

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



**BACPAR**

BRITISH ASSOCIATION  
OF CHARTERED PHYSIOTHERAPISTS  
IN AMPUTEE REHABILITATION 2006



THE CHARTERED SOCIETY OF PHYSIOTHERAPY

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The endorsement statement is:

This clinical guideline was endorsed by the CSP following a process of expert and peer review. The recommendations are based on the available evidence and expert opinion identified through consensus. Recommendations are made for further research and users of the guideline should keep abreast of new evidence.

# **Clinical guidelines for the pre and post operative physiotherapy management of adults with lower limb amputation**

Produced by:

Penny Broomhead

Diana Dawes

Amanda Hancock

Pragna Unia

Anne Blundell

Vanessa Davies

And members of the BACPAR Guidelines Development Group



**British Association of Chartered Physiotherapists  
in Amputee Rehabilitation 2006**

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- Chartered Society of Physiotherapy (CSP)
- British Association of Chartered Physiotherapists in Amputee Rehabilitation (BACPAR).

Throughout this document adults with lower limb amputation are referred to as individuals, amputees or patients.

Comments on these guidelines should be sent to:

Penny Broomhead, Guidelines Co-ordinator,

BACPAR

Nottingham Mobility Centre

Nottingham University Hospitals

Hucknall Road

Nottingham NG5 1PB

email: [penny.broomhead@nuh.nhs.uk](mailto:penny.broomhead@nuh.nhs.uk)



## Foreword

This is the second guideline that BACPAR has developed, it follows on and links to the first document *Evidence based clinical guidelines for the physiotherapy management of adults with lower limb prostheses*.

*The Clinical guidelines for the pre and post operative physiotherapy management of adults with lower limb amputation* considers what constitutes best practice in the physiotherapy management of adults with lower limb amputation. Agreement about effectiveness of interventions has been derived from consideration of research, expert opinion, patient and professional experience. Recommendations in the document are based on the above together with the expert opinion of the guideline development group.

Readers are encouraged to use the material in their practice taking responsibility for identifying new information as it becomes available. The guidance given here does not override the responsibility of the physiotherapist to make appropriate decisions for individual patients, in consultation with the patient and/or carer.

The document represents considerable time, effort and commitment on the part of the guideline development group and members of BACPAR and will form part of the evidence base that will support physiotherapists in evaluating and developing their practice in this field.

The guideline development group are to be congratulated on their efforts and contribution to supporting best practice in physiotherapy for the management of adults with lower limb amputation.

**Dawn Wheeler**

**Head of Research and Clinical Effectiveness**

**Chartered Society of Physiotherapy**

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## 1 Background and development of the guidelines

### Introduction

The British Association of Chartered Physiotherapists in Amputee Rehabilitation (BACPAR) is a clinical interest group recognised by the Chartered Society of Physiotherapy (CSP). BACPAR aims to promote best practice, through evidence and education, in the field of amputee and prosthetic rehabilitation for the benefit of patients and the profession. It is committed to research and education, providing a network for the dissemination of best practice in pursuit of excellence and equity whilst maintaining cost effectiveness.

These guidelines have been produced by physiotherapists who are members of the Chartered Society of Physiotherapy and who hold State Registration with the Health Professions Council.

A clinical guideline is not a mandate for practice – it can only assist the clinician with the decision making process about a particular intervention. They do not negate the need for physiotherapists to use their clinical reasoning skills or discuss choices with patients. However, where a guideline recommendation is based on strong evidence of effectiveness, there would need to be an explicit reason for not implementing it for a particular patient, such as other complicating conditions or patient preferences and this should be documented [1].

This guideline is derived from a rigorous search of the literature, forming recommendations based on the best available evidence. However, the lack of sufficient high quality published evidence meant that in order to publish a useable guideline it was necessary to rely heavily on consensus opinion. This was gained through a meticulous consensus exercise using physiotherapists experienced in pre-prosthetic rehabilitation. The need to develop so many recommendations from expert opinion highlights the need for detailed research in this area of rehabilitation. BACPAR has debated the need for research and has proposed the following topics as priorities for research in the field of amputee rehabilitation

- A valid tool to identify health benefits specific to people with lower limb amputation
- Health gains and benefits of prosthetic prescription versus wheelchair use
- The impact of a specialist physiotherapist on the multidisciplinary team (this has implications in other areas of rehabilitation)
- Pre-operative physiotherapy management
- Early post-operative physiotherapy management.

The guidelines are intended as a resource to guide application of best practice. They should be used in conjunction with the CSP Core Standards [2].

The scope of these guidelines is purposely broad. It was not BACPAR's intention to include details of specific areas of physiotherapy management as these would detract from the broader overview that these guidelines present.

Recommendations for local implementation were developed by the Guidelines Development Group (GDG) based on their expert knowledge. They are given to assist individual physiotherapists and service managers to implement the recommendations of the guidelines. It is recognised that local variations in service provision will influence their implementation.

These guidelines are intended to be useful to physiotherapists working in this clinical area as a readily available source of information. They can assist in clinical decision making, adapting knowledge into practice and providing recommendations to ensure competence. For the experienced clinician, the guidelines can act as a reference to support and guide clinical practice and service provision. They are intended to be a framework for best practice that all physiotherapists should aspire to achieve as part of their professional responsibilities.



## The need for evidence based clinical guidelines

### Definition of clinical guidelines

'Systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific circumstances' [3].

The practice of evidence based medicine means integrating individual clinical expertise with the best available external evidence from systematic research [4].

### Background to the development of clinical guidelines in the UK

In 1997 the government White Paper 'The New NHS modern – dependable' [5] set out a ten-year modernisation strategy for the health service. It was followed by a consultation document 'A first class service – quality in the NHS' [6] which focused on increasing the quality of care at local level with clear national standards.

The National Institute for Clinical Excellence (NICE) was established in 1999 and has been given a remit by the Department of Health to develop national clinical guidelines. Further information about NICE can be found at [www.nice.org.uk](http://www.nice.org.uk)

Since 1995 the CSP has called for proposals from its clinical interest groups to develop clinical guidelines. In February 2003 the CSP endorsed BACPAR's first clinical guideline, Evidence Based Clinical Guidelines for the Physiotherapy Management of Adults with Lower Limb Prostheses, available at <http://www.csp.org.uk/effective-practice/clinicalguidelines/physiotherapyguidelines.cfm#3> [7].

### Professional responsibility

The Government has recognised the need for health care professionals to be informed of changes and improvements in their clinical practice and to remain in touch with current research findings that affect clinical decision-making. Through commitment to continuing professional development and lifelong learning, physiotherapists are required to be reflective practitioners and base clinical judgements on the most appropriate information available.

In the field of amputee rehabilitation strategic thinking is needed to address the long-term needs of the patient. This involves close teamwork and consultation between all members of the multidisciplinary team including the patient and their carers.

### Resource Implications

The prevalence of amputation is small in comparison to other chronic impairment, affecting 51,000 of the UK population (approximately 0.1% of the adult population) [8]. The National Amputee Statistical Database (NASDAB) in their report 2004/05 recorded 5,210 new referrals to prosthetic service centres in the United Kingdom (<http://www.nasdab.co.uk/publications.asp>). However, as not all patients are referred to a prosthetic service centre this does not reflect the total incidence, which is not published.

Major lower limb amputation has a profound effect on quality of life with high levels of morbidity and mortality [9-15].

Multidisciplinary rehabilitation of this client group consumes significant resources in order to minimise the disability caused by the loss of a limb. This includes skilled therapeutic input and provision of costly equipment.

The dissemination of well-researched clinical guidelines enables patients and all grades of clinician to base decisions on the best available evidence. They also assist in the delivery of an efficient and cost effective service.





## Identifying the need

The Scottish Physiotherapy Amputee Research Group (SPARG) and the Audit Commission demonstrated wide variation nationally in the quality and type of service and care offered by physiotherapists to adults with lower limb amputation [8, 16]. BACPAR has previously identified the need for and developed evidence-based guidelines with respect to the physiotherapy management of adults with lower limb prostheses [7]. A further need exists with regard to the complex pre and post-operative management of these patients which these guidelines seek to address.

## The clinical question

These guidelines address the question: “What physiotherapy management constitutes best practice for adults requiring lower limb amputation, from the pre-amputation phase until receipt of the first prosthesis or completion of rehabilitation as a non-prosthetic user”?

## Aims of the guidelines

These guidelines have been produced to:

- Facilitate best practice for the physiotherapy management of amputees during the pre-operative and immediate post-operative phase of care
- Assist clinical decision-making based on the best available evidence
- Inform users and carers
- Inform service providers in order to promote quality and equity
- Reduce variation in the physiotherapy management of adults undergoing amputation
- Facilitate audit and research
- Identify areas of practice not supported by research.

## Objectives of the guidelines

These guidelines have been developed to:

- Provide a comprehensive document which will inform physiotherapists in the pre and post-operative management of adults with lower limb amputation
- Rigorously appraise the current relevant literature
- Make recommendations for best practice based on the published evidence and expert consensus opinion
- Disseminate information
- Facilitate a tool for audit and benchmarking.

## Scope of the guidelines

These guidelines address the pre and post-operative physiotherapy management of adults with lower limb amputation. They are applicable to all major levels of amputation, including bilateral amputation, and all causes and pathologies.

The levels of amputation covered by the guidelines are:

- Transpelvic
- Hip disarticulation
- Trans-femoral
- Knee disarticulation
- Transtibial
- Ankle disarticulation (Symes).



The guidelines commence when the decision is taken to amputate and continue until the receipt of the first prosthesis or until completion of rehabilitation as a non-prosthetic user. The physiotherapy management of the patient once a prosthesis is delivered is addressed in Evidence Based Clinical Guidelines for the Physiotherapy Management of Adults with Lower Limb Prostheses [7] .

The guidelines are presented in six sections that cover:

- The Role of the Physiotherapist within the Multidisciplinary Team
- Knowledge
- Assessment
- Patient and Carer Information
- Pre operative management
- Post-operative management.

The guidelines do not cover:

- Specific types of equipment such as walking aids, wheelchairs and prosthetic componentry
- Upper limb prosthetic management
- Prosthetic care of the amputee
- Care provided by members of the multidisciplinary team who are not physiotherapists
- Children
- Digital and partial foot amputations
- Cost effectiveness.

## The development process

### Guideline development group

A Guideline Development Group (GDG) (Appendix 1) was formed from:

- Members of BACPAR
- Representatives from relevant professional groups
- CSP Officers
- Patient and Carer representatives.

The contributing GDG members reflected the necessary experience and skills needed to compile clinical guidelines. All members had an understanding of the use of guidelines in assisting and informing clinical practice, with some members having previous experience in the development of other guidelines. None of the GDG declared a conflict of interest.

Before and during the project BACPAR took advice from the Chartered Society of Physiotherapy (CSP) regarding procedures for the development of clinical guidelines. The CSP were kept informed at regular intervals of the progress of the guidelines.

### Professional advisers

The GDG approached professional bodies and user groups, who were recognised as being stakeholders and interested parties, to assist in the development of the guidelines in the capacity of professional advisers (Appendix 1). Their comments and suggestions informed the guidelines.

The collaborative nature of this project reflects the multidisciplinary philosophy of rehabilitation and enhances the validity of the recommendations.

### Funding

The guidelines were developed without external funding. The project was funded by the CSP and BACPAR.



## The literature search

### Aims of search

To identify literature relating to the pre and post-operative management of adults with lower limb amputation.

The literature search was limited by:

### Inclusion Criteria

Articles were included if they were:

- Published within the last 25 years (to provide currency to the recommendations)
- Published in English (for practical reasons)
- Relevant to lower limb amputees
- Relevant to adults, 18 years of age and over
- Relevant to all pathologies/causes of amputation
- Relevant to all major levels of lower limb amputation i.e. transpelvic, hip disarticulation, transfemoral, knee disarticulation, transtibial and ankle disarticulation (Symes).

### Exclusion Criteria

Articles were excluded if they were related to:

- Prosthetic care of the amputee
- Surgical management of the amputee
- Upper limb amputees
- Paediatric amputees
- Minor levels of amputation e.g. partial foot.

The databases were searched in March 2004 and February 2006.

### Key words

To make the search as sensitive as possible MeSH terms were used in conjunction with keywords and free text. These were joined with Boolean operators (Appendix 2 shows an example and includes the full research strategy).

The MeSH terms used were Amputation, Physical Therapy, Exercise Therapy, and Rehabilitation.

The key words and free text used were Phys\*, Therap\*, Rehab\*, Amp\*, Manag\*, Care, "Lower limb".

### Databases

The following databases were searched for material between 1978 and 2006:

Cochrane	Pedro
Recal (specialist prosthetic/orthotic database)	EmbaseMedline
Cinahl	Amed

### Unpublished material

The British Schools of Physiotherapy and Occupational Therapy were contacted with the key words and asked to list relevant titles held in the libraries, both at under and post graduate levels.

Conference proceedings (International Society of Prosthetists and Orthotists, British Association of Prosthetists and Orthotists, British Association of Chartered Physiotherapists in Amputee Rehabilitation) and abstracts relating to the topic were hand searched.

No material relevant to the scope of the guidelines was identified.



## The appraisal process

### Selection of appraisal tool:

The Critical Appraisal Skills programme (CASP) appraisal tool (<http://www.phru.nhs.uk/casp/casp.htm>) as recommended for use by the CSP and NICE was chosen for this project for its validity and clinical applicability.

### Training in appraisal skills

The Appraisal group (see appendix 1) were trained in the use of the CASP appraisal tool as part of the development process of the guidelines.

#### The training included:

- Use of appraisal guides to estimate bias
- Extraction of numbers from papers
- Conversion of numbers into 'numbers needed to treat'
- Production of a declarative title about the article findings
- Establishment of level of evidence.

#### The appraisers gained knowledge of:

- CASP appraisal tool
- Different styles of papers e.g. therapy, diagnosis, randomised control trial
- Numerical analysis
- Levels of evidence.

### Selection of articles for appraisal

Articles were examined and selected for appraisal, based on a review of the abstract. Using the inclusion and exclusion criteria the articles were assessed as:

- 'not relevant',
- 'maybe relevant',
- 'possibly relevant'
- 'definitely relevant'.

based on the agreement of at least two GDG members. Any articles in the category 'not relevant' were rejected at this stage. If there was disagreement the article was discussed by the appraisal group and a majority decision taken. All remaining articles were retrieved for appraisal by the CASP trained physiotherapists (Figure 1, page 10).

### Appraising the literature

Two hundred and three published papers were retrieved. Articles were excluded if at least two of the appraisers felt the study was either:

- not relevant to the guidelines
- of poor study design (e.g. described as RCT but not randomised, no defined/validated outcome measure)



- contained poor quality evidence (e.g. not sufficient follow up, groups were too different, incorrect statistics).

or

- was purely descriptive.

The appraisal group resolved any disagreement over categorisation. Thirty-five papers were agreed as suitable for critical appraisal.

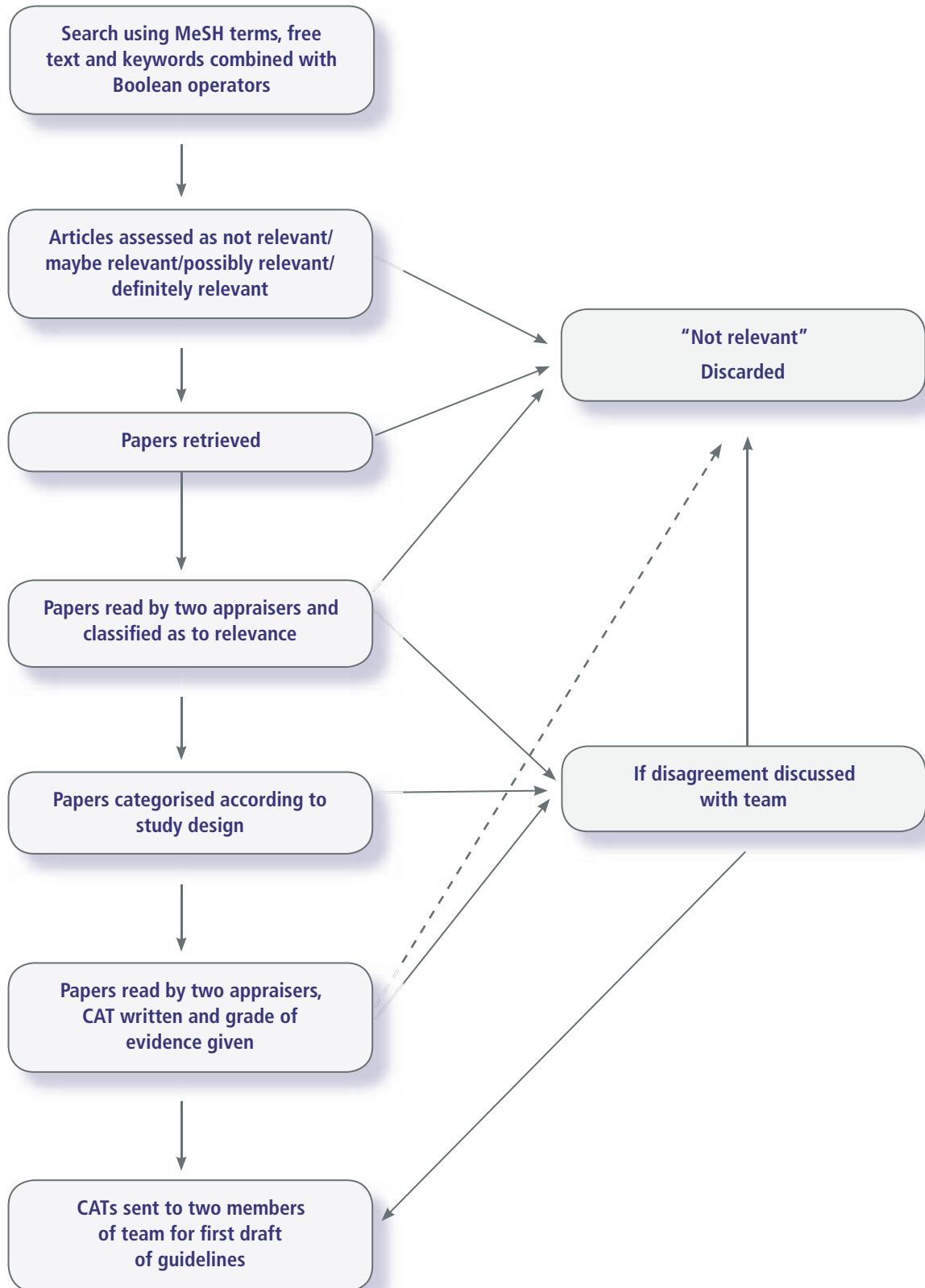
**These thirty-five articles were classified as:**

- Therapeutic
- Diagnostic
- Prognostic
- About harm or aetiology
- Systematic review
- Economical analysis.

No systematic reviews were found.

Seven groups, each consisting of two appraisers, appraised the articles independently. The two appraisers discussed differences in opinion and a Critically Appraised Topic (CAT) was written. If the two did not agree it was referred to the wider group for discussion and a CAT concluded by majority decision (page 11)





CAT-maker was used to record this process. CAT-maker is a computer programme designed to organise and summarise the evidence (Appendix 3).

**The CAT-maker assists by:**

- carrying out the clinical calculations
- storing appraisals (as well as search strategies that led to them)
- generating files that can be formatted with word processors, stored and printed for other team members.

Of the thirty-five papers that were appraised seven were considered not suitable for inclusion into the guidelines, they were either anecdotal papers or not relevant to the guidelines. In addition, the papers used to inform the Evidence Based Clinical Guidelines for the Physiotherapy Management of Adults with Lower Limb Prostheses[7] were examined for their relevance to the pre-prosthetic phase. This provided another thirty papers. In total fifty-eight papers of supporting evidence informed the guideline.

### **Update of appraisal**

The literature search was updated in February 2006 and 14 articles were found. None were considered suitable for inclusion into the guidelines. The same appraisal protocol was adhered to.

### **Classification of articles**

Articles were classified according to the levels of evidence recommended in the CSP Information Paper no CLEF07 [1]:

- Ia Evidence obtained from a systematic review of randomised controlled trials
- Ib Evidence obtained from at least one randomised controlled trial
- IIa Evidence obtained from at least one well-designed controlled study without randomisation
- IIb Evidence obtained from at least one other type of well-designed quasi-experimental study
- III Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies
- IV Evidence obtained from expert committee reports or opinions and/or clinical experience of respected authorities.

Adapted from A hierarchy of evidence, NICE, 2001.

A table of the papers used to develop the recommendations and their level of evidence is presented in Appendix 4.

Papers appraised but not used are listed in appendix 5.

**They were not used if the appraisal team considered them to be:**

- irrelevant to the guideline
- of poor study design
- or
- contained poor quality evidence.



## Guideline development and consultation

- Following appraisal of the literature a GDG consensus conference was held to review the literature evidence and agree a framework for the guideline
- Sections were identified covering topics relating to the clinical question. The section headings were decided on by using the
  - CSP Standards of physiotherapy practice for the management of patients with amputations[17]
  - CSP Core Standards[2]
  - Knowledge and expertise of the GDG
- Patients, professional advisors and peer reviewers were consulted on the proposed framework for the guideline (Appendix 6). Their comments were used to further define and clarify the scope and framework of the document. For example; suggesting additional detail and topics within sections, splitting section 6 into subsections and placing recommendations on wheel chairs and discharge planning more appropriately
- A first draft was produced using evidence from the literature
- The GDG used their extensive clinical experience and knowledge base, the CSP Standards of physiotherapy practice for the management of patients with amputations[17] and the CSP Core Standards[2] to identify areas of clinical practice relevant to the guidelines not supported by evidence from the literature (gaps in the evidence)
- Gaps in the evidence were used to formulate the initial questions posed for consensus opinion
- Three rounds of the Delphi process were used to gain consensus opinion and the resulting recommendations were incorporated into a second draft
- The professional advisor's comments were sought on the second draft and assimilated (Appendix 7)
- An updated literature search was undertaken but no additional evidence was found to add to the guidelines
- The third draft was circulated for peer and external review and amended accordingly (Appendix 8)
- The final (fourth) draft was submitted to the CSP for endorsement.

