1 year post amputee rehab

Pip Joubert
Amputee Rehab Unit – Guys and St Thomas’
Prosthetics at the ARU

• Patients admitted from 10-14 days post op
• 7 week patient stay
• Visiting prosthetist 2 times a week
• MDT assessments
• Service tends to be strict with prosthetic provision for transfemoral amputees: Must achieve local criteria
• Often more lax with the transtibials
Borderline patient predictor tool

<table>
<thead>
<tr>
<th>If patients are unable to achieve the following they are unsuitable for prosthetic rehabilitation:-</th>
</tr>
</thead>
<tbody>
<tr>
<td>• ► Be completely independent in using their wheelchair indoors and understand the importance of safe wheelchair drill</td>
</tr>
<tr>
<td>• ► Transfer independently from wheelchair to bed / chair / toilet and back using a standing pivot transfer</td>
</tr>
<tr>
<td>• ► Push up from sitting in wheelchair to standing independently in parallel bars</td>
</tr>
<tr>
<td>• ► Have independent standing balance within parallel bars (patients need to be able to stand for 5 minutes for casting)</td>
</tr>
<tr>
<td>• ► Hip flexion contracture under 25°</td>
</tr>
<tr>
<td>• ► Cognitively unimpaired i.e. be able to follow instructions, process new information and remember it over a period of time.</td>
</tr>
<tr>
<td>• ► With the aid of an EWA mobilise within the parallel bars. The patient should be able to achieve @ 4 - 10 lengths.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The following areas would cause concern and would impact on prosthetic rehabilitation:-</th>
</tr>
</thead>
<tbody>
<tr>
<td>• ► Muscle strength under MRC scale 4 in all four limbs</td>
</tr>
<tr>
<td>• ► Poor hand dexterity, with patient unable to manage velcro fastenings, straps or knee locking mechanisms.</td>
</tr>
<tr>
<td>• ► Patient unable to wash and dress themselves independently.</td>
</tr>
<tr>
<td>• ► Hips or remaining knee with flexion contractures over 25°</td>
</tr>
<tr>
<td>• ► Other pathologies e.g. CVA, RA, OA, respiratory problems and poor cardiovascular state.</td>
</tr>
</tbody>
</table>
ARU so far...

Open for 2 and half years

186 patients → 100 TTA’s of which 15 bilateral
78 TFA’s of which 9 bilateral
6 TKA’s
1 fingers and toes
1 upper limb

*96% trans tibial’s were given a prosthesis during rehab*
Common prosthetic questions raised for providing transtibial prosthesis

• Is this patient going to be able to remember how to put the prosthesis on correctly?

• Is the patient going to use the prosthesis safely?

• What is the benefit of the patient having a prosthesis?

• Is the patient likely to continue regular prosthetic use?
We therefore looked at the data...

Data for the first year of patients.

ARU 1st year 87 patients

Transformors 41 patients

Transstibials 46 patients

Followed up at Bowley Close: 23 patients
Timed up and go - Range of outcomes

Time (seconds)

ARU dc  1 month  3 months  6 months  12 months

Upper Quartile

Lower Quartile

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Two minute walk test - Range of outcomes

Distance (Metres)

ARU dc  1 month  3 months  6 months  12 months

Upper Quartile
Lower Quartile
Data Summary

• The median of the TUAG and the 2MWT continued to improve at 1, 3, 6 and 12 months however there was very little improvement between 3 and 6 months.

• Almost 25% of patients had poor outcomes or were not tested at 3 months. This was due to issues with wounds, musculoskeletal pain, cognition or failed community follow up.

• 8% had issues with the contralateral leg by 12 months requiring a 2nd amputation

• 24% had discontinued limb use
Reasons for Limb disuse

- cognition
- poor function
- wound
- patient choice
- death
Reasons for discontinued use

- **Choice**
- **Poor function**
- **Death**

<table>
<thead>
<tr>
<th>Timeframe</th>
<th>ARU dc</th>
<th>1 month</th>
<th>3 months</th>
<th>6 months</th>
<th>12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Choice</strong></td>
<td>5%</td>
<td>10%</td>
<td>15%</td>
<td>20%</td>
<td>25%</td>
</tr>
<tr>
<td><strong>Poor function</strong></td>
<td>10%</td>
<td>15%</td>
<td>20%</td>
<td>25%</td>
<td>30%</td>
</tr>
<tr>
<td><strong>Death</strong></td>
<td>5%</td>
<td>5%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
</tbody>
</table>

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## Factors that can limit prosthetic outcome

**Pre –Op**
- Co-morbidities
- Age
- Pre-morbid mobility
- Medications
- Skin integrity
- Ethnicity
- Socioeconomic status
- Cognition
- Social support
- Psychological factors
- Self efficacy
- Motivation

