

NHS Training for
Physiotherapy Support Workers

Workbook 2
Amputee rehabilitation



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Workbook 2

Amputee rehabilitation

2.1 Aim

The aim of this workbook is to provide the Healthcare Support Worker (HCSW) with the knowledge and skills required to work effectively in amputee rehabilitation.

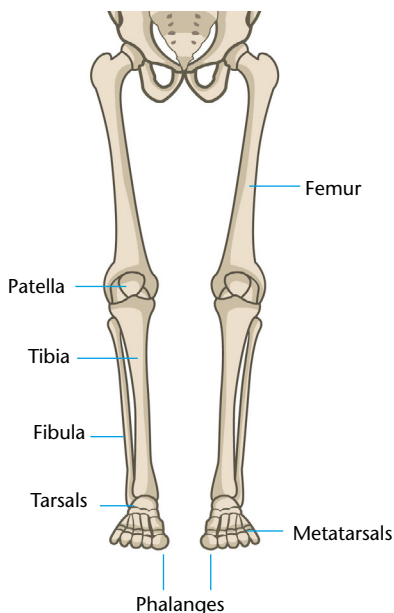
2.2 Learning outcomes

- Understand the main causes of lower limb amputations, the levels of amputation that you are likely to see and the likely mobility outcomes for each.
- Understand what diabetes mellitus is, how it affects individuals and be able to recognise diabetic hypoglycaemia in exercising patients and take appropriate action.
- Contribute to the ongoing management and treatment of amputee patients such as recognising stump oedema, supervising exercises and recognising pain.
- Understand use of early mobility aids and safely conduct activities with patients using wheelchairs, PPAM Aids and Femurett.
- Describe and demonstrate the use of the components of a variety of prosthetic limbs and be able to teach patients to safely and effectively don and doff their limb.

In order that you gain the most from this workbook it is important you complete the following workbooks prior to this one, or at the very least review the appropriate sections.

- **Workbook 4** Musculoskeletal system
- **Workbook 5** Pain control awareness
- **Workbook 9** Supervision of active exercise
- **Workbook 11** The articular system
- **Workbook 15** Transfers
- **Workbook 16** Walking re-education

2.3 Background knowledge



Bones of the leg

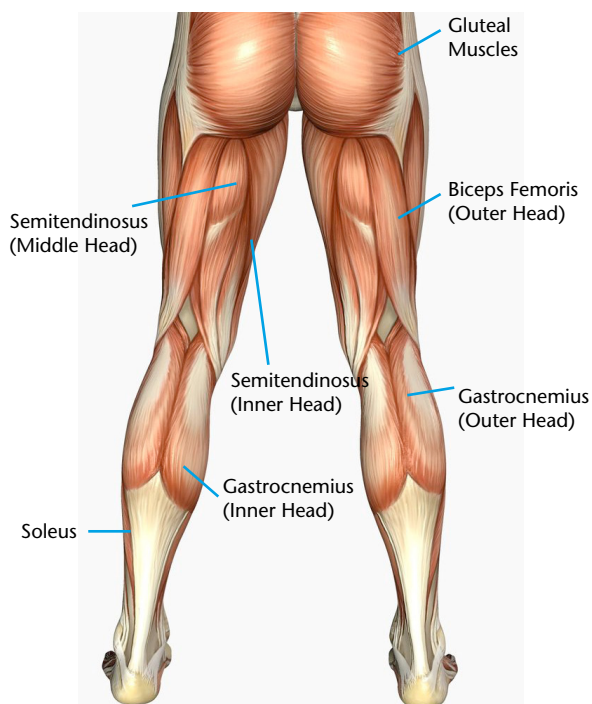
Most patients treated by in the amputee service will have had part of their leg removed.

Patients may require amputation of part of a leg for a number of reasons.

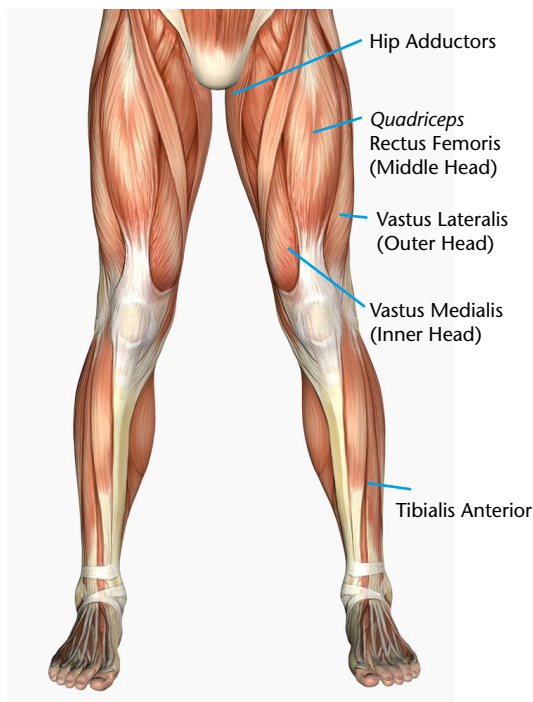
It is important therefore to have some understanding of the anatomy of the leg.

