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Clinical guidelines for the pre and post operative physiotherapy management of adults with lower limb amputations

British Association of Chartered
Physiotherapists in Amputee Rehabilitation



NICE has accredited the process used by the British Association of Chartered Physiotherapists in Amputee Rehabilitation. Accreditation is valid for 5 years from 10 January 2017 and is applicable to the guideline processes described in 'Clinical guidelines for the pre and post-operative physiotherapy management of adults with lower limb amputations'."

Clinical guidelines for the pre and post operative physiotherapy management of adults with lower limb amputations

About this document:

This document presents the updated, evidence based, clinical guidelines for the pre and post operative physiotherapy management of adults with lower limb amputations as described in the literature and expert opinion.

Please refer to the guideline process document for full details of all methodology and processes undertaken in the development of these recommendations.

All appendices referred to will be found in the process document.

Citing the full guideline document:

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About BACPAR:

The British Association of Chartered Physiotherapists in Amputee Rehabilitation (BACPAR) is a professional network recognised by the Chartered Society of Physiotherapy (CSP). BACPAR aims to promote best practice in the field of amputee and prosthetic rehabilitation, through evidence and education, for the benefit of patients and the profession.

Comments on these guidelines and the additional documents should be sent to:

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Introduction

The first edition of this guideline was published in 2006. This second edition seeks to integrate new scientific evidence and current best practice into the original recommendations and create additional recommendations where new evidence has emerged.

These guidelines are not mandatory and BACPAR recognises that local resources, clinician enthusiasm and effort, support from higher management, as well as the rehabilitation environment in which the practitioner works, will influence the ability to implement recommendations into clinical practice.

■ CPD activities:

Examples of CPD activities and evidence can be found at Health Professions Council (2010) Continuing Professional Development & your registration. www.hpc-uk.org/assets/documents/10001314CPD_and_your_registration.pdf

■ Guideline recommendations

The guidelines are divided into six sections for ease of reference:

1. The role of the physiotherapist within the MDT
2. Knowledge
3. Assessment
4. Patient and carer information
5. Pre operative management
6. Post operative management

Each section includes an introduction, a summary of the

evidence, the relevant recommendations and good practice points (GPPs).

Throughout these sections the adults with lower limb amputation may be referred to as individuals, amputees, patients or users.

Recommendations were developed and graded according to the level of evidence (Appendix 8). After each recommendation the letter in brackets refers to the evidence grade allocated (Appendix 13).

Where a number of different evidence sources were used to develop a recommendation, the grade is based on the highest level of evidence used. This grade reflects the quality of the evidence reviewed and should not be interpreted as the recommendation's clinical importance.

The table of the papers utilised in developing the recommendations and their allocated level of evidence is in Appendix 9.

The full list of references follows the recommendations.

■ Key to the guideline update:

Where recommendations have been amended or added for this update symbols are displayed next to the recommendation numbering for ease of identification.

New recommendations in this guideline update are marked **. Amended recommendations are marked ~.

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Section 1 - the role of the physiotherapist within the multidisciplinary team

Introduction

A specialist multidisciplinary team (MDT) achieves the best rehabilitation outcome.^(38, 39, 40)

To provide an effective and efficient service the team work together towards goals agreed with the patient. The physiotherapist plays a key role in coordinating patient rehabilitation.⁽⁴¹⁾

The Chartered Society of Physiotherapy (CSP) Core Standards⁽²⁾ outline the role of the physiotherapist within an MDT. These standards emphasise the need for physiotherapists to be aware of the roles of other members of the MDT and to have clear protocols and channels of referral and communication between members.

To rehabilitate people who have had an amputation, the core MDT may include: specialist physiotherapist, specialist occupational therapist, surgeon, specialist nurse and social worker. Additional MDT members include: diabetic team, dietician, general practitioner, specialist nurses, housing and home adaptation officer, podiatrist, counsellor, psychologist, social services team, social worker, pain control team, wheelchair services, rehabilitation consultant prosthetist, orthotist and community services.

Evidence

The multidisciplinary team approach to rehabilitation following amputation is recognised internationally as the rehabilitation mode of choice; however there is little published literature to support this. Campbell et al⁽⁴²⁾ concluded from a case series of 61 people with an amputation that the MDT can reasonably predict prosthetic outcome 85% of the time in predicted users and 65% of the time in predicted non users. Ham et al⁽⁴¹⁾, in a case controlled study, suggested that vascular amputees benefit from care by a specialist MDT resulting in reduced hospital stay and out-patient re-attendance.

In addition to Ham et al⁽⁴¹⁾, two other papers support the role of the physiotherapist within the MDT. Condie et al⁽⁴³⁾ found that in a cohort of Scottish people with a lower limb amputation, the time from surgery to casting was reduced when the patients received physiotherapy. Klingenstierna⁽⁴⁴⁾ concluded from eight case studies that exercise improves thigh muscle strength in people with a transtibial amputation.

