying Support system cannot be configured into a side-lying position

Supine with 30° hip abduction data

Each system was also evaluated for ease of positioning patients in a supine posture featuring 30° bilateral hip abduction and the adjustability for each body region. The data match those for the side-lying evaluation in that they are again broken down into ratings for performance variables and adjustability variables. Table 8 shows the results of the performance evaluation.

Table 8. Rating of systems for supine position with 30° hip abduction performance

Rating variable	Chailey Lying Support	Dreama 2	Moonlite	Sleepform	Snoooooze	Symmetrisleep
Approach to setting up the system	★★★☆☆	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★★
Adjusting the system for a supine position with 30° abduction	★★★☆☆	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★★
Positioning the child's lower limbs	★★★☆☆	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆
Positioning the child so that the hips are level	★★★★☆	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆
Positioning the child so that the spine is straight	★★★★☆	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆
Positioning the child so that the knees are flexed	★★★★☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★★★	★★★★☆
Total score (%)	70%	77%	60%	60%	83%	87%

★☆☆☆☆ = Very difficult ★★★★★ = Very easy

Table 9 provides the weighting factors that were used to correct for the importance of each body region in evaluating the adjustability of the systems in this configuration. Table 10 presents the weighted adjustability data.

Table 9. Weighting factors for importance of supine position with 30° hip abduction adjustability for each body region

Body region	Weighting factor for importance
Head	★★★★★ (5)
Shoulders	★★★★☆ (4)
Elbows	★★★☆☆ (3)
Wrists	★★★☆☆ (3)
Trunk	★★★★★ (5)
Hips	★★★★★ (5)
Knees	★★★★☆ (4)
Ankles	★★★☆☆ (3)

Table 10. Weighted rating of systems for supine position with 30° hip abduction adjustability

Body region	Chailey Lying Support	Dreama 2	Moonlite	Sleepform	Snoooooze	Symmetrisleep
Head	★★★☆☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★★	★★★★☆
Shoulders	★★☆☆☆	★★☆☆☆	★★☆☆☆	★★★☆☆	★★★☆☆	★★★☆☆
Elbows	★☆☆☆☆	★☆☆☆☆	★☆☆☆☆	★☆☆☆☆	★★☆☆☆	★★☆☆☆
Wrists	★☆☆☆☆	★☆☆☆☆	★☆☆☆☆	★☆☆☆☆	★★☆☆☆	★☆☆☆☆
Trunk	★★★☆☆	★★★★☆	★★★★☆	★★★☆☆	★★★★★	★★★★☆
Hips	★★★★☆	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆
Knees	★★☆☆☆	★★☆☆☆	★★☆☆☆	★★☆☆☆	★★★☆☆	★★★☆☆
Ankles	★☆☆☆☆	★☆☆☆☆	★☆☆☆☆	★☆☆☆☆	★★☆☆☆	★★☆☆☆
Total weighted score (%)	43%	45%	43%	45%	65%	58%

★☆☆☆☆ = Very difficult ★★★★★ = Very easy

Overall ratings

The therapists' rated the overall usability (table 11) and overall performance (table 12) of each system at the end of each system evaluation. The findings are presented using a simple three point scale.

Table 11. Overall usability rating

Satisfaction variable	Chailey Lying Support	Dreama 2	Moonlite	Sleepform	Snoooooze	Symmetrisleep
Safety of the child	★☆	★☆	★★	★☆	★☆	★★
Ease of use by carer	★☆	★☆	☆☆	☆☆	★☆	★☆
Upper body adjustability	★☆	★☆	★☆	★☆	★☆	★★
Hip adjustability	★☆	★★	★☆	☆☆	★☆	★★
Lower limb adjustability	☆☆	★☆	☆☆	☆☆	★★	★★
Total score (%)	40%	60%	40%	20%	60%	90%

☆☆ = Dissatisfied ★☆ = Satisfied ★★ = Very satisfied

Table 12. Overall performance rating

Performance variable	Chailey Lying Support	Dreama 2	Moonlite	Sleepform	Snoooooze	Symmetrisleep
I would recommend to colleagues	★☆	★★	★☆	★☆	★★	★★
I would recommend to patients	☆☆	★☆	★☆	★☆	★★	★★
The system is easy to use	★☆	★★	★☆	★☆	★☆	★★
The system is effective in use	★☆	★★	★☆	★☆	★☆	★★
The system is easy to learn to use	★★	★★	★☆	★☆	★★	★★
The system is easy to adjust	★☆	★★	★☆	★☆	★★	★★
Total score (%)	50%	92%	50%	50%	83%	100%

☆☆ = Disagree ★☆ = Neutral ★★ = Agree

Expert evaluation

In addition to the heuristic assessment, a separate expert evaluation of the systems was undertaken on key design elements which may impact effectiveness and user satisfaction. This covered:

- assessment of risks from the weight of each system
- assessment of the quality of written user instructions that accompany each system
- assessment of the manufacturer support available with each system.

When considering the weight-related risk, a maximum mass of 25kg was deemed acceptable, in line with that recommended by the Health and Safety Executive (HSE) [43] for lifting near to the body by male individuals. Any system in excess of this mass is likely to require more than one individual to lift it safely. Systems below this weight were banded on the basis of lifting guidelines for males and females. It is important to note that these bandings represent a best case scenario. In practice the values can be reduced by 20% or more if the action required involves stretching or twisting, both of which are likely given the size of the NTPME. However, this point is not laboured as it is anticipated that health workers would be aware of the necessity to adopt appropriate strategies when presented with heavy lifting tasks, and in some settings lifting equipment, hoists or additional help may be available.

