York and Scarborough Teaching Hospitals
NHS Foundation Trust

Abdominal wall rehabilitation after surgery

For Complex Abdominal Wall Reconstruction, and Rectus Diastasis

Information for patients, relatives and carers

ⓘ For more information, please contact:

York Abdominal Wall Unit

Department of Surgery
4th floor Admin block

York Hospital, Wigginton Road, York, YO31 8HE

Telephone: 01904 721154

andrea.cussans@nhs.net

Contents **Page**

Introduction

This leaflet will help you in your recovery and rehabilitation after surgery on your abdominal wall. It explains the key functions of the abdominal wall and how they can be affected by your surgery. This guide provides a step-by-step approach to rebuilding strength and function. These exercises aim to help you regain core functions of your abdomen, including breathing support and strength.

Doing these exercises is important for a smooth and effective recovery after your surgery.

If you have any questions that are not covered in this leaflet, please speak with your doctor or physiotherapist.

What is the Abdominal Wall?

The abdominal wall forms the front cover of the abdomen as shown in Figure 1. The abdominal wall is made up of:

1. Skin
2. Layers of fat
3. Layers of muscles
4. Layers of connective tissue

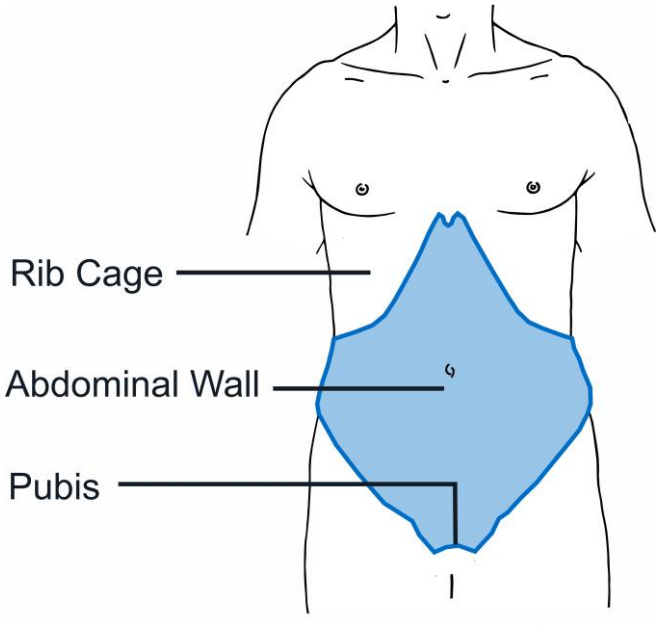


Figure 1. Illustration of front of abdomen with margins.

The muscles of the abdominal wall and their coverings have complex relationships to each other as shown in Figures 2 and 3.