In the absence of other evidence on the role of the physiotherapist consensus opinion was sought to further inform this section.⁽⁴⁵⁾

Recommendations

1.1 Within the MDT the role of the physiotherapist includes exercise therapy. B^(2, 44)

1.2 Within the MDT the role of the physiotherapist includes assessment and treatment with early walking aids. B⁽⁴³⁾

1.3 The physiotherapist contributes, as part of the MDT, to the prediction of prosthetic use. B⁽⁴²⁾

1.4 A physiotherapist specialised in amputee rehabilitation (Appendix 16) should be responsible for the management of physiotherapy care. C^(3, 41)

1.5 When it is possible to choose the level of amputation the physiotherapist should be consulted in the decision making process regarding the most functional level of amputation for the individual. C⁽⁴⁵⁾

1.6 The physiotherapist should be involved in producing protocols to be followed by the MDT. C⁽⁴⁵⁾

1.7 There should be an agreed procedure for communication between the physiotherapist and other members of the MDT. C⁽⁴⁵⁾

1.8 Within the MDT the role of the physiotherapist includes compression therapy. C⁽⁴⁵⁾

1.9 A physiotherapist experienced in amputee rehabilitation can, as part of the MDT, be responsible for the decision to start using the early walking aid having liaised with other members of the MDT as necessary. C⁽⁴⁵⁾

1.10 The physiotherapist, along with other professionals, should contribute in the management of residual limb wound healing. C⁽⁴⁵⁾

1.11 The physiotherapist, along with other professionals should contribute to the management of pressure care. C⁽⁴⁵⁾

1.12 The physiotherapist, along with other professionals, should contribute to the management of wound healing on the contra lateral limb if applicable. B⁽⁸⁾

1.13 The physiotherapist, as part of the MDT, should contribute to the management of pain as necessary. C⁽⁴⁵⁾

1.14 The physiotherapist, as part of the MDT, should be involved in making the decision to refer the patient for a prosthetic limb. C⁽⁴⁵⁾

1.15 The physiotherapist should contribute to the decision on which MDT outcome measures are to be used. C⁽⁴⁵⁾

1.16 The physiotherapist, along with other professionals, should contribute to the patient's psychological adjustment following amputation. C⁽⁴⁵⁾

1.17 The physiotherapist should be able to refer directly to a clinical psychologist/counsellor if appropriate. C⁽⁴⁵⁾

Good practice points

The MDT agrees its approach to rehabilitation.⁽⁴⁵⁾

Roles and responsibilities are agreed within the MDT.⁽⁴⁵⁾

Patient and public involvement should underpin service delivery and development.⁽⁴⁵⁾

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Establish channels of communication between: the MDT, stakeholders, commissioners, professional networks.⁽⁴⁵⁾

Education, audit and research should be undertaken on a regular basis by the MDT.⁽⁴⁵⁾

Documented pathways of care should be used.⁽⁴⁵⁾

Contact details of MDT members should be readily available to the patient and carers.⁽⁴⁵⁾

Access to other stakeholder agencies should be understood and agreed to facilitate discharge planning and transfer of care e.g. Intermediate Care Teams, Social Services etc.⁽⁴⁵⁾

A summary of the patient's treatment and status at transfer or discharge should be documented in the patient's record, with details of future management plan e.g. details of package of care, community therapy, prosthetic referral.⁽⁴⁵⁾

Section 2 – Knowledge

Introduction

To provide effective rehabilitation the physiotherapist needs a good understanding of the factors that may influence the outcome of rehabilitation.⁽⁴⁵⁾

The physiotherapist also needs to have an understanding of prosthetic prescription principles and the prosthetic rehabilitation process to successfully plan and deliver rehabilitation.⁽⁴⁵⁾

Knowledge of the complications that may arise following amputation of the lower limb and how members of the MDT may deal with these complications is essential in order that the rehabilitation process may be adapted to accommodate these factors.^(46, 47)

An understanding of the psychological implications of amputation is necessary and the physiotherapist should be aware of how these issues may be dealt with by the physiotherapist and other members of the MDT.⁽⁴⁸⁾

The physiotherapist is responsible for keeping up to date with developments in amputee rehabilitation. This should include awareness of published guidance and recommendations.

Evidence

Concurrent conditions will influence rehabilitation potential and the physiotherapist should be aware of these⁽⁴⁵⁾. In a non-systematic overview of 71 studies Pernet et al⁽³⁹⁾ suggest that concurrent conditions along with increasing age are prognostic of a low level of function. In a systematic review Sansam et al⁽⁴⁹⁾ found that poorer health status can impact negatively on walking ability particularly given the increased energy requirements to walk with a prosthesis.

Hanspal et al⁽⁵⁰⁾, in a retrospective case series, found that outcome is affected by cognitive and psychomotor function. In a literature review Coffey et al⁽⁵¹⁾ identify that a range of strategies should be used in the rehabilitation of amputees.

Cognitive deficit affecting memory and executive function is predictive of functional limitations.

Czerniecki et al⁽⁵²⁾ report that average subjects did not regain pre-amputation levels of mobility within the first year post surgery. In addition to this, increased age and previous arterial reconstruction are factors associated with a reduced rate of ambulatory recovery.