The weight of each system used in the evaluation represents the combined weight of all the components supplied by the manufacturer for the heuristic appraisal. However, it should be noted, that when systems are used within a clinical setting, all components may not be utilised and thus the total weight may be less. These systems were intended for users aged 3 to 8 years and primarily for use in conjunction with a single bed. The Chailey Lying Support was notable for being available in many sizes. The 'junior system' was provided by the manufacturer (to accommodate the 8 year old mannequin) and the weight of this system used for the evaluation. The results are shown in Figure 1.

Figure 1. Rating of weight-related risk

Weight band	Chailey Lying Support	Dreama 2	Moonlite	Sleepform	Snoooooze	Symmetrisleep
Under 7kg						
7 - 10kg						
11 - 15kg	11kg(i)			11kg		
16 - 25kg					25kg(ii)	17kg
26kg plus		42kg	31kg			

(i) Junior system
(ii) Weight of all adult & paediatric components

Key: Low risk | Medium risk | High risk

Instructions for use were divided into those for the end user (the carer) and those intended for the therapist. The presence of one or both of these resources was recorded, and the quality of the carer's instructions for use appraised by a qualified ergonomist with expertise in instructions, warnings and labelling. The appraisal was undertaken by comparing the features of the written instructions with a set of best practice guidelines for the main elements of good instruction practice [44]. The results are shown in Table 13.

Table 13. Rating of written instructions supplied with systems, determined by expert appraisal

Written instructions	Chailey Lying Support	Dreama 2	Moonlite	Sleepform	Snoooooze	Symmetrisleep
For carer	✓	✓	×	✓	✓	✓
For therapist	✓	✓	✓	✓	✓	✓
Instruction DVD for carer	×	×	×	✓	✓	✓
Quality of written instructions for carers	★★★★★	★★★★☆	n/a(i)	★★★☆☆	★★☆☆☆	★★★☆☆
★☆☆☆☆ = Poor ★★★★★ = Excellent						

(i) No written instructions provided for carers

The final assessment relates to the manufacturer support which is available to users. This covers additional material available on request as well as support provided through help lines, demonstrations and other media. The results are shown by category in Table 14.

Table 14. Manufacturer support available to users

Manufacturer support feature	Chailey Lying Support	Dreama 2	Moonlite	Sleepform	Snoooooze	Symmetrisleep
Demonstration for carer	✓	✓	✓	✓	✓	✓
Demonstration for therapist	✓	✓	✓	✓	✓	✓
On-site installation/handover	✓	✓	✓	✓	✓	✓
Case history support	✓	✓	✓	✓	×	✓
DVD/CD information resources	✓	×	✓	✓	✓	✓
Phone support	✓	✓	✓	✓	✓	✓
Supporting technical data	✓	✓	✓	✓	✓	✓

Prevention of surgical procedures

Children with CP who do not walk before the age of 5 years have a 58% incidence of hip dislocation (44% bilateral, 14% unilateral) [6]. Once subluxation occurs it can be difficult to treat, often requiring surgery. Surgical intervention can be costly, and traumatic for the children and their families. Preventive strategies such as 24 hour postural management and botulinum toxin offer less invasive approaches to the management of hip subluxation but still required long term evaluation [17].

Funding

There is no consistency of funding provision for NTPME throughout the UK. The main funding streams identified are:

- foundation and acute hospital trusts (various budget streams)
- primary care trusts
- education budget (local education authority or individual schools)
- charitable funding sources
- ICES
- continuing care/social services
- self funding by parents/carers/relatives.

Some stakeholders highlighted further difficulties; whilst local acute trust policies may be written and recommendations for equipment made, the primary care trust may hold the budget for equipment used in the community. This has the potential to create some issues for securing funding.

Securing initial funding for the purchase of the equipment itself can be an issue. Stakeholders report this to be a very time consuming process and the lack of robust clinical efficacy data can make the justification for funding problematic. This issue is supported by the national survey results which showed that the second most commonly cited reason (48%) why systems were not in use for children with a need (despite therapist recommendation), was inability to secure funding.

Training and therapist time

In addition to the purchase price, other on-going costs need to be considered. These include:

- therapist training time
  - therapist time for setting up equipment and monitoring progress
  - adequate training and support for parents/carers both before and after equipment installation
  - cost of maintenance checks, repairs, cleaning, infection control.

The national survey results highlighted that training is crucial for increasing acceptance of the equipment by parents and carers. Goldsmith indicates that, *'the users' understanding of the principles of postural management is only as good as the training and support they receive from therapy services'* [2].

The Mac Keith consensus statement concludes that training is needed to enable the active understanding and involvement of all those directly involved with the child, including professionals, parents, wheelchair services, education and respite carers [36].

Table 15 provides an overview of the type of training provided by each manufacturer. Some training is provided free of charge; individual manufacturers will provide further details on the range and cost of training available. All systems included in this report are available for trial purposes for a minimum of one week duration.

Table 15. Type of training provided per NTPME system, as stated by each manufacturer

Training type	
Chailey Lying Support	Formal 2 day courses of informal training for specific requirements.
Dreama 2	One day product training for therapists.
Moonlite	Detailed training by regional representative includes demonstration, installation and on-going support.
Sleepform	Product advisors demonstrate equipment for therapists and carers. Demonstration and set up DVD and video available.
Snoooooze	Workshops, forums, on site demonstrations and lectures.
Symmetrisleep	One to one training. One day courses, family workshops.

Abandonment of equipment

Abandonment of equipment has a large negative economic impact. Verza summarises key factors associated with abandonment of assistive technology, including lack of consideration of user and carer opinion in equipment selection, poor device performance, change in the needs of the user, lack of training, and inappropriateness of the equipment [45]. Operational difficulties, appearance, and social acceptability are all factors which have previously been associated with dissatisfaction and abandonment of similar devices [46].

