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Traumatic Limb Loss in Older Adults: A Case Study on Rehabilitation Challenges and Strategies

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ABSTRACT: Diabetes and Peripheral Vascular Disease are the leading cause of amputation for adults aged over 65[1]. However, traumatic amputations can also occur in this population and present another set of challenges for a person who may also be affected by other medical issues or have reduced function. This case presentation follows the journey of a patient in her late sixties from amputation to initial limb fitting. It will describe some of the difficulties faced by older amputees, and the physiotherapy assessment and management of this patient.

KEY WORDS: Older Adult Traumatic Amputee GMI Phantom

I. PATIENT CHARACTERISTICS

(Please note - due to the small population of my area, I am unable to provide a detailed description of the events leading to the amputation and the client characteristics as this may be identifying within this population) The client (Mrs. A) was a female in her late sixties, living alone. A medical event caused her collapse at home and she lay on the ground for several hours with her leg trapped under her body. Luckily she escaped without complications from the medical event itself, however the tissue in her lower leg and foot had restricted blood flow for several hours, which lead to compartment syndrome. Multiple surgeries followed to debride the necrotic tissue however this was unsuccessful and ultimately led to a transtibial amputation. She had poor wound healing after the debridement surgery and fragile skin in the popliteal fossa, which was at risk of skin breakdown. Mrs. A was previously in good health, however she was troubled by osteoarthritis of her hips and her hands. Her hobbies included walking and cooking. Mrs. A did not drive; previously she walked places to get to appointments, meet friends etc. Mrs. A had a small circle of friends and family in her local area.

II. EXAMINATION FINDINGS

Subjective: Mrs. A was motivated to walk as soon as possible after her amputation, however she was concerned how she would manage crutches (or even a wheelchair) given her osteoarthritis. Mrs. A was worried about being reliant on other people for help with her activities of daily living. Mrs. A reported that she felt like her foot was still there, which caused several falls when she stood up quickly as if she had two feet. Mrs. A admitted that she had failed to report a fall, as she was "embarrassed" about forgetting about the amputation for a moment.
Mrs. A identified her goals as: 1) being independently mobile around the inpatient ward, 2) be independent with ADLs and 3) learn to walk with a prosthesis within 8 months.

Objective:

- Body Structures and Functions: Right TT amputation with delayed wound healing, fragile skin in popliteal fossa, arthritis of MCP and PIP joints of hands bilaterally, mild osteoarthritis of both hips. Grade 4 (AIS Grading of Muscle strength) of hip abduction bilaterally, otherwise Grade 5 of all muscle groups. Grip strength of 22kg (R) and 21 kg (L).
- Activities and Participation- Mrs. A was able to transfer independently with a pick up frame. Mrs. A could stand for up to 6 seconds on her residual limb without hand support, but was able to perform most ADLS independently when she was sitting down.
- Environmental Factors/Personal Factors- Mrs. A's house was on a steep section with multiple steps (unsuitable for discharge). Mrs. A had clear goals.

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III. CLINICAL HYPOTHESIS

Mrs. A's main problem was her ability to live independently, given her issues with osteoarthritis which may affect her ability to mobilise with crutches/frames and self-propel a wheelchair and her history of falls on the inpatient ward. Mrs. A was very concerned about losing her independence and her usual home was no longer suitable for her.

IV. INTERVENTION

After completing the subjective and objective assessment as above, I reviewed Mrs. A's goals with her and we made a plan for physiotherapy input to address these issues.

1. Mrs. A was provided with a suitable wheelchair with stump support with a small pressure-relieving cushion to protect the fragile skin of the popliteal fossa. Mrs. A could self-propel this lightweight chair independently.
2. Mrs. A was given a programme of exercises for bilateral leg strengthening (particularly abduction of the hip), upper limb strengthening (to assist with transfers) and prone lying. Mrs. A completed this independently 2x day.
3. Mrs. A also began a Graded Motor Imagery programme to assist with the phantom pain and sensation. This included mental imagery, mirror therapy and laterality training as shown to reduce pain and cortical reorganisation[2].
4. Mrs. A completed functional exercises (transfers, reaching, balancing etc) to train balance in real-life scenarios.
5. Mrs. A was advised on stump care, particularly during the wound healing phase. Compression bandaging for stump shaping was completed under the guidance of the prosthetist and a wound care specialist.

V. OUTCOME

1. Mrs. A was completely independent within the inpatient ward in her wheelchair. She was gradually shown how to negotiate ramps, curbs etc. in her wheelchair and how to get up off the floor. She was completely independent with ADLs, and maintained adequate skin integrity in the popliteal fossa to allow limb fitting.
2. Mrs. A maintained joint range of movement of her hips and knees. Mrs. A improved the strength of her abductors bilaterally, which also improved her balance when standing on her remaining limb.
3. Mrs. A reported a gradual reduction in phantom sensation and did not have any more falls on the ward after beginning the Graded Motor Imagery programme. Mrs. A was reassured that phantom sensation in common amongst amputees[3] and was more open to reporting phantom pain to staff members.
4. Mrs. A was completely independent with ADLs on the ward. She sat down to get dressed and shower. Mrs. A could complete car transfers independently with assistance to load her wheelchair into the car.
5. Mrs. A cared for her stump with the support of the nursing staff for the wound. While her poor wound healing was initially a limiting factor to prosthetic fitting, her wound eventually healed enough to allow initial fitting.

VI. DISCUSSION

The challenges faced by an older adult with a traumatic amputation can be similar to those faced by an older adult with a vascular amputation, for example, co-morbidities such a osteoarthritis impacting on upper and lower limb function, delayed wound healing and poor mobility. However, an older adult who has a traumatic amputation may have less warning about the amputation than a person who has had vascular complications for many years which can significantly impact environmental factors such as the home environment and activities such as mobilising in the community or participating in hobbies, such as a walking group with friends.

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While an amputation requires a huge physical and emotional adjustment at any age, a traumatic amputation for an older person can have a significant impact on their independence. For Mrs A, physiotherapy examination and management focused on her own ultimate goal: to maintain her independence. This included stump management and exercises to optimise her function before limb fitting, ensuring independence with ADLs prior to limb fitting and addressing phantom pain/sensation with Graded Motor Imagery[2].

Other members of the multidisciplinary team were also involved in her care, for example, a prosthetist, a clinical psychologist to support Mrs A through the grief of losing a limb, a social worker to support her in finding suitable accommodation, an occupational therapist to consider adaptive equipment for cooking independently etc.[4].

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