In a 1997 pilot study of 10 patients (seven with abnormal resting ECG) with peripheral vascular disease, Bailey et al⁽⁵³⁾ investigated ECG abnormalities during walking with a pneumatic post-amputation mobility aid. They found normal blood pressure elevation in nine patients and a group mean age-predicted maximum heart rate of less than 70%, suggesting appropriate exercise levels. However, five patients reached over 70% of age-predicted maximum heart rate. They suggest that physiotherapists need to pay close attention to patients' cardiac status during rehabilitation.

Czyrny and Merrill⁽⁵⁴⁾ concluded that amputees on renal dialysis admitted to acute rehabilitation had similar functional outcomes and rehabilitation costs to amputees with peripheral vascular disease without renal failure. In a prospective case series of 16 healthy males Rush et al⁽⁵⁵⁾ found that there is an increased risk of osteopenia in the femur of the amputated limb.

In a prospective cohort of 21 diabetic patients with unilateral, transtibial amputations Jayatunga⁽⁵⁶⁾ found that the use of orthoses/appropriate footwear reduced the risk of contralateral foot damage due to diabetic neuropathy.

Factors affecting wound healing include smoking, malnutrition, previous surgery, gangrene, level of amputation, antibiotics, diabetes, surgical technique, dressings and drains. No single factor can be considered in isolation⁽⁴⁶⁾.

Two case series^(57, 58) have looked into the relationship between amputation level and rehabilitation outcome. These studies show that patients with a transtibial amputation have a greater chance of succeeding with a prosthesis than those with a trans-femoral amputation^(57, 58).

Ward and Meyers⁽⁵⁹⁾ in their review found evidence that the energy cost of ambulation is greater with ascending levels of amputation. They also describe that with daily exercise people with an amputation consume significantly less oxygen (i.e. use less energy).

Use of an early walking aid to facilitate assessment and rehabilitation is well documented.^(7, 59, 60, 61, 62, 63, 64)

Vanross et al⁽⁶⁰⁾ demonstrate that in the presence of a large open residual limb wound, early use of the pneumatic post amputation mobility (PPAM) aid may still be appropriate and can facilitate healing. An MDT protocol was considered essential.

Mazari et al⁽⁶³⁾ concluded there is no difference in clinical and quality of life outcomes between articulated and non-articulated early walking aids in the rehabilitation of transtibial amputees.

Three studies agree that exercise plays an important part in a functional rehabilitation programme following amputation.^(44, 65, 66)

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The BACPAR guidelines on the management of residual limb oedema reference the different approaches to inform best practice.⁽⁷⁾

Discharge data for amputees in Scotland over a three-year period⁽²³⁾ (1998) shows that the use of compression socks to control oedema of the residuum can reduce the time to prosthetic rehabilitation. Lambert and Johnson⁽⁶⁷⁾ in an audit of physiotherapists working in artificial limb units found that compression socks are widely used.

McCartney et al⁽⁶⁸⁾ concluded from his cross sectional study that 10% of patients had their quality of life affected by phantom pain/sensation. Two studies found that it was not uncommon for amputees to experience phantom limb sensation/pain influenced by a number of factors^(69, 70). Mortimer et al⁽⁷¹⁾ suggests in a well conducted qualitative study that accurate information on phantom limb pain/sensation should be provided by an individual with appropriate knowledge and training. A range of modalities have been identified in the management of phantom limb pain^(69, 72, 73, 74).

In a retrospective cohort of 254 lower limb amputees, Meikle et al⁽⁷⁵⁾ found that interruptions to rehabilitation are common and result in longer periods of rehabilitation but the outcome is not adversely affected.

A study into psycho-educational intervention by Delehanty⁽⁴⁸⁾ concluded that psychological support is beneficial.

Recommendations

2.1 ~The use of early walking aids as an assessment and treatment tool is understood by the physiotherapist. A^(7, 61, 64)

2.2 The physiotherapist is aware that level of amputation, pre-existing medical conditions and social environment will affect rehabilitation. B^(39, 45, 49, 51, 52, 57, 76, 77, 78)

2.3 ~The role of exercise therapy as an essential part of the rehabilitation process is understood. B^(44, 53, 59, 65, 66, 79)

2.4 ~The impact of the level of amputation on rehabilitation potential is understood by the physiotherapist. B^(45, 57, 58, 59)

2.5 ~The physiotherapist has an understanding of the predisposing factors to successful (and unsuccessful) rehabilitation. B^(31, 45, 51, 52, 53, 54)

2.6 ~The physiotherapist has an understanding of the management of residual limb oedema. B^(7, 43, 67)

2.7 ~The physiotherapist is aware that pain (of the residuum, phantom or lower back) may affect the quality of life of the amputee. B^(68, 69, 70)

2.8 ~Methods of pain relief for the post-operative treatment of phantom pain/sensation are understood by the physiotherapist. B^(71, 72, 73, 74)

2.9 ~The physiotherapist has an awareness of the long term effects of amputation. B^(52, 55, 59)

2.10 ~The physiotherapist understands the factors affecting the healing of residuum wounds. B^(7, 46, 60)

