



2nd Edition- 2016

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

British Association of Chartered  
Physiotherapists in Amputee Rehabilitation



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

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

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**About this document:** This document describes the evidence based clinical recommendations for the pre and post operative physiotherapy management of adults with lower limb amputations.

**This document will update:** Broomhead P, Dawes D, Hancock A, Unia P, Blundell A, Davies V (2006). 'Clinical guidelines for the pre and post operative physiotherapy management of adults with lower limb amputations'. Chartered Society of Physiotherapy, London.

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British Association of Chartered Physiotherapists in Amputee Rehabilitation (BACPAR)

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St Georges Medical Library – Lynsey Hawker, Karen John-Pierre, Louise Davies

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# Preface, Introduction and Evidence Based Guidelines

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## Preface

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The British Association of Chartered Physiotherapists in Amputee Rehabilitation (BACPAR) is a professional network that is recognised by the Chartered Society of Physiotherapy (CSP).

BACPAR encourages its members to use the biopsychosocial model of care. It aims to promote best practice in the field of amputee and prosthetic rehabilitation, through evidence and education, for the benefit of patients and the profession. 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.

### 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.
- Support and inform all physiotherapists working in this field regardless of their level of experience.
- Identify and incorporate new published evidence into the guidelines' recommendations.
- Assist clinical decision-making based on the best available evidence.
- Provide evidence for physiotherapists to inform service providers of best practice to promote quality and equity.
- Inform service providers in order to promote quality and equity.
- Reduce variation in the physiotherapy management of adults undergoing amputation.
- Facilitate audit and research.
- Reduce unproven and ineffective practice.

### Objectives of the guidelines

These guidelines have been developed to:

- Provide a comprehensive process document outlining how the guidelines are produced and a recommendations document which will inform physiotherapists in the pre and post operative management of adults with lower limb amputation.
- Rigorously appraise the current relevant literature since 2006.
- Make recommendations for best practice based on the published evidence and expert consensus opinion.
- Facilitate the dissemination of information to relevant parties.
- Facilitate a tool for audit and benchmarking of local service provision against national best practice recommendations.

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## Introduction

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The first edition of these guidelines was published in 2006(1). This second edition seeks to integrate new scientific evidence and current best practice into the original recommendations following similar methodology. The Delphi consensus method was replicated to ensure that recommendations based

upon expert opinion capture and continue to reflect current thinking and best clinical practice. Some previous consensus recommendations have been converted to good practice points due to the nature of these.

The impact of the new evidence and the 2014/15 Delphi consensus exercise are detailed at the beginning of each recommendation section; all new recommendations are marked (\*\*) after the recommendation numbering and amended recommendations marked (~) for ease of identification.

Supplementary documents have been developed to support this guideline update; these are:

- The information for the public guide on the pre and post operative physiotherapy management of lower limb amputees; and
- An implementation guide detailing the audit tools developed for individual practitioner use.

Both the first and second editions have been produced by members of the Chartered Society of Physiotherapy who hold State Registration with the Health Care and Professions Council. At the time of production all members of the guideline update group (GUG) were practising physiotherapists.

These guidelines do not constitute a legally binding document. They are based on the best evidence currently available, and are intended as a resource to guide application of best practice.

BACPAR recommends that these guidelines should always be utilised in conjunction with the CSP Quality Assurance Standards<sup>(2)</sup>.

If this document is being used for the purpose of service planning it should be read alongside other amputee-specific guidelines and documents developed by other healthcare professions<sup>(3, 4, 5, 6, 7, 8)</sup> and groups representing service user views<sup>(9)</sup> along with pertinent government publications whose findings can be extrapolated to the lower limb amputee population (the NCEPOD<sup>(10)</sup> is one such example).

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

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## Background to the updating of these guidelines

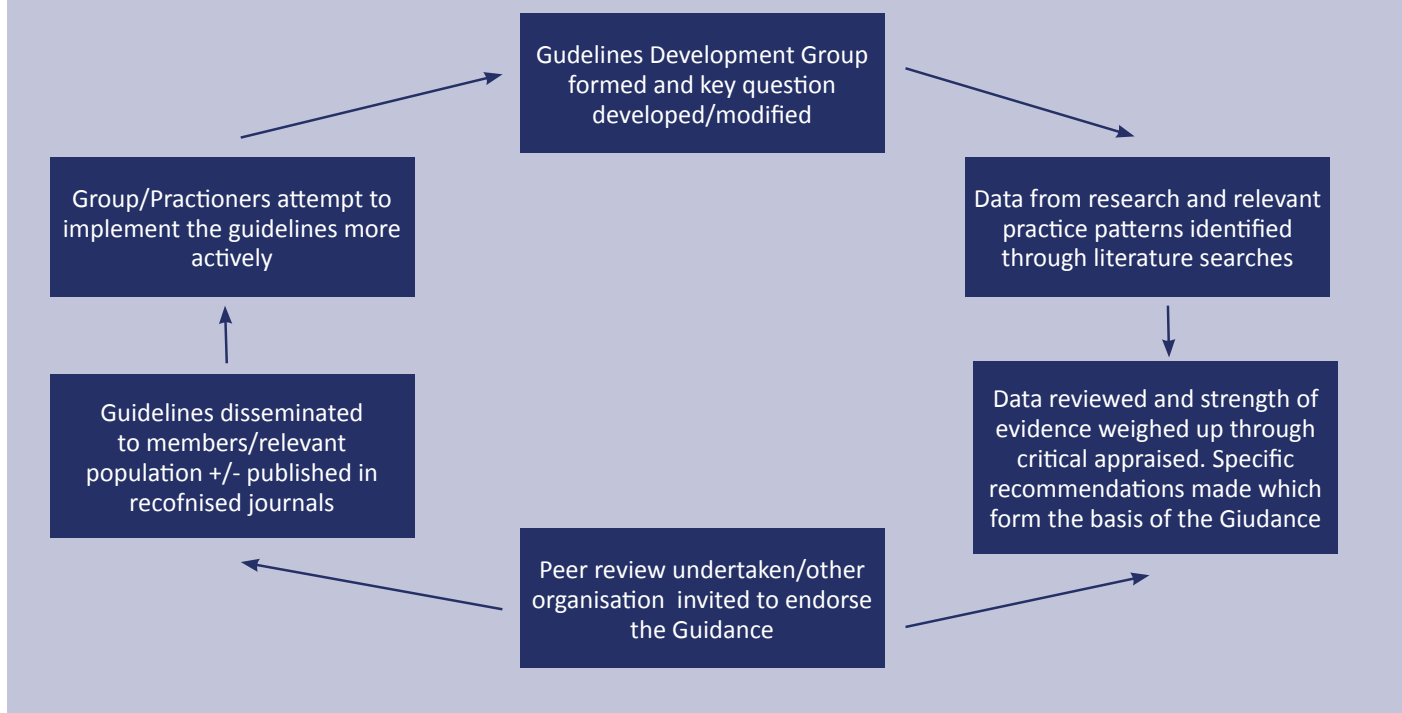
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### ■ Definition of clinical guidelines

Evidence based guidelines (EBGs) are 'systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific circumstances'<sup>(11)</sup>

The practice of evidence based medicine means integrating individual clinical expertise with the best available external evidence from systematic research. The filtering and refining of research information to create a 'knowledge product' with clear, concise and explicit recommendations and aims, follows the knowledge translation model proposed by Graham et al<sup>(12)</sup>. Guidelines seek to guide the clinician/stakeholder through steps of knowledge acquisition and transfer, and facilitate instrumental use of this new knowledge by actioning changes in clinical behaviour.

**Figure 1: Key stages of the Guideline Development Process**



## ■ Clinical governance and professional responsibility

Clinical governance is a central theme promoted within the NHS. Evidence based practice is recognised as a statutory duty for health organisations to examine the quality of healthcare provided. <sup>(13, 14)</sup>

Although there continue to be political and policy changes, the elements of clinical governance continue to drive many changes within the physiotherapy profession. Successive Governments have recognised the need for health care professionals to be informed of change and improvements within clinical practice and to remain in touch with current research findings that affect clinical decision-making <sup>(15)</sup>. The Health Professions Council has now made continuing professional development a regulatory requirement for physiotherapists and, through commitment to lifelong learning, physiotherapists are required to be reflective practitioners and base clinical judgements on the most appropriate information available<sup>(16)</sup>.

The need to drive up clinical standards and the quality of clinical services so that meaningful improvements for the patient are seen, whilst maintaining cost effectiveness, is a central theme found in all recent government publications pertaining to the NHS.<sup>(17)</sup>

Therapists need to prove that they are providing clinically effective interventions and demonstrate their ongoing commitment to continuing professional development (CPD) in order to maintain state registration<sup>(16)</sup>.

## ■ Resource implications

“Most countries face common challenges in delivering consistent, appropriate and high quality health care within available resources. Clinical practice guidelines are one of the important options to support and promote good clinical practice, to make patient care more effective and to help achieve better outcomes for patients.”<sup>(18)</sup>

Major lower limb amputation has a profound effect on quality of life with high levels of morbidity and mortality.<sup>(10,19-25)</sup> It is reported that approximately 5000-6000 major lower limb amputations are carried out in England every year.<sup>(26)</sup>

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 specialised 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 for guidelines specific to physiotherapy treatment of adults with lower limb amputation

In the field of amputee rehabilitation strategic thinking is needed to address the long-term needs of the patient. This involves teamwork and consultation, which should include the patient and their carers.

There is a wide variation nationally in the quality, type of service and care offered by physiotherapists to adults with lower limb amputation.<sup>(27, 28, 10)</sup>

These guidelines will provide best practice recommendations to allow benchmarking and audit of local service provision.

Commonly, within the current healthcare environment a patient will not necessarily be treated by a physiotherapist with ‘specialist’ knowledge of the pre and post operative management of the lower limb amputee. In the past ‘senior colleagues’ have been the most relied upon source to inform and develop clinicians <sup>(29)</sup>. However specialist senior staff are becoming fewer in number due to re-banding and re-configuration of services.

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# Methods used to update the Guideline & Scope of the Guideline

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A clinical guideline is not a mandate for practice – it can only assist the clinician with the decision-making process about a particular intervention. Consideration of the strength of the evidence on which the guidelines recommendations are made is important; however it is the responsibility of the individual clinician to interpret their application for each particular patient encounter. Guidelines do not negate the need for physiotherapists to use their clinical reasoning skills or discuss choices with patients. This will include taking account of patient preferences as well as local circumstances.<sup>(2)</sup>

BACPAR recognises that local resources, clinician prioritisation, as well as the rehabilitation environment in which the practitioner works, will influence their implementation. It is however encouraging that senior clinicians currently practising in the field of amputee rehabilitation do report using the first edition of these guidelines in a number of ways as identified in the introduction (Appendix 3b).

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## Process of updating the guidelines

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The NICE Guideline manual<sup>(30)</sup> suggests that: “Any decision to update a guideline must balance the need to reflect changes in the evidence against the need for stability.”

The first edition was published with the expectation that it would be reviewed and updated as required. In 2013 the BACPAR Executive Committee decided to review and update the guidelines. This was perceived as necessary due to potential changes in physiotherapy management over time and the possible new evidence available. Priority was given to this update to ensure the work remained relevant and valid.

### ■ The guideline update group (GUG)

A working party of BACPAR members was formed. Volunteers were requested via the professional network and were sought predominantly from the acute sector reflecting the necessary experience and skills needed to compile these clinical guidelines (Appendix 1a). All members had an understanding of the use of guidelines in assisting and informing clinical practice, with some members having post graduate experience of guideline development. The BACPAR Guideline Coordinator led the working party. No member declared a conflict of interest.

Details of the 2006 working party involved in the development and writing of the first edition are detailed in Appendix 1b.

No physiotherapy-specific literature/information regarding the update of clinical guidelines was identified. The methods utilised during the updating process have therefore been drawn from those outlined within ‘The Guideline Manual’ developed by NICE<sup>(30)</sup> (Figure 2). The CSP was kept informed at regular intervals of the progress of the update.

Following advice from the CSP and the NICE guideline manual, a patient representative was sought to be part of the working party. The patient representative had experience of intensive post operative physiotherapy and had skills in appraisal and working at MSc level.

The patient representative was invited to attend meetings with the GUG and if unable to attend the meetings was asked to comment on the minutes and actions. For future update working parties it is recommended that at least two patient representatives are sought to facilitate attendance at meetings and overall involvement.

Also throughout the updating of these guidelines, the views of

clinicians, individual service users, service user focus groups and professional advisers recognised as being stakeholders/interested parties were sought – see Appendices 2a and 2c. Their comments and suggestions informed the guidelines.

### ■ Preparation for updating

Before updating could begin, the GUG undertook a survey of clinicians using edition one to identify how the current guidelines were being used and what changes may be useful. Clinicians completed a Survey Monkey questionnaire posted on iCSP or available from the GUG. Clinicians were asked to comment on the relevance of the guidelines; the content; current format, presentation and language. See Appendix 3b for the questionnaire and summary of the main comments

Clinicians working within amputee rehabilitation reported using the first edition in different ways:

- as a reference tool to guide best recognised clinical practice;
- to aid in the identification of personal and team learning needs specific to physiotherapy treatment of adults with lower limb amputation; and
- to benchmark local services against national evidence based recommendations and use the findings as drivers in the development of local service provision and local protocols.

The update group also asked patients for their comments on the first edition of the guidelines. This was collated using postal feedback questionnaires to individual patients and to patient user groups. The main focus of this questionnaire was to identify if patients were aware of the guidelines and, if they were, if they were useful in informing patients of what physiotherapy they should expect to receive following amputation. See Appendices 3c and 3d for the questionnaire and summary of the main comments.

The feedback from these surveys was used to inform the production of the 2nd edition of the guidelines and the development of the new public information document.

Following the results of these surveys BACPAR was confirmed in its decision to update this guideline to support and facilitate its members striving to achieve best clinical outcomes and secure the optimal local service provisions for patients who have undergone lower limb amputation.

### ■ Funding

BACPAR as a professional network is funded by its members’ subscriptions and it is these funds that support the development of any guideline produced by BACPAR. This funding is not conditional on editorial input.

The members of the GUG are all BACPAR members and carry out the update within their own work time. Members of the GUG claim their travel expenses to get to GUG meetings from BACPAR.

BACPAR will fund the publication of hard copies of the Recommendations, the Audit Tool and the Patient information documents, but it is expected this will be a small print run as all the guideline documents will be available electronically. The guidelines were developed without any external funding.

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## Scope of the guidelines

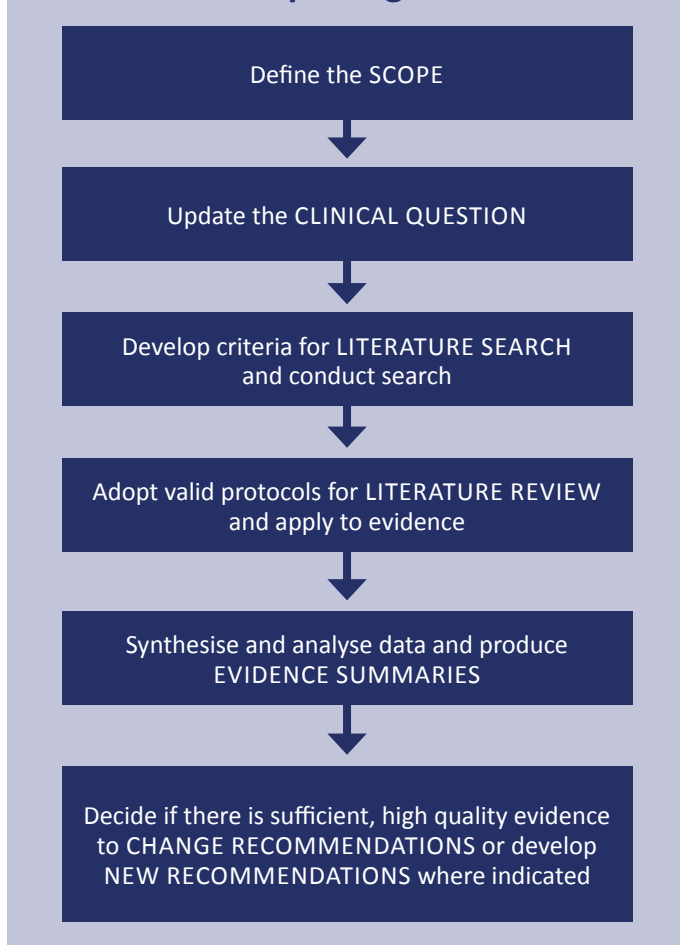
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The scope of these guidelines is purposely broad. It was not BACPAR’s intention to include details of specific areas of physiotherapy management as these would detract from the broader overview that these guidelines present.



# Methods used to update the Guideline & Scope of the Guideline

**Figure 2: Summary of the six basic steps identified in the updating of a Guideline** <sup>(30)</sup>



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'<sup>(31)</sup>.

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 MDT who are not

physiotherapists

- Children
- Digital and partial foot amputations
- Cost effectiveness.

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## The clinical question

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The clinical question is unchanged from the first edition of these guidelines:

“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?”

The GUG sought to assess whether new evidence and/or clinical developments have changed what is considered to be best physiotherapy practice.

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## Literature search

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### ■ Aims of search:

To identify literature relating to the pre and post operative management of adults with lower limb amputation from March 2006 to Nov 2012.

The literature search was limited by:

### ■ Inclusion criteria

Articles were included if they were:

- Published from March 2006
- 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, trans-femoral, 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.

### ■ Method of literature search

Literature searches were conducted in Nov 2012 by a medical university librarian using the search protocol and key words detailed in the first edition of the guidelines. The following databases were searched:

AMED, Cinahl, Cochrane Library, DARE, Embase, Medline, PEDRO.

### ■ Key words

To make the search as sensitive as possible MeSH terms were used in conjunction with keywords and free text.

The MeSH terms used were amputation, physiotherapy, physical therapy, post operative care, pre operative care, exercise therapy, and rehabilitation.

The key words and free text used were physical therap\*, physiotherap\*, exercise therap\*, therapeutic exercise\*, rehab\*, amp\*, manag\*, care\*, lower limb\* and lower extremity\*.

# Methods used to update the Guideline & Scope of the Guideline

## ■ Selection of relevant articles

The results from each database search were assessed and all duplicates removed. The GUG undertook the appraisal by dividing into pairs and then the abstracts were distributed equally. The abstracts were then reviewed to ensure the article met the inclusion criteria.

From the abstracts, the articles were excluded if both of the appraisers felt the study was:

- not relevant to the guidelines
- contained inconclusive evidence and
- purely descriptive.

Details of the articles excluded after full review are displayed in Appendix 7.

All articles deemed relevant were obtained in full to be critically appraised.

Figure 3 details a completed PRISMA flow diagram illustrating the flow of information through the different phases of literature identification and review.

## The appraisal process

The GUG undertook the literature appraisal (Appendix 6).

The CASP (Critical Appraisal Skills Programme) tools<sup>(32)</sup>, specifically developed to help evidence based analysis in health and social care settings, were selected to guide article appraisal.

There are seven separate tools devised to help appraise different types of research methodology, each has simple applicability. All appraisers practised using one of the tools to compare their results and ensure consistency.

## ■ Classification of included articles

Each pair agreed on the relevant CASP tool and carried out separate reviews on full text articles prior to discussing it in order to minimise potential bias. For each article the pairs completed an 'evidence table' detailing the study design, characteristics, subject of study/intervention, comments, potential use in guidelines and level of evidence. The level of evidence of each article was classified using the SIGN grading tool<sup>(33)</sup> (Appendix 13).

## ■ Levels of evidence

1++ High quality meta-analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias

1+ Well-conducted meta-analyses, systematic reviews, or RCTs with a low risk of bias

1- Meta-analyses, systematic reviews or RCTs with a high risk of bias

2++ High quality systematic reviews of case control or cohort studies/High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal

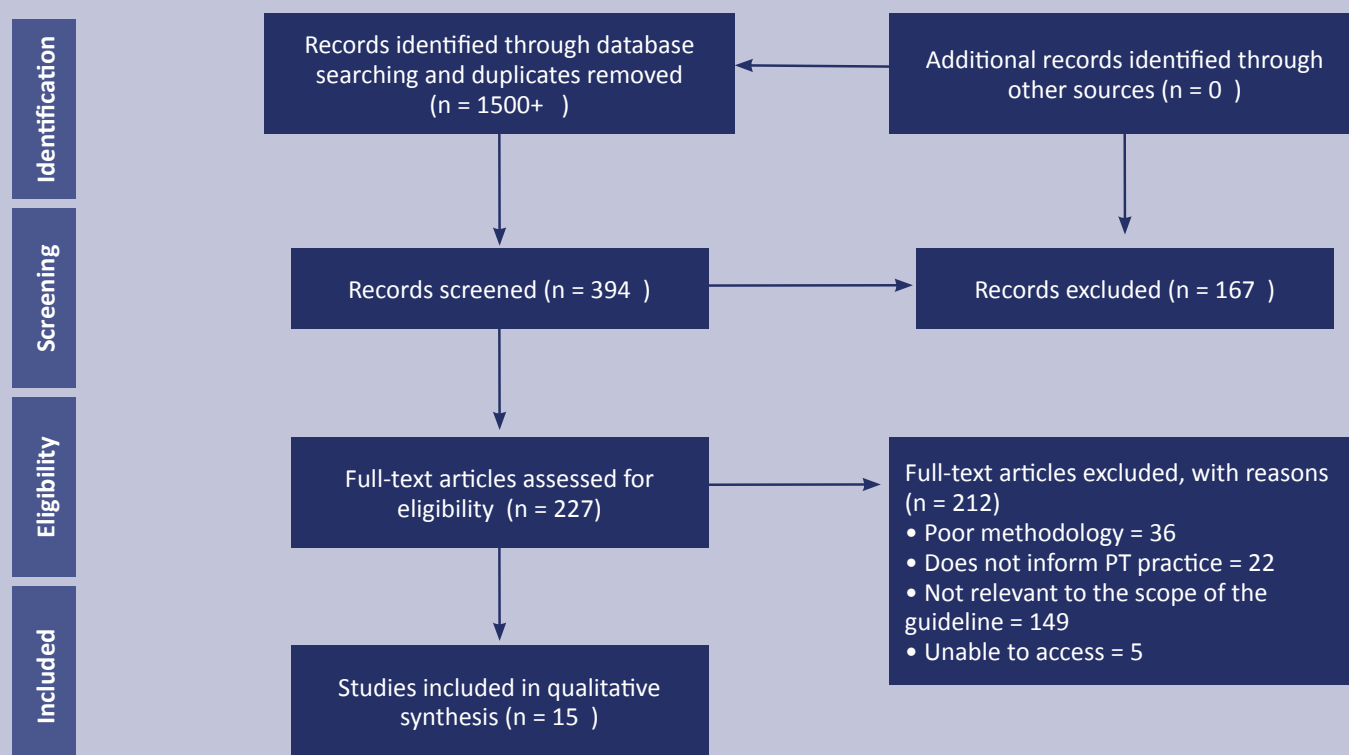
2+ Well-conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal

2- Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal

3 Non-analytic studies, e.g. case reports, case series

4 Expert opinion

**Figure 3: PRISM (2009) Flow Diagram illustrating the flow of information through the different phases of the literature identification and review process**





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# Methods used to update the Guideline & Scope of the Guideline

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Fifteen articles were identified as providing new evidence. Completed evidence tables were reviewed by the GUG and, where ambiguous or contradictory comments were found, the full text article was revisited and further detail added. The evidence tables for all articles utilised in the previous and current edition of these guidelines are found in Appendix 9.

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## The consensus process

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It was recognised in the first edition<sup>(1)</sup> that, in some clinical areas, the literature did not provide sufficient evidence to develop recommendations; the authors therefore chose the Delphi technique to obtain consensus opinion where the literature was lacking.

Given the length of time that had elapsed since publication it was felt by the GUG that it was important that the expert opinion (from which 'D' graded recommendations had been developed) be scrutinised to ensure they continue to be a true reflection of current ideas and clinical practice.

### ■ The Delphi technique

The Delphi technique 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'<sup>(34)</sup>.

It is a widely utilised methodology within health care for gathering expert opinion and turning it into group consensus<sup>(35)</sup> and, although more time consuming and labour intensive than a conference, the Delphi Technique ensures that:

- all contributors have an equal voice
- geographical barriers do not prevent participation
- there is consideration of all possible options for treatment and
- practising clinicians have the opportunity to contribute to and develop the guidelines.

### ■ The Delphi process

In the original process three rounds of postal questionnaires were sent out before recommendations were written. It was decided that those recommendations that currently had level D grading would be the statements that needed to be tested by the Delphi process and would be the basis for the questionnaire for the second edition. (Appendix 11)

No literature could identify a universally acceptable percentage at which it could be determined that consensus agreement had been reached. Previously, it was decided that if 75% or more of the respondents scored more than 75% agreement with a statement, consensus would be reached. If consensus was 75% or below, the statement would not have the agreement of the panel and the question would be refined for a second round. If consensus could not be reached after all the rounds of questionnaires then no recommendation would be written.

### ■ The consensus panel

No specific panel size has been identified as being optimal for the Delphi process; representation should be assessed by 'qualities of the expert panel rather than its numbers'<sup>(35)</sup>.

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

Invitations to participate were sent out by an appeal on the amputee network on the iCSP website, by the BACPAR membership secretaries and BACPAR regional representatives. Fifty-four clinicians were recruited (Appendix 10).

The panel inclusion criteria remain unchanged - Physiotherapists who:

- were working as a senior physiotherapist or clinical specialist
- had worked mainly with amputees (pre and post surgery) for a minimum of two years and
- had postgraduate training in the field of amputation rehabilitation.

For round one a return rate of 89% was achieved with forty-eight out of the eligible fifty-four 'experts' returning a completed Delphi questionnaire.

No literature reviewed could identify an acceptable return rate for the Delphi technique; as subject numbers closely reflect those gained in the first edition, any bias introduced by a difference in response rate is unlikely to be significant.

### ■ Round one Delphi results

Three statements did not have consensus of more than 75%; therefore a further round of postal questionnaires was indicated.

Using the feedback from the consensus panel, one statement was supported by evidence<sup>(8)</sup> and reworded.

The remaining two statements were reworded using the feedback from the consensus panel and were resent to the original panel of 54.

### ■ Round two Delphi results

Forty-one responses were received giving a 75.9% response rate. Consensus of over 75% agreement was indicated by 36 responders, giving a level of agreement of 87.8% for both reworded statements.

A further round was therefore not indicated.

Appendix 12a displays the results of the 2 postal questionnaires.

Appendix 12b outlines the impact and changes made to the guidelines following the comments from round one of the Delphi process.

Appendix 12c outlines the comments received from the 2nd round of Delphi.

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## Drafting the Updated Guideline:

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A considered judgement of all new evidence identified was made by the GUG (Appendix 1a) and reviewed in light of the section headings utilised in the guidelines first edition.

### ■ Section headings:

The original authors (Appendix 1b) had decided upon section headings for the recommendations using:

- CSP Core Standards<sup>(2)</sup> (now replaced by CSP Quality Assurance Standards<sup>(2)</sup>)
- Knowledge and expertise of the working party

It was agreed that the six section headings utilised in the guidelines first edition remained clinically relevant and representative of the evidence.