Equipment acceptability and full utilisation are key to preventing wasted resources, and any equipment issued needs to integrate with the lifestyle of the child and the child's family/carers [47]. A more recent publication identifies the need to provide a high quality service which is specific to the child and family with greater emphasis being placed on what children, young people and their parents receive [48].

Pope recommends that to avoid abandonment of NTPME for people with multiple sclerosis, a full/comprehensive assessment should be carried out before purchasing equipment. She suggests it may be preferable to try simple, less restrictive means before more sophisticated systems are used; if a simple means of night time support is not acceptable to the patient then it is unlikely a more sophisticated one will be. Despite the simplicity of the equipment used, training in its use (as opposed to demonstration), with ongoing support and encouragement, is critical to its effectiveness [49].

The Audit Commission report 'Fully Equipped' states that prevention is always better than cure and investment in equipment services has the potential to deliver high quality at low cost. Enabling a person to remain independent in the community through the use of appropriate equipment is preferable to admitting them for treatment. Money is wasted when users are not provided with adequate information about their equipment and training in how to use it [50].

Purchaser profiles and market preferences

The national stakeholder survey identified that 88% of respondents who used or were aware of NTPME were employed by the National Health Service (NHS). Users had similar years of clinical experience across all the Strategic Health Authorities (SHA) within the UK. Mean number of years post qualification for respondents was 21 and 40% of therapists had worked with children for more than 16 years (consistent across all SHAs).

Table 16 displays the number of respondents who had previously used any of the five commercially available systems at the time of the survey (Oct 05-Feb 06), and those who were unaware of the systems.

Table 16. Previous experience with NTPME systems

	Used previously		Not aware of product	
	(n =)	(%)	(n =)	(%)
Chailey Lying Support	178	39.7	30	6.7
Dreama	159	35.5	40	8.9
Moonlite	21	4.7	235	52.9
Snoooooze	11	2.5	330	73.7
Symmetrisleep	290	64.7	31	6.9

Three of the systems were widely known, with more than 90% of respondents being aware of them (Dreama, Chailey Lying Support and Symmetrisleep). 78.8% of all respondents had used at least one of the three most commonly used systems; 14.3% having used all three. Less than 5% of respondents had used the two least commonly known systems (Moonlite and Snoooooze).

List prices for the systems and manufacturer warranty details are shown in the market review section.

Sustainable procurement

The UK Government launched its current strategy for sustainable development, Securing the Future, in March 2005 [51]. The strategy describes four priorities to progress sustainable development, in the UK and in the world as a whole:

- sustainable production and consumption – working towards achieving more with less
- natural resource protection and environmental enhancement – protecting the natural resources and habitats upon which we depend
- sustainable communities – creating places where people want to live and work, now and in the future
- climate change and energy – confronting a significant threat to the global community.

The strategy highlights the key role of public procurement in delivering sustainability.

This section identifies relevant sustainability issues and provides some guidance on how these can be incorporated into procurement decision making processes. Environmental impact is becoming increasingly important globally with pressure to minimise that impact. Procurement decisions have a direct influence on how well organisations (such as the NHS) meet their wider objectives for sustainable development.

Decontamination, end of life disposal and refurbishment

Units designed for low cost (and low environmental impact) decontamination, repair and refurbishment to promote re-allocation and extended serviceable life are preferable from a sustainability point of view.

Consideration should be given to the likely costs of disposal at the end of the product's life. Where appropriate, suppliers of equipment placed on the market after the 13th August 2005 should be able to demonstrate compliance with the *UK Waste Electrical and Electronic Equipment (WEEE) regulations (2006)* [52] including producer registration, compliance scheme details and correct product marking. Electrical and electronic equipment is exempt from the WEEE regulations where it is deemed to be contaminated at the point at which the equipment is scheduled for disposal by the final user. However, if it is subsequently decontaminated such that it no longer poses an infection risk, it is again covered by the WEEE regulations, and there may be potential to dispose of the unit through the normal WEEE recovery channels at no cost to the final user. (The WEEE regulations place responsibility for financing the cost of collection and disposal on the producer.) Units that are classified as contaminated, fall outside the WEEE regulations and the organisation consigning the waste for disposal will be liable for the costs of collection, treatment and disposal. The cost of disposal can vary widely between waste contractors and regionally, so it is advised that an estimate for disposal be obtained from your incumbent medical waste contractor.

Consideration may also need to be given to any costs associated with the recovery of equipment that has been issued to patients, especially where units are considered to be contaminated at end of use.

Medical devices are currently exempt from the UK Restriction of Hazardous Substances Regulations (2005) [53] but there are moves to remove this exemption in due course – proactive moves by manufacturers and distributors to comply with these regulations ahead of any changes should be recognised positively.

Consideration when purchasing NTPME should be given to:

- equipment which is manufactured from sustainable sources
- purchase of equipment from manufacturers who have an environmental accreditation (e.g. ISO14001)
- responsibility for, and the cost of, equipment collection, recycling or disposal when no longer required.

The key sustainability issues in relation to NTPME are summarised in Table 17.

