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USE OF AN INTEGRATED CARE PATHWAY: A THIRD ROUND AUDIT OF THE MANAGEMENT OF SHOULDER PAIN IN NEUROLOGICAL CONDITIONS

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Objectives: **To complete a third round audit of management of shoulder pain using an integrated care pathway, to evaluate pro forma documentation and to determine outcome.**
Subjects and setting: **Thirty-four patients with upper limb paresis admitted to a rehabilitation unit during a 22-month period had shoulder pain and were included in the integrated care pathway.**
Methods: **Retrospective review of pro forma documentation against pre-determined standards.**
Results: **Compared with the second round audit, performance against 5 out of 9 standards for initial assessment and documentation had improved, and ranged from 56% to 94%. Achievement of 9 further standards relating to continued management ranged from 44% to 97%. Variance was not always well recorded. Shoulder pain resolved or improved in 18/34 (53%) of patients.**
Conclusion: **Introducing the pro forma improved standards of documentation and demonstrated a positive outcome in over half the patients. Some problems with developing and maintaining integrated care pathways in the context of rehabilitation are discussed.**

Key words: integrated care pathway, audit, stroke, upper limb paresis, shoulder pain.

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INTRODUCTION

The concept of clinical governance has been introduced in the UK with the aim of enhancing the quality of clinical care through the practice of evidence-based medicine (1). Integrated care pathways (ICPs) have been advocated as a means of prompting clinicians to follow agreed guidelines (2, 3) and have been used in a neurological setting (4, 5). By recording variance from the guidelines, they also form a convenient tool for prospective audit of clinical practice (6). However, they are time-consuming to develop and there is continuing debate about their effectiveness (7).

Shoulder pain is a common complication following stroke (8) and may also affect patients with other neurological conditions causing upper limb paresis (9). It causes discomfort and distress, is generally poorly managed (10, 11) and may impede rehabilitation and delay discharge (12). Timely and effective management by co-ordinated input from a multi-disciplinary team could help to reduce its impact. Shoulder pain was therefore considered an appropriate area for ICP-based management.

A first round audit between 1994 and 1997, had shown virtually no systematic records of shoulder pain management or outcome. To address this deficit, an ICP was developed following a review of the literature (13), which proposed "best practice" guidelines for inter-disciplinary management of shoulder pain. Following its introduction, a second round audit in a cohort of 32 stroke patients admitted between March 1999 and March 2000, showed improved documentation of assessment and initial management (14). However, the initial checklist and summary sheets were not detailed enough to permit audit of continued management, compliance with the ICP protocol or to evaluate outcome. A pro forma was therefore introduced to prompt management according to guidelines and act as a "live" record to provide more systematic documentation of variance and outcome.

Although the ICP was originally developed for hemiplegic shoulder pain in the context of stroke, it has been extended to all patients with shoulder pain resulting from paresis of the upper limb, including those with tetraplegia due to Guillain-Barré Syndrome or spinal cord injury. These patients experience similar problems and require similar management, albeit sometimes applied bilaterally. We see no reason to exclude them.

The objective of this third round audit was to assess the impact of introducing the pro forma. The following aims were identified:

1. To compare performance against second round audit achievements for assessment and initial management.
2. To assess practice against a set of further process standards to determine whether guidelines for continued management were being followed, and to explore reasons for variance.
3. To assess the outcome of management in terms of reduction of shoulder pain.

Based on this re-appraisal of our system for recording management, some problems which arise in the implementation of ICPs in routine clinical practice are discussed.

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METHODS

The study setting is a regional unit, which mainly provides post-acute rehabilitation for younger (aged 16–65) patients with complex neurological disabilities. Patients are admitted on average 3 months post onset, and participate in an inter-disciplinary programme of rehabilitation.

The ICP has been described previously (14), but the main principles are summarised in revised form in Fig. 1. The protocol guides the choice of intervention according to the timing and severity of shoulder pain, the physical presentation of the patient and their level of functional recovery.