## The consensus process

### The Delphi technique

Where the literature did not provide sufficient evidence to develop recommendations within the areas identified consensus opinion was sought. The Delphi Technique was chosen to obtain consensus opinion where the literature was lacking. This method involves a series of questions to 'obtain the most reliable consensus of opinion of a group of experts...by a series of intensive questionnaires interspersed with controlled opinion feedback'[18]. Although more time consuming and labour intensive than a conference, the Delphi Technique ensures:

- all contributors have an equal voice
- consideration of the possible options for treatment
- contributors have the opportunity to contribute to and develop the guidelines.

### The consensus panel

The consensus panel consisted entirely of physiotherapists because the Delphi questions were directly related to physiotherapy practice.

**All BACPAR members (164) were asked to participate if they fulfilled the following criteria:**

- they were working as a senior physiotherapist or clinical specialist
- they had worked mainly with amputees (pre- and post-surgery) for a minimum of two years





- they had postgraduate training in the field of amputation rehabilitation.

Fifty BACPAR members met the eligibility criteria and agreed to participate in the initial round of questions.

### The Delphi process

The GDG decided that if 75% or more of the respondents scored more than 75% agreement with a statement, consensus would be reached. If consensus was below 75% the statement would not have the agreement of the panel and the question was refined for a second round, and if necessary a third round. If no consensus was reached after all rounds of questionnaires then no recommendation would be written.

A postal questionnaire was developed (Appendix 9). An explanatory letter was sent with the questionnaire and copies of the draft evidence based guidelines were supplied.

### Results of the Delphi process

Fifty questionnaires were sent out in the initial round. Forty-three were returned, a response rate of 86%.

Eighteen questions (28%) produced agreement of less than 75%. Thirty-five questions (55%) had agreement greater than 90% and eleven (17%) had agreement between 75-90% (Appendix 8).

Using the comments made in the first round the eighteen questions which did not have consensus were redrafted for the second round. An additional 10 questions were drafted having been generated from the first round comments. These 28 questions (Appendix 9) were submitted to the panel.

The response rate to the second round was 78%. Greater than 75% agreement was gained in 23 questions and consensus was considered to have been reached (Appendix 10). Unfortunately, no consensus was gained on 5 questions. One question was dropped from the guidelines as it was clear from the responses that consensus would not be gained. The other 4 questions were redrafted using the comments from the first and second rounds and submitted to the panel (one question was split into 2 questions, making a total of 5 questions).

The response rate to the third round was 82% and greater than 75% agreement was gained on all 5 questions.

### The external review

Experts in the development of evidence based clinical guidelines were chosen to reflect different backgrounds and perspectives (Appendix 1). Reviewers were asked to comment on the process of development, its validity and applicability, format and presentation, using the Appraisal of Guidelines for Research and Evaluation (AGREE) appraisal instrument as recommended by the CSP [1].

Their comments and suggestions were considered and the document amended accordingly (Appendix 8). For example: The section on barriers to implementation was expanded, this was assisted by comments from the peer reviewers.

Comments included:

*The BACPAR guideline development group (GDG) has produced a well-researched and thorough guideline for the Pre and Post-Operative Physiotherapy Management of Adults with Lower Limb Amputation. This guideline rates very well overall with a few minor details that the GDG may wish to consider*

*Congratulations on the document*

*On the whole a very comprehensive document.*

### Peer review

Twelve physiotherapy staff of various clinical grades and experience in the field of amputee rehabilitation and three patients and their carers were asked to test the guidelines (Appendix 1). They were asked to comment on the applicability and presentation of the recommendations and the practicalities of implementation (Appendix 8). Alterations were made to the presentation of the guidelines following their recommendations.



For example: Statements on discharge planning and transfer of care were added to section 1. Several minor changes to the wording of the document were made to improve the ease of use and readability. Several of the peer reviewers commented on the lack of published evidence in this field of rehabilitation. For example; 'Not really surprised at the lack on evidence relating to physiotherapy. It's the same in all areas'.

The guidelines also highlight areas which are currently not well supported with evidence, which may in future become areas to consider researching.

Other comments included:

*Presentation is well structured, clear and concise throughout.*

*The evidence presented is perfectly clear and understandable.*

*Recommendations very nicely set out, easy to access the guidelines and the evidence for each. They would provide a framework from which we could audit the present system and then develop towards.*

*I feel that they are very far reaching and would be an excellent guide (especially to less experienced clinicians) of the sheer scope of considerations they need to take into account.*

*A huge amount of work has obviously gone into this – it is very comprehensive and impressive, especially knowing that it has been put together by volunteers and through good will.*

The patients and carers who reviewed draft three understandably had difficulty with the medical terminology and phraseology used. The target users of this guideline are physiotherapists and a document for patients and carers use would be written in a very different format.

## Implementation and dissemination

The Evidence Based Clinical Guidelines for the Physiotherapy Management of Adults with Lower Limb Prostheses[7] published in 2003 were enthusiastically taken up internationally, including by the International Red Cross. These guidelines are intended to compliment those already published.

It is recommended that the CSP Core Standards (2005) [2] are used alongside these guidelines.

As these guidelines have been endorsed by the CSP a strategy for implementation and dissemination has been jointly agreed by the CSP and BACPAR.

## Tools for application

Suggested outcome measures are listed in appendix 11.

### Audit

An audit tool is suggested in Appendix 12.

### Review

BACPAR will update these evidence-based guidelines every three years.

## Health benefits, side effects and risks

The recommendations within the guidelines are evidence based and support best practice; however at the time of writing, no valid tool specific to people with an amputation was available to measure health benefits.

The benefits of the approach to treatment recommended by the guideline are identified in the introduction and evidence presented in each section.

No side effects or risks were identified from the literature, professional advisers or consensus panel.



## Barriers to implementation and cost implications

In order to implement the recommendations in these guidelines a number of factors should be considered which may influence their implementation.

- Although implementation of these guidelines may have cost implications a cost benefit analysis could not be undertaken. The data required to enable an economic evaluation of amputee rehabilitation was not available at the time of publication but it is expected that the introduction by the NHS of 'Payment by Results' will inform this economic evaluation in the future
- Implementing these guidelines may involve further training of staff
- Inappropriate skill mix and/or understaffing will limit service development
- The co-operation of other members of the Multidisciplinary Team is required for full implementation of these guidelines
- Resistance to change of practice
- Organisational and operational practises/systems will need to support the recommendations
- Ability to access a suitable environment.

Overcoming barriers to implementation will require change and change management skills. Resources, such as tools and techniques, to support and facilitate change should be accessed through locally agreed routes.



## 2 Recommendations of the guidelines

The Guidelines are divided into six sections for ease of use.

1. **The role of the physiotherapist within the multidisciplinary team**
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 suggestions for local implementation.

### Grading Guideline Recommendations (NICE 2001)

Grade	Evidence
A	At least one randomised controlled trial as part of a body of literature of overall good quality and consistency addressing the specific recommendation (evidence levels Ia and Ib)
B	Well conducted clinical studies but no randomised clinical trials on the topic of the recommendation (evidence levels IIa, IIb and III)
C	Expert committee reports or opinions and/or clinical experience of respected authorities. This grading indicates that directly applicable clinical studies or good quality are absent (evidence IV)
D	Recommended good practice based on the clinical experience of the Guidelines Development Group

Recommendations were developed and graded according to the levels of evidence of the papers appraised. After each of the recommendations the number in brackets refers to the level of evidence, the letter refers to the grade of recommendation. Where a number of sources of evidence were used to develop a recommendation the grade was based on the highest level of evidence used.

A table of the papers used to develop the recommendations and their level of evidence is presented in Appendix 4.

Recommendations for local implementation are given to assist individual physiotherapists and service managers to implement the recommendations of the guidelines.



## Section 1 – The role of the physiotherapist within the multidisciplinary team

### Introduction

A specialist multidisciplinary team (MDT) achieves the best rehabilitation outcome[19, 20].

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[21].

The Chartered Society of Physiotherapy (CSP) Core standards [2] outline the role of the physiotherapist within a 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 multidisciplinary team (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, orthotist, podiatrist, counsellor, psychologist, social services team, social worker, pain control team, wheelchair services, prosthetic services 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[22] 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[21] 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[21], two other papers support the role of the physiotherapist within the MDT. Condie et al[23] 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[24] concluded from 8 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.

### Recommendations

- 1.1 Within the multidisciplinary team the role of the physiotherapist includes exercise therapy. B (III) [24]
- 1.2 Within the multidisciplinary team the role of the physiotherapist includes assessment and treatment with early walking aids. B (III) [23]
- 1.3 The physiotherapist contributes, as part of the multidisciplinary team, to the prediction of prosthetic use. B (III) [22]
- 1.4 A physiotherapist specialised in amputee rehabilitation (Appendix 13) should be responsible for the management of physiotherapy care. C (IV) [21]
- 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 (IV) [25]
- 1.6 The physiotherapist should be involved in producing protocols to be followed by the MDT. C (IV) [25]
- 1.7 There should be an agreed procedure for communication between the physiotherapist and other members of the MDT. C (IV) [25]
- 1.8 Within the multidisciplinary team the role of the physiotherapist includes compression therapy. C (IV) [25]
- 1.9 A physiotherapist experienced in amputee rehabilitation can, as part of the MDT, be solely responsible for the decision to start using the Early Walking Aid having liaised with other members of the MDT as necessary. C (IV) [25]



- 1.10 The physiotherapist, along with other professionals, should contribute in the management of residual limb wound healing. C (IV) [25]
- 1.11 The physiotherapist, along with other professionals should contribute to the management of pressure care. C (IV) [25]
- 1.12 The physiotherapist, along with other professionals, should contribute to the management of wound healing on the contra lateral limb if applicable. C (IV) [25]
- 1.13 The physiotherapist, as part of the MDT, should contribute to the management of pain as necessary. C (IV) [25]
- 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 (IV) [25]
- 1.15 The physiotherapist should contribute to the decision on which MDT outcome measures are to be used. C (IV) [25]
- 1.16 The physiotherapist, along with other professionals, should contribute to the patient's psychological adjustment following amputation. C (IV) [25]
- 1.17 The physiotherapist should be able to refer directly to a clinical psychologist / counselor if appropriate. C (IV) [25]

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### Local implementation

- The MDT agrees its approach to rehabilitation
- Roles and responsibilities are agreed within the MDT
- Patient and public involvement should underpin service delivery and development
- Channels of communication and opportunities for education and discussion should be established
- Annual targets for education, audit and research should be set
- Integrated care pathways should be used
- Contact details of MDT members should be readily available to the patient and carers
- 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
- A summary of the patient's treatment and status at transfer or discharge should be documented in the medical notes, with details of arrangements for further treatment.



## Section 2 – Knowledge

### Introduction

In order to provide effective rehabilitation the physiotherapist needs a good understanding of the factors that may influence the outcome of rehabilitation [25].

The physiotherapist also needs to have an understanding of prosthetic prescription principles and the prosthetic rehabilitation process to successfully plan and deliver rehabilitation [25].

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 [26, 27].

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 [28].

The physiotherapist is responsible for keeping up to date with developments in amputee rehabilitation. This should include awareness of published guidance and recommendations (see Appendix 15 for Useful Resources).

### Evidence

Concurrent conditions will influence rehabilitation potential and the physiotherapist should be aware of these [25]. In a non-systematic overview of 71 studies Pernot [20] suggests that concurrent conditions along with increasing age are prognostic of a low level of function. In a retrospective case series of 52 dysvascular, hemiplegic patients Altner [29] found that only neuromuscular status had any significance on the mobility of this group of patients. Grieve [9], in a case series of 26 patients, found that co-morbidity is associated with lower levels of function.

In a 1997 pilot study of 10 patients (7 with abnormal resting ECG) with peripheral vascular disease, Bailey et al [30] investigated ECG abnormalities during walking with a pneumatic post-amputation mobility aid. They found normal blood pressure elevation in nine patients and group mean age-predicted maximum heart rate of less than 70%, suggesting appropriate exercise levels. However, 5 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.

A retrospective chart review of 38 patients by Czynny [31] concluded that end stage renal disease does not reduce functional outcome in patients with amputations due to peripheral vascular disease.

In a prospective case series of 16 healthy males Rush [32] 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 [33] found that the use of orthoses/appropriate footwear reduced the risk of damage due to diabetic neuropathy.

Four case series [34-37] have looked into the relationship between amputation level and rehabilitation outcome. In 2 of these studies it was shown that patients with a transtibial amputation have a greater chance of succeeding with a prosthesis than those with a trans-femoral amputation [34, 37]. Beekman [35], in a case series of 55 vascular patients found that people with a trans-femoral or knee disarticulation amputation perform at a functionally lower level than bi-pedal subjects. In a retrospective case series of 18 bilateral vascular amputees, Wolf [36] concluded that 50% of bilateral transtibial amputees could be rehabilitated on two prostheses.

Ward and Meyers [38] 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 the early walking aid is well documented [39, 40]. In a randomised controlled trial of 80 people undergoing lower extremity amputation, Pollack [40] found that using a pneumatic prosthesis leads to fewer pulmonary, cardiac, urinary tract and wound complications. Lein [39] found in a cross sectional survey of 58 physiotherapists that there was a lack of availability of the Vessa Ppam Aid and that some physiotherapists are using it in a "potentially dangerous manner" by not following the manufacturers instructions, thereby risking wound breakdown.

Four case series, a retrospective cohort and a case control study agree that exercises play an important part in the functional rehabilitation programme [24, 30, 41-43].

Discharge data for amputees in Scotland over a 3 year period [23] shows that the use of compression socks to control oedema of the residuum can reduce the time to prosthetic rehabilitation. Lambert [44] in an audit of physiotherapists working in artificial limb units found that compression socks are widely used.

McCartney [45] concluded from his cross sectional study that 10% of patients had their quality of life affected by phantom pain/ sensation. Smith [46] found by use of a patient questionnaire that it was not uncommon for amputees to experience phantom limb sensation/pain. Mortimer [47] 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 1994 case control study by Liaw [48] concluded that acupuncture may temporarily reduce pain.

Factors affecting wound healing include smoking, malnutrition, previous surgery, gangrene, level of amputation, antibiotics, diabetes, surgical technique, dressings and drains. No one factor can be looked at in isolation [26].

In a retrospective cohort of 254 lower limb amputees, Meikle [49] found that interruptions to rehabilitation are common and result in longer periods of rehabilitation but the outcome is not adversely affected.

A study by Delahanty [28] of patients before and after instigating a psychoeducational intervention concludes that psychological support is beneficial. Hanspal [50], in a retrospective case series, found that outcome is affected by cognitive and psychomotor function.

No evidence was available to support the need for an understanding of pathology, investigations or surgical techniques used. Further evidence is required regarding long term effects of osteopenia, awareness of complications which may arise, counselling skills and psychology. This evidence was gathered using the Delphi Technique.

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## Recommendations

- 2.1 The use of early walking aids as an assessment and treatment tool is understood by the physiotherapist. A (Ib) [30, 39, 40, 51]
- 2.2 The physiotherapist is aware that level of amputation, pre-existing medical conditions and social environment will affect rehabilitation. B (IIa) [9, 20, 25, 30, 34-36, 52-56]
- 2.3 The role of exercise therapy as an essential part of the rehabilitation process is understood. B (IIb) [24, 30, 38, 41-43, 57, 58]
- 2.4 The impact of the level of amputation on rehabilitation potential is understood by the physiotherapist. B (III) [25, 34-38, 56, 59]
- 2.5 The physiotherapist has an understanding of the predisposing factors to successful (and unsuccessful) rehabilitation. B (III) [25, 29-31]
- 2.6 The various techniques for control of oedema of the residuum are understood by the physiotherapist. B (III) [23, 44]
- 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 (III) [45, 46]
- 2.8 Methods of pain relief for the post-operative treatment of phantom pain/sensation are understood by the physiotherapist. B (III) [47, 48]
- 2.9 The physiotherapist has an awareness of the long term effects of amputation. B (III) [32, 38]





- 2.10 The physiotherapist understands the factors affecting the healing of residuum wounds. B (III) [26]
- 2.11 The psychosocial issues which may affect patients following amputation and the cognitive and psychomotor aspects affecting the rehabilitation potential of the amputee are understood by the physiotherapist. B (III) [28, 50, 55]
- 2.12 The risk of damage to the remaining diabetic/neuropathic foot is understood by the physiotherapist. B (III) [33]
- 2.13 The physiotherapist should have an understanding of complications that may arise following amputation. C (IV) [25]
- 2.14 The physiotherapist should have an understanding of the pathology leading to amputation. C (IV) [25]
- 2.15 The physiotherapist should have knowledge of medical investigations commonly undertaken prior to amputation and their significance. C (IV) [25]
- 2.16 The physiotherapist should have knowledge of surgical techniques used in amputation. C (IV) [25]
- 2.17 The physiotherapist should be aware of other guidelines relevant to rehabilitation following amputation. C (IV) [25, 49]
- 2.18 The physiotherapist should have knowledge of the principles of prosthetic prescription. C (IV) [25]
- 2.19 The physiotherapist should be aware of the possible psychological effects which may occur following amputation. C (IV) [25]
- 2.20 The physiotherapist should know when it is appropriate to refer a patient to a clinical psychologist/counsellor. C (IV) [25]
- 2.21 The physiotherapist should have basic knowledge of the principles of counselling. C (IV) [25]
- 2.22 The physiotherapist should be aware of the socio-economic impact of lower limb amputation. C (IV) [25]
- 2.23 The physiotherapist should be aware of the systems in place to refer for assessment for a prosthesis. C (IV) [25]
- 2.24 The physiotherapist should have basic knowledge of the provision of wheelchairs and accessories. C (IV) [25]
- 2.25 The physiotherapist, as part of the MDT, should know where to get advice on pressure relieving seating. C (IV) [25]
- 2.26 The physiotherapist should have basic knowledge of the provision of equipment that can facilitate activities of daily living. C (IV) [25]

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### Local implementation

- There should be opportunities for CPD and lifelong learning.



## Section 3 – Assessment

### Introduction

Sufficient information should be gathered from all sources including medical notes and other members of the multi-disciplinary team before carrying out a full subjective and objective examination of the patient. This should take into account the emotional and cognitive status and co-morbidity 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 [9, 10, 60].

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

Assessment should include both lower and upper limbs and the trunk. Due to the expected change in functional level as a result of rehabilitation, a relevant, validated outcome measure should be used and recorded to evaluate change.

### Evidence

Grieve et al [9] in a small case series with inadequate follow up, showed that following amputation patients experienced lower levels of function compared to "normals". In addition, those patients with diabetes were more likely to experience functional difficulties.

Collin et al [13] 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 [52] reported the results of a retrospective case series looking at patients using a wheelchair following bilateral amputation. They emphasised that functional outcome can be affected by the environment into which the patient is discharged. Van de Ven in 1981 [53] highlighted the importance of environmental factors in determining mobility in a cohort study of 96 bilateral amputees and suggested this could explain deterioration in mobility outside the clinical setting.

Studies that gave evidence supporting the need to examine specific pathologies include a cohort study by Potter et al [54]. 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 importance of skin checks is reinforced by a descriptive cohort study carried out by Levy in 1995 [60] who investigated the skin problems associated with wearing a prosthesis. However, the participants in this study were not well defined and it was not possible to tell if the follow up of the subjects was adequate.

Nicholas et al [10] in a case series of 94 amputees and Waters et al [61] in a case-control study found that the higher the level of amputation, the more energy was used in walking and also that job retention was reduced.

Hanspal et al [50] found impaired cognitive skills to negatively affect functional outcome with a prosthesis in a retrospective case series, where no adjustment had been made for other prognostic factors. A later paper by the same authors [55] suggested that the results of an intellectual 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.

Neuromuscular status was found by Altner et al [29], in a retrospective case series of patients with hemiplegia and dysvascular lower limb amputation, to be the only significant factor affecting ambulation in patients.

There was often only one study for each prognostic factor investigated, making it difficult to draw any conclusions based on the evidence available at present.



### Recommendations

- 3.1 There should be written evidence of a full physical examination and assessment of previous and present function B (IIa) [9, 10, 13, 60, 62, 63]
  - 3.2 The patients' social situation, psychological status, goals and expectations should be documented B (IIb) [9, 10, 13, 50, 52, 53, 55]
  - 3.3 Relevant pathology including diabetes, impaired cognition and hemiplegia should be noted B (III) [29, 55, 60, 64]
  - 3.4 A problem list and treatment plan, including agreed goals, should be formulated in partnership with the patient B (III) [10]
- 

### Local implementation

- A locally agreed physiotherapy assessment form should be used
- Names and contact details of the MDT members involved in the patient's care should be recorded to facilitate communication
- The principles of the Single Assessment Process (SAP) should be applied.



## Section 4 – Patient and carer information

### Introduction

The Core standards of physiotherapy practice [2] recommend that patients are informed of “...all potential and significant risks, benefits and likely outcomes of treatment”. 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.

