



RESOURCEGUIDE RUNNING





University of Roehampton

RESOURCE GUIDE

A Guide to Running for Amputees

LimbPower have produced this guide to help you to begin to run. According to the *LimbPower Amputee Sport and Activity Survey 2016,* running is one of the top five activities amputees want to take up in the future. Over 83% of survey respondents are interested in doing more sport and physical activity in the future and running is one of the top five activities amputees would like to take up. You will also find some useful information on how to improve your running. Throughout the guide you will find useful links to additional resources to support you as you embark on your running journey. If you have any questions, try some of our online resources or contact LimbPower at info@limbpower.com.

*Constant for everyone as it is proven to increase life-expectancy and decrease the risk of developing various chronic conditions ***



Why Run?

Exercising for fitness involves raising the heart rate and fast walking and running are great activities to participate in. Exercise is important for everyone as it is proven to increase life-expectancy and decrease the risk of developing various chronic conditions. Physical activity is linked to a reduced risk of over 20 illnesses. Physical activity also has a positive impact on mental well-being, reducing depression, anxiety and psychological stress. One must not overlook the social and cultural benefits and the positive impact on education and employment, as well as increased social inclusion. Current guidelines suggest that people should exercise at moderate intensity (feel out of breath) for 30 minutes five days a week and that they should also do some strength training twice a week. See LimbPower's ABC Toolkit http://limbpower.com/index.php/resources for strength training exercises suitable for amputees.

Who to talk to

There are a number of people who can help you to learn to run. Here we outline who you can talk to and how they can help.

Rehabilitation consultant:

The rehabilitation consultant at your amputee rehabilitation centre holds the budget and makes the final decision on your prosthetic prescription, supervises the medical and surgical management of the amputee, monitors the general health of the amputee and plays an important role in diagnosing injuries and injury management.

Physiotherapist

The physiotherapist can advise you on your capacity for fast walking and running. By completing a physical assessment and if appropriate and in conjunction with the coach, the physiotherapist can develop and supervise a general fitness program. They can develop your general strength, flexibility, stability and endurance and provide you with basic education on sport specific skills. Through careful preparation with the physiotherapist, you can minimise the chance of developing an injury, joint pain and any long-term damage to your body. The physiotherapist should be satisfied with your physical health and condition, including your walking gait, before recommending that you begin running or receive a running prosthesis.

Prosthetist

The prosthetist will decide which prosthetic components you need for your running prosthesis including the suspension and interface. The prosthetist will work with you to correctly align your prosthesis to enhance symmetry and reduce gait deviations, which are magnified when running. The prosthetist is concerned with the effects of the prosthesis on movement and your utilisation of the prosthesis. Ask



your prosthetist if they have previously fitted a running prosthesis for your impairment, whether you are upper or lower limb. If they do not have experience and you want a second opinion, you can request a second opinion from any other amputee rehabilitation centre or LimbPower. LimbPower members can get a free consultation with a number of the private prosthetic firms who have experience in this area and often work with elite athletes. Contact LimbPower for more information on this.

Coach

After the introduction of the basic sport specific skills by the physiotherapist, a coach can work with you to create a training program and to develop your running. The coach is interested in your general movement and your running technique and will provide technical input. There are a number of resources you can share with your coach to support your running listed at the end of this guide.

A Guide to Running for Amputees

Preparing to Run strength and conditioning

The physiotherapist should conduct an initial assessment (PTI) to test if you are ready to run. This initial assessment should include a gait analysis and an assessment of your posture, agility/mobility, strength and stability. Walking is assessed as it is important to ensure that you can (a) move the limbs forward safely and with minimal chance of tripping (b) take weight effectively on both limbs with minimal chance of the leg collapsing under you or the leg being injured and (c) that you are fit enough to be able to keep going for a period of time. Any problems with these aspects will be magnified in running and so could result in injury, falls or exhaustion.

If walking is difficult for you, then changes can be made to your prosthesis or you can undergo a strength and conditioning programme to help get you fit enough to walk well and thereafter to run.

LimbPower has developed a fitness session and supporting videos and a toolkit to help amputees to develop their balance, coordination and agility along with their strength and conditioning. To read this toolkit visit the LimbPower website **www.limbpower.com** or to book onto one of these sessions please contact the Sports Development Officer on **07503 030702** or at **andy@limbpower.com**

A good starting point before learning to run is to be able to walk quickly for a sustained period of time. This prepares the heart and lungs for the increased demand associated with running and most importantly, it prepares the muscles, tendons, ligaments and bones for the increased forces they will experience when running. By developing strength in the muscles and bones, the likelihood of their being injured is reduced.