Pain status is serially recorded every fortnight using a self-completed questionnaire, the "ShoulderQ". This includes questions in verbal format and a numerical graphic rating scale (15). Because some patients with brain injury may have difficulty in completing any questionnaire, a screening tool, the "AbilityQ", is used to assess their ability to complete a questionnaire. This determines whether they respond more accurately to verbal or visual questions and identifies the level of help needed to complete the ShoulderQ. These tools have been described and evaluated (16) but are under continued development. In this series, questionnaires were administered by a junior doctor on the rehabilitation unit, using structured interview where necessary. Where patients had severe cognitive and/or communication deficits, the skilled help of a speech and language therapist or a clinical psychologist was enlisted.

The protocol requires categorisation of physical presentation according to tonal pattern in the shoulder girdle musculature because the handling and management protocols are different. For example, patients with a hypotonic (flaccid) upper limb, who can achieve sufficient lateral rotation, are provided with an Otto Bock trough arm support (Fig. 2), whereas those with pronounced hypertonicity (spasticity) are given the

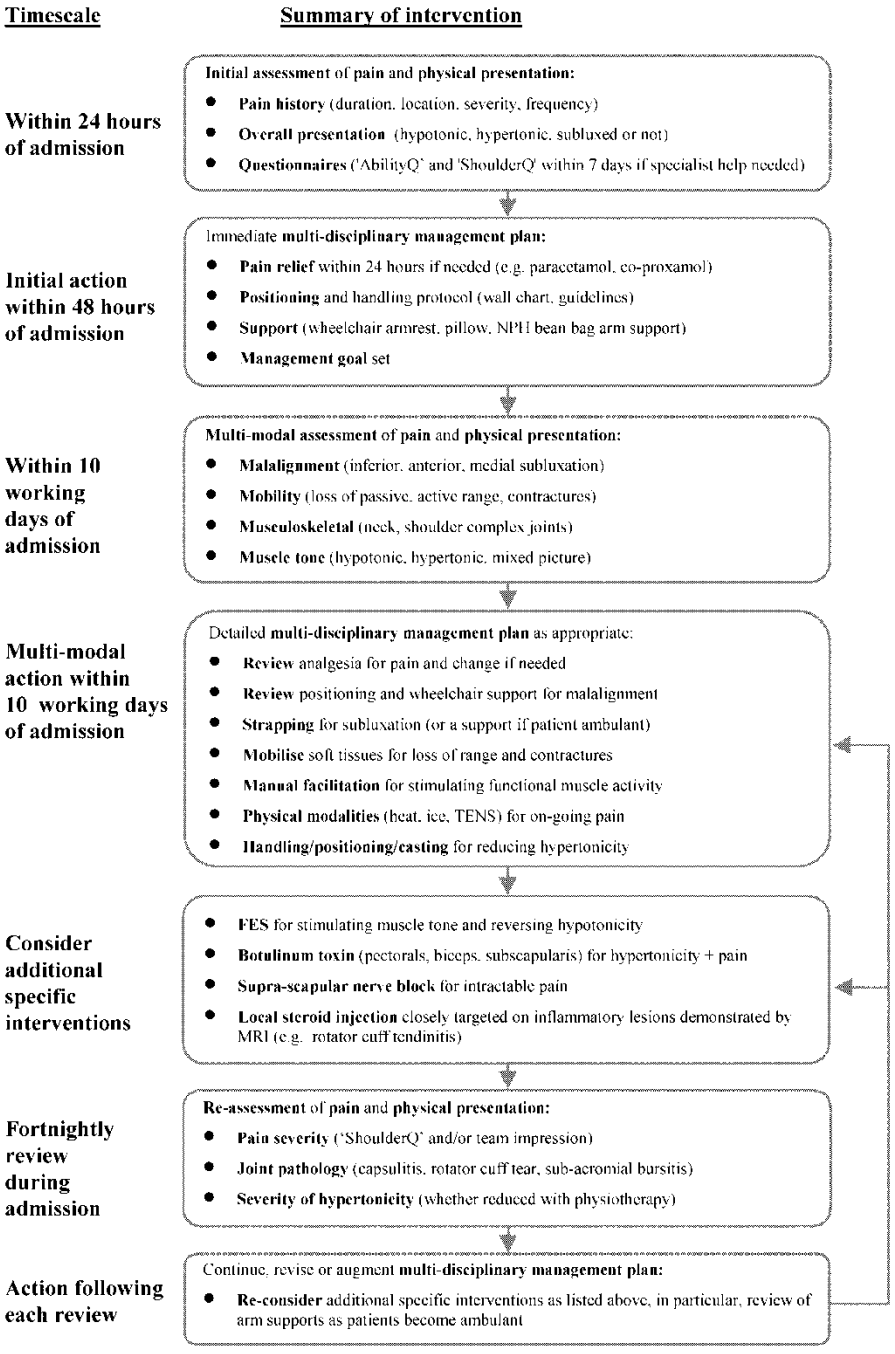

Fig. 1. Summary and timescale of the integrated care pathway [revised from a previous version (14) http:/www.tandf.co.uk].

