

Information for Patients
with an above Knee Amputation

Direct Bone Anchoring of Amputation Protheses



Background

Many people who have tried to use or are using an above knee prosthesis have reported a range of problems and difficulties in using a prosthesis with a prosthetic socket. In a Swedish scientific survey of patients with a unilateral above knee amputation, 72% report problems with heat and sweating in the prosthetic socket, 62% report problems with chafing from the socket, and 44% say it is uncomfortable to sit while wearing the prosthesis and that these difficulties considerably reduce their quality of life.

Direct bone anchorage means that the prosthesis is attached without using a socket. The method is based on the principle of osseointegration, which has been in clinical use for prosthetic replacement of teeth since 1965. By surgically implanting a titanium screw, known as a fixture, into the femur – the thigh bone – the method produces a direct attachment for the prosthetic leg. The concept of osseointegration entails a direct contact between the fixture and the bone tissue, thereby assuring a stable attachment.

The main difference between a conventional socket prosthesis and a bone anchored prosthesis is the absence of a socket, which means the prosthesis always fits, always attaches correctly and is always firmly held in place. The absence of a socket also relieves other problems directly related to the use of a socket, such as heat, chafing and discomfort.

Treatment

The treatment involves two surgical procedures. In the first operation, a specially designed titanium screw known as a fixture is inserted into the residual femur. The fixture is then allowed to heal into the bone for 6 months with no load. During this period it is usually possible to use a standard socket prosthesis as soon as the residual limb has healed. In the second procedure an extension known as an abutment is attached to the bottom of the fixture. This abutment protrudes from the skin penetration area and serves as the attachment onto which the prosthesis is screwed.

However, to ensure a solid attachment between the titanium fixture and the bone, the bone needs to be carefully subjected to a load before the patient can start walking properly with a prosthesis again. This is done through controlled, gradually increased training using a short 'training prosthesis'. It is not



Abutment and skin penetration area

possible to walk with the training prosthesis. The real prosthesis is tested around 3 months after the second operation. In the months that follow the prosthesis can gradually be used more and more, although always with a pair of crutches. Walking without support or with only one crutch is possible around 6 months after the second operation.

The first operation generally requires 5-7 days in hospital, and the second about 10 days. The overall length of the treatment including both operations, rehabilitation and prosthesis provision is estimated at around 12 months for patients with a normal bone quality.

The skin penetration area

The point at which the abutment protrudes is called the skin penetration area. Just as it is important always to brush your teeth morning and evening, the skin penetration area must be cleaned twice a day.

The prosthesis

The prosthesis itself is made up of much the same parts as a standard prosthesis. However some components, such as certain knee joints, may not be suitable. At the top of the prosthesis is a special connector which forms the attachment between the abutment and the prosthesis. The connector has an in-built safety mechanism to prevent bone damage in the event of excessive loads, such as in a fall. The cosmetics of the prosthesis join onto the bottom of the residual limb.



Load training using a short training prosthesis on bathroom scales



Attachment of a prosthesis using an Allen key

Complications

As with all surgical treatment, there is a risk of complications which can alter the treatment or compromise the results. Superficial infections in or around the skin penetration area are not uncommon. These can normally be treated by particularly careful cleaning, although antibiotics may sometimes be required. More serious complications such as the fixture working loose or rupture of the attachment sections or the bone can also arise. Most complications are treatable.

Treatment location

Both operations are performed at the Department of Orthopaedics, Sahlgrenska University Hospital (SU). Rehabilitation and prosthesis provision take place at the Department of Prosthetics and Orthotics at SU, in co-operation with the patient's local health services. Much of the training takes place in the home with regular follow-ups at the Rehabilitation Centre for persons with a lower limb amputation at SU's Department of Prosthetics and Orthotics.

Subsequent checkups and prosthetic/orthotic servicing

Once treatment is complete, regular medical checkups are performed at Sahlgrenska University Hospital. Alongside the checkups, the Department of Prosthetics and Orthotics at SU also examines the prosthesis itself. Standard prosthetic/orthotic servicing can usually be dealt with locally, although continued servicing at SU may also be necessary.

Requirements for treatment

To find out whether a bone anchored above knee amputation prosthesis is suitable for you, we require the following information:

- A brief description of your amputation (cause and year) and the problems you are currently experiencing with a socket prosthesis
- A plain-film X-ray of your residual femur
- A description of any other illnesses and/or disabilities you may have

Please send this information to:

Sahlgrenska International Care
Medicinaregatan 12A
SE-413 90 Göteborg
Sweden



Team assessment

Before making a decision on treatment, you will be called to Sahlgrenska University Hospital for a 'team assessment'. There you will meet the treatment team, and a decision will be made on whether treatment can go ahead or if further investigation/examination is required.

At the team assessment you will also be given further information about the treatment in general.

Non-Swedish citizens require a payment guarantee for each visit to and treatment session at Sahlgrenska University Hospital. All financial issues for foreign nationals are dealt with by Sahlgrenska International Care.

Please feel free to contact us for further information!

Contacts:

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