Table 17. Summary of sustainability issues

	Chailey Lying Support	Dreama 2	Moonlite	Sleepform	Snoooooze	Symmetrisleep
Comply with ISO14001 environmental management system	×	×	×	×	×	×
Any materials from sustainable managed sources	×	×	✓	✓	×	×
Manufacturer collects when no longer required	×	× (i)	✓	×	✓	✓
Disposal of equipment / re-issue	Returned loan equipment is re-issued.	Returned equipment is re-cycled wherever possible.	Re-issue or re-cycle depending on age & condition.	Returned equipment is cleaned & used as demonstration stock.	Equipment is client specific & if returned will be disposed.	Unused and unopened equipment is inspected & re-issued. Used equipment is disposed.
Written instructions for re-issue e.g. to ICES	× (ii)	✓	✓	×	×	×
Infection control instructions	× (ii)	×	✓	✓	✓	✓

(i) Will receive equipment but not collect it

(ii) Guidance can be provided on request and currently being reviewed

Table 18. Product specification details[1]

Chailey Lying Support Active Design Ltd	Dreama 2 Jenx Ltd	Moonlite JCM Seating Solutions Ltd	Sleepform Leckey	Snoooooze Peacocks Medical Group	Symmetrisleep Helping Hand Company
Positioning and base options					
▪ Supine lying & prone, not side lying ▪ Base can be placed on bed/floor or trolley ▪ Can be used for prone lying activities and for sleep at night	▪ Supine, prone & side lying ▪ Fits profiling bed	▪ Supine, prone & side lying ▪ Fits profiling bed ▪ Can be profiled without a profiling bed	▪ Supine, prone & side lying ▪ Mouldable to profiling bed	▪ Supine, prone & side lying ▪ Fits profiling bed ▪ Therapy mat available with hook & hoop covering or use with all pads/supports	▪ Supine, prone & side lying ▪ Fits profiling bed
Range and size					

▪ Age range infant to adult
▪ All supports & base board are supplied according to body anthropometrics
▪ Larger size boards (teenage and adult) are hinged & fold
	▪ Cot size 1200 x 560mm
	▪ Single bed size 1900 x 900mm
	▪ Mattress height 160mm for both cot & single bed
		▪ Age range infant to adult
		▪ Standard single bed positioning base 1700 x 800mm
		▪ Centre base 400 x 800mm
		▪ Cot 1200x 560mm
			▪ Mattress 950 x 950mm
			▪ Kit available for three different age groups
			  ▪ 0-1 yrs cot
			  ▪ 1-5 yrs cot
			  ▪ 1-5 yrs single bed
			  ▪ 5-18 yrs single bed
			▪ Airflow mattress cot size 560 x 1180mm
			▪ single bed size 1000 x 2000mm
				▪ Pads & brackets, pillows available in both adult & paediatric sizes	▪ Age range infant to adult with differing sized brackets & pads

Base					
▪ Wooden base board	▪ Aluminium base which lies on patient bed frame	▪ Flexible sub-frame which can be rolled	▪ Mouldable base mattress with air pump (puncture kit) ▪ Base grid sheet	▪ 'Hook & loop' type fastening to base sheet	▪ Grid sheet
Mattress/overlay					
▪ Not available	▪ Individual mattress units with individual fitted sheets (18 single mattress units & 2 double for single bed size)	▪ Padded cover (pressure relieving foam & gel pads) ▪ Air flow overlay with 2 way stretch sheet	▪ Air flow over mantle with cotton sheet covering	▪ Day time therapy mat with 'hook & loop' system	▪ Over mantle - airflow or low ozone ▪ 2 way stretch sheet

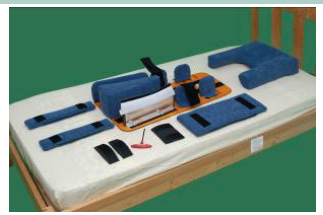
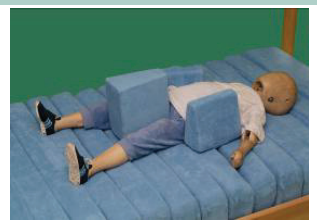
Market review

Chailey Lying Support Active Design Ltd	Dreama 2 Jenx Ltd	Moonlite JCM Seating Solutions Ltd	Sleepform Leckey	Snoooooze Peacocks Medical Group	Symmetrisleep Helping Hand Company
Positioning supports and pads					
▪ Lateral wooden foam covered supports for chest, pelvis & lower limbs. Can adjust laterally, for height & can be rotated to accommodate asymmetry ▪ Rotation with use of Allen key ▪ Larger sizes of system - lateral lower limb supports fold flat ▪ Foam head & shoulder support ▪ Lumbar support ▪ Prone lying supports	▪ Glide & lock position pads with or without memory foam pads. Pads can be rotated ▪ Positioning pads available in 4 sizes ▪ Positioning hoops available in 4 sizes ▪ Angle adjusted foot rest	▪ Range of brackets in 4 sizes. ▪ Supports may be angulated & can be folded flat without removal. ▪ Figure of 8 fixing brackets ▪ Removable pressure relieving padded foam covers for supports/brackets	▪ Cushioned chest (thorax) & hip (pelvic) guides with elasticised straps in 4 sizes ▪ Cushioned leg & knee guides, adjustable & elasticised, 2 sizes	▪ Rolls, pillows & supports for paediatric & adults ▪ Rigid padded brackets (various sizes). ▪ Range of positioning cushions, pillows, troughs, neck ring, spinal cube, banana bolsters, beanie arm/leg ramps, tapered rolls, multi, body & T rolls, wedges, & side lying support ▪ Two foam fillings: Comfy chip foam & crumbed CONFOR foam ▪ Three cover options white, light blue & silver 3 Dartex	▪ Various pillows & rolls made from low zone material ▪ Brackets in 4 sizes with removable padded foam covers
Abduction block/wedge					
✓ Available in varying sizes depending on anthropometrics	✓ Available in 3 sizes	× Bracket can be used	× Mouldable base can be used	✓ Wedges & W troughs	× Bracket can be used
Side lying platform					
×	✓ With limb support	✓ With limb support	× Knee pillow	× Knee pillow	✓ With limb support
Fleece panels/cooling sheets					
×	×	✓ Gel pads & lambs wool fleece panels	✓ Waterproof sheet & cool/gel sheet	✓ Special order option of cotton covers	✓ Lambs wool fleece panels