Walking training needs to address any walking deviations, as these will be magnified during running – for example, if you have a limp it means that one side of your body is being over-loaded. By training, you can reduce and correct deviations or you can make sure that the muscles and bones are strong enough to accommodate any deviations. It is important to minimize deviations to avoid injury.

Preparing to run your prosthesis

It is easier to run on a prosthetic leg designed for running. These prostheses have a spring which compresses when loaded and returns energy when unloaded. There are a number of different prosthetic legs designed for running on the market and so choosing the right one can be difficult. Generally running blades range from those suitable for fast walking and slow logging through to sprint specialist prostheses. It is important to note that running prostheses designed for sprinting may not be suitable for running on the road. We have included some information here so that you can talk to your prosthetist and discuss some of the advantages and disadvantages of the components on the market. Remember, if you are purchasing a running blade privately it can cost upwards of £4,000 for a single below-knee blade, socket and fitting.

You will know when it is time to move from an everyday prosthesis to a running

prosthesis, it may be that you are frustrated that you can't go faster on your current leg, or you feel limited by the lack of energy return. As you move to more frequent participation or competition you will start to notice the limitations of your everyday prosthesis. Remember there are different types of running prosthetic leas designed for running, with different levels of stiffness for different types of running; jogging, sprinting etc. If you are increasing your level of activity and your competence beyond where you were when you were prescribed the running prosthesis, you will need to go back to your consultant and prosthetist to discuss an upgrade.

If you are registered with a Disablement Services Centre that does not fund activity and sports limbs you can:

a) Look at what is available within the current NHS prescription that you can run on and ask if you can trial one of these prostheses.

The NHS do not fund dedicated sports specific limbs. They will fund a prosthetic limb which would be considered your everyday prosthesis, which has the capacity to be used for running and other activities.

Above knee amputees have a more limited choice of prosthesis and prosthetic function, but it is still worth having the discussion with the rehabilitation team at your limb centre. For upper limb amputees a prosthesis is generally not worn for running, unless for balance or for support in the starting blocks.

b) Ask your Disablement Services Centre if you can apply for a running limb through an exceptional funding request.



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"Running in many ways is really the most exciting, diverse and vibrant sport there is "

Type of prostheses

A Guide to Running for Amputees

The different prostheses recommended for running at different levels of activity which are available on prescription from the NHS.

available under the		
current prescription	Below Knee	Above Knee
Lower activity	Standard prosthesis with no modifications	Standard prosthesis with no modifications
Medium activity	Standard prosthesis, with some shock absorbing properties and a quality sports shoe	Standard prosthesis, with locked or hydraulic knee, some energy storing properties
High activity	Prosthesis with blade and excellent shock absorbing properties and a quality sports shoe	Reinforced prosthesis, hydraulic knee or no knee, energy storing foot
Competitive/Specialist (these are unlikely to be available through the NHS)	Prosthesis with blade and excellent shock absorbing properties and a quality sports shoe	Carbon socket, energy storing blade; hydraulic knee with dampener or no knee
Type of prostheses available under the		
current prescription	Below elbow	Above elbow
Lower activity	No Prosthesis	No Prosthesis
Medium activity	No Prosthesis	No Prosthesis
High activity	No Prosthesis	No Prosthesis
Competitive/Specialist (unlikely to be available through the NHS)	No prosthesis or specialist prosthesis with rigid formed blade/starting block prosthesis	No prosthesis or specialist prosthesis with rigid formed blade/starting block prosthesis

c) Or you can ask for a second opinion from another amputee rehabilitation centre. Prosthetics are nationally commissioned so you can choose where you go for your prosthetic requirements.

What is a Clinical Assessment?

Your rehabilitation consultant and prosthetist will meet with you to discuss why you want a sports/activity limb. They will look at factors such as:

• If you are not a congenital amputee, were you involved in the sport/activity you want to pursue prior to your amputation? 2 If you are not a congenital amputee, were you active prior to the amputation?