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#### 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 (IV) [25]
  - 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 (IV) [25]
  - 4.1.3 The physiotherapist should offer patients the opportunity to meet other adults with lower limb amputations. C (IV) [25]
  - 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 (IV) [25]
  - 4.1.5 The physiotherapist should provide information about the prosthetic process to those patients likely to be referred for a prosthesis. C (IV) [25]
  - 4.1.6 The physiotherapist should offer to show demonstration limbs to those patients likely to be referred for a prosthesis. C (IV) [25]
  - 4.1.7 The physiotherapist should know where to refer patients for information about benefits. C (IV) [25]
  - 4.1.8 The physiotherapist should know where to get advice on arrangements available to support carers. C (IV) [25]
  - 4.1.9 The physiotherapist should be able to refer the patient to other agencies as necessary. C (IV) [25]
  - 4.1.10 Where possible all verbal information/advice given should be supplemented in written form. C (IV) [25]
- 



## 4.2. Informed goal setting

### Evidence

Nine studies of mixed design and generally poor quality were found to inform this topic [9, 34-37, 56, 59, 61, 65]. Most studies examined the influence of the level of amputation on the outcome. Hubbard [59], in a retrospective case series of patients with peripheral vascular disease, stated there were no predictive factors for mobility levels attained other than level of amputation. The paper further concludes that pre-operative mobility and personal goals should be considered when evaluating the success of rehabilitation. A retrospective case control study of people with lower limb amputation, vascular disease and end-stage renal disease by Lucke [65] showed they could be rehabilitated as successfully as those without end-stage renal disease.

Two case series, by Beekman et al [35] and Grieve et al [9] both state that following amputation patients will have lower levels of function than bi-pedal subjects. Four studies, all but one with a retrospective design [34, 35, 37, 56], concluded that the lower the level of amputation the greater the chance of succeeding with a prosthesis. Wolf et al [36], observed in a retrospective case series of 18 elderly vascular bilateral transtibial patients, that 50% became independently mobile with prostheses. For patients with a unilateral amputation as a result of either trauma or vascular disease the energy cost of walking increases as the level of amputation becomes higher [61]. Waters concludes from his case-control study in 1976 that, when preservation of function is the chief concern, amputation should be at the lowest possible level [61].

No contradictory evidence was found.

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

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### Recommendations

- 4.2.1 Patients/carers should be made aware that the level of amputation affects the expected level of function and mobility. B (III) [34, 35, 37, 56, 67]
  - 4.2.2 Patients/carers should be made aware that they will experience lower levels of function than bipedal subjects. B (III) [61]
  - 4.2.3 Patients/carers should be made aware that concurrent pathologies and previous mobility affects realistic goal setting and final outcomes of rehabilitation. C (III) [25, 65, 66]
  - 4.2.4 The physiotherapist should use appropriate outcome measures (Appendix 13) for rehabilitation goals. C (IV) [25]
- 

## 4.3. Care of the remaining limb

### Evidence

Potter et al [54], in a cohort study of 80 patients with unilateral amputation due to diabetes, found peripheral neuropathy to be nearly always present in the remaining limb. In addition, two thirds of non-diabetic, non-traumatic, unilateral amputees were found to have peripheral neuropathy in their remaining limb. A cohort study by Jayatunga [33], with no control group, found that patients with a unilateral transtibial amputation due to diabetes were subject to abnormal loading on the remaining foot. Careful monitoring of the remaining foot and early orthotic referral were recommended, as foot orthoses and appropriate footwear significantly reduced these forces in the study participants. Levy [60] in a descriptive paper describes skin disorders due to mechanical rubs, over or under zealous skin care. He also describes the formation of oedema due to the underlying disorder. In the absence of further literature evidence consensus opinion has been sought to further inform this sub-section.

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### 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 (IIa) [33, 54, 60]
- 4.3.2 The patient/carer should be taught how to monitor the condition of the remaining limb. B (IIa) [25, 54]



- 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(IV) [25]

#### 4.4. Care of the residual limb

##### Evidence

In a review by Eneroth [26] multiple factors were found to affect wound healing in vascular patients with an amputation. In a Scottish study, discharge data gathered over 3 years found that the use of shrinker socks and Early Walking Aids decreased the time to cast for transtibial patients and was more effective than crepe bandages or no bandages [23]. In the same study rigid plaster dressings were found to reduce time to casting compared with other compression therapies. In a small randomised controlled trial of 12 patients by Manella, the use of a shrinker socks was found to be more effective at reducing residual limb oedema than elastic bandaging [68].

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

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##### Recommendations

- 4.4.1 Advice should be given to the patient/carer on the factors affecting wound healing. B (III) [26]
- 4.4.2 Advice should be given to the patient/carer on the use of compression therapies. B (IIb) [23, 68]
- 4.4.3 Instruction should be given to the patient/carer on methods to prevent and treat adhesions of scars. C(IV) [25]
- 4.4.4 The physiotherapist should give on-going advice about residual limb care. C(IV) [25]

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##### Local implementation

- Names and contact details of the MDT members involved in the patient's care should be given to patients and carers
- Information leaflets / booklets should be developed locally for patients and carers to supplement information given verbally.



## 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. 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.

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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 (IV) [25]
  - 5.2 Where possible the patient and carers should be given advice, information and reassurance by the physiotherapist about rehabilitation. C (IV) [25]
  - 5.3 The physiotherapy assessment should be commenced pre-operatively, if possible. C (IV) [25]
  - 5.4 Where possible rehabilitation/discharge planning should commence pre-operatively. C (IV) [25]
  - 5.5 Where appropriate and possible the patient should be instructed in wheelchair use pre-operatively. C (IV) [25]
  - 5.6 A structured exercise regime should be started as early as possible. C (IV) [25]
  - 5.7 Bed mobility should be taught where possible. C (IV) [25]
  - 5.8 Where appropriate and possible transfers should be taught pre-operatively. C (IV) [25]
  - 5.9 If indicated, the patient should be assessed for physiotherapy respiratory care. C (IV) [25]
  - 5.10 If indicated, the patient should be given appropriate physiotherapy respiratory treatment. C (IV) [25]
  - 5.11 Pain control should be optimised prior to physiotherapy treatment pre-operatively. C (IV) [25]
  - 5.12 If appropriate, and with the patient's consent, carers should be involved in pre-operative treatment and exercise programmes. C (IV) [25]
- 

### Local implementation

- A procedure for prompt referral to physiotherapy following decision to amputate should be developed.



## Section 6 – Post-op management

### Introduction

The rehabilitation process should commence as early as possible, preferably following a suitable care pathway [69]. 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.

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

- 6.1 Early rehabilitation
- 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.

### 6.1 Early rehabilitation

#### Evidence

In 2000 a retrospective cross sectional study of 146 traumatic amputees by Pezzin et al [70] found that their physical function and vitality was increased by having longer in-patient rehabilitation. Schaldach [69] 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 in 2002 [49] in a well designed 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 [71] observed that in-patient rehabilitation reduced the time from surgery to prosthetic ambulation among male dysvascular transtibial patients. There is known controversy about the use of clinical care pathways and inpatient rehabilitation but not sufficient published evidence. The evidence from these papers is not sufficient to make individual recommendations, therefore consensus opinion was sought to inform this section.

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#### Recommendations

- 6.1.1 Treatment must be given after adequate analgesia has been supplied. C (IV) [25]
  - 6.1.2 Post-operative rehabilitation should start the first day post-operation where possible. C (IV) [25]
  - 6.1.3 Respiratory care should be given if appropriate. C (IV) [25]
  - 6.1.4 A physiotherapist should aid the MDT in the decision as to the appropriate time for discharge from inpatient care. C (IV) [25]
- 

### 6.2 Environment and equipment

#### Evidence

A questionnaire cross sectional survey carried out by White [72] 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.

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





### Recommendations

- 6.2.1 The physiotherapist should have knowledge of the provision of equipment that can facilitate activities of daily living. C (IV) [25]
- 6.2.2 Therapists should be familiar with the correct use of specialist equipment. C IV [72]
- 6.2.3 The physiotherapist should be involved in home visits where necessary. C (IV) [25]

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## 6.3 Compression therapy

### Evidence

A small, non-blinded, randomised controlled trial [68] found that compression socks are significantly more effective in reducing limb volume than elastic bandages. A cross-sectional survey of physiotherapists [44] showed that compression socks are widely used, but that their use varies greatly as there are no current guidelines. 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 [23].

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

---

### Recommendations

- 6.3.1 A compression sock should be used in preference to elastic bandages for reducing limb volume. B (IIb) [68]
- 6.3.2 The physiotherapist should use compression therapy as appropriate. C (IV) [25]

---

## 6.4 Mobility

### Evidence

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

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### Recommendations

- 6.4.1 Bed mobility should be taught first day post-operation. C (IV) [25]
- 6.4.2 Sitting balance should be re-educated if needed. C (IV) [25]
- 6.4.3 Standing balance should be re-educated if needed. C (IV) [25]
- 6.4.4 Safe transfers should be taught as early as possible. C (IV) [25]
- 6.4.5 Mobility pre-prosthetically should be in a wheelchair unless there are specified reasons to teach a patient to use crutches/zimmer frame/rollator. C (IV) [25]
- 6.4.6 The physiotherapist should help the patient gain maximum mobility pre-prosthetically. C (IV) [25]

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## 6.5 Early walking aids (EWAs)

### Evidence

Schon et al [73] demonstrated in a 'before and after' case control study that prefabricated prostheses may reduce complications, falls, revisions and time to first prosthesis. Pollack et al [40] 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. Lein [39] carried out a cross sectional survey in 1992, and concluded that the Pneumatic Post-Amputation Mobility Aid (Ppam aid) provides a valuable tool for assessment and treatment, provided it is used correctly. In 1998, Condie found from a cohort of all the Scottish amputee discharge information that use of compression therapy, including EWA's resulted in quicker progression to prosthetic rehabilitation [23].

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### 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(IIa) [23, 39, 40, 73]



- 6.5.2 EWAs should be considered as part of the rehabilitation programme for all lower limb amputation patients as a treatment tool. B(IIa) [23, 39, 40, 73]
- 6.5.3 EWAs should be used under the supervision of therapists trained in their correct and safe application and use. C (IV) [39]

## 6.6 Falls management

### Evidence

In 1996 Kulkarni et al [74] reported an increased risk of falls following lower limb amputation in a cross-sectional study of 1164 patients. This was more likely to occur at trans-femoral level compared with trans-tibial level. The study concluded that instruction on how to get up from the floor should be part of rehabilitation. However, this study did not include a comparison group and only gives limited evidence.

### Recommendations

- 6.6.1 All parties involved with the patient should be made aware that the risk of falling is increased following lower limb amputation. B (III) [74]
- 6.6.2 Rehabilitation programmes should include education on preventing falls and coping strategies should a fall occur. B (III) [74]
- 6.6.3 Instructions should be given on how to get up from the floor. B (III) [74]
- 6.6.4 Advice should be given in the event that the patient is unable to rise from the floor. B (III) [74]

## 6.7 Wheelchairs and seating

### Evidence

Collin et al [13] stated, in a case series of mostly elderly patients, that provision of a wheelchair should be routine. Van De Ven [53] suggested that all patients with a bilateral amputation should be issued with a wheelchair.

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

### Recommendations

- 6.7.1 Patients should routinely be provided with a wheelchair. B (III) [13, 53]
- 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 (IV) [25]
- 6.7.3 Physiotherapists, as part of the MDT, should be able to teach the patient and carer how to use the wheelchair, including all accessories. C(IV) [25]

## 6.8 Prevention/reduction of contractures

### Evidence

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

### Recommendations

- 6.8.1 Contractures should be prevented by appropriate positioning. C (IV) [25]
- 6.8.2 Contractures should be prevented by stretching exercises. C (IV) [25]
- 6.8.3 Where contractures have formed appropriate treatment should be given. C (IV) [25]



## 6.9 Exercise programmes

### Evidence

Seroussi et al [63] in 1996 carried out a prospective case control study on gait analysis, and concluded that hip extensors (bilaterally), eccentric hip flexors and ankle plantar flexors benefit from strengthening. No other muscle groups were investigated in this study.

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

---

### Recommendations

- 6.9.1 Exercise programmes should include exercises for the hip extensors, hip flexors and ankle plantar flexors. B (IIa) [63]
- 6.9.2 An exercise regime should be given relevant to the patient's goals. C (IV) [25]
- 

## 6.10 Management of phantom sensation and pain

### Evidence

Mortimer et al [47] 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. A poorly conducted, small, case control study [48] found that applying acupuncture to the contralateral limb, at acupoints corresponding to the painful area in the phantom limb, may relieve acute pain temporarily.

McCartney [45], 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. Non-painful phantom sensations were significantly more frequent than painful in a study by Smith [46]. The same study concluded that people with a trans-femoral amputation are significantly more likely to have greater intensity of pain and more bothersome back pain than people with a transtibial amputation.

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

---

### Recommendations

- 6.10.1 Patients should be made aware of the possibility of experiencing phantom limb pain or sensation post-operatively. B (III) [45, 46]
- 6.10.2 Patients should be given accurate and timely knowledge of phantom limb pain. B (III) [47]
- 6.10.3 Information regarding phantom limb pain should be given by clinicians with appropriate knowledge and training. B (III) [47]
- 6.10.4 Information should be given about phantom limb sensation. C (IV) [25]
- 6.10.5 Appropriate treatment should be given for phantom limb pain. C (IV) [25]
- 6.10.6 Appropriate treatment should be given for residual limb pain. C (IV) [25]
- 6.10.7 Techniques for the self-management of phantom pain/sensation should be taught. C (IV) [25]
- 

### Local Implementation

- Information leaflets/booklets should be developed locally for patients and carers to supplement information given verbally
- Information on self management / home exercise following discharge should be provided to the patient
- Patients requiring ongoing outpatient treatment should have this arranged prior to discharge
- A summary of the patient's treatment and status at transfer should be sent to the physiotherapist providing on-going treatment
- Contact names, telephone numbers and addresses of relevant MDT members should be supplied to patients prior to discharge.



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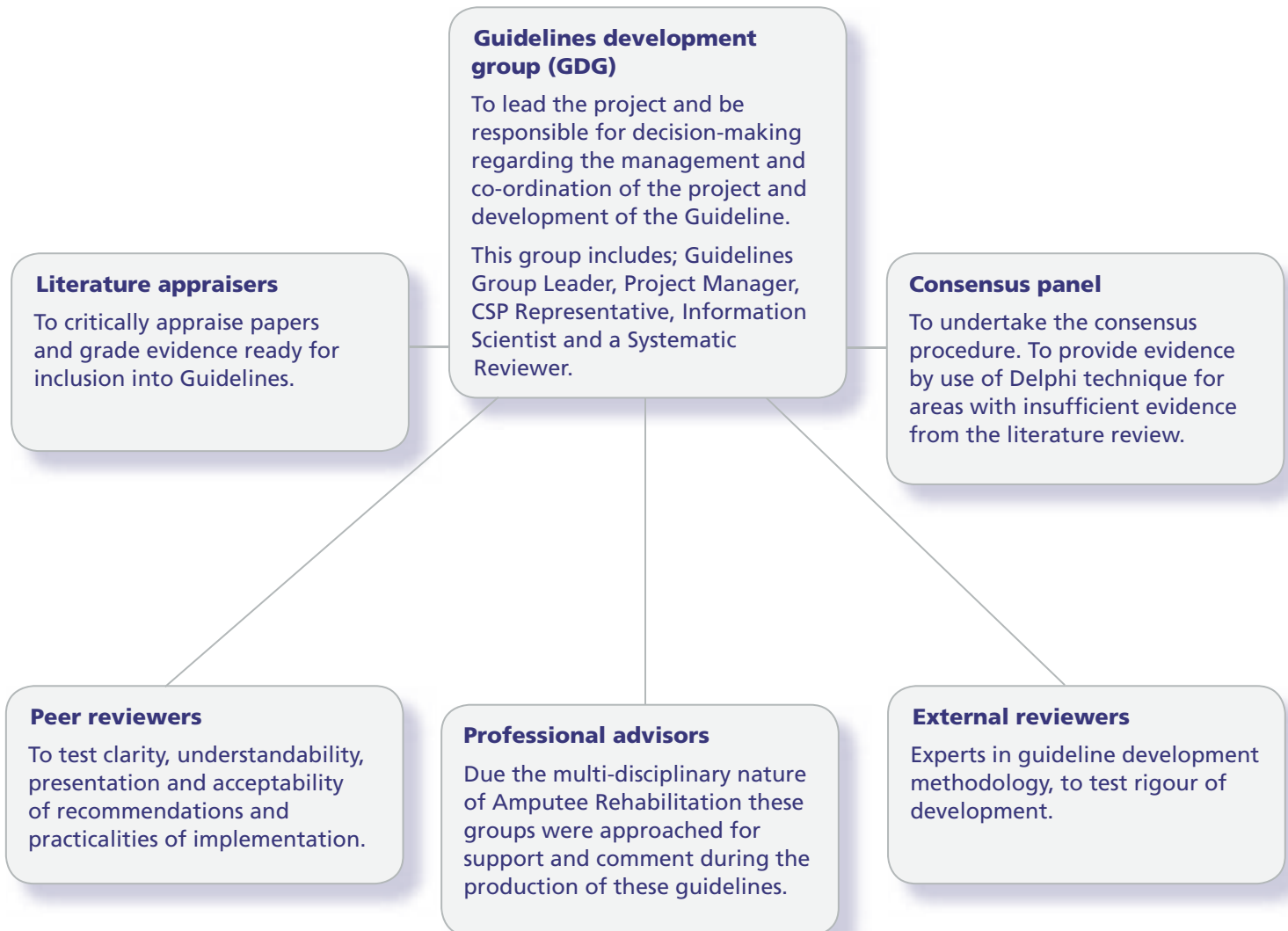


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## 4 Appendices

### Appendix 1 BACPAR guidelines development structure and contributors



## BACPAR Guidelines development contributors

### Guidelines Development Group

Penny Broomhead, Diana Dawes, Amanda Hancock

#### **Penny Broomhead MCSP; Guidelines Group Leader, Project Lead, Lead Author**

Penny has worked in the field of amputee rehabilitation for 17 years and is presently Clinical Physiotherapy Specialist in Amputee and Prosthetic Rehabilitation at Nottingham Mobility Centre. She is currently studying for a master's degree in Rehabilitation Studies at The National Centre for Training and Education in Prosthetics and Orthotics, Strathclyde University.

She is Guidelines Coordinator for BACPAR and chaired the guideline development group for the Evidence Based Clinical Guidelines for the Physiotherapy Management of Adults with Lower Limb Prostheses.

Penny has lectured nationally and internationally and is a visiting lecturer at Bradford and Strathclyde Universities.

#### **Diana Dawes MSc (Oxon): Project Lead, Systematic Reviewer, Lead Author**

Diana worked as a senior physiotherapist/acting Clinical Manager in the Oxford Prosthetics Service from 1995 to 2003. In 2005 she received her masters in Evidence-Based Health Care and is now working as a research co-ordinator in the area of outcomes research for the department of clinical epidemiology, McGill University, Montreal, Canada.

Diana was a member of the guideline development group for the Evidence Based Clinical Guidelines for the Physiotherapy Management of Adults with Lower Limb Prostheses. She was also a contributor to the third edition of 'Therapy for Amputees' handbook by Barbara Engstrom and Catherine Van de Vent. She has given lectures to the undergraduate physiotherapy students at Oxford Brooks and McGill Universities on the physiotherapy care of people with amputations.

#### **Amanda Hancock, MCSP: Project Manager, Lead Author**

Amanda worked as Clinical Specialist in Amputee Rehabilitation for Hull and East Yorkshire Hospitals NHS Trust from 1992 to 2005. In 2006 she became a Manager of Physiotherapy at the same Trust maintaining one day a week clinical contact within her speciality.

Amanda was a member of the guideline development group for the Evidence Based Clinical Guidelines for the Physiotherapy Management of Adults with Lower Limb Prostheses. She has published work related to Shrinker sock use and is currently leading a research study examining Early Walking Aids for people with a transtibial amputation. She has presented both nationally and internationally on a variety of subjects related to the rehabilitation of people with lower limb amputations.