Market review

Chailey Lying Support Active Design Ltd	Dreama 2 Jenx Ltd	Moonlite JCM Seating Solutions Ltd	Sleepform Leckey	Snoooooze Peacocks Medical Group	Symmetrisleep Helping Hand Company
Knee pillow					
▪ Knee supports	▪ Height adjustable T-roll	▪ Knee abduction system/softknee cups (adjustable)	▪ Knee roll ▪ Air flow knee pillow	▪ T-rolls, troughs	▪ Knee block/knee cosy
Warranty period					
12 months	24 months	36 months	24 months	24 months	12 months
List Price Plus VAT unless order is accompanied by VAT exemption form [2]					
Baby £295 Nursery £333 Nursery Plus £345 Child £375 Child Plus £375 Junior £490 Junior Plus £490 Teenage £565 Teenage Plus £565 Adult £590	▪ Cot size pressure relief system £1065 ▪ Full size pressure relief system £ 1264	▪ Available in junior & adult packs ▪ Packs include positioning base, brackets, side lying tables, soft knee cups, mattress with waterproof cover, fleece, towelling top cover & travel bag ▪ Junior £1,073.48 ▪ Senior £1,165.23	▪ Sleepform Kit (includes mattress, chest/hip guide, 2 fitted grid sheets & airflow mattress) £785- £840 ▪ Therapist Assessment Kit (includes chest/hip guides, leg/knee guides, air flow knee pillow, small & large knee rolls, air flow mattress, fitted grid sheets, mattress) £945- £1470 depending on size	▪ Manufacturer supplies bespoke systems ▪ 'Average' system price £500	▪ Modular system, prices range from £750-£1200 depending on needs

Market review

Chailey Lying Support	Dreama 2	Moonlite	Sleepform	Snoooooze	Symmetrisleep
Active Design Ltd	Jenx Ltd	JCM Seating Solutions Ltd	Leckey	Peacocks Medical Group	Helping Hand Company
System components					
					
Mannequin in side lying position					
n/a					
Mannequin supine position with 30º hip abduction					
					

(i) Information collated from current manufacturer documentation. Please contact the manufacturer for further details.

(ii) Most systems are modular - contact manufacturer for prices of individual components.

Acknowledgements

We would like to thank all manufacturers and suppliers for providing product information for use in the specification tables, and for the loan of their equipment for the heuristic ergonomic evaluations.

Ginny Humphries MSc, MCSP, Head of Therapy, Vranch House School and Centre, Exeter, who kindly reviewed this guide and for her helpful constructive comments.

Nikki Daniels MA, Lecturer in Occupational Therapy, University of Derby (formerly Research Therapist, ATEC) for her work in the preparation of the written questionnaire. The Association of Paediatric Chartered Physiotherapists (APCP) for their support in the distribution of the questionnaire and our thanks to the members of APCP who completed the questionnaire.

Sincere thanks to the six therapists who participated in the ergonomic appraisals, for their expert opinions and for their valuable time.

Glossary

Term	Meaning
Postural management programme	A programme designed to provide postural management for an individual through appropriate positioning equipment and support.
Abduction	Movement which draws a limb such as a leg or arm away from the center or midline of the body.
Adduction	Movement which brings a limb such as the arm or leg closer to the center or midline of the body.
Anthropometrics	The measurement of living human individuals for the purposes of understanding human physical variation.
Aspiration	The entry of secretions or foreign material into the trachea and lungs.
Asymmetrical muscle activity	Activity of the muscles is unbalanced.
Biofidelic	Simulates the behaviour of the human body.
Bony changes	Changes to the bone structure, for example thickening or weakening.
Botulinum toxin	A toxin that is used clinically in small quantities to treat spasticity and other neurological disorders characterized by abnormal muscle contractions.
Conservative management	Solution to a medical condition, such as hip partial dislocation, by using techniques which do not involve surgery.
Contraindications	A condition or factor that increases the risks involved with the use of equipment, medication or treatment.
Ergonomic	A scientific discipline concerned with the understanding of interactions among humans and other elements of a system to optimize human well-being and overall system performance.
Femoral head	The round end of the large bone in the thigh that articulates with the socket in the pelvis.
Functional capacity	The capability of performing tasks and activities that people find necessary for everyday living.
Hip acetabulum	The hollow, cuplike portion of the pelvis into which the head of the thigh bone or femur fits.
Hip migration	Measures extent of hip subluxation (partial dislocation of the hip).
Lateral support	A type of physical support to help prevent sideways movement.
Likert scale	A method of measuring attitudes that asks respondents to indicate their degree of agreement or disagreement with statements, e.g., "strongly agree", "no opinion" or "strongly disagree".

