Acute Amputee Physiotherapy Management

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27/03/2017

Content

Causes/levels of Amputation
Amputation surgery
Pre-operative therapy
Post operative therapy
Amputee Therapy Guidelines

Causes of Amputation

Diabetes Mellitus
Congenital
Trauma
Infection
Tumour
Vascular Disease

5000-6000 major LLA/yr
70,000 in UK
(NCEPOD 2016)
Levels of UL and LL Amputation

<table>
<thead>
<tr>
<th>Amputation Level Lower Limb</th>
<th>Percentage</th>
<th>Amputation Level Upper Limb</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partial foot</td>
<td>1.5</td>
<td>Partial Hand</td>
<td>22</td>
</tr>
<tr>
<td>Transtibial</td>
<td>53</td>
<td>Wrist Disarticulation</td>
<td>3</td>
</tr>
<tr>
<td>Knee Disarticulation</td>
<td>3</td>
<td>Trans-radial</td>
<td>40</td>
</tr>
<tr>
<td>Transfemoral</td>
<td>41</td>
<td>Trans-humeral</td>
<td>30</td>
</tr>
<tr>
<td>Hip Disarticulation</td>
<td>1</td>
<td>Shoulder Disarticulation</td>
<td>5</td>
</tr>
<tr>
<td>Hemi Pelvectomy</td>
<td>0.5</td>
<td><a href="http://www.limbless-statistics.org">www.limbless-statistics.org</a> (2011/2012)</td>
<td></td>
</tr>
</tbody>
</table>

Myodesis
muscles are anchored to the end of the bone

Myoplasty
muscles are attached to the opposing group
Surgical Closure of Trans Tibial Amputations

- A. Skew flap
- B. Equal A-P
- C. Equal M-L
- D. Long Post. Flap

Physiotherapy Pre-Operative Management

Pre-Operative Subjective Assessment

MDT Communication

“All patients admitted electively for lower limb amputation should be seen in a pre-assessment clinic to optimise medical co-morbidities and to plan post operative rehabilitation”.

(NCEPOD, 2014)
Pre-Op Subjective Assessment

**Discuss stages/ expectations of Rehabilitation**

- Gage what the patient is thinking - Goals
- Explain immediate post-op rehab
  - Exercise programme
  - Day 1 post-op review
  - Physio gym asap
  - Review discharge needs
- OT - access visit/wheelchair referral

Pre-operative Objective Assessment

- Bed mobility
- Joint AROM
- Mobility
Physiotherapy Post – Operative Management

It all begins first day Post Op – No lying about!

“Post operative physiotherapy should commence on the first day where possible and should include exercise, oedema management and use of early walking aids as appropriate.”

(NCEPOD 2014)

BACPAR guidelines
(Pre and Post Op Mgmt – 2006)

The MDT

Good Communication Is Essential

Pain Team
Diabetic Foot Clinic/ Podiatry
Surgical Team
Nurse
Dietician
Wheelchair Service

Social Worker
Local Physio
Prosthetic Physio
Occupational Therapist
Counsellor
Rehab Consultant
Prosthetist

PATIENT
Post Operative Management & MDT Roles

- Anticoagulation levels and return to normal medication
- Pain Control
- Bandages/drain removal 1-3 days post-op
- Monitor and reduce dressings
- Stitches removed ~ 10-14 days
- Encourage gradual independence on the ward e.g., transfers, washing, and toileting

Acute Post Op Physiotherapy Management

- Reassurance
- Respiratory Care
- Maintaining ROM/Posture
- Residual limb care
- Improving Mobility
- Prevent contractures
- Oedema Control
- Strengthening
- Timetabling Inpatient Activity
- Wheelchair use
- Goal setting
- Education/Health Promotion
- Falls prevention

Say What You See!

AID
Positioning – Prevention of Contractures

AKA – Prevent Hip flex/ abd contracture
BKA – Maintain full knee extension

Assess all UL/LL joints
Adequate Analgesia
Positioning
Education
Stretching
PNF/ Manual therapy
Splinting

Reassurance / Acceptance of new body image

Psychological impact (immediate or delayed)

Normalising altered body image
- Residual limb handling
- Moving the residual limb
- Use of appropriate language
- Visual feedback
- Support Group/ Limbless Association

Pain / Phantom Limb pain or Sensations

Exercise
Adequate Pain Relief
Self Management: Massage/Residual Limb Handling
Mind – Body Interventions
Graded Motor Imagery
Acupuncture
TENS
Phantom Limb Pain Evidence

- Davies, A (2013)

  - Well-conducted qualitative study using focus groups. Patients rated acupuncture and
    herbal medicine as helpful, but study was too small to provide strong evidence.