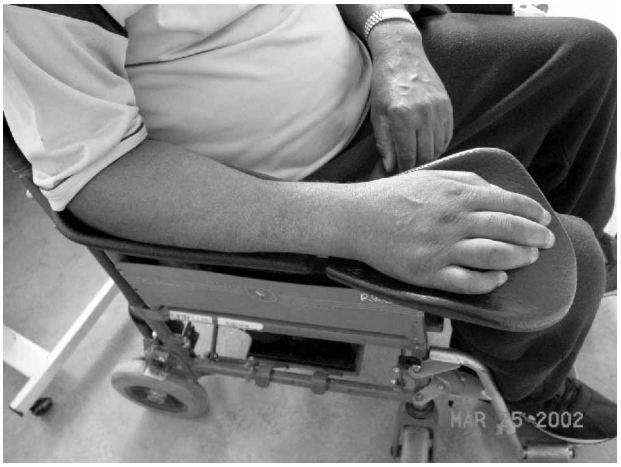

Fig. 2. Positioning a hypotonic (flaccid) upper limb using an Otto Bock trough arm support. This is designed to provide full forearm support to patients with sufficient lateral rotation of the upper arm and thus helps to control subluxation at the shoulder joint. The angle of the support can be varied and a choice of end pieces is available to accommodate the hand; a spreader (as shown) and a cone.

Northwick Park Bean Bag arm support (Fig. 3). Fortnightly reviews aim to note persistent or changing tone problems associated with pain and to pick up other alterations in physical status which may dictate a change in management. For example, those with persistent dense hypotonia (flaccidity) and subluxation, who may have initially required a wheelchair arm support, may require strapping or a brace once they become ambulant to prevent exacerbation of pain due to increased gravitational pull.

Pro forma records and questionnaires for all patients included in the ICP from 1 July 2000 to 30 April 2002 were reviewed retrospectively. Documentation was audited against pre-determined standards A–S (see Appendix). In this round, the timing of standards B–K is judged from the date of first pain report, which marks ICP commencement, rather than from admission. Performance was assessed as follows:

Fig. 3. Positioning a hypertonic (spastic) upper limb using the Northwick Park Bean Bag arm support. This has a padded upper section that helps to separate the upper arm from the side of the body and prevent it from adopting an adducted position. The lower section is filled with polystyrene beads and can be formed into a trough to support the forearm across the body (as shown) or alternatively, positioned in front of the patient to hold the forearm in a forward position.

1. For assessment and initial management, pro forma records were evaluated against standards A–H and compared with the second round audit results.
2. For continued management and compliance with the protocol, pro forma records were evaluated against standards J–R.
3. For a report of pain resolution or pain status at discharge, pro forma records were evaluated against standard S and compared with the second round audit results.

To determine final outcome in terms of resolution or reduction of pain, the pattern of change was determined from the collated ShoulderQ's of patients deemed able to self-report. Changes in ratings for pain at rest, on movement and at night were charted. For patients unable to self-report, evaluation of pain severity was judged fortnightly by members of the rehabilitation team most familiar with each individual and broadly recorded as "better", "the same" or "worse" on the ICP pro forma. Serial records of pain for all patients were categorized by consensus among members of the developing team as: (a) resolved, (b) improved, (c) the same, (d) worse or (e) unclear, to provide a final measure of outcome.

RESULTS

Among a total of 104 patients with upper limb paresis admitted to the unit between 1 July 2000 and 30 April 2002, 34 either had, or developed, shoulder pain and were managed according to the ICP. Their characteristics are shown in Table I.