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# Methods used to update the Guideline & Scope of the Guideline

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## ■ Updating the guideline and incorporating new evidence

The introduction was reviewed and updated to reflect changes within NHS and professional policy; additions and changes to the methodology utilised were made.

Following appraisal of the new evidence each section of the previous guideline was re-examined by the GUG; consensus was gained within the group as to whether the new evidence strengthened previous recommendations or supported a new recommendation being developed. Once the new literature was amalgamated, levels of evidence for each recommendation were allocated (Appendix 8) reflecting the strength of the supporting evidence from which they were formulated.

The recommendation grading system utilised gives guideline users information about the quality of evidence upon which each recommendation is based; it does not rank recommendations in the authors' perceived level of importance. It is acknowledged that it is sometimes not appropriate to use a randomised controlled trial (RCT) to answer therapy research questions<sup>(33, 36, 37)</sup> hence there are very few 'A' graded recommendations. The authors continue to find that there are large areas of pre and post operative physiotherapy input with lower limb amputees where no supporting published evidence exists; in these instances expert opinion has been revisited using the Delphi process and recommendations derived from this can only receive a 'D' grading.

## ■ Good Practice Points (GPPs):

Following on from the publication of Prosthetic Guidelines (31) the GUG in conjunction with recommendations from the CSP reviewed existing 'Local Implementation Points' and replaced these with GPPs. These GPPs by definition<sup>(33)</sup> reflect a 'common sense' approach to intervention and achieved consensus through the Delphi process.

Having updated the 6 sections of guideline recommendations it was these that were sent out for considerations using the Delphi process previously described

In parallel, these 6 sections of updated guideline recommendations were sent to Lay/patient representatives for their feedback.

See appendix 3c and 3d for the postal questionnaires and feedback comments

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## Guideline Audit Tools:

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It is recognised by validated guideline appraisal tools (i.e. the AGREE 11 tool –<sup>(18)</sup> that a guideline should present key review criteria that individual practitioners could utilise in the monitoring and auditing of their own service/practice.

## ■ Updating the Audit tool

The previously developed audit tool was reviewed as part of the updating process and changes made in line with new evidence and the incorporation of the Good Practice Points

The revised audit tool has been split into 3 parts, giving three distinct tools:

- service evaluation
- personal achievement of GPPs
- patient notes audit form

It is hoped that these stand alone audit tools will decrease some of the time burden on the auditor/clinician as they can be completed at separate times and could be utilised as evidence of continued professional development – e.g. completion of audit tool 2: Personal achievements of GPPs.

The audit tool is available as a standalone document and can be found on the BACPAR website [www.BACPAR.org.uk](http://www.BACPAR.org.uk)

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## Public Information document

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Following the feedback from patients/service users at the beginning of the update process and the review of the updated recommendations, the GUG used this feedback to develop a new information document outlining what patients/service users should expect from their physiotherapist before and after their amputation surgery. The information within the document is based on questions patients asked and the relevant recommendations within the guideline document.

The Public information document is available on the BACPAR website [www.BACPAR.org.uk](http://www.BACPAR.org.uk)

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## Seeking feedback from Stakeholders/Interested parties:

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As recommended by NICE, the AGREE II guideline appraisal tool was used as a tool to assist the reviewers to deliver a quality judgement about these guideline's usefulness and validity; see Appendix 15 for the specific domains examined<sup>(30,33)</sup>.

## ■ Review of the drafted guideline update:

Once a full draft of the process document, the Guideline recommendations, the audit and implementation tool and the Public information document were completed these were sent with the Agree II tool to:

20 Peer reviewers

- Peer Review: non specialist Physiotherapy staff with or without experience of the pre and post operative management of the lower limb amputees were invited to comment upon the draft guideline. A mixture of staff grades, clinical specialities and geographical location was sought to maximise the strength of the peer feedback. This was carried out by inviting interested Band 5 and Band 6 physiotherapists who responded to an invitation published in Frontline and on the iCSP amputee network (Appendix 15a)

8 external reviewers

These stakeholders were approached to be part of the review process as they had advised on the 1st edition and, as they are considered to represent all the multidisciplinary aspects of amputee rehabilitation, their expert opinion is highly valued

- SPARG - Scottish physiotherapy amputee research group are the equivalent of BACPAR in Scotland and are involved in guideline development themselves
- ISPO - International Society for Prosthetic and Orthotics is an interdisciplinary society for professionals working in the fields of Prosthetics and Orthotics and in the associated areas of Rehabilitation. Its aim is to improve the standard of care in these fields by promoting dialogue, disseminating information, and setting and monitoring standards of training.

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# Methods used to update the Guideline & Scope of the Guideline

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- BSRM - The British Society of Rehabilitation Medicine is a learned society representing doctors who practise in Rehabilitation Medicine. The Society encourages doctors in all clinical specialties to be involved in education and research into the management of disability.
- BAPO – British Association of Prosthetists and Orthotists is the only UK body that represents the interests of prosthetic and orthotic professionals and associate members to their employers, colleague Allied Health Professionals and all groups that are involved in the field of prosthetics and orthotics. BAPO enjoys the support of a high majority of the profession as members. Its aims include:
  - Lobbies to promote and maintain our member’s clinical excellence and service to the patient to all organisations involved in prosthetics and orthotics.
  - Produces guidelines for best practice.
  - Professional Development for members.
  - Provides advice to members and other interested parties.
- Vascular Society - The Vascular Society of Great Britain and Ireland is the pre-eminent organisation in the country promoting vascular health by supporting and furthering excellence in education, training and scientific research. The Society represents & provides professional support for over 600 members, including vascular surgeons, vascular radiologists & others involved in independent vascular practices in Great Britain and Ireland. The Society focuses on non cardiac vascular disease, including diseases of peripheral arteries, veins & lymphatic. Vascular specialists are trained in the diagnosis and management of conditions affecting all parts of the vascular system.
- COTSSTO - COT Specialist Section Trauma and Orthopaedics provides a forum for occupational therapists and occupational therapy staff that have an interest in upper and lower limb prosthetics and rehabilitation. They work closely with other related organisations and professionals with a similar interest. They share and exchange knowledge, skills and ideas and provide access to resource material to promote research and evidence-based practice
- LA - The Limbless Association is the leading UK charity for people with limb-loss. LA offers support to individuals of any age, whether they are about to have an amputation or are already living with congenital or acquired limb-loss and they offer assistance and information to carers, family members and friends if they require it. They support both the civilian and military population and work closely with other UK Charities to provide the best overall service for each individual
- WCPPLG - Westminster Cross party parliamentary limb loss group was established and is led by patients “to inform Members of Parliament so that they may promote the prevention of limb loss and the provision of prosthetic, orthotic, wheelchair/special seating, medical and other vital rehabilitation services to persons of all ages suffering limb loss and associated disabilities in the United Kingdom and Internationally.

## Service Users

Service users who had been approached for comments at the beginning of the process to help develop this guideline, were asked to comment on the new Information for the Public document (appendix 15a)

The recommendations and comments from all the reviewers were considered by the GUG. They were collated and themed and where appropriate the document was amended to produce the final documents. See Appendix 15b and 15c for their comments and suggestions and actions taken.

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## Review and Further Updates of the work:

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The GUG acknowledges the length of time that has elapsed from when the initial literature search and CASP appraisals were carried out, to the update publication of the updated guidelines. However, during this process members of the GUG were involved in various conferences, CPD events and liaised closely with the research officer. These regular events provide opportunity for any new developments that could impact on the guidelines to be highlighted. BACPAR executive meetings also have the guidelines as a standing item on the agenda with a detailed report and newly published evidence can be disseminated.

The role of the guideline co-ordinator will be important in the continual review and updating of all the guidelines produced by BACPAR. The guidelines for Care of the contra-lateral limb and the Falls guidelines are due for review. It was recognised that during the literature search for the pre and post-operative guidelines, articles were sourced that would support the Care of the contra-lateral limb, and therefore it is proposed that the literature searches used for these two updates will incorporate the search criteria for the pre and post op guidelines, and if articles are identified as supporting the pre and post op guidelines they be appraised and added to the body of evidence.

Therefore the GUG proposes that going forward the following processes will be adopted to improve the updating process:

- The guideline co-ordinator, liaising with BACPAR’s Honorary research officer, will undertake an annual literature review and appraise any relevant articles.
- Any new evidence that is appraised as adding to the body of evidence will be added to the recommendations document and information about this new evidence will be disseminated in the same way through regional networks, iCSP, BACPAR conference and the journal.
- The guideline co-ordinator will update the BACPAR Executive committee of any new evidence in their report at the March executive meeting.
- The guideline co-ordinator liaises with the MSc Amputation and Prosthetic Rehabilitation (University of Southampton) course lead and BACPAR Honorary Education officer to consider the opportunity for participating students to identify areas lacking in evidence with the potential for supporting course assignments and/ or research dissertations.

BACPAR will then continue to assess the need to undertake a major review and update of the guidelines after a period of 5 years. The new processes outlined, and the knowledge that the amount of new evidence for physiotherapy within amputee management being published is small, will impact on the update process.

With the information gathered on an annual basis, BACPAR’s executive committee will have assessed the amount of new evidence available. They will discuss whether there is sufficient new evidence, or if there has been a change in clinical practice by either healthcare professions and/or patient and carer organisations, that would warrant a major review and update. A decision will then be made either to update the guideline or produce a statement detailing the reasons why it will be postponed.

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# Methods used to update the Guideline & Scope of the Guideline

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## Health Benefits, Side Effects and Identified Risks:

The recommendations within the guidelines are evidence based and support best practice. Further details of the health benefits of each recommendation are detailed under the relevant guideline section. No side effects or risks were identified from the literature, professional advisers, reviewers or consensus panel.

BACPAR considered volunteer physiotherapists to be part of this process and this posed no Conflict of interest.

The conflict of interest policy is available from the guideline co-ordinator, <http://bacpar.csp.org.uk/contact-us>

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## Implementation and Dissemination of the Updated Guideline:

### Publication and Presentation:

It is good practice that all guidelines be free to all who wish to access them as established by the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities (<http://oa.mpg.de/openaccess-berlin/berlindeclaration>). The guideline is accessible from the CSP website.

BACPAR will fund the publication and dissemination of the 'Audit and Implementation Guide' as short documents at the request of the membership and stakeholders to improve accessibility of the information.

The regional networks of BACPAR membership will support the implementation and promotion of this guideline update at a local level by supporting various CPD opportunities.

The GUG will also seek to present at relevant national conferences to disseminate to multi professional audiences.

The GUG will seek to use the stakeholders already involved to facilitate dissemination of the updated guidelines through their own networks and communications links.

Dissemination of the guideline can be further enhanced by the use of social media networks. This will be supported by the Social media office of BACPAR executive committee.

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## Barriers to Implementation:

In order to adopt the recommendations in this guideline a number of factors should be considered which may act as barriers to their implementation. Although implementation of these guidelines may have cost implications, a cost benefit analysis could not be undertaken as the data required to enable an economic evaluation is not available.

Implementing these guidelines may involve further training of staff. The co-operation of other members of the MDT is required for full implementation of these guidelines.

It is unfortunately outside the scope of this work to directly address the varying local resources identified through the Delphi consensus exercise; the authors suggest that the evidence based recommendations could assist in presenting a 'case of need' to healthcare managers in areas where non-compliance can be demonstrated.

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## Conflict of interest

In accordance with NICE recommendations a conflict of interest policy was developed. A signed declaration of interest was provided by all members of the GUG and External reviewers. Those physiotherapists who participated in the Delphi process and peer review were volunteers. The GUG and



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## Appendix 1a - GUG 2nd Edition

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### ■ *Jeanette Adu-Bodie - Patient representative*

Dr Jeannette Adu-Bodie is internationally recognised Scientist and is currently a Manager at GlaxoSmithKline Vaccines.

Jeannette studied Biochemistry at King's College London, followed by a PhD in Biochemistry at Imperial College. This started her interest in Infectious diseases and Vaccines. In 1998 she joined Chiron as a post-doctoral scientist working on the development of a Meningococcal B vaccine. As a postdoc she was awarded by the European Commission a two-year Marie Curie Individual Fellowship. Over the course of several years, she became a Senior Research Scientist and Head of the Genetics Group. This project led to the successful development, registration and licensure of the first recombinant Meningococcal B vaccine. Her research activities were largely carried out in the fields of bacterial genetics, molecular biology, functional genomics, infectious diseases and vaccine development. She has authored over several peer-reviewed articles and contributed to several international books on Vaccinology.

In 2005 Jeannette survived a life-threatening illness, which left her a quadruple amputee and confined to a wheelchair. She spent several months rehabilitating at Queen Mary's hospital where she fitted with C-legs. After spending a year in hospital, in 2006 she fulfilled her goal of walking the length of St. Peter's Cathedral in Rome and meeting the Pope. In 2007, she joined GSM London to study the Executive Diploma in Management (EDMS). Thereafter Jeannette obtained an Executive MBA (EMBA) from Imperial College in 2009 and 2010 completed a 1Km sponsored walk to raise money for the 500miles charity.

Over the last ten years Jeannette has been a Patient and Professional Advisor for the Amputee Rehab Department at Queen Mary's Hospital in Roehampton. She is active in disabled sports and 2012 was a Gamesmaker for the Paralympics. Since becoming an amputee Jeannette has taken a keen interest in sailing, learning to sail solo. She is member of the East London Lynx Sitting Volleyball Team who were the 2015 National Champions. She is currently the Captain of the East London Lynx Sitting Volleyball Development Team and in addition a member of the GB Women's Sitting Volleyball Team.

### ■ *Heidi Baker – Lead Author*

Graduated in 2008 from University of East London. This included a placement at RNOH Stanmore within the amputee team, which is where my enthusiasm for Amputees ignited. After graduating I initially worked as a community physiotherapy assistant in Coventry PCT before commencing a rotational Band 5 Physiotherapy role at Peterborough City Hospital in 2010. In 2012 I secured a Band 6 role within the vascular and abdominal surgery team, where I had the opportunity to be involved with both inpatient and outpatient amputee rehabilitation. During this time I worked with the team to improve patient engagement during their inpatient rehab. 2013 saw me move back to a domiciliary intermediate care team where I had the opportunity to work with amputees in their own environment. In 2014 I was able to secure a post much closer to home at Buckingham Community Hospital, where I now have the pleasure of working with both the Bucks Healthcare therapists and with Oxford DSC to support patients to either further their post op rehabilitation and to see those in times of crisis.

### ■ *Amanda Hancock – Lead on Delphi and Joint Audit guide co-ordinator, Lead Author*

Amanda has worked in Amputee Rehabilitation throughout her career. Working at Hull and East Yorkshire Hospitals NHS

Trust since 1992 Amanda spent 13 years as the Clinical Lead for Amputee Rehabilitation. These days Amanda is a Physiotherapy Clinical Manager but still manages to maintain a clinical contact within her speciality.

Amanda was a member of the original GUGs for both of BACPAR's Evidence Based Clinical Guidelines. She has presented both nationally and internationally on a variety of subjects related to the rehabilitation of people with lower limb amputations and co-authored several publications. Amanda is currently collaborated with colleagues at Hull University Department of Sport, Health and Exercise Science to undertake research into the prevention of falls in adults with lower limb amputations.

### ■ *Amy Jones - Joint co-ordinator of NICE application, Lead Author*

Amy Jones is clinical lead prosthetic physiotherapist at Guys and St Thomas' NHS Prosthetics Centre (GSTT). She first worked in amputee rehabilitation in Manchester Royal Infirmary, on the acute surgical wards. From there, she secured a static post working within the amputee MDT team, consisting of acute in patients, inpatient rehab and an out reach service. From here, she moved to the prosthetics centre based in Crystal Palace, working part time in prosthetics and part time in the wheelchair service. The service expanded leading to a full time role in prosthetics. Amy has been an active BACPAR member and sat on the committee as SIG liaison officer and is current equality and diversity officer.

### ■ *Clare Moloney, Lead Author*

Clare has worked with amputees since she qualified as a physiotherapist from Hertfordshire University in 2008. She is currently a specialist physiotherapist working within acute medicine and surgery in London. Her experience reaches across both in and outpatient amputee management in a number of London Hospitals, in liaison with the MDT.

In her previous post, Clare ran the amputee rehabilitation service and was responsible for developing the service to ensure greater consistency and provision of care, from pre operative management to long term rehabilitation follow up. Clare managed the training of other therapy colleagues to support the on going growth of the service.

### ■ *Lauren Newcombe – Lead on Public Information document, Lead Author*

Lauren Newcombe has been the Lead Amputee and Vascular Physiotherapist at Frimley Park Hospital for the past 4 years. Since qualifying in 2008, Lauren has developed significant experience in the management of acute amputee patients as well as the treatment of established prosthetic users. Working within the inpatient and outpatient setting, Lauren has developed the amputee service across different hospital sites with the production of MDT pathways and protocols, training for staff on the management of amputees as well as numerous study days and information packs for amputee patients. Lauren has also led "running sessions" for prosthetic users and taken an active role in BACPAR. Most recently, Lauren has written a chapter on stump oedema and wound management for the online Physiopedia amputee course and has set up an Amputee Support Group for patients local to Frimley Park. Lauren has developed a keen interest in Phantom Limb Pain and is currently trialling the use of acupuncture for the treatment of this and will be working with the MDT to develop a formal amputee mentoring programme.

## Appendix 1a - GUG 2nd Edition

### ■ *Claire Norman, Lead Author*

Claire graduated in 1997 from Manchester University, and went on to undertake core rotations as a band 5 then a band 6 and locum in Sheffield and Australia before starting work at St Georges Healthcare NHS trust in 2001. Here I started working with vascular amputees and found an area of Physio I love. Since then I have specialised in trauma and orthopaedics and have worked mostly with traumatic amputees but remained the lead physiotherapist in acute amputees for the trust, the majority of our patients going on to Queen Mary's Roehampton for their prosthetic fitting and rehab. I recently moved to Guernsey and now have involvement in all areas of the amputee pathway both as inpatients and out patients.

### ■ *Heather Pursey, Lead Author*

Heather began her career within the NHS in 1999 working as a physiotherapy assistant. During this time she was given the opportunity to train as a Chartered Physiotherapist and attended Colchester institute and undertook a 4 year degree programme. After completing core rotations as a band 5 and 6 physiotherapist she joined Ashford and St Peter's Hospitals NHS Foundation Trust in 2009 as a Specialist Physiotherapist in General Rehabilitation and Amputees. She developed the amputee service at Ashford and St Peter's and mainly treats patients in the acute/pre prosthetic stage of amputee rehabilitation.

### ■ *Tim Randall – Advisor from prosthetic guideline, Joint co-ordinator of Audit guide, Lead Author*

Tim has worked as an amputee specialist at the Dorset Prosthetic Centre at Royal Bournemouth Hospital for the last ten years. He treats prosthetic amputees as outpatients and in the community and co-ordinates their care within the region.

The role also involves being responsible for all new amputees within the trust and has worked with the vascular team to refine an integrated care pathway for amputees.

He has successfully completed a Post Graduate Certificate in Amputee Rehabilitation at Bradford University. As part of this course along with his colleagues he developed a short guideline titled: Risks to the contra-lateral foot of unilateral lower limb amputees: A therapist's guide to identification and management. He is an active member of the British Association of Chartered Physiotherapists in Amputee Rehabilitation (BACPAR) and helped co-ordinate their 2012 guidelines update on physiotherapy in adults with lower limb prostheses.

He is involved in teaching throughout the region covered by the Dorset Prosthetic Centre and guest lectures at Bournemouth University.

### ■ *Anna Rose - Lead on Referencing, Lead Author*

Anna has worked in the acute care and prosthetic rehabilitation of amputees since 2007. In 2012 she received her PG Certificate in amputee rehabilitation from Bradford University. During her studies Anna was co-author on BACPAR's 'Guidance for the multi-disciplinary team on the management of post-operative residuum oedema in lower limb amputees.' Anna has also volunteered with BACPAR to develop an educational module in association with Handicap International. Anna is currently working at Barts Health NHS Trust managing the vascular and amputee ward.

### ■ *Carla Shaw, Lead Author*

Carla Shaw currently works at Milton Keynes University Hospital Foundation Trust as a surgical and critical care band 6

Physiotherapist. Prior to this she worked at University of Hospitals of Leicester as a band 6 Physiotherapist in vascular, surgery and critical care. She has a specific interest in acute amputee rehabilitation and this is her first venture into the development of a large guideline.

### ■ *Hannah Slack – Joint co-ordinator of Audit guide, Lead Author*

Hannah qualified as a physiotherapist in 2003 and after completing core band 5 and 6 rotations, at Lewisham University Hospital, she undertook a new service developmental role in critical care, surgical and amputee rehabilitation. During this time she worked with a range of patients from pre-amputation to prosthetic fitting and discharge. From here she gained a band 7 role in vascular and amputee rehabilitation for North West London Hospitals NHS Trust in 2010. Working in both acute and prosthetic phases, specialising in vascular amputee rehabilitation. In 2011 she moved to her current role as complex medical, renal and amputee rehabilitation team lead based at St Helier Hospital in South West London. Hannah now primarily works with amputees in the acute and pre-prosthetic stages, with a special interest in renal failure, diabetes care and self-management. She has also developed an active role in diabetic foot care, within the specialist MDT. In addition, Hannah is currently undertaking a MSc in Rehabilitation.

### ■ *Sara Smith – Guideline co-ordinator, Lead Author*

Sara has been the amputee therapy team lead at Roehampton since 2008 and worked in amputee rehab since 1987. She is part of the team that co-ordinates the amputee course at Roehampton. She has been a regional rep for BACPAR and had previous experience with the guidelines as a critical appraiser and part of the Delphi process. She contributed to the Amputee Assessment and Amputee Treatment chapters of the:- Ainslie T editor. 2012. The concise guide to Physiotherapy Vol 1 Assessment and Vol 2 Treatment: Chapter 2 in each volume. Elsevier

She has presented nationally at BACPAR and ISPO conferences. She is currently working with the St Mary's University, Twickenham on a qualitative research project investigating the management of patient expectations and how this impacts on quality of life and outcome measures.

### ■ *Gemma Springate, Lead Author*

Gemma qualified as a Physiotherapist from the University of Hertfordshire in 2004, she has worked for Peterborough and Stamford Hospitals NHS Foundation Trust since 2007 and is the Operational Team Leader for the Surgery and Amputee Team. She works with lower limb amputees within the inpatient setting and has recently set up a Outreach Amputee Team comprising of Physiotherapists, Occupational Therapists and an Assistant to cover the whole hospital site.

Gemma works closely with the rehabilitation consultants and prosthetist from Addenbrookes and assists in the running of a satellite prosthetic clinic. As the link for the Outreach service Gemma ensures that evidence based practice is maintained and is currently working on updating amputee patient information within the Trust and moulding the service to ensure a seamless transition for patients between in and outpatient rehabilitation.

Gemma is hoping to undertake an MSc Qualification in Amputee Rehabilitation Pathway within the near future.

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## Appendix 1b - Working Group from 1st Edition

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(Information reprinted from 1st edition)

■ *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 GUG 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 GUG 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 GUG 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.

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## Appendix 2a - Professional Advisors to 2nd Edition

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■ **CSP**

Carley King BSc (hons) MRes MCSP

■ **BACPAR**

Louise Tisdale – Chair

Julia Earle – PRO officer

Jodie Georgiou – Journal officer

Karen Clark – Previous guideline co-ordinator

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## Appendix 2b - Advisors to first edition

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### ■ 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

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## Appendix 2c: Patient Representatives who contributed to the development of the 2nd Edition

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Mr A Bamford, Mr A Lloyd, Mr Stephen Allcott, Ms A Shaw,

Royal Bournemouth Hospital, Dorset Prosthetic centre User Group

National Rehab Hospital (Dublin) user group

Oxford prosthetic centre user group

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# Appendix 3a: Survey monkey questionnaire to clinicians

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

Dear Colleague

The GUG is seeking feedback on the current use of the above guidelines as part of the review process.

If you would like to participate please complete the questionnaire and provide the information requested and return to

**Sara Smith, Therapy team lead, Queen Mary's Hospital, Roehampton Lane, London SW15 5PN**

**Sarah.smith2@stgeorges.nhs.uk**

### QUESTIONNAIRE

Name ..... Place of work.....

Post/AfC band.....

Number of years experience working with amputees .....

Have you used the guidelines to inform your practice? Yes /No

Did the guidelines answer all the questions you had regarding the management of the lower limb amputee? Yes/No

If No, please provide details

.....

*Please rate the following sections of the guidelines*

#### **Section 1 – The role of the physiotherapist within the MDT team**

Did this help inform your practice?

Strongly disagree Disagree Neither agree/disagree Agree Strongly agree

The section was relevant and easy to use

Strongly disagree Disagree Neither agree/disagree Agree Strongly agree

In your opinion is there any aspect missing in this section – please state

.....

#### **Section 2 – Knowledge**

Did this help inform your practice?

Strongly disagree Disagree Neither agree/disagree Agree Strongly agree

The section was relevant and easy to use

Strongly disagree Disagree Neither agree/disagree Agree Strongly agree

Is there any aspect missing in this section – please state

.....

#### **Section 3 – Assessment**

Did this help inform your practice?

Strongly disagree Disagree Neither agree/disagree Agree Strongly agree

The section was relevant and easy to use

Strongly disagree Disagree Neither agree/disagree Agree Strongly agree

In your opinion is there any aspect missing in this section – please state

.....



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## Appendix 3a: Survey monkey questionnaire to clinicians

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### Section 4 – Patient and carer information

Did this help inform your practice?

Strongly disagree Disagree Neither agree/disagree Agree Strongly agree

The section was relevant and easy to use

Strongly disagree Disagree Neither agree/disagree Agree Strongly agree

In your opinion is there any aspect missing in this section – please state

.....

### Section 5 – Pre-operative management

Did this help inform your practice?

Strongly disagree Disagree Neither agree/disagree Agree Strongly agree

The section was relevant and easy to use

Strongly disagree Disagree Neither agree/disagree Agree Strongly agree

In your opinion is there any aspect missing in this section – please state

.....

### Section 6 – Post-operative management

Did this help inform your practice?

Strongly disagree Disagree Neither agree/disagree Agree Strongly agree

The section was relevant and easy to use

Strongly disagree Disagree Neither agree/disagree Agree Strongly agree

In your opinion is there any aspect missing in this section – please state

.....

Was the Quick guide a useful tool in addition to the full document?

Strongly disagree Disagree Neither agree/disagree Agree Strongly agree

Please comment

.....

Have you used the document to carry out an audit of your service?

Yes/No

If yes, when was this carried out? (Please ring all that apply)

2006 2007 2008 2009 2010 2011 2012

Any further comments?