This will enable you to understand the terminology used, and to understand the effect that the different types of amputations will have on what the patient can do.

Muscles of the lower limb (posterior)



| Muscle | Movements |
|--|---|
| Gluteal muscles | Extend, abduct, externally rotate the hip |
| Biceps femoris Semimembranosus Semitendinosus | Flexes the knee |
| Gastrocnemius and Soleus | Plantarflexes the foot |



Muscles of the lower limb (anterior)

| Muscle | Movements |
|--|--|
| Adductors | Adducts the hip: pulls the leg towards midline |
| Quadriceps Rectus femoris Vastus lateralis Vastus medialis | Flexes the knee |
| Tibialis anterior | Dorsiflexes the foot |

Amputation

Amputation can be carried out through the hip, the knee and the ankle, as well as through the tibia or femur, pelvis or foot.

The reasons for amputation vary and will be discussed below.

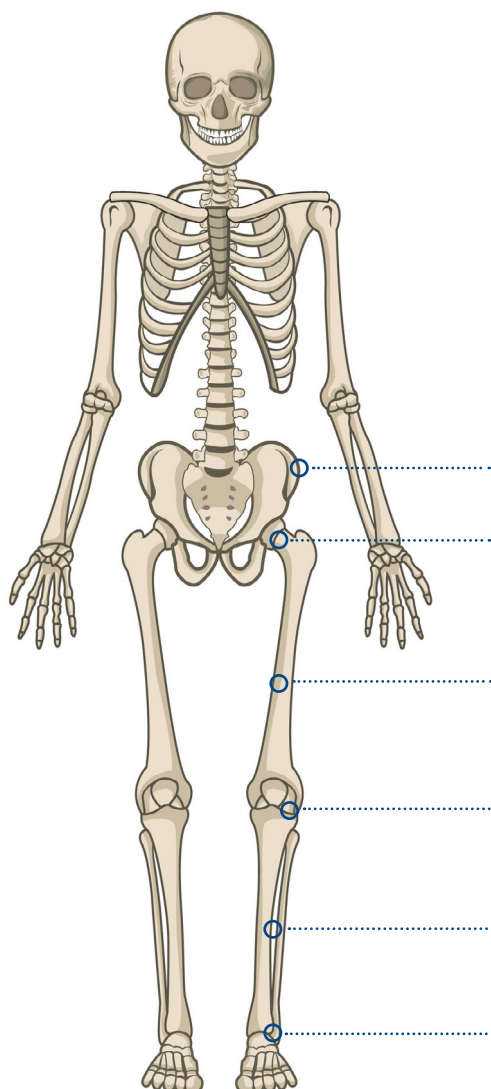
The ability of patients to return to walking following an amputation very much depends on where the amputation is carried out. This also determines the type of prosthesis that can be fitted.

The levels of amputation are shown on the next page.

What is a prosthesis?

A Prosthesis is an artificial limb that is tailor made and fitted for the individual patient.

Physiotherapists are involved in assessment of patients for suitability for prosthetic fitting, and in training patients in the use of the prosthesis.



Levels of lower limb amputation

The different levels of amputation of the leg.

Hemipelvectomy Half of the pelvis is removed, generally for malignant bone tumour.

Hip disarticulation The femur is removed from its socket in the pelvis. This is usually done because of tumour or as a result of trauma.

Above knee amputation Amputation occurs through the shaft of the femur. This is a very common level for amputation.

Through knee amputation The tibia and fibula are removed from the knee joint, leaving the patella.

Below knee amputation Amputation is done through the shafts of the tibia and fibula

Symes amputation The foot is removed through the ankle joint

Mobility outcomes

The extent to which the patient is able to become mobile again after amputation is determined by the level of amputation, comorbidities and the quality of the remaining limb along with other factors such as motivation and cognition.

Re-education of walking is more difficult for some amputees than for others, depending on how much of the limb has been removed. For example, patients with an above knee amputation may find rehabilitation more difficult than those with below knee amputations.

Energy required to walk with an above knee prosthesis is 85% more than required for normal walking.

At present 45% of all trans tibial amputees go on to limb fit but only 25% of trans femoral manage this (SPARG 2009).



Evidence

Describe the likelihood of patients regaining mobility with each type of amputation. What difficulties are there for each type of amputation?

Hemipelvectomy

Above knee amputation

Through knee amputation

Below knee amputation

Syme's amputation

2.4 Causes of amputation

There are several main causes of amputation:

- Peripheral Arterial Disease (PAD)
- Diabetic Vascular Disease
- trauma
- tumour
- congenital deformity

Around 85% of amputations are performed because of diabetes related vascular disease or PAD.