### Professional Advisors

**British Association of Prosthetists and Orthotists (BAPO);** Anne Rees, BSc(hons), MBAPO

**British Limbless Ex-Servicemen's Association (BLESMA);** S.A Coltman, OBE, Assistant General Secretary.

**International Society of Prosthetics and Orthotics (ISPO);** Dr Robin Luff, FRCS, FRCP

**Limbless Association;** Sam Gallop CBE, PML MA (Oxon),

**Murray Foundation;** Susan Shaw, MBAPO, MBA

**Nurses Amputee Network (NAN);** Maggie Morton, Clinical Nurse Specialist, RGN, SEN

**Occupational Therapists in Trauma and Orthopaedics (OTTO);** Anne Ewing, DipCOT, SROT

**Scottish Physiotherapy Amputee Research Group (SPARG);** Sally Thompson, MCSP, SRP

**Special Interest Group Amputee Medicine (SIGAM);** Dr Jeff Lindsay M.B. ChB. FRCSEd

**Society of Vascular Nurses;** Sue Ward, Vascular Nurse Specialist, RGN

**Vascular Surgical Society of Great Britain and Ireland (VSSGBI);** Prof. Peter McCollum, MCh, SRCSI, FRCSEd





### CSP Officers

Dawn Wheeler, Head of Clinical Effectiveness

Jo Jordan, Systematic reviewer

### Patient and Carer Representatives

Mr and Mrs C Mills, Mr and Mrs N Craig, Ms T Stober

### Authors

Leads: Penny Broomhead, Diana Dawes, Amanda Hancock

### Contributors:

Judy Ashby, Gill Atkinson, Anne Blundell, Sue Bolton, Barbara Brown, Vanessa Davies, Jennifer Fulton, Jane Greiller, Belinda Quinlan, Gerry Reid, Jess Slater, Hannah Stockham, Pragna Unia, Sarah Vernon

### Literature Appraisers

**Tutor:** Jean Suvan, Clinical Co-ordinator, Department of Peridontology, Eastman Dental Institute

**Leads:** Diana Dawes, Vanessa Davies, Penny Broomhead, R.A. Shepherd

**Contributors:** Judy Ashby, Gill Atkinson, Sue Bolton, Jane Greiller, Jackie Petrie, Belinda Quinlan, Geraldine Reed, Jess Slater, Hannah Stockham, Pragna Unia

### Consensus

**Leads:** Anne Blundell, Diana Dawes, Pragna Unia, Sarah Vernon, Barbara Brown, Sue Boulton, Lysa Downing, Gillian Atkinson

### Contributors:

Katherine Atkin

Clare Blount

Sarah Bradbury

Joanna Buckley

Jane Cumming

Vanessa Davies

David Dickman

Gillian Evans

Carolyn Hale

Caroline Hird

Lynn Hirst

Morag McNaughton

Catrina Mawdsley

Jackie Petrie

Laura Rosbottom

Jane Saunders

Sandra Sheval

Rona Smith

Gayle Sweeney

Louise Tisdale

Louise Whitehead

Eleanor Bacon

Helen Booth

Penny Broomhead

Mary Jane Cole

Emma Crawshaw

Ian Dawson

Karen Duncan

Jennifer Fulton

Amanda Hancock

Joanne Hebenton

Lucy Holt

Kelvin Marshall

Jill Mutton

Di Quinlivan

Lesley Rugg

Helen Scott

Jessica Slater

Bev Sweeny

Joanne Teesdale

Maggie Uden

Ruth Woodruff



**External reviewers**

Ian Dawson; MCSP, SRP, Scottish Physiotherapy Amputee Research Group

Amanda Hurdowar MSc, Project Coordinator, Toronto Rehabilitation Institute, Canada

Elizabeth McInnes, BA (Hons); Grad Dip Applied Science (Nursing); Master of Public Health (MPH); (RCN Associate)

Dr Sara Twaddle, Director, Scottish Intercollegiate Guidelines Network

**Peer reviewers**

**Lead:** Penny Broomhead

**Contributors:**

Helen Ashcroft

Angela Brett

Karen Clark

Julia Gamlen

Anne Harrill

Janet Parkinson

Alison Philip

Vicky Pursey

Di Quinlivan

Susan Rorison

Emma Tebbutt

Sharon Wright



## Appendix 2 Literature search strategy

#18	Search #17 AND (#16 OR #15 OR #13) Limits: All Adult: 19+ years, Publication Date from 1978/01/01 to 2004/01/30, English, Human
#17	Search treat* OR care OR manag* OR physi*) Limits: All Adult: 19+ years, Publication Date from 1978/01/01 to 2004/01/30, English, Human
#16	Search ("Phantom Limb/blood"[MeSH] OR "Phantom Limb/classification"[MeSH] OR "Phantom Limb/complications"[MeSH] OR "Phantom Limb/diagnosis"[MeSH] OR "Phantom Limb/drug therapy"[MeSH] OR "Phantom Limb/nursing"[MeSH] OR "Phantom Limb/prevention and control"[MeSH] OR "Phantom Limb/psychology"[MeSH] OR "Phantom Limb/rehabilitation"[MeSH] OR "Phantom Limb/surgery"[MeSH] OR "Phantom Limb/therapy"[MeSH]) Limits: All Adult: 19+ years, Publication Date from 1978/01/01 to 2004/01/30, English, Human
#15	Search ("Amputation Residuums/blood supply"[MeSH] OR "Amputation Residuums/classification"[MeSH] OR "Amputation Residuums/complications"[MeSH] OR "Amputation Residuums/drug therapy"[MeSH] OR "Amputation Residuums/injuries"[MeSH] OR "Amputation Residuums/instrumentation"[MeSH] OR "Amputation Residuums/methods"[MeSH] OR "Amputation Residuums/nursing"[MeSH] OR "Amputation Residuums/rehabilitation"[MeSH] OR "Amputation Residuums/surgery"[MeSH]) Limits: All Adult: 19+ years, Publication Date from 1978/01/01 to 2004/01/30, English, Human
#9	Search ("Amputees/education"[MeSH] OR "Amputees/psychology"[MeSH] OR "Amputees/rehabilitation"[MeSH] OR "Amputees/statistics and numerical data"[MeSH]) Limits: All Adult: 19+ years, Publication Date from 1978/01/01 to 2004/01/30, English, Human
#13	Search #8 AND (#12 OR #10 OR #9) Limits: All Adult: 19+ years, Publication Date from 1978/01/01 to 2004/01/30, English, Human
#12	Search ("Phantom Limb/complications"[MeSH] OR "Phantom Limb/diagnosis"[MeSH] OR "Phantom Limb/drug therapy"[MeSH] OR "Phantom Limb/etiology"[MeSH] OR "Phantom Limb/nursing"[MeSH] OR "Phantom Limb/prevention and control"[MeSH] OR "Phantom Limb/psychology"[MeSH] OR "Phantom Limb/rehabilitation"[MeSH] OR "Phantom Limb/surgery"[MeSH] OR "Phantom Limb/therapy"[MeSH]) Limits: All Adult: 19+ years, Publication Date from 1978/01/01 to 2004/01/30, English, Human
#10	Search ("Amputation Residuums/complications"[MeSH] OR "Amputation Residuums/drug therapy"[MeSH] OR "Amputation Residuums/injuries"[MeSH] OR "Amputation Residuums/methods"[MeSH] OR "Amputation Residuums/nursing"[MeSH] OR "Amputation Residuums/physiopathology"[MeSH] OR "Amputation Residuums/rehabilitation"[MeSH] OR "Amputation Residuums/surgery"[MeSH] OR "Amputation Residuums/therapy"[MeSH]) Limits: All Adult: 19+ years, Publication Date from 1978/01/01 to 2004/01/30, English, Human
#8	Search Care OR physi* OR manag* Limits: All Adult: 19+ years, Publication Date from 1978/01/01 to 2004/01/30, English, Human



## Appendix 3 Example of a critically appraised topic (CAT)

### Rehabilitation of lower extremity amputation due to peripheral arterial occlusive disease in patients with end-stage renal disease

There may be no significant difference in the ability of elderly patients with lower limb amputation, and co-existent end-stage renal to successfully complete prosthetic rehabilitation and those without end-stage renal disease.

**Citation/s:** Lucke C., MD, Beindorff N., MD, Thomas R., MD, Hoy L., Lucke Christoph MD, Vascular Surgery, Jan/Feb 1999, Vol 33, No 1

**Lead author's name and fax:** Caroline Luke, MD Department of Cardiology, Pulmonology and Angiology, Otto-von-Guericke University of Magdeburg, Leipziger Str. 44, D-39120 Magdeburg, Germany

**Three-part Clinical Question:** Does the presence of End Stage Renal Disease (ESRD) affect the outcome of rehabilitation in lower limb amputees with peripheral vascular disease?

**Search Terms:** ESRD, LEA's, PVD, rehab, prosthetic use

#### The Study:

**The Study Patients:** Cases: 30 Lower limb amputees (age 50-89 years, with end-stage renal failure and peripheral arterial occlusive disease). Controls: 319 lower limb amputees with peripheral arterial occlusive disease, but without end-stage renal failure, referred for rehabilitation between 1987-1996. Significantly larger percentage of transtibial amputations among the cases. Significantly larger number of bilateral amputations amongst controls.

**Prognostic Factor:** End stage renal failure, age, prevalence of diabetes, amputation levels

**The Outcome:** Rehabilitation, length of admission

There was a well-defined sample at a uniform (early) stage of illness. Follow-up was long enough; follow-up was complete. There were not blind, objective outcome criteria. Adjustment was made for other prognostic factors. There was validation in an independent test-set of patients.

#### The Evidence:

Prognostic Factor	Outcome	Result	Measure	Confidence Interval	Independent?
Trans-tibial amputation with end-stage renal disease	Able to use a below-knee prosthesis in average 74days	74%	% able to walk		yes
Trans-femoral amputation with end-stage renal disease	Able to use an above-knee prosthesis in average 74days	86%	% able to walk		yes
Trans-tibial amputation without end-stage renal disease	Able to use a below-knee prosthesis in average 68days	74%	% able to walk		yes
Trans-femoral amputation without end-stage renal disease	Able to use an above-knee prosthesis in average 68days	56%	% able to walk		yes
Diabetes	Diabetes in ESRD: patients without ESRD	77% :56%	% Ratio		yes

#### Comments:

Poor quality retrospective case control study demonstrating that patients with end-stage renal disease were just as likely as non-renal failure patients to achieve prosthetic fitting and mobility status, but the cases were not well matched to controls. Small sample of 30 cases compared to 319 in the control group, Appraised by: XXX; 21 May 2004. Email: **Kill or Update By:**



## Appendix 4 Table of papers referenced in guidelines

These tables list the evidence appraised and used to inform the recommendations. The references are in alphabetical order with the reference number in brackets as found in the reference section. Each table gives a brief description of the design, the sample studied, the intervention (if one was employed), and a conclusion or comment. Readers are recommended to read the original article if they want more detail.

Citation	Study design	Population	Intervention	Comments	Level of evidence
Altner P [29]	Retrospective case series	52 double-disability patients (hemiplegia and dysvascular lower limb amputation). No control group	Hemiplegia	Neuromuscular status influences the mobility of amputees with a CVA. Eight patients attained independent prosthetic function while 16 patients were limited and six were nonambulatory. Cannot tell if follow-up was long enough, but was complete. No blind, objective outcome criteria. Adjustment was not made for other prognostic factors	IV
Bailey M [30]	Case series	10 consecutively presenting amputees with PVD, able to use Ppam Aid. No control group	Walking	Resting ECG alone may be inadequate for safe prescription of exercise. Moderate walking exercise produces myocardial ischaemia in 30% of patients, despite 70% presenting with cardiac anomalies at rest. Small study, not blinded	III
Beekman C [35]	Case series	55 trans-femoral or knee disarticulation amputees. Aged over 50 with NIDDM or PVD in USA		TF and TKD amputees perform at a functionally lower level than bipedal subjects. There are no factors that predict functional outcome. Functional peak is reached at discharge from rehabilitation. No account made for domestic situation. Wide variety of patients in study group, no differentiation for independent factors. Follow-up was complete and long enough. No blind, objective outcome criteria. No adjustment for other prognostic factors. No validation in independent test-set of patients	III
Campbell W [22]	Case series	61 adult amputees with primary major amputation, 25 TTA, 19 TFA. Age range 51-91 (median 79) 35 M 26 F	Predicted prosthetic outcome by MDT	MDT can reasonably predict prosthetic outcome 85% in predicted users 65% in predicted non users. No details of factors influencing predictions for this group of patients. Predictions incomplete	III



Citation	Study design	Population	Intervention	Comments	Level of evidence
Chin T [41]	Case control	Traumatic trans-femoral amputees. Mean age <42. Cases n=14 Controls n=10	Inclusion of endurance training in rehabilitation programme	One-leg cycling is of use as a form of endurance training for traumatic amputees. Poorly presented results. Reports statistically significant increases in post training values for endurance with training programme. No effort to blind or randomise allocation of subjects	III
Chin T [58]	Case control	Traumatic unilateral amputees Mean age 26.1+/- 3.7 Cases n=16 Controls (amputees) n=15 Controls (able bodied) n=18	Effect of endurance training on the physical fitness of amputees	Physical fitness of traumatic amputees is lower than the able bodied. Endurance training can help to recover physical fitness. Study of patients at the prosthetic stage of rehabilitation. Not randomised or blind. 15 amputees, who were not selected for endurance training, unaccounted for, therefore unable to assess the impact of prosthetic training alone on amputees fitness	III
Christensen B [34]	Retrospective case series	29 Danish, prosthetic transibial and trans-femoral amputees – all causes. 18 transibial, 1 bilateral and 10 trans-femoral amputees	Rehabilitation with prosthesis	Transibial amputees achieve a higher level of prosthetic skill than trans-femoral. Non-validated questionnaires (response rate not given) and unstructured interviews. Small sample, no adjustment made for other prognostic factors. Not blinded, over a short period of time (10 months)	IV
Collin C [52]	Retrospective case series	37 amputees referred to DSC for review. PVD or diabetes	Prosthetic rehabilitation	The physical environment to which the patient is discharged can affect functional outcome. Modifications to the environment can improve functional outcome. Well defined sample at uniform (early) stage. Follow-up long enough & complete. No blind, objective outcome criteria. Adjustment made for other prognostic factors. No validation in independent test-set of patients	III
Collin C [13]	Case series	Elderly lower limb amputees with occlusive arterial disease (n not stated)	Amputation	Mobility is reduced post-amputation. Provision of a wheelchair should be routine. Provides very little information on a study performed by questionnaire. Poorly defined sample, generally refers to the elderly amputee. Cannot tell if there were blind, objective outcome criteria or if there was adequate follow up	III



Citation	Study design	Population	Intervention	Comments	Level of evidence
Condie M [23]	Cohort	Discharge data gathered from all amputees in Scotland during a 3 year survey (absolute numbers not stated)	Compression bandaging / EWAs/ shrinker socks	The use of Elset 's' shrinker socks and EWAs result in decreased time to casting for transfemoral amputees compared to crepe bandages or no bandage. Patients using a rigid plaster dressing have reduced time to casting compared to other compression therapies. Comparisons of all patients across units, effect size may be due to differing treatments in units/patient selection/staff	III
Cruts H [66]	Cohort	39 unilateral vascular amputees, referred for prosthetic rehabilitation	Mean age 72	Compares prosthetic outcome with peak cardiac load. Poor cardiac condition of patients will influence the outcome of prosthetic training with patients adapting speed and waking distances. Poorly reported results. Small patient groups. Only includes patients suitable for prosthetic rehabilitation – not able to generalise results	III
Cutson T [71]	Case control	Cases: 20 male vascular TTA, admitted to in patient rehabilitation within 3/52 of surgery. Controls: retrospective group of patients of comparable age and comorbidities who had rehabilitation after receipt of prosthesis.	Early Inpatient rehabilitation. Outcome: Time from surgery to prosthesis	Early inpatient rehabilitation, tailored to subjects needs, may reduce time to prosthetic ambulation. Poorly conducted before & after study. Introduction of rigid removable dressing in study group may have influenced results. Subjects had 1 hour PT daily consisting of resisted exercise using theraband and PWB exercises with RRD. No details of PT input for control group	III



Citation	Study design	Population	Intervention	Comments	Level of evidence
Czyrny J [31]	Retrospective case control	Cases: 19 adult lower limb amputees with end stage renal disease	Controls: 19 adult lower limb amputees with peripheral vascular disease	Comparison of functional outcome and cost of rehabilitation for renal patients and vascular amputees. Renal patients can be as effectively rehabilitated after amputation as peripheral vascular patients. No significant difference was found between the two groups in total cost of rehabilitation or functional outcome. Follow up ended at discharge giving no indication of functional use of prosthesis in home environment. Completed by retrospective chart review	III
De Fretes A [67]	Case series	8 bilateral lower limb amputees admitted to a rehabilitation unit in Netherlands between 1980 - 1990	Rehabilitation	Bilateral amputees can achieve functional walking and usually require use of walking aids. Life satisfaction is satisfactory or very satisfactory. Small numbers and different cross section of population at the end of the study. No indications given at discharge of walking ability to allow comparison at follow up	III
Delahanty R [28]	Before and after study	All levels and causes of amputation admitted to Canadian rehabilitation unit Controls n=21 Experimental n=20	Three 2-hour psychoeducational group sessions	Trend for amputees who participated in group sessions to experience less distress than comparison subjects, but statistical significance was only achieved for going on holiday. Clinical significance not discussed. Results were maintained 8-months post discharge	III
Dingwell J [62]	Prospective case control	6 unilateral amputees. Aged 31-69 yrs. Established users. 6 matched controls	CCF treadmill walking. Visual feedback training	Visual feedback training is an effective means of producing short term reductions in gait asymmetry. Non-blinded randomised controlled trial with intention-to-treat. Very small sample	III
Eneroth M [26]	Review	Search and inclusion criteria not described, number of papers reviewed unclear	Review of wound healing post amputation for vascular disease	Multiple factors affect wound healing in vascular amputees and no one factor can be looked at in isolation. Factors include smoking, hemorrheology, malnutrition, previous vascular surgery, pre-op gangrene, level of amputation, antibiotics, diabetes mellitus, dressings and drains, surgical technique	III





Citation	Study design	Population	Intervention	Comments	Level of evidence
Fletcher D [27]	Retrospective case series	199 major lower extremity amputees reviewed for prosthetic success	Prosthetic fitting	Rate of fitting prosthesis in an unselected group of geriatric amputees was 36% (47% BKA, 14.5% AKA), but 74% amongst those referred to a clinic. Age, AKA, dementia and CVD are independently associated with unsuccessful fit. These factors are predictors. The knowledge of predictors is important to allow realistic goal setting and correct identification of prosthetic candidates	III
Grieve A [9]	Prospective case series	26 Dutch lower limb amputees, 5 months after amputation. No control group	Amputation or rotational osteotomy	Co-morbidity is associated with lower levels of functional outcome. Can't tell if sample well defined at uniform (early) stage of illness. Follow-up complete but not long enough. No blind, objective outcome criteria. Adjustment made for other prognostic factors. No validation in independent test-set of patients. Small study with possible skewed results as age associated with presence of IDDM	IIb
Ham R [19]	Prospective case control	75 vascular amputees. Control group of 25 patients received no specialist physiotherapy or surgical care	Specialist care	Increasing age, concurrent diseases and poor compliance are prognostic of a low functional level. Amputees benefit from care by a specialist multidisciplinary team and early delivery of a prosthesis. No homogeneity in studies. Non-blinded, non-randomised trial without intention to treat	IV
Ham R [21]	Prospective case control	233 consecutive patients with pvd admitted for lower limb amputation	Team approach to rehabilitation	To achieve 1 patient going home with a prosthesis 1 patient needs to be treated by the team approach (95%C.I. 1.1 to 1.7) but study is seriously flawed. Non-blinded, non-randomised trial without intention-to-treat. Results for final stage of study incomplete due to staffing changes. Not representative sample of population	IV



Citation	Study design	Population	Intervention	Comments	Level of evidence
Hanspal R [50]	Retrospective case series	100 unilateral trans-femoral and transtibial amputees, aged 60+ yrs. No control subjects	Amputation	Functional outcome with a prosthesis is affected by cognitive and psychomotor function. Provides evidence for the need of accurate assessment and the setting of realistic functional goals. Well-defined sample. Cannot tell if follow-up long enough or complete. No blind, objective outcome criteria. No adjustment for other prognostic factors. Not randomised	III
Hanspal R [55]	Cohort	32 lower limb amputees aged 54-72yrs. No control group	Cognitive Assessment Scale. Clifton Assessment Procedure. Harold Wood/Stanmore Mobility Grade	There is a correlation between cognitive, psychomotor status and mobility level achieved. Follow up long enough but can't tell if complete. No blind objective outcome criteria. Adjustment was made for other prognostic factors. No validation in independent test set of patients	III
Houghton A [37]	Retrospective case series	102 Vascular lower limb amputees operated on in 1986 and 1988 in London	Amputation	Rehabilitation is more successful in transtibial than trans-femoral amputees. Non-validated rehabilitation questionnaires were sent to 179 patients, response rate was 81 per cent. Not blinded or randomised. No standardised rehabilitation programme	IV
Houghton A [56]	Retrospective cross section	169 unilateral amputees under 3 DSC's. 88 trans-femoral, 54 knee disarticulation, 27 Gritti-Stokes	Functional use of prosthesis	Amputees with a knee disarticulation rehabilitate better than those with a trans-femoral or Gritti-Stokes level of amputation. Non-validated questionnaire, response rate 74%. Selected responders were used by matching for age & duration of amputation. Not blinded. Adjustment made for prognostic factors. Due to selection for matching numbers were small in each group	III
Hubbard W [59]	Retrospective case series	92 vascular amputees in Ballarat, Australia	Rehabilitation and prosthetic fitting	Below knee amputees gain a higher level of mobility than above knee amputees. 20% amputees died within two years of primary amputation. All patients had been accepted into a rehabilitation programme. Not all assessed at similar stage of rehabilitation. Discusses earlier studies but not all use the same classification	III