Can you prove that if you are given the limb you will make good use of it? To help the clinical team to make the answer 'yes' you should support your request with evidence. For instance, joining a running club or group can prove that you are dedicated. You can ask a coach at the club to support your application by asking them to write a letter of support to give to your rehabilitation consultant and prosthetist.

G Check with your prosthetist whether your prosthesis is suitable for running on

before you try to run. If it is not suitable for running, do not run on it as you may injure yourself or damage the prosthesis. Have you tried running on your current limb, but are limited by its capability? You should bring some evidence that you are trying to participate/compete in the activity on a limb that does not fulfil the function. Some people request a consultation with one of the private clinics. This will normally cost you a consultation fee of around £100, however they will write a report stating whether you will benefit from having the limb you want. Contact LimbPower for a list of private clinics who will offer LimbPower members a free consultation.

What is your current health and activity level? Are you exceeding expectations on your everyday limb, taking on exercise or sporting activities that result in your everyday limb breaking?

If you can demonstrate with evidence your interest in running for fitness and your current prosthesis is limiting you, then a prosthesis with the capacity for running and other activities may be available through the NHS. This may be funded through the existing contract.

If you are turned down for a running/ activity limb, ask the Rehabilitation Consultant/prosthetist how they came to this decision. Ask your GP to refer you to another limb centre for a second opinion or an independent rehabilitation provider who will fund activity limbs.

Visit the LimbPower website resources section for an updated list of charities and organisations you can approach for funding http://limbpower.com/index. php/resources.



Manufacturers

Have a look at the web sites of these manufacturers to get an idea of the options that are available, and think seriously about what you want from the prosthesis.

Blatchford Opcare Ossur OttoBock RSLSteeper www.blatchford.co.uk www.opcare.co.uk www.ossur.co.uk www.ottobock.co.uk www.rslsteeper.com

Running — Prostheses and componentry

Lower Limb Below knee componentry

Feet – For running use an energy storing foot. During sprinting the prosthetic can incur loads up to five times bodyweight.

Prosthetic legs designed for running are made of lightweight carbon fibre that runs the full length of the blade. These blades come in different categories relating to the different stiffness of the carbon fibre. The higher the category the stiffer the foot. Sprinters use stiffer feet than distance runners because the impact of sprinting is greater than the impact of jogging. It is important to use the correct stiffness for the amputee and the distance they are running as the wrong stiffness can lead to gait deviations including knee hyperextension. **Liner** – The liner protects the stump from shear and frictional forces. Polyurethane and silicon liners are popular among active amputees. Recently liners are being developed to deal with sweat production. Socket type - A well fitting socket needs to allow the efficient transfer of energy from the residual limb to the prosthesis, while

allowing free movement. Total bearing sockets evenly distribute loads over the whole surface of the residual limb. **Suspension** – will be down to the amputee's choice and confidence in the system. The choice is a cuff, elastic sleeve, gel sleeve, self suspending, locking and sealing liner (using a valve or pump). **Trimlines** – should be kept to a minimum to avoid restricting movement, particularly knee flexion. Medial and lateral trimlines should be kept to a minimum.

Alignment – refers to the position of the socket in relation to the foot. The aim of the alignment is to reduce or eliminate gait deviations. Core stability and prosthetic alignment work in unison. Good core stability and precise alignment can improve efficiency.

Static alignment and dynamic alignment

Static Alignment is the evaluation while the prosthetic user is standing, with weight distributed equally on both limbs and feet approximately 10cm apart. Dynamic Alignment is the evaluation while the user is in motion.

The focus of the dynamic alignment is to remove gait deviations and allow for symmetrical running. The dynamic alignment will change as the amputee becomes more proficient and more efficient when using the running prosthesis. The alignment will need adjusting to focus on the amputee using their muscles for control and not the prosthesis.

Above knee componentry

More components are required in an above knee prosthesis. **Foot** – For above knee runners it is important that the category of foot is



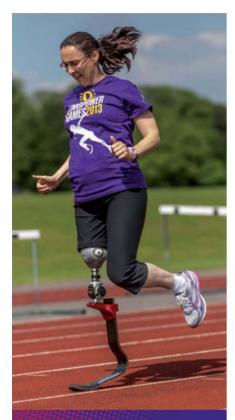
not too soft, as this results in excessive compression of the foot, resulting in the hyperextension of the knee, causing increased asymmetry.

Knee units – in running there is an increased demand on the knee due to speed and increased loading. Until recently four bar knees were used for above knee and through knee running.