Diabetes mellitus

Diabetes is a condition in which levels of sugar (or blood glucose) in the blood are too high. Blood always has some glucose in it because the body needs glucose for energy. But too much glucose in the blood can be detrimental for health.

How do you get high blood glucose?

Glucose comes from food, and is also made in the liver and muscles.

Blood carries the glucose to all the cells in the body. Insulin is a chemical (a hormone) made by the pancreas.

The pancreas releases insulin into the blood. Insulin helps the glucose from food get into the cells. If the body doesn't make enough insulin or if the insulin doesn't work the way it should, glucose can't get into the cells. It stays in the blood instead. Blood glucose levels then get too high, causing pre-diabetes or diabetes.

What are the signs of diabetes?

The signs of diabetes are:

- being very thirsty
- urinating often
- feeling very hungry or tired
- losing weight without trying
- having sores that heal slowly
- having dry, itchy skin
- losing the feeling in your feet or having tingling in your feet
- having blurry eyesight

People can get diabetes at any age. There are three main kinds.

Type 1 diabetes

Formerly called juvenile diabetes or insulin-dependent diabetes

Type 1 diabetes is usually first diagnosed in children, teenagers, or young adults. In this form of diabetes, the beta cells of the pancreas no longer make insulin because the body's immune system has attacked and destroyed them. Treatment for type 1 diabetes includes taking insulin shots or using an insulin pump, making wise food choices, exercising regularly, taking aspirin daily (for some), and controlling blood pressure and cholesterol.

Type 2 diabetes

Formerly called adult-onset diabetes or non-insulin-dependent diabetes

Type 2 diabetes is the most common form of diabetes. People can develop type 2 diabetes at any age – even during childhood. This form of diabetes usually begins with insulin resistance, a condition in which fat, muscle, and liver cells do not use insulin properly. At first, the pancreas keeps up with the added demand by producing more insulin. In time, however, it loses the ability to secrete enough insulin in response to meals. Being overweight and inactive increases the chances of developing type 2 diabetes. Treatment includes using diabetes medicines, making wise food choices, exercising regularly, taking aspirin daily, and controlling blood pressure and cholesterol.

Some women develop gestational diabetes during the late stages of pregnancy. Although this form of diabetes usually goes away after the baby is born, a woman who has had it is more likely to develop type 2 diabetes later in life. Gestational diabetes is caused by the hormones of pregnancy or a shortage of insulin.

Management of diabetes

To replace insulin levels, patients either take insulin in tablet form, or by injection of insulin. Patients with mild diabetes can control their blood glucose with diet only.

When diabetic patients exercise, their blood glucose falls, and the patient may show signs of hypoglycaemia. Signs of this are:

- sweating
- vagueness
- drowsiness
- light headedness
- abnormal behaviour

You must know if a patient in your care is diabetic.

If a patient shows signs of hypoglycaemia during treatment:

- Inform the supervising therapist.
- If the blood sugar levels are thought to be low, treatment should stop, and the patient should be given a sugary drink, or digestive biscuit.
- Patient blood sugar levels should be checked: return the patient to the ward.



Evidence

Diabetic patients taking part in physiotherapy activities may become hypoglycaemic. It is important that you recognise the signs that a patient might be hypoglycaemic.

Describe here the signs of diabetic hypoglycaemia

Describe here a situation in which you thought a patient in the gym was becoming hypoglycaemic.

What did you do?

What went well?

Was there anything that you could have done better?

What would you do another time?

Causes of Amputation

Diabetes

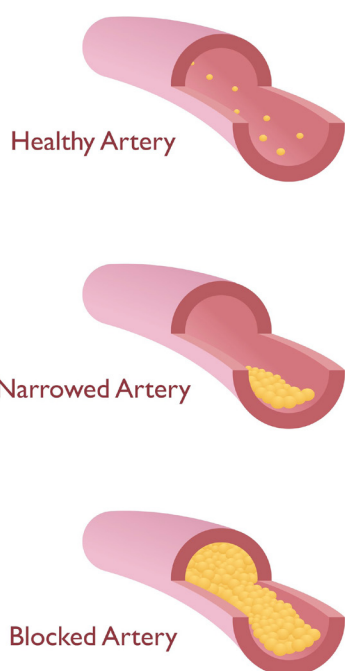
After many years, particularly if blood glucose levels are poorly controlled, diabetes can lead to serious problems in the eyes, kidneys, nerves, gums and teeth. But the most serious problem caused by diabetes is heart disease. People with diabetes, are more than twice as likely as people without diabetes to have heart disease or a stroke.

For diabetics, the risk of a heart attack is the same as someone who has already had a heart attack. Both women and men with diabetes are at risk and may not even have the typical signs of a heart attack.