**Post-Op**
- High level of amputation
- Multiple amputation
- Post operative complications
- Wound healing
- Oedema
- Contractures
- Pain
- Delay to prosthetic fit
- Falls
- Energy consumption
- Functional factors

<table>
<thead>
<tr>
<th>Intrinsic factors</th>
<th>Amputation factors</th>
<th>Functional Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Amputation cause</td>
<td>Mobility level achieved without the prosthesis- transfers, wheelchair, hopping</td>
</tr>
<tr>
<td>Age</td>
<td>Amputation level</td>
<td>Independence donning, doffing and monitoring fit</td>
</tr>
<tr>
<td>City verses country</td>
<td>Bilateral amputation</td>
<td>Mobility aid used at discharge</td>
</tr>
<tr>
<td>Accommodation at discharge</td>
<td>Time to second amputation</td>
<td>Mobility level achieved at discharge</td>
</tr>
<tr>
<td>Diabetes, PAD, cardiac condition, ren failure, stroke, TIA, lower limb pathology</td>
<td>Time from amputation to casting and fit delivery</td>
<td>Roffman, et al (2014)</td>
</tr>
</tbody>
</table>
## BLARt Score for Amputee Outcomes Assessment Tool

(Blatchford Leicester Allman Russell tool)

<table>
<thead>
<tr>
<th>Sex</th>
<th>Score</th>
<th>Special Risks</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0</td>
<td>Severe respiratory disease(^2)</td>
<td>5</td>
</tr>
<tr>
<td>Female</td>
<td>1</td>
<td>Renal failure requiring dialysis</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stroke/neurological disease(^3)</td>
<td>3</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>Recent MI / Angina(^4)</td>
<td>2</td>
</tr>
<tr>
<td>14-49</td>
<td>0</td>
<td>Contralateral Limb Problems(^5)</td>
<td>2-4</td>
</tr>
<tr>
<td>50-64</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>65-74</td>
<td>2</td>
<td>Cause of Amputation</td>
<td></td>
</tr>
<tr>
<td>75-80</td>
<td>5</td>
<td>Trauma</td>
<td>0</td>
</tr>
<tr>
<td>81+</td>
<td>6</td>
<td>Congenital</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cancer</td>
<td>1</td>
</tr>
<tr>
<td>BMI</td>
<td></td>
<td>Orthopaedic</td>
<td>2</td>
</tr>
<tr>
<td>18.5 - 24.9 (Average)</td>
<td>0</td>
<td>Vascular</td>
<td>3</td>
</tr>
<tr>
<td>25 - 29.9 (Above Average)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30+ (Obese)</td>
<td>3</td>
<td>Level of Amputation</td>
<td></td>
</tr>
<tr>
<td>18.5 or less (Below Average)</td>
<td>2</td>
<td>Above / Through Knee</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Below Knee</td>
<td>1</td>
</tr>
<tr>
<td>Mobility Before Amputation</td>
<td></td>
<td>Hip Disarticulation</td>
<td>5</td>
</tr>
<tr>
<td>Wheelchair bound ≥12 months</td>
<td>5</td>
<td>Bilateral</td>
<td>4-6</td>
</tr>
<tr>
<td>Wheelchair bound &lt;12 months</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indoor mobility with aids</td>
<td>3</td>
<td>Cognitive Capacity(^6)</td>
<td></td>
</tr>
<tr>
<td>Outdoor mobility with aids</td>
<td>2</td>
<td>Confused</td>
<td>5</td>
</tr>
<tr>
<td>Unaided outdoor mobility</td>
<td>1</td>
<td>Limited Carry Over</td>
<td>3</td>
</tr>
<tr>
<td>Able to walk ≥3 miles</td>
<td>0</td>
<td>Alert / Aware</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total Score:</strong></td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Contralateral Limb Problems – score varies on degree of disability for example:
Score 2 – Underlying claudication (can weight bear), leg ulcers or knee replacement.
Score 3 – Toe / partial foot amputation (difficulty weight bearing due to neuropathy or balance issues).
Score 4 – Amputation or severe disease to limb (not able to weight bear or stand).

\(^2\) Severe Respiratory Disease – This was defined as a history of COPD, home oxygen therapy or shortness of breath at rest.

\(^3\) Neurological Disease / Stroke – Any history of CVA. Patients who had hemiplegia also scored on the contralateral limb problems.

\(^4\) Recent MI / Angina – MI within the last 6 months, ongoing angina.