Term	Meaning
Muscle contracture	An abnormal, often permanent shortening of muscle, that results in muscle imbalances between muscle groups.
Musculoskeletal	Relating to or involving the muscles and the skeleton.
Opisthotonus	Spasm of the body where the head, neck and spinal column are hyper extended, forming a bridge or arching position.
Overlay/overmantle	Thin mattress often providing pressure relief.
Pathology	Branch of medicine concerned with disease, especially its structure and its functional effects on the body.
Postural intervention	A method using therapy techniques, knowledge and/or equipment such as night time postural management.
Primitive reflexes	Reflex actions originating in the central nervous system that are exhibited by normal infants.
Quadriplegia	Paralysis distinguished by the loss of motion, reflexes, and sensation in the trunk of the body in addition to both legs and arms.
Spasticity	A disorder of the body motor system, in which certain muscles are over excited. This contraction causes stiffness or tightness of the muscles and may interfere with gait, movement, and speech.
Spinal rotation	Twisting of the spinal column.
Spinal scoliosis	A medical condition in which a person's spine is curved from side to side, and may also be rotated.
Stakeholders	Any person or organization who can be positively or negatively impacted by, or cause an impact on the success of a project.
Subluxation	An incomplete or partial dislocation of a joint.
Supine lying	A position of the body; lying down with the face up, as opposed to the prone position, which is face down.
Sustainable development	A pattern of resource use that aims to meet human needs while preserving the natural environment so that these needs can be met, not only in the present, but in the indefinite future.

References

1. Waugh K. International Seating Symposium; 2007. p. 6-7.
2. Goldsmith S. Postural Care at night within a community setting: A feedback study. Physiotherapy. 2000;86(10):528-34.
3. Carr J, Shepherd R, Ada L. Spasticity: Research findings and implications for intervention. Physiotherapy 1995;81 421-9.
4. Tardieu C, Lespargot A, Tabary C, Bret M. For how long must the soleus muscle be stretched each day to prevent contracture? Developmental Medicine and Child Neurology. 1988;30(1):3-10.
5. Scrutton D, Baird G, Smeeton N. Hip dysplasia in bilateral cerebral palsy; incidence and natural history in children aged 18 months to 5 years. Developmental Medicine and Child Neurology. 2001:586-600.
6. Scrutton D, Baird G. Surveillance measures of the hips of children with bilateral cerebral palsy. Archives Dis Child. 1997;76:381-4.
7. Scrutton D. The early management of the hips in cerebral palsy. Developmental Medicine and Child Neurology. 1989;31:108-16.
8. Soo B, Howard J, Boyd R, Reid S, Lanigan A, Wolfe R, et al. Hip Displacement in Cerebral Palsy. The Journal of Bone and Joint Surgery. 2006;88-A(1):121-9.
9. Bower E. Hip abduction and spinal orthosis in cerebral palsy. Physiotherapy. 1990;76:658-9.
10. Cornell M. The hip in cerebral palsy. Developmental Medicine and Child Neurology. 1995 37(3-18).
11. Pountney T, Mandy A, Green E, Gard P. Management of hip dislocation with postural management. Child Care, Health and development. 2002 28(2):179-85.
12. Vidal J, Deguillame P, Vidal M. The anatomy of the dysplastic hip in cerebral palsy relating to prognosis and treatment. Int Orthop. 1985 9:105-10.
13. Dobson F, Boyd R, Parrott J, Nattrass G, Graham H. Hip surveillance in children with cerebral palsy. Impact on the surgical management of spastic disease. Journal Bone and Joint Surgery Br. 2002 85(5): 720-6.
14. Hankinson J, Morton R Use of a lying hip abduction system in children with bilateral cerebral palsy: a pilot study. Developmental Medicine and Child Neurology 2002;44 (3):177-80.
15. Newman C, O'Regan M, Hensey O. Sleep disorders in children with cerebral palsy. Developmental Medicine and Child Neurology. 2006;48:564-68.
16. Collins F. The JCM Moonlite Sleep System: Assisting in the provision of 24-hour postural support. International Journal of Therapy and Rehabilitation. 2007;14(7):36-40.
17. Pountney T, Green E. Hip dislocation in cerebral palsy. British Medical Journal. 2006;332:772-5.
18. Gericke T. Postural management for children with cerebral palsy: consensus statement. Developmental Medicine and Child Neurology. 2006;48:244.
19. Palisano R, Rosenbaum P, Walter S, Russell D, Wood E, Galuppi B. Gross Motor Function Classification System for Cerebral Palsy. Developmental Medicine and Child Neurology. 1997;39:214-23.
20. Draft Guidelines for the Provision of Night Time Postural Management Equipment - September 2004. 2004 [cited 13.06.08]; Available from: This

document is available to members of the interactive Chartered Society of Physiotherapist (iCSP) Paediatric network forum at www.Interactivecsp.org/documents.cfm
21. The North West Group of Paediatric Physiotherapists & Children's Occupational Therapists: Good Practice Guidelines to 24 hour Postural Management. 2008 [cited 13.06.08]; Available from: This document is available to members of the interactive Chartered Society of Physiotherapist (iCSP) Paediatric network forum at www.Interactivecsp.org/documents.cfm
22. Pountney T, Cheek L, Green E, Mulcahy C, Nelham R. The Chailey Approach to Postural Management. Chailey Heritage Clinical Services; 2004.
23. Pountney T, Mandy A. The Chailey approach to postural management and clinical effectiveness. Journal of the Association of Paediatric Chartered Physiotherapists 1999;90:18-23.
24. North Devon's Integrated care pathway for 24 hour postural management. 2004 [cited 02.07.08]; Available from: This document is available to members of the interactive Chartered Society of Physiotherapist (iCSP) Paediatric network forum at www.Interactivecsp.org/documents.cfm
25. Medical Devices Regulations. In: MHRA, editor.; 2002.
26. BS 7176:2007 Specification for resistance to ignition of upholstered furniture for non-domestic seating by testing composites. BSI www.bsigroup.co.uk/en/Standards-and-Publications; 2007.
27. BS 7177:1996 Specification for resistance to ignition of mattresses, divans and bed bases. BSI www.bsigroup.co.uk/en/Standards-and-Publications; 1996.
28. BS 6807:2006 Methods of test for assessment of ignitability of mattresses, upholstered divans and upholstered bed bases with flaming types of primary and secondary sources of ignition. BSI www.bsigroup.co.uk/en/Standards-and-Publications; 2006.
29. BS 5852:2006 Methods of test for assessment of the ignitability of upholstered seating by smouldering and flaming ignition sources. BSI www.bsigroup.co.uk/en/Standards-and-Publications; 2006.
30. BS EN 597-1:1995 Furniture. Assessment of the ignitability of mattresses and upholstered bed bases. Ignition source: smouldering cigarette. BSI www.bsigroup.co.uk/en/Standards-and-Publications; 1995.
31. BS EN 597-2:1995 Furniture. Assessment of the ignitability of mattresses and upholstered bed bases. Ignition source: match flame equivalent. BSI www.bsigroup.co.uk/en/Standards-and-Publications; 1995.
32. European Medical Devices Directives Regulations MDD 93/42 EEC: Medical Devices Directive; 1993.
33. BS 5852:1990 Methods of test for assessment of the ignitability of upholstered seating by smouldering and flaming ignition sources. BSI www.bsigroup.co.uk/en/Standards-and-Publications; 1990.
34. NHS Firecode Document HTM 87 (now superseded by Health Technical Memorandum 05-03: Operational provisions: Part C - Textiles and furnishings): Department of Health; 1999.