Diabetics are also more likely to develop peripheral vascular disease, a condition in which the artery walls in the limbs become thickened and narrow with fatty deposits.

This can lead to a reduction in blood flow to the muscles of the limbs, which when severe can lead to amputation.

Peripheral Vascular Disease



In Peripheral Vascular Disease, fatty deposits build up along artery walls (atherosclerosis) and affect blood circulation, mainly in arteries leading to the legs and feet. In its early stages a common symptom is cramping or fatigue in the legs and buttocks during activity.

Such cramping subsides when the person stands still. This is called “intermittent claudication”. People with PVD have a higher risk of death from stroke and heart attack, due to the risk of blood clots.

Arterial ulcers are another complication of PVD. Leg ulcers are breaks in the layers of the skin that fail to heal and may be accompanied by inflammation. Sometimes they do not heal and become chronic.

Smoking, high blood pressure and obesity are risk factors for PVD.

Where the tissue of the limb is very badly affected, gangrene, or tissue death may occur, at which point amputation may need to be considered.

Traumatic amputation

Traumatic amputation is the loss of a body part - usually a finger, toe, arm, or leg - that occurs as the result of an accident or trauma. Only around 5% of amputations are caused in this way.

Tumour

4.5% of amputations are due to bone tumour. The majority are young patients, under 30 years of age.

Orthopaedic

This is becoming an increasing trend in reason for amputation either due to failed replacements and subsequent developing aneurysm in the popliteal artery or DVT.



Evidence

What are the common causes of amputation and why do they lead to amputation?

2.5 Stump healing

The normal healing process

Following a surgical incision, such as amputation, bleeding ensues, followed by clotting of the blood and formation of a scab.

Within the next 6–8 hours, an inflammatory process starts, in which white blood cells clean the wound, removing any debris and secreting growth factors that will help with repair of the tissue. This stage lasts for 3–4 days.

In the following days, new collagen, or connective tissue, and new blood vessels are formed, followed by the growth of a new skin layer that bridges the gap formed by the cut.

This stage lasts up to 4 weeks. Thereafter, the new tissue begins to contract and form scar tissue, pulling the edges of the wound together. The new scar tissue is never as strong as the original.

Factors influencing wound healing in amputees

The factors leading to amputation, such as arterial disease and diabetes may mean that healing is slow following amputation.

- Trauma of the surgery, poor bandaging of the stump, or inability to contract the muscles enough, may lead to swelling or oedema of the stump.
- Infection or trauma may cause inflammation of the skin or of the wound.
- Oedema is a serious problem following amputation and may lead to breakdown of the wound or infection. Either of these problems will lead to difficulties of prosthetic fitting and delays in rehabilitation.

It is very important that you can recognise the presence of stump oedema, wound breakdown and inflammation in patients that you treat and that you report it immediately to your supervising therapist.

Recognising Inflammation

Inflammation causes redness, swelling, heat and pain in the tissues of the body in response to chemical or physical injury or to infection.

Stump inflammation may occur as the result of surgery or injury, for example rubbing of the prosthesis.

Infection may also cause inflammation. The site of the amputation wound may become inflamed for example, if it becomes infected.



Evidence

Think about patients that you have been working with, or of your own experience of redness and swelling in a joint or on your skin.

How does the inflamed area look?

How does the patient describe it as feeling?

How do you think having an inflamed stump or wound might affect a patient's progress and ability to take part in therapy?

Recognising stump oedema

Oedema is an abnormal accumulation of fluid in the body tissues. Oedema may be visible as swelling. The stump may appear larger than it should, or it may have changed shape, with some areas appearing thicker than others.



Activity

Ask your supervising therapist to show you patients with stump oedema

- You should always inspect the patient's stump for oedema or inflammation prior to exercise, application of PPAM Aid, Prosthesis, Flowtron or any other procedure.
- You should always report any changes in the stump condition immediately to the supervising therapist.



Evidence

Describe below a patient in whom you recognised the presence of stump oedema.

| |
|---|
| How does the oedematous stump look? |
| How does the patient describe it as feeling? |
| How do you think having stump oedema might affect a patient's progress and ability to take part in therapy? |
| What did you do with the patient? |
| Anything that you could have done better? |
| Would you do anything differently next time? |

Management of stump oedema

There are several ways that stump oedema can be managed:

- The bed may be elevated to drain the oedema.
- The stump may be elevated on a stump board of the wheelchair.
- Shrinker socks may be applied.
- Flowtron, an intermittent air pressure machine may be applied.
- Using the PPAM Aid will assist in reduction of oedema – unless a rigid dressing is in situ.
- Active exercise and massage also reduces oedema.

Stump elevation

Find out how elevation of the stump is used to control oedema on the unit.

If a patient requires the stump to be elevated on a stump rest or whilst in bed, all staff working with the patient have responsibility to ensure that the patient is advised on correct positioning.