Citation	Study design	Population	Intervention	Comments	Level of evidence
Jayantunga U [33]	Prospective cohort	21 unilateral, diabetic trans-tibial amputees with no existing plantar ulceration Control group not used	Foot orthoses and footwear	Natural feet in this group are subject to abnormal loading forces. These can be reduced by the provision of orthoses and proper footwear. The foot should be monitored and referred early for an orthosis. Well defined sample at uniform (early) stage. Follow-up complete and long enough. Can't tell if blind, objective outcome criteria. No adjustment for other prognostic factors. No validation in independent test-set of patients. Useful study but no figures shown to support claim that Orthotics reduced abnormal forces in diabetic foot	III
Kegel B [42]	Prospective case studies	4 trans-tibial amputees. No control group	EMG biofeedback	Residuum exercises enhance retention characteristics of the residuum. Residuum exercises should become an integral aspect of routine physiotherapy management. Small study, not blinded. No follow-up. No adjustment for other prognostic factors	III
Klingenstierna U [24]	Case studies	8 male transtibial amputees, all cause. Mean age 61.5	Bilateral Lower Limb Exercise Programmes	Isokinetic knee flexion and extension exercises in transtibial amputee will increase their muscle strength. Supports the general premise that exercise improves muscle strength. Selected sample, not enough information about bias	III
Kulkarni J [74]	Prospective cross sectional	164 consecutive lower limb amputees presenting to UK DSC. No controls.	Falls	Lower limb amputees are at risk from falling. Amputees should be educated what to do in the event of a fall, with written instructions provided. No differentiation made between pathologies, some may be at greater risk than others. Not blinded. Not randomised, no controls. Structured questionnaire expanded in light of pilot study	III
Lachman S [64]	Retrospective case control	11 lower limb amputees with rheumatoid arthritis. Control subjects –matched amputees without rheumatoid arthritis	Rheumatoid arthritis	Most amputees with rheumatoid arthritis use their prosthesis daily for help with transfers and cosmetic purposes. Small study size. Exposures were neither objective nor measured blind. Cannot tell if follow-up was long enough, but was complete	IV



Citation	Study design	Population	Intervention	Comments	Level of evidence
Lambert A [44]	Cross-sectional survey	Audit of physiotherapists at 35 artificial limb units in England and Wales	Residuuum shrinker usage	Residuuum shrinkers are used widely, but only 8.6% of units issue to every patient, for various reasons. There is a need for guidance in use of residuum shrinkers, and research into effects. Small audit	IV
Lein S [39]	Cross-sectional survey	58 physiotherapists working with amputees in catchment area of the Gillingham Disablement Services	Vessa PPAM aid Mark 1 usage	The Vessa PPAM aid is a valuable tool for physiotherapists assessing and treating amputees, but is being used by some in a potentially dangerous manner. Not all conclusions can be derived from data - no damage was shown to be done to patients by lack of knowledge of Ppam Aid	IV
Levy S [60]	Descriptive cohort study (number in cohort not stated)	Lower limb amputees	Prosthesis, skin infection, residual limb oedema	1.Skin disorders may be due to mechanical rubs, over or under zealous skin care 2.Oedema may be caused by incorrectly fitted socket, excessive negative pressure in suction socket, underlying vascular disorder 3. Rub & shear cause epidermoid cysts Subjects not defined. Exposures and outcomes not objective or blind. Cannot tell if follow-up was long enough or complete	IV
Liaw M [48]	Case control	n = 54 with phantom limb pain Cases: 25 male amputees Controls: 29 amputees	Acupuncture applied to the sound contralateral limb at acupoints	Acupuncture therapy may be effective in temporarily relieving pain ( $p < 0.05$ ) when the pain is acute. Poor randomization, no blinding, different sample groups, poor standardization. Small population	III
Lucke M [65]	Retrospective Case control study	Cases: 30 lower limb amputees with vascular disease and end-stage renal disease Controls: 319 lower limb amputees with vascular disease	Completion of rehabilitation	There may be no significant difference in the ability of elderly patients with lower limb amputation, and co-existent end-stage renal to successfully complete prosthetic rehabilitation and those without end-stage renal disease. Small sample. Significantly larger percentage of transtibial amputations among the cases. Significantly larger number of bilateral amputations amongst controls	III

Citation	Study design	Population	Intervention	Comments	Level of evidence
Manella K [68]	RCT	12 selected trans-tibial amputees with residual limb oedema 6 Shrinker socks 6 elastic bandaging	Limb volume	The shrinker sock is significantly better than the elastic bandage for reducing residual limb oedema (p=0.03). Small sample size; not blinded	IIb
McCartney C [45]	Cross sectional	40 selected lower limb amputees in Scotland	Prevalence of pain	Pain is common after amputation and affects quality of life in 10% of the population	III
Meikle B [49]	Retrospective cohort study	254 consecutively admitted lower limb amputees in an acute amputee rehabilitation unit, all within 90 days of amputation surgery	Interruptions to rehabilitation	Interruptions to rehabilitation are common, and may result in longer rehab, but do not affect eventual outcome. No intention to treat, confounded by not including patients who did not return to complete rehabilitation	IV
Moirenfeld I [43]	Case series	11 trans-tibial Israeli amputees aged 22-68 yrs. Regular, independent walkers. No control subjects	Isokinetic strength and endurance tests in sound and amputated limb	In trans-tibial amputees, the maximal strength in the residual limb is lower than in the sound limb. Recommends trans-tibial amputees should do strengthening exercises for residual limb. Small number of subjects. Results of individuals heterogeneous, ? due to differing age groups, time since amputation and residuum length. Follow-up long enough and complete	IIb
Mortimer C [47]	Qualitative study	31 lower limb amputees attended one of 7 focus groups	Focus groups discussing experiences of phantom pain, information received re phantom pain and opinions on development of patient information	Well conducted and analysed focus groups. Concludes that better patient information re phantom pain should be provided. Preference for; 1) early discussion of phantoms. 2) initial information provided verbally rather than written information alone. 3) better professional training needed	III
Nicholas J [10]	Case series	94 consecutive amputees in Pittsburgh answered questionnaires	Amputation and rehabilitation	Patients felt vulnerable, defenceless and conspicuous. Patient information should be given in written form. Treatment & assessment should be documented. Response to questionnaire 100%. Questionnaire piloted	III



Citation	Study design	Population	Intervention	Comments	Level of evidence
Pernot H [20]	Literature overview	71 studies concerning predictive or prognostic factors. Lower limb amputees 1983-1994 due to PVD		Increasing age, concurrent diseases and poor compliance are prognostic of a low functional level. Advocates multidisciplinary team. No homogeneity in studies. Can't tell if studies were multiple independent reviews of individual reports	III
Pezzin L [70]	Cross sectional questionnaire	46 patients who had a trauma related amputation to the lower limb at the university of Maryland Shock Trauma Centre between 1984 and 1994 68% response rate (n=78)	Discharge to in-patient rehabilitation	In-patient rehabilitation improves the long-term outcomes of people with trauma-related amputations	III
Pollack C [40]	Randomised control trial	80 lower extremity amputees. 40 Early walking aid 40 controls received 'normal care'	Prevalence of postoperative complications	Using early walking aids reduces the incidence of postoperative complications and results in faster and more successful rehabilitation. No blinding occurred, randomization based on admission number	Ila
Potter P [54]	Prospective cohort	80 non-traumatic, unilateral amputees admitted consecutively to regional rehabilitation unit	Test for peripheral neuropathy	Peripheral neuropathy in the intact limb is nearly always present in diabetics requiring amputation. Peripheral neuropathy is also present in 2/3rds of non-diabetic amputees. Preventative measures of limb care should be utilized in all patients with an amputation. Well-defined cohort. Not blinded. Follow-up complete	Ila
Rush P [32]	Prospective case series	16 healthy males (mean age = 48). Unilateral, prosthetic, trans-femoral amputees for $\geq 5$ yrs. Compares bone density of amputated femur to contralateral femur	Bone densitometry	There is an increased risk of developing Osteopenia in the femur of the amputated limb. Accounts for other prognostic factors. Small number in study, all healthy males. Not randomised or blind	III
Sapp L [57]	Retrospective cohort	132 lower limb amputees in Nova Scotia entering rehabilitation programme. No control group	Rehabilitation programme	A rehabilitation program for lower limb amputees leads to functional prosthetic use. Poorly defined intervention. Review of charts and non-validated questionnaire (85% return). No blind, objective outcome criteria. Adjustment was not made for other prognostic factors	IV

Citation	Study design	Population	Intervention	Comments	Level of evidence
Schaldach D [69]	retrospective, before and after, case control study	71 above-knee and below-knee arterial occlusive disease amputees in USA	Interventions: 1. Without clinical care pathway 2. With a consultation to rehabilitation services 3. With a rehabilitation-focused clinical pathway	Clinical pathways reduce hospital stay ( $p=0.01$ ), reduce hospital charges ( $p=0.003$ ) and there was a possible trend to more patients being discharged to home ( $p=0.932$ ). Retrospective chart review of patients before and after intervention introduced. Only patients discharged to a rehabilitation unit followed up	IV
Schon L [73]	before and after case control study.	Cases: 31 transtibial amputees Controls: 23 matched transtibial amputees using soft dressings	Exposure of Interest: Use of IPOP	Prefabricated prostheses may reduce complications, revisions & time to first custom prosthesis. Selection bias may have occurred. 11 dropouts in IPOP group. No intention to treat. No. of falls not significantly reduced	III
Scott H [51]	pilot randomised cross-over trial	12 trans tibial amputees from 5 Glasgow hospitals	AMA & Ppam Aid. Walking 4 lengths of parallel bars	During standing interface pressures of AMA are significantly greater ( $p=0.02$ ) than in the PPAM aid. During walking there is no significant difference. Care needs to be taken that patients do not hyper-extend when using the AMA. 4 amputees randomised to group 1 were excluded from the study due to excessive pain on donning the AMA	Ib
Seroussi R [63]	prospective case control	Subjects: 8 healthy, non-dysvascular, trans-femoral amputees. Controls : 8 healthy, normal ambulators, no other information given	Gait analysis	Hip extensors (bilaterally), eccentric hip flexors and ankle plantar flexors benefit from strengthening. Small numbers in trial. Non-blinded, non-randomised trial. All prostheses fitted by the same, experienced prosthetist with the same system (worn for > 1 month)	Ila



Citation	Study design	Population	Intervention	Comments	Level of evidence
Smith D [46]	Cross sectional questionnaire	73% of eligible patients from two USA hospitals (n = 92). 1 or more years post-unilateral amputation and use a fitted prosthesis at least 5 days a week	Phantom limb, residual limb, and back pain after lower limb amputation	Non-painful phantom sensations are significantly more frequent than painful $p < 0.0001$ No significant difference in frequency of phantom, residual or back pain. Time since amputation was not correlated with the occurrence of non-painful phantom sensations or pain, or intensity of pain Intensity of phantom sensations is not significantly different than the intensity of phantom limb pain. Above knee amputees are significantly more likely to have greater intensity of pain & more bothersome back pain than below knee amputees. Back pain is more common in this sample than the general population. Not representative of all persons with amputations as only subjects who were 1 or more years post amputation and wore a prosthesis were included in the study	III
Van De Ven C [53]	Cohort	96 bilateral amputees aged >55 yrs. Amputation within 3 years living at home or residential care	Bilateral amputation	Bilateral amputees should be provided with a wheelchair and attend a home visit early in the rehabilitation process to allow successful return to the domestic environment. No control group. Follow-up was long enough and complete. No blind, objective outcome criteria. Adjustment was not made for other prognostic factors. Large study with data gathered from many variables	III
Ward K [38]	Descriptive review	Studies (1953-1994) concerning energy cost of ambulation. Search not described	Ambulation	Energy cost of ambulation is greater for amputees than for non-amputees. Ascending level of amputation is associated with increasing metabolic demand. Literature regarding energy cost of ambulation with different lower limb prostheses is equivocal. Aerobic training may reduce metabolic costs of ambulation, particularly for those with cardiopulmonary or vascular insufficiency. Not a systematic review. Insufficient data given on inclusion of papers therefore may be biased	III



Citation	Study design	Population	Intervention	Comments	Level of evidence
Waters R [61]	Case control	70 unilateral prosthetic lower limb amputees, other pathologies not noted but had no residuum pain, swelling or pressure sores. Number of controls unclear – “5 normal persons of each sex in each decade from third to seventh”, comparable results with other large studies for non amputees	Walking	The higher the level of amputation, the higher the energy cost. Amputees adjust their velocity to maintain the rate of energy expenditure within normal limits. Age adjusted but not randomised or blinded. Large number in study	III
White E [72]	Cross-sectional survey	14 DSA managers (86% response rate), 30 occupational therapists (87% response) 12 elderly amputees (100% response)	Residuum board use	Residuum boards are a well accepted piece of equipment for use with lower limb amputees. Therapists should be made aware of the equipment available, its uses and disadvantages	IV
Wolf E [36]	Retrospective case series	18 Israeli, bilateral vascular amputees, aged > 55yrs. No control group	Rehabilitation	Rehabilitation of bilateral lower limb amputees can lead to independent function. Small number of subjects. Cannot tell if the follow-up was long enough, but was complete. Adjustment was made for other prognostic factors. Not blinded	IV



## Appendix 5 Excluded papers

These papers were not included in the guideline because they were descriptive, irrelevant to the topic or of poor quality.

Dillingham T., Pezzin L. et al. Incidence, acute care length of stay, and discharge to rehabilitation of traumatic amputee patients: an epidemiologic study. *Arch Phys Med Rehabil*, 1998 79: p279-287

Ehde, D., Smith. D. et al. Back pain as a secondary disability in persons with lower limb amputations. 2001. *Arch Phys Med Rehabil* 82; p.731-734

Fitzpatrick, M. The psychological assessment and psychosocial recovery of the patient with an amputation. *Clinical Orthopaedics and related research*, 1999.361, p.98-107

Ham, R., Richardson, P., Sweet, A. A new look at the Vessa Ppam Aid. *.Physiotherapy*, 1989. 75 (8), p.493-494

Lilja M., Johannsson T. Adherent Cicatrix after below-knee amputation. *Journal of Prosthetics and Orthotics*, 1993. 5(2): p65

Matsen S., Malchow D. et al .Correlations with patients' perspectives of the result of lower-extremity amputation. *Journal of Bone and Joint Surgery*. 2000, 82-A, (8); p.1089-1095

Yetzer E., Kauffman R. et al. Development of a patient education program for new amputees. *Rehabilitation Nursing*, 1994 19 (6);p.355-357



## Appendix 6 Patient, peer and professional advisors' comments on the framework of the guidelines

### Draft Framework for pre and post-operative physiotherapy management of adults with lower limb amputation, amended following consultation

#### Suggested sections and the topics included in them

Additions were made on this document but other comments were not transferable, refer to framework response sheet for more detail

### 1. The role of the physiotherapist within the multidisciplinary management team

Introduction; section covers the contribution of physiotherapy to the multidisciplinary management of the patient.

Pain control

Wound healing

Control of oedema

Management of phantom limb

Psychological adjustment

Decision on treatment progression, including start of EWA, referral for prosthetic rehab and prescription

Discharge planning

Wheelchair and seating prescription

Pathways of care; standardised documentation, patient journey, protocols for MDT management

Communication within MDT

Discharge planning

Review and use of shared outcome measures

Level selection from a functional stand point.

### 2. Knowledge

Introduction; outlines the knowledge base that the physiotherapist should have or have access to:

Pathology

Surgical techniques

Impact of concurrent conditions

Impact of level of amputation on rehab potential

Prosthetic rehab process including prescription principles

CPD and keeping up to date

MDT management of concurrent conditions

Other relevant guidelines

Investigations

Infection diagnosis and management

Counselling skills/psychology.

### 3. Assessment

Similar format to previous guidelines but made applicable to this stage of rehab.

Intro; info may be obtained pre or post –op



- 3.1 There should be written evidence of a full physical examination and assessment of previous and present function (A)
- 3.2 The patients' social situation, psychological status, goals and expectation should be documented. (B)
- 3.3 Relevant pathology including diabetes, impaired cognition and hemiplegia should be noted. (C)
- 3.5 A problem list and treatment plan, including agreed goals, should be formulated in partnership with the patient. (D)

Drug history, management of other pathology through medication

If the assessment is done pre op then there needs to be another assessment / review post op as the patients physical condition may have changed due to surgery and therefore their goals may need to be changed

Subjective findings of past activities incl. mobility should be noted.

#### 4. Patient and carer education

Intro; physiotherapy contribution to information and education for patients and carers.

Patient journey; including stages in rehab process, meeting other amputees and seeing demo limbs

Informed goal setting

Care of remaining limb

Care of residual limb

Coping strategies following falls

Other information; driving, employment, leisure, etc access to benefits and psychological support, charities.

#### 5. Pre-op management

Intro; for those patients who are seen pre-op this section will cover physiotherapy interventions

Check chest

Pre-op assessment (in line with section 3)

Appropriate information giving to patients and carers (section 1 and 4)

Pre-op treatment regimes based on assessment findings; ROM, muscle power and length, functional activities e.g. transfers, wheelchair mobility

Specifically noting Upper Limbs inc. dexterity in ROM assessment

Patients' goals.

#### 6. Post-op management

Intro; many topics in this section could be started pre-op if time and patient's condition allows.

Knowledge of alternate models of rehab

Environment and equipment

EWA to assess potential & assist patients' decision making

Compression therapy

Mobility aids

Balance re-ed

Transfers, on/off floor

Wheelchair and seating

Prevention/reduction of contractures

Home visit

Bed mobility

Positioning/posture

Care of pressure areas

Wound condition

Management of phantom sensation and pain

Psychological management.

Exercise programmes for trunk and all limbs, including residual limb specific exercises



## BACPAR Guidelines framework response sheet

### Please indicate below your comments on the attached Framework

1. Do the suggested six headings of the Framework cover the full scope of the guideline?

Yes  No

If NO, please give recommendations for improvement

*I feel that the post operative section is too long, and should be split into the initial post operative period and then a more specific rehab phase. These two periods are very different for the patient.*

2. Are the suggestions for topics to be covered in each section sufficient to cover the scope of the Guideline? Please indicate YES or NO for each section and add any recommendations that you feel will improve the document.

	Yes	No	If NO please give indicate topics to add or remove
Section 1	X 9	3	<p>Re management of phantom pain and psychological adjustment. Not sure how the physiotherapist would/should contribute towards this except in perhaps an informal way.</p> <p>The heading is an overlap with the other guidelines – isn't the need for MDT and communication the same pre- and post prosthetic?</p> <p>I think this section could be divided more.</p> <p>Pain and oedema could go together in maybe its own section, ? with psychological care.</p> <p>Wheelchair and seating could ?? go into assessment (not sure about this)</p> <p>Psychological adjustment could go in knowledge or assessment??</p> <p>Discharge planning in assessment section? Include the review and use of shared outcome measures</p> <p>What is EWA ?</p> <p>Level selection from a functional stand point</p> <p>Level selection from a functional stand point</p> <p>Carers psychological needs</p>
Section 2	X 8	3	<p>Awareness of the MDT management of concurrent conditions i.e. who responsible for what, next appointments etc.</p> <p>Access to other relevant guidelines/standards eg In Scotland, Clinical standards document Vascular services – care of the patient with vascular disease.</p> <p>May be add "investigations"</p> <p>How much knowledge of prosthetic prescription principles required?</p> <p>Re comments for sections 1&amp;3; - basic knowledge of counselling skills and /Or psychology would be useful</p> <p>Infection - diagnosis and management</p>



	Yes	No	If NO please give indicate topics to add or remove
Section 3	X 9	3	<p>Re 3.2 documentation of patients' psychological status. I'm interested to know the recommendation on how this should be done!</p> <p>Include the management of other pathology through medication (Drug History). A/A knowledge of key clinicians involved in the patient's management.</p> <p>3.1 – Clear definition of "full physical examination" required and minimum data required on each patient.</p> <p>3.2/3.3 – Information may already be documented in MDT notes or unitary patient records.</p> <p>If the assessment is done pre op then there needs to be another assessment / review post op as the patients physical condition may have changed due to surgery and therefore their goals may need to be changed</p> <p>Subjective findings of past activities incl. mobility should be noted</p>
Section 4	X 8	3	<p>? Include in other information something about access to benefits and psychological support.</p> <p>Add ?Life style changes e.g. cessation of smoking!!</p> <p>Need for standardisation of written information given?</p> <p>In Scotland, Murray Foundation pack given to all amputees plus additional leaflets.</p> <p>List of charities that can help as appropriate</p> <p>Where to obtain information ie pamphlets that are available eg driving after amputation and booklets on amputation eg our Making the best of amputation</p> <p>Seeing demo. Limbs may not always be possible – especially DGHs with small satellite services</p> <p>Communication pathways with patients &amp; carers</p> <p>Communication pathways with patients and carers</p> <p>Information on potential psychological problems should be supplied</p>



## Appendix 7 Professional advisors' comments on draft 2

*Very comprehensive and well researched document. Provides staff with a clear understanding of areas to consider when carrying out assessment and treatment of the lower limb amputee.*

*Provides a comprehensive tool to enable all physios to be able to understand the process when assessing and treating the lower limb amputee. Extremely useful tool for other members of the MDT.*

*A very comprehensive set of guidelines which I am sure future physiotherapists and patients will benefit from.*

'Well done! Lack of evidence and reliance quite heavily on consensus opinion slightly disappointing but not surprising.' The development of the Evidence Based Clinical Guidelines for the Physiotherapy Management of Adults with Lower Limb Prostheses [7] highlighted the lack of evidence in the literature. The GDG was mindful that a robust Delphi consensus exercise was essential.

The use of jargon was highlighted by one of the patient advisors and the text was amended to reflect their comment. E.g. 'the greater the negative influence in respect to job retention and energy cost of walking respectively' was changed to: 'the more energy was used in walking and job retention was reduced'.

One of the professional advisors felt that 'there should be more reference to the MDT and not just the physio in some places'. However, in the introduction and section 1 of the recommendations it is clearly stated that the physiotherapist works as part of and contributes to the MDT. Therefore the suggestion to add "and other members of the MDT" to recommendation 5.2 was not adopted. Although the target users of these guidelines are physiotherapists the professional advisors recognised the possibility of extending the use of the guidelines to other professions and patients.

In section 3 the same advisor commented that 'documentation of all this needs to be in MDT notes to reduce repetition and ensure continuity of care' and 'patients do get fed up answering the same queries over again'. In response to this a statement was added under local implementation; The principles of single assessment should be applied.

