

Pilates exercises for above-knee amputees

This booklet includes exercises adapted for people who have had above-knee amputations, and can be used for those who have had bilateral (both sides) amputations. This booklet is intended to accompany the exercise programme your physiotherapist has taught you. If you have any questions or concerns about any of the information in this booklet, please speak to your physiotherapist.

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What is Pilates?

Pilates exercises have been shown to improve walking, balance and decrease back pain, and to prevent further pain or injury. All of these are common problems for people who have had an amputation.

These exercises work by activating core muscles which help to improve stability at the trunk. When you have a strong core, it gives you a good foundation from which to move your arms and legs.

How do I know if I am activating the right muscles and doing the exercises correctly?

When completing any Pilates exercises, it is important that you follow these principles:

- 1) Keep a 'neutral spine position', with your core muscles activated throughout all exercises (see page 5).
- 2) Maintain control and precision when completing the exercises.
- 3) Begin all exercises with a good alignment and then maintain this alignment throughout the exercise
- 4) Ensure coordinated, conscious deep stomach breathing patterns (this will be explained for each exercise).
- 5) Ensure fluid, smooth movements rather than movements that are fast, jerky and uncontrolled.

Key terms

Neutral spine

The position where your pelvis is in its neutral alignment and where your core muscles work most effectively. See page 5 for further details.

Pilates rest position

This includes the neutral spine, and is a starting position for all exercises that begin in crook lying (laying on your back with your knees bent).

Table top position

Lying on your back with both your hip and knee at 90°. This can either be completed on one leg (single table top) or with both legs (double table top). See pictures on pages 7 and 9.

Core stability muscles

These are the muscles which are used to stabilise the spine. These muscles include the deep neck flexors (at the front of your neck), multifidus (muscles that support your spine), trans-abdominals and pelvic floor muscles.

Pilates rest position

1. Lie on your back with your knees bent, and your feet level with each other and about 2.5cm (1 inch) from your bottom.



2. Place your feet and knees hip distance apart.
3. Support your head on a small cushion or towel and relax the weight of your head on the support.
4. Gently draw your shoulder blades down towards your waist to relax the neck and shoulders – imagine you have a small orange in between your chin and chest.
5. Soften the ribcage into the mat to connect the back of the ribcage with the mat.
6. Imagine that your pelvis is a bucket of water. Tip it back to ‘spill some water out the back of the bucket’. Now tip it forwards and ‘spill some water out the front of the bucket’. You will feel your lower back arch slightly.
7. Your bottom and shoulders should remain on the mat throughout.
8. Find your neutral spine position by resting ‘the bucket’ halfway between these two movements.
9. Activate your core muscles in this position by imagining that you are drawing your stomach in gently as if you were putting on a tight pair of low jeans, or drawing your tummy button towards your spine.

You should keep the neutral spine position for all of the exercises in this booklet, and only progress to the more difficult exercises if you can maintain it.

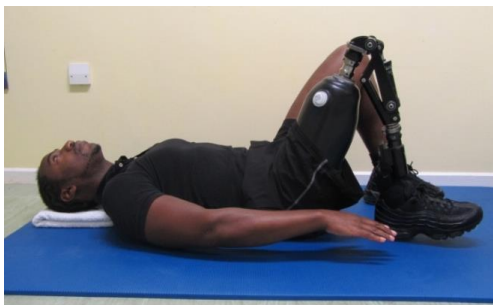
Possible problems you may experience with this posture during the exercises in this booklet:

- You may struggle with bending your prosthetic knee and placing your foot in a correct position because of lack of sensation on this side. You may need someone to help you with this, especially if using a gym ball.
- The toes of your prosthetic foot will not rest fully on the floor (unlike your non-prosthetic side) due to the reduced movement available in your prosthetic ankle and foot.
- Be aware that there are different types of sockets and prosthetic knees, which may affect either your ability to do some of these exercises, or your positioning. For example, a high socket wall may obstruct into your groin.

If you have any questions or concerns, please speak to your physiotherapist.

Adapted hundreds

- Begin in the Pilates rest position.
- Inhale to prepare.
- Exhale to float both arms off the mat – pulse them up and down in a small range of movement.
- Inhale for 5 pulsing arm movements, exhale for 5 pulsing arm movements.
- Focus on 5 breath cycles (five inhales and five exhales)
- The aim is build up, over time, to ten breath cycles (a hundred arm pulses)



Progression for prosthetic side:

- Position your prosthetic leg on a gym ball so that your hip and knee are at a 90 degree angle.
- Exhale to float both arms off the mat – pulse them up and down.
- Focus on five cycles of breathing as you pulse your arms up and down, and then relax.