Your supervising therapist will advise you about the use of stump rest and bed positioning to reduce oedema and what to look out for.



Evidence

Describe here how stump oedema was managed using elevation with a selected patient.

What was your role?

What advice did you give the patient?

Anything you would do differently next time?

JUZO Shrinker

Another method for controlling stump oedema in patients who will go on for limb fitting is through use of a shrinker sock. Sometimes these are called Juzo.

These are fitted to the individual patient and usually started one week post amputation. The stump will therefore not be healed but it must not have any infection or ischaemia.

Usually patients are shown how to apply the Juzo by themselves, but supervision is important to ensure that the patients can apply it correctly and safely.

Your supervising therapist will demonstrate to you how to apply the Juzo shrinker and how to supervise patients in its application.

- Where there is a raw area, the sock must be applied with great care so not to pull on the wound.
- Ensure that the sock is smooth fitting – wrinkles will cause sore areas on the stump.

As with all oedema control, care must be taken to ensure that the stump colour does not change, and that there are no indentations or swollen areas on the stump.

Patients should be reminded to apply the sock when not wearing their prosthesis – in the morning before the prosthesis is applied and at night when the prosthesis is removed.



Evidence

Describe a real situation in which you applied or assisted a patient to apply a Juzo shrinker.

What went well?

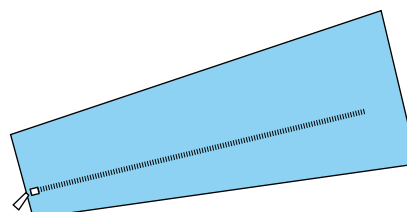
Anything that could have been better?

Anything you would do differently next time?

Flowtron



Pressure gauge



Pressure garment

Another method for reducing stump oedema is to apply Flowtron, an air pressure machine that is used to intermittently inflate a zipped sleeve fitted over the stump. (*Illustrated above*). The Flowtron is generally used to control oedema following amputation, but before the patient has been fitted for a prosthetic limb. The patient is taught to use the machine on the ward themselves. You may be asked to show the patient how to apply the splint and to use the machine.



Evidence

Your supervising therapist will show you how to use the Flowtron, and how to teach patients to use it, but here are some pointers:

- You must explain the procedure to the patient.
- You must check the stump for leakage before use – ensure that the wound is healed and dry.
- The patient would always have a Juzo shrinker sock or dressings on before application.
- Explain to the patient what is going to happen, and show him the equipment.
- Show the patient how to apply the splint – make sure that the bag closes over the end of the stump.
- The pressure gauge should be set at 40mmHg – never more.
- You should explain to the patient that the bag will inflate and deflate to create a pump effect that will reduce the swelling.
- The patient should know that he or she must inform a therapist or nurse if the splint becomes uncomfortable, and that the splint must be removed.
- Show the patient how to switch the machine on.
- The Flowtron should be used for 30 minutes three times per day.
- The patient should be shown how to unzip and remove the splint.
- The splint cover should be washed after use.
- The Flowtron machine should be cleaned.

Under supervision of your therapist, assist a patient to apply the Flowtron using the directions above.



Evidence

Describe a real situation in which you applied or assisted a patient to apply Flowtron.

What went well?

Anything that could have been better?

Anything you would do differently next time?

2.6 Pain and the amputee patient

Amputees may suffer from one of several types of pain. It is important that you are aware of these types of pain, and that you recognise when a patient is experiencing pain.

You should know that in collaboration with your therapist you may need to modify the activities that you carry out with the patients.

Early post-operative wound pain

This pain occurs:

- as a result of surgery and should be managed by post-operative analgesia
- from pressure on the wound during use of early walking aids and prostheses
- from discomfort in joints unaccustomed to stretching and exercise

Phantom sensation and pain

This occurs when the patient has an awareness of the amputated limb. It relates to the fact that although the limb is removed, the central nervous system still has memory of the nerve impulses travelling from the removed leg. Generally the sensation improves in time.

Sometimes however, the sensation is experienced as pain because the brain remembers the presence of the limb, but there is no response to commands from the brain, and no feedback from the limb, so the brain zaps up its activity over and over, leading to a sensation of pain. This may become a problem in time, requiring specialist pain management.

Later pain

Ongoing or persistent pain may continue in some patients for a variety of reasons:

- scar adherence
- problems of wound healing or oedema
- claudication pain (pain caused by insufficient blood supply) from the amputated or non-amputated side
- psychological factors, such as anxiety or difficulty adjusting to the change

Therapists and assistants can:

- reassure patients that this is a normal consequence of the surgery
- grade activities and progression accordingly
- request review of the prosthesis
- review analgesic regime with nursing and medical staff

Adopting a sympathetic attitude is vital in helping patients overcome their pain.