\(^5\) We defined Cognitive Impairment as the inability of patients to retain information shortly after it had been discussed, such as physiotherapy exercises and basic instructions. It was categorised as:
Score 5 - Confused (unable to understand and retain information).
Score 3 – Limited Carry Over (able to understand but not retain information).
Score 0 - Alert/ Aware (able to understand and retain information).
76 year old woman

**PMH**
- Breast Cancer
- Type 2 Diabetes
- HTN
- Anxiety and depression
- Meningitis as a child causing mild cognitive impairment.

**Clinical history**
- Road traffic accident. Patient vs HGV lorry on crossing
- Crush injury to Left leg/foot + degloved
- Trans Tibial amputation
- Traumatic Brain Injury
- T1 fracture-stable

**Problem list and rehab**
- Cognitive impairment: CAM showed difficulty with problem solving, safety awareness, learning new tasks and recall of information
- Husband took full responsibility of the prosthesis on discharge.
- Mobile with close supervision with a frame

**Outcome measures**
- SIGAM: Ca
- Time Up and Go: 1.24 mins with frame and close supervision
- Two Minute Walk Test: 15m - with frame and close supervision
- LCI-5: 5/56

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**Bowley follow up**

**3 months**
- Unable to complete – had falls, stump painful

**6 months**
- SIGAM: Ca
- Time Up and Go: 1 min 41 seconds with frame and close supervision
- Two Minute Walk Test: 14m - with frame and close supervision
- LCI-5: 14/56

**12 months**
- SIGAM: Ca
- Time Up and Go: 1 min 38 seconds with frame and close supervision
- Two Minute Walk Test: 17.5m - with frame and close supervision
- LCI-5: 14/56
ARU

64 year old man

PMH
• Apical myocardial aneurysm
• heart failure
• Previous partial gastrectomy
• ETOH and Smoker
• Low BMI – 35kg on going investigation

Clinical history
• Necrotic ulcer lateral left foot leading to left 4th & 5th toe amputation
• Problems healing leading to below knee amputation.

Problem list and rehab
• Cognitive impairment: MOCA – 22/30, CAM highlighted poor short term memory, with difficulties learning new information and carrying over information.
• Lives alone with limited family input.
• Prosthesis made and trialled for 3 weeks but stopped due to poor carry over and safety issues
• Used prompt sheets, errorless learning, repetition ++
• Mobile with close supervision with a frame

Outcome measures
• SIGAM: B
• Time Up and Go: 45 seconds with frame and close supervision
• Two Minute Walk Test: 31 m - with frame and close supervision
• LCI-5: 5/56

Reasons for non limb use
• Poor memory
• Poor safety with wheelchair
• Able to follow donning instruction booklet but not always able to remember to use it.
• Poor problem solving
• Little family input
• Occasional risky behaviours
Case study 3

79 year old man

**PMH**
- Blind in left eye
- Hard of hearing
- IHD – Stent 2011
- HTN
- COPD
- Type 2 diabetes

**Clinical history**
- Infected diabetic foot ulcer and ischemia leading to right trans-tibial amputation

**Problem list and rehab**
- Wound originally on stump
- Slide board transfer with Ao1
- Weakness in left side secondary to OA, making the amputated side the stronger side.
- Trialled a sit to stand using the AMA – independent for 45s

**Outcome measures**
Discharged using the prosthesis for a rota stand transfer with family/ carer.
- SIGAM: B
- LCI-5: 1/56
- Timed stand: 3min

**Reasons for having a prosthesis**
- Moisture lesion on bottom making slide board transfers painful
- Good strength in amputated side
- Functional goals
- Very supportive family
- Reduced carer support required
- Good psychological benefits
- Maintain and strengthen lower limb muscles with standing
Rehabilitation efforts should best be targeted depending on need. Rehabilitation professionals should make an educated estimate of outcomes at the beginning of rehabilitation based on the characteristics of the patients (level of amputation and functional level on admission).

Hershkovitz et al, 2013
Change in practice

1. Cognition:
   • MDT assessment of prosthesis is ongoing: The ARU have increased OT input in this decision process
   • Every patient has a MOCA as part of their initial assessment
   • Patients that have been highlighted as having cognitive impairment have a CAM assessment
   • Close observation by team of patients cognitive ability while completing functional tasks- ie: planning/sequencing/recall/safety awareness
   • Continued joint working with family and carers
Change in practice

2.
• Create a predictor tool for prosthetic use in trans tibials at ARU or implement already validated tool
• Implement a criteria for borderline trans tibial patients
• Follow up community referrals
Further research

• Ongoing data collection of TTA outcome measures at the ARU.

• Pilot an outreach service to see if 3-6 month outcome measures can be improved***.
AnY QuESTiOn’S
References


• http://www.ncepod.org.uk/