The suggestion to highlight key recommendations was made by two advisors. At that point the grades of recommendation had not been added to the document. The final document now includes grades of recommendation in accordance with CSP and NICE guidance.



## Appendix 8 External, peer and patient reviews comments on draft 3

### Collated comments of external reviewers on Draft 3, using the Appraisal of Guidelines for Research and Evaluation (AGREE) instrument

Page numbers in this appendix refer to an earlier draft document

#### Overall Comments:

The BACPAR guideline development group (GDG) has produced a well-researched and thorough guideline for the Pre & Post-Operative Physiotherapy Management of Adults with Lower Limb Amputation. This guideline rates very well overall with a few minor details that the GDG may wish to consider. These are outlined below in the AGREE ratings.

Congratulations on the document

On the whole a very comprehensive document.

This is a very good guideline, which may not be apparent from the AGREE criteria! The majority of the points are to do with presentation and can be dealt with very easily (such as decs of interest, editorial independence etc). I do have some concerns about the recommendations made in section 2, as these are passive rather than leading to action.

#### Agree ratings

##### 1. The overall objective of the guideline is specifically described.

Rating: 4

Statement 1: 4

Statement 1: 4

Statement 1: 4.

##### 2. The clinical question covered by the guideline is specifically described.

Rating: 4

Statement 2: 3

Statement 2: 4

Statement 2: 4.

##### 3. The patients to whom the guideline is meant to apply are specifically described.

Rating: 3

**Comments:** This is implied on page 12, but the authors could provide more specifics on the inclusion and exclusion of patients. (i.e. co-morbidities – whether this may/may not be an issue)

Statement 3: 2 (Would be useful to have a sub-heading with this information for ease of access)

Statement 3: 4

Statement 3: 4.

##### 4. The guideline development group includes individuals from all relevant professional groups.

Rating: 1

**Comments:** The credentials for the guideline development group (GDG) should be clearly indicated, at least in Appendix 1. The names are listed, but the reader should be provided with their training (degrees), expertise, position/title and place of employment. In appendix 1 (p. 61) are the contributors (4th subheading) a part of the GDG? You may need a 3rd level of subheadings to help clarify this.

Statement 4: 3

Statement 4: 3 Details of GDG missing

Statement 4: 2.





### **The patients' views and preferences have been sought**

Rating: 4

Statement 5: I wasn't sure. Patient/carer representatives are listed in the guidelines and there is a section on patient information needs. May be useful to have a heading describing any 'patient-related' focus.

Statement 5: 4

Statement 5: 2.

### **5. The target users of the guideline are clearly defined.**

Rating: 4

Statement 6: 3

Again, may be useful to have a heading as for NICE guidelines 'Who this guideline is for'

Statement 6: 1 Implementation not yet decided

Statement 6: 4.

### **6. The guideline has been piloted among target users.**

Rating: 1

Statement 7: 4

Statement 7: N/A yet

Statement 7: 1.

### **7. Systematic methods were used to search for evidence.**

Rating: 4

Statement 8: 4

Statement 8: 4

Statement 8: 4.

### **8. The criteria for selecting the evidence are clearly described.**

Rating: 4

- When the articles were selected for appraisal was this based on review of the abstract or the full article? Either is acceptable, but this should be indicated either way in text.
- Figure 1. The flow chart is fairly straight forward to follow, but when there is more than one choice/ decision to be made there should be some yes/no type indicators beside the arrows so the reader knows which decision path to follow.

Statement 9: 4

Statement 9: 4

Statement 9: 4.

### **9. The methods used for formulating the recommendations are clearly described.**

Rating: 4

Statement 10: 3

Statement 10: 4 Should local implementation be in the guidelines? Surely this should be decided on locally

Statement 10: 2.



**10. The health benefits, side effects and risks have been considered in formulating the recommendations.**

Rating: 3

The potential health benefits are somewhat discussed in the introductions for the recommendations sections 1-6. Some of the key points could be discussed and reiterated in the 'Health benefits, Side effects and Risks' section. Currently when I read this section (p.15, heading 3) I don't see any health benefits for the patient if a PT uses this guideline. The authors could provide a brief paragraph outlining statistics for health benefits to help strengthen this section. (i.e. indicating a potential reduction in hospital stay, time from surgery to casting was reduced when patients received PT, etc... (taken from p.18 in document))

Statement 11: 3

Statement 11: 4

Statement 11: 1 Unclear form guideline.

**11. There is an explicit link between the recommendations and the supporting evidence.**

Rating: 4

Statement 12: 4

Statement 12: 4

Statement 12: 4.

**12. The guideline has been externally reviewed by experts prior to its publication.**

Rating: 4

Statement 13: 4

Statement 13: 4

Statement 13: 3.

**13. A procedure for updating the guideline is provided.**

Rating: 3

**Comment:** The authors indicated that the guideline will be updated in 3 years, but no procedure is detailed.

Statement 14: 3 (Could do with a separate heading about when future updates will occur, the section 1.19 on the present update could benefit from saying if any recommendations have changed as a result of the update)

Statement 14: 4

Statement 14: 4.

**14. The recommendations are specific and unambiguous.**

Rating: 4

Statement 15: 4

Statement 15: 4

Statement 15: 3/2 Variable – some sections better than others in this regard. For example, section on knowledge- many of the recs are ambiguous, what if you understand but don't act? It seems to me that many of these recs could be condensed into one large rec.

**15. The different options for management of the condition are clearly presented.**

Rating: 4

Statement 16: 4

Statement 16: 4

Statement 16: 3.



**16. Key recommendations are easily identifiable.**

Rating: 4

**Comment:** The recommendations could be bolded/italicized (or some other way of highlighting) to help recommendations stand out a bit better.

Statement 17: 2 (Think the AGREE instrument is referring to the 'key priorities for implementation' system that NICE use and which are recommendations prioritised for rapid implementation in the NHS. The guideline development methodology used for this guideline may have elected not to do this)

Statement 17: 4

Statement 17: 1 No evidence found.

**17. The guideline is supported with tools for application.**

Rating: 1

**Comment:** No tools were included with this version of the document. For example, a summary page or pocket cards listing the key recommendations would be helpful for the PT to keep with them or have posted on a bulletin board for easy access while in clinic.

Statement 18: 3 (Local implementation sections appear at the end of listing of groups of recommendations. There is a patient/carer section but this appears to be for health care professionals rather than a patient information leaflet. May be worth mentioning if any tools planned or developed in tandem with the guidelines)

Statement 18: ?

Statement 18: 1.

**18. The potential organizational barriers in applying the recommendations have been discussed.**

Rating: 3

**Comment:** Could be discussed in more detail.

Statement 19: 3 (On page 27, in relation to the last two dot points it would be useful to suggest strategies to help with overcoming these barriers).

Statement 19: 3 The dilemma of optimum versus resources. Theory versus Practice

Statement 19: 4.

**19. The potential cost implications of applying the recommendations have been considered.**

Rating: 3

Statement 20: 3

Statement 20: 3 this is adequately covered by p 26

Statement 20: 3.

**20. The guideline presents key review criteria for monitoring and/or audit purposes.**

Rating: 3

Statement 21: Not sure if the local implementation points are the same.

Would be useful to have a separate section listing audit criteria.

Statement 21: 3 Appendix 11, recommendation 1.6 should read 1.5

Statement 21: 4 .



**21. The guideline is editorially independent from the funding body.**

Rating: 4

Statement 22: Could not really ascertain this. May be useful to have a statement to this effect early on in the document (or on the cover)

Statement 22: 4

Statement 22: 1 Not clear.

**22. Conflict of interest of guideline development members have been recorded.**

Rating: 4

**Comment:** A sentence describing how this information was solicited from members of the group could be included. (i.e. Was this a verbal statement? Did they complete and sign a questionnaire asking specific questions regarding what could be a conflict of interest?)

Statement 23: 4

Statement 23: 4

Statement 23: 1 No evidence found.

**Overall Assessment:**

Three external reviewers Recommended (with Provisos or alterations).  
One did not state an overall assessment.



### Peer review of draft 3

#### 1. Please comment on the presentation, ease of use and clarity of the whole document.

Presentation is well structured, clear and concise throughout.

Very clear and easy to use document, a pleasure to read. Flow chart "The Appraisal Process" on page 8 easy to follow.

Very clear and even though it is a lengthy document it is easy to read.

The document is presented very well and is very well written. The sections are usually self-explanatory and the format is maintained throughout. I understand that introduction, evidence and recommendations is a logical sequence, however, it is not always clear whilst reading why certain aspects have been included in the evidence section as they do not link with the introduction, only the recommendations. The section on Local Implementation is not well enough related to the other sections i.e. I was not sure what lead to them being made and bare bullet points do not encourage suggested implementation. The introduction to the post-op management section was brief and introductions to each sub section would have been beneficial in setting the scene before the evidence was presented.

Although it was useful having the Referenced authors listed in Appendix 4, either listing the title of the study or making it clearer which statement the level of evidence refers to would be helpful.

The document takes time to read properly and digest –I had to read it at home as have too many interruptions to concentrate at work. Having said that once I got down to it, I found it clear and logically presented.

My manager didn't have time to look at it at all.

I forwarded it to 3 other physios, an OT, vascular surgeon and vascular nurse in my MDT for their comments and have not heard back which may reflect the off-putting size of the document.

The evidence presented is perfectly clear and understandable.

Recommendations very nicely set out, easy to access the guidelines and the evidence for each. The layout of this section makes it easy to access the specific piece of evidence in order to read further in to it.

Introduction, aims scope etc excellent and clear.

Overall clearly presented and easy to navigate.

Generally very well presented. Certainly lots to wade through before getting to the actual recommendations themselves! – But hard to see how this be altered

Good (although difficult to read on computer didn't feel I could print out all pages!!)

Are the recommendations going to be numbered as in the other guidelines as it's very difficult to reference them if they're just bullet points.?

Page 8 – ?clarify whose competence you are referring to.

Pg 23 – With the Delphi process could you clarify how many questions were initially asked in the questionnaire, I was a bit confused at first as the next sentence contains 2 percentages referring to different things.

Pg 39 – I feel that this reads that the pt & carer should be involved in agreeing a rehab plan but not necessarily having any influence/ negotiation in goal setting.

Are 'shrinker socks' the same as the compression therapies/ garments you have mentioned earlier? Pg 43

Why does 'respiratory care' in the pre op section suddenly become 'chest care' post op? (Section 5.9 & 10 and section 6.1.3)(...sorry I just have a thing about people being referred to as 'chesty' etc)

Presentation wise- 'Recommendations' heading is the last thing on pg's 48 & 50.

Pg 60 – At the end of the professional advisors box you have a colon- is this referring to the list that is on the next page or should something else be listed there?

Pg 39– I am unsure what 'kill or update by' means..but it sounds important!



Pg 72 – the comments regarding Ham (21) about 1 pt going home requires 1 pt... etc seems to just be phrased a bit oddly

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## 2. Is the evidence presented in the guideline clear and understandable?

Most of the time. However, why did the CDG decide in the Delphi process that 75% consensus was acceptable? Is this an arbitrary figure or one used internationally? Also what is the AGREE appraisal instrument and what does it stand for?

Apart from the following terminology:

MESH on page 15 and CASP on page 17 or AGREE on page 25 – do not know what they mean!

Yes very.

Yes.

Section 1 The MDT P29 it is not clear why the Klingenstierna paper about increase in thigh muscle strength is included as an isolated statement in a section on evidence that MDT is required for best practice. If it is included to justify why there should be a PT involved, it is too specific a piece of evidence and would be better suited in section 6.9.. Although the recommendations detail the role of the physiotherapist, this is not introduced. Either this should be done in the introduction and/or the sentence at the end of “evidence” amended to read

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

The evidence presented in the section suggesting that physiotherapists have adequate knowledge comes across as a series of disjointed statements, leaving the reader unsure as to why they have been included. This is especially true of the Meikle paper. Perhaps examples of “interruptions” would help in this case, but overall the whole section needs a better connection.

In the evidences section of assessment, Levy is quoted regarding the skin problems associated with wearing the prosthesis. This quote does not relate to the skin problems pre-prosthetic users encounter and may be considered misplaced.

P39 The principles of single assessment should be applied

Should this be single shared assessment or single assessment for the MDT team?

The evidence presented is perfectly clear and understandable.

I found the guidelines well written and at an appropriate level to be easily understandable.

At times I found the evidence hard to read as sentences were long – have made some modifications as suggestions for increasing clarity/ease of reading.

Is it necessary to always state what kind of study it is? If you left this out, it would be easier to read and people could refer to the appendix if interested.

The evidence seems very comprehensive and relevant.

Yes I feel it is.

Yes – fine.

Overall I would say yes – but again just a few silly quibbles!!!

I did not know what ‘conversion of numbers into numbers needed to treat’ meant when you were talking about the Delphi process (pg 17)

CAT written – if this is simply a Critically appraised topic in what format is a CAT written? (Also do you need to write it in full before using the abbreviation?...sorry should be saving this for the grammar bit!!!!)

Appendix 9- should you also include the covering letter so it is transparent what advice/ guidance/ remit BACPAR gave those filling out the questionnaires?



### 3. In your experience, do the 6 sections cover all aspects of pre and post-operative physiotherapy management of adults with lower limb amputation?

My experience is limited here but I wondered if referral on to intermediate care should also be mentioned and an appropriate transfer package developed for continuity of care.

Yes.

Yes.

I find the title of section 3 a little confusing until having read the introduction. Changing the title "Knowledge Base" would be more suggestive that you are referring to the background knowledge of the therapist to inform practice.

I find the work on EWAs a little disjointed – the decision is made under MDT, potentially using them in a dangerous way is mentioned in knowledge and their use is mentioned in post-op management. I couldn't find mention of using the SPARG information on their use – did I miss it somewhere? Have the SPARG guidelines been updated? Has there been any work on use of Ppam Aid since '92? Did Helen Scott's work comment on dangers? Having read the knowledge section and been left without the introduction in post-op management, I am under the impression that, although you advocate use of the Ppam aid, it can be a dangerous thing.

6.2 Environment and Equipment. The Whittle study (1992) was quoted saying that although residual limb support boards are well accepted for use but therapists are not confident. This will have been published at a time when the boards were ply board inserts under the cushions with hinges to drop them down. Since 1995, "boards" are supplied as a wheelchair accessory that replaces the footrest on a wheelchair and I imagine they are now considered routine. However, I assume that no evidence probably exists to suggest that therapists are now confident with these. Although quoting Whittle does lead to the recommendation that physiotherapists should be familiar with equipment, it creates an impression that we are still unsure into e.g. Many relevant accessories are now available as standard items to provide for the environmental needs of amputees. New models appear regularly and therapists should be aware as to the range available and their mode of functioning given that White said...

I am a band 7 therapist in a small DGH with clinical responsibility for patients predominantly with cardio respiratory conditions on surgical wards and ICU so am not an amputee expert. I have been providing early post op care to our amputees prior to their transfer to peripheral hospitals for coming up to 2 years and have had no formal training relating to amputees since qualifying 14 years ago! Just telling you this because I may be typical of physios staffing many units. In answer to the question, I have limited knowledge so there is more information in the guidelines than I was aware of and will be using this evidence to update our service.

The guidelines are very thorough covering everything that I have come across, or need to be aware of in practise when working with amputees pre and post op.

I wondered if the following points were included under other sections, or if they would be worth considering?

#### 6.4 Mobility

Could this section include recommendation re: the progression of walking aids post-op, and for the higher level patient outdoor mobility practise, in and out of cars, picking things up from the floor? I appreciate that this may come under the exercise section as related to the patient's goals.

Could this section include recommendation re: risk assessment of mobilising a patient and the availability of manual handling belts and other equipment to make this process safer?

Yes (although my area of experience is rehab and I have not worked with amputees in an acute setting – although see some primary patients when still in-patients)

I think so, although I suppose I am relatively inexperienced in working with amputees. All things that I considered important are mentioned along with a few others.

All areas seem to be covered \_ only comments are that Counsellor is very absent from the list of MDT members in the MDT section!!! Psychologist is mentioned and counsellor referred to later in section 2 recommendations. Needs to be added here too.



Yes I think they are really far reaching although sometimes do imply that the physiotherapists should be doing everything rather than at times bowing to the fact that other MDT members might be better suited to a specific role.

Discharge planning does seem to be sucked into lots of subsections. I would quite like to see the physio's responsibility in ensuring that appropriate follow up is organised for ongoing rehab emphasised a bit more I felt that the use of 'ongoing outpatient treatment' was a little ambiguous – as these services are local specialist amputee Physio outpatient services, DSC or Community Physio. Also I feel that documentation of the specific plans is important to stress- that the physio needs to evidence the appropriate plans they have organised.

**4. In your opinion, are there any recommendations that should have been included but were not? If yes, please state what these recommendations are.**

On P.32 monitoring the cardiac status of the patient was mentioned. I have started measuring BP's prior to outpatient treatment and following the British Hypertension Guidelines. If the patient's BP is too high we then inform their GP and contemplate postponing treatment. Should we also be aware of the patient's blood sugar level and be able to measure it pre treatment? There were also no comments on the use of tubifast. Is this just a nursing decision or part of the MDT process?

No.

No, no omissions.

**Section 4.2** on Informed Goal Setting could be broadened to include measurement of outcome. You refer to it in recommendation 4.2.4 so, instead of putting Appendix 13 in brackets as part of the recommendation, a short paragraph could be included to mention that several outcome measures have been validated for use with amputees (Gagnon, SPARG's PPI adaptation, Hanspal's work) and that other generic measures are also suitable (SF36). OTs in amp rehab use COPM.

The statement 'No contradictory evidence was found' is puzzling.

**Section 4.4 and 6.3** Missing from these recommendations are timescales for commencement of the use of shrinker socks. I thought Amanda did a follow up study (but I am unaware of what she found or if it was published).

**6.7.1** In addition the wheels in a wheelchair issued to a bilateral amputee should be set back to ensure stability (most chairs are modular and it is a simple case of reversing the brackets. MARS (the wheelchair service in Aberdeen) looked at stability levels of standard wheelchairs on a standard degree ramp and found most were inherently unstable, reinforcing the need for care in this either frail or top heavy group of clients).

**6.8** inclusions on the effects of adequate pain relief in preventing the development of contractures.

**6.9.2** I agree about strengthening hip flexors and extensors but there is no mention of abductors. Although this group is missing from the evidence, I do not think they should be missing from our programme.

Recommendation 6.10.5 states 'appropriate treatment' should be given – can we be any more specific? I know of at least one other acupuncture reference without doing a search:

Bradbrook D (2004) Acupuncture treatment of phantom limb pain and phantom limb sensation in amputees. *Acupuncture in Medicine* Jun; 22(2): 93-7.

In the MDT section perhaps there needs to be more in the area of discharge planning – i.e. who to involve, taking a lead or significant role in complex discharge plans, working with Discharge Liaison teams and Social Services, discharge home visit appropriateness, length of stay, etc

Not sure.





Yes – Section 4 – I think we need to add Physio should ensure a referral to the DSC has been made for patients suitable for prosthetic rehab.

Also In patient physios should ensure that arrangements have been made for ongoing physiotherapy on discharge from hospital so ensure no break in treatment process occurs.

In local recommendations for section 3 emphasizing that the patient is important in goal setting.

In section 5 should it be stated that if you are unable to perform a pre op Rx that this and the reasons why should be documented simply for fullness of information?

## 5. Would you find these recommendations useful and applicable in your current clinical practice?

They would provide a framework from which we could audit the present system and then develop towards.

Extremely helpful.

Will be useful as a reference to ensure that we are adhering to good practice / audit practice

I am no longer involved in clinical practice, but in education. All my other comments are based on past experience and my new role in measuring outcomes!

See 3 above. The MDT covers all the points noted, but certain areas need tightening up in order to deliver seamless care –especially as our patients are shunted about a lot.

ie.care pathway, single patient assessment

closer MDT liaison

areas for my CPD-wound healing, PPAM aid training, knowledge of phantom pain management, MDT outcome measures

Yes, I would find the guidelines very useful in making me aware of everything I need to consider as a new member of staff working with amputees. They are helpful in identifying gaps in knowledge which can then become learning objectives to ensure a wide knowledge base as appropriate to this area. I also think that the evidence as it is written, allows easy access to reading materials to build up this knowledge base with.

It is encouraging to have these guidelines to compare my current practise to, and ensure that it is evidence based and that therefore the best possible treatment, available at this time, is being provided to my patients.

The guidelines are a useful tool to compare the current practise of a department to; to help identify what is being done well and what needs to be improved upon.

The guidelines also highlight areas which are currently not well supported with evidence, which may in future become areas to consider researching.

Yes – to know what the gold standard should be in the acute setting plus very useful to be able to access such a body of evidence/references within one document (which is also relevant to my area of practice).

Very much so, but particularly as we have a brand new, inexperienced Senior II, and for our students. We have an ever increasing amputee caseload across vascular, trauma, elective etc and are expected to see all amputee patients, not just rehab candidates. These guidelines help to support our practice across the amputee client group.

Well I am not in amputee rotation at present but I would definitely have found these of benefit when I was. Especially the evidence about compression therapy to try to show to the more old fashioned consultants!

Yes for physios in acute setting.

Yes I feel that they are very far reaching and would be an excellent guide (especially to less experienced clinicians) of the sheer scope of considerations they need to take into account.