*“Pain is whatever the experiencing person says it is, existing when he says it does”
(McCaffery 1968)*



Evidence

Describe here a patient that you recognised as suffering one of these types of pain.

What did you do?

Anything that could have been better?

Anything you would do differently next time?

2.7 Exercise and amputation

Exercise is an important part of post-operative management of the amputee.

The purpose of these exercises is to:

- **Maintain range of movement and prevent shortening of the muscles of the amputated leg** This is very important, since loss of movement will impair the patient's ability to walk with a prosthesis.
- **Prevent and reduce stump oedema** Regular exercise to contract the muscles of the stump can prevent oedema.
- **Develop strength for**
 - moving themselves around in bed
 - for efficient transfers
 - for wheelchair mobility
 - for preparation for prosthetic use

Ensure that you are familiar with the above and below knee exercise programmes provided to patients.

The physiotherapist may in addition prescribe an exercise programme for individual patients.

You will be expected to supervise patients in carrying out their programme.

You should be absolutely clear that you know exactly what is required, and what is meant by the therapist's instruction. Do not proceed if you do not know what is required.



Evidence

Describe what factors you think that you should consider to ensure:

That the exercises that you carry out with a patient are conducted in a safe environment

That the exercises are carried out effectively



Evidence

Describe how you supervised a patient to carry out their individual exercise programme.

What went well?

What could have been better?

What would you do differently next time?

2.8 Group exercises

There may be occasions on which it is more appropriate for patients to carry out exercises in a group.

Indications that therapists might consider appropriate for this would be:

- Where patients have common disabilities with similar goals.
- Where patients require similar exercise regimes, but where the exercises can be modified to meet their individual needs.
- Where patients require some individual attention to monitor and progress their rehabilitation, but at the same time can take some responsibility for themselves.



Evidence

Describe here what you think might be some of the advantages of group exercise

Describe here what you think the disadvantages of group exercise might be



Evidence

Write here which exercises you do in your group exercises that are for

- endurance

- strengthening

- flexibility

Functional activity/recreational activities

Therapeutic Exercise groups may also include recreational or functional activities – this would include games, or activities that patients might need to be able to do at home, such as stretching to lift an object onto a shelf, or polishing a table top or window.



Activity

Write here the activities you do in your class that are either recreational or functional

2.9 Use of early mobility aids

Wheelchairs

In the earliest period following amputation patients will be taught to use a wheelchair for mobility. Some patients, those who are too unwell or frail to regain mobility and those who have had bilateral amputation may require to use a wheelchair as their only method of mobility.

Patients may find using a wheelchair psychologically difficult because of the association of wheelchair use with disability, and this must be dealt with sensitively.

Supervising the patient in wheelchair use

Part of your duty is to supervise the patients when they are making their way between the ward and the therapy areas.

- You must be aware of safety issues for patients when they are moving between areas.
- You should explain to the patient the importance of using a safety belt when moving in the chair and check that the patient has the belt strapped before moving between areas.
- You should ensure that the patient can manoeuvre the chair effectively and explain to the patient that it is important they are as independent as possible when using the wheelchair.
- You should be aware that patients may fatigue when propelling the chair and be able to recognise when this is happening. You must recognise when the patient requires assistance.
- Remember to ensure that the patient brings the necessary equipment with them.



Evidence

Describe below the threats to safety that a patient under your supervision meets when moving between areas of the hospital in a wheelchair.

Describe how you deal with these safety issues.

Is there anything that could be done better?

2.10 Early Mobility Aids: Pneumatic Post-Amputation Mobility Aid (PPAM aids) and the Femurett

PPAM aid uses:

- Patients start using this aid between 7 and 10 days following amputation.
- It enables patients to re-educate balance, weight bearing and walking very soon after amputation.
- It facilitates assessment for prosthetic fitting and rehabilitation.
- Weight bearing during walking with the aid reduces stump oedema because of the changes in pressure to the inflated bag as the patient steps on and off the prosthetic leg.
- Muscle control and balance are improved.
- The stump is prepared for prosthetic fitting.

Contraindications

The PPAM aid would not be used with:

- acute wound infection
- ischaemia (tissue death)
- deterioration of the wound with use
- increased wound pain with use
- some other general medical conditions
- Knee flexion contracture

The Femurett

The Femurett provides the same functions as the PPAM aid but only for above-knee amputees, it is more stable and therefore easier for some patients to use.

You will be expected to assist patients to apply these aids and to adjust them to ensure that they are used correctly.

Applying the PPAM Aid and Femurett

Your supervising therapist will demonstrate how to apply the PPAM aid or Femurett.

