

## Physiotherapy Department

# Pilates exercises for above knee amputees

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**This booklet includes useful exercises for people who have had above knee amputations, as well as for those who have had bilateral amputations, below knee amputations and non-amputees. If you have any questions or concerns about any of the information in this booklet, please speak to your physiotherapist.**

## **What is pilates?**

Pilates exercises have been shown to improve walking, balance and lower 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 (see page 5).

- 4) Ensure deep, coordinated, conscious diaphragmatic 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.

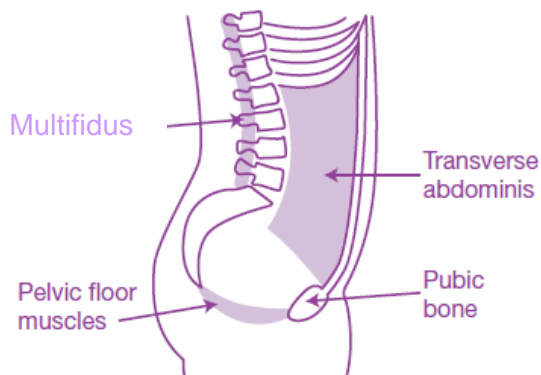
### Table top position

Lying on your back with both your hip and knee at 90 degrees. This can either be completed on one leg ('single table top') or with both legs ('double table top'). See pictures on pages 10 and 11.

### Core stability muscles

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.

#### Core stability muscles



## Pilates rest position



- 1) Lie on your back with your knees bent to the same level on both sides and your feet about an inch from your bottom.
- 2) Make sure that your feet are the same distance from your bottom.
- 3) Place your feet and knees hip distance apart.
- 4) Support your head on a small cushion or towel and relax the weight of your head on the support.
- 5) 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.
- 6) Soften the ribcage into the mat to connect the back of the ribcage with the mat.
- 7) Image 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.

- 8) Your bottom and shoulders should remain on the mat throughout.
- 9) Then find your **neutral spine position** by resting 'the bucket' halfway between these two movements.
- 10) Activate your core muscles in this position either by imagining that you are drawing your stomach in gently as if you were putting a tight pair of jeans on or going into cold water.

**You should keep the neutral spine position throughout all of the exercises in this booklet and only progress if you can maintain it.**

### **Possible problems you may experience with this posture during the exercises:**

- 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 the gym ball.
- The toes of your prosthetic foot will not rest fully on the floor as is the case on your non-prosthetic side – this is due to the reduced movement available in your prosthetic ankle and foot.
- Be aware that there are different types of sockets and prosthetic knees, both of which may affect either your ability to do some of these exercises or your positioning. One example of this is a high socket wall which may obstruct into groin.

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

# Hundreds

- Begin in the pilates rest position.
- Inhale to prepare.
- Exhale to float both arms off the mat – pump them up and down as if dipping your hands in a bowl of water.
- Focus on 5 cycles of breathing (5 inhales and 5 exhales) as you pump your arms up and down, and then relax.



### Progression for prosthetic side:

- Position your prosthetic leg on a gym ball.
- Exhale to float both arms off the mat – pump them up and down as if dipping your hands in a bowl of water.
- Focus on 5 cycles of breathing (5 inhales and 5 exhales) as you pump 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 degrees).
- Ensure that you are able to maintain a neutral spine position.
- Focus on 5 cycles of breathing (5 inhales and 5 exhales) as you pump your arms up and down, and then relax.



## Hip twist

- Begin in the pilates rest position.
- Inhale to prepare. Exhale to roll your left leg outwards from your body, keeping your foot still on the mat.
- Inhale and roll your left leg back inwards until you are back in the pilates rest position.
- Switch legs.
- Repeat the sequence on each leg ..... times.



### Progression for prosthetic side:

- Rest your prosthesis on a gym ball, keeping your other knee bent as in level 1.
- Ensure you find neutral spine position before beginning the exercise.
- Inhale to prepare and exhale to float your leg out to the side. Imagine that you are opening the page of a book. Keep your foot and knee in line with each other.
- Inhale to draw your leg back into your middle until your knee is directly above your hip.



## Progression for non-prosthetic side:

- Begin in the pilates rest position.
- Inhale to prepare. Exhale to float your non-prosthetic leg into a single table top position. Glide this leg out to the side. Imagine that you are opening the page of a book.
- Inhale to draw this leg back into your middle until your knee is directly above your hip.



### Tips:

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

## Shoulder bridge

- Begin in the pilates rest position.
- Inhale to prepare. Exhale to gently roll your lower back into the mat. Squeeze your buttocks together and lift your hips about 1 inch from the mat. Only lift your hips off the mat, not your lower back.
- Inhale and hold this position for ..... seconds.
- Exhale and lower your hips down to the mat to return to the neutral spine position.