2.11 ~The psychosocial issues that may affect patients following amputation and the cognitive and psychomotor aspects affecting the rehabilitation potential of the amputee are understood by the physiotherapist. B^(48, 50, 51, 78)

2.12 ~The risk of damage to the remaining diabetic/neuropathic foot is understood by the physiotherapist. B^(8, 30, 56, 80)

2.13 The physiotherapist should have an understanding of the pathology leading to amputation. C⁽⁴⁵⁾

2.14 ~The physiotherapist should have knowledge of medical investigations commonly undertaken prior to amputation and their significance. C^(45, 52)

2.15 The physiotherapist should have knowledge of surgical techniques used in amputation. C⁽⁴⁵⁾

2.16 ~The physiotherapist should have knowledge of the principles of prosthetic prescription. C^(31, 45)

2.17 The physiotherapist should be aware of the possible psychological effects that may occur following amputation. C⁽⁴⁵⁾

2.18 ~The physiotherapist should have basic knowledge of the principles of counselling and should know when it is appropriate to refer a patient to a clinical psychologist/counsellor. C⁽⁴⁵⁾

2.19 The physiotherapist should be aware of the socio-economic impact of lower limb amputation. C⁽⁴⁵⁾

2.20 The physiotherapist should be aware of the systems in place to refer for assessment for a prosthesis. C⁽⁴⁵⁾

2.21 ~The physiotherapist should have basic knowledge of

- Who prescribes wheelchairs
- How they are provided
- Any accessories including pressure-relieving seating. C⁽⁴⁵⁾

2.22 ~The physiotherapist should have basic knowledge of the provision of equipment that can facilitate activities of daily living. C⁽⁴⁵⁾

Good practice point

There should be opportunities for CPD and lifelong learning.⁽⁴⁵⁾

Section 3 – Assessment

Introduction

Sufficient information should be gathered from all sources including the clinical record and other members of the MDT before carrying out a full subjective and objective examination of the patient. This should take into account the emotional and cognitive status and co-morbidities e.g. cardiac and/or renal disease, diabetes, arthritis or previous stroke, which may affect the patient's motivation, exercise tolerance, skin condition or sensation. The social situation, including available support, occupation and hobbies, together with the home environment of the patient, should also be considered.⁽²⁾

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Realistic goals and a rehabilitation programme should be discussed and agreed with the patient (and carers).⁽²⁾

An outcome measure should be used to evaluate change in functional level as part of continual assessment.

Evidence

Collin et al⁽²³⁾ in 1995 concluded from a case series of poorly defined elderly individuals that a wheelchair should be routinely provided following a lower limb amputation. In 1992, Collin et al⁽⁷⁶⁾ highlighted the importance of environmental factors in determining functional outcome.

Studies that gave evidence supporting the need to examine specific pathologies include a cohort study by Potter et al⁽⁷⁷⁾. They noted that in patients with diabetes, peripheral neuropathy is nearly always present in the intact limb and that it is also present in two thirds of non-diabetics. This demonstrates the need to ensure sensation is routinely checked at assessment.

The care of the contra-lateral limb guidelines evidence the importance of assessing skin condition⁽⁸⁾ This is also relevant when assessing patients who have undergone previous amputation of the contra-lateral limb. The importance of skin checks is reinforced by a descriptive cohort study carried out by Levy in 1995⁽⁸¹⁾.

Coffey et al⁽⁵¹⁾ in a systematic literature review found that impaired cognitive skills such as memory and executive function negatively affect independence. A further paper by Hanspal⁽⁷⁸⁾ suggested that the results of a cognitive assessment soon after amputation can predict the level of mobility likely to be achieved. This was based on a cohort study of 32 elderly patients but no specific results were published on level of mobility and links with cognitive status.

Recommendations

3.1 ~~~There should be written evidence of a full physical examination and assessment of previous and present function. B⁽²⁾

3.2 ~~~The patient's social situation, psychological status, goals and expectations should be documented. B^(50, 76, 78)

3.3 ~~~Relevant pathology including diabetes, previous arterial reconstruction, impaired cognition and skin condition should be noted. B^(78, 51, 81, 77, 52)

3.4 ~~~A problem list and treatment plan, including agreed goals, should be formulated in partnership with the patient. B⁽²⁾

Good practice points

A locally agreed amputee specific physiotherapy assessment tool should be used.⁽⁴⁵⁾

Names and contact details of the MDT members involved in the patient's care should be recorded to facilitate communication.⁽⁴⁵⁾

The principles of the Single Assessment Process (SAP) should be considered to improve MDT communication.⁽⁴⁵⁾

Section 4 – Patient and Carer Information

Introduction

The CSP Quality Assurance Standard⁽²⁾ 4.3 states that “information [should be] provided to enable service users to participate fully in their care”. This promotes understanding of the process and reasoning behind treatment. The rehabilitation process should have an educational element that empowers patients and carers to take an active role in their present and future management. This will assist with problem solving and awareness of when to seek professional help.