On starting the ICP, 25/34 (73%) had a predominantly hypotonic (flaccid) upper limb, 5 (15%) had a predominantly hypertonic (spastic) upper limb and 2 (6%) had a mixed tonal pattern. Muscle tone may increase over time following brain damage. In this group, 5 developed increased tone during their stay, thereby requiring a change in management. The remaining 2 patients (6%) had neurogenic-type pain. Also at ICP commencement, 30 (88%) patients were wheelchair bound and 4 (12%) ambulant. By discharge, a further 23 (68%) had achieved independent walking and required a review of arm support.

Achievement against standards in the round three audit are shown in Table II and compared, where relevant, with results from round two (Standards A–H and S only).

Table I. *Characteristics of patients included in the audit (*n = *34)*

Age, years	
Mean (range)	46 (19–63)
Gender, *n* (%)	
Male	23 (68)
Female	11 (32)
Diagnosis, *n* (%)	
CVA	20 (59)
ICH	8 (24)
TBI	2 (6)
Meningo-encephalitis	2 (6)
Guillain-Barré syndrome	2 (6)
Side of paresis, *n* (%)	
Left	12 (35)
Right	11 (32)
Bi-lateral	11 (32)
Length of stay, weeks	
Mean (range)	17 (3–37)

Cerebrovascular accident; Intra-cerebral haemorrhage; Traumatic brain injury.

Documentation of initial assessment and management (Standards A–H)

Achievement for initial assessment within 24 hours of admission or first pain complaint (Standard A) had improved from 56% to 71%. Provision of analgesia (Standards B and G) and wheelchair armrests (Standard D) had also improved markedly in comparison to the second round, although timing is now from commencement of the ICP, not date of admission. In contrast, timely documentation of the placement of a positioning and handling chart (Standard C) was significantly worse than in round two. Documenting a management goal (Standard E) appeared to be less well achieved, although in round two this had originally been rated against a 10 working day standard, but was reduced to 48 hours for consistency with other initial standards (14). Timely recording of a multi-disciplinary assessment (Standard F) and treatment plan (Standard H) were all less well achieved than in the second round audit. However, there was evidence in some cases that charts were put up but not noted or that information was recorded elsewhere in the records but not in the pro forma. This indicates a need for on-going staff education concerning documentation.

Ability to self-report on pain and pain status at admission (Standards J and K)

The AbilityQ (Standard J) was presented to most (91%) patients and a timely record of the initial timing and severity of pain (Standard K) was documented in each one. Thirty (88%) patients were able to complete the ShoulderQ at some level; either independently or with assistance from speech and language therapy or psychology staff. Four were unable to understand questions presented in this way, but were able to indicate some information about the timing and severity of their pain through facial expression and gesture.

Documentation of fortnightly reviews (Standards L–O)

Achievement of these standards required documentation of review every 2 weeks during the patient's stay. Information on timing and severity of shoulder pain (Standard L) was monitored every 2 weeks in 71%. A further 9% missed only 1 assessment in their series while 20% had more significant gaps. Two weekly medication reviews (Standard N) were moderately well achieved whereas multi-disciplinary reviews (Standard M) and arm support reviews (Standard O) were less well achieved.

Documented changes in management as a result of review (Standards P–R)

Achievement of these standards required a documented change in management, in accordance with the protocol, in response to a change in presentation or persistence of symptoms. Where the recommended change was not thought to be suitable, reasons for variance were to be recorded. Performance was generally encouraging. Appropriate analgesic management following review was achieved in 97% of patients (Standard P) and re-appraisal of arm supports in response to changes in physical presentation (Standard Q) in 70%. However, this was sometimes

Table II. *Achievement against Standards A–H and S^{+} in second and third round audits and Standards J–R in third round audit*

Standard	Title of Standard	2nd round (%) ($n \leq 32$)*	3rd round (%) ($n = 34$)
Documentation of initial assessment and management during first 10 days			
A	Preliminary assessment (within 24 hours)	56	71
B	Simple analgesia (within 24 hours)	63	94
C	Positioning and moving chart (within 48 hours)	70	26
D	Wheelchair armrest (within 48 hours)	31	56
E	Management goal (within 48 hours)$^{\phi}$	48	41
F	Multidisciplinary assessment (within 10 working days)	65	59
G	Appropriate analgesia regimen (within 10 working days)	31	85
H	Treatment plan (within 10 working days)	65	53
J	Ability to complete a questionnaire (within 7 days)		91
K	Initial timing and severity of pain (within 7 days)		100
Documentation of fortnightly reviews while on ICP			
L	Review of timing and severity of pain		71
M	Multi-disciplinary review		44
N	Medication review		59
O	Arm supports review		44
Documented change in management as a result of review			
P	Appropriate analgesia recommended		97
Q	Arm support re-issued in response to change in status		70
R	Resistant/persistent symptoms$^{\#}$		52
Final outcome			
S^{+}	Date of pain resolution or pain at discharge	44	82