- As you improve and are able to control this movement, you can increase how high you lift your hips from the mat so that you are resting on your shoulders.
- Imagine you have a cup of water on both knees – make sure that you do not spill any water!



### Progression for non-prosthetic side only:

- Beginning in the pilates rest position.
- Inhale to prepare. Exhale and roll into a full shoulder bridge position (see page 13).
- Inhale and hold the position for .....seconds.
- Exhale, lifting your non-prosthetic leg off the mat. Stretch your leg forwards and imagine it stretching out in front of you until it is at the same level as your bent knee.
- Inhale and bend your knee bringing your foot back to the mat.
- Exhale and lower your hips back to the mat.



**Tips:**

- During each of these exercises make sure that you keep your hips at the same level when lifting them from the mat, and 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. Try to imagine lifting a string of beads off the floor as you do that. When you lower your hips to the mat, 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, try to bring your feet closer to your bottom, remembering to keep them at the same level, and squeeze your bottom as you roll up to activate the correct muscle group.

## Roll-up

- Starting position: sit on the mat with your legs in front of you, hip distance apart. Bend your knees a little. Ensure that your pelvis is in an upright, neutral position and that you are sitting on your sitting bones.
- Lengthen your spine and the back of your neck. 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 neutral alignment.



## Progression:

- In the starting position, lift both arms upwards to shoulder height with palms facing downwards.
- Inhale to prepare. Exhale to roll off the back of your sitting bones to round your lower back and tilt your pelvis backwards. Your ribcage and upper body should remain relatively still. Keep the head upright.
- Inhale as you roll you pelvis forwards onto the sitting position again to resume neutral alignment.



### 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 reaching above your head and rest your top hand on the floor in front of you. Bend your hips to about 45 degrees and your knees to about 90 degrees.
- Shoulders and hips should be stacked on top of each other – don't let your shoulders or hips roll back and keep them both facing forwards.
- Draw the top hip downwards as if trying to push it towards your feet – this will create a small space between your waist and the mat. Imagine a space small enough for a mouse!
- Inhale to prepare. Exhale and lift your top knee upwards keeping your feet together.
- Inhale and lower the top knee onto the bottom leg.



### Progression:

- Ask your physiotherapist which level of resistant band is appropriate 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 on page 18 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. Alternatively, you may want to use a resistant band to 'tie' your feet together, or position yourself so that your feet are up against a wall to stop your prosthetic foot from slipping.
- Keep your hips, shoulders and face forwards throughout the whole exercise – don't let them roll backwards (especially your top hip).
- Keep space for the mouse between your waist and the mat throughout 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 for you. Keep your neck long.
- Place your arms straight out in front of you shoulder width apart and palms facing downwards. Keep your eyes looking down at the mat/bed.
- Ensure 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 hip width apart.



- Inhale to prepare. Exhale to reach your left arm forwards, allowing it to hover about one inch off 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.
- To make it more difficult, begin slowly and as you are able to control your movements better increase your speed. Imagine swimming away from a shark! Remember to maintain control and neutral spine throughout.



### Tips:

- If your lower back begins to hurt, either reduce the height that you raise your upper body 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.
- You may find it difficult to get a good position if you are on the floor because of your prosthetic foot – therefore you may find that this exercise is easier on a bed/plinth.

## Appointments at King's

We have teamed up with King's College Hospital in a partnership known as King's Health Partners Academic Health Sciences Centre. We are working together to give our patients the best possible care, so you might find we invite you for appointments at King's. To make sure everyone you meet always has the most up-to-date information about your health, we may share information about you between the hospitals.

## Contact us

If you have any questions or concerns, please contact the Prosthetic Physiotherapy Department on **020 3049 7724** (Monday to Friday, 8.30am to 4.30pm).

For more information leaflets on conditions, procedures, treatments and services offered at our hospitals, please visit [www.guysandstthomas.nhs.uk/leaflets](http://www.guysandstthomas.nhs.uk/leaflets)

## Notes

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## Further information

### **Pharmacy Medicines Helpline**

If you have any questions or concerns about your medicines, please speak to the staff caring for you or call our helpline.

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

### **Patient Advice and Liaison Service (PALS)**

To make comments or raise concerns about the Trust's services, please contact PALS. Ask a member of staff to direct you to the PALS office or:

**t:** 020 7188 8801 at St Thomas' **t:** 020 7188 8803 at Guy's

**e:** [pals@gstt.nhs.uk](mailto:pals@gstt.nhs.uk)

### **Language support services**

If you need an interpreter or information about your care in a different language or format, please get in touch using the following contact details.

**t:** 020 7188 8815 **fax:** 020 7188 5953

### **NHS Choices**

Provides online information and guidance on all aspects of health and healthcare, to help you make choices about your health.

**w:** [www.nhs.uk](http://www.nhs.uk)

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