Guidelines for the Prevention of Falls in Lower Limb Amputees

To be revised April 2011

Assessment Tools

Tools to assess risk of falling include:

- Timed Up and Go [3,5,10,12,15,20,21,41]
- Berg Balance Scale [3]
- Functional Reach Test [5,21]
- Lawton and Brody Instrumental ADL Scale [6]
- Activities Specific Balance Confidence Scale [6,10,11,12,13,17,22,24]
- Falls Efficacy Scale [3,13]
- Prosthetic Profile of the Amputee [11,12]
- Tinetti's Performance orientated mobility assessment
- Quadriceps Strength [5,6,30]
- Timed Stair Climb [5]
- Timed Walk [5,10,12,21]
- Four Square Step Test [41]
- 180° Turn Test [41]

Objective

This guideline is based on current best evidence for the prevention of falls in amputee patients. Due to the paucity of evidence specific to amputees some information has been extrapolated from literature regarding falls in the elderly.

Definition of a Fall

An unintentional event which results in a person coming to rest on the ground, floor, or other lower level, other than as a consequence of loss of consciousness, overwhelming external force, sudden onset of paralysis, stroke or epileptic seizure. [43]

Incidence

Studies found 20% – 53% of amputees experienced at least one fall a year. [4,10,11,12,13,14]

Risk Factors

- Presence of Co-morbidities [3,6,7,14,15,16,17,18,19,20,21,22,23,26]
- Increasing age [3,5,7,8,11,13,15,18,19,20,21,22,23,24,25,26,27]
- Poor Balance [3,15,16,17,18,19,20,22,23,27,28,29,30,31,32,33,34,35,36]
- Reduced muscle strength [3,5,15,16,18,19,20,21,23,29,30,36]
- Medication [3,6,8,14,15,16,17,18,19,20,21,22,23]
- Environmental hazards [3,4,6,9,15,16,19,20,23,38]
- Gait deficiencies [15,16,17,18,20,22,23,30,37,39]
- Reduced confidence / fear of falling [6,10,11,12,13,16,17,18,19,21,24,30]
- Level of Amputation [4,14,28]
- Poor functional ability [3,10,11,13,17,18,19,21,22,23,27,38,39]
- Level of activity [19,20,21,23]
- Sensory deficits [17,19,20,23,28,30,32,38,39]
- Decreased flexibility [16,30]
- Length of hospital stay [8,14,26]
- Female gender [5,25]
- Previous Falls [6,20,39]

Multi-factorial Falls Prevention Programmes

These should include:

- MDT approach [36,38] (B)
- Environmental modifications [15,20,25,29,38,40] (B)
- Exercise [2,15,20,29,36,40] (B)
- Medication review [2,15,20,25,29,40] (B)
- Gait training and provision of walking aid [15,20,29] (B)
- Education [2,15,25,40] (B)
- Treatment of any acute illness [15,25] (C)
- A comfortable fitting prosthesis [36]

Overall Grade of Recommendation = B

Other Interventions

Education of healthcare professionals regarding risk factors, safe use of prosthesis and environmental hazards [2,4,40]

Tapering and discontinuing of psychotropic medications [15]

Using a strap across the inlet of a walking frame to prevent the patient stepping too close to the front of the frame [28]

Overall Grade of Recommendation = B

Future Research

The current available evidence suggests that a multi-factorial approach with an emphasis on exercise, in particular balance exercises is most effective in reducing falls. Further high quality, large scale studies, specific to amputees [33] are required to determine:

- The most appropriate clinical balance tool for this population [3,14]
- The most appropriate type, amount and specificity of exercise in reducing falls [14,15,18,29]
- The ideal intensity, frequency and duration of excercise programmes [15,18,29,42]
- The relative value of different components of falls prevention programmes [18,39]
- Specific interventions to assist in improving balance confidence and therefore quality of life among this population [10,11,12,17,22]

Additional Good Practice Points

- Teach patients how to get up off the floor in the event of a fall [4,18]
- Exercise programmes should include adequate intensity frequency and duration, with monitoring of compliance [6,15,16,18,29]
- Measures to prevent injury should be taken in all patients with a high risk of falling e.g. stump protectors [26]

Target Users of Guidelines

Multi-disciplinary team directly involved in amputee rehabilitation.

Exercise Programmes

Exercise programmes recommended to reduce the risk of falls include:

- Balance exercises [2,5,6,16,18,19,20,29,40,42] (B)
- Strengthening exercises [2,5,16,18,19,20,21,24,29,42] (B)
- Tai Chi [2,5,6,16,18,29] (B)
- Endurance exercises [5,20,29] (B)
- Stretching [16,18,20] (D)
- Multiple task practice [13,16,18] (D)
- Functional floor work [16,18]
- Co-ordination [20]
- Agility training [24,42]
- Gait [2]
- Transfers [2]
- Aerobic exercise [2,42]

Programmes should include a combination of exercises to be effective in reducing falls. [5,18,20,42]

Overall Grade of Recommendation = B

Environmental Modifications

Specific assessment by an Occupational Therapist to check for environmental hazards such as poor lighting, recommendations of modifications and assistance with their implementation. [2,9,15,23,38,40]

Overall Grade of Recommendation = B

Authors

Produced as part of the Post-Graduate Certificate in Amputee Rehabilitation June 2007

R. Blundell,
D. Bow,
J. Donald,
S. Drury
L. Hirst

Modified April 2008

Contributions by **P. Rochester**

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MAKING KNOWLEDGE WORK

Acknowledgements:
P. Rochester Senior Lecturer
Division of Rehab Studies University of Bradford
P. Broomhead Honorary Education Officer BACPAR
G.Hirst Design support

Literature Search

Databases Searched:
Medline, Amed, Cinahl, Cochrane, COT, Google Scholar, SIGN, PeDro, DARE, PubMed, Embase, Internet, Hand search of relevant literature

Key Words:
Amputee, Amputation – Traumatic, Amputation stumps, Falls - Accidental, In-patient

Level of evidence

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

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

1- Meta analyses, systematic reviews of RCTs, 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, bias, or chance and a high probability that the relationship is causal

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

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

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

4 Expert opinion

Grade of recommendation

A At least one meta analysis, systematic review, or RCT rated as 1++, and directly applicable to the target population; or
A systematic review of RCTs or a body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency or results

B A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or
Extrapolated evidence from studies rated as 1++ or 1+

C A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or
Extrapolated evidence from studies rated as 2++

D Evidence level 3 or 4; or
Extrapolated evidence from studies rated as 2+

Level of evidence awarded to each paper was assessed by 2 group members. Grades of recommendation were discussed and decided on as a group based on evidence available.

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