* Numbers of patients varied from 16 to 32 in the second round audit (14).
$^{\#}$ Standard R was rated only for patients with resistant/persistent symptoms ($n = 21$).
$^{\phi}$ Standard E was rated for 10 working days in the second round audit but for 48 hours in the third round.
$^{+}$ Standard S was formerly Standard I in the second round audit.
ICP: Integrated care pathway.

neglected when patients started to spend more time on their feet (see below) or where muscle tone evolved from a hypotonic (flaccid) to a hypertonic (spastic) picture. Appropriate treatment (or recorded variance) for the 21 patients documented as having resistant or persistent symptoms (Standard R) was less well achieved; performance against this standard being only 52%.

Documentation of final outcome (Standard S)

Documentation of the date of shoulder pain resolution or pain status at discharge had improved substantially; almost twice as many patients had a record of outcome than in the second round audit.

Evaluation of outcome through a change in shoulder pain

Analysis of serial pain records showed that in 18/34 (53%) patients, shoulder pain either resolved ($n = 9$) or improved ($n = 9$) during their stay on the unit. In 11/34 (32%), pain remained the same ($n = 9$) or worsened ($n = 2$). In the remaining 5 (15%), the outcome was unclear because of missing or ambiguous records. Among those who failed to improve, 5 had done so initially, but deteriorated when they became ambulant. This reinforces the need for a review of arm supports and medication at that critical time.

Variance

Despite providing space on the pro forma to document variance from the protocol and reasons for this, it was not always recorded as intended. Four variance categories were identified from our analysis of completed pro formas: (1) omissions in recording; (2) prescribed intervention at odds with the protocol; (3) patients' non-compliance with recommended care; (4) lack of appropriate equipment. Omissions in recording occurred when the ICP co-ordinator was on leave, which in 3 cases resulted in inadequate documentation to determine whether pain had improved or not. Regular reviews were less likely to be completed for patients who were on the ICP for many weeks, especially if they were being satisfactorily managed, or if their condition had improved.

Medication was prescribed according to the protocol in 27/34 (79%) of cases. In the remaining 7, valid reasons for variance were recorded in 6; in only 1 patient was no reason given. Valid reasons included development of side-effects to first choice medication or patient disinclination to accept medication.

Variance from the recommended provision of armrests was investigated further (Table III). Sometimes, this reflected inadequate management, but at other times it was appropriate, as in the case of a patient with a hypotonic (flaccid), subluxed upper limb, who was wheelchair-bound, aphasic and blind. She was provided with a tray, as opposed to a trough arm support, to enable her to locate drinks and personal items. Of the patients showing poor compliance with their allocated support, only 2 benefited from a change. In 5 (15%), incompatibility between the most appropriate armrest and the wheelchair chosen as best for their general positioning resulted in a compromise solution that was at odds with the protocol.

Table III. *Variance from the protocol and its incidence in the provision (Standard D) and review (Standard O) of arm supports (*n = *34)*

Variance category	Incidence
Omissions in recording	11 (32%)
Prescription of support at odds with protocol	10 (29%)
Patients' non-compliance with support	12 (35%)
Lack of appropriate equipment	9 (26%)

DISCUSSION

The process of development of the ICP represents an audit cycle, where consecutive rounds enable comparison with previous practice and the introduction of new more searching standards. Overall, this third round showed improved documentation of initial assessment and management compared to the previous round, together with some evidence of compliance with the guidelines for management of shoulder pain. However, appropriate management may have been under-reported. For example, positioning charts or wheelchair arm supports were sometimes provided but not recorded. Outcome was at least noted in most cases. The importance of serial recording was highlighted as the patients' condition (for example, their muscle tone or their mobility) may vary during their stay, requiring a change in management.