Due to the number of recommendations in this section it has been sub-divided into four sections for ease of use. These sub-sections are:

- 4.1 Patient journey
- 4.2 Informed goal setting
- 4.3 Care of the remaining limb
- 4.4 Care of the residual limb

■ 4.1. Patient journey

Evidence

In the absence of published literature this sub-section is supported by consensus opinion.⁽⁴⁵⁾

Recommendations

4.1.1 ~~~The physiotherapist should give patients information about the expected stages and location of the rehabilitation programme suited to their individual circumstances. C^(2, 45)

4.1.2 ~~~With the patient's consent, the physiotherapist should give carers information about the expected stages and location of the rehabilitation programme suited to the patient's individual circumstances. C^(2, 45)

4.1.3 The physiotherapist should offer patients the opportunity to meet other adults with lower limb amputations. C⁽⁴⁵⁾

4.1.4 Where appropriate, and with the patient's consent, the physiotherapist should offer carers the opportunity to meet other adults with lower limb amputations. C⁽⁴⁵⁾

4.1.5 The physiotherapist should provide information about the prosthetic process to those patients likely to be referred for a prosthesis. C⁽⁴⁵⁾

4.1.6 The physiotherapist should offer to show demonstration limbs to those patients likely to be referred for a prosthesis. C⁽⁴⁵⁾

4.1.7 The physiotherapist should know where to refer patients for information about benefits. C⁽⁴⁵⁾

4.1.8 The physiotherapist should know where to get advice on arrangements available to support carers. C⁽⁴⁵⁾

4.1.9 The physiotherapist should be able to refer the patient to other agencies as necessary. C⁽⁴⁵⁾

4.1.10 ~~~Where possible all verbal information/advice given should be supplemented in written form. C^(2, 45)

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4.2. Informed goal setting

Evidence

The CSP Quality Assurance Standard 8.5 states that “goals [should be] agreed with the service user and multi-disciplinary team, including outside agencies and wider carers and family”.

A prospective cohort study by Czerniecki⁽⁵²⁾ summarised that co-morbidities (including cognitive and physical factors) will impact on levels of ambulation post-operatively. This is further supported by a systematic review by Coffey et al⁽⁵¹⁾ which states that cognitive impairment, particularly memory and executive function, is predictive of functional limitations over time. These factors should be considered when undertaking the goal-setting process.

In the absence of other evidence, consensus opinion was sought to further inform this section.⁽⁴⁵⁾

Recommendations

4.2.1 Patients/carers should be made aware that concurrent pathologies and previous mobility affects realistic goal setting and final outcomes of rehabilitation. C⁽⁵²⁾

4.2.2 Patients/carers should be made aware that the level of amputation affects the expected level of function and mobility. B^(52, 82)

4.2.3 Patients/carers should be made aware that they will experience lower levels of function than bipedal subjects. B⁽⁵²⁾

4.2.4 The physiotherapist should use appropriate outcome measures for rehabilitation goals. C^(2, 3)

4.2.5 The physiotherapist should use a range of strategies to assess and consider the impact of cognitive impairment on goal setting. B⁽⁵¹⁾

4.3. Care of the remaining limb

Evidence

A body of work was carried out by BACPAR in 2009 recommending that “care of the remaining/contra-lateral limb is included in therapeutic practice. These guidelines are intended to be a practical resource for therapists working with lower limb amputees and should be used alongside other current, published guidelines.”⁽⁸⁾ Rerkasem et al⁽⁸⁰⁾ also support the education of patients in regards to risk factors for foot care and ensuring that the patient is under the care of appropriate MDT foot care specialists.

Recommendations

4.3.1 Vascular and diabetic patients and their carers should be made aware of the risks to their remaining foot and educated in how they can reduce them. B^(8, 80)

4.3.2 The patient/carer should be taught how to monitor the condition of the remaining limb. B^(8, 80)

4.3.3 Physiotherapists should establish links with their local podiatry/chiropractic services to ensure that information and education given to patients and carers is consistent. C⁽⁴⁵⁾

4.3.4 Physiotherapists should ensure that patients are under the care of a specialist MDT, including a diabetic specialist, podiatrist and foot care specialist. B⁽⁸⁾

4.4. Care of the residual limb

Evidence

In a review by Eneroth⁽⁴⁶⁾ multiple factors were found to affect wound healing in vascular patients with an amputation. Oedema control is considered essential in preventing this delay. BACPAR guidelines found robust evidence to support the use of rigid dressings, pneumatic post amputation mobility (PPAM) aids, compression socks and wheelchair residual limb support boards in the management of oedema and discouraged the use of elastic bandage wrapping⁽⁷⁾.