Progression for non-prosthetic side:

- Inhale to prepare.
- Exhale to float your non-prosthetic side to a single leg table top position (hip and knee at 90°).
- Make sure that you can maintain a neutral spine position.
- Focus on five cycles of breathing (five inhales and five exhales) as you bounce your arms up and down, and then relax.



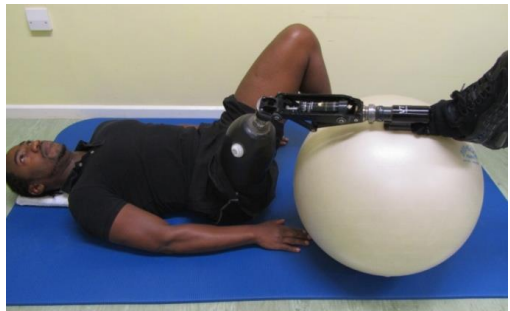
Hip twist

- Begin in the Pilates rest position.
- Inhale to prepare. Exhale to roll your prosthetic knee outwards from your body, keeping your foot in contact with the mat.
- Inhale and roll your prosthetic knee back inwards until you are back in the Pilates rest position.
- Repeat this for the other leg.
- Make sure that the leg that you are not moving remains still and doesn't drift out to the side.
- Repeat the exercise times with each leg.



Progression for prosthetic side:

- Rest your prosthesis on a gym ball so that your hip and knee are at a 90 degree angle, keeping your other knee bent as in the hip twist exercise, above.
- Make sure you find neutral spine position before starting the exercise.
- Inhale to prepare and exhale to roll your prosthetic leg out to the side. Imagine that your leg is the turning page of a book. Keep your foot and knee in line with each other.
- Inhale to move your leg back into the starting position so that your knee is directly above your hip.



- Make sure that the leg that you are not moving remains still and doesn't drift out to the side.
- Repeat the exercise times with each leg.

Progression for non-prosthetic side:

- Begin in the Pilates rest position.
- Inhale to prepare. Exhale to float your non-prosthetic leg into a single leg table top position.
- Roll this leg out to the side. Imagine that your leg is the turning page of a book.
- Inhale to move this leg back into the starting position with your knee directly above your hip.
- Make sure that the leg that you are not moving remains still and doesn't drift out to the side.
- Repeat the exercise times with each leg.



Tips

- On each level of this exercise, imagine that you have a cup of water on the knee that **is not** moving – make sure that you do not spill any water!
- Only roll the leg out as far as you can while maintaining a neutral spine. As soon as your hip begins to come off the mat, stop moving your leg.

Shoulder bridge preparation

- Begin in the Pilates rest position.
- Inhale to prepare. Exhale to gently roll your lower back into the mat. Squeeze your buttocks together and continue to roll up bone by bone in your spine until your hips are about 2.5cm from the mat.
- Inhale and hold this position for seconds.
- Exhale and roll down bone by bone so that you lower your hips down to the mat to return to the neutral spine position.
- Repeattimes



Shoulder bridge

- As you improve and are able to control this movement, you can gradually increase how high you lift your hips from the mat so that you raise your lower back and are resting on your shoulders.



Progression for non-prosthetic side only:

- Begin in the Pilates rest position.
- Inhale to prepare. Exhale and roll into a full shoulder bridge position (see previous page).
- Inhale and hold the position for seconds.
- Exhale, lifting your non-prosthetic leg off the mat. Stretch your leg up until it makes a straight line with your thigh.
- Inhale and bend your knee, bringing your foot back to the mat.
- Exhale and lower your hips back to the mat.



Tips

- During these exercises make sure that you keep your hips at the same level when lifting them from the mat – don't let one side drop down lower than the other.
- When lifting your hips off the mat, make sure that you roll up from your tail bone, lifting your hips first and then peeling each level of your spine off the mat. Imagine lifting a string of beads off the floor as you do it. When you lower your hips, start with your mid back and follow with your lower back. Your hips should be the last part of your body to rest back on the mat.
- You should feel this exercise working the muscles of your bottom and not your hamstrings (the muscles at the back of your thighs). If you feel it more in your hamstrings, move your feet nearer to your bottom, keeping them level, and squeeze your bottom as you roll up to activate the correct muscle group.