35. BS 3379:2005 Combustion modified flexible polyurethane cellular materials for loadbearing applications. Specification. BSI www.bsigroup.co.uk/en/Standards-and-Publications; 2005.
36. Postural management for children with cerebral palsy: consensus statement. 2006 [cited 04.07.08]; Available from: www.mackeithpress.co.uk/forumposture.html
37. Hayley S, Coster W, Ludlow L, Haltiwanger J, Andrellos P. Pediatric Evaluation of Disability Index: Trustees of Boston University, Health and Disability Research Institute; 1992.
38. Russell D, Rosenbaum P, Avery L, Lane M. Gross Motor Function Measure (GMFM-66 & GMFM-88) : User's Manual. Mac Keith Press Blackwell Publishing; 2002.
39. Varni J, Burwinkle T, Seid M. The PedsQL™ as a pediatric patient-reported outcome: Reliability and validity of the PedsQL™ Measurement Model in 25,000 children. Expert Review of Pharmacoeconomics and Outcomes Research. 2005;5:705-19.
40. Hunt A, Goldman A, Seers K, Crichton N, Mastroyannopoulou K, Moffat V, et al. Clinical validation of the Paediatric Pain Profile. Developmental Medicine and Child Neurology. 2004;46:9-18.
41. DB 2006(05) Managing Medical Devices. MHRA www.mhra.gov.uk/Publications; 2006.
42. Health Service Guidelines - Hospital Laundry Arrangements for Used and Infected Linen HSG (95)18: Department of Health; 1995.
43. Manual handling. Manual Handling Operations Regulations 1992 (as amended). Guidance on Regulations L23 (Third edition): Health and Safety Executive; 2004.
44. Instructions for Consumer Products: Institute for Consumer Ergonomics on Behalf of Department of Trade and Industry. HMSO; 1988.
45. Verza R, Messmer M. A team approach to evaluating the need for assistive technology reduces equipment abandonment. Way Ahead. 2007;11(2):4-5.
46. Hocking C. Function or feelings: factors in abandonment of assistive devices. Technology and Disability 1999 11:3 -11.
47. Guide to integrating community equipment services: Department of Health; 2001.
48. Shribman S. Making it better: For children and young people: Department of Health; 2007.
49. Pope P. Night-time postural support for people with multiple sclerosis. Way Ahead. 2007;11(4):6-8.
50. Fully Equipped: Promoting Independence 2. National Report: Audit Commission 2000.
51. Securing the Future - UK Government sustainable development strategy www.sustainable-development.gov.uk/publications/uk-strategy/index.htm; 2005.
52. UK Waste Electrical and Electronic Equipment (WEEE) regulations (2006); 2006.

53. The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations. Department for Business, Enterprise and Regulatory Reform www.berr.gov.uk/sectors/sustainability/rohs/page29048.html; 2005.
54. NHS-PASA. NHS PASA Leasing. [cited 04.07.08]; Available from: http://www.pasa.nhs.uk/pasaweb/productsandservices/leasing
55. OGC. EU Procurement Thresholds. [cited 04.07.08]; Available from: http://www.ogc.gov.uk/procurement_policy_and_application_of_eu_rules_eu_procurement_thresholds_.asp
56. OGC. Office of Government Commerce. [cited 04.07.08]; Available from: http://www.ogc.gov.uk/stdtoolkit/reference/documentation/p13_buscase.html
57. NHS-PASA. PASA Operational Purchasing Procedures Manual, Procedure 1-01. [cited 04.07.08]; Available from: http://home.pasa.nhs.uk/PASAWeb/Guidance/OPPM/LandingPage.htm
58. Department-of-Health. European Union Tendering Timetable. [cited 04.07.08]; Available from: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsProcurement/DH_4070620
59. NHS-PASA. Trust Operational Purchasing Procedures Manual. [cited 04.07.08]; Available from: http://home.pasa.nhs.uk/PASAWeb/Guidance/TOPPM/LandingPage.htm
60. Department-of-Health. Desk guide to procurement - 2005 edition. [cited 04.07.08]; Available from: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsProcurement/DH_4109316