## Appendix 3b: Comments from clinicians used to inform the production of the 2nd Edition of the guideline

Comments received re the usefulness of the existing guideline. Some comments were duplicated and have been amalgamated	
Comment received	Action taken
These are great start, but the additional guidance that BACPAR has rolled out has had much more content to inform particulars for treatment e.g. falls management/care of contralateral foot	These additional guidelines will be referenced within the updated guideline
I have had to liaise with colleagues at the Centre for Enablement about issues with vulnerable skin and their progression of using the prosthesis on one occasion	Whilst this was a specific problem, the update group sort to review literature on wound management and progression of vulnerable areas.
Specific problems not addressed	The update group reviewed the section detailing the scope of the guideline to ensure this was clear. It will also be important in the implementation and dissemination process to be clear about the scope of the guideline
The guidelines are pre prosthetic so are only relevant to a part of the pathway. My work involves the whole amputee rehab pathway.	During the implementation and dissemination process there will be an opportunity to highlight the many guidelines BACPAR has produced to ensure the clinicians and patients are aware of these
Some of our patients are just so complex that they do not fit the guidelines! But that is not to say that the guidelines are not useful and comprehensive	As Above
Need more info on: Early walking programme criteria Pressure relief in wheelchairs Specific (expected) timeframes to discharge from hospital	The update group reviewed the evidence to see if there were any articles to help inform these problems
There are no timescales included for compression therapy or EWA. There is no mention of the use of predicted mobility level assessments or outcome measures	The update group reviewed the evidence to see if there were any articles to help inform these problems
The importance of promoting a healthy lifestyle, including information on smoking cessation and decreasing risk factors	This is outside the scope of these guidelines
Could be more detailed about the content of the physical examination and function. More details about noting relevant pathologies Use of outcome measures as a baseline assessment Need to include falls risk assessment	The update group considered the evidence for these areas. No evidence available The updated guideline will reference the BAPCAR falls guideline
Info discussing with patients the possibility of phantom limb pain and management issues	This statement was considered using the Delphi consensus process
Include timescales for compression therapy and other ways to manage oedema	The updated guideline will reference the BAPCAR oedema guideline
Could include different methods of transferring. Could include acupuncture as a treatment option for Phantom limb pain Could highlight the importance of not hopping routinely.	Beyond scope of guideline This question was considered using the Delphi consensus process Beyond the scope of guideline
Gaps have been plugged by 2012 guidelines for adults with lower limb prostheses	No action required
More specific clinical and product info obviously cannot be included in the guidelines	Scope of guideline made clear
Need more info on: Use of outcome measures Managing patients with multiple amputations Use of hopping	The update group reviewed the evidence to see if there were any articles to help inform these problems
I am hoping to do an audit in the near future	It will be important to highlight the use of the guideline in audit during the implementation and dissemination process
Audit tool a useful tool if a quick reference was needed	The update group will develop a quick reference guide for these updated guidelines in line with the updated prosthetic guideline
A very helpful guideline, referred to ++ in practice and in amputee education	No action required
The content of the guideline has been used to develop a care pathway	No action required
Service audited using department audit, but there is a plan to audit soon, just deciding whether or not to wait for the update	No action required
Due to do the audit this year	No action required
The audit tool numbers don't appear to match the numbers on the recommendations	The update group reviewed the audit tool to ensure items matched and were clear
Have used the document to develop a physiotherapy pathway. Am planning an audit of the service	No action required

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## Appendix 3c: Postal questionnaire to patients and user groups

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

Dear User/ User group

In 2006 the British Association of Chartered Physiotherapists in Amputee Rehabilitation ( BACPAR) developed a set of guidelines to help physiotherapists provide evidence based management for adult lower limb amputees following their amputation.

These guidelines are to be reviewed and updated and a GUG has been formed to do this piece of work.

The group is seeking feedback on the current use of the above guidelines as part of the review process and would like to seek user feedback regarding this.

If you as an individual or your user group would like to participate please complete the questionnaire and return to

Sara Smith  
Therapy team lead  
Queen Mary's Hospital  
Roehampton Lane  
London SW15 5PN  
Sarah.smith2@stgeorges.nhs.uk

### QUESTIONNAIRE

Name ..... User Group.....

Rehabilitation centre .....

Were you aware of the existence of the guidelines? Yes /No

If yes, did you have access to the guidelines? Yes/No

If yes, were they useful Yes/No

If No, please provide details

If you haven't seen the guidelines before today, having looked at them are they useful? Yes/No

If No, please provide details

Any further comments?

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

Dear Service user/User group

In 2006 the British Association of Chartered Physiotherapists in Amputee Rehabilitation ( BACPAR) developed a set of guidelines to help physiotherapists provide evidence based management for adult lower limb amputees following their amputation.

These guidelines are to be reviewed and updated and a guidelines update group has been formed to do this piece of work.

The group is seeking feedback on the updated guidelines as part of the review process and would like to seek user feedback regarding this.

If you as an individual or your user group would like to participate please complete the questionnaire and return to

Sara Smith  
Therapy team lead  
Queen Mary's Hospital  
Roehampton Lane  
London SW15 5PN  
Sarah.smith2@stgeorges.nhs.uk

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## Appendix 3c: Postal questionnaire to patients and user groups

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### QUESTIONNAIRE

User/User Group

Rehabilitation centre .....

Were you aware of the existence of the guidelines? Yes/No

If yes, did you have access to the guidelines? Yes/No

If yes, were they useful Yes/No

If No, please provide details

We would value your feedback on the updated guidelines:

Is the document user friendly?

If not how could it be improved?

Would a short version for users, similar to that provided for the prosthetic guidelines be a more useful document

Each of the 6 sections has implementation suggestions or good practice points at the end of them. Are these useful and clear?

Section 1

The Role of the Physio

Are the recommendations what you would expect a physiotherapists role to include?

Any comments?

Section 2

Knowledge

Would you expect your physiotherapist to have knowledge of the recommendations outlined?

Any comments?

Section 3

Assessment

Are the recommendations what you would expect should happen when an amputee is assessed for treatment?

Any comments?

Section 4

Patient and carer information

This section is large and broken into 4 sections. Does this facilitate the use of this section?

Are the recommendations for information for patient and carers comprehensive and incorporate all the areas that should be covered?

Any comments?

Section 5

Pre-op management

Pre-operative involvement by the physiotherapist is not always possible, but where it is, are these recommendations what you would expect a physiotherapist's role to include at this stage?

Any comments?

Section 6

Post-op management

Again this is a large section and broken into 10 areas. Does this help with using the document?

For each section are the recommendations clear and what you would expect?

Any comments?

Any general comments?

## Appendix 3d: Comments from patients used to inform the production of the 2nd Edition of the guideline

### Comments received from the first questionnaire sent to patients to inform the production of the updated guideline

Themes of comments received	Action taken
Some Patients were not aware of the existence of the guidelines	This is going to be an important part of the implementation and dissemination process
Those patients that were aware rarely had access to the guidelines	This is going to be an important part of the implementation and dissemination process
Some patients that were aware found some areas useful	
Some patients that were aware found them difficult to read with a lot of information and difficult to understand	The development of a quick reference guide with patient involvement will be key to the implementation and dissemination process
Needs clear glossary to enable patients to understand terminology	As above

### Comments received from the second questionnaire sent to patients to inform the production of the updated guideline

Themes of comments received	Action taken
A shortened version would be useful to encourage patients to read it	Development of a shorter patient information document
Some amputees might struggle with how user friendly it is	Develop a document that answers the pts questions directly in laymen's terms

## Appendix 4: Literature Search

### ■ AMED search

25. AMED; ("lower extremit\*" OR "lower limb\*" OR leg\* OR foot OR feet OR ankle\* OR thigh\*).ti,ab; 19194 results.
28. AMED; exp AMPUTATION/; 1668 results.
24. AMED; amput\*.ti,ab; 2081 results.
27. AMED; (physiotherap\* OR "physical therap\*" OR "exercise therap\*" OR "therapeutic exercise\*" OR "postoperative care" OR "preoperative care" OR "perioperative care" OR manag\* OR care OR rehab\*).ti,ab; 60280 results.
29. AMED; exp LEG/ OR exp ANKLE/ OR exp FOOT/ OR exp HIP/ OR exp KNEE/ OR exp THIGH/; 8981 results.
26. AMED; disarticulation.ti,ab; 99 results.
30. AMED; exp PHYSIOTHERAPISTS/; 654 results.
39. AMED; 38 [Limit to: (Languages English) and Publication Year 2006-Current]; 238 results.
33. AMED; exp PREOPERATIVE CARE/; 195 results.
34. AMED; 24 OR 26 OR 28; 2340 results.
35. AMED; 25 OR 29; 23126 results.
38. AMED; 36 AND 37; 733 results.
31. AMED; exp PHYSICAL THERAPY MODALITIES/ OR exp REHABILITATION/; 51985 results.
37. AMED; 27 OR 30 OR 31 OR 32 OR 33; 89810 results.
36. AMED; 34 AND 35; 1437 results.
32. AMED; exp POSTOPERATIVE CARE/; 1150 results.

### ■ CINAHL search

1. CINAHL; exp AMPUTATION/; 3546 results.
2. CINAHL; exp ABOVE-KNEE AMPUTATION/ OR exp BELOW-KNEE AMPUTATION/ OR exp AMPUTATION, TRAUMATIC/ OR exp AMPUTATION STUMPS/; 1233 results.
3. CINAHL; exp AMPUTEES/; 1276 results.
4. CINAHL; amput\*.ti,ab; 4577 results.
5. CINAHL; 1 OR 2 OR 3 OR 4; 6509 results.
6. CINAHL; exp LOWER EXTREMITY/ OR exp FOOT/ OR exp HIP/ OR exp KNEE/ OR exp LEG/ OR exp THIGH/; 21648 results.
7. CINAHL; exp ANKLE/; 2572 results.
8. CINAHL; ("lower extremit\*" OR "lower limb\*" OR leg\* OR foot OR feet OR ankle\* OR knee\*).ti,ab; 83078 results.
9. CINAHL; disarticulation.ti,ab; 110 results.
10. CINAHL; 5 OR 9; 6536 results.
11. CINAHL; exp THERAPEUTIC EXERCISE/; 24691 results.
12. CINAHL; exp PHYSICAL THERAPY/; 61116 results.
13. CINAHL; exp REHABILITATION/; 127967 results.
14. CINAHL; exp POSTOPERATIVE CARE/ OR exp PERIOPERATIVE CARE/; 23222 results.
15. CINAHL; exp PREOPERATIVE CARE/; 9580 results.
16. CINAHL; ("physical therap\*" OR physiotherap\* OR "postoperative care" OR "preoperative care" OR "perioperative care" OR rehab\* OR manag\* OR care).ti,ab; 504541 results.
17. CINAHL; ((therapeutic exercise\*) OR (exercise therap\*)).ti,ab; 5447 results.
18. CINAHL; 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17; 604305 results.
19. CINAHL; 6 OR 7 OR 8; 91747 results.
20. CINAHL; 10 AND 19; 3120 results.
21. CINAHL; 18 AND 20; 1493 results.
22. CINAHL; 21 [Limit to: Publication Year 2006-2012 and (Language English) and (Age Groups All Adult)]; 347 results.

### ■ Cochrane Library Search

#### Search History

Date Run: 06/11/12 10:58:54.607

ID Search	Hits
#1 MeSH descriptor: [Amputation] explode all trees	297
#2 physical therap* or physiotherap* or exercise therap* or rehab*	53623
#3 MeSH descriptor: [Physical Therapy Modalities] explode all trees	12684
#4 #2 or #3	57385
#5 #1 and #4	78

### Embase search

5. EMBASE; ("lower extremit\*" OR "lower limb\*" OR leg\* OR foot OR feet OR ankle\* OR thigh\*).ti,ab; 407855 results.
21. EMBASE; 11 AND 20; 7360 results.
22. EMBASE; 21 [Limit to: English Language and Publication Year 2006-Current and (Human Age Groups Adult 18 to 64 years)]; 1196 results.
23. EMBASE; 22 [Limit to: English Language and Publication Year 2007-Current and (Human Age Groups Adult 18 to 64 years)]; 1037 results.
1. EMBASE; amput\*.ti,ab; 33227 results.
13. EMBASE; exp KINESIOTHERAPY/; 41514 results.
7. EMBASE; 3 OR 5; 473931 results.



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## Appendix 4: Literature Search

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8. EMBASE; 6 AND 7; 17280 results.
12. EMBASE; exp PHYSIOTHERAPY/; 47000 results.
17. EMBASE; exp PERIOPERATIVE PERIOD/; 23309 results.
18. EMBASE; 12 OR 13 OR 14 OR 15 OR 16 OR 17; 364449 results.
19. EMBASE; (physiotherap\* OR "physical therap\*" OR "exercise therap\*" OR "therapeutic exercise\*" OR "postoperative care" OR "preoperative care" OR "perioperative care" OR manag\* OR care OR rehab\*).ti,ab; 1812716 results.
9. EMBASE; disarticulation.ti,ab; 826 results.
3. EMBASE; exp LEG/ OR exp ANKLE/ OR exp FOOT [+NT]/ OR exp KNEE/ OR exp LOWER LEG/ OR exp THIGH/; 140060 results.
10. EMBASE; 7 AND 9; 299 results.
2. EMBASE; exp ABOVE KNEE AMPUTATION/ OR exp AMPUTATION STUMP/ OR exp BELOW KNEE AMPUTATION/ OR exp FOOT AMPUTATION/ OR exp KNEE AMPUTATION/ OR exp LEG AMPUTATION/ OR exp LIMB AMPUTATION/ OR exp TRAUMATIC AMPUTATION/; 14655 results.
14. EMBASE; exp REHABILITATION/; 191481 results.
11. EMBASE; 2 OR 8 OR 10; 25069 results.
20. EMBASE; 18 OR 19; 2048173 results.
16. EMBASE; exp PREOPERATIVE CARE/; 33262 results.
15. EMBASE; exp POSTOPERATIVE CARE/; 61739 results.
4. EMBASE; exp AMPUTATION/; 29745 results.
6. EMBASE; 1 OR 4; 43939 results.

### ■ Medline Search

23. MEDLINE; amput\*.ti,ab; 29834 results.
25. MEDLINE; ("physical therap\*" OR physiotherap\* OR "postoperative care" OR "preoperative care" OR "perioperative care" OR rehab\* OR manag\* OR care).ti,ab; 1469934 results.
26. MEDLINE; ((therapeutic exercise\*) OR (exercise therap\*)).ti,ab; 22142 results.
24. MEDLINE; ("lower extremit\*" OR "lower limb\*" OR leg\* OR foot OR feet OR ankle\* OR knee\*).ti,ab; 394872 results.
27. MEDLINE; exp AMPUTATION/ OR exp AMPUTATION STUMPS/ OR exp AMPUTATION, TRAUMATIC/; 21300 results.
28. MEDLINE; exp AMPUTEES/; 2052 results.
29. MEDLINE; disarticulation.ti,ab; 824 results.
30. MEDLINE; exp LOWER EXTREMITY/ OR exp FOOT/ OR exp HIP/ OR exp KNEE/ OR exp LEG/ OR exp THIGH/; 122715 results.
32. MEDLINE; exp ANKLE/; 6447 results.
33. MEDLINE; 24 OR 30 OR 32; 456523 results.
36. MEDLINE; exp EXERCISE THERAPY/; 26757 results.
37. MEDLINE; exp REHABILITATION/; 142035 results.
38. MEDLINE; exp PHYSICAL THERAPY MODALITIES/; 115456 results.
40. MEDLINE; exp MUSCULOSKELETAL MANIPULATIONS/; 11503 results.
41. MEDLINE; exp POSTOPERATIVE CARE/; 50343 results.
42. MEDLINE; exp PREOPERATIVE CARE/; 55982 results.
43. MEDLINE; 25 OR 26 OR 36 OR 37 OR 38 OR 40 OR 41 OR 42; 1705047 results.
44. MEDLINE; 23 OR 27 OR 28 OR 29; 38870 results.
45. MEDLINE; 33 AND 44; 17799 results.
46. MEDLINE; 43 AND 45; 5155 results.
47. MEDLINE; 46 [Limit to: English Language and Publication Year 2006-Current and (Age Groups All Adult 19 plus years)]; 957 results.

For Pedro and Trip databases the following keywords were used for the search "amputation" and "lower limb amputation rehabilitation" respectively.

All results were then put through refworks - a reference management programme, and this then de-duplicated the searches - this resulted in 1500 results

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## Appendix 5: Example of CASP tool

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There are seven different appraisal tools available on the website; which one is selected depends upon the methodology utilised within the appraised piece of literature. Below is an example of the tool that was utilised by the Literature Reviewers for new literature identified which applied cohort study methodology.

These tools can be accessed via [www.caspinternational.org](http://www.caspinternational.org).

CASP tool example: Appraising cohort studies.

Critical Appraisal Skills Programme: making sense of evidence

12 questions to help you make sense of a cohort study

General comments

- Three broad issues need to be considered when appraising a cohort study.

Are the results of the study valid?

What are the results?

Will the results help locally?

The 12 questions on the following pages are designed to help you think about these issues systematically.

- The first two questions are screening questions and can be answered quickly. If the answer to those two is “yes”, it is worth proceeding with the remaining questions.
- There is a fair degree of overlap between several of the questions.
- You are asked to record a “yes”, “no” or “can’t tell” to most of the questions.
- A number of italicised hints are given after each question.

These are designed to remind you why the question is important.

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## Appendix 6: Literature appraisers

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Heidi Baker

Karen Clark

Fiona Gillow

Amanda Hancock

Amy Jones

Clare Moloney

Lauren Newcombe

Claire Norman

Heather Pursey

Tim Randall

Anna Rose

Carla Shaw

Hannah Slack

Sara Smith

Gemma Springate

Sarah Verity

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Treating the diabetic patient with leg and foot pain. (2008) <i>The Journal of Family Practice</i> , 57(5), pp.54-57.	Case study	Study used to highlight issues of wider cohort. Supports BACPAR guidelines on risks to the contralateral foot of unilateral amputees.	No findings relevant to these guidelines, but support contralateral foot care guidelines.
Abbas, Z.G., Lutale, J. and Archibald, L.K., 2009. A comparative study of outcomes of patients with diabetic foot lesions managed with an off-loading device. <i>Diabetes</i> , 58(i)	Unable to determine as unable to obtain full text article		Unable to access
Abeyasinghe, N.L., de Zoysa, P., Bandara, K.M., Bartholameuz, N.A. and Bandara, J.M., 2012. The prevalence of symptoms of Post-Traumatic Stress Disorder among soldiers with amputation of a limb or spinal injury: a report from a rehabilitation centre in Sri Lanka. <i>Psychology, Health &amp; Medicine</i> , 17(3), pp.376-381.	Observational cohort	Poor design. No intervention to consider.	No findings relevant to these guidelines.
Abolfotouh, M.A., Alfaif, S.A. and Al-Gannas, A.S., 2011. Risk factors of diabetic foot in central Saudi Arabia. <i>Saudi Medical Journal</i> , 32(7), pp.708-713.	Case control study	Study designed well and findings concur with NICE guidelines.	No findings relevant to these guidelines, but support contralateral foot care guidelines.
Abou-Zamzam, A.M.Jr., Gomez, N.R., Molkara, A., Banta, J.E., Teruya, T.H., Killeen, J.D. and Bianchi, C., 2007. A prospective analysis of critical limb ischemia: factors leading to major primary amputation versus revascularization. <i>Annals of Vascular Surgery</i> , 21(4), pp.458-463.	Prospective cohort study	Concentrates on early surgical referral and management of pts with critical limb ischaemia.	No findings relevant to these guidelines, but support contralateral foot care guidelines.
Adam, D.J., Raptis, S. and Fitridge, R.A., 2006. Trends in the presentation and surgical management of the acute diabetic foot. <i>European Journal of Vascular &amp; Endovascular Surgery</i> , 31(2), pp.151-156.	Prospective cohort study	Provides a clear protocol for foot management.	No findings relevant to these guidelines, but support contralateral foot care guidelines.
Aikenhead, K. and Cleary, K.K., 2009. Physical therapy management of a patient following external hemipelvectomy due to recurrent local chondrosarcoma. <i>Acute Care Perspectives</i> , 18(2), pp.1-7.	Case Report	No specific physiotherapy interventions identified.	Does not add to the body of evidence.

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Akula, M., Gella, S., Shaw, C.J., McShane, P. and Mohsen, A.M., 2011. A meta-analysis of amputation versus limb salvage in mangled lower limb injuries - the patient perspective. <i>Injury</i> , 42(11), pp.1194-1197.	Meta-analysis of observational studies	Analysis concentrates on the outcomes of either type of intervention from the patients perspective. Good breadth of outcome measures identified to measure quality of life.	No findings relevant to these guidelines.
Alsancak, S., Kenan, S. and Altinkaynak, H., 2011. <i>Effect of elastic bandaging and prosthesis on the decrease in stump volume. Acta Orthopaedica et Traumatologica Turcica</i> , 45(1), pp.14-22.	Cohort study	Poor methodology for measurement. No additional evidence with regards timings of use for the different methods of oedema control.	No findings relevant to these guidelines.
Alvarsson, A., Sandgren, B., Wendel, C., Alvarsson, M. and Brismar, K., 2012. <i>A retrospective analysis of amputation rates in diabetic patients: can lower extremity amputations be further prevented? Cardiovascular Diabetology</i> , 11(18), pp.1475-2840.	Cohort	Looks at co-morbidities and outcomes, not treatments.	No findings relevant to these guidelines.
Al-Wahbi, A.M., 2010. Impact of a diabetic foot care education program on lower limb amputation rate. <i>Vascular Health and Risk Management</i> , 6(1), pp.923-934.	Pilot study	Highlights importance of education to prevent amputation.	No findings relevant to these guidelines, but support contralateral foot care guidelines.
Aragon-Sanchez, J., Maynar-Moliner, M., Pulido-Duque, J.M., Rabellino, M., Gonzalez, G. and Zander, T., 2011. The role of a specialized approach for patients with diabetes, critical ischaemia and foot ulcers not previously considered for proactive management. <i>Diabetic Medicine</i> , 28(10), pp.1249-1252.	Retrospective cohort study	No control group, small numbers – proactive revascularisation to try and prevent amputation.	No findings relevant to these guidelines.
Archer, K.R., Castillo, R.C., Mackenzie, E.J. and Bosse, M.J., 2010. Perceived Need and unmet need for vocational, mental health, and other support services after severe lower-extremity trauma. <i>Archives of Physical Medicine and Rehabilitation</i> , 91(5), pp.774-780.	Observational study	Study focuses on need for MH support/monitoring for patients.	Not within scope of guidelines.
Armstrong, D.G. and Andros, G., 2012. Use of negative pressure wound therapy to help facilitate limb preservation. <i>International Wound Journal</i> , 9, pp.1-7.	Review article/case studies	Observation of options for wound treatment.	No findings relevant to these guidelines.

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Asano, M., Rushton, P., Miller, W.C. and Deathe, B.A., 2008. Predictors of quality of life among individuals who have a lower limb amputation. <i>Prosthetics &amp; Orthotics International</i> , 32(2), pp.231-43.	Observational cohort		No findings relevant to these guidelines.
Atherton, R. and Robertson, N., 2006. Psychological adjustment to lower limb amputation amongst prosthesis users. <i>Disability and Rehabilitation</i> , 28(19), pp.1201-1209.	Cross sectional survey		No findings relevant to these guidelines.
Atkinson, G.J., Lee, M.Y. and Mehta, M.K., 2010. Heterotopic ossification in the residual lower limb in an adult non-traumatic amputee patient. <i>American Journal of Physical Medicine and Rehabilitation</i> , 89(3), pp.245-248.	Case Report	Case report demonstrated that heterotopic ossification can occur in non-traumatic amputees and in this case appeared to be a cause of residual limb pain and consequent functional decline.	No findings relevant to these guidelines.
Baril, D.T., Goodney, P.P., Robinson, W.P., Nolan, B.W., Stone, D.H., Li, Y., Cronenwett, J.L. and Schanzer, A., 2012. Prior contralateral amputation predicts worse outcomes for lower extremity bypasses performed in the intact limb. <i>Journal of Vascular Surgery</i> , 56(2), pp.353-360.	Cohort study	Article mentions therapy, but no indications as to particular interventions and their impact or outcome.	No findings relevant to these guidelines.
Bates, B.E., Kwong, P.L., Kurichi, J.E., Bidelsbach, D.E., Reker, D.M., Maislin, G., Xie, D., and Stineman, M., 2009. Factors influencing decisions to admit patients to veterans affairs specialized rehabilitation units after lower limb extremity amputation. <i>Archives of Physical Medicine and Rehabilitation</i> , 90(12), pp.2012-2018.	Cohort	Patients with most and least severe disabilities were less likely to be admitted to the specialist rehabilitation unit, patients with FIM scores 26-65 were most likely to be accepted. Inverted U for admission rates highlighted in results.	Only applies to veterans not the wider amputee population, not directly relevant to these guidelines.
Bates, B.E., Kurichi, J.E., Marshall, C.R., Reker, D., Maislin, G. and Stineman, M.G., 2007. Does the presence of a specialized rehabilitation unit in a veterans affairs facility impact referral for rehabilitative care after a lower extremity amputation? <i>Archives of Physical Medicine and Rehabilitation</i> 88(10), pp.1249-1255.	Cohort	Showed that veterans were as likely to be referred to a specialist rehabilitation centre regardless of their location. However did highlight that a patient was more likely to be admitted if there was one on site.	Only applies to veterans not the wider amputee population, not directly relevant to these guidelines
Becotte, A., Lapie, V., Martin, R. and Gagnon, V., 2012. Preoperative continuous sciatic nerve block for perioperative analgesia and for phantom limb prevention. <i>Journal of Clinical Anesthesia</i> , 24(3), pp.256-257.	Prospective Study	Flawed methodology with a small sample size. High mortality during follow up leading to a very small number of results. Results not depicted in a thorough, clear format. Follow up period not consistent.	Study not robust enough for inclusion and not directly relevant to guidelines.