OttoBock have developed a knee specifically for running called the 3s80, such as the one used by Para-Tri athlete Andy Lewis, usually used for short distances due to lack of stance control. It is worth mentioning here that some above the knee amputees don't use a knee unit and run with a fixed pylon with circumducting gait, for longer distances, such as Richard Whitehead. Running prosthesis are not designed for walking on and do not have a heel, there are blades with a heel plate designed for multipurpose (walking through to running).

Above knee alignment – the dynamic alignment is set up to gain symmetry between the intact limb and the residual limb. The alignment will depend on the amputee's ability to control the knee unit and the energy storing foot.

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Eligibility for a running prosthesis

To be eligible for the fabrication of a running prosthesis, the amputee must fulfil a number of criteria. The athlete should have:

- A sound gait with no or minimal deviation, as any deviations in walking are more pronounced during running
- Achieved a good level of general fitness, including strength, flexibility, stability and endurance
- Demonstrated commitment through adhering to the initial fitness program for a minimum of approximately three months.
- Joined a sporting association and have commenced competition at a local level.

Socket – Ischial containment is a popular socket, which contours better to the residual limb giving a bony lock to reduce rotation and offloading the tuberosity. The most common above knee design is a flexible inner plastic socket with a more rigid outer socket. The inner socket is the interface for suction suspension and the outer socket provides the structural framework. Liner/suspension – this is down to the amputee's choice and is about security

and trust. The options are a pin lock system or a suspension system such as a seal-in liner.

Suction suspension – requires a total surface contact contoured to the amputee's stump. This type of suspension is used with a flexible liner. Suction suspension is also suitable for through knee amputees. Through knee amputees have an extra suspension option available to them which is the supra-condylar suspension. Above knee amputees can also use additional suspension options such as a neoprene sleeve or TES belt.

Upper Limb

If you are an upper limb amputee or you were born with or acquired a limb difference, you will need to decide at some point whether or not you want to use an artificial limb (a prosthesis) for physical activity. You basically have four options: 1) take part without a prosthesis, 2) use a passive prosthesis, 3) use a functional prosthesis or 4) do a combination of these things. Many upper limb amputees choose not to wear a prosthesis for running. Some athletes use a function prosthesis to help them with balance in the starting blocks.

There are no rules or specifications from the International Paralympic Committee

on prosthetics for upper limb amputees as they don't create a large performance enhancement (in the same way as a running blade can). They are generally used to aid overall upper body alignment/ balance.

What you need to be aware of

Amputees will find it more tiring than able-bodied people when they start to exercise. This is because it takes more energy to walk and run as a result of the reduced push-off by the prosthetic leg and energy loss moving from one foot to the other. This is not a barrier to exercising, but be aware that you will tire more easily than an able-bodied person when travelling the same distance, not because you are not fit, but because of the way you move with your prosthetic leg.

Amputees are prone to developing joint pain on the intact limbs due to the way that they load the leg. It is very important to prepare for fast walking and running by building up the strength and power of the muscles in order for them to be able to take the increased force on the intact limb associated with these movements. Amputees need to look after their residual limb (stump) to make sure that the skin stays healthy. It is enclosed in a plastic capsule which can result in sweat, blisters and ingrowing hairs if left uncared for, can cause long term damage. For further information on residual limb (stump) care, read Practical Tips for Sport and High Activity by Penny Broomhead. You can find this in the resources section of the



LimbPower website. www.limbpower.com

The prosthesis and how it is used can affect the way you move. It is important to understand the different components and how to use them, and how to get them if appropriate. Discuss this with your prosthetist or rehabilitation consultant.

The level of your amputation and the length of your residual limb, will have an influence on how well you can walk and run. The higher the level of the amputation, the more difficult it is to be able to move the prosthetic side, and the more demand you place on the intact limbs. The longer the residual limb, the longer the lever and the easier it is to produce the force to rotate the limb around the joint and to control the hip movement, but the easier it is to get a socket to attach to the limb. There is an important balance to find before running, to ensure that the limb can be 'swept through' from being the trailing to the leading limb quickly enough and safely enough.