A specific objective was to assess the impact of introducing a pro forma to record management more systematically. Though aiming to prompt clinical practice, it analysed documentation rather than clinical practice itself. While successful in many areas, this introduced a more rigid structure.

The audit has highlighted some problems with the implementation and maintenance of ICPs in routine clinical practice. To begin with, it is difficult to write a simple protocol to cater for conditions such as shoulder pain with its diverse presentation patterns. Team members may be confused about what information needs to be recorded for which patients, or may become disenchanted with complicated paperwork. Where patients have mild, transient and easily managed pain, this can be perceived as "using a sledge hammer to crack a nut" and may distract staff from more pertinent aspects of patient care. Insistence on very rigorous standards may sometimes be unnecessary, for example, documenting fortnightly reviews once a good care routine has been established.

A further major challenge is keeping up momentum after initial enthusiasm wanes. The ICP co-ordinator played a crucial role in both training and prompting staff to record interventions appropriately. Documentation deteriorated when the co-ordinator was absent or new to the post. High staff turnover, especially among nurses, requires repeated training, which places extra demands on clinicians' time. This may have contributed to the poor documentation of continuing management, especially in the later stages. Discussion of the ICP is now included in the weekly ward round to raise staff awareness, monitor progress and improve documentation. Strong leadership and commitment is essential for successful continuation.

While we are now better able to describe our management of shoulder pain and its outcome in our patients, our inability to show relationships between the two from the small numbers included here highlights a limitation of the study. Thus there is still little direct evidence that ICPs actually improve quality of care (7). In this audit, most patients could complete the ShoulderQ to some level, despite varying degrees of cognitive and/or language impairment. The help of speech and language therapy and psychology staff was invaluable, but may not be available in other settings. Work is in progress to develop simpler and more accessible versions of the ShoulderQ for those with profound impairment. Future development will include streamlining the ICP documentation to make it more comprehensible for staff who are not familiar with it.

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APPENDIX: AUDIT STANDARDS

Standard A marks ICP commencement.
Standards B–K should be carried out within the stated time from ICP commencement.
Standards L–O should be carried out every 2 weeks while on the ICP.
All standards should be documented.

Documentation of initial assessment and management

A: For all patients with hemiplegic shoulder pain, a preliminary assessment to determine the presence/absence and characteristics of shoulder pain should be undertaken within 24 hours of admission (or complaint, if pain develops subsequently).
B: Simple analgesia should be prescribed within 24 hours.
C: An appropriate nursing positioning and moving chart should be placed above the patient's bed within 48 hours.
D: An appropriate wheelchair armrest or other support should be provided within 48 hours.
E: A dated goal, specific to the management of shoulder pain should be set within 48 hours.
F: A full shoulder assessment should be completed by the multidisciplinary team within 10 working days.
G: An appropriate analgesia regimen in relation to timing and severity of shoulder pain should be introduced within 10 working days.
H: The treatment plan should be agreed within 10 working days.

Ability to self-report on pain and pain status at admission

J: The patient's ability to self-report on pain should be assessed (noting the degree of assistance required) within 7 working days.
K: A patient-led record of the timing and severity of shoulder pain should be completed within 7 working days.

Documentation of fortnightly reviews

L: Patient-led records of the timing and severity of shoulder pain should be repeated.
M: Multi-disciplinary team reviews should be undertaken (even when there are no changes, this should be recorded).
N: Medication should be reviewed.
O: Arm supports should be reviewed.

Documented changes in management as a result of review

P: Medication should be prescribed according to the agreed protocol, or the reasons for variance recorded.
Q: Arm supports should be re-issued according to the protocol in response to changing physical status; in particular provision of suitable "mobile" arm supports for those who are ambulant or the reasons for variance recorded.
R: Patients with persistent shoulder pain despite appropriate basic management, should be considered for a change in management according to the protocol or the reasons for variance recorded:

a) Pain associated with hypertonicity (spasticity) in the shoulder girdle muscles should be considered for treatment with Botulinum toxin.
b) Pain associated with hypotonicity (flaccidity) and subluxation should be considered for functional electrical stimulation (FES).

Documentation of final outcome

S: The date of resolution of pain or pain status at discharge should be documented.