Roll-ups

- Starting position: sit on the mat with your legs in front of you, feet hip distance apart. Bend your knees a little. Make sure that your pelvis is in an upright, neutral position and that you are sitting on your sitting bones. (You can sit on a small block or folded towel if you find this easier)



- Lengthen your spine and the back of your neck as if you have an orange under your chin. Place your hands on the back of your thighs.



- Inhale to prepare. Exhale and roll off the back of your sitting bones to round your lower back and tilt your pelvis backwards. Your head, upper body and ribcage should remain relatively still.
- Inhale as you roll your pelvis forwards onto the sitting bones again to resume the starting position.
- Repeat the exercise times.

Progression:

- In the starting position, lift both arms upwards to shoulder height with palms facing downwards.
- Inhale to prepare and do the exercise as above.



Tips

- The type of knee that you have and your socket may mean that your posture needs to be adapted slightly. Talk to your physiotherapist about this.
- On each level of this exercise imagine that you have a cup of water on both knees – make sure that you do not spill any water!

Clam

- Lie on your side with your head supported on a small pillow or rolled towel.
- Keep your bottom arm straight above your head and rest your top hand on the floor in front of you. Bend your hips to about 45° and your knees to about 90°.
- Shoulders and hips should be stacked on top of each other and facing forwards – don't let your shoulders or hips roll backwards (especially your top hip!).
- Push your top hip towards your feet – this will create a small space between your waist and the mat.
- Inhale to prepare. Exhale and lift your top knee upwards keeping your feet together.
- Inhale and lower the top knee onto the bottom leg.
- Repeat the exercise times on each side.



Progression:

A resistance band is like a large elastic band, which can make your muscles work harder by giving resistance.

- Ask your therapist which resistance band is right for you.
- Tie the piece of the band in a loop and place it around both legs just above your knees.



- With the band in place align yourself as described above and repeat the exercise.
- **Tips** This may be more difficult when your prosthetic foot is the 'top' leg, as the foot may slip. You may need someone to assist with keeping your feet together. You may want to use a resistance band to keep your feet together, or position yourself so that your feet are up against a wall to stop your prosthetic foot from slipping.
 - Keep the space between your waist and the mat during the whole exercise.

Swimming

- Starting position: lie on your front. You can place a small towel/ cushion under your forehead if this is more comfortable. Keep your neck long.
- Place your arms straight out in front of you, shoulder width apart and palms facing down. Keep your eyes looking down at the mat/bed.
- Make sure that your spine is in neutral position by pressing your lower stomach into the mat/bed and squeezing your bottom muscles. Keep your legs straight and feet hip width apart.



- Inhale to prepare. Exhale to reach your left arm forwards, allowing it to hover about 2.5cm above the mat/bed.
- Inhale and lower this arm to the mat/bed.
- Repeat with the right arm.
- The movement should only come from your arms – try to keep the rest of your body as still as possible.
- Begin slowly and as you are able to control your movements better, increase your speed.
- Remember to maintain control and neutral spine throughout.
- Continue for as long as you comfortably can and build up to a minute.



Tips

- If your lower back begins to hurt, either reduce the height that you raise your arm off the mat/bed, or try to push your pubic bone/stomach harder into the mat and squeeze your bottom muscles harder.
- Imagine holding an orange between your chin and chest throughout the exercise.
- It is difficult to get into a good position if you are on the floor because of your prosthetic foot – so this exercise is easier on a bed.

Contact us

If you have any questions or concerns, please contact the Prosthetic Physiotherapy Department,
t: 020 3049 7724, Monday to Friday, 8.30am-4.30pm.

For more information leaflets on conditions, procedures, treatments and services offered at our hospitals, please visit **w:** www.guysandstthomas.nhs.uk/leaflets

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t: 020 7188 8748, Monday to Friday, 9am-5pm

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t: 020 7188 8801 (PALS) **e:** pals@gstt.nhs.uk

t: 020 7188 3514 (complaints) **e:**
complaints2@gstt.nhs.uk

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e: patientinformationteam@gstt.nhs.uk or fill in our simple form, **w:** www.guysandstthomas.nhs.uk/leaflets

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