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Behr, J., Friedly, J., Molton, I., Morgenroth, D., Jensen, M.P. and Smith, D.G., 2009. Pain and pain-related interference in adults with lower-limb amputation: Comparison of knee-disarticulation, transtibial and transfemoral surgical sites. <i>Journal of Rehabilitation Research and Development</i> , 46(7), pp.963-973.	Cross Sectional Survey	Established that knee-disarticulation wore a prosthesis less than transtibial amputees $p < 0.05$ . Transfemoral amputees wore a prosthesis more than knee-disarticulation amputees.	Not relevant for pre and post op guidelines. Looks at prosthesis use.
Bendermacher, B.L., Willigendael, E.M., Nicolai, S.P., Kruidenier, L.M., Welten, R.J., Hendriks, E., Prins, M.H., Teijink, J.A.W. and De, R.A., 2007. Supervised exercise therapy for intermittent claudication in a community based setting is as effective as clinic-based. <i>Journal of Vascular Surgery</i> , 45(6), pp.1192-1196.	Cohort	Looks at whether exercise can cause an improvement in distance mobilised prior to onset of intermittent claudication.	Not relevant for pre and post op guidelines. Would recommend this is included in prosthetic guidelines.
Bentley, J. and Foster, A., 2008. Management of diabetic foot ulcer: exercising control. <i>British Journal of Community Nursing</i> , 13(3)sup1, pp.S16-S25.	Review	Review of pertinent papers associated with diabetic foot ulcers, a high emphasis is placed on a multi-disciplinary approach to prevention alongside patient self-management.	No findings relevant to these guidelines.
Björkman, B., Arner, S., Lund, I. and Hyden, L.C., 2010. Adult limb and breast amputees' experience and descriptions of phantom phenomena - a qualitative study. <i>Scandinavian Journal of Pain</i> , 1(1), pp.43-49.	Prospective Qualitative Study	Article discusses patients with mastectomies and upper limb amputations, unable to determine how many lower limb amputees were included within the study.	No findings relevant to these guidelines.
Blake, D.J., Brielmaier, S.M., Czerniecki, J., Henson, H.K., Kent, M.J., Mcdowell, M.L., Nelson, L., Pike, A., Poorman, C.E., Roper, J.F., Jr, Saliman, S., Sigford, B.J., Velez, D.J., Weber, M., Benedetti, G.E., Coniglio, L.A., Ferguson, J., Helmers, S.W., Menetrez, J.S., Miller, J., Papazis, J.A., Pasquina, P.F. and Wilson, R.J. 2007. <i>Va/Dod Clinical Practice Guideline for Rehabilitation of Lower Limb Amputation. (1)</i> . USA:Healthcare Quality Informatics, Inc.	Clinical Practice Guidelines	Premise is agreed but doesn't fit with the direct guidelines, poorly written scientific paper, not directly applicable to UK health and service delivery.	No findings relevant to these guidelines.
Blom, R.M., Hennekam, R.C. and Denys, D., 2012. Body integrity identity disorder. <i>PLoS One</i> , 7(4), pp.1-6.	Qualitative Study	Patients recruited to the study via online forum with no formal diagnosis therefore information collected likely to be invalid.	No findings relevant to these guidelines.

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Blume, P.A., Walters, J., Payne, W., Ayala, J. and Lantis, J., 2008. Comparison of negative pressure wound therapy using a vacuum-assisted closure with advanced moist wound therapy in the treatment of diabetic foot ulcers: a multicentre randomized controlled trial. <i>Diabetes Care</i> , 31(4), pp.631-636	Randomised Control Trial	Looks specifically at vacuum therapy and is not relevant to these guidelines.	No findings relevant to these guidelines.
Bollero, D., Carnino, R., Risso, D., Gangemi, E.N. and Stella, M., 2007. Acute complex traumas of the lower limbs: a modern reconstructive approach with negative pressure therapy. <i>Wound Repair and Regeneration</i> , 15(4), pp.589-594.	Cohort	Although 8 lower limb amputees were included within the study results of the outcomes for them following the vacuum therapy are not clear. Discussion indicates that if complexity of trauma prevents wound closure then vacuum therapy may assist in the healing process.	No findings relevant to these guidelines.
Boonhong, J., 2006. Correlation between volumes and circumferences of residual limb in below knee amputees. <i>Journal of the Medical Association of Thailand</i> , 89(3), pp.S1-S4.			Unable to access
Borghi, B., D'Addabbo, M., White, P.F., Gallerani, P., Toccaceli, L., Raffaelli, W., Tognu, A., Fabbri, N. and Mercuri, M., 2010. The use of prolonged peripheral neural blockade after lower extremity amputation: the effect on symptoms associated with Phantom Limb Syndrome. <i>Anesthesia and Analgesia</i> , 111(5), pp.1308-1315.	Randomised prospective study	Design changed to a observational study with poor methodology.	No findings relevant to these guidelines.
Bosmans, J.C., Suurmeijer, T.P., Hulsink, M., Van, C.P., Geertzen, J.H. and Dijkstra, P.U., 2007. Amputation, phantom pain and subjective wellbeing: a qualitative study. <i>International Journal of Rehabilitation Research</i> , 30(1), pp.1-8.	Qualitative Study	Looked at areas of social interactions and the impact that pain and amputation had on this, ethical issues do not appear to have been addressed. Concluded that the greatest influence of subjective wellbeing occurred when more than one factor was involved. Nearly all patients stated that completing activities distracted their attention away from pain.	Not robust enough for these guidelines.
Bosmans, J.C., Geertzen, J.H., Post, W.J., Van, C.P. and Dijkstra, P.U., 2010. Factors associated with phantom limb pain: a 3 and ½ year prospective study. <i>Clinical Rehabilitation</i> , 24(5), pp.444-453.	Prospective Qualitative Study	More women than men experience phantom pain and this is increased in upper limb amputees, phantom pain decreases over time. Questionnaires used had not been tested for reliability and validity. Follow up time was not consistent for each patient	Not within the remit of these guidelines contains upper limb amputees.
Bourke, H.E., Yelden, K.C., Robinson, K.P., Sooriakumaran, S. and Ward, D.A., 2011. Is revision surgery following lower limb amputation a worthwhile procedure? A retrospective review of 71 cases. <i>Injury</i> , 42(7), pp.660-666.	Cohort	Looks at rehab following revision surgery and the outcomes following this, looks at prosthetic use and socket comfort.	Not within the remit of these guidelines includes prosthetic users.



## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Boutoille, D., Feraille, A., Maulaz, D. and Krempf, M., 2008. Quality of life with diabetes-associated foot complications: Comparison between lower-limb amputation and chronic foot ulceration. <i>Foot and Ankle International</i> , 29(11), pp.1074-1078.			Unable to access
Bradley, L. and Kirker, S.G., 2006. Secondary prevention of arteriosclerosis in lower limb vascular amputees: a missed opportunity. <i>European Journal of Vascular &amp; Endovascular Surgery</i> , 32(5), pp.491-493.	Retrospective, Cross-sectional Study	Looks at medication and prescription.	Not applicable to the scope of these guidelines.
Brewer, P., Riddell, Z., Grimer, R.J. and Jeys, L., 2012. Perioperative mortality following above-knee amputations indicated for bone and soft tissue tumours. <i>European Journal of Surgical Oncology</i> , 38(8), pp.706-710.	Cohort	Recommendations for article state that routine thrombo-prophylaxis should be used for patients over 60 or with other risk factors.	Not applicable to the scope of these guidelines.
Brown, C.A. and Lido, C., 2008. Reflexology treatment for patients with lower limb amputations and phantom limb pain-an exploratory pilot study. <i>Complementary Therapies in Clinical Practice</i> , 14(2), pp.124-131.	Pilot Study	Looks at reflexology as a treatment for phantom limb sensation and pain but looks at patients 6 months post amputation.	Not applicable to the scope of these guidelines.
Brunelli, S., Averna, T., Porcaccia, P., Paolucci, S., Di, F. and Trallesi, M., 2006. Functional status and factors influencing the rehabilitation outcome of people affected by above-knee amputation and hemi-paresis. <i>Archives of Physical Medicine &amp; Rehabilitation</i> , 87(7), pp.995-1000.	Retrospective Review	Useful for the prosthetic guidelines. As looked at rehabilitation following dual disability or above-knee amputees with hemi-paresis.	Not applicable to the scope of these guidelines included prosthetic use.
Buijck, B.I., Zuidema, S.U., Van, M.S., Gerritsen, D.L., Koopmans, R.T. and Van, H., Linde, 2012. Determinants of quality of life in older adults after lower limb amputation and rehabilitation in skilled nursing facilities. <i>Journal Of The American Geriatrics Society</i> , 60(4), pp.796-798.	Cohort	Looks at prosthetic use and the impact of the ability to mobilise on quality of life	Not applicable to the scope of these guidelines.
Burger, H. and Marincek, C., 2007. Return to work after lower limb amputation. <i>Disability &amp; Rehabilitation</i> , 29(17), pp.1323-1329.	Systematic Review	Looks at Lower limb amputation and return to work.	Not applicable to the scope of these guidelines. Would be beneficial to be included in prosthetic guidelines.

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Busse, J.W., Jacobs, C.L., Swiontkowski, M.F., Bosse, M.J. and Bhandari, M., 2007. Complex limb salvage or early amputation for severe lower-limb injury: <i>A meta-analysis of observational studies. Journal of Orthopaedic Trauma, 21(1), pp.70-76.</i>	Systematic Review of Observational Studies	Looks at outcomes only not treatments. Limited study design by using observational trials.	No findings relevant to these guidelines.
Canadian Agency for Drugs and Technologies in Health. 2012. Removable Rigid Dressings for Leg Amputation: A Review of the Clinical Effectiveness, Cost Effectiveness and Guidelines. <i>Canada: Canadian Agency for Drugs and Technologies in Health.</i>	Systematic Review	Only one article reviewed.	No findings relevant to these guidelines.
Carr, J.S., Morse, B.C., Vercruyse, G.A., Wyrzykowski, A.D., Moore, T.J. and Feliciano, D.V., 2012. Traumatic hemipelvectomy: A survivor of a catastrophic injury. <i>American Surgeon, 78(6), pp.E237-E239.</i>	Case Report	Does not look at physiotherapy management within the case. Mechanism of injury is high energy.	Does not add anything to these guidelines.
Casale, R., Damiani, C. and Rosati, V., 2009. Mirror therapy in the rehabilitation of lower-limb amputation: Are there any contraindications? <i>American Journal of Physical Medicine and Rehabilitation, 88(10), pp.837-842.</i>	Cohort	Side effects appear to be caused by mirror box therapy. Only four patients completed the trial, patients withdrew rapidly from the trial, large number of side effects reported. Limited selection criteria for patients, mirror box therapy ran alongside the conventional method of prosthetic rehabilitation. Recommend that patients should be selected on their psychological as well as physical profile. Small study, unable to determine length of time to follow up.	Not applicable to the scope of these guidelines. Contains prosthetic rehabilitation.
Chen, H.F., Ho, C.A. and Li, C.Y., 2006. Age and sex may significantly interact with diabetes on the risks of lower-extremity amputation and peripheral revascularization procedures: evidence from a cohort of a half-million diabetic patients. <i>Diabetes Care, 29(11), pp.2409-2414.</i>	Prospective Study	Sample taken from insurance claims, unable to establish if claims are a true reflection of disease. Six year follow up period. Concluded that in Taiwan important to provide multidisciplinary foot care especially to young and female patients including revascularisation for high risk diabetic patients	Not applicable to the scope of these guidelines.
Coffey, L., Gallagher, P., Horgan, O., Desmond, D. and MacLachlan, M., 2009. Psychological adjustment to diabetes related lower limb amputation. <i>Diabetic Medicine, 26(10), pp.1063-1067.</i>	Retrospective Qualitative	Compared HADS to non-amputees. They make suggestions of how clinicians should use an anxiety & depression assessment e.g. HADS with this patient group. Can't tell if relationship between researcher and participants has been considered.	Not applicable to the scope of these guidelines. Contains prosthetic rehabilitation.

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Coulston, J.E., Tuff, V., Twine, C.P., Chester, J.F., Evers, P.S. and Stewart, A.H.R., 2012. Surgical factors in the prevention of infection following major lower limb amputation. <i>European Journal of Vascular And Endovascular Surgery</i> , 43(5), pp.556-560.	Cohort	Skin clips and drains increase infection rates. Significantly higher infection rates in below knee amputees compared to above knee amputees.	Not applicable to the scope of these guidelines.
Couture, M., Caron, C.D. and Desrosiers, J., 2010. Leisure activities following a lower limb amputation. <i>Disability &amp; Rehabilitation</i> , 32(1), pp.57-65.	Mixed Qualitative and Quantitative Study.	Not within the scope of these guidelines	Not within the scope of these guidelines
Couture, M., Desrosiers, J. and Caron, C.D., 2011. Cognitive appraisal and perceived benefits of dysvascular lower limb amputation: A longitudinal study. <i>Archives of Gerontology and Geriatrics</i> , 52(1), pp.5-11.	Longitudinal Cohort Study Qualitative and Quantitative.	N=16, TT, TF DM, Heart disease, neuropathy and retinopathy, assessed hospitalisation, rehab and post discharge Excl: bilat, TM, mod or severe cognitive or hosp tf, 4 pts refused, 1 died, 1 subs amp, =16 Recruited from one hospital. Quan and qual data Age, gender, schooling, marital, level, side, cause and co-morb, numeric pain rating scale (ax at all 3 stages. 'would you say this event (the amputation) has had a positive or negative effect on your life?' - assigned +ve or -ve. Recorded, transcribed interview and analysed. Functional independence measure, LCI, Beck depression inventory and body image questionnaire 69% patients give a +ve appraisal P=0.06 TT more positive vs TF DM p=0.03 more negative +ve p=0.08 greater functional independence Lower depression p=0.10 and improved body image p=0.08 (post discharge P=0.05) Detailed qualitative examples to back up stats	No findings relevant to these guidelines.
Cox, P.S., Williams, S.K. and Weaver, S.R., 2011. Life after lower extremity amputation in diabetics. <i>The West Indian Medical Journal</i> , 60(5), pp.536-540.	Qualitative	To determine QOL and functional independence of lower limb, diabetic amputees 1 – 3 yrs post amp. 87 pts from 1 hospital in Jamaica. Pts who received rehab at that hospital between 2006– 09, age range 40 – 90. TTAs and TFAs secondary to amputation. 35 females, 52 males. 64 TTAs (32 men and 32 females), 23 TFAs (3 men and 20 females). Used WHO - QOL - BREF and FIM. TTAs had sig better QOL (p<0.05) and functional indep scores (p<0.0001) Females had sig better QOL and func indep p<0.0001 Despite the study involving patients 1 – 3 yrs post amputation, the main other references relating to diabetes and amputation QOL and func independence are very old (23 and 15 yrs old), so I think we should try to include this. ? transferable to UK population.	Not suitable for the population or scope of these guidelines.

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Darnall, B.D., 2009. Self-delivered home-based mirror therapy for lower limb phantom pain. <i>American Journal of Physical Medicine &amp; Rehabilitation/Association of Academic Physiatrists</i> , 88(1), pp.78-81.	Case Report - Qualitative	No clear statement of aims, no standardisation of methodology or explanation of why only 1 case study, not more pts, no attempt to standardise procedure and no clear record of how the intervention was carried out. Doesn't consider existing evidence of Phantom pain management.	Does not contribute to current body of knowledge.
Daveport, D.L., Ritchie, J.D. and Xenos, E.S., 2012. Incidence and risk factors for 30-day post discharge mortality in patients with vascular disease undergoing major lower extremity amputation. <i>Annals of Vascular Surgery</i> , 26(2), pp.219-224.	Cohort	They did not look at the cause of death. Reduced LOS over the 5 yr study period time has not altered the rate of post discharge death rate, which is supported by another study (Baker DW, Einstadter D et al 2004). They found in hospital mortality to be inadequate as a performance measure and quality improvement. Good confidence intervals. Lacked cause of death information	No relevant findings for these guidelines.
Davidson, J.H., Khor, K.E. and Jones, L.E., 2010. A cross-sectional study of post-amputation pain in upper and lower limb amputees, experience of a tertiary referral amputee clinic. <i>Disability &amp; Rehabilitation</i> , 32(22), pp.1855-1863.	Qualitative	Not within the remit of these guidelines, 1 of the 2 hypotheses was to look at upper limbs' pain post op.the 2nd hypoth is looking at UL an LL's pre vs post op pain	Heavy UL involvement
De, V.G., Bolt, A., Geertzen, J.H., Emmelot, C.H., Baars, E.C. and Dijkstra, P.U., 2011. Variation in results of volume measurements of stumps of lower limb amputees: a comparison of 4 methods. <i>Archives of Physical Medicine and Rehabilitation</i> , 92(6), pp.941-946.	Diagnostic test study	Looked at 4 methods to measure stump volume	Pts were at least 1 yr post amputation. Not in the remit of these guidelines
Dillingham, T.R. and Pezzin, L.E., 2008. Rehabilitation Setting and Associated Mortality and Medical Stability Among Persons With Amputations. <i>Archives of Physical Medicine and Rehabilitation</i> , 89(6), pp.1038-1045.	Cohort	N = 2468 elderly dysvasc amps in US. Looked at discharge destination and 12/12 outcomes: mortality, receipt of prosthesis, possibility of re amp, No of re amps and No of subsequent hospital admissions. Exclusions: amputations due to Ca, trauma, toe amps or UL amps, pts transferred to hospice or another acute setting. Inclusion: Foot, TTA or TFA amps. Results: with any of the 3 levels of amputation level included, they have sig better mortality, prosthetic acquisition and medical stability if they go into inpatient rehab then if they go to a SNF (specialist nursing facility) and worst results if they go home. Other literature supports this. p<0.001 for mortality, getting a prosthesis, fewer additional amps if go to inpt rehab. We don't know what their admission criteria are for the inpatient rehab units. Do we have comparable SNFs? Do we have comparable data for 1yr post amp mortality rates in UK?	Not robust enough methodology

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Dionne, C.P., Ertl, W.J. and Day, J.D., 2009. Rehabilitation for those with transtibial osteomyoplastic amputation. <i>Journal of Prosthetics and Orthotics</i> , 21(1), pp.64-70.	Qualitative	Rehab. Post a certain type of amputation surgical procedure.	No clear statement of aims and very poor methodology. Doesn't fit into any of the guideline categories.
Dudek, N.L., Marks, M.B. and Marshall, S.C., 2006. Skin problems in an amputee clinic. <i>American Journal of Physical Medicine &amp; Rehabilitation</i> , 85(5), pp.424-429.	Retrospective Qualitative	Very interesting and relevant to prosthetic rehab guidelines.	Not relevant for pre and post op guidelines. Would recommend this is included in prosthetic guidelines.
Durovic, A., Ilic, D., Brdareski, Z., Plavsic, A. And Durdevic, S., 2007. Pain, functional status, social function and conditions of habitation in elderly unilaterally lower limb amputees. <i>Vojnosanitetski Pregled</i> , 64(12), pp.837-43.	Cohort	Study carried out in Serbia, non-comparable healthcare system or population.	non-comparable healthcare system or population.
Eijk, M.S., Van der Linde, H., Buijck, B.I., Zuidema, S.U. and Koopmans, R.T., 2012. Geriatric rehabilitation of lower limb amputees: a multicentre study. <i>Disability Rehabilitation</i> , 34(2), pp. 145-150	Cohort	Set in Netherlands, patients were in skilled nursing facilities (SNFs), non-comparable to UK facilities. Didn't consider all relevant co-morbidities, pain, prosthetic use and therapy intervention. Didn't discuss other available evidence. Insufficient follow-up and outcome measures not validated for amputees.	non-comparable healthcare system or population
Erjavec, T., Presern-Strukelj, M. and Burger, H., 2008. The diagnostic importance of exercise testing in developing appropriate rehabilitation programmes for patients following transfemoral amputation. <i>European Journal of Physical &amp; Rehabilitation Medicine</i> , 44(2), pp.133-139.	Diagnostic Test Study	Outside of the remit of these guidelines, but useful for the prosthetic guidelines	Not relevant for pre and post op guidelines. Would recommend this is included in prosthetic guidelines.
Gailey, R.S., 2006. Predictive outcome measures versus functional outcome measures in the lower limb amputee. <i>Journal of Prosthetics and Orthotics</i> , 18(1), pp.51-60.	Clinical Prediction Rule	Useful for the prosthetic guidelines.	Not in the remit of these guidelines
Gallagher, P., O'Donovan, M.A., Doyle, A. and Desmond, D., 2011. Environmental barriers, activity limitations and participation restrictions experienced by people with major limb amputation. <i>Prosthetics and Orthotics International</i> , 35(3), pp.278-284.	qualitative	55 % of pts used a prosthesis (LL or UL) and 43.9 % weren't specified as to whether they use a prosthesis or not.	High % of pts used a prosthesis and therefore not in the remit of these guidelines

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Giuffrida, O., Simpson, L. and Halligan, P.W., 2010. Contralateral stimulation, using TENS, of phantom limb pain: two confirmatory cases. <i>Pain Medicine</i> , 11(1), pp.133-141.		Mixture of upper limb and lower limb phantom limb pain	No findings relevant to these guidelines.
Gunawardena, N.S., Seneviratne, A. and Athauda, T., 2006. Functional outcomes of unilateral lower limb amputee soldiers in two districts of Sri Lanka. <i>Military Medicine</i> , 171(4), pp.283-287.	Retrospective Case Control - Qualitative	Comparing patients from 2 army districts of Sri Lanka, to non-amps in same 2 districts. N=922, AK and BK Surgery = 8/12 – 6 yrs before study 100 % response rate and 97.6 % response for non amps. Good inclusion and exclusion. SF36 and self assessment in changes in health status Study population significant difference for physical functioning and role limitation, vitality and social functioning. Significant lower mental health dimensions and worsening health status in amp. Group; not associated with time from amputation. Poor mental health scores correlated with employment within the army but these roles were non active roles. Less use of prosthesis was associated with less lower physical scores.	Non comparable population, not relevant to our system of healthcare
Hakimi, K.N., 2009. Pre-operative rehabilitation evaluation of the dysvascular patient prior to amputation. <i>Physical Medicine and Rehabilitation Clinics of North America</i> , 20(4), pp.677-688.		No research involved - purely descriptive	Not relevant to the guidelines
Hammarlund, C.S., Carlstrom, M., Melchior, R. and Persson, B.M., 2011. Prevalence of back pain, its effect on functional ability and health-related quality of life in lower limb amputees secondary to trauma or tumour: A comparison across three levels of amputation. <i>Prosthetics and Orthotics International</i> , 35(1), pp.97-105.	Cross Sectional Survey	Incidence of back pain.	Involves patients who were prosthetic users



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Reference	Study design	Comments	Reason for exclusion
Hamamura, S., Chin, T., Kuroda, R., Akisue, T., Iguchi, T., Kohno, H., Kitagawa, A., Tsumura, N. and Kurosaka, M., 2009. Factors affecting prosthetic rehabilitation outcomes in amputees of age 60 years and over. <i>Journal of International Medical Research</i> , 37(6), pp.1921-1927.	Cohort CASP, Observational Study	Partly retrospective but used scientific testing. Japanese n=64, 40 men, 24 women from 1 rehab. centre Unilateral TFA and hip disartics older than 60 yrs old. Measured ability to stand on 1 leg, motivation to regain mobility, %VO2 Max uptake. Failure was defined as 'patients who could NOT walk > 100 ms +/- 1 walking stick.' Excluded Steinberg factors( mental deterioration, advanced neuro disorders, CCF, advanced COPD, advanced hip flexion contractures) 44 pts were successful. Sig diff between successful and non successful group re VO2 Max p=<0.01, able to stand on 1 leg p=<0.05, motivation for walking p=<0.05, 1 or less co morbidity p=<0.01 No diff between Male and female, age, vasc Vs non vasc and level of amputation. Not stated how level of motivation was measured. Recommend to assess 1 leg standing, motivation and No of co morbidities.	Not fitting with UK standards of success criteria
Hanley, M.A., Ehde, D.M., Campbell, K.M., Osborn, B. and Smith, D.G., 2006. Self-reported treatments used for lower-limb phantom pain: descriptive findings. <i>Archives of Physical Medicine &amp; Rehabilitation</i> , 87(2), pp.270-277.		No description of what Physiotherapy was included, old data that was collected in 1997 and not published until 2006.	Poor quality evidence
Hanley, M.A., Jensen, M.P., Smith, D.G., Ehde, D.M., Edwards, W.T. and Robinson, L.R., 2007. Pre-amputation pain and acute pain predict chronic pain after lower extremity amputation. <i>Journal of Pain</i> , 8(2), pp.102-109.		Data recycled from another study- no data for POD 1-3. Sample too diverse.	Poor quality evidence.
Hanling, S.R., Wallace, S.C., Hollenbeck, K.J., Belnap, B.D. and Tulis, M.R., 2010. Pre-amputation mirror therapy may prevent development of phantom limb pain: a case series. <i>Anesthesia and Analgesia</i> , 110(2), pp.611-614.		Very limited description of methodology, no outcome measures used	Poor quality evidence
Hawamdeh, Z.M., Othman, Y.S. and Ibrahim, A.I., 2008. Assessment of anxiety and depression after lower limb amputation in Jordanian patients. <i>Neuropsychiatric Disease and Treatment</i> , 4(3), pp.627-633.		Diverse sample (age). Descriptive study - patients not followed up longitudinally.	Poor quality evidence.
Hrnack, S., Elmore, S.P., and Brindley, G.W., 2009. Literacy and patient information in the amputee population. <i>Journal of Prosthetics and Orthotics</i> , 21(4), pp. 223-6.	Qualitative	Premise is agreed but doesn't fit with the direct guidelines, poorly written scientific paper, directly applicable to UK health and service delivery	Not relevant

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Hsiao, A.F., York, R., Hsiao, I., Hansen, E., Hays, R.D., Ives, J. and Coulter, I.D., 2012. A randomized controlled study to evaluate the efficacy of noninvasive limb cover for chronic phantom limb pain among veteran amputees. <i>Archives of Physical Medicine and Rehabilitation</i> , 93(4), pp. 617-622.		Only includes patients at least 6 weeks post-operatively	Not relevant to the guidelines
Jacobs, M.B. and Niemtzw, R.C., 2011. Treatment of phantom limb pain with laser and needle auricular acupuncture: A case report. <i>Medical Acupuncture</i> , 23(1), pp. 57-60.		Single case study treating upper limb phantom pain	Not relevant to the guidelines
Janchai, S., Boonhong, J. and Tiamprasit, J., 2008. Comparison of removable rigid dressing and elastic bandage in reducing the residual limb volume of below knee amputees. <i>Journal of the Medical Association of Thailand</i> , 91(9), pp. 1441-1446.		Small sample size n=26, does not mention size of population recruited from, follow-up frequency too long	Poor quality evidence
Jones, R.N. and Marshall, W.P. 2008. Does the proximity of an amputation, length of time between foot ulcer development and amputation, or glycemic control at the time of amputation affect the mortality rate of people with diabetes who undergo an amputation? <i>Advances in Skin &amp; Wound Care</i> , 21(3), pp. 118-23.			Not relevant to the guidelines
Kapidzic-Durakovic, S., Karabegovic, A., Halilbegovic, E., Cickusic, A., Osmanovic, N. and Kudumovic, Z., 2006. Check list of symptoms SCL-90-R at persons with extremities amputations. <i>Bosnian Journal of Basic Medical Sciences</i> , 6(1), pp. 58-61.	qualitative	No clear statement of aims. Use of the self reporting outcome measure SCL 90 R. N = 37. Data didn't address the research question. Don't know how, when or where the questionnaire was administered. No mention of consent? due to translation. No clear statement of findings. Not valid or comparable to UK civilians or veterans. Very badly translated into English	Poor Methodology
Karanikolas, M., Aretha, D., Tsolakis, I., Monantera, G., Kiekkas, P., Papadoulas, S., Swarm, R.A. and Filos, K.S., 2011. Optimized perioperative analgesia reduces chronic phantom limb pain intensity, prevalence, and frequency: a prospective, randomized, clinical trial. <i>Anesthesiology</i> , 114(5), pp. 1144-1155.			Not relevant to the guidelines
Kelly, M. and Dowling, M., 2008. Patient rehabilitation following lower limb amputation. <i>Nursing standard (Royal College of Nursing (Great Britain))</i> : 1987, 22(49), pp. 35-40.			No research involved - purely descriptive