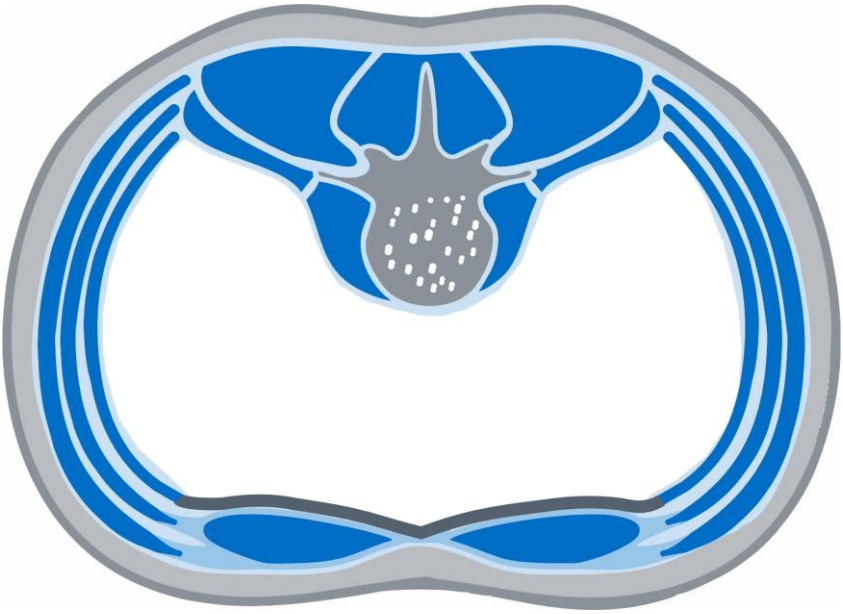


Figure 2. Illustration of cross section of abdominal wall showing relationships of different muscles.

In the middle of the tummy there is a bulky muscle called the rectus abdominis (RA), sometimes called the ‘six pack’. Both right and left RA muscles together are about 10-20cms wide. On each side of the abdomen there are three muscles. The three muscles on each side and their relationships are shown in Figure 3.

These three muscles cross over each other and contribute to entire abdominal wall strength.
The muscles are shown below (Figure 3).
Each individual muscle is covered by a firm layer of connective tissue (fascia). They are important for control over the abdominal function.

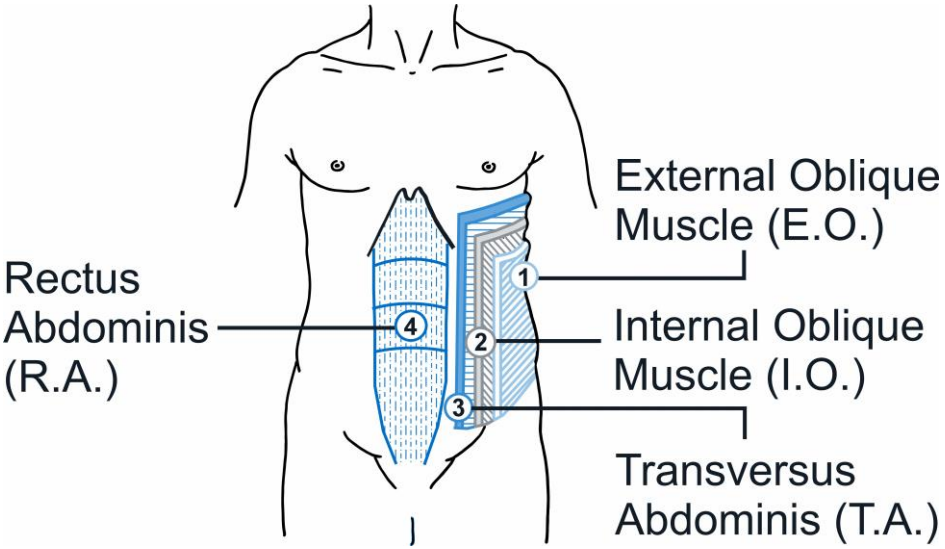


Figure 3: Illustration of front strap muscles and lateral abdominal wall muscles.

What are the normal functions of the Abdominal Wall?

The abdominal wall is a vital part of your body that serves three key purposes:

1. Contain your abdominal contents (organs).
2. Support your breathing.
3. Provide strength and support for movement.

It is made up of muscles, layers of connective tissue, nerves, and blood vessels that work together to perform these important roles.

Function 1: Breathing

The abdominal wall plays a key role in supporting your breathing, particularly during deep breaths, coughing, and other activities that rely on deep or strong respiratory movements.

How It Works: When you breath in (inhale), your abdominal muscles relax and allow your diaphragm (which is a layer of muscle between upper part of abdomen and lungs) to descend to increase the space in your chest for air to fill.

When you breathe out (exhale), your abdominal muscles contract, and your diaphragm rises thus increasing pressure inside your abdomen to help push air out of your lungs.