In the absence of other evidence, consensus opinion was sought to further inform this section.⁽⁴⁵⁾

Recommendations

4.4.1 Advice should be given to the patient/carer on the factors affecting wound healing. B⁽⁴⁶⁾

4.4.2 Advice should be given to the patient/carer on the use of compression socks. B^(3, 7, 43)

4.4.3 Instruction should be given to the patient/carer on methods to prevent and treat adhesions of scars. C⁽⁴⁵⁾

4.4.4 The physiotherapist should give on-going advice about residual limb care. C⁽⁴⁵⁾

Good practice points

Names and contact details of the MDT members involved in the patient’s care should be given to patients and carers.⁽⁴⁵⁾

Information leaflets/booklets should be developed locally for patients and carers to supplement information given verbally.^(45, 71)

Physiotherapists should be aware of the BACPAR Guidelines entitled “Risks to the contra-lateral foot of unilateral lower limb amputees” and “Guidance for the multi-disciplinary team on the management of post-operative residuum oedema in lower limb amputees”.^(7, 8, 45)

Section 5 – Pre-op Management

Introduction

Early assessment and planning of rehabilitation can commence at this stage and helps to prepare the patient for rehabilitation. A pre-amputation consultation also enables the physiotherapist to give appropriate advice, information and reassurance; issues such as phantom limb sensation and avoidance of falls may be discussed.⁽⁸³⁾ However, it is acknowledged that patients who require emergency amputation may not have the opportunity for pre-amputation consultation, assessment and treatment.

Evidence

This section is supported by consensus opinion in the absence of any published literature.⁽⁴⁵⁾

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Recommendations

- 5.1 Where possible the physiotherapist should reinforce information given by other MDT members about the general surgical process (not technique). C⁽⁴⁵⁾
- 5.2 Where possible the patient and carers should be given advice, information and reassurance by the physiotherapist about rehabilitation. C^(45, 83)
- 5.3 The physiotherapy assessment should be commenced pre-operatively, if possible. C^(3, 45)
- 5.4 Where possible rehabilitation/discharge planning should commence pre-operatively. C⁽⁴⁵⁾
- 5.5 Where appropriate and possible the patient should be instructed in wheelchair use pre-operatively. C⁽⁴⁵⁾
- 5.6 A structured exercise regime should be started as early as possible. C⁽⁴⁵⁾
- 5.7 Bed mobility should be taught where possible. C⁽⁴⁵⁾
- 5.8 Where appropriate and possible transfers should be taught pre-operatively. C⁽⁴⁵⁾
- 5.9 If indicated, the patient should be assessed for physiotherapy respiratory care. C⁽⁴⁵⁾
- 5.10 If indicated, the patient should be given appropriate physiotherapy respiratory treatment. C⁽⁴⁵⁾
- 5.11 Pain control should be optimised prior to physiotherapy treatment pre-operatively. C⁽⁴⁵⁾
- 5.12 If appropriate, and with the patient's consent, carers should be involved in pre-operative treatment and exercise programmes. C⁽⁴⁵⁾

Good practice point

The physiotherapist should be involved with the MDT decision to proceed with amputation and level selection.^(10, 45)

Where this is not possible, a procedure for prompt referral to physiotherapy following decision to amputate should be developed.⁽¹⁰⁾

Section 6 – Post-op Management

Introduction

The rehabilitation process should commence as early as possible, preferably following a suitable care pathway⁽⁸⁴⁾. Patients should be assessed and a rehabilitation plan discussed and agreed. Advice and information should be given regarding bed mobility, to avoid complications such as contractures and pressure sores. Appropriate advice and assistance with transfers should be given. Following assessment, a problem list should be made, with both short and long term goals considered, taking into account the patient's psychological, emotional and physical status, pain management and the broader issues surrounding social and home environment.

Setting of care

In 2000 a retrospective cross sectional study of 146 traumatic amputees by Pezzin et al⁽⁸⁵⁾ found that their physical function and vitality were increased by having longer in-patient rehabilitation. Schaldach⁽⁸⁴⁾ found in a retrospective 'before and after' case control study of 71 trans-femoral and transtibial patients that in-patient rehabilitation is more effective in terms of cost and time when a clinical care pathway is followed. Meikle et al⁽⁷⁵⁾, in a retrospective cohort study, found that interruptions to rehabilitation due to co-morbidity are common, but do not adversely affect the outcome of rehabilitation despite lengthening the process. In a case control study Cutson et al⁽⁸⁶⁾ observed that in-patient rehabilitation reduced the time from surgery to prosthetic ambulation among male dysvascular transtibial patients. **There are, however, known issues with accessibility to inpatient rehabilitation.

For ease of description, this section has been divided into the following sub-sections:

- 6.1 Immediate post-operative care
- 6.2 Environment and equipment
- 6.3 Compression therapy
- 6.4 Mobility
- 6.5 Early walking aids (EWAs)
- 6.6 Falls management
- 6.7 Wheelchairs and seating
- 6.8 Prevention/reduction of contractures
- 6.9 Exercise programmes
- 6.10 Management of phantom sensation and pain

Evidence

This section is supported by consensus opinion in the absence of relevant published literature.⁽⁴⁵⁾

Recommendations

- 6.1.1 Physiotherapy assessment and rehabilitation should ideally start on the first day post-operatively. C⁽⁴⁵⁾
- 6.1.2 Pain should be considered and adequately controlled prior to every treatment. C⁽⁴⁵⁾
- 6.1.3 Respiratory care should be given if appropriate. C⁽⁴⁵⁾
- 6.1.4 A physiotherapist should use their assessments to inform the MDT regarding interventions and discharge planning. C⁽⁴⁵⁾

6.2 Environment and equipment

Evidence

**Environment and equipment should be considered in relation to the individual, the intervention and both the rehabilitation setting and discharge destination.