Running – Your residual limb and residual limb management

When fast walking and running, the forces applied to the residual limb are increased. These increased forces can cause serious problems to the health of the residual limb. If there are pressure points related to a poor socket fit, then you should see your rehabilitation consultant and your prosthetist as a matter of urgency. Perspiration, hygiene problems and a poorly fitting socket can cause irritations, blistering, skin sensitivity, skin breakdown, pimples, ingrowing hairs, hives, pressure areas and sores, which can all lead to tissue breakdown and may result in time off your prosthesis. After every exercise session, check the skin health, and if there are any issues, seek help immediately.

Running – Hygiene management

As an amputee you will perspire more during running than you do during walking because of the increase in energy used for running and as a result of having a reduced surface area for heat dissipation. For this reason, it is very important to clean the residual limb during and after exercise, as well as following a good hygiene routine. When we exercise we perspire more and perspiration can cause a build up of bacteria on the residual limb. Stump socks and sleeves should be cleaned and checked regularly. Follow this link to read Practical Tips for Exercise, Physical Activity and Sport. http://limbpower.com/index. php/resources/info-sheets.

Training considerations when you are running

Warm up properly! A proper warm up and stretch will prevent injury and time off your prosthesis. Because you are an amputee you will need to stretch your trunk side flexors specifically, whether you have an upper or lower limb amputation. Stand with your feet apart, raise the arm on your amputated side over your head, put your other hand on your hip and lean over to the non-amputated side. You should feel a really nice opening up sensation from your shoulder to your hip. Don't forget the other stretches for the rest of your body; arms, trunk and legs. Visit the resources section of the LimbPower website for warm-up exercises.

Your physiotherapist should let you know when you are strong enough and moving well enough to run. Building up your



"For many sports you do not need special sockets or components"

endurance is important and a training plan is useful to make sure that you increase the amount you do in a safe manner. If you are part of a running club, the coach should be able to advise you on this.

LimbPower have developed a training plan that you can follow to help you to find the right balance. Cross training, that is mixing running up with other activities will help to build fitness without placing excessive demand on the residual limb and the intact joints. Cycling and swimming are excellent activities for this. To help maintain the strength and conditioning, Pilates, Yoga and Circuit session should be completed, ideally once per week. Visit the LimbPower website resources section to view a suggested training plan. http://limbpower. com/index.php/resources/info-sheets.



Activity and running limbs for children

If you have a child under the age of 18, they are entitled to apply for an activity or running limb through their NHS limb centre through the **Children's Prosthetic Fund. "The** range of activity prostheses available for children is more limited than for adults and you will also need to take into consideration that your child is growing and may require a new socket every six months to two years." (lan Jones, Prosthetist, Limb Solutions). Some of the new children's running limbs are being designed to grow with you, to increase their lifespan. You can now get running blades with a footplate which means that they can be used for other activities. Some schools and runs will not allow children to participate if they are wearing a prosthesis without a cover on, so do check this and make sure you choose the most appropriate prostheses for the activity your child wants to do. Visit the resources section of the LimbPower website to read our Pupils with Amputations **Coaching Fact Sheet.** www.limbpower.com

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How you can get involved in running in the community.

There are many options to get involved in running, from ParkRuns **www.parkrun. org.uk** to charity fun runs and mass participation road racing for adults and children. Children can be classified and join a club from the age of 11. There are specific events for runners with a disability which you can read about on the LimbPower website –

www.limbpower.com.

How to find a coach

One of the most important services available to athletes is effective coaching. This is fundamental if you want to maximise your performance and enjoyment, and also to reduce the risk of injury through inappropriate training. Disabled athletes wanting to take part in athletics can register online for support to find a local club and coach.

Follow this link for more information: www.englandathletics.org/ parallelsuccess.

How to find a running or athletics club

Athletics clubs and running clubs in England can offer so much to people of all ages and all abilities who are new to athletics – in all its varied disciplines. You can use our clubfinder to find a club. Scroll down to find out more about athletics clubs in England.

http://www.englandathletics.org/athletic s-clubs/find-an-athletics-club.

How to get involved in competitive athletics

The disability programme for British Athletics is called Parallel Success and includes Talent Identification days and support. You can contact England Athletics National Disability manager on 0121 3476543 or visit **www.englandathletics. org/parallelsuccess.** Alternatively, you can contact the British Athletics Parallel Success Co-ordinator on **0121 713 8400**.

Don't forget to join the Disability Rankings on the Power of 10 http://www.thepowerof10.info/rankings/ disabilityrankinglistrequest.aspx.