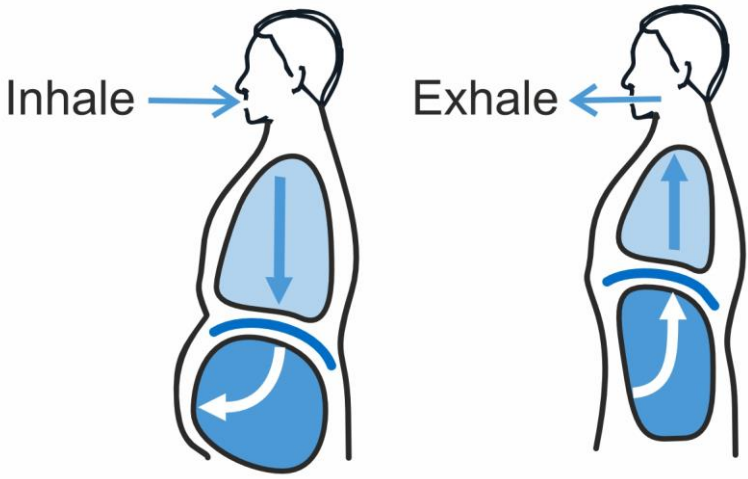


Figure 4. Illustration of how diaphragm descends while inhaling and rises while exhaling.

During coughing, sneezing, or any action that requires expelling air forcefully your abdominal muscles contract.

These muscles also support your breathing when you laugh, or perform actions that require a strong breath, such as singing or exercising.

How might breathing be affected if the abdominal wall is not working properly?

- After surgery, your abdominal wall may behave differently. This might be because of pain, or adjustment to the new reconstruction.

- You may have difficulty breathing deeply or coughing effectively, which can lead to a build-up of mucus in the lungs and can increase the risk of chest infections, such as pneumonia.

- It can also impair the ability to perform activities that require strong breaths, such as speaking loudly, singing, laughing, or vigorous physical activity

- You may have been given breathing exercises or an incentive spirometer which would help deep breathing.

Function 2: Power and Core Strength

The abdominal wall is part of your body's core, which provides stability and strength for your upper and lower body to move effectively.

How It Works: When exerting force, the muscles of the abdominal wall, diaphragm and pelvic floor contract simultaneously to stiffen your trunk and stabilize your spine. They also protect your internal organs by forming a flexible barrier around them.

How might power and core strength be affected if the abdominal wall is not working properly?

If the abdominal wall isn't working properly, it is hard to develop sufficient pressure in your trunk with the following effects:

- You may feel physically weaker, especially when pushing, lifting objects, bending, or twisting. This weakness can make everyday tasks more challenging.
- Poor core stability may predispose you to injuries, such as back pain or muscle strains, due to a lack of support for your trunk during movement.
- Over time, inadequate abdominal support can affect posture and lead to chronic discomfort or difficulty maintaining balance.

Introduction to Rehabilitation Exercises

The following exercises are specifically designed to support your recovery after abdominal Wall reconstruction (AWR). They are tailored to help restore the two key functions of the abdominal wall: breathing and power or core strength.

These exercises are split into two groups: those that improve your breathing function and those that rebuild strength and stability in your core. Perform them as regularly as you can, stopping if you experience significant pain. A little discomfort is normal, but these exercises should not cause undue pain. Progress at a pace that feels manageable, and if you have any concerns, speak with your physiotherapist or hospital doctor.

Breathing Exercises: Rehabilitating the Cooperation Between the Diaphragm and Abdominal Wall

The following exercises are specifically designed to rehabilitate the breathing function of your abdominal wall. The diaphragm and abdominal wall normally work together to allow smooth and effective breathing. These exercises aim to improve the cooperation between these two structures, helping to restore the natural rhythm of your breath. Remember to approach these exercises gently Some discomfort is okay but stop if you experience significant discomfort, pain, or shortness of breath. If these persist, contact a healthcare professional.

You can track your progress in these exercises by marking the below table.