A questionnaire cross sectional survey carried out by White⁽⁸⁷⁾ in 1992 concluded that residual limb support boards are well accepted for use with patients with a lower limb amputation, but that therapists are not always confident about their use. The evidence based guidelines for occupational therapy with

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people who have had lower limb amputations recommend the provision of residual limb support boards for all transtibial amputees.⁽⁸⁸⁾

In the absence of other evidence consensus opinion was sought to further inform this section.⁽⁴⁵⁾

Recommendations

6.2.1 ~~~The physiotherapist should have knowledge of the provision of equipment that can enhance the rehabilitation process and facilitate activities of daily living. C⁽⁴⁵⁾

6.2.2 ~~~Physiotherapists should be familiar with the correct use and availability of specialist amputee equipment, e.g. slings, hoists, residual limb boards. C^(45, 87, 88)

6.2.3 The physiotherapist should be involved in home visits where necessary. C⁽⁴⁵⁾

■ 6.3 Compression therapy

Evidence

~~~A cross sectional survey of physiotherapists<sup>(67)</sup> showed that compression socks are widely used, but that their use varies greatly. Discharge data from all Scottish amputees over a three-year period showed that all forms of compression therapy resulted in quicker progression to prosthetic rehabilitation<sup>(43)</sup>. Recent guidelines by BACPAR have demonstrated that available evidence is against the use of elastic bandages due to it being unreliable and dangerous in regards to pressure distribution \*\*BACPAR oedema guidelines recommend compression therapy is commenced within 10 days post-operatively.<sup>(3,7)</sup>

In the absence of other evidence, consensus opinion was sought to further inform this section.<sup>(45)</sup>

## Recommendations

6.3.1 ~~~A compression sock should be used in preference to elastic bandages for reducing limb volume. D<sup>(7)</sup>

6.3.2 The physiotherapist should use compression therapy as appropriate. D<sup>(7)</sup>

6.3.3 \*\*The timing of compression therapy application should be discussed with the MDT at an early stage. C<sup>(7, 45)</sup>

## ■ 6.4 Mobility

### Evidence

A longitudinal cohort study by Stineman et al<sup>(89)</sup> found that even a small improvement in dependency levels resulted in improved mortality rates at six months. i.e. through progression of transfers and functional ability.

\*\*According to Kirby et al<sup>(90)</sup> in a qualitative study, "the seated stair handling method is a generally effective, safe and well-tolerated method for people with unilateral lower limb amputations to ascend and descend the stairs."

In the absence of other evidence, consensus opinion was sought to further inform this section. <sup>(45)</sup>

## Recommendations

6.4.1 ~~~Ideally, bed mobility should be taught on the first day post-operatively. C<sup>(45)</sup>

6.4.2 Sitting balance should be re-educated if needed. C<sup>(45)</sup>

6.4.3 Standing balance should be re-educated if needed. C<sup>(45)</sup>

6.4.4 Safe transfers should be taught as early as possible. C<sup>(45)</sup>

6.4.5 ~~~Mobility post-operatively should be in a wheelchair unless there are specified reasons to teach a patient to use crutches/zimmer frame/rollator. C<sup>(45)</sup>

6.4.6 ~~~The physiotherapist should help the patient gain maximum mobility post-operatively. C<sup>(45, 89, 90)</sup>

## ■ 6.5 Early walking aids (EWAs)

### Evidence

\*\*Pollock et al<sup>(62)</sup> found in a randomised controlled trial that using EWA's reduced the incidence of post-operative complications, and resulted in faster and more successful rehabilitation. Schon et al<sup>(91)</sup> demonstrated in a 'before and after' case control study that prefabricated prostheses may reduce complications, falls, revisions and time to first prosthesis. \*\*This is further supported by Vanross<sup>(60)</sup> with the use of an EWA as part of an unhealed wound protocol. Lein<sup>(92)</sup> carried out a cross sectional survey in 1992, and concluded that the pneumatic post-amputation mobility (PPAM) aid provides a valuable tool for assessment and treatment, provided it is used correctly. In 1998, Condie et al<sup>(43)</sup> found from a cohort of all the Scottish amputee discharge information that use of compression therapy, including EWAs, resulted in quicker progression to prosthetic rehabilitation.

## Recommendations

6.5.1 EWAs should be considered as part of the rehabilitation programme for all lower limb amputation patients as an assessment tool. B<sup>(43, 60, 61, 91, 92)</sup>

6.5.2 EWAs should be considered as part of the rehabilitation programme for all lower limb amputation patients as a treatment tool. B<sup>(43, 60, 61, 91, 92)</sup>

6.5.3 EWAs should be used under the supervision of therapists trained in their correct and safe application and use. C<sup>(3, 92)</sup>

## ■ 6.6 Falls management

### Evidence

\*\*Three studies have reported an increased risk of falls following lower limb amputation<sup>(93, 94, 95)</sup>. Kulkarni<sup>(93)</sup> concluded that instruction on how to get up from the floor should be part of rehabilitation. Pauley<sup>(95)</sup> states that older age, greater number of co-morbidities, cognitive impairment and the use of a greater number of medications predict a greater likelihood of falling. \*\*"BACPAR guidance for the prevention of falls in lower limb amputees"<sup>(6)</sup> further supports this evidence by identifying a number of risk factors along with appropriate assessment tools and multi-factorial falls prevention interventions.