## 6. How practical would you find implementing the guideline recommendations in your workplace?

This would be challenging. We currently receive repatriated patients who have had their amputation at another local hospital where surgery has become their local specialism. We do provide an inpatient service but have been awaiting these guidelines for assistance. We also just run a district clinic for outpatients one morning a week. Our knowledge base is limited. Setting short term goals would be more realistic until the patient has discussed their situation with a rehabilitation consultant. Also who would lead, initiate and maintain this MDT approach – who's professional responsibility is it to start the process?

Most are already in place. Implementation would come from physios not me.

Will take some time to work through the guidelines and develop training packages to ensure all staff are familiar with them but once completed it should be OK.

Recommendations 6.10.5, 6 & 7 may be difficult if I didn't know about desensitising management and the use of TENS - if these sections had an introduction, techniques commonly used could be mentioned and the lack of evidence highlighted. Is there no evidence on TENS?

I've just had a discussion with my surgical ward manager who is keen to hold a monthly development-type meeting to create a care pathway etc. I also discussed the guidelines this morning with my line manager and she has agreed to me attending the weekly diabetic foot ward meeting for an hour which will foster team identity, be educational for me and facilitate early assessment and discharge of patients. This document has enabled me to negotiate my training needs.

Producing leaflets and care pathways is very time consuming –we do have an exercise booklet for AK and BKs but would it be possible for BACPAR to come up with ones that could be tweaked according to local requirements? This would help to ensure a national standard is being attained.(like ACPRC competency grids).

In my current department there are no barriers that I am aware of to implementing these guidelines.

Role would be more that of supporting acute physios in implementing them – may be not so practical (see below)

Recommendations that are relevant to primary assessment at limb fitting centre – mostly in place already (information booklets/compression/advice & counselling etc).

Hopefully with ease, as I feel we are already doing much of what is suggested. However it's very useful to have it in written form as, for example, the previous guidelines helped us to argue for money to develop our outdoor courtyard space for the patients.

I have concerns that these guidelines are still very much geared to the rehabilitatable patient, and will not always be appropriate for patients with very limited rehabilitation potential, e.g. recommendation 3.4 is difficult to achieve with some of our patients. Reference to complex discharge plans is not made. How much follow-up is appropriate for a patient who won't become a limb wearer?

N/A.

With some persuasion and further education to ward physios!

I have a few issues here but not many answers I am afraid...

How do you adequately document psychological status of patient (unless they have been formally sectioned?!!) I am unsure even what sort of objective things I would write down ?Mini mental score.

How do you test the 'understanding' of the physio mentioned so much in section 2 – is this taken to be self competenced?

I would have difficulty showing demonstration limbs- as may many ward PT's- as I do not work in an area where prosthetic rehab takes place.

Who deems the 'safe and effective use' of EWA's? With PPAM would this be Vessa's instructions, SPARG guidelines, peer review? (If peer review it raises the question when you work independently who is deemed appropriate to Ax you?...sorry I know this is the proof of competency question rearing its head again!).



## 7. Are there any barriers to implementation of these guidelines?

Currently as physios we are not allowed to issue juzos, unable to demonstrate artificial limbs (only available at the DSC), time and skill mix is limited.

Time / staffing levels.

The main barrier to implementation of guideline 1.8 is lack of trust on the part of the surgeons of the decision-making abilities of experienced physiotherapists or fear of misinterpretation of the guidelines on the part of less experienced therapists.

I can foresee guideline 1.8 being misinterpreted as “physiotherapists are solely responsible for the decision to start EWA”!

I suggest rephrasing as follows:

A physiotherapist experienced in amputee rehabilitation can, as part of the MDT, be solely responsible for the decision to start using the Early Walking Aid having liaised with other members of the MDT as necessary. C (IV) [25].

Scoring out the middle phrase as it keeps the word CAN beside SOLELY, and the caveat that liaison is taking place is still retained!

To further safeguard misinterpretation, the words ONLY AFTER could be inserted before having or the word SOLELY being removed.

The SPARG study showed principally that days to casting were shorter with early use of the EWA. It was this that helped many Scottish PTs to convince surgeons to allow early use of the EWA. I recommend mentioning it here rather than in the section on post op management.

In the section on knowledge p33, Lein is quoted that EWA are being used by physiotherapists in a potentially dangerous manner – this is a further barrier to implementation of the decision to start EWA as the sole responsibility of a physiotherapist.

My line manager and MDT members are conducive to taking things forward and are positive about using a guideline to facilitate this. I would find a basic update course lasting a day reflecting the Physio management in the guidelines very helpful (note points in 5) As amputees are only a small part of my job, attending for example, a 2 or 3 day course would not be justifiable to my manager.

Guidelines relate more to acute hospitals we liaise with and I think primary barrier is that junior or senior 2 rotational staff cover the vascular wards and therefore, there is limited or no service development/ consistent input from more specialised/experienced staff. Patients often do not Ppam-aid etc whilst in patients and I think this is a staffing issue.

MDT barriers mostly. We struggle to get OT input in a timely manner. We don't have a specialist nurse, and at present don't have access to psychological support in a structured way.

Trust and PCT's who are overspent will surely have an impact on the implementation of these guidelines. Our wheelchair centre is in financial crisis and may not be able to provide chairs for discharge in a timely fashion – this will have a major impact on our length of stay.

I guess if you were trying to implement an Integrated care plan this demands cooperation of all staff.

In smaller hospitals there may not be the availability of the equipment such as juzo socks, PPAM aid etc. Do you need to mention that if they are not available the Physio should be aware of the local procedures for gaining access to them or mention that the local DSC can be used as support for queries regarding specific aspects of amputee rehab?

Should it be acknowledged in the EWA intro that there will always be patients that aren't suitable for the EWA- it reads a little like it is suitable for everyone.

## 8. Are there any typing or grammatical errors?

Errors noticed by peer reviewers were corrected.



## 9. Can you suggest any additions to the Glossary (Appendix14).

Nursing guidelines specific to amputee care?

No.

Only the abbreviation GDG on page 89. I realise that this is written out in full on page 62 however, and that is being used in another persons comment.

None. Curious that 'acupoints' are in it.

Remaining limb.

MDT in abbreviations.

No.

I have a feeling that somewhere you have mentioned 'Gritti- Stokes' as a level of amputation but this is not defined alongside 'Symes'

Is the glossary going to be alphabetical – 'residual limb' is the last entry after the s's & t's.

---

## 10. Any further comments.

Thanks for letting me comment on this valuable document.

Thanks you for all your hard work. I think these guidelines are excellent.

P11 The aims and objectives are not set out in traditional fashion. This may not be an issue but generally there is a broad aim of what is hoped to be achieved e.g. facilitating best practice (in your definition the other aims and subsets of this main one and if not indicated as such may be seen as duplication). The objectives are achievable measures of how the aim is to be met e.g. rigorously appraise literature to ascertain how clinical decision making is best informed, how best to inform carers etc; to make recommendations for best practice etc.

P26 It is not clear if the audit is to form the basis for the review, nor how the checklist is to be used i.e. is the literature search to be repeated to see if more boxes should be ticked?

P28 It is not clear if the adjective "specialist" refers only to the physiotherapist or to all the members of the team detailed in the sentence as the same adjective is used for nurse in the 2nd sentence. I would hope it included a specialist OT.

P32/p35 The physiotherapist should have an awareness of the long term effects of amputation but I am not sure that reference [32] on osteopenia is all that relevant. The isolated statement about it in the evidence section certainly puzzled me until I checked the references in the recommendations. More relevant would be the more major co-morbidity factors and progression of arterial disease and diabetes. Perhaps also, the survey by BLESMA who summarized that back pain was more of a problem for war veterans than phantom pain would be of interest?

P33 I am not clear why the report of the effects of exercise on rehabilitation is quoted in the section of knowledge rather than under the section on exercise in post op management. It doesn't connect in the knowledge section with other statements but does add importantly to the body of evidence directly on the effects of exercise.



I don't have anyone regionally I feel I can call on for expert advice. Interactive CSP has to some degree filled that void but it would be helpful to have a list of specialists and their e mails, and centres of excellence that are willing to have visits from less experienced colleagues.

Thank you to all your team for the immense amount of time and effort you have put into producing this document. It has come at just the right time for me to start implementing the changes I need to make to service delivery here!

- Unable to access link to CSP effective guidelines practise pg.9
- Would it be useful to clarify as to why articles from 1978 onwards were chosen in the inclusion criteria pg. 16? There was no reason given.

Could the document be spaced more widely to reduce the number of pages and save paper (especially right hand margin)?

A huge amount of work has obviously gone into this – it is very comprehensive and impressive, especially knowing that it has been put together by volunteers and through good will.

There are sections where I feel our autonomy and expertise is not being highlighted. There is possibly too much emphasis on decisions being made in the MDT, e.g. recommendation 6.1.4, which I feel does not support our practise at all. Here we nearly always take a lead role in deciding the discharge date for a patient, and usually our surgeons allow me and the OT to fully decide and set the date. It's much more than us just 'aiding' that decision.

Not really surprises at the lack on evidence as relating to physiotherapy. It's the same in all areas.

Will be an excellent document to refer to. Especially good is having all references together to locate evidence or information when required.

Well done everyone involved- it is obvious the time and effort that has gone into drafting these.

6.5 – EWA's section – bit confusing to say EWA's should be considered for all levels of lower limb amputation as we are including hip disartics and clearly there isn't a suitable EWA

6.9 – in Exercise programmes, recommendations – I don't understand why these specific excs areas have been mentioned and singled out – looks like main emphasis is on them alone

Finally my name isn't on the Consensus Contributors list but I did the Delphi questionnaires.

Well done – looks great!



### Patient and carer review of draft 3

#### 1. Please comment on the presentation, ease of use and clarity of the whole document.

I felt that the overall document was reasonably easy to understand, well set out and clear. To a lay person the only problem which compounded this was the use of abbreviations and medical terminology. However, the main use will be by Professionals and this will not cause difficulties

The recommendations section was clear and well laid out. Pages 7-22 were harder going but informed the reading of the recommendations (where and how the evidence was obtained and used)

PRESENTATION – From a laymans point of view, there is too much information, the document is too big to take in.

EASE OF USE – Again from a laymans point of view, there are too many big words and medical phrases that I don't understand.

This is a very well written and presented document, which is clear and easy to use by a lay person.

---

#### 2. Is the evidence presented in the guideline clear and understandable?

The evidence was clear, understandable and I felt that the way it was used effectively proved ideas throughout the document.

Yes, but would have been even easier if I had read Appendix 14 (glossary) first!

I can see that there is a lot of evidence present, but as I am not from a medical background it is too complicated for me to understand.

Yes, quite clear and understandable.

---

#### 3. In your experience, do the 6 sections cover all aspects of pre and post-operative physiotherapy management of adults with lower limb amputation?

##### Section 3 Assessment.

It is difficult to set realistic goals and a rehab, programme with the patient, when the patient has little or no knowledge of time-scales etc at this stage.

##### Section 5 Pre op management.

In my case I was a little confused because at the hospital visit stage the Sister from the Mobility Centre appeared to be the "keyworker" whilst as soon as you attend the Centre it becomes clear that the Physiotherapist is the "keyworker"

A **joint** Physio/nurse visit is more appropriate even before the operation. This would sow the seeds in the patient's mind of being involved with a MDT.

##### Section 6.3 Compression Therapy.

Compared to the continual emphasis put on the use of a compression sock during treatment, I was surprised that more emphasis was not put on this in the document.

Yes. Just one comment: See Q 4

From the parts that I understand, yes, but again I don't understand it all.

Yes, based on my experience/journey as a new trauma amputee.



**1. In your opinion, are there any recommendations that should have been included but were not? If yes, please state what these recommendations are.**

6.6 Falls management.

I think that there should be a recommendation that dealing with a fall should be done in hospital and not as an outpatient. I fell out of my wheelchair on my first night home!! This was, of course, long before I received instruction from a Physiotherapist or anyone else as to how to get up (remember Carl.)

I think that the term 'exercise regime relevant to the patients goals' in section 6.9 could include a reference to exercise designed to build up a patient's fitness and confidence once a prosthesis is fitted (not just strength in muscles). If a patient has had difficulty with mobility pre-op, build up of tolerance of the prosthesis should be in conjunction with the gradual increase in basic fitness through a recommended exercise programme, which is already in place before discharge. Perhaps this needs to be a separate section?

No.

No, none I could think of as a new lower limb amputee/

---

**2. Would you find these recommendations useful and applicable in your current clinical practice?**

As a patient, I think the recommendations would be useful as a basis for treatment. They would have to be written in a more user friendly way.

Useful for a carer in what is generally a 'whole new and potentially traumatic experience' to use as a guide to all the areas of management mentioned. Bite sized booklets for each area on a 'need to know' basis could also be useful (I am sure we had some!)

Not applicable to me.

I am a patient not a practioner but would find the recommendations very useful and applicable at the clinic I attend.

---

**6. How practical would you find implementing the guideline recommendations in your workplace?**

N/A.

N/A. I am patient, however in the interest of providing qualitative service and support to patients I see no reason why it should not be practical to implement the guidelines.

---

**7. Are there any barriers to implementation of these guidelines?**

N/A.

Barriers as mentioned in the Draft. A patient's/care's emotional state with regard to the nature of the surgery and it's lifetime/style implications may result in the patient/carer not listening!

N/A I am a patient but any barriers should be removed to help successful rehabilitation of amputees.

---

**8. Are there any typing or grammatical errors?**

No comment as my typing, grammar and spelling skills are terabal. (joke!!)

---

**9. Can you suggest any additions to the glossary (Appendix14).**

No.



**10. Any further comments.**

Page 16. I was a little concerned to read that "Exclusion Criteria excluded literature on prosthetic care and surgical management of the amputee". Would this information not be vital in forming the Recommendations for Compression Therapy and The Management of Phantom Pain?

I found the Document to be a well researched and well put together piece of work.

Re Q 4

On Page 12, it states that the scope of the guide lines ceases when the patient receives the first prosthesis, and that further management is addressed in the Evidence Based Clinical Guidelines for the Physiotherapy Management of Adults with lower limb amputations. However, my husband was not referred for further physio, and a programme of exercise to develop a basic level of fitness while increasing tolerance when he first received his prosthesis might have been beneficial. It might also help other patients bridge any possible gap between referral to further physio, and the first appointment and assessment.

As a patient with no medical background, I found this document very complicating and confusing. I don't understand all the long words and medical phrases. I feel it would have been easier for me if someone had sat me down both before and after my operation and had a chat with me, rather than asking me to complete this questionnaire. It seems to me that this document is aimed more at medical staff than at patients.

My only concern is the voluntary nature of these guidelines. To achieve minimum standards and consistency across the service, their use should be mandatory subject to variations as appropriate. Patients should also be made aware of the guidelines so that they know what to expect and can ask for information as necessary.





## Appendix 9 Delphi questionnaires

### 1st Delphi questionnaire

How strongly do you agree with the following statements  
(please mark the line with a cross and give reasons for your answer in the comments section).

For example :

All physiotherapists should have a pay rise.

\_\_\_\_\_ X  
Disagree Strongly  
Strongly

Comments.....We deserve every penny.....

This means 100% agreement with this statement.

The above scale and comments section appears after every question

### MDT management

- 1:1 A physiotherapist specialised in amputee care should be responsible for the overall pre and post-operative physiotherapy management.
- 1:2 The physiotherapist, as part of the MDT should decide on outcome measures to be used.
- 1:3 The physiotherapist should be involved in producing protocols to be followed by the MDT.
- 1:4 There should be an agreed procedure for communication between the physiotherapist and other members of the MDT.
- 1:5 A specialist physiotherapist can be solely responsible for the decision to start using an Early Walking Aid.
- 1:6 The physiotherapist, as part of the MDT, should be involved in the decision making process regarding the level of amputation.
- 1:7 The physiotherapist, as part of the MDT, should be involved in making the decision to refer the patient for a prosthetic limb.
- 1:8 The physiotherapist, along with other professionals, should contribute in the management of residual limb wound healing.
- 1:9 The physiotherapist, along with other professionals, should contribute to the management of wound healing on the contralateral limb if applicable.
- 1:10 The physiotherapist, along with other professionals should contribute to the management of pressure care.
- 1:11 The physiotherapist, along with other professionals, should contribute to the patient's psychological adjustment following amputation.
- 1:12 The physiotherapist should be able to refer directly to a clinical psychologist / counsellor if appropriate.

What would you like added to this section?



## Knowledge

- 2:1 The physiotherapist should have an understanding of the pathology leading to amputation.
- 2:2 The physiotherapist should have knowledge of medical investigations commonly undertaken prior to amputation and their significance.
- 2:3 The physiotherapist should have knowledge of surgical techniques used in amputation.
- 2:4 The physiotherapist should have an understanding of the impact of the level of amputation on rehabilitation potential.
- 2:5 The physiotherapist should have an understanding of the predisposing factors to successful rehabilitation.
- 2:6 The physiotherapist should have an understanding of complications that may arise following amputation.
- 2:7 The physiotherapist should have an understanding of how concurrent conditions may impact on rehabilitation potential.
- 2:8 The physiotherapist should be aware of other guidelines relevant to rehabilitation following amputation.
- 2:9 The physiotherapist should have knowledge of the principles of prosthetic prescription.
- 2:10 The physiotherapist should be aware of the possible psychological effects which may occur following amputation.
- 2:11 The physiotherapist should know when it is appropriate to refer a patient to a clinical psychologist/counsellor.
- 2:12 The physiotherapist should have knowledge of the principles of counselling.

What would you like added to this section?

## Patient and carer information

- 4:1 The physiotherapist should give patients information about the expected stages and location of the rehabilitation programme suited to their individual circumstances.
- 4:2 The physiotherapist should give carers information about the expected stages and location of the rehabilitation programme suited to their individual circumstances.
- 4:3 The physiotherapist should offer patients the opportunity to meet other adults with lower limb amputations.
- 4:4 The physiotherapist should offer carers the opportunity to meet other adults with lower limb amputations.
- 4:5 The physiotherapist should provide information about the prosthetic process to those patients likely to be referred for a prosthesis.
- 4:6 The physiotherapist should offer to show demonstration limbs to those patients likely to be referred for a prosthesis.
- 4:7 The physiotherapist should know how to get information about benefits.
- 4:8 The physiotherapist should be aware of local arrangements available to support carers.

What would you like added to this section?

## Pre-op management

- 5:1 Where possible the patient and carers should be given advice, information and reassurance by the physiotherapist about the surgical process.
- 5:2 Where possible the patient and carers should be given advice, information and reassurance by the physiotherapist about rehabilitation.
- 5:3 The physiotherapy assessment should be commenced pre-operatively, if possible.
- 5:4 Where possible rehabilitation/discharge planning should commence pre-operatively.



- 5:5 Where possible the patient should be instructed in wheelchair management pre-operatively.
- 5:6 A structured exercise regime should be started as early as possible.
- 5:7 Bed mobility should be taught where possible.
- 5:8 Transfers should be taught pre-operatively.
- 5:9 Chest care should be given routinely.

What would you like added to this section?

### **Post-op management**

- 6:1 A physiotherapist should aid the MDT in the decision as to the appropriate time for discharge from inpatient care.
- 6:2 The physiotherapist should have knowledge of the provision of wheelchairs and accessories.
- 6:3 The physiotherapist should be able to assess a patient's suitability for a specified wheelchair.
- 6:4 The physiotherapist should have knowledge of pressure relieving seating.
- 6:5 The physiotherapist should teach the patient and carer how to use the wheelchair (including all accessories).
- 6:6 Safe transfers should be taught as early as possible.
- 6:7 The physiotherapist should have knowledge of the provision of equipment that can facilitate activities of daily living.
- 6:8 Standing balance should be re-educated if needed.
- 6:9 The physiotherapist should help the patient gain maximum mobility pre-prosthetically.
- 6:10 Mobility pre-prosthetically should be in a wheelchair unless there are specified reasons to teach a patient to use crutches/zimmer frame/rollator.
- 6:11 Post-operative rehabilitation should start the first day post-operation where possible.
- 6:12 Chest care should be given if appropriate.
- 6:13 Bed mobility should be taught first day post-operation.
- 6:14 Sitting balance should be re-educated if needed.
- 6:15 The physiotherapist should use compression therapy as appropriate.
- 6:16 Contractures should be prevented by appropriate positioning.
- 6:17 Contractures should be prevented by stretching exercises.
- 6:18 Where contractures have formed appropriate treatment should be given.
- 6:19 An exercise regime should be given relevant to the patients goals.
- 6:20 Information should be given about phantom limb sensation.
- 6:21 Appropriate treatment should be given for phantom limb pain.
- 6:22 Appropriate treatment should be given for residual limb pain.
- 6:23 Treatment must be given after adequate analgesia has been supplied.

What would you like added to this section?



## 2nd Round Delphi questionnaire

How strongly do you agree with the following statements (please mark the line with a cross and give reasons for your answer in the comments section).

### MDT management

- 1.2 The physiotherapist should contribute to the decision on which MDT outcome measures are to be used.
- 1.5 A physiotherapist experienced in amputee rehabilitation can, as part of the MDT, be solely responsible for the decision to start using the early walking aid having liaised with other members of the MDT as necessary.
- 1.6 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.
- 1.9 The physiotherapist, along with other professionals, should contribute to the management of wound healing on the contralateral limb where appropriate.
- 1.13 The physiotherapist, as part of the MDT, should contribute to the management of pain as necessary.

### Knowledge

- 2.12 The physiotherapist should have basic knowledge of the principles of counselling.
- 2.13 The physiotherapist should be aware of the socio-economic impact of lower limb amputation.
- 2.14 The physiotherapist should be aware of the systems in place to refer for assessment for prosthesis.
- 2.15 The physiotherapist should have basic knowledge of the provision of wheelchairs and accessories.
- 2.16 The physiotherapist, as part of the MDT, should have basic knowledge of pressure relieving seating.
- 2.17 The physiotherapist should have basic knowledge of the provision of equipment that can facilitate activities of daily living.