1: Relaxing the Abdomen When Breathing	
2: Relaxing the Diaphragm and Abdomen from Exhalation to Inhalation	
3: Gentle activation of abdominal wall during Exhalation	
4: Widening Breathing with Emphasis on Exhalation	

Exercise 1: Relaxing the Abdomen When Breathing

Aim to start on day two after surgery

Purpose: To restore the natural rhythm of abdominal movement during breathing.

1. Lay on your back at about 45 degrees in a relaxed posture, placing one or both hands on your abdomen just below the level of your belly button.
2. Allow your breathing to take its natural course without trying to control it. Feel how your abdomen presses against your hands as you breathe in and relaxes and reduces as you breathe out.
3. Gradually, without forcing, allow your abdomen to expand a little more with each inhalation, gently pushing your hands outward. Let this happen naturally -- do not force the movement.

Tips:

- Avoid forcing any movements; let the process happen gradually.
- If you feel tension in the abdominal wall, diaphragm, or back, allow it to pass. This is your muscles adapting.
- This exercise might seem uncomfortable or mildly painful at first. As your abdomen relaxes, this discomfort should disappear.

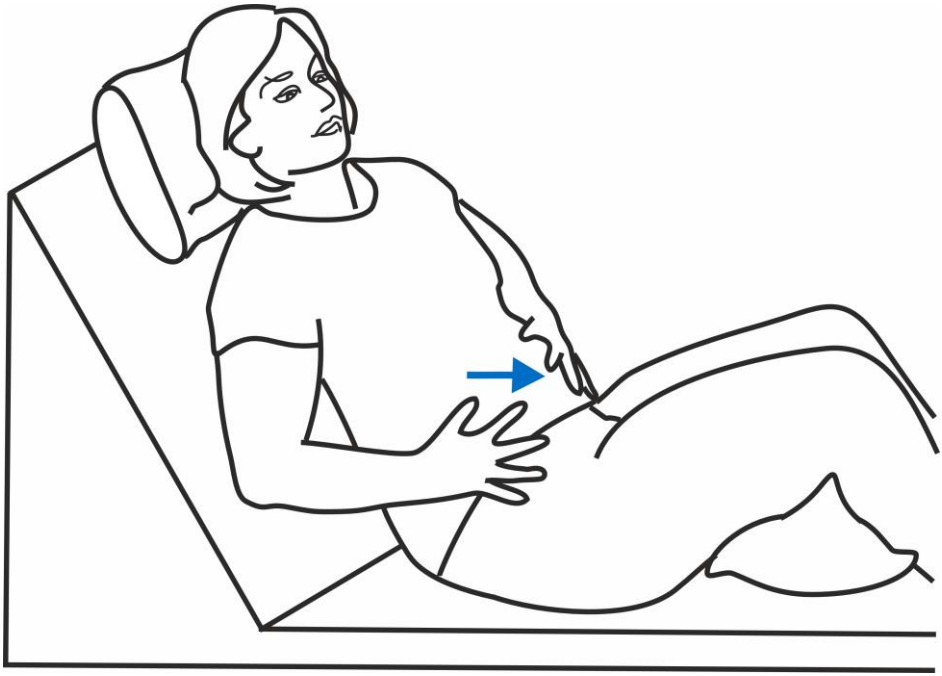


Illustration of relaxing the abdomen while breathing out.