Application of the PPAM Aid

There are several points that you must consider for application of the PPAM aid:

- Position the patient correctly in sitting or standing.
- Check that the aid is in good condition.
- Ensure that wound is covered appropriately.
- Apply small inflatable cushion at the end of the stump, and hold in place.
- Pull the large bag over the stump and small bag to groin and buttock creases.
- Place frame over the large bag ensuring no creasing.
- Webbing straps attached and fixed to support the distal end of the large bag.
- Ensure that leg length is correct.
- Bag inflated to 40mmHg – check this with the foot pump.
- Stand the patient in the parallel bars, with assistance if required and check the fit and length. Re-check the pressure in standing and ensure it is 40mmHg
- The patient should feel even pressure.
- The patient should use the aid for at most 1 hour twice per day.
- The aid may be used with trousers, dressings or POP. Check for creases.
- The use of the aid is always for partial weight bearing: weight bearing in the parallel bars, with a walking frame or elbow crutches.

Application of the Femurett

- Check that the aid is in good condition.
- Ensure that wound is covered appropriately.
- Position the patient correctly in standing within parallel bars.
- Slide Femurett over clothing, ensuring no creases.
- Ensure ischium is on the seating of the aid.
- Stand patient with 4" between feet.
- Apply shoulder strap, ensuring a firm fit.

Assessment of gait with the PPAM Aid and Femurett

Once the patient has the aid on, you must assess that the walking pattern is normal.



Evidence

Write here what you would be looking for to tell you that the patient's walking pattern was normal with the PPAM aid and Femurett.

What difficulties might the patient demonstrate that would indicate to you that walking was not normal with the PPAM aid and Femurett and that the aid required adjustment?

Difficulties with walking

- The patient may have difficulty clearing the ground to swing the Early Walking Aid through.
- They may be unstable when weight bearing through the aid.
- They may have difficulty evenly weight bearing through the aid.
- The stump may piston: that is move up and down within the aid.
- The PPAM aid may deflate, and lose pressure which is very dangerous. Check that the bag is firm and adequately inflated.
- The shoulder strap on the Femurett may be too loose or has slipped off the shoulder, leading to pistoning.

You must be able to recognise these difficulties and be able to adjust the aid accordingly. You must know when to report difficulties to your supervising therapist.



Evidence

Describe what adjustments you can make to the PPAM aid and Femurett to ensure that it fits correctly.

PPAM aid

Femurett

What would you do if you felt that the adjustments were not effective?

PPAM aid

Femurett

Sitting down

- Ensure that the brakes are applied on the wheelchair, that foot plates and stump rests are clear.
- Remind the patient to place both hands on the chair prior to sitting.
- Remind the patient to place the PPAM aid or Femurett out in front before sitting down. The Femurett has a pin to pull up to allow the knee to flex.
- Replace stump rest and footplate, and instruct patient to use.
- Report any pain or leakage of the wound to the therapy staff.



Activity

Your supervising therapist will demonstrate how to apply and adjust the PPAM aid. Once you are clear about the procedure, and under supervision, apply the aids, and instruct the patient in walking re-education following the steps outlined above.



Evidence

Describe here both the application of the PPAM aid and the Femurett with appropriate patients.

PPAM aid

What went well?

Anything not so good?

Anything you could have done differently?

Femurett

What went well?

Anything not so good?

Anything you could have done differently?

Progression to advanced walking pattern

Once the patient has become proficient in use of the PPAM aid or Femurett, the supervising therapist in collaboration with yourself and the patient may indicate that the patient is ready to progress to a more advanced walking pattern.



Evidence

Describe here how you have assisted a patient, under supervision, to progress to a more advanced walking pattern with the PPAM aid and Femurett.

PPAM aid

What went well?

Anything not so good?

Anything you could have done differently?

Femurett

What went well?

Anything not so good?

Anything you could have done differently?

Prosthetic management

You will have a role in teaching patients to apply and remove their prosthetic limb, and you must therefore know the components of the prosthesis and be able to explain and demonstrate their use to the patient.

2.11 Components of the prosthetic limb

Socket

This is the part of the artificial limb that contains the stump and provides for weight bearing and stability. This is made to measure for individual patients.

Socket liner

This is a thermoplastic foam liner that is designed as an exact fit to the socket. The patient applies the liner before placing the stump into the socket.

Stump socks

Socks that are of the correct fit for the individual patient are applied over the stump, inside the liner. These ensure comfort of the stump inside the prosthetic socket, and are used to adjust the amount of padding where the size of the stump is fluctuating due to oedema.

The socks are made of different materials:

- **Nylon** This is a very thin covering that reduces friction of the socket against the skin, and is so thin that it is not regarded as padding.
- **Terry towelling** This is the thickest material and protects the skin and absorbs perspiration.
- **Cotton** This is thinner – two cotton socks are the same thickness as one terry sock.

Suspension

This is how the limb is held in place – there are several types that your supervising therapist will show you: supracondylar, cuff or ICEROSS. You will need to know how to assist a patient with each type.

Joints

Hip, knee or ankle, to replace those amputated.