Table 19. Supplier contact details

Chailey Lying Support	Dreama 2	Moonlight	Sleepform	Snoooooze	Symmetrisleep
Active Design Ltd 68K Wryley Road Birmingham B6 7BN	**Jenx Limited** Wardsend Road Sheffield S6 1RQ	**JCM Seating Solutions Ltd** 15-18 Maxwell Road Woodston Ind Estate Peterborough Cambridgeshire PE2 7HU	**Leckey** Kilwee Business Park Dunmurry BT17 0HD Northern Ireland	**Peacocks Medical Group** Benfield Business Park Benfield Road, Newcastle upon Tyne NE46 4NQ	**Helping Hand Company** Bromyard Road Ledbury, Herefordshire HR8 1NS
+ 44 (0) 121 326 7506	+ 44 (0) 1142 853376	+ 44 (0) 1733 405830	+ 44 (0) 28 9060 2277	+ 44 (0) 1912 769600	+ 44 (0) 1532 635388
info@activedesign.co.uk	info@jenx.com	enquiries@jcmseating.co.uk	info@leckey.com	info@peacock.net	sales@helpinghand.co.uk
www.activedesign.co.uk	www.jenx.com	www.jcmseating.co.uk	www.leckey.com	www.peacocks.net	www.helpinghand.co.uk

EU procurement procedure

Lease options

National frameworks are in place for operating leases to help the NHS procure leases more cost efficiently and effectively. The framework came into place on 1st April 2007 and runs for two years. Further details are available from the PASA website [54].

EU procedures

The Public Sector Directive (2004/18/EC) has been transposed into UK law. This has been achieved by means of the following statutory instruments:

- the Public Contracts Regulations SI 2006 No.5 (the regulations)
- the Utilities Contracts Regulations SI 2006 No.6 (not relevant to this guide).

The regulations apply to contracts worth more than £90,319 (from January 1st 2008) [55] over their whole life, and specify the procedures to be followed for public sector contracting, including adherence to strict timetables, requirements for advertising, invitation to tender and the award of contract. Organisations undertaking a procurement exercise covered by the regulations must give all suppliers an equal opportunity to express an interest in tendering for the contract by placing a contract notice in the Official Journal of the European Union (OJEU). At all stages of the procurement process, the purchaser must be demonstrably fair, as any decision made can be challenged by the unsuccessful suppliers.

Establishing a procurement strategy

To achieve a successful outcome, decisions need to be made on:

- whether an existing contract/agreement can be used
- the need to consider sustainable development issues
- whether EU directives apply
- the type and form of contract
- sourcing potential suppliers
- duration of contract and opportunity to review/extend
- payment schedules
- how to minimise any risks with the chosen strategy, including supplier appraisal and evaluation/clarification of suppliers' bids.

Preparing a business case

A business case should be drafted and approved before conducting any procurement exercise. Further guidance on preparing business cases is available from the Office of Government Commerce [56] and an illustrative example is provided in the NHS PASA Operational Purchasing Procedures Manual, Procedure 1-01 [57].

The EU tendering exercise

EU procurements usually take between 4 and 6 months to complete. This needs to be taken into account in the planning stages. The length of the exercise depends on the chosen procedure (open or restricted). Further information is available from the Department of Health [58].

The procurement panel

A multidisciplinary team should be selected to guide the purchase. Representatives from clinical, user, technical, estates and financial areas should be considered.

Identifying potential suppliers

Criteria for supplier selection must be established. A supplier pre-qualification questionnaire may be employed as an initial screen to exclude unsuitable suppliers which asks for details such as skills and experience of the service engineers.

Evaluation criteria

Performance specifications should be derived from local operational requirements, and agreed by the procurement panel. They will form the basis for assessing the adequacy of suppliers' technical specifications, provided in response to the technical specification questionnaire.

It is important to have agreed on the performance specifications of the product as they will be used in the adjudication against company specifications.

Requests for features which are supplier-specific are not permitted under the regulations. Very specific features which are not supported by operational requirements are also not allowed.

Award of contract

Following award of the contract to the successful supplier; unsuccessful suppliers may need to be debriefed. This is at the supplier's request.

Buyers must be aware of the 'Alcatel' procedure (see the Trust Operational Purchasing Procedures Manual [59], Procedure No.T-08, section 6 - 'Mandatory Standstill Period').

For more information on procurement please refer to the Department of Health Website [60].

Author and report information

Buyers' guide:
Night time postural management equipment for children

Frances Polak[1], Maxine Clift[1], Laurence Clift[2]

Assistive Technology Evaluation Centre (ATEC)[1]
Derby Hospitals NHS Foundation Trust
Derby City General Hospital
Uttoxeter Road
Derby DE22 3NE

Tel: 01332 785627
Fax: 01332 789815
Email: atec@derbyatec.co.uk
www.derbyatec.co.uk

Ergonomics and Safety Research Institute (ESRI)[2]
Garendon Building
Holywell Park
Loughborough
Leicestershire
LE11 3TU

Tel: 01509 22 6900
Fax: 01509 22 6960
Email: esri@lboro.ac.uk

About CEP

The Centre for Evidence-based Purchasing (CEP) is part of the Policy and Innovation Directorate of the NHS Purchasing and Supply Agency. We underpin purchasing decisions by providing objective evidence to support the uptake of useful, safe and innovative products and related procedures in health and social care.

CEP 08030: June 2009

We are here to help you make informed purchasing decisions by gathering evidence globally to support the use of innovative technologies, assess value and cost effectiveness of products, and develop nationally agreed protocols.

Sign up to our email alert service

All our publications since 2002 are available in full colour to download from our website. To sign up to our email alert service and receive new publications straight to your mailbox contact:

Centre for Evidence-based Purchasing
Room 152C
Skipton House
80 London Road
SE1 6HL

Tel: 020 7972 6080
Fax: 020 7975 5795
Email: cep@pasa.nhs.uk
www.pasa.nhs.uk/cep