Exercise 2: Relaxing the Diaphragm and Stretching the Abdomen

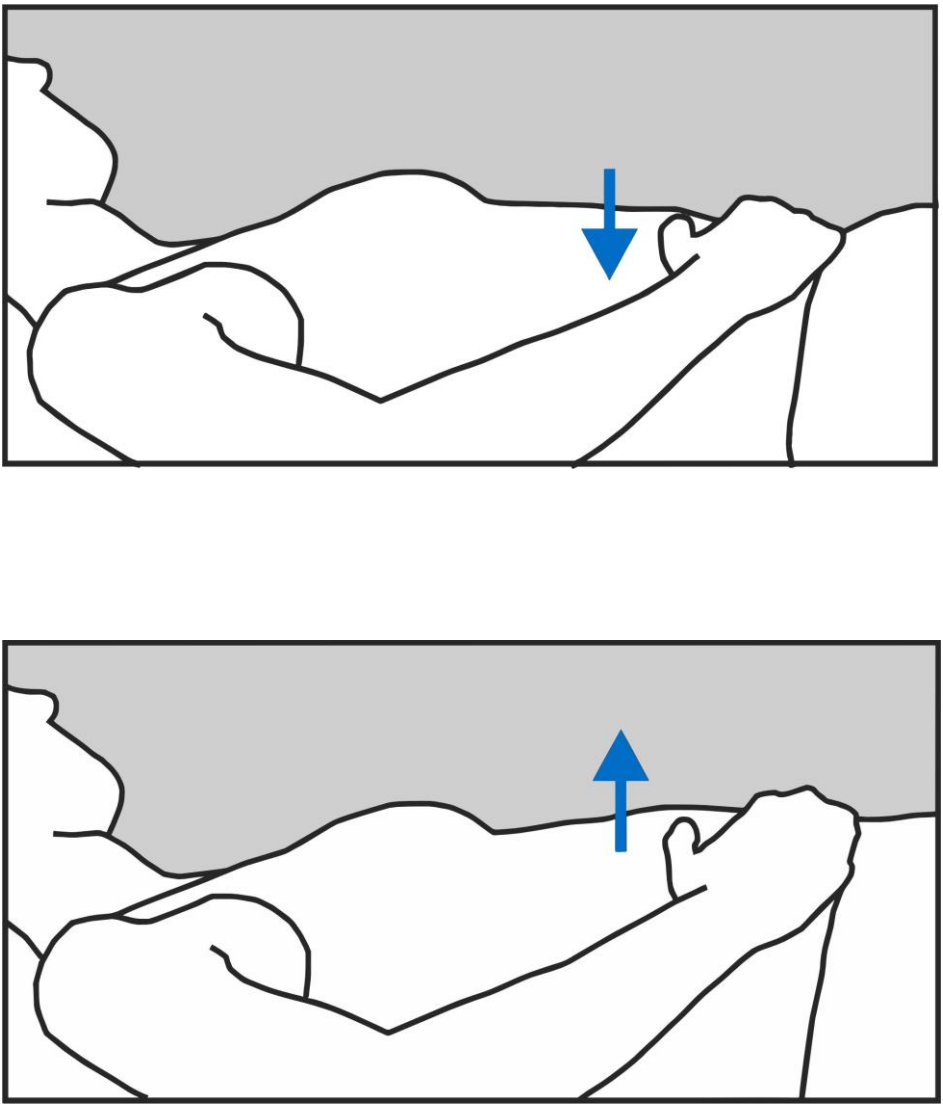
Aim to start on day two after surgery

Purpose: To stretch the abdominal wall during exhalation and promote its natural movement.

1. Lie on your back with a pillow under your knees for comfort.
2. Place one or both hands on your abdomen at the level of your belly button.
3. Let your breathing take its natural course. Observe how your abdomen collapses slightly as you exhale and presses outward as you inhale.
4. Focus on the rhythm of your breath, allowing the abdomen to move naturally with each cycle.
5. Now, actively push your abdomen out as far as possible, tightening your diaphragm (even if you do not feel it directly).
6. After pushing out, allow your abdomen to lower back in and return to normal breathing. Repeat this a few times, taking short pauses between movements to avoid feeling out of breath.

Tips:

- This exercise may feel a bit awkward, stiff or mildly painful to begin. The discomfort should begin to ease after a few repetitions.
- This position might feel unusual at first, but it helps the diaphragm move freely.



Illustrations showing relaxing the diaphragm and stretching the abdomen.

Exercise 3: Gentle activation of abdominal wall