Locking mechanism

Some knee joints in above knee prostheses lock, in order to provide maximum stability. The therapist will be able to explain what type of mechanism a patient is using and what the most appropriate technique for unlocking that knee is.

Prosthetic foot

A matching sock can be worn between the foot and the shoe for cosmetic reasons.

Cosmetic covering

The limb is covered in a flesh-coloured foam to give it a good cosmetic appearance.



Activity

With your supervising therapist, examine different types of prosthetic limbs. Find out the main components of each of the prostheses below, and what they do.

Above-knee prostheses

Below-knee prostheses

With your supervising therapist, and working with suitable patients, find out how the locking mechanism, socket and stump sock system and suspension system work on the prosthetic limbs used in the department.



Evidence

You should be able to demonstrate that you know what each part is for and to demonstrate on a limb how each part works for both an above knee and a below knee prosthesis.

- Socket system and socks
- Suspension system
- Locking mechanism

Briefly describe what each part of the limb is for, and how to work it:

Above-knee prostheses

Below-knee prostheses

Teaching a patient to don and doff a prosthetic limb

Once you know what the parts of the limb are and how they work, you will be able to assist patients and to teach patients to apply the prosthetic limb themselves.

As well as knowing how the parts of the limb work, you will need to be able to understand how the limb must be applied and removed effectively and safely.

Application of the prosthesis

Observe your supervising therapist teaching the patient to don and doff the prosthesis.

When you are ready, under supervision, teach a patient to don and doff a prosthesis.

Remember to explain each step carefully. As the patient becomes more able you will be able to gradually reduce your input so that the patient is independent at safely doing it for themselves.

Check the stump for abnormalities before and after limb use:

- bruising
- grazing
- wound breakdown
- oedema
- inflammation
- pain

Report any adverse changes to the therapist.

For below knee prostheses:

- Ensure that the socket liner and stump socks are applied correctly.
- Know the correct order of application.
- Ensure that correct length and type of sock is used.
- Nylon sock should go next to the skin.
- Apply socks ensuring smooth fit and no creases.
- Apply liner and pull over stump.
- Assess the comfort and fit.
- If leg loose or uncomfortable, report to therapist.
- Re-adjust sock profile as instructed and reassess.

For other below knee prostheses check the procedure with your therapist.

- ICEROSS
- Silipos

Above knee prostheses

- Patient should be sitting on bed or plinth with privacy.
- Remove lower clothing and dress prosthesis as appropriate.
- Put on stump socks as prescribed.
- Slide socket onto stump, ensuring correct position of foot.
- Stand up using walking frame for support
- Adjust stump sock over prosthesis.
- Apply TES belt and finish dressing.
- Ensure patient safety throughout.
- Supervise adequately and correct when necessary.

To remove the prosthesis

You must also be able to teach the patient to remove the prosthesis safely:

- Most patients will remove the prosthesis in sitting.
- Ensure that the patient can unfasten the suspension.
- They should be taught to ease the socket off and to remove the liner and socks.
- The patient should be taught to inspect the stump thoroughly after removal of the prosthesis for redness, rubbing, swelling or other abnormalities.
- Patient should be advised to wash stump and reapply juzo shrinker sock.

You will need to do this several times with amputees of different levels.

Acknowledgements

NHS Tayside

2.12 Amputee rehabilitation workbook completion

Your supervising physiotherapist will sign your portfolio to indicate that you have completed this workbook successfully.

| Objective | Physiotherapist's signature | Date |
|---|-----------------------------|------|
| Describe the levels of lower limb amputation that you are likely to see and the likely mobility outcomes for each | | |
| Discuss the main causes of lower limb amputation | | |
| Describe and recognise diabetic hypoglycaemia in exercising patients and the appropriate action required | | |
| Discuss the factors that effect wound healing in amputee patients | | |
| Recognise and assist with management of stump oedema | | |
| Explain the causes of post-amputation pain | | |
| Effectively teach patients the safe use of the flowtron | | |
| Discuss the benefits of early mobility aids and when they should and should not be used | | |
| Effectively apply early mobility aids and assist in the re-education of gait | | |
| Effectively fit and apply shrinker socks recognising and correcting errors | | |

| Objective | Physiotherapist's signature | Date |
|--|-----------------------------|------|
| Demonstrate the use of the components of a variety of prosthetic limbs | | |
| Effectively supervise patients donning and doffing a prosthetic limb | | |
| Describe possible psychological effects of amputation | | |

| |
|-------------------------------|
| Support worker (name) |
| Support worker's signature |
| Physiotherapist (name) |
| Physiotherapist's signature |
| Date |

2.13 Amputee rehabilitation reflection

Suggested KSF Dimensions: C2, HWB2, HWB7

This form should be placed in the appropriate section of your portfolio.

What did you learn from this module?

How has this influenced your work?

Date module completed