  - Pilot study: TENS reduced pain in 11/15 participants when TENS sensation was
    projected into the main site. The pain in the phantom limb or stump.

  - RCT, 51 PLP or CRPS randomly allocated to GM or PT and function. GM reduced pain and disability.

- Clark et al. (2012)
  - Customised postal questionnaire: 107 responses. 38% had GM or PT. GM was more effective than PT and control group.

- Moura et al (2012)
  - Literature review. Only studies of hypnosis, imagery and
    biofeedback were found. Studies on meditation, yoga and
    tai chi were missing. Mind-body approach to PLP is promising.

Residual Limb Oedema Control

Management

- Rigid Dressings
- Compression socks
- W/c stump boards
- Active exercises
- EWA
- Prosthetic limb use
- Elevation
- Medication

Bed Mobility / Transfers

- Transfer Day One Post Op
- Hoist
- Slide Board
- Forward/Backward
- Pivot (With/Without side panel)
- On/Off Floor
Exercises

Mobility
- Assess Standing Balance
- EWA - PPam aid/ Femurett
- Stair Assessment
- Prosthetic mobility (early mobilisation – VanRoss – 2009)
- Wheelchair mobility

Benefits of early walking aids
- Regain Mid Line
- Increase exercise tol
- Improve joint ROM and m/s strength
- Reduce stump volume
- Psychological
- Assess prosthetic suitability
- Skin Preparation
PPAM Aid – Adv/ Disadv

**Advantages**
- Easy to use
- Quick to don
- Cheap
- De-sensitises stump
- Reduces volume

**Disadvantages**
- Poor aesthetics
- Heavy
- No free knee mode
- Limited length options
- Non-durable

Femurett – Adv/ Disadv

**Advantages**
- Very adjustable
- Free+ fixed knee mode
- IT weight bearing
- Variable socket sizes

**Disadvantages**
- Poor aesthetics
- TFA only
- Timely and fiddly
- Expensive

Outcome Measures

- AmpnoPro
- GAS goals
- SIGAM
Falls Prevention

- MDT Approach
- Environmental Modifications
- Exercise
- Medication Review/Mgmt
- Gait training/walking aids provision
- Education
- Appropriate socket fit

Say What You See!

SOS.

Falls Guidelines

Care of the remaining limb guidelines

After 1-5 years, 26-53% of the dysvascular amputee population requires a second amputation

(Izumi et al. 2006)

Residual Limb Care


Residual Limb Care
Health Promotion

Guidelines
- Rehabilitation process should have an educational element that empowers the patient and carers to take an active role in their present and future management (BACPAR, 2006)

On-going service referrals
- Wellness Centre
- Alcohol/Drug liaison
- Smoking Cessation
- Dietician/Nutritionalist
- Diabetic Team
- Podiatry
- Therapy - Exercise promotion programmes
- Community Active Health Schemes

Occupational Therapy

Assess the patient
- Physical ability
- Cognition, memory

Assess home environment
- For wheelchair
- For prosthesis

Equipment provision

Discharge Planning

Referrals
- Inpatient rehab – generic or amputee
- Repatriation
- ICT or Community therapy
- DSc Referral + OPD PT
- Social services OT
- OT report for re-housing
Amputee Rehabilitation Guidelines

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

INCERD 2015

Evidence based clinical guidelines for physiotherapy management of adults with lower limb amputation

INCERD 2015

Guidance for the multi disciplinary team on the management of post operative residuum oedema in lower limb amputees (BACPAR, 2012)

MDT Guidelines References


MDT Guidelines References


References

References

7. Mayor S. Less than half of people undergoing leg amputation get good care, inquiry warns. BMJ (Clinical research ed). 2014 Apr 21; 348: g3127

Early Prosthetic Physiotherapy Management

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27/03/2017

Contents

- Prosthetic suitability
- Prosthetic terminology
- Prosthetic suspension
- Socket design
- Aims of prosthetic rehabilitation
- Normal gait
- Prosthetic gait training
When are patients ready for a prosthesis?