### Patient and carer information

- 4.2 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.
- 4.4 Where appropriate, and with the patient's consent, the physiotherapist should offer carers the opportunity to meet other adults with lower limb amputations.
- 4.7 The physiotherapist should know where to refer the patient for information about benefits.
- 4.8 The physiotherapist should be aware of arrangements available to support carers.
- 4.9 The physiotherapist should be able to refer the patient to other agencies as necessary.
- 4.10 Where possible all verbal information/advice given should be supplemented in written form.

### Pre-operative management

- 5.1 Where possible the physiotherapist should reinforce information given by other MDT members about the general surgical process (not technique).
- 5.5 Where appropriate and possible the patient should be instructed in wheelchair use pre-operatively.
- 5.8 Where appropriate and possible transfers should be taught pre-operatively.
- 5.9 The patient should be assessed for respiratory care and treated appropriately.
- 5.10 Pain control should be optimised prior to physiotherapy treatment pre-operatively.



- 5.11 If appropriate, and with the patient's consent, carers should be involved in pre-operative treatment and exercise programmes.

### Post-operative management

- 6.3 Where necessary the physiotherapist should be able to assess a patient's suitability for a wheelchair.
- 6.5 The physiotherapist, as part of the MDT, should be able to teach the patient and carer how to use the wheelchair, including all accessories.
- 6.24 The physiotherapist should use appropriate outcome measures for rehabilitation goals.
- 6.25 The physiotherapist should be involved in home visits where necessary.
- 6.26 The physiotherapist should give on going advice about residual limb care.

### 3rd Round delphi questionnaire

How strongly do you agree with the following statements (please mark the line with a cross and give reasons for your answer in the comments section).

#### Knowledge

- 2.16 The physiotherapist, as part of the MDT, should know where to get advice on pressure relieving seating.

#### Patient and carer information

- 4.8 The physiotherapist should know where to get advice on arrangements available to support carers.

#### Pre-operative management

- 5.9.1 If indicated the patient should be assessed for physiotherapy respiratory care.
- 5.9.2 If indicated the patient should be given appropriate physiotherapy respiratory treatment.

#### Post-operative management

- 6.3 Where necessary the physiotherapist should be able to assess a patient's suitability for a wheelchair or have knowledge of the referral process.



## Appendix 10 Delphi questionnaires results

Percentage of respondents in agreement with Delphi questions

### 1st Questionnaire results

Question	% Agreement
1.1	86.0
1.2	69.8
1.3	95.3
1.4	79.1
1.5	69.8
1.6	62.8
1.7	95.3
1.8	83.7
1.9	69.8
1.10	79.1
1.11	93.0
1.12	93.0
2.1	97.7
2.2	93.0
2.3	88.4
2.4	100
2.5	97.7
2.6	100
2.7	97.7
2.8	95.3
2.9	93.0
2.10	97.7
2.11	90.7
2.12	67.4
4.1	90.7
4.2	67.4
4.3	88.4
4.4	60.5
4.5	97.7
4.6	87.7
4.7	65.1
4.8	69.8
5.1	67.4
5.2	93.0
5.3	90.7
5.4	76.7
5.5	65.1
5.6	95.3
5.7	97.7

Question	% Agreement
5.8	60.5
5.9	30.2
6.1	97.7
6.2	69.8
6.3	53.5
6.4	58.1
6.5	69.8
6.6	93.0
6.7	74.4
6.8	86.0
6.9	88.4
6.10	86.0
6.11	97.7
6.12	90.7
6.13	93.0
6.14	95.3
6.15	90.7
6.16	100
6.17	93.0
6.18	97.7
6.19	93.0
6.20	95.3
6.21	100
6.22	100
6.23	95.3



## 2nd Questionnaire results

Question	% Agreement
1.2	92.3
1.5	94.9
1.6	84.6
1.9	64.1
1.13	87.2
2.12	89.7
2.13	87.2
2.14	100
2.15	84.6
2.16	71.8
2.17	79.5
4.2	89.7
4.4	79.5
4.7	79.5
4.8	64.1
4.9	92.3
4.10	87.2
5.1	82.1
5.5	76.9
5.8	82.1
5.9	71.8
5.10	94.9
5.11	87.2
6.3	74.4
6.5	84.6
6.24	94.9
6.25	87.2
6.26	97.4

## 3rd Questionnaire results

Question	% Agreement
2.16	89.7
4.8	87.2
5.9.1	94.9
5.9.2	97.4
6.3	87.2



## Appendix 11 Outcome measures

### Amputee rehabilitation clinical forum (ARCF)

#### Outcome measures

The Outcome Measures listed in this document are taken from a variety of sources and cover different aspects of Amputee Rehabilitation.

They are selected from a very wide range of Outcome Measures available and are put forward following consultation with each of the disciplines represented by the ARC forum, as having been found to be both useful and useable. All are validated. ARCF does not suggest that they must be used but recommends them as useful tools to formalise the assessment process.

Following up the references of other studies will broaden the range of Outcome Measures available.

#### Quality of life outcome measures

SF-36, Quality of Life Questionnaire

This is an overall measure of health status and functioning, used to assess outcome of health care services.

Available from: [www.sf-36.com](http://www.sf-36.com)

Quality Metric Inc.  
640 George Washington Highway  
Lincoln  
RI 02865  
USA

There is a cost to purchase this pack and obtain the license to use it, however, it may be that the Hospital Trust is already licensed.

#### Hospital anxiety and depression scale

Indicates levels of Anxiety and Depression

Available from: [www.nfernelson.co.uk](http://www.nfernelson.co.uk)

Nfer Nelson  
414 Chiswick High Road  
London  
W4 5TF

There is a cost to purchase this pack and obtain the license to use it, however, it may be that the Hospital Trust is already licensed.

#### Recovery locus of control

Indicates whether the individual believes the responsibility for their recovery lies within themselves or with others.

Available from: [www.nfernelson.co.uk](http://www.nfernelson.co.uk)

nfer Nelson Publishing Co Ltd  
Darville House  
20 Oxford Road East  
Windsor  
Berkshire SL4 1DF

Part of the 'Measures in Health Psychology', A users portfolio. 'Causal and Control Beliefs'

There is a cost to purchase this pack and obtain the license to use, however, it may be that the Hospital Trust is already licensed.





## Functional health status outcome measures

### Locomotor capabilities index

The index was designed to trace a comprehensive profile of locomotor capabilities of the lower limb amputee with the prosthesis and to evaluate the level of independence while performing these activities.

Available from: [christiane.gagnon@sympatico.co](mailto:christiane.gagnon@sympatico.co)

Christiane Gauthier-Gagnon & Marie-Claude Grisé  
Ecole de réadaptation,  
Universite de Montreal,  
C.P. 6128, Branch Centre-Ville,  
Montreal  
Quebec  
Canada H3C 3J7

The LCI is part of the PPA (Prosthetic Profile of the Amputee), Gauthier-Gagnon & Grisé, 1993. It may be photocopied but not modified (page 90). Gauthier-Gagnon & Grisé also identify a compilation of outcome measures called 'Tools for Outcome Measures in Lower Limb Amputee Rehabilitation', 2001

### Prosthesis evaluation questionnaire

This allows a prosthetic user to self-rate the qualities of the prosthesis, their ability to perform various activities with the prosthesis and the psychological and social effects of living with the prosthesis.

Available from: [www.prs-research.org](http://www.prs-research.org)

Prosthetics Research Study  
675 South Lane Street  
Suite 100  
Seattle  
Washington  
98104  
USA

### SIGAM algorithm

Offers the clinician a simple, valid and reliable means of measuring mobility in lower limb amputees, whilst also being able to identify changes to mobility making it useful for both new and established amputees.

See *Disability and Rehabilitation*. 2003. Vol 25. No 15. 833 – 844

### Amputee activity score

The AAS is a specific measure developed for outpatient amputees with a prosthetic limb, it looks at the actual level of activity a person achieves. The level of activity achieved depends both on functional capacity and amount of activity carried out.

See *Prosthetics and Orthotics International*, 1981, 5, 23-28 (AAS)

*Clinical Rehab* 2001. Vol 15. 157-171 (Modified AA Questionnaire)



## Amputee rehabilitation clinical forum

**The ARC Forum is devoted to supporting the care and rehabilitation of people with limb deficiency.**

The members of the forum are representatives of the following organisations:

British Association of Chartered Physiotherapists in Amputee Rehabilitation (BACPAR)

British Association of Prosthetists and Orthotists (BAPO)

British Health Trades Association (BHTA)

Centre Managers Forum

International Society of Prosthetics and Orthotics (ISPO)

Limbless Association (LA)

Nurses Amputee Network (NAN)

National Forum of Amputee Rehabilitation Counsellors (NFARC)

Occupational Therapists in Trauma and Orthopaedics (OTTO)

Special Interest Group in Amputee Medicine (SIGAM)

Department of Health (DH)

### **This Forum:**

- Offers the opportunity for multi-disciplinary clinicians to meet and discuss issues arising from clinical practice.
- Aims to provide information on best practice in relation to matters associated with limb deficiency, so that this information is available to clinicians and others, without being prescriptive.
- Offers the opportunity to obtain advice / comments on clinical issues related to matters associated with limb deficiency.

Unfortunately since this work was completed ARCf has ceased to function.

March 2005



## Appendix 12 Audit data collection form

Date:

Re-audit date:

Recommendation		Yes	No	N/A	Action Points
1.5	There is an agreed procedure for communication between the physiotherapist and the MDT	£	£		
1.10 – 1.15, 1.17	<p>There is written evidence of the contribution of the physiotherapist to:</p> <ul style="list-style-type: none"> <li>• management of residual limb wound healing</li> <li>• pressure care</li> <li>• management of wound healing on the contra lateral limb</li> <li>• management of pain</li> <li>• prediction of prosthetic use</li> <li>• decision making re: referral for an artificial limb</li> <li>• the patients psychological adjustment following amputation</li> </ul>	£	£		
1.18	A procedure exists for the physiotherapist to refer directly to a clinical psychologist / counsellor	£	£	£	
2.1 – 2.26	There is written evidence of on-going CPD relating to the pre and post operative management of adults with lower limb amputations	£	£		
3.1 – 3.4	<p>There is written evidence in the patients physiotherapy treatment record of:</p> <ul style="list-style-type: none"> <li>• a physical examination and assessment of previous and present function</li> <li>• the patients social situation, psychological status, goals and expectations</li> <li>• relevant pathology including diabetes, impaired cognition and hemiplegia</li> <li>• a problem list and treatment plan including agreed goals formulated in partnership with the patient</li> </ul>	£	£		



Recommendation		Yes	No	N/A	Action Points
4.1.1 , 4.15	There is written evidence of information being given to the patient with regard to: <ul style="list-style-type: none"> <li>the expected stages and location of the rehabilitation programme</li> <li>the prosthetic process</li> </ul>	£ £	£ £	£	
4.1.2	There is written evidence that the physiotherapist (with the patients consent) provides carers with information about: <ul style="list-style-type: none"> <li>the expected stages and location of the rehabilitation programme</li> </ul>	£	£	£	
4.1.3, 4.1.6	There is written evidence that the physiotherapist offers patients the following opportunities: <ul style="list-style-type: none"> <li>to meet other adults with lower limb amputations</li> <li>to see demonstration prostheses (those patients likely to be referred for a prosthesis)</li> </ul>	£ £	£ £		
4.1.4	There is written evidence that (with the patients consent) the physiotherapist offers carers the opportunity to meet other adults with lower limb	£	£		
4.1.10	Patient information/advice is available in written format	£	£		
4.2.1 – 4.2.3	There is written evidence that the physiotherapist makes patients/carers aware of the following: <ul style="list-style-type: none"> <li>that concurrent pathologies and previous mobility affects realistic goal setting and the final outcome of rehabilitation</li> <li>the level of amputation affects the expected level of function and mobility</li> <li>they will experience lower levels of function than bipedal subjects</li> </ul>	£ £ £	£ £ £		



Recommendation		Yes	No	N/A	Action Points
4.2.4	There is written evidence that the physiotherapist uses appropriate outcome measures for rehabilitation goals	£	£		
4.3.1	There is evidence that the patient/carer is taught to monitor the condition of the remaining limb	£	£		
4.3.2	There is evidence that the information given to patients regarding the care of the remaining limb is consistent with the local podiatry / chiropody service	£	£	£	
4.3.3	There is evidence that vascular and diabetic patients are made aware of risks to their remaining foot	£	£	£	
4.4.1 – 4.4.4	There is written evidence of information being given to the patient / carer with regard to the following: the following: <ul style="list-style-type: none"> <li>• Factors influencing wound healing</li> <li>• Methods to prevent and treat adhesion of scars</li> <li>• The use of compression therapy</li> <li>• Residual limb skin care</li> </ul>	£	£		
5.3 – 5.10	There is written evidence of the following pre-operative management: <ul style="list-style-type: none"> <li>• Physiotherapy assessment</li> <li>• Rehabilitation / discharge planning</li> <li>• Patients are instructed in wheelchair use</li> <li>• A structured exercise programme is started</li> <li>• Bed mobility is taught</li> <li>• Transfers are taught</li> <li>• Respiratory care assessment</li> <li>• Respiratory physiotherapy treatment</li> </ul>	£	£	£	



Recommendation		Yes	No	N/A	Action Points
6.1.2	There is written evidence that post-operative treatment started the first day post operation	£	£		
6.4.1	There is written evidence that bed mobility is taught the first day post-operation	£	£		
6.4.5	There is written evidence that pre-prosthetic mobility is in a wheelchair.  Where a patient has been taught pre-prosthetic mobility using crutches/ zimmer frame/ rollator specified reasons are documented.	£ £	£ £	£	
6.6.1	There is written evidence that all parties involved with the patient are made aware of the increased risk of falling following lower limb amputation	£	£		
6.6.2	There is written evidence that the rehabilitation programme included education on preventing falls and coping strategies should a fall occur	£	£		
6.6.3	There is written evidence that instructions are given on how to get up from the floor	£	£	£	
6.6.4	There is written evidence that the patient is given advice in the event they are unable to rise from the floor.	£	£		
6.7.1	Patients are provided with a wheelchair	£	£		
6.9.1	There is written evidence that an exercise regime is given relevant to the patients goals	£	£		



Recommendation		Yes	No	N/A	Action Points
6.9.2	Exercise programmes include exercises for the hip extensors, hip flexors and ankle plantar flexors	£	£		
6.10.1	There is written evidence of information being given to the patient regarding the possibility of experiencing phantom limb pain or sensation post operatively	£	£		
6.10.3	There is written evidence that information is given about phantom limb sensation	£	£		
6.10.7	Techniques for the self management of phantom limb pain / sensation are taught	£	£		



## Appendix 13 Definition of a clinical physiotherapy specialist in amputee rehabilitation

Based on the three key components which indicate a clinician is practising at an advanced grade as defined in the 1996 PTA Whitley Council Grading Agreement and recognised by the CSP (Advanced Grades Document September 02)

- a) The physiotherapist is recognised as an expert practitioner (1).  
There is evidence of:
- A relevant post-graduate accredited qualification eg CSP Validated course, post-graduate diploma/certificate/MSc in related studies
  - Continual professional development
  - The physiotherapist maintains a weekly clinical case load.
- b) The physiotherapist/post is a resource in terms of education, training, and development of senior physiotherapists and other professional staff.
- c) The post/physiotherapist carries responsibilities for developing and utilising research evidence, current national guidelines and recommendations and integrating this into service delivery to ensure that practice is evidence based.
- <sup>1</sup> *The expert in the Dreyfus model has extensive experience, an intuitive grasp of the situation, and focuses intervention without wasteful consideration of other possibilities (Railstone 1994)*

BACPAR

September 2002





## Appendix 14 Glossary of terms

The following recognised terminology and abbreviations were used in the guideline document.

Acupoints	are specific anatomical locations on the body that are believed to be therapeutically useful for acupuncture, acupressure, sonopuncture, or laser treatment.
ADL	Activities of Daily Living
AGREE	Appraisal of Guidelines for Research and Evaluation
BACPAR	British Association of Chartered Physiotherapists in Amputee Rehabilitation
CASP	Critical Appraisal Skills Programme
CSP	Chartered Society of Physiotherapy
DGH	District General Hospital
DSC	Disablement Services Centre
Dysvascular	having a defective blood supply
Evaluation	review and assessment of care for the purpose of identifying opportunities for improvement
EWA	Early Walking Aid
Goal setting	establishing the desired end points of care
GP	General Practitioner
Hip Disarticulation	amputation involving disarticulation of the femur from the acetabulum
JAMA	Journal of American Medical Association
Knee disarticulation	amputation by disarticulation of the tibia from the femur
Multidisciplinary team (MDT)	a group of people (e.g. healthcare staff, patients and others) who share a common purpose.
Neuropathic	having to do with damage to a nerve
OT	Occupational Therapist
Osteopenia	decrease in bone mineral density that is a precursor condition to osteoporosis
Outcome measures	a 'test or scale administered and interpreted by physical therapists that has been shown to measure accurately a particular attribute of interest to patients and therapists and is expected to be influenced by intervention' (Mayo 1995)
Peer review	assessment of performance undertaken by a person with similar experiences and knowledge.
Prosthesis	artificial replacement of a body part
PVD	Peripheral Vascular Disease
Residual limb, residuum	remaining part of the leg on the amputated side
Socket	component of the prosthesis that contains the residual limb
Symes	amputation by disarticulation of the ankle with removal of the medial malleolus and resection of the tibia
Trans-femoral Amputation	amputation through the femur
Transpelvic	an amputation when approximately half the pelvis is removed
Transtibial Amputation	amputation through the tibia



## Appendix 15 Useful resources

### **BACPAR**

Through the Interactive CSP or [www.bacpar.org.uk](http://www.bacpar.org.uk)

### **British Association of Prosthetists & Orthotists (BAPO)**

Sir James Clark Building, Abbey Mill Business Centre, Paisley PA1 1TJ

### **British Limbless Ex-Servicemen's Association (BLESMA)**

Frankland Moore House, 185 High Road, Chadwell Heath, Essex RM6 6NA

### **The Chartered Society of Physiotherapy (CSP)**

The CSP, 14 Bedford Row, London WC1R 4ED

### **The College of Occupational Therapy (COT)**

106-114 Borough High Street, London SE1 1LB

### **Community agencies**

List of Social Services available in local telephone directories

### **Diabetes UK (Central Office)**

Macleod House, 10 Parkway, London NW1 7AA. Tel: 020 7424 1000

Email: [info@diabetes.org.uk](mailto:info@diabetes.org.uk) [www.diabetes.org.uk](http://www.diabetes.org.uk)

### **Disabled Drivers Association**

Ashwell Thorpe, Norwich NR6 1EX

### **EmPower**

c/o Roehampton Rehabilitation Centre, Roehampton Lane, London SW15 5PR

### **International Society for Prosthetics & Orthotics UK NMS (ISPO)**

ISPO, PO Box 26528, London SE3 7WF

### **The Limbless Association**

Roehampton Rehabilitation Centre, Roehampton Lane, London SW15 5PR

### **Scottish Physiotherapists Amputee Research Group (SPARG)**

C/o Liz Condie

National Centre for Training & Education in Prosthetics & Orthotics

The Curran Building, 131 St. James Road, Glasgow G4 0LS

### **Society of Vascular Nurses**

[www.svn.org.uk](http://www.svn.org.uk)

### **Special Interest Group for Amputee Medicine (SIGAM) for the British Society of Rehabilitation Medicine (BSRM)**

c/o Royal College of Physicians

11, St Andrews Place, London NW1 4LE

[www.bsrm.co.uk](http://www.bsrm.co.uk)

### **The Vascular Society of Great Britain and Ireland**

The Vascular Society Office, The Royal College of Surgeons of England.

35-43 Lincoln's Inn Fields, London. WC2A 3PE

Tel. 020 7973 0306

[www.vascularsociety.org.uk](http://www.vascularsociety.org.uk)



## Relevant guidelines and National Service Frameworks

British society of rehabilitation medicine. (2003) *Amputee and Prosthetic Rehabilitation – Standards and Guidelines*, 2nd Edition: Report of the Working Party (Chair: Hanspal RS). London. British Society of Rehabilitation Medicine.

Dawson I, Divers C, Furniss D. (2007) *Ppam-aid Clinical Guidelines for Physiotherapists*. Glasgow. Scottish Physiotherapy Amputee Research Group

**The National Service Framework for Diabetes** (1999) Department of Health  
<http://www.dh.gov.uk/PolicyandGuidance/HealthandSocialCareTopics/OlderpeoplesServices/OlderPeoplesNSFStandards/fs/en>

**The National Service Framework for Older People** (2001) Department of Health  
<http://www.dh.gov.uk/PolicyandGuidance/HealthandSocialCareTopics/Diabetes/fs/en>

**Long Term Conditions National Service Framework (2005) Department of Health**  
<http://www.dh.gov.uk/PolicyandGuidance/HealthandSocialCareTopics/LongTermConditions/fs/en>



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**The Chartered Society of Physiotherapy**  
14 Bedford Row, London, WC1R 4ED  
Tel: 020 7306 6666  
Textphone: 020 7314 7890  
Fax: 020 7306 6611  
Email: [enquiries@csp.org.uk](mailto:enquiries@csp.org.uk)  
[www.csp.org.uk](http://www.csp.org.uk)