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Reference	Study design	Comments	Reason for exclusion
Kern, U., Altkemper, B., and Kohl, M. 2006. Management of Phantom pain with a textile electromagnetically acting stump liner: A randomized double blind cross over study. <i>Journal of Pain &amp; Symptom Management</i> , 32(4), pp. 352-60	RCT	TT, TF and Bilat LL amp, varies cause (n=22) 16 males. Blinded ortho technician. Inclusion: PP greater than or = to 3 (10) on at least 10 days/month, over 18 Exclusion: path stump symptoms, stump pain alone, poor language, undergoing invasive interventions 5 drop outs Baseline and max intensity PP Experimental liner vs placebo liner, 2 week baseline period, then 2 weeks exp, then 2 weeks placebo or vice versa Signif pain reduction in median of daily max pain by both groups p<0.001, however more signif in exp liner p<0.001 Sleep not signif in either group P=0.008 exp liner on chronic PP	Not in the remit of these guidelines
Ketz, A.K., 2008. The Experience of Phantom Limb Pain in Patients With Combat-Related Traumatic Amputations. <i>Archives of Physical Medicine and Rehabilitation</i> , 89(6), pp. 1127-1132.		Unable to separate results upper limb and lower limb patients, insufficient description of interventions to allow repetition	Not relevant to the guidelines and poor quality evidence
Klomp, H.M., Steyerberg, E.W., Wittens, C.H., Van, H., Habbema, J.D. and Eses, E.S.E.S., GROUP, 2009. A prognostic model for amputation in critical lower limb ischemia. <i>Vascular Medicine</i> , 14(2), pp. 109-15.		no relevance to therapy	Not relevant to the guidelines
Klute, G.K., Kantor, C., Darrouzet, C., Wild, H., Wilkinson, S., Iveljic, S. and Creasey, G., 2009. Lower-limb amputee needs assessment using multistakeholder focus-group approach. <i>Journal of Rehabilitation Research &amp; Development</i> , 46(3), pp. 293-304.		Relates to prosthetics and prosthetic users	Not relevant to the guidelines
Kohler, F., Xu, J., Silva-Withmory, C. and Arockiam, J., 2011. Feasibility of using a checklist based on the international classification of functioning, disability and health as an outcome measure in individuals following lower limb amputation. <i>Prosthetics and orthotics international</i> , 35(3), pp. 294-301.		Pilot study, narrative contradicts results table	Poor quality evidence
Kortte, K.B., Falk, L.D., Castillo, R.C., Johnson-Greene, D. and Wegener, S.T., 2007. The Hopkins Rehabilitation Engagement Rating Scale: development and psychometric properties. <i>Archives of Physical Medicine &amp; Rehabilitation</i> , 88(7), pp. 877-84.		Only 11.6% of participants were amputees	Not relevant to the guidelines

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Reference	Study design	Comments	Reason for exclusion
Kovac, I., Medved, V., Kasovic, M., Heimer, Z., Luzar-Stiffler, V. and Pecina, M., 2010. Instrumented joint mobility analysis in traumatic transtibial amputee patients. <i>Periodicum Biologorum</i> , 112(1), pp. 25-31.		Based on gait analysis with prosthetics	Not relevant to the guidelines
Kurichi, E., Xie, D., Kwong, L., Bates, E., Vogel, W., Bruce and Stineman, G., 2011. Factors Associated with Late Specialized Rehabilitation Among Veterans with Lower Extremity Amputation Who Underwent Immediate Postoperative Rehabilitation. <i>American Journal of Physical Medicine &amp; Rehabilitation</i> , 90(5), pp. 387-399.		Focused on rehabilitation services in America	Not relevant to the guidelines
Kurichi, J.E., Stineman, M.G., Kwong, P.L., Bates, B.E. and Reker, D.M., 2007. Assessing and using comorbidity measures in elderly veterans with lower extremity amputations. <i>Gerontology</i> , 53(5), pp. 255-9.		Focused on co-morbidity prevalence	Not relevant to the guidelines
Kusljagic, A., Kapidzic-Durakovic, S., Kudmovic, Z. and Cickusic, A., 2006. Chronic low back pain in individuals with lower-limb amputation. <i>Bosnian Journal of Basic Medical Sciences</i> , 6(2), pp. 67-70.		Focused on chronic back pain	Not relevant to the guidelines
Laferrier, J., Mcfarland, L., Boninger, M., Cooper, R. and Reiber, G. (2010) Wheeled mobility: Factors influencing mobility and assistive technology in veterans and servicemembers with major traumatic limb loss from vietnam war and OIF/OEF conflicts. <i>Journal of Rehabilitation Research and Development</i> , 47(4), pp. 349-360.		Focused on prosthetics.	Not relevant to the guidelines.
Laghari, M., Makhdoom, A., Pahore, M., Raja, R. and Bhutto, I. (2011) Amputation in diabetic foot. <i>Medical Channel</i> , 17(1), pp. 60-64.		Focused on incidence of surgery.	Not relevant to the guidelines.
Latlief, G., Elnitsky, C., Hart-Hughes, S., Phillips, S., Adams-Koss, L., Kent, R. and Highsmith, M. (2012) Patient Safety in the Rehabilitation of the Adult with an Amputation. <i>Physical Medicine and Rehabilitation Clinics of North America</i> , 23(2), pp. 377-392.		Mixture of evidence review and consensus opinion.	No findings relevant to guidelines.

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Lee, J., Garcia, A., Lee, W. and Munin, M. (2011) Inpatient rehabilitation challenges in a quadrimembral amputee after bilateral hand transplantation. <i>American Journal of Physical Medicine and Rehabilitation</i> , 90(8), pp. 688-93.		Focused on rehabilitation after a hand transplant.	Not relevant to the guidelines.
Lee, M., Lin, C. and Soon, K. (2007) Balance control enhancement using sub-sensory stimulation and visual-auditory biofeedback strategies for amputee subjects. <i>Prosthetics and orthotics international</i> , 31(4), pp. 342-352.		Focused on prosthetics.	Not relevant to the guidelines.
Lefebvre. K. and Metraux S. (2009) Disparities in Level of Amputation Among Minorities: Implications for Improved Preventative Care. <i>Journal of the National Medical Association</i> , 101, pp.649 -655.	Retrospective study of hospital discharges records	Assessing whether race is an independent factor for higher risk amputation. 80845 weighted vascular amputations of black or white race studied. Attempts to control confounding factors. Found black race associated with increased risk of an above knee amputation.	No findings relevant to guidelines.
Lebfevre. K. and Chevan. J. (2011) Sex Disparities in Level of Amputation. <i>Archives of Physical Medicine and Rehabilitation</i> , 92, pp.118-24.	Retrospective secondary analysis of hospital data	Reasonable attempts to control confounding factors. Found that female sex is significantly associated with trans-femoral amputation.	No findings relevant to guidelines.
Leon Jr, L., Psalms, S. and Walters, J. (2007) Diabetic foot infections in the elderly: primary amputation versus 'foot-sparing surgery'. <i>A case report. International Wound Journal</i> , 4(4), pp. 315-21.	Case report	Based on diabetic foot infections.	Not relevant to the guidelines.
Lim, T., Finlayson, A., Thorpe, J., Sieunarine, K., Mwiapatayi, B., Brady, A., Abbas, M. and Angel, D. (2006) Outcomes of a contemporary amputation series. <i>ANZ Journal of Surgery</i> , 76(5), pp. 300-5.	Retrospective audit of hospital notes	Analysed 87 patient notes over a 2 year period from amputation to prosthetic limb wearing. Poor description of follow up. Found high level of co-morbid conditions equaled increased risk of amp. 23% of patients had contra-lateral amp. Average length of stay in acute hospital was 20 days. 45% patients selected for prosthetic use – more likely if younger and below knee amputee.	No findings relevant to guidelines.
Lipsky, B., Weigelt, J., Sun, X., Johannes, R., Derby, K. and Tabak, Y. (2011) Developing and validating a risk score for lower-extremity amputation in patients hospitalized for a diabetic foot infection. <i>Diabetes Care</i> , 34(8), pp. 1695-1700.	Retrospective cohort study of hospital records	Some factors that may have influenced risk not included but otherwise comprehensive attempt to include all. Potential selection bias. Authors have devised a risk strata to identify people at high risk of amputation.	No findings relevant to guideline.
Liu, F., Williams, R., Liu, H. and Chien, N. (2010) The lived experience of persons with lower extremity amputation. <i>Journal of Clinical Nursing</i> , 19(15-16), pp. 2152-2162.	Qualitative Phenomenological analysis.	Well –conducted qualitative study. Participants recruited who were over 45 and within two months of having a LEA. Participants recruited (22) until research saturation point reached. In depth interview completed with inter rating testing. Follow up limited to 6 months with telephone call. Study completed in Taiwan.	Difficult to apply results to Western culture.

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Low, A. and Kapur, S. (2010) Pain after amputation of the lower leg. <i>BMJ: British Medical Journal (Overseas &amp; Retired Doctors Edition)</i> , 341, pp. c4578-NaN.	Single case study used as the basis of a question/answer training pack.	Answers to questions posed are referenced but no details of how comprehensive literature search methodology was.	Methodology not robust enough to be considered as a literature review.
Machado, I., Roque, V., Pimentel, S., Rocha, A. and Duro, H. (2012) Psychosocial characterization of a Portuguese lower limb amputee population English;Portuguese] Caracterizaco psicossocial de uma populaco Portuguesa de amputados do membro inferior. <i>Acta Medica Portuguesa</i> , 25(2), pp. 77-82.	Cross sectional study.	Assessed 45 consecutive patients with lower limb amputation. Found high prevalence of depression/anxiety.	Only abstract in English so unable to fully assess reliability and validity of the paper.
Malay, D., Margolis, D., Hoffstad, O. and Bellamy, S. (2006) The incidence and risks of failure to heal after lower extremity amputation for the treatment of diabetic neuropathic foot ulcer. <i>Journal of Foot and Ankle Surgery</i> , 45(6), pp. 366-74.	Cohort study	Interesting article showing a correlation between wound size, duration of wound and grade of wound and the failure to heal after amputation.	Does not add to the guidelines.
Malek, F., Somerson, J., Mitchel, S. and Williams, R. (2012) Does limb-salvage surgery offer patients better quality of life and functional capacity than amputation? <i>Clinical Orthopaedics and Related Research</i> , 470(7), pp. 2000-2006.	Cohort study	Limb salvage surgery offers better gait efficiency and return to normal living when compared to AKA, but does not improve the patient's perception of quality of life. Limited as no use of the C leg or Genium which may have improved AKA outcomes and impact of chemotherapy on some subjects. Small sample group.	Age range 15yr and over, not applicable to these guidelines looks at prosthetic use.
Markowitz, J., Gutterman, E., Magee, G. and Margolis, D. (2006) Risk of amputation in patients with diabetic foot ulcers: a claims-based study. <i>Wound Repair and Regeneration</i> , 14(1), pp. 11-7.	Retrospective analysis of claims data.	Studying risk factors for amputation with patients with diabetic foot ulcers (DFU). 5911 patients with DFU studied, 116 went onto amputation. Significant risk factors: PVD, male sex, renal disease, multiple co-morbid conditions and repeated diabetic foot appointments.	No findings relevant to guidelines.
Martin, M., Gomez, M., Morlion, B. and Simpson, K. (2008) The management of pain due to amputation. <i>Journal of Pain and Palliative Care Pharmacotherapy</i> , 22(1), pp. 57-60.	Single Case Study.	Descriptive discussion on treatments of phantom limb pain.	No findings relevant to guidelines.
Mavrogenis, A., Abati, C., Romagnoli, C. and Ruggieri, P. (2012) Similar survival but better function for patients after limb salvage versus amputation for distal tibia osteosarcoma. <i>Clinical Orthopaedics and Related Research</i> , 470(6) pp. 1735-1748.	Case control	43 patients. Review of function with salvage vs amputation patients.	Not applicable to scope of guidelines.
Mayer, A., Kudar, K., Bretz, K. and Tihanyi, J. (2008) Body schema and body awareness of amputees. <i>Prosthetics and orthotics international</i> , 32(3), pp. 363-382.	Various due to slightly different studies within the paper	Very poor methodology and reporting of recruitment etc. Mainly related to prosthetic limb users.	Not applicable to scope of guidelines.



## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups *continued*

Reference	Study design	Comments	Reason for exclusion
Mayer, A., Tihanyi, J., Bretz, K., Csende, Z., Bretz, E. and Horvath, M. (2011) Adaptation to altered balance conditions in unilateral amputees due to atherosclerosis: a randomized controlled study. <i>BMC Musculoskeletal Disorders</i> , 12:118	Cohort study	Studying balance in prosthetic limb users.	Not applicable to scope of guidelines.
Maynard, C., Flohr, B., Guagliardo, T., Martin, C., Mcfarland, L., Pruden, J. and Reiber, G. (2010) Department of veterans affairs compensation and medical care benefits accorded to veterans with major limb loss. <i>Journal of Rehabilitation Research and Development</i> , 47(4), pp. 403-408.	Retrospective study of records	Relates to veteran compensation in the USA.	Not applicable to scope of guidelines.
Mcavinue L. and Robertson I. (2011) Individual differences in response to phantom limb movement therapy. <i>Disability and Rehabilitation</i> . 33 (23-24): 2186-2195.	Case studies	4 lower limb amputee patients with phantom limb pain recruited from voluntary group. Completed motor imagery and phantom limb movement therapy.	Poor methodology and no results applicable to guidelines.
Mercier, C. and Sirigu, A. (2009) Training with Virtual Visual Feedback to Alleviate Phantom Limb Pain. <i>Neurorehabilitation and Neural Repair</i> , 23 (6) 587-594.	Case series	Studying virtual visual feedback therapy in 8 upper limb amputees.	Not applicable to scope of guidelines.
Meulenbelt, H., Geertzen, J., Jonkman, M. and Dijkstra, P. (2011) Skin problems of the stump in lower limb amputees: 2. influence on functioning in daily life. <i>Acta Dermato-Venereologica</i> , 91(2), pp. 178-182.	Cross-sectional study by means of a questionnaire	Studying skin problems in amputees wearing a prosthesis in relation to their function.	Not applicable to scope of guidelines.
Meulenbelt, H., Geertzen, J., Jonkman, M. And Dijkstra, P. (2009) Determinants of skin problems of the stump in lower-limb amputees. <i>Archives of Physical Medicine &amp; Rehabilitation</i> , 90(1), pp. 74-82.	Cross-sectional survey using questionnaire	Studying skin problems in amputees who had received a prosthesis.	Not applicable to scope of guidelines.
Meulenbelt, H., Dijkstra, P., Jonkman, M. and Geertzen, J. (2006) Skin problems in lower limb amputees: a systematic review. <i>Disability and Rehabilitation</i> , 28(10), pp. 603-8.	Systematic review	Only one article found fulfilled their criteria.	No findings relevant to guidelines.
Miyajima, S., Shirai, A., Yamamoto, S., Okada, N. and Matsushita, T. (2006) Risk factors for major limb amputations in diabetic foot gangrene patients. <i>Diabetes Research &amp; Clinical Practice</i> , 71(3), pp. 272-9.	Retrospective cohort study of subjects treated for diabetic foot lesions in Japan.	Poor reporting of methodology and recruitment process.	No findings relevant to guidelines.

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Mohanty, R., Lenka, P., Equebal, A. and Kumar, R. (2012) Comparison of energy cost in transtibial amputees using “ prosthesis” and “ crutches without prosthesis” for walking activities. <i>Annals of Physical and Rehabilitation Medicine</i> , 55(4), pp. 252-262.	Case Control	Study in India assessing energy expenditure in transtibial amputees when crutch walking and when using a prosthesis. Users aged 25 – 45. Weak study with poor description of recruitment and potential confounding factors. Used axilla crutches that are unavailable in the UK.	Prosthetic users studied. Methodological flaws in regards to selection criteria bias and generalizability of results given patients studied and cultural rehab differences.
Molton, I., Jensen, M., Ehde, D. and Smith, D. (2007) Phantom Limb Pain and Pain Interference in Adults with Lower Extremity Amputation: The Moderating Effects of Age. <i>Rehabilitation Psychology</i> , 52(3), pp. 272-9.	Questionnaire survey	Questionnaires sent out to lower limb amputees. Comparing pain levels with age and time since amputation to try to determine what has the greatest impact.	No findings relevant to guidelines.
Montesinos, L., Goig, J., Melendez, M., Pages, E. and Ruiz, A. (2010) Unilateral lower-limb amputation during childhood: Outcome and psychosocial situation as adults. <i>Physical Medicine and Rehabilitation</i> , 2(9), S159	Cross sectional study	Study completed in Spain. 45 subjects who had their amputation in childhood telephoned interviewed. D-EEARB and PPA used as outcome measures.	No findings relevant to guidelines.
Morgenroth, D., Shakir, A., Orendurff, M. and Czerniecki, J. (2009) Low-back pain in transfemoral amputees with back pain compared with 8 without. <i>American Journal of Physical Medicine and Rehabilitation</i> , 88(2), pp. 108-13.	Case control: 9 transfemoral amputees with back pain compared with 8 without.	Studying dynamic and static leg length discrepancy (LLD). Poor methodology – brief description of recruitment process and therefore unable to ascertain bias. No attempt to blind assessor. Small numbers of subjects (17) and majority trauma related amputations (14). No detail on how long pain subjects had their pain. No description of type of suspension or prosthetic knee type, but attempts to rule out other confounding variables. Majority of subjects had static and dynamic LLD (14 and 16) with a longer intact limb. No significant difference between the two groups was found.	No findings relevant to guidelines.
Morse, B., Cull, D., Kalbaugh, C., Cass, A. and Taylor, S. (2008) Through-knee amputation in patients with peripheral arterial disease: A review of 50 cases. <i>Journal of Vascular Surgery</i> , 48(3), pp. 638-643.	Retrospective review of through knee amputations.	Review of outcomes of through knee amputation. Found they have acceptable primary healing rates.	Not applicable to scope of guidelines – addresses surgical technique only.
Mozumdar, A. and Roy, S. (2008) Somatotype of the individuals with lower extremity amputation and its association with cardiovascular risk. <i>Anthropologischer Anzeiger; Bericht uber die Biologisch-Anthropologische Literatur</i> . 66(1) pp.99-116.	102 consecutive male unilateral amputees in Calcutta.	Endomorphy and mesomorphy associated with increased cardiovascular risk.	No findings relevant to guidelines and study not performed on western subjects.

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Nallegowda, M., Lee, E., Brandstater, M., Kartono, A., Kumar, G. and Foster, G. (2012) Amputation and cardiac comorbidity: analysis of severity of cardiac risk. <i>Physical Medicine and Research</i> , 4(9) pp. 657-66.	Cohort study	76 veterans, 2 controls. Cardiac risk should be assessed – could influence rehab potential.	Does not add to knowledge/ would not influence practice. Not applicable to scope of guideline
Nolan, L. (2012) A training programme to improve hip strengthen in persons with lower limb amputation. <i>Journal of Rehabilitation Medicine</i> 44(3), pp. 241-249.	Trial (not randomised)	10 week training regime for prosthetic users.	Not applicable to scope of guidelines. (could be included in next prosthetic guideline)
Norman, R., Gagnon, C., Khan, A., Wallach, G. and Zereshki, A. (2010) Hypoesthesia in the distal residual limb of amputees. <i>Physical Medicine and Research</i> , 2(7), pp. 607-611.	Cohort study	Study assessing thermal sensitivities in residual limb. Subjects acting as their own controls but no valid or reliable tools used.	Not applicable to scope of guideline with limited clinical significance.
Nunes, A., de Barros Jr. N., Miranda Jr. F. and Baptista-Silva J. (2012) Common Mental Disorders in Patients Undergoing Lower Limb Amputation: A Population-based Sample <i>World journal of surgery</i> . 36: pp.1011-1015.	Cross sectional study	Poor study design with no follow up.	Chronic disease and reduced independence result in depression – Does not add to knowledge. Not applicable to scope of guidelines.
Osmani-Vllasolli, T., Hundozi, H., Bytyci, C., Kalaveshi, A. and Krasniqi, B. (2011) Rehabilitation of patients with war-related lower limb amputations. <i>Nigerian Journal of Medicine: Journal of the National Association of Resident Doctors of Nigeria</i> . 20(1). pp. 39-43.			Unable to obtain study from British Library.
Owen, S., Heath, J., Kringelbach, M., Stein, J. and Aziz, T. (2007) Preoperative DTI and probabilistic tractography in an amputee with deep brain stimulation for lower limb stump pain. <i>British journal of neurosurgery</i> , 21(5), pp. 485-90.	Case Control	Deep brain stimulation for residual limb pain.	Not applicable to scope of guidelines.
Pasquina, P.F., Bryant, P.R., Huang, M.E., Roberts, T.L., Nelson, V.S. and Flood, K.M., 2006. Advances in amputee care. <i>Archives of Physical Medicine and Rehabilitation</i> , 87(3), pp. S34-42.	Literature Review	Useful resource for reference to outcome measures and surgical technique. Poor quality design, commentary paper only.	Limited clinical significance. Not applicable to scope of guideline.

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Parsons, C.M., Pimiento, J.M., Cheong, D., Marzban, S.S., Gonzalez, R.J., Johnson, D., Letson, G.D. and Zager, J.S., 2012. The role of radical amputations for extremity tumors: A single institution experience and review of the literature. <i>Journal of surgical oncology</i> , 105(2), pp. 149-155.		Based on surgical treatment of extremity tumours	No findings relevant to these guidelines.
Paul, R., Masilamani, S. and Dwyer, A.J., 2012. Evaluation of rehabilitated bilateral lower limb amputees - an Indian study. <i>Disability and rehabilitation</i> , 34(12), pp. 1005-1009.	Retrospective Cohort	Evaluating the prosthetic outcomes of bilateral amputees in India.	Not applicable to scope of guideline.
Peck, M.A., Clouse, W.D., Cox, M.W., Bowser, A.N., Eliason, J.L., Jenkins, D.H., Smith, D.L. and Rasmussen, T.E., 2007. The complete management of extremity vascular injury in a war time forces hospital	Cohort	Describes vascular surgery in a war time forces hospital	Not applicable to our population with no evidence relevant to guidelines.
Penn-Barwell, J.G., 2011. Outcomes in lower limb amputation following trauma: A systematic review and meta-analysis. <i>Injury</i> , 42(12), pp. 1474-1479.	Literature Review	Review of outcomes post traumatic amputation. 27 papers identified. Crude objective measures used to evaluate. Mixed reports on benefits of TKA vs TFA. Difficult to extrapolate conclusions.	Limited clinical significance. Not applicable to scope of guideline.
Perkins, Z.B., De'Ath, H.D., Sharp, G. and Tai, N.R.M., 2012. Factors affecting outcome after traumatic limb amputation. <i>British Journal of Surgery</i> , 99(suppl1), pp.75-86	Systematic review	No discussion re the rigour of the articles. No reference to therapy interventions	Does not inform practice or add to body of evidence
Pinzur, M.S., Beck, J., Himes, R. and Callaci, J., 2008. Distal tibiofibular bone-bridging in transtibial amputation. <i>Journal of Bone and Joint Surgery - Series A</i> , 90(12), pp. 2682-2687.	Cohort study	Compared tibiofibular bone-bridging transtibial amputations with control group of transtibial amputations traditionally performed. No difference was found. Small sample	Does not meet inclusion criteria as uses prosthetic rehab and prosthetic outcome measures for evaluation.
Probstner, D., Thuler, L.C.S., Ishikawa, N.M. and Alvarenga, R.M.P., 2010. Phantom limb phenomena in cancer amputees. <i>Pain Practice</i> , 10(3), pp. 249-256.	Cohort	75 patients, one centre. Ax presence of phantom pain or sensation and stump pain.	Cancer patients only. Too generic/descriptive. Does not add to knowledge.

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Rahimi, A., Mousavi, B., Soroush, M., Masumi, M. and Montazeri, A., 2012. Pain and health-related quality of life in war veterans with bilateral lower limb amputations. <i>Trauma Monthly</i> , 17(2), pp. 282-286.	Questionnaire	Pain and quality of life questionnaire post bilateral amputation (high number of prosthetic users).	Not applicable to scope of guideline. (could be included in next prosthetic guideline)
Ramdass, M.J., 2009. Grade IV frostbite requiring bilateral below knee amputations: A case report. <i>Cases Journal</i> , 2(4), pp.6635	Case Study	Description of case study.	Not applicable to scope of guideline.
Rau, B., Bonvin, F. and De, R., 2007. Short-term effect of physiotherapy rehabilitation on functional performance of lower limb amputees. <i>Prosthetics and orthotics international</i> , 31(3), pp. 258-270.	RCT	Intensive training regime versus usual care for prosthetic users in Myanmar. Lacked rigor and open to bias.	Not applicable to scope of guideline.
Raya, M.A., Gailey, R.S., Fiebert, I.M. and Roach, K.E., 2010. Impairment variables predicting activity limitation in individuals with lower limb amputation. <i>Prosthetics &amp; Orthotics International</i> , 34(1), pp. 73-84.	Cohort - Convenience sampling	Review of prosthetic users outcomes post fitting.	Not applicable to scope of guideline.
Reed, A.B., Delvecchio, C. and Giglia, J.S., 2008. Major lower extremity amputation after multiple revascularizations: was it worth it? <i>Annals of Vascular Surgery</i> , 22(3), pp. 335-40.	Qualitative	33 patients surveyed. Ax of pts decision making when choosing revascularisation vs amputation.	Not applicable to scope of guideline.
Reiber, G.E., McFarland, L.V., Hubbard, S., Maynard, C., Blough, D.K., Gambel, J.M. and Smith, D.G., 2010. Service members and veterans with major traumatic limb loss from Vietnam war and OIF/OEF conflicts: Survey methods, participants, and summary findings. <i>Journal of Rehabilitation Research and Development</i> , 47(4), pp. 275-297	Questionnaire	Survey of prosthetic use.	Not applicable to scope of guideline.
Remes, L., Isoaho, R., Vahlberg, T., Viitanen, M. and Rautava, P., 2009. Predictors for institutionalization and prosthetic ambulation after major lower extremity amputation during an eight-year follow-up. <i>Aging Clinical &amp; Experimental Research</i> , 21(2), pp. 129-136.	Cohort	119 amputees followed up over 8 years. High rate of placement in those with less social support, greater amputation severity, cardiac problems. Importance of wheelchair skills highlighted. Study conducted in Finland and had missing data.	Not applicable to scope of guideline with limited clinical significance. (may assist with decision to refer to prosthetic centres)

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Reference	Study design	Comments	Reason for exclusion
Remes, L., Isoaho, R., Vahlberg, T., Viitanen, M., Koskenvuo, M. and Rautava, P., 2010. Quality of life three years after major lower extremity amputation due to peripheral arterial disease. <i>Aging Clinical &amp; Experimental Research</i> , 22(5), pp. 395-406.	Qualitative	59 amputees. 118 control. Found increased depression in amputees, especially in institutionalised.	Not applicable to scope of guideline with limited clinical significance.
Rerkasem, K., Kosachunhanun, N., Tongprasert, S., Khwanngern, K., Matanasarawoot, A., Thongchai, C., Chimplee, K., Buranapin, S., Chairsisawadisuk, S. and Manklabruks, A., 2007. The development and application of diabetic foot protocol in Chiang Mai University Hospital with an aim to reduce lower extremity amputation in Thai population: a preliminary communication. <i>International Journal of Lower Extremity Wounds</i> , 6(1), pp. 18-21.	Cohort	Emphasis on education for the care of the diabetic foot. Cohort of non-amputee patients.	Limited clinical significance.
Restrepo-Garces, C.E. Marinov, A., McHardy, P., Faclier, G. and Avila, A. 2011 Pulsed radiofrequency under ultrasound guidance for persistent stump-neuroma pain. <i>Pain Practice</i> . 11(1), pp. 98-102.	Case Study	Single patient - Pulsed radiofrequency ambulation of a neuroma –	Limited extrapolation and rigor. Not applicable to scope of guideline
Riffle, M.D., Ross, D.W., Wichman, C. and MacKinnon, M., 2007. "Lower extremity" amputation: conclusion. <i>Air Medical Journal</i> , 26(5), pp. 202-204.	Case Report	Penis/testicle self harm.	Not applicable to scope of guideline.
Rommers, G., Ryall, H., Kap, A., Laat, F., and Van Der Linde, H., 2008. The mobility scale for lower limb amputees: The SIGAM/WAP Mobility Scale. <i>Disability and Rehabilitation</i> , 30(15), pp. 1106-1115	Mixed methods	Study focused on translation of a mobility scale into the Dutch language for prosthetic users	Not applicable to scope of the guidelines
Rothgangel, A.S., Braun, S.M., Beurskens, A.J., Seitz, R.J. and Wade, D.T., 2011. The clinical aspects of mirror therapy in rehabilitation: a systematic review of the literature. <i>International Journal of Rehabilitation Research</i> , 34(1), pp.1-14.	Literature Review	21 studies reviewed but only one on phantom limb pain and not discussed.	Limited clinical significance.
Rotter, K., Sanhueza, R., Robles, K. and Godoy, M., 2006. A Descriptive Study of Traumatic Lower Limb Amputees from the Hospital del Trabajador: Clinical Evolution from the Accident until Rehabilitation Discharge. <i>Prosthetics &amp; Orthotics International</i> , 30(1), pp. 81-86	Descriptive Study	Findings not relevant to the larger population. Discusses cases at a specific Chile hospital.	No findings relevant to these guidelines.