How to get classified

Athletes with a physical impairment are required to have a Physical Impairment Medical Diagnostics Form (MDF) and to be given a classification class if they want to take part in competition. The MDF must be completed by your GP or rehabilitation medical consultant, accompanied by additional supporting medical documentation i.e. doctor's letters and/or physiotherapist reports that discuss movement and functioning. If your MDF and supporting documentation demonstrates eligibility for national classification, you will be invited to attend a classification clinic to be assessed by UKA national classifiers, where a sport class will be allocated to you. National classification clinics for physical impairment classification run throughout the winter each year (i.e. October to March).

Wheelchair Athletics

If you are an amputee and a wheelchair user and you want to get involved in athletics you can try wheelchair racing, hand-cycling and seated throws. You can find out more about each of these activities through the British Athletics Parallel Success Co-ordinator on **0121 713 8400** or by contacting The British Wheelchair



Preparing to run exercises

Below is a list of physical exercises that will prepare you for running. Ideally do these on a mat or carpet to prevent injury.

- Walk taking large strides forwards and then repeat going backwards for 6-10 reps
- 2 Side step leading with your prosthetic limb. Ensure that as you move your hips are level and not dipping and your elbows remain on your hips and don't twist throughout the movement. Repeat for 6-10 reps.
- 3 Side step leading with the sound limb. Ensure that as you move your hips are level and not dipping and your elbows on your hips and don't twist throughout the movement. Repeat for 6-10 reps.
- Grapevine, this is like weaving with your feet. Side step by bringing the back, prosthetic leg across in front then step to the side with the

sound limb and bring the leg across and behind and step to the side. Repeat for 6-10 reps

- Grapevine, leading with the other leg. Side step by bringing the back, sound leg across in front then step to the side with the prosthetic limb and bring the leg across and behind and step to the side. Repeat for 6-10 reps
- 6 Stand on the spot with your legs slightly apart and bounce from one leg to the other trying to put weight equally through both legs, repeat for 20 repetitions (reps)
- Stand on the spot and bounce up and down on both legs, again putting weight equally through both legs, repeat for 20 reps.
- 8 Place the sound limb out in front of you and bounce backwards and forwards from the sound limb onto the prosthetic limb, repeat for 20 reps.

9 Place the prosthetic limb out in front of you and bounce backwards and forwards between the prosthetic limb and the sound limb, repeat for 20 reps. IF YOU HAVE A FREE KNEE, BE CAREFUL THAT THE KNEE DOESN'T GIVE WAY.

If you can do these exercises without pain, you are ready to start running. Always consult your rehabilitation consultant before trying to run. Keep doing these exercises and make the steps longer and the feet faster as you improve.

Now you have mastered the techniques it's time to give running a go. Make sure you are wearing comfortable clothing and that your leg is fitting properly and then take a deep breath and go... If you feel a pain in your stump you must stop!

Athletics Association on **01704 224825** or email **barbarahoole@hotmail.com http://www.bwaa.co.uk**



Resources

A selection of resources are available from the LimbPower website, WWW.limbbower.com

- Practical Tips for Sport and High Activity
- Exercises to prepare you for running
- Five steps to Running, *Robert Gailey*
- Blade Runner, Adrian Howden
- Five minutes with John Wrightson on Learning to Run
- Checklist Criteria for Progression to Running
- Eligibility for Running screening form
- Running Workshops
- Information and advice running blades
 Impairment-specific coaching awareness Top Tips – Amputees

- Pupils with Amputations Coaching Fact Sheet
- Amputee Guide Fit for Life
- Classification
- Training Plan
- Funding Opportunities

Practical Tips for Exercise, Physical Activity and Sport

- Fit for Life Toolkit http://www.lboro.ac.uk/media/wwwlbo roacuk/content/peterharrisoncentre/ downloads/brochures/pdfs/Amputee %20guide_Fit_for_Life.pdf
- Fit for Sport Toolkit http://www.lboro.ac.uk/media/wwwlbo roacuk/content/peterharrisoncentre/ downloads/brochures/pdfs/Amputee %20guide_Fit_for_Sport.pdf



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LimbPower exists to engage amputees and individuals with limb impairments in regular and sustained participation in physical activity, sport and the arts to improve quality of life and to aid physical, social and psychological rehabilitation. To find out more about how we can help you, visit our website. LimbPower is a Limited Company No. 09513024 Charity No 1132829