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## Recommendations

6.6.1 ~The patient, carers and the MDT should be made aware that the risk of falling is increased following lower limb amputation. B<sup>(6, 93)</sup>

6.6.2 ~Rehabilitation programmes should include education on preventing falls. B<sup>(6, 93, 96)</sup>

6.6.3 Patients and carers should be given instructions on how to get up from the floor in the event of the patient falling. B<sup>(6, 93, 96)</sup>

6.6.4 Advice should be given in the event that the patient is unable to rise from the floor. B<sup>(93, 96)</sup>

## 6.7 Wheelchairs and seating

### Evidence

~This section is supported by consensus opinion in the absence of any published literature.<sup>(45)</sup>

### Recommendations

6.7.1 \*\*Patients should routinely be provided with a wheelchair and appropriate accessories to include residual limb support (as appropriate) footplates, anti-tips and appropriate pressure management devices. C<sup>(45, 88)</sup>

6.7.2 Where necessary the physiotherapist should be able to assess a patient's suitability for a wheelchair or have knowledge of the referral process. C<sup>(45)</sup>

6.7.3 ~The physiotherapist as part of the MDT should be able to teach the patient and carer how to safely use the wheelchair, including all accessories. C<sup>(45, 87)</sup>

## 6.8 Prevention/reduction of contractures

### Evidence

This section is supported by consensus opinion in the absence of any published literature.<sup>(45)</sup>

### Recommendations

6.8.1 ~Contractures should be prevented by education of appropriate positioning. C<sup>(45)</sup>

6.8.2 ~Contractures should be prevented by education of stretching exercises. C<sup>(45)</sup>

6.8.3 Where contractures have formed appropriate treatment should be given. C<sup>(45)</sup>

## 6.9 Exercise programmes

### Evidence

~In the absence of other evidence consensus opinion was sought to further inform this section.<sup>(45)</sup>

### Recommendations

6.9.1 \*\*Following on from the initial assessment, an exercise program should be provided to address the problems

identified. This should be reviewed and progressed as appropriate. C<sup>(45)</sup>

6.9.2 ~An exercise regime should be given relevant to the patient's goals and reviewed on a regular basis. C<sup>(45)</sup>

## 6.10 Management of phantom sensation and pain

### Evidence

\*\*52% of patients experience phantom limb pain and/or sensation immediately following surgery<sup>(70)</sup>. ~Mortimer et al<sup>(71)</sup> in 2002, found from a well conducted qualitative study, using focus groups, that patients need accurate and timely information about phantom limb pain, and this should be provided by individuals with appropriate knowledge and training.

~McCartney<sup>(68)</sup>, in a cross sectional study of 40 subjects from Scotland, found that pain after amputation is common and affects quality of life in 10% of the population. In the absence of other evidence, consensus opinion was sought to further inform this section.<sup>(45)</sup>

### Recommendations

6.10.1 ~As early as possible, patients should be made aware they may experience phantom limb sensation or pain post-operatively. B<sup>(68, 70, 71, 72)</sup>

6.10.2 ~Information and treatment regarding phantom limb sensation and pain should be given by clinicians with appropriate knowledge and training. B<sup>(71, 72, 97)</sup>

6.10.3 \*\*Techniques for the self-management of phantom sensation and/or pain should be taught. C<sup>(45, 72)</sup>

6.10.4 ~Appropriate information and treatment should be given for residual limb pain. C<sup>(45)</sup>

### Good practice points

- Information leaflets/booklets should be developed locally for patients and carers to supplement information given verbally.<sup>(45)</sup>
- Information on self management/home exercise following discharge should be provided to the patient.<sup>(45)</sup>
- Patients requiring ongoing outpatient treatment should have this arranged prior to discharge.<sup>(45)</sup>
- A summary of the patient's treatment and status at transfer should be sent to the physiotherapist providing on-going treatment.<sup>(45)</sup>
- Contact names, telephone numbers and addresses of relevant MDT members should be supplied to patients prior to discharge.<sup>(45)</sup>
- \*\*Physiotherapists should be aware of the BACPAR guidance entitled "Guidance for the prevention of falls in lower limb amputees" and "Guidance for the multi-disciplinary team on the management of post-operative residuum oedema in lower limb amputees".<sup>(45)</sup>

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- \*\*Physiotherapists should be aware of the well established PIRPAG exercise program.<sup>(45)</sup>
- \*\*Physiotherapists should consider the option of ascending and descending the stairs using a seated method.<sup>(45)</sup>
- \*\*Physiotherapists should be aware of other relevant guidelines including AGILE and the OT guidelines.<sup>(45,96)</sup>

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