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Reference	Study design	Comments	Reason for exclusion
Roulet, S., Nouette-Gaulain, K., Biais, M., Bernard, N., Benard, A., Revel, P., Capdevila, X. and Sztark, F., 2009. Preoperative opioid consumption increases morphine requirement after leg amputation. <i>Canadian Journal of Anesthesia</i> , 56(12), pp. 908-913.	Cohort Study	Subjective measures did not eliminate bias. Small study population. Needed further studies to confirm hypothesis	No significant findings relevant to these guidelines. Study not robust enough for inclusion.
Russell, M.C., 2008. Treating Traumatic Amputation-Related Phantom Limb Pain: A case study utilizing eye movement desensitization and reprocessing within the armed services. <i>Clinical Case Studies</i> , 7(2), pp.136-153	Case Study	Individual case study not relevant to the larger population	No findings relevant to these guidelines.
Sakakibara, B.M., Miller, W.C. and Backman, C.L., 2011. Rasch analyses of the activities-specific balance confidence scale with individuals 50 years and older with lower-limb amputations. <i>Archives of Physical Medicine and Rehabilitation</i> , 92(8), pp. 1257-1263.	Case Control	Studies function of prosthetic users	Not applicable to the scope of the guideline
Sanders, J.E. and Fatone, S., 2011. Residual limb volume change: Systematic review of measurement and management. <i>Journal of Rehabilitation Research &amp; Development</i> , 48(8), pp. 949-986	Literature review	Not precise on how to manage volume change as no consensus on how to measure volume reliably	Quality of studies reviewed low-moderate, with different methodologies so difficult to compare.
Sarikaya, A., Top, H., Aygit, A.C., Benlier, E. and Unal, Y., 2006. Predictive value of 99mTc-sestamibi scintigraphy for healing of extremity amputation. <i>European Journal of Nuclear Medicine &amp; Molecular Imaging</i> , 33(12), pp. 1500-7.	Diagnostic test	Describes the use of 99m Tc- sestamibi Scintigraphy to indicate the level of amputation that should be undertaken	Although using this test 65% of patients had their level of amputation reduced, flaws in outcome measure used and little statistical data to back up conclusion.
Schade, C.P. and Hannah, K.L., 2007. Quality of Ambulatory Care for Diabetes and Lower-extremity Amputation. <i>American Journal of Medical Quality</i> , 22(6), pp. 410-417	Case control	Recruitment from "fee-for-service" database and under 75 year old only included.	Bias in recruitment and not applicable to local populations

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Reference	Study design	Comments	Reason for exclusion
Schofield, C.J., Libby, G., Brennan, G.M., Macalpine, R.R., Morris, A.D., Leese, G.P. and DARTS/MEMO collaboration, 2006. Mortality and hospitalization in patients after amputation: a comparison between patients with and without diabetes. <i>Diabetes care</i> , 29(10), pp. 2252-2256.	Retrospective cohort review	Increased risk of death after amputation in patients with DM compared to non-DM. Suggests a more aggressive approach to cardiovascular risk/Rx to those who have had amputation. Secondary prevention of foot ulcer in remaining limb very important	No new evidence, not specific to physiotherapy
Seidel, S., Kasprian, G., Furtner, J., Schopf, v., Essmeister, M., Sycha, T., Auff, E. and Prayer, D., 2011. Mirror therapy in lower limb amputees-a look beyond primary motor cortex reorganization. <i>Rofo</i> , 183(11), pp. 1051-1507.	Cohort	Very small sample size with minimal details on recruitment techniques. Potential for bias in recruitment due to use of a subjective measure. Poor analysis of results.	Study not robust enough for inclusion. No findings relevant to these guidelines.
Senchenkov, A., Moran, s.l., Petty, P.M., Knoetgen, J.,3rd, Tran, N.V., Clay, R.P., Bite, U., Johnson, C.H., Barnes, S.A. and Sim, F.H., 2009. Soft-tissue reconstruction of external hemipelvectomy defects. <i>Plastic &amp; Reconstructive Surgery</i> , 124(1), pp. 144-55.	Retrospective Cohort study	Related specifically to surgical technique	Not appropriate to the scope of these guidelines
Senra, H., Oliveria, R.A., Leal, I., and Vierira, C., 2012. Beyond the body image: a qualitative study on how adults experience lower limb amputation. <i>Clinical Rehabilitation</i> , 26(2), pp. 180-191	Qualitative	Established the emotional impact of amputation can be divided into 3 phases of self-identity changes. Suggests we need to consider psychotherapeutic follow up for patients and recognise the positive impact rehabilitation can have on wellbeing.	Not about physiotherapy intervention and does not offer any "new" evidence re psychological impact.
Shashank, D., Salyer,j. and Desai, K.A., 2010. Botulinum Toxin Type A for the Treatment of Postamputation Residual Limb Myokymia: A Case Report. <i>Archives of Physical Medicine &amp; Rehabilitation</i> , 2(8), pp.777-779	Case study	Single case study, 3 years post op	Not in the remit of these guidelines
Shapiro, L.T. and Huang, M.E., 2009. Inpatient rehabilitation of survivors of purpura fulminans with multiple limb amputations: A case series. <i>Archives of Physical Medicine &amp; Rehabilitation</i> , 90(4), pp. 696-700.	Case Series	Examination of aspects of care of people with purpura fulminans and limb loss.	Limited clinical significance.
Singh, R., Hunter, J. and Philip, A., 2007. Fluid Collections in Amputee Stumps: A Common Phenomenon. <i>Archives of Physical Medicine and Rehabilitation</i> , 88(5), pp.661-663	Cohort	Small sample size. Findings not relevant to the larger population	No findings relevant to these guidelines.

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Reference	Study design	Comments	Reason for exclusion
Singh, R., Hunter, J., and Philip, A. 2007. The rapid resolution of depression and anxiety symptoms after lower limb amputation. <i>Clinical Rehabilitation</i> , 21(8), pp. 754-759	Cohort	Being treated in a specialist centre may help with quicker resolution of anxiety and depressive symptoms. Need to increase self-efficacy and coping skills.	Too many confounding issues i.e. there was no mention of treatment for depression or prev hx of depression, no comparison of patients not in a rehab setting.
Singh, R., Hunter, J., Philip, A. and Tyson, S., 2008. Gender differences in amputation outcome. <i>Disability and rehabilitation</i> , 30(2), pp.122-125	Cohort	Lots of confounding factors and potential for bias that could have impacted on the results of amputation outcome. Did not fit with findings of other studies.	No significant findings relevant to these guidelines. Large potential for bias.
Singh, R., Ripley, D., Pentland, B., Todd, I., Hunter, L., Hutton, L. & Phillip, A., 2009. Depression and anxiety symptoms after lower limb amputation: the rise and fall. <i>Clinical rehabilitation</i> , 23(3), pp.281-286	Cohort	Depression and anxiety reduce during an inpatient rehabilitation stay and then increase again on discharge. No association with age, gender wearing limb or length of inpatient stay found	As above And not post op as describes 3 years post op
Singh, R. and Venkateshwara, G., 2012. Effect of Fluid Collection on Long-Term Outcome after lower Limb Amputation. <i>Archives of Physical Medicine and Rehabilitation</i> , 93(3), pp. 509-511	Cohort	Confounding factors could affect outcome measures used and therefore validity of results.	Study not robust enough for inclusion.
Sinha, R., Van Den Heuvel, W.J.A. and Arokiasamy, P., 2011. Factors affecting quality of life in lower limb amputees. <i>Prosthetics and Orthotics international</i> 35(1), pp. 90-96	Qualitative	Study carried out in developing country therefore not relevant to our population. Problems with recruitment and sample size	No findings relevant to these guidelines.
Sinha, R. and Van Den Heuvel, W.J.A., 2011. A systemic literature review of quality of life in lower limb amputee. <i>Disability and Rehabilitation</i> , 33(11), pp. 883-899	literature review	Revealed lack of longitudinal studies. Suggests a standardised and validated QOL measure required for amputees required. Few studies look at QOL adequately in amputees due to methodological flaws.	Not relevant to physiotherapy management
Sivan, M., Stoppard, E. and Kirker, S., 2010. Alteration in Phantom Pain and Sensation with Visceral Movement. <i>American Academy of Physical Medicine and Rehabilitation</i> , 2(6), pp. 576-578	Cohort/case presentation	Small sample size. No real statistical analysis. Only serves to advise professionals that this phenomena could be presented	Descriptive study
Sjodahl, C., Gard, G. and Jarnlo, G.B., 2008. Transfemoral amputees' experiences of the first meeting and subsequent interactions with hospital staff. <i>Disability and Rehabilitation</i> , 30(16), pp.1192-1203	Qualitative	Methodologically flawed. Small sample size.	Retrospective study affected by patient recall. Study not robust enough for inclusion.

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Reference	Study design	Comments	Reason for exclusion
Sloan, F.A., Feinglos, M.N. and Grossman, D.S., 2010. Receipt of care and reduction of lower extremity amputations in a nationally representative sample of US elderly. <i>Health Services Research, 45(6)</i> , pp. 1740-1763	Case Control	Relates to prevention of amputation rather than management of amputations.	Not applicable to the scope of the guidelines.
Smith, E. and Ryall, N., 2009. Residual limb osteomyelitis: A case series from a national prosthetic centre. <i>Disability and Rehabilitation, 31(21)</i> , pp. 1785-1789	Cohort	Informs professionals osteomyelitis may be a consequence of amputation but numbers are small. Very small sample size. Not statistically relevant.	No findings relevant to these guidelines.
Smuck, M., Christensen, S., Lee, S.S. and Sagher, O., 2008. An unusual case of S1 radicular pain presenting as early phantom pain in a Transfemoral amputee: A case report. <i>Archives of physical medicine and rehabilitation, 89(1)</i> , pp. 146-149	Case Study	Not applicable to wider population. No new evidence.	No significant findings relevant to these guidelines or wider population.
Somroo, J.A., Hashmi, A., Iqbal, Z. and Ghori, A., 2011. <i>Diabetic foot care-a public health problem. Journal of medicine, 12(2)</i> , pp. 109-114	Cohort	Describes prevention of amputation not management of amputation	No findings relevant to these guidelines.
Spiliotopoulou, G. and Atwal, A., 2012. Is Occupational Therapy practice for older adults with lower limb amputations evidenced-based? A systematic review. <i>Prosthetics and Orthotics International, 36(1)</i> , pp. 7-14	Review	Review of literature search and review of effectiveness of Occupational therapy	Only 2 papers identified for inclusion, 1st about prosthetic wearers and function, 2nd about common OT practices-no evidence relevant to guidelines
Srivastava, K., Saldanha, B.D., Chaudhury, S., Ryali, S.C.V.S.S.R., Goyal, S.C.S., Bhattacharyya, L.C.D. and Basannar, D., 2010. A study of psychological correlates after amputation. <i>Medical Journal Armed Forces India, 66(4)</i> , pp. 367-373.	Cohort	Describes psychological aspects of amputation in an Indian hospital.	Study looks at an all male population whose main reason for amputation was traumatic therefore not relevant to our population. Methodology also has flaws.

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Reference	Study design	Comments	Reason for exclusion
Stineman, M.G., Kwong, P.L., Kurichi, J.E., Prvu-Bettger, J.A., Vogel, W.B., Maislin, G., Bates, B.E., Reker, D.M., 2008. The effectiveness of inpatient rehabilitation in the acute postoperative phase of care after transtibial or transfemoral amputation: study of an integrated health care delivery system. <i>Archives of Physical Medicine and Rehabilitation</i> , 89(10), pp. 1863-1872	Observational cohort study	Study did not look at specific interventions but concentrated on a specific rehabilitation pathway and its outcome	No findings relevant to these guidelines.
Stineman, M.G., Kwong, P.L., Xie, D., Kurichi, J.E., Ripley, D.C., Brooks, D.M., Bidelspach, D.E. and Bates, B.E., 2010. Prognostic differences for functional recovery after major lower limb amputation: effects of the timing and type of inpatient rehabilitation services in the veterans health administration. <i>Archives of Physical Medicine and Rehabilitation</i> , 2(4), pp. 232-243	Cohort	Concludes earlier rehab does not necessarily mean better outcomes-co-morbidities do, specialised rehab achieves a better FIM (results significant). However there are co-founding factors that could affect results (US system, sample sizes not equal between types of rehab)	FIM a questionable outcome measure. Confounding factors limit conclusions that can be made. Evidence that is presented does not better evidence already given in guidelines
Stone, P.A., Flaherty, S.K., Aburahma, A.F., Hass, S.M., Jackson, J.M., Hayes, J.D., Hofeldt, M.J., Hager, C.S. and Elmore, M.S., 2006. Factors affecting perioperative mortality and wound-related complications following major lower extremity amputations. <i>Annals of Vascular Surgery</i> , 20(2), pp. 209-16	Retrospective Cohort study	Study related to factors affecting perioperative mortality rates. 380 patients with BKA or AKA	Not appropriate to the scope of these guidelines
Taylor, S.M., Kalbaugh, C.A., Cass, A.L., Buzzell, N.M., Daly, C.A., Cull, D.L. and Youkey, J.R., 2008. "Successful outcome" after below-knee amputation: an objective definition and influence of clinical variables. <i>American Surgeon</i> , 74(7), pp. 607-12; discussion 612-3.	Retrospective cohort study	Factors affecting successful outcomes of amputation. 309 consecutive patients undergoing BKA. 86.4% patients healed successfully 86.1% survived 6 months post op	No control group, no physiotherapy recommendations
Theeven, P., Hemmen, B., Stevens, C., Ilmer, E., Brink, P. and Seelen, H., 2010. Feasibility of a new concept for measuring actual functional performance in daily life of transfemoral amputees. <i>Journal of Rehabilitation Medicine</i> , 42(8), pp. 744-51.	Cross-sectional design	Testing the validity of an assessment tool. 2 study groups (total of 30 participants) with different knee joints, assessing the ADAPT test	Study too small. No other studies available to support. Used prosthesis wearing participants

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Reference	Study design	Comments	Reason for exclusion
Timmers, T.K., Tiren, D., Hulstaert, P.F., Schellekens, P.P.A. and Leenen, L.P.H., 2012. Traumatic hemipelvectomy: Improvements in the last decennia illustrated by 2 case reports. <i>International Journal of Surgery Case Reports</i> , 3(7), pp. 246-252.	Retrospective Cohort study	Related specifically to surgical technique	Not appropriate to the scope of these guidelines
Tisi, P.V., and Callam, M.J., 2004. Type of incision for below knee amputation. <i>Cochrane Database of Systematic Reviews</i> . vol./is. /1(CD003749), 1361-6137;1469-493X	Systematic review		No difference in incision to outcomes
Traballesi, M., Porcacchia, P., Aversa, T., Angioni, C., Lubich, S., Di, F. and Brunelli, S., 2007. Prognostic factors in prosthetic rehabilitation of bilateral dysvascular above-knee amputee: is the stump condition an influencing factor? <i>Europa Medicophysica</i> , 43(1), pp. 1-6. <i>30 bilateral AKA amputees</i>	Retrospective Cohort study	Evaluation of prognostic factor for rehabilitation outcome.	Study too small. No control group. Nothing new to add to established guidelines
Traunter, C., Haastert, B., Mauckner, P., Gatcke, L.M. and Giani, G., 2007. Reduced incidence of lower-limb amputations in the diabetic population of a German City, 1990-2005: <i>Results of the Leverkusen Amputation Reduction Study (LARS)</i> . <i>Diabetes care</i> , 30(10), pp. 2633-2637.	Retrospective Cohort study	Study related to relevance of foot care preventing amputation. 3 hospitals in one city, comparison of data between 1990-1991 and 1994-2005	Related to 1 city, not representative in totality. Nothing new to add to established guidelines
Tseng, C.L., Helmer, D., Rajan, M., Tiwari, A., Miller, D., Crystal, S., Safford, M., Greenberg, J. and Pogach, L., 2007. Evaluation of regional variation in total, major, and minor amputation rates in a national health-care system. <i>International Journal for Quality in Health Care</i> , 19(6), pp. 368-376.	Retrospective Cohort study	Study related to relevance of foot care preventing amputation.	Nothing new to add to established guidelines
Tseng, C.L., Rajan, M., Miller, D.R., Lafrance, J.P. and Pogach, L., 2011. Trends in initial lower extremity amputation rates among veterans health administration health care system users from 2000 to 2004. <i>Diabetes care</i> , 34(5), pp. 1157-1163.	Retrospective Cohort study	Study related to relevance of foot care in diabetics	Not appropriate to the scope of these guidelines



## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Ulger, O., Topuz, S., Bayramlar, K., Sener, G. and Erbahceci, F., 2009. Effectiveness of phantom exercises for phantom limb pain: a pilot study. <i>Journal of rehabilitation medicine : official journal of the UEMS European Board of Physical and Rehabilitation Medicine</i> , 41(7), pp. 582-584.	Pilot study	Phantom exercises and prosthetic training vs general exercises and prosthetic training. 20 prosthesis wearing participants	Pilot study, no control group, includes prosthetic training as exercise group
Ulger, O., Topuz, S., Bayramlar, K., Erbahceci, F. and Sener, G., 2010. Risk factors, frequency, and causes of falling in geriatric persons who has had a limb removed by amputation. <i>Topics in Geriatric Rehabilitation</i> , 26(2), pp. 156-63.	Retrospective questionnaire	No interventions to consider	No findings relevant to these guidelines. But highlights falls risks in amputees
Unwin, J., Kacperek, L., Clarke, C., 2009. A prospective study of positive adjustment to lower limb amputation. <i>Clinical rehabilitation</i> , 23(11), pp. 1044-50.	Cohort study	Study focuses on the factors that influence positive adjustment. No interventions were described.	No findings relevant to guidelines
Valabhji, J., Gibbs, R.G.J., Bloomfield, L., Lyons, S., Samarasinghe, D., Rosenfeld, P., Gabriel, C.M., Hogg, D. and Bicknell, C.D., 2010. Matching the numerator with an appropriate denominator to demonstrate low amputation incidence associated with a London hospital multidisciplinary diabetic foot clinic. <i>Diabetic Medicine</i> , 27(11), pp. 1304-1307.	Retrospective Cohort study	Related to relevance of MDT foot clinic in prevention of amputation	Not appropriate to the scope of these guidelines
Vamos, E.P., Bottle, A., Majeed, A. and Millett, C., 2010. Trends in lower extremity amputations in people with and without diabetes in England, 1996-2005. <i>Diabetes research and clinical practice</i> , 87(2), pp. 275-282.	Prospective hospital data	Related to prevention strategies and controlling risk factors in diabetics	Not appropriate to the scope of these guidelines
Van, C.K., Sluis, Hartman, P.P., Schoppen, T. and Dijkstra, P.U., 2009. Job adjustments, job satisfaction and health experience in upper and lower limb amputees. <i>Prosthetics and orthotics international</i> , 33(1), pp. 41-51.	Retrospective Cohort study	Related to overall job satisfaction and adjustments needed	Not appropriate to the scope of these guidelines
Van Velzen, J.M., Van Bennekom, C.A., Polomski, W., Slootman, J.R., Van der Woude, L.H., and Houdijk, H., 2006. Physical capacity and walking ability after lower limb amputation: a systematic review. <i>Clinical rehabilitation</i> , 20(11), pp. 999-1016.	Systematic review	Related to evidence for balance, strength and walking training. 48 studies reviewed, all prosthesis wearers	Nothing new to add to established guidelines

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Vincent, C., Demers, E., Moffet, H., Corriveau, H., Nadeau, S., Mercier, C. and Members, R.Q.R .V.2.0.0.6.2.0.0.9.,2006-2009, 2010. Use of an innovative model to evaluate mobility in seniors with lower-limb amputations of vascular origin: a pilot study. <i>BMC Geriatrics</i> , 10.	Prospective cohort study	Related to new model for proposed outcome following amputation	Sample size too small (10 patients) to validate findings
Visscher, M.O., Robinson, M., Fugit, B., Rosenberg, R.J., Hoath, S.B. and Randall, R., 2011. Amputee skin condition: Occlusion, stratum corneum hydration and free amino acid levels. <i>Archives of Dermatological Research</i> , 303(2), pp. 117-124.	Randomised control trial	Related to prosthetic skin irritation and prosthetic use	Sample size too small to validate findings. No other studies to support these findings. Uses prosthesis wearers as participants
Viswanathan, V. and Kumpatla, S., 2011. Pattern and causes of amputation in diabetic patients - A multicentric study from India. <i>Journal of Association of Physicians of India</i> , 59(3), pp. 148-151.	Retrospective Cohort study	Related to diabetic foot care and infection	Not appropriate to the scope of these guidelines
Viswanathan, V., Wadud, J.R., Madhavan, S., Rajasekar, S., Kumpatla, S., Lutale, J.K. and Abbas, Z.G., 2010. Comparison of post amputation outcome in patients with type 2 diabetes from specialized foot care centres in three developing countries. <i>Diabetes research and clinical practice</i> , 88(2), pp. 146-150.	Prospective cohort study	Related to prevalence of good foot care upon incidence of amputation	Not appropriate to the scope of these guidelines
Wan Hazmy, C.H., Chia, W.Y., Fong, T.S. and Ganendra, P., (2006). Functional outcome after major lower extremity amputation: a survey on lower extremity amputees. <i>Medical Journal of Malaysia</i> , 61, Supplement A, pp. 3-9.	Cross sectional survey	Related to post-amputation functional outcome	Sample size too small to validate findings. Nothing new to add to established guidelines
Wasiak, K., Paczkowski, P.M., Garlicki, J.M., 2006. Surgical results of leg amputation according to Ghormley's technique in the treatment of chronic lower limb ischaemia. <i>Acta Chirurgica Belgica</i> , 106(1), pp. 52-54.	Retrospective Cohort	Examination of the Ghormley amputation technique. No relation to post-operative functional outcome.	Not applicable to scope of guideline.

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Weber, D.J., Shoham, D.A., Luke, A., Reed, R.L. and Luchette, F.A., (2011). Racial odds for amputation ratio in traumatic lower extremity fractures. <i>Journal of Trauma - Injury, Infection and Critical Care</i> , 71(6), pp. 1732-1736.	Retrospective Cohort study	Related to racial disparity between salvage surgery/ amputation	Socio-economic/ racial disparity already reported
Wezenberg, D., De, A., Faber, W.X., Slootman, H.J., Van Der Woude, L.H., and Houdijk, H., (2012). Peak oxygen consumption in older adults with a lower limb amputation. <i>Archives of Physical Medicine and Rehabilitation</i> , 93(11), pp. 1924-1929.	Cross sectional survey	Related to aerobic capacity 36 participants who were all prosthesis wearers and able to walk 4 mins (minimum)	Nothing new to add to established guidelines
Williams, L.H., Miller, D.R., Fincke, G., Lafrance, J.P., Etzioni, R., Maynard, C., Raugi, G.J. and Reiber, G.E., (2011). Depression and incident lower limb amputations in veterans with diabetes. <i>Journal of Diabetes and its Complications</i> , 25(3), pp. 175-182.	Retrospective Cohort Study	Related to depression and incidence of lower limb amputees	Not relevant to the scope of these guidelines
Wilkes, D., Ganceres, N., Solanki, D. and Hayes, M., (2008). Pulsed radiofrequency treatment of lower extremity phantom limb pain. <i>Clinical Journal of Pain</i> , 24(8), pp. 736-9.	Case study	Pulsed radiofrequency treatment for chronic phantom limb pain	Not relevant, participants experiencing chronic phantom limb pain
Witso, E., Lium, A. and Lydersen, S., (2010). Lower limb amputations in Trondheim, Norway: A 40% reduction in diabetic major lower-limb amputations from 1996 to 2006. <i>Acta Orthopaedica</i> , 81(6), pp. 737-744.	Prospective and retrospective cohort study	Related to diabetic foot care and incidence of amputation	Not appropriate to the scope of these guidelines
Wong, M.W., (2006). Predictors for mortality after lower-extremity amputations in geriatric patients. <i>American Journal of Surgery</i> , 191(4), pp. 443-7.	Retrospective Cohort study	Related to independent predictors of operative and long term mortality	Not appropriate to the scope of these guidelines
Yari, P., Dijkstra, P.U. and Geertzen, J.H.B., (2008). Functional outcome of hip disarticulation and hemipelvectomy: A cross-sectional national descriptive study in the Netherlands. <i>Clinical Rehabilitation</i> , 22(12), pp. 1127-1133.	Retrospective Cohort study	Related specifically to surgical technique	Not appropriate to the scope of these guidelines
Zidarov, D., Swaine, B. and Gauthier-Gagnon, C., (2009). Life Habits and Prosthetic Profile of Persons With Lower-Limb Amputation During Rehabilitation and at 3-Month Follow-Up. <i>Archives of Physical Medicine and Rehabilitation</i> , 90(11), pp. 1953-1959.	Qualitative	Based on community integration, not in the remit of these guidelines, useful for prosthetic guidelines	Not in the remit of these guidelines

## Appendix 7: Articles excluded after review of full text by the Literature Appraisal Groups

Reference	Study design	Comments	Reason for exclusion
Zidarov, D., Swaine, B. and Gauthier-Gagnon, C., (2009). Quality of Life of Persons With Lower-Limb Amputation During Rehabilitation and at 3-Month Follow-Up. <i>Archives of Physical Medicine and Rehabilitation</i> , 90(4), pp. 634-645.	Qualitative	Describe and compare QOL of lower limb amps at admission, discharge and 3/12 after discharge. To explore the relationship between QOL and demographics, clinical variables and body image	Pts in study using a prosthesis, so not in the remit of these guidelines

## Appendix 8: Definitions of the Scottish Intercollegiate Guideline Network (SIGN) Levels of Evidence(33)

These levels of evidence were assigned by sub groups of the GUG (GDG) after review of the individual pieces of literature. Any contentious issues between these sub groups which meant that a level of evidence could not be decided upon was resolved by getting the whole GDG to review the article and gaining consensus from this additional input.

### ■ Quality rating of the Subsections:

++, + or – are allocated by the reviewers according to whether all, some or few of the criteria specified in the validated SIGN checklists (33) have been fulfilled and whether the methodology has been adequately described and is sound enough to control/eliminate bias in the findings of the literature.

#### Levels of Evidence

1++ High quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias

1+ Well-conducted meta-analyses, systematic reviews, or RCTs with a low risk of bias

1- Meta-analyses, systematic reviews or RCTs with a high risk of bias

2++ High quality systematic reviews of case control or cohort studies/High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal

2+ Well conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal

2- Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal

3 Non-analytic studies, e.g. case reports, case series

4 Expert opinion

## Appendix 9: Table of Papers Referenced Within the Updated Guideline

These tables list the evidence appraised and used to inform the recommendations. The references are in alphabetical order. The reference number in brackets refers to the first time they are found in the document.

Each entry gives a brief description of the design, the sample studied, the subject of the study or intervention (if one was employed), and a conclusion or comment.

Evidence appraised for the first edition of the guideline is in black text; evidence appraised for the second edition is in blue text. Readers are recommended to read the original article if they want more detail.

Citation	Study Design	Population	Subject or Intervention	Comments	Level of Evidence
Bailey M (53)	Case Series	10 consecutively presenting amputees with PVD, able to use PPAM aid. No control group	Walking	Resting ECG along 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
Campbell W [42]	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
Chin T (65)	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
Christensen B [57]	Retrospective Case series	29 Danish, prosthetic transtibial and trans-femoral amputees – all causes. 18 transtibial, 1 bilateral and 10 trans-femoral amputees.	Rehabilitation with prosthesis	Transtibial 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
Coffey L (51)	Review	Reviewed 30 papers, dementia, cognitive impairment, included all persons with LL amps, not just prosthetic users. All variables associated with cognitive function included	SIGN ratings 1++ to 2- US, UK, Canada 2 RCT 4 case control 18 cohort 4 prospective 6 cross sectional 2 non-analytical	Failure to gain prosthesis was associated with cog impairment, successful fitting of pts with poorer cognitive function equals less extensive use of the prosthesis Cognitive impairment was also associated with mortality, adherence to medical regimens and falls Cognitive deficit particularly of memory and executive function is predictive of greater functional limitations over time The authors identify a range of strategies will need to be used in the rehab of all amputees who have cognitive impairment	2++

## Appendix 9: Table of Papers Referenced Within the Updated Guideline

Citation	Study Design	Population	Subject or Intervention	Comments	Level of Evidence
Collin C (76]	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 and complete. No blind, objective outcome criteria. Adjustment made for other prognostic factors. No validation in independent test-set of patients.	III
Collin C [23]	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
Condie M [43]	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 transtibial 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
Cutson T (86]	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 and 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



## Appendix 9: Table of Papers Referenced Within the Updated Guideline

Citation	Study Design	Population	Subject or Intervention	Comments	Level of Evidence
Czerniecki J (52)	Cohort	Prospective cohort study, multi-centre undergoing major LEA surgery secondary to PAD or DM. TM, TT, TF levels (unilat) (n=87) pre-surg ax n=29 (33%) 18 years over. Exclu: cognitive or language barriers, non-amb prior to surgery	Pre-surg data collected for all participants (33% pre surg and 67% collective at 6/52 post-op) test-retest reliability showed 6/52 post-op retrospective recall was reliable. 6/52, 4/12 and 12/12 follow-up. Age, marital status, race, employment level, ed level, residential status, charlson Co-morbid index, BMI, LCI-5, amp level, primary aeit of loss, smoking, ETOH	P=0.03 TT and TF more likely to be treated for depression and anxiety P=0.05 proportion of smokers increased with higher levels of amputation P<0.001 decline in LCI-5 pre morbid to day of surgery Rate of decline steeper with increasing age p<0.05 and for those with art reconstruction p<0.05 12/12 levels of ambulation were significantly reduced compared to the LCI-5 premorbid (no p value given). Other evidence refutes this-discussed Study limitations discussed at length	2+
Czyrny J (54)	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 functi Follow up ended at discharge giving no indication of functional use of prosthesis in home environment. onal outcome. Completed by retrospective chart review.	III
De Fretes A [82]	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 [48]	Before and After Study	All levels and causes of amputation admitted to Canadian rehabilitation unit Controls n=21 Experimental n=20	Three 2-hour	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

## Appendix 9: Table of Papers Referenced Within the Updated Guideline

Citation	Study Design	Population	Subject or Intervention	Comments	Level of Evidence
Eneroth M [46]	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
Fletcher D [47]	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

## Appendix 9: Table of Papers Referenced Within the Updated Guideline

Citation	Study Design	Population	Subject or Intervention	Comments	Level of Evidence
Giummarra M (70)	Qualitative	N= 26 4, UL and LL amps, from one amp centre and media advertising. 75% males, 83% LL, 18.6% vasc, 9.5% ca, 50.4% trauma, 8.7% DM and 7.2% infection/ gangrene.51.1% PLP and PLS, 21.6% PLP only and 27.3% PLS only. Open and closed questions, questionnaire.	Postal questionnaires	<p>52.3% phantom first experienced immediately after surgery</p> <p>47.7% non-immediate phantom could not recall a specific trigger</p> <p>62.1% report spontaneous triggers to Phantom</p> <p>5 categories of triggers, in greater detail.</p> <p>Psych and emotional:  <math>P &lt; 0.05</math> trauma vs others  <math>P &lt; 0.01</math> more likely to use diverting mechanisms  <math>P &lt; 0.05</math> coping self statements  <math>P &lt; 0.01</math> use behavioural strategies eg household chores</p> <p>If triggered by Thinking about accident more likely to use diverting strategies <math>p &lt; 0.05</math></p> <p>Amp with emotional triggers adjust less well to the limitation of being an amputee <math>p = 0.05</math></p> <p>Motor Schema triggers:            49% used their phantom reflexively at some point, <math>p &lt; 0.01</math> (most recently)            Habitual behaviour e.g walking more likely soon after amputation <math>p &lt; 0.001</math>            Influence of weather            UL more likely to be affected by cold/wet <math>p &lt; 0.01</math> and hot humid <math>p &lt; 0.05</math> vs LL            Sens ref from body parts:            36.7% perceived phantom sensations are referred from stump, 11.4% from opposite limb            UL and LL were equally likely to receive referred sensations from the genitals, not significant <math>p = 0.21</math>            No signif between prior surgery and number of amputations            Two thirds reported at least one trigger that modified their experience of phantom            Detailed description of theory around phantom also given</p>	2+
Ham R [38]]	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 MDT and early delivery of a prosthesis. No homogeneity in studies. Non-blinded, non-randomised trial without intention to treat.	IV
Ham R [41]]	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

## Appendix 9: Table of Papers Referenced Within the Updated Guideline

Citation	Study Design	Population	Subject or 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 [78]	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 [58]	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
Jayantunga U [56]	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 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

## Appendix 9: Table of Papers Referenced Within the Updated Guideline

Citation	Study Design	Population	Subject or Intervention	Comments	Level of Evidence
Kirby L, (90)	Qualitative	Pts were assessed transferring from wheelchair to stairs, climbing the stairs in a seated position, manoeuvring themselves onto the step stool and then onto a chair and then the reverse. The process was standardised and pts carried out a pre stair training test, were provided training and then assessed and a self rating questionnaire was completed. The assessor was blinded to previous attempts. Pts responded +vly in the questionnaire re if they felt safe. Some found it difficult and 1 persons' knee pain was aggravated. N = 7	Is teaching seated stairs ascent and descent safe and effective for amputees and does it speed up rehab ?Very small sample size	Very small sample size, and recruitment strategy unclearWe don't know what stage of rehab this was carried out, doesn't identify differences between TFAs and TTAs (only 1 TFA) and also included pts over 18 but 18 yrs olds will find this activity v. easy	3
Klingenstierna U (44)	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 [93]	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

## Appendix 9: Table of Papers Referenced Within the Updated Guideline

Citation	Study Design	Population	Subject or Intervention	Comments	Level of Evidence
Kurichi (40)	Observational Study	Observational approach completed retrospectively. 1339 subjects included for analysis	Specialised in-patient rehabilitation compared to rehabilitation on a general surgical/medical unit	Relates to American Health Care System with limited transferability to the UK system	2+
Lambert A (67)	Cross-sectional Survey	Audit of physiotherapists at 35 artificial limb units in England and Wales	Residuum shrinker usage	Residuum 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 [92]	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 [81]	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 and 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 [73]	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
Mazari F, (63)	RCT	Patients randomized to either receive PPAM aid or AMA training before receiving definitive prosthesis. QOL and 10m gait velocity measured as outcome measures.	PPAM aid or AMA training.	13 patients in each treatment arm. Gait training on an articulated early walking aid (prior to prosthetic provision) did not offer clinical or QOL advantage over using the non articulated PPAM aid. Duration of physio treatments with definitive prosthesis after work on either EWA not statistically significant.	2+
McCartney C [68]	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



## Appendix 9: Table of Papers Referenced Within the Updated Guideline

Citation	Study Design	Population	Subject or Intervention	Comments	Level of Evidence
Meikle B [75]	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 (66)	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 (71)	Qualitative study	31 lower limb amputees attended one of 7 focus groups.	Focus groups discuss 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
Mulvey, M.R., (74)	Systematic Review	Review of 72 articles	Review of the evidence for TENS for phantom pain.	No rigorous evidence to support or disprove the use of TENS in phantom pain management.	1+
Pauley, T., (95)	Retrospective Cohort	1267 notes reviewed	Falls incidence and risk factors.	An increased age, LOS, 4+ co-morbidities, psychological impairment, 2+ meds PRN, benzodiazepines and opiates all increase risk of falling.	2-
Pernot H (39)	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 MDT. No homogeneity in studies. Can't tell if studies were multiple independent reviews of individual reports.	III
Pezzin L (85)	Cross Sectional Questionnaire.	146 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

## Appendix 9: Table of Papers Referenced Within the Updated Guideline

Citation	Study Design	Population	Subject or Intervention	Comments	Level of Evidence
Pollock C (62)	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 (77)	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. F/up complete.	Ila
Rush P (55)	Prospective Case series	16 healthy males (mean age = 48). Unilateral, prosthetic, trans-femoral amputees for ≥ 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
Quon, D.L (83)	Cohort. Semi-structured interviews	8 subjects	What influences decision to amputate in elective orthopaedic patients.	Limited extrapolation.	2+
Sapp L (79)	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
Rerkasem, K., (80)	Cohort	73 in experimental group. 110 in control group.	Diabetic foot protocol.	Emphasis on education for the care of the diabetic foot. Cohort of non-amputee patients – evidence to support education.	2-
Richardson, C., (97)	Cohort	52 subjects followed up at 6 months.	Ax of phantom phenomena, presence and characteristics.	Small sample. Bias not discussed. Highlights the benefit or asking about the nature of pain to best direct management.	2+

## Appendix 9: Table of Papers Referenced Within the Updated Guideline

Citation	Study Design	Population	Subject or Intervention	Comments	Level of Evidence
Sansam K, (49)	Literature review	57 studies selected that investigated factors that predicted walking ability.	walking	Predictors include cognition, fitness, ability to stand on 1 leg, independence of ADL's and pre-op mobility. Time from op to rehab and stump complications predict poor out comes. Comparison of articles difficult due to different methodology but authors indicated quality of design.	2+
Schaldach D (84)	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.	v
Schon L (91)	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 and 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 (64)	Pilot Randomised Cross-over Trial	12 trans tibial amputees from 5 Glasgow hospitals	AMA and 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
Smith D (69)	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 and 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

## Appendix 9: Table of Papers Referenced Within the Updated Guideline

Citation	Study Design	Population	Subject or Intervention	Comments	Level of Evidence
Stineman, M (89)	Longitudinal cohort study Cohort CASP	8 databases for 99 US departments. 2616 veterans. All levels of amputations. Completed rehab within 6 months of surgery. Used FIM, clinical characteristics and demographic data	N/A	35.9 % did NOT regain independence past grade 1 (full dependence), sig more likely to die within 6 months compared to grade 6 pts(P=0.001) Improvement of 1 grade showed a sig. lower mortality risk p=<0.05. 6/12 mortality - Metastatic Ca increased risk, haemodialysis and valvular disease p=<0.001, CCF p=<0.05,pulm. Circ p=<0.01, chronic anaemia, chronic pulm disease and depression = p=<0.01. Might be useful for OT guidelines. VERY DIFFICULT TO READ +++	2+
Van Ross, E. (60)	Observational, prospective, cohort study	66 trans-tibial patients, unhealed stump wound	PPAM AID use for 3 weeks	74% of stump wounds healed despite and in respect of PPAM AID use	2-
Ward K [59]	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
White E (87)	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
Yu and Lam (94)	Retrospective Cohort	Focus on timeframe immediately after surgery before formal inpatient rehabilitation or discharge to community hospital or home. 370 subjects included for analysis.	Retrospective review of incidence of falls and risk factors following lower limb amputation in three adult tertiary acute care hospitals between 2011 and 2005.	Canadian study. Incidence of falls was 16.5%. Risk factors for falls include dysvascular etiology, transtibial level and right sided amputation.	2+

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## Appendix 10: the Delphi Panel

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### ■ List of Delphi volunteers

Heather Pursey	Liz Bouch
Wendy Leonard	Sue Flute
Amy Jones	Louise Tisdale
Kate Sherman	Julia Earle
Amanda Hancock	Hayley Conroy
Matt Fuller	Ruth Woodruff
Maggie Wilson	Barbara Brown
Sarah Vernon	Kate Primett
Jane Cummings	Jennifer Fulton
Maria Manock	Elizabeth Torrance
Claire Norman	Gemma Springate
Karen Clark	Heidi Baker
Pip Joubert	Lauren Newcombe
Sarah Verity	Hannah Slack
Gill Atkinson	Anna Rose
Carla Shaw	Natasha Brett
Maria Brown	Kathryn Conway
Brenda Stoffberg	Nancy Golland
Clare Moloney	Helena Train
Tim Randall	Lizzie Taylor
Kathryn May	Jennifer Fernandes
Melanie Judd	Emma Rogerson
Laura Burgess	Jennifer Bullock
Rita Blundell	Rhian Duffus
Anne Harrill	Jane Watkin
Lucy Holt	Kim Ryder
Jane Greiller	Sara Smith

# Appendix 11: The Delphi Questionnaire

The questionnaire was sent out to the selected expert panel in Sept 2014. The following information was given regarding how to complete the questionnaire:

The original guidelines were published in 2006 and have proved to be a valuable tool in both the education and clinical practice of amputee rehabilitation. During the updating process BACPAR have been advised by the CSP to re-examine the expert opinion that was used to formulate recommendations where no evidence exists; we are therefore going to revisit the Delphi technique used within the original methodology to ensure that previous expert opinion is scrutinised and deemed to still be clinically relevant.

## Further Information:

*Below is a brief outline of the updating process BACPAR has so far undertaken:*

- An updated literature search has been carried out using recognised databases.
- The new titles elicited from this search were examined and categorised according to relevance.
- The relevant papers were appraised.
- The appraised articles were classified and the evidence rated.
- We have compared the new evidence with the original guideline recommendations drawn up. Where relevant new recommendations have been added or original recommendations modified to incorporate the new evidence.
- Every recommendation was scrutinised and, at the advice of the CSP, those stating basic and obvious good practice have been turned into 'Good Practice Points'.
- The recommendations which continue to be backed only by the expert opinion of the 2006 consensus group will be re-examining in this work.

## The Delphi technique:

This is a useful research method used to produce guidelines from consensus when clinical trials or published information is inadequate or non-existent.

- In the previous guideline two Delphi questionnaires were utilised to gain consensus opinion.
- The sections that the guideline recommendations are divided into remain unchanged; please bear these sections in mind as you answer the question.
- If 75% or more of experts agree on a statement, with strength of 7 or more out of 10, that statement will become a guideline. This strength of agreement will be considered sufficient to be consensus opinion.

Enclosed is the questionnaire. We would be very grateful if you could complete this at your earliest convenience and return it in the SAE.

Each statement has a 10cm line under it. The strength of your agreement with the statement will be indicated by the position of your mark on the line

0 ————— 10

No agreement

Full agreement

Please add any comments throughout the questionnaire as necessary. Use extra paper if you need more space to answer any question or to provide any further ideas or evidence. A second questionnaire will only be sent out if there are areas where consensus is not reached.

## 1st Questionnaire

### Statements for the Delphi process

#### Section 1 The role of the Physiotherapist within the MDT team

- 1.1 Within the MDT the role of the physiotherapist includes exercise therapy.
- 1.4 A physiotherapist specialised in amputee rehabilitation should be responsible for the management of physiotherapy care.
- 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.
- 1.7 The physiotherapist should be involved in producing protocols to be followed by the MDT.
- 1.8 There should be an agreed procedure for communication between the physiotherapist and other members of the MDT.
- 1.9 Within the MDT the role of the physiotherapist includes compression therapy.
- 1.10 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.
- 1.11 The physiotherapist, along with other professionals, should contribute in the management of residual limb wound healing.
- 1.12 The physiotherapist, along with other professionals should contribute to the management of pressure care.
- 1.13 The physiotherapist, along with other professionals, should contribute to the management of wound healing on the contra lateral limb if applicable.
- 1.14 The physiotherapist, as part of the MDT, should contribute to the management of pain as necessary.
- 1.15 The physiotherapist, as part of the MDT, should be involved in making the decision to refer the patient for a prosthetic limb.
- 1.16 The physiotherapist should contribute to the decision on which MDT outcome measures are to be used.
- 1.17 The physiotherapist, along with other professionals, should contribute to the patient's psychological adjustment following amputation.
- 1.18 The physiotherapist should be able to refer directly to a clinical psychologist/counsellor if appropriate.

#### Good practice points

- The MDT agrees its approach to rehabilitation (GPP)
- Roles and responsibilities are agreed within the MDT. (GPP)
- Patient and public involvement should underpin service delivery and development. (GPP)



## Appendix 11: The Delphi Questionnaire *continued*

- Establish channels of communication between:
  - o The MDT
  - o Stakeholders
  - o Commissioners
  - o Professional networks
- Education, audit and research should be undertaken on a regular basis by the MDT. (GPP).
- Documented pathways of care should be used. (GPP)
- 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 patient's record, with details of future management plan e.g. details of package of care, community therapy, prosthetic referral.

### Section 2 Knowledge

2.14 The physiotherapist should have an understanding of the pathology leading to amputation.

2.16 The physiotherapist should have knowledge of surgical techniques used in amputation.

2.19 The physiotherapist should be aware of the possible psychological effects which may occur following amputation.

2.20 The physiotherapist should have basic knowledge of the principles of counselling and should know when it is appropriate to refer a patient to a clinical psychologist/counsellor

2.21 The physiotherapist should be aware of the socio-economic impact of lower limb amputation.

2.23 The physiotherapist should be aware of the systems in place to refer for assessment for a prosthesis.

2.24 The physiotherapist should have basic knowledge of the provision of wheelchairs and accessories including pressure relieving seating.

2.26 The physiotherapist should have basic knowledge of the provision of equipment that can facilitate activities of daily living.

#### Good practice points

- There should be opportunities for CPD and lifelong learning

### Section 3 Assessment

#### All recommendations evidenced

#### Good practice points

- A locally agreed amputee specific physiotherapy assessment tool 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 considered to improve MDT communication.

### Section 4 Patient and Carer information

#### 4.1 Patient Journey

4.1.1 The physiotherapist should give patients information about the expected stages and location of the rehabilitation programme suited to their individual circumstances.

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.

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

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.

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

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

4.1.7 The physiotherapist should know where to refer patients for information about benefits.

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

4.1.9 The physiotherapist should be able to refer the patient to other agencies as necessary.

4.1.10 Where possible all verbal information/advice given should be supplemented in written form. C

#### 4.2 Informed Goal setting

#### All recommendations evidenced

#### 4.3 Care of the remaining limb

4.3.3 Physiotherapists should establish links with their local podiatry/chiroprody services to ensure that information and education given to patients and carers is consistent.

#### 4.4 Care of the residual limb

4.4.3 Instruction should be given to the patient/carers on methods to prevent and treat adhesions of scars.

4.4.4 The physiotherapist should give on-going advice about residual limb care.

#### Good practice points

- Names and contact details of the multi-disciplinary team 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
- Physiotherapists should be aware of the BACPAR Guidelines entitled "Risks to the Contra-lateral foot of Unilateral Lower Limb Amputees" and "Guidance for the multi-disciplinary team"

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## Appendix 11: The Delphi Questionnaire *continued*

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on the management of post-operative residuum oedema in lower limb amputees”.

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### Section 5 Pre-Op Management

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5.1 Where possible the physiotherapist should reinforce information given by other MDT members about the general surgical process (not technique).

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 appropriate and possible the patient should be instructed in wheelchair use 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 Where appropriate and possible transfers should be taught pre-operatively.

5.9 If indicated, the patient should be assessed for physiotherapy respiratory care.

5.10 If indicated, the patient should be given appropriate physiotherapy respiratory treatment.

5.11 Pain control should be optimised prior to physiotherapy treatment pre-operatively.

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

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### Good Practice Point

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- The Physiotherapist should be involved with the multi-disciplinary team decision to proceed with amputation and level selection
- Where this is not possible, a procedure for prompt referral to physiotherapy following decision to amputate should be developed

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### Section 6 Post op Management

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#### ■ 6.1 Immediate post operative care

6.1.1 Physiotherapy assessment and rehabilitation should ideally start the first day post-operatively.

6.1.2 Pain should be considered and adequately controlled prior to every treatment

6.1.3 Respiratory care should be given if appropriate.

6.1.4 A physiotherapist should use their assessments to inform the MDT regarding interventions and discharge planning.

#### ■ 6.2 Environment and Equipment

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

6.2.2 Therapists should be familiar with the correct use and availability of specialist equipment.

6.2.3 The physiotherapist should be involved in home visits where necessary.

#### ■ 6.3 Compression therapy

6.3.3 The timing of compression therapy application should be discussed with the MDT at an early stage

#### ■ 6.4 Mobility

6.4.1 Ideally, bed mobility should be taught first day post-operatively.

6.4.2 Sitting balance should be re-educated if needed.

6.4.3 Standing balance should be re-educated if needed.

6.4.4 Safe transfers should be taught as early as possible.

6.4.5 Mobility post-operatively should be in a wheelchair unless there are specified reasons to teach a patient to use crutches/zimmer frame/rollator.

#### ■ 6.5 Early walking aids

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All recommendations evidenced

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#### ■ 6.6 Falls Management

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All recommendations evidenced

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#### ■ 6.7 Wheelchairs and seating

6.7.1 Patients should routinely be provided with a wheelchair and appropriate accessories to include residual limb support (as appropriate) footplates, anti-tips and appropriate pressure management devices.

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.

6.7.3 Physiotherapist as part of the MDT should be able to teach the patient and carer how to safely use the wheelchair, including all accessories.

#### ■ 6.8 Prevention/reduction of contractures

6.8.1 Contractures should be prevented by appropriate positioning.

6.8.2 Contractures should be prevented by stretching exercises.

6.8.3 Where contractures have formed appropriate treatment should be given.

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## Appendix 11: The Delphi Questionnaire *continued*

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### ■ 6.9 Exercise programmes

6.9.1 Following on from the initial assessment, an exercise program should be provided to address the problems identified. This should be reviewed and progressed as appropriate.

6.9.2 An exercise regime should be given relevant to the patient's goals. And reviewed on a regular basis.

### ■ 6.10 Management of phantom sensation and pain

6.10.3 Techniques for the self-management of phantom sensation and/or pain should be taught.

6.10.4 Appropriate information and treatment should be given for residual limb pain.

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#### Good practice points

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- 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
- Physiotherapists should be aware of the BACPAR Guidelines entitled "Guidelines for the prevention of falls in lower limb amputees" and "Guidance for the multi-disciplinary team on the management of post-operative residuum oedema in lower limb amputees".
- Physiotherapists should be aware of the well established PIRPAG exercise program
- Physiotherapists should consider the option of ascending and descending the stairs using a seated method
- Physiotherapists should be aware of other relevant guidelines including AGILE and the OT guidelines

## Appendix 12a: Results from the Delphi questionnaire

Some consensus questions that were posed by the original GUG have been excluded from this list as there is new evidence that supports the recommendation and expert opinion is therefore not required.

Those statements that were included as implementation points in the original guideline were converted to Good Practice Points (GPP) and consensus was sort for these.

Questionnaire Results	Round 1 (n= 48) * Consensus not reached	Round 2 (n= 41)
Question Number	% Agreement	% Agreement
<b>Section 1</b>		
1.1	100.0	
1.4	95.8	
1.5	85.4	
1.6	95.8	
1.7	91.7	
1.8	93.8	
1.9	93.6	
1.1	95.8	
1.11	79.2	
1.12	70.8	New evidence to support the recommendation therefore expert opinion not required.
1.13	79.2	
1.14	100.0	
1.15	89.6	
1.16	89.6	
1.17	95.8	
<b>Section 1 GPP</b>		
1	89.6	
2	89.6	
3	83.3	
4	85.1	
5	93.8	
6	81.3	
7	93.8	
8	97.9	
9	93.8	
<b>Section 2</b>		
2.14	100.0	
2.16	87.5	
2.19	100.0	
2.2	85.4	
2.21	85.4	
2.23	97.9	
2.24	89.4	
2.26	93.6	
<b>Section 2 GPP</b>		
1	100.0	
<b>Section 3 - GPP</b>		
1	83.0	

## Appendix 12a: Results from the Delphi questionnaire

Questionnaire Results	Round 1 (n= 48) * Consensus not reached	Round 2 (n= 41)
Question Number	% Agreement	% Agreement
2	87.2	
3	83.0	
<b>Section 4.1</b>		
4.1.1	97.9	
4.1.2	91.5	
4.1.3	75.0*	87.8% following rewording of question
4.1.4	68.8*	87.8% following rewording of question
4.1.5	100.0	
4.1.6	87.5	
4.1.7	81.3	
4.1.8	77.1	
4.1.9	97.9	
4.1.10	89.6	
<b>Section 4.3</b>		
4.3.3	91.7	
<b>Section 4.4</b>		
4.4.3	95.8	
4.4.4	95.8	
<b>Section 4 GPP</b>		
1	93.8	
2	97.9	
3	93.8	
<b>Section 5</b>		
5.1	95.8	
5.2	100.0	
5.3	97.9	
5.4	100.0	
5.5	83.3	
5.6	95.8	
5.7	95.8	
5.8	81.3	
5.9	97.9	
5.1	100.0	
5.11	95.8	
5.12	83.3	
<b>Section 5 GPP</b>		
1	95.7	
2	100.0	
<b>Section 6.1</b>		
6.1.1	100.0	
6.1.2	100.0	
6.1.3	100.0	
6.1.4	100.0	

## Appendix 12a: Results from the Delphi questionnaire

Questionnaire Results	Round 1 (n= 48) * Consensus not reached	Round 2 (n= 41)
Question Number	% Agreement	% Agreement
<b>Section 6.2</b>		
6.2.1	93.8	
6.2.2	89.6	
6.2.3	89.6	
<b>Section 6.3</b>		
6.3.3	87.5	
<b>Section 6.4</b>		
6.4.1	95.8	
6.4.2	100.0	
6.4.3	97.9	
6.4.4	100.0	
6.4.5	93.8	
<b>Section 6.7</b>		
6.7.1	100.0	
6.7.2	93.8	
6.7.3	93.8	
<b>Section 6.8</b>		
6.8.1	100.0	
6.8.2	97.9	
6.8.3	97.9	
<b>Section 6.9</b>		
6.9.1	100.0	
6.9.2	100.0	
<b>Section 6.10</b>		
6.10.3	91.7	
6.10.4	93.8	
<b>Section 6 GPP</b>		
1	95.8	
2	95.8	
3	95.7	
4	100.0	
5	93.8	
6	100.0	
7	89.6	
8	79.2	
9	77.1	



## Appendix 12b: Comments from the Delphi First round and their impact on the 2016 Guidelines

No statement received more than 3 comments and the majority received only 1, and many were individual comment requiring no action. The table below outlines those statements where the comments resulted in changes to the statement or action from the GUG

All statements had consensus

Number	Statement	Comment(s)	Actions from GUG
1.8	Within the MDT the role of the physiotherapist includes compression therapy.	1. May have to in absence of nurse? Training issue 2. But with consent of the named consultant	This area can be highlighted during implementation including the Oedema management guidelines
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.	This sentence is contradictory	Amended by removing the word "solely"
1.14	The physiotherapist, as part of the MDT, should be involved in making the decision to refer the patient for a prosthetic limb.	Working in a tertiary/satellite clinic away from the limb centre makes communication more challenging - particularly initial decision making re management	The guideline is evidence of best practice and can be used to support changes to services
1.17	There should be an agreed procedure for communication between the physiotherapist and other members of the MDT.	1. We should be able to, but if local policy is that you are not able to, how can we change that? 2. However this is not my experience. The emphasis is on "should"	The guideline is evidence of best practice and can be used to support changes to services The guideline is evidence of best practice and can be used to support changes to services
Section 1 GPP 2	Roles and responsibilities are agreed within the MDT. (GPP)	Again this is harder when you work in a small satellite clinic but should be "best practice"	The guideline is evidence of best practice and can be used to support changes to services
GPP 3	Patient and public involvement should underpin service delivery and development. (GPP)	Not sure what this is aiming at? The service as a whole or individual pts	This will be clarified during implementation
GPP 4	Establish channels of communication between: o The MDT o Stakeholders o Commissioners o Professional networks	As the actual physio treating the pts, communication with the stakeholders and commissioners is difficult directly	This aspect can be clarified during implementation
2.24	The physiotherapist should have basic knowledge of the provision of wheelchairs and accessories including pressure relieving seating.	Is this asking that we should all be prescribers or aware of who is?	Original statement and comment
2.24	The physiotherapist should have basic knowledge of • Who prescribes wheelchairs • How they are provided • Any accessories including pressure relieving seating.		The amended statement using comments from the GUG

## Appendix 12b: Comments from the Delphi First round and their impact on the 2016 Guidelines

Section 3 GPP 1	A locally agreed amputee specific physiotherapy assessment tool should be used.	Could this be clarified further? - an agreed Ax tool from the limb centres we work with or within the trust?? In Lancashire we have 1 limb centre for a few trusts	Clarified as a local Assessment tool for the trust.
		this is difficult as we don't rehab to any prosthetics but in principle I agree	The amputee specific Assessment tool would consider whether the pt meets the criteria for prosthetic rehab or is a non-limb user
GPP 3	The principles of the Single Assessment Process (SAP) should be considered to improve MDT communication.	this is difficult as we don't rehab to any prosthetics but in principle I agree	The amputee specific Assessment tool would consider whether the pt meets the criteria for prosthetic rehab or is a non-limb user
4.1.3	The physiotherapist should offer patients the opportunity to meet other adults with lower limb amputations.	? "where possible" may be difficult in an isolated unit	This statement was reworded and sent out for a 2nd round of Delphi process and received consensus in the 2nd round
		where appropriate	
		Difficult to arrange on occasion but likely to meet other inpatients	
5.3	The physiotherapy assessment should be commenced pre-operatively, if possible	But this rarely happens	This is considered best practice and possible assumes appropriate
		"and appropriate" added at end of sentence	
5.7	Bed mobility should be taught where possible.	"and appropriate" added to end of sentence	Possible assumes appropriate
6.1.1	Physiotherapy assessment and rehabilitation should ideally start the first day post-operatively.	Remove the word "ideally"	This statement recognises that some pts may be too unwell for Ax and rehab to start 1st day post-operatively and therefore left unchanged

To provide context for statement 6.2.2 and the comments made, this is what precedes this statement in the guidelines:

### 6.2 Environment and Equipment

#### Evidence

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

#### Evidence

A questionnaire cross sectional survey carried out by White [87] in 1992 concluded that residual limb support boards are well accepted for use with patients with a lower limb amputation, but that therapists are not always confident about their use.

The evidence based guidelines for Occupational therapy with people who have had lower limb amputations recommend the provision of residual limb support boards for all transtibial amputees (88)

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

#### 6.10.1

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

6.2.2	Therapists should be familiar with the correct use and availability of specialist equipment.	This recommendation is vague and relates to the use of residual limb boards which I feel physios are aware of (in previous guidelines). If further evidence is used to guide this recommendation I feel the guideline should be more specific	Original statement and comments
		"Physio" added to the word Therapists"	
6.2.2	Physiotherapists should be familiar with the correct use and availability of a range of amputee specialist equipment e.g. slings, hoists, residual limb boards		The amended statement with clarification

## Appendix 12b: Comments from the Delphi First round and their impact on the 2016 Guidelines

6.4.1	Ideally, bed mobility should be taught first day post-operatively	Remove "Ideally"	This statement recognises that some pts may be too unwell for treatment to start 1st day post-operatively and therefore left unchanged
6.8.1	Contractures should be prevented by appropriate positioning.	?should say "advice" should be given re preventing contractures" as positioning + exercises are only effective if patient continues	The term "education" has been inserted into each statement.
6.8.2	Contractures should be prevented by stretching exercises.		
Section 6 GPP 3	Patients requiring ongoing outpatient treatment should have this arranged prior to discharge	"when possible" added to end of statement	The guideline is evidence of best practice and can be used to support changes to services
GPP 4	A summary of the patient's treatment and status at transfer should be sent to the physiotherapist providing on-going treatment	"if feasible" added to end of sentence	The guideline is evidence of best practice and can be used to support changes to services
GPP 8	Physiotherapists should consider the option of ascending and descending the stairs using a seated method	huge risks with this - we tend to avoid	This GPP reflects recommendation 6.4.6 and is supported by evidence (Ref Kirby)
		when properly risk assessed	
		Most of our pts are high falls risk	
GPP 9	Physiotherapists should be aware of other relevant guidelines including AGILE and the OT guidelines	Are not aware of OT guidelines - ?need for this/how would we be aware?	This can be addressed during the implementation process
		This needs "specialist" at the beginning of the statement, otherwise I'm not convinced they need to be aware of all the guidelines out there - there are lots!	

## Appendix 12c: Comments from the Delphi Second round

Number	Statement	No. comments	Score	Comment
4.1.3	The Physiotherapist will provide the patient with information and advice on how to meet an amputee with a similar lower limb amputation if they wish to. This could include information on local or national service user groups and referral to the local prosthetic service		9	The statement "If they wish to" Does this relate to the patient or the therapist?? I read it as the patient but is slightly ambiguous.
			6.8	Unable to introduce similar patients any more
4.1.4	The physiotherapist where appropriate and with the patients consent, can provide the family/carers with information and advice on how to meet other adults with a similar lower limb amputation. This could include information on local and national service user groups and referral to the local prosthetic service.		10	Important where there may be cognitive /memory issues that limit patients ability to understand +/- remember such information

### General comments;

- I would always suggest this meeting should be arranged by the physiotherapist/local prosthetic service to ensure an appropriate established amputee with a similar history is used wherever possible. (score = 10)
- Any member of the MDT should be able to provide information and set up meetings of established limb users (score = 8)
- As both of these statements stand I would not agree them. There is a confidentiality issue for prosthetic centres in formally introducing prospective patients to established patients. If however the statement was to read from the second sentence "This could include information on local and national charities who operate a volunteer visitor service" I could agree this. (Score = 0)

## Appendix 13: Definition of Sign's 'Grades of Recommendations

These grades are allocated by the GUG to the recommendations of the completed Guideline and based on the strength of the supporting evidence from which they were formulated.

The aim of these grades is to give the Guideline user important information about the quality of evidence upon which each recommendation is based; it is not ranking the recommendations in the authors' perceived level of importance to clinical practice.

Grade of Recommendation	Level of Evidence Found	Definition
A	1++ or 1+	Must have at least 1 meta analysis, RCT or systematic review rated 1++ that is directly applicable to the Guideline population Or A body of evidence rated as 1+ directly related to Guideline population with consistency in the results presented.
B	2++ or Extrapolated from 1++ or 1+ studies.	Must have a body of evidence rated as 2++ directly related to Guideline population with consistency in the results presented. Or Results extrapolated from 1++ or 1+ studies.
C	2+ or Extrapolated from 2++ studies.	Must have a body of evidence rated as 2+ directly related to Guideline population with consistency in the results presented. Or Results extrapolated from 2++ studies.
D	3or4	Evidence is gained from literature rated as 3 or 4 Or Results extrapolated from 2+ studies.

## Appendix 14: Domains of the Appraisal of Guidelines, Research and Evaluation (AGREE II)

This international, validated tool is designed to assess the overall quality of a Guideline. The tool contains 23 items and is split into six theoretical quality domains

Domain	Definition
Scope and Purpose	Clarity is needed about the overall objectives of the Guideline being developed and the potential impact on society & patient populations. There should be a clear description of the patient population to which the guideline is applicable to.
Stakeholder Involvement	Description of all of the authors involvement needed (including those just used for consultation or expert advice). A range of authors from differing professional backgrounds is thought to be essential to control potential biases. Stakeholders should have appropriate clinical skills and/or experience and/or technical expertise to justify their involvement in the formulation +/- implementation of the Guideline (patients views should be included in this process). Target user are unambiguously identified and the Guideline piloted amongst this group.
Rigour of Development	Systematic review and rigorous appraisal of the available evidence should be demonstrated. The methods used for formulating the recommendations are clearly described. External review of the Guideline has been undertaken by appropriate group of individuals.
Clarity and Presentation	Recommendations should be clear & unambiguous. Key recommendations are easy to identify and support material for application is included (i.e. – patient information, quick reference guide etc)
Applicability	Potential organisational barriers to implementation of the Guideline have been discussed with cost implications identified. Guideline also suggests identifies audit criteria so that the Guidelines use and effect in clinical practice may be measured by the Practitioner.
Editorial Independence	Is there independence from the Editorial group from any Funding committee & any conflicts of interest have been declared.

### ■ AGREE II scoring system

Each of the AGREE II items and the two global rating items are rated on a 7-point scale (1–strongly disagree to 7–strongly agree).

A quality score is calculated for each of the six AGREE II domains. The six domain scores are independent and should not be aggregated into a single quality score.

Domain scores are calculated by summing up all the scores of the individual items in a domain and by scaling the total as a percentage of the maximum possible score for that domain.

The scaled domain score will be:

Obtained score – Minimum possible score ÷ Maximum possible score – Minimum possible score

(Maximum possible score = 7 (strongly agree) x No of items in domain x No of appraisers

Minimum possible score = 1 (strongly disagree) x No of items in domain x No of appraisers)

The percentage allocated to each of the six quality domains help to form the overall quality rating of the guideline

## Appendix 15a: External, patient and peer reviewers

### ■ External stakeholders

British Association of Prosthetists and Orthotists (BAPO);

British society of Rehabilitation Medicine (BSRM);

International Society of Prosthetics and Orthotics (ISPO);

Limbless Association (LA);

Occupational Therapists in Trauma and Orthopaedics (COTSSTO);

Scottish Physiotherapy Amputee Research Group (SPARG);

Vascular Surgical Society of Great Britain and Ireland (VSSGBI);

Westminster Cross Party Limb Loss Group (WCPLLG);

### ■ Patient reviewers of new Information for Public document

Mr A Bamford, Mr A Lloyd, Mr Stephen Allcott, Mr and Mrs Broadhurst,

### ■ Peer reviewers

Peer Reviewer	Employing trust	Clinical speciality	AfC banding/job title
Lesley Anderson	Western Sussex Hospitals NHS Foundation Trust	Older persons rehabilitation	Band 7 physiotherapist
Alison Baldwin	Frimley Hospital Foundation trust	N/A	B 5 Rotational Physiotherapist
Claire Briggs	Belfast trust	N/A	Band 7 physiotherapist
Rosie Carr	Royal Devon and Exeter NHS Foundation Trust	Vascular Surgery and Amputee Rehabilitation	Band 7 Team lead
Alex Christiansen	Frimley Hospital Foundation trust	N/A	B 5 Rotational Physiotherapist
Hayley Crane		N/A	B 5 Rotational Physiotherapist
Claire Davey	Western Sussex Hospitals NHS Foundation Trust	N/A	B 5 Rotational Physiotherapist
Jack Davis	Leicestershire partnership trust	N/A	B 5 Rotational Physiotherapist
Emma Dyce	Working health services, Scotland	N/A	B 5 Rotational Physiotherapist
Cassandra Hall	Frimley Hospital Foundation trust	N/A	B 5 Rotational Physiotherapist
Sarah Holden	Oxford University Hospitals NHS Foundation Trust	Vascular and emergency dept	Band 7 physiotherapist
Kiran Katikaneni	Western Sussex Hospitals NHS Foundation Trust	Rehab of older persons	Band 7 Team lead
Natasha Lea	Frimley Hospital Foundation trust	N/A	B 5 Rotational Physiotherapist
Alison Minns	Western Sussex Hospitals NHS Foundation Trust	Amputee rehabilitation	Band 7 physiotherapist
Alex Palmer	Peterborough and Stamford Hospitals NHS Foundation Trust	N/A	B 5 Rotational Physiotherapist
Susan Saul	Lancashire Teaching Hospitals Trust	Surgical wards	Band 6 physiotherapist
Vicki Scott	Cambridge University hospitals foundation trust	N/A	Band 6 rotation
Bryony Skelton	Frimley Hospital Foundation trust	N/A	B 5 Rotational Physiotherapist
Ivanka Todorova	Western Sussex Hospitals NHS Foundation Trust	Amputee rehabilitation	B 3 Physiotherapy Technician
Sarah Wiejak	Cheshire and Wirral Partnership	N/A	B 5 Rotational Physiotherapist
Natasha Wilkinson	Western Sussex Hospitals NHS Foundation Trust	N/A	B 5 Rotational Physiotherapist



## Appendix 15b: Impact of comments from the reviewers using the Agree II tool upon the 2016 guideline update process

Each domain was scored using the scoring tool in appendix 14:

Domain 1 Scope and purpose= 86%

Domain 2 Stakeholder involvement =78%

Domain 3 Rigour of development = 75%

Domain 4 Clarity of presentation = 70% - see actions taken in table below

Domain 5 Applicability = 66% - see action taken in table below

Domain 6 Editorial independence = 72%

Relevant Agree II question/domain	Comments received	Action taken by GUG
Qn 5	Reviewers recognised that patients and service users found the recommendations document too complex for their needs	This had already been addressed by the creation of the new Information for the Public document
Qn 9	One aim to identify gaps in evidence and areas for further research has not been commented on	The GUG recognised that they were unable to get clarity on the gaps and therefore the aim was retracted
Qn 17 Domain 4	Several comments outlined the need to highlight the key recommendations	The GUG have retitled the main recommendations document to clarify this.
Qn 17 Domain 4	Comment regarding the omission of recommendation regarding the use of rigid dressings	BACPAR Oedema guidelines indicate that the use of rigid dressings lies with the surgical team and this is not a specific physiotherapy treatment modality. The BACPAR oedema guidelines are referenced within the recommendations.
Q18 Domain 5	Several comments highlighted lack of clarity regarding which physiotherapists the guidelines were developed for	This was clarified within the process document within the Aims and Objectives section
Q22	Comment identified that there was no clear statement within the process document regarding conflict of interest or potential for the GUG to profit from the guideline	The GUG had created a conflict of interest policy and all GUG members have completed a declaration of interest statement. This is available from the guideline co-ordinator
Domain 5	Several comments regarding the lack of undertaking a cost benefit exercise	No action taken. No evidence to complete this which is discussed in the process document
Domain 5	Conflicting positive and negative comments received regarding layout, format and application of the audit tool.	The comments were discussed at length, however no action taken, the GUG consider the audit tool is fit for purpose
General comment 1	The need to address patient responsibility within the Information for Public document	A new section regarding this was added to the Information for Public document
General comment 2	Comment regarding the use of the Agree II tool as the review tool and its limitations	Agree II is recommended by NICE as the gold standard tool for this process. The GUG did use other methods to receive feedback from both clinicians and patients e.g. postal questionnaires, focus groups.
General comment 3	Comments regarding the failure of the process document to address service structure, local planning and the operational implementation of the guideline.	No action. This is beyond the scope of this clinical guideline

## Appendix 15c: User Feedback on Public Information for Physiotherapy Management following lower limb amputation

Question relating to the information	Yes	No	Not answered
Does it answer your questions?	5	0	
Is it Clear?	5	0	
Is it readable?	4		1
General Comments	Action Taken by GUG		
No mention of the involvement of a doctor in relation to pain management	Wording of the leaflet altered to identify that the physiotherapist works in conjunction with the MDT and will liaise and work closely alongside them to establish optimum pain management for the patient.		
Regarding arranging a meeting with another amputee it was suggested that the level of amputation should always be matched	No action taken. The GUG decided that this would be a clinical decision by the treating physiotherapist based on individual circumstances.		

## Appendix 16: Definition of a Clinical Specialist in Prosthetic Rehabilitation

Since the first edition a new pay structure (Agenda for Change) has been introduced to all NHS staff. Due to national variations in the banding allocated to similar jobs it is no longer possible to define a Clinical Specialist by banding alone.

The following description has been formed by clinicians and managers involved in amputee rehabilitation.

Specialised physiotherapists should:

- Be experienced in amputee management, including lower limb prosthetic training
- Have a good understanding of prosthetics
- Be able to look after amputees with complex problems
- Be conversant with evidence –based clinical guidelines produced by BACPAR
- Ideally have a relevant post-graduate accredited qualification.
- Be a resource in terms of education, training, and development of senior physiotherapists and other professional staff.
- Carry responsibility for developing and utilising research evidence, current national guidelines and recommendations and integrating this into service delivery to ensure that practice is evidence based.

The CSP(2) define a specialist physiotherapist as one who works at an advanced clinical level within a specific clinical field. Their practice will be underpinned by advanced clinical reasoning and will encompass four elements, but the weighting attached to each element will vary to reflect the service need and organisational structure and the practitioner's own expertise/interests. The four elements of 'advanced' clinical reasoning were defined as:

### ■ Clinical Practice

- Demonstrates advanced knowledge/skills and clinical reasoning;
- Evidence of dealing with complex cases within a particular field of physiotherapy practice;
- Provision of advice/support to physiotherapy colleagues on clinical practice issues.

### ■ Evaluation

- Active participation in research and/or clinical evaluation and audit;
- Evidence of critically appraising the knowledge base and applying relevant high quality evidence to change practice;
- Publication(s) within the clinical field in peer recognized journals/periodicals.

### ■ Teaching

- Delivery of physiotherapy in-service education across the region;
- Acting as a mentor or supervisor for physiotherapy colleagues;
- Participation in developing post-qualification education packages;
- Involvement in the delivery of teaching to physiotherapy and/or other professions at a qualifying and post qualifying level.

### ■ Practice/service development

- Development of the clinical field with colleagues;
- Clinical supervision of senior members of the physiotherapy team within the clinical domain;
- Involvement in the local clinical governance agenda;
- Involvement in professional networks;
- Leading the physiotherapy service within a particular clinical field.

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## Appendix 17: Glossary of terms

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

### ■ Terminology:

**Audit**- In healthcare is a process used by health professionals to assess, evaluate and improve care of patients in a systematic way. Audit measures current practice against a defined (desired) standard. It forms part of clinical governance, which aims to safeguard a high quality of clinical care for patients.

**Benchmarking** – A systematic process in which current practice and care are compared to, and amended to attain, best practice and care.

**Bio psychosocial** – The biopsychosocial model states that health and illness are determined by a dynamic interaction between biological, psychological, and social factors.

**Causal** - The presence of cause, or ideas about the nature of the relations of cause and effect.

**Clinical Effectiveness** - “the extent to which specific clinical interventions do what they are intended to do” (98)

**Clinical Governance** - “the system through which NHS organisations are accountable for continuously improving the quality of their services and safeguarding high standards of care” (99)

**Cohort** – A group of individuals who share a characteristic at some specific time.

**Discharge Summary** - summary of the episode of care

**Evaluation** - review and assessment of the quality of the care for the purpose of identifying opportunities for improvement

**Goal setting** - establishing the desired end points of care.

**Hemi pelvectomy** - amputation of the whole leg plus the pelvis on that side; also known as a ‘hindquarter’ amputation.

**Hip disarticulation** - amputation involving disarticulation of the femur from the acetabulum.

**Knee disarticulation** - amputation by disarticulation of the tibia from the femur

**Meta-analysis** – A quantitative, formal, epidemiological study design used to systematically assess previous research studies to derive conclusions about that body of research.

**MeSH** – Medical Subject Heading: specified subject headings are used so that all databases are uniform in cataloguing their articles.

**Multidisciplinary team** - a group of people (e.g. healthcare staff, patients and others) who share a common purpose.

**Morbidity** – Is another term for illness.

**Neuropathy/Neuropathic** – Having to do with a damage to a nerve

**Oedema** – Swelling

**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’ (98)

**Patient Record**- Refers to any record containing patient details. Can be separate physiotherapy record or within multidisciplinary case notes.

**Peer review**- assessment of performance undertaken by a person with similar experiences and knowledge.

**Prosthesis** - artificial replacement of a body part

**Residual limb/Residuum** - remaining part of the leg on the amputated side

**Service user**- Anyone who is a patient or other user of health and/or social services

**Service provider**- A legal entity, or a sub-set of a legal entity, which may provide health care under NHS Service Agreements; it may operate on one or more sites within and outside hospitals.

**Stakeholder** – Are people or groups, each with a unique perspective, who have an interest in health care decisions.

**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

**Transfer of care** - the process of transferring the responsibility for care from one service to another. It includes secondary referrals and discharges.

**Transpelvic** - an amputation when approximately half the pelvis is removed

**Trans tibial Amputation** - amputation through the tibia

### ■ Abbreviations

ADL- Activities of Daily Living

AfC - Agenda for Change

Agree - Appraisal of Guidelines for Research and Evaluation

AMA - Amputee Mobility Aid

BACPAR - British Association of Chartered Physiotherapists in Amputee Rehabilitation

CASP - Critical Appraisal Skills Programme

CPD - Continuing Professional Development

CSP - Chartered Society of Physiotherapy

DSC - Disablement Services Centre

DGH - District General Hospital

EWA - Early Walking Aid

GP - General Practitioner

MRI - Magnetic Resonance Imaging

OT - Occupational Therapist

PPAM aid - Pneumatic Post Amputation Mobility Aid

PVD - Peripheral Vascular Disease

RCT - Randomised Controlled Trials

SIGN - Scottish Intercollegiate Guideline Network

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## Appendix 18: Useful resources

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### ■ Professional Organisations:

Contact details for BACPAR through the CSP or [www.bacpar.org.uk](http://www.bacpar.org.uk)

British Association of Prosthetists and Orthotists (BAPO)  
Sir James Clark Building,  
Abbey Mill Business Centre,  
Paisley PA1 1TJ  
[www.bapo.org](http://www.bapo.org)

The Chartered Society of Physiotherapy (CSP)  
14 Bedford Row,  
London WC1R 4ED  
[www.csp.org.uk](http://www.csp.org.uk)

International Society for Prosthetics and Orthotics UK NMS (ISPO)  
PO Box 2781,  
Glasgow, G61 3YL  
[www.ispo.org.uk](http://www.ispo.org.uk)

The College of Occupational Therapy (COT)  
106-114 Borough High Street,  
London SE1 1LB

Scottish Physiotherapists Amputee Research Group (SPARG)  
c/o Helen Scott (Chairman)  
Westmarc,  
Southern General Hospital,  
1345 Govan Road,  
Glasgow, G51 4TF.

Special Interest Group for Amputee Medicine for the British Society of Rehabilitation Medicine (SIGAM of the BSRM) (formerly AMRS)  
c/o Royal College of Physicians  
11, St Andrews Place,  
London NW1 4LE

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

Society of Vascular Nurses  
[www.svn.org.uk](http://www.svn.org.uk)  
Community agencies:  
List of Social Services available in local telephone directories

Other useful organisations:  
British Amputee and Les Autres Sports Association  
[www.balasa.org.uk](http://www.balasa.org.uk)

British Limbless Ex-Servicemen's Association (BLESMA)  
Frankland Moore House,  
185 High Road, Chadwell Heath,  
Essex RM6 6NA  
[www.blesma.org](http://www.blesma.org)

Disabled Drivers Association  
Mobilise Organisation National Headquarters,  
Ashwell Thorpe,  
Norwich NR6 1EX  
[www.dda.org.uk](http://www.dda.org.uk)

Disability Living Foundation  
[www.dlf.org.uk](http://www.dlf.org.uk)

Douglas Bader Foundation  
[www.douglasbaderfoundation.co.uk](http://www.douglasbaderfoundation.co.uk)

The Limbless Association  
Jubilee House, 3 The Drive,  
Warley Hill,  
Brentwood, CM13 3FR  
[www.limbless-association.org](http://www.limbless-association.org)

Limb Power – The British Ambulant Disabled Sports and Arts Association.  
[www.limbpower.com](http://www.limbpower.com)

Limb Loss information Centre  
[www.limblossinformationcentre.com](http://www.limblossinformationcentre.com)

Westminster Cross Party Limb Loss Group (WCPLLG)  
[feedback@apllf.co.uk](mailto:feedback@apllf.co.uk)