**Not Suitable**
- Cognitive impairment
- Hip contracture > 20 TFA
- Knee contracture > 30 TT
- Large open wound
- Patient does not want one
- Unable to sit – stand ind.
- Unable to stand for > 5 mins in bars – TFA only
- Not used TFA
- Medically unstable
- Oedematous stump

**Suitable**
- Wound healed
- No contractures
- Sit – stand Indep
- Indep. Transfers
- Medically stable
- Has successfully used EWA
- Understanding of prosthesis

Prosthetic Terminology

**Socket**
- Proximal part of the prosthesis. Has direct contact with the residual limb

**Liner**
- Used in TI prostheses to protect the skin.
- Made from a variety of materials including polyurethane and silicone

**Componentry**
- Prosthetic hardwear eg. the knee, foot and tibial tubes

Transtibial Prosthetic Fitting
Several techniques used to capture the residual limb:

- POP casting
- Hand casting
- Pressure casting
- Vacuum casting
- Scanning using Tracer Cad

Pressure Areas for TTA

Tolerant Areas
- Patella tendon
- Popliteal fossa
- Para-tibial areas
- Distal post aspect of stump

Pressure Relieving Areas
- Patella
- Tibial shaft, tibial tubercle
- Mid cut end of tibia
- Fibula head

Transtibial socket suspension

How does the prosthesis stay on?

- Cuff strap
- Supracapsular
- Elastic rubber/gel/silicone, or suction sleeve
- Seal in liner
- Pin lock system
- Belts
Transfemoral Prosthetics

TF and Knee Disarticulation Socket Design

How the prosthesis stays on?
- RPB (Rigid Pelvic Band)
- Silesian RSS (Roehampton soft suspension)
- TES (Total Elastic Suspension) belt
- Skin fit suction
- Liner – Seal-in or pin lock
- Self suspending

Transfemoral socket suspension
Transfemoral Prosthetic Componentry

- Locking – SAKL, HOKL
- Knees Units
- Polycentric
- Uniaxial–safety

Aims of prosthetic Physiotherapy

- Teach safe & correct donning & doffing until independent
- Close monitoring of skin / wounds
- Liaise with prosthetist re socket fit
- Set functional goals with patients
- Progress mobility using prosthesis
- Increase time prosthesis worn
- Teach on / off floor with and without prosthesis on
- Teach stump hygiene

NO PULLING UP
NO SWIVELLING
NO HOPPING
Normal Gait

**DEFINED AS:**
- A series of rhythmical, alternating movements of the trunk and limbs which result in the forward progression of the centre of gravity
- A series of controlled falls

Normal Gait Cycle

<table>
<thead>
<tr>
<th>Gait cycle 100%</th>
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</thead>
<tbody>
<tr>
<td><strong>Stance phase (St) ca. 60%</strong></td>
</tr>
<tr>
<td>0% initial contact</td>
</tr>
<tr>
<td>Single support P</td>
</tr>
<tr>
<td><strong>Swing phase (Sw) ca. 40%</strong></td>
</tr>
<tr>
<td>60–73% initial Sw</td>
</tr>
</tbody>
</table>

Determinants of Normal Gait

- Pelvic rotation
- Pelvic tilting
- Knee flexion/Extension
- Hip flexion/extension
- Foot/Ankle mechanism
- Lateral displacement of the body
- Minor: Neck and upper limb movement
Assessing Gait

Be aware of normal gait patterns

Two vantage points: Sagittal and Coronal

Consider muscle length and strength, joint ROM, balance and CV fitness

Consideration of symmetry

Observe sitting, standing, mobility and the transition between each of these

Start at the base of support and work up towards head

Be aware of normal gait patterns

Be aware of normal gait patterns

Amputee Gait Considerations

Compensatory patterns

General condition (pain, ex tol)

Bad habit

Shape, length, size of residual limb

Psychological factors

The prosthesis - Prosthesis Vs. Person

Inadequate re-education

Say What You See!
Weight transfer onto prosthesis – hip stability

Equal stride length

Rhythmical gait pattern

Minimise accessory m/s

Walking indoors

Turning, twisting, carpet, stepping over

Mobilising outdoors

Pavements
Slopes
Curbs
Grass

Swing through - ? Knee type

Transfemoral Rehabilitation

Donning – sitting or standing

Sit – stand

Weight transfer onto prosthesis

Gait re-education (Transtibial)

Transfemoral Rehabilitation

Donning – sitting or standing

Sit – stand

Weight transfer onto prosthesis

Transfemoral Rehabilitation
Use your other core Physiotherapy skills

![Diagram showing Musculo-skeletal, Neurological - Normal Movement, Respiratory, Orthopaedic, Psychology, Communication with other MDT members, Pathology/Anatomy.]

Outcome measures

- There are a number of outcome measures validated for amputee rehab:
- Activities-specific Balance Confidence Scale-UK
- Amputee Mobility Predictor
- Houghton Scale
- Locomotor Capabilities Index-5
- Trinity Amputation and Prosthesis Experiences Scales Timed Up and Go
- L-Test 28 Timed walk tests
- Berg Balance Scale

Prosthetic rehabilitation Guidelines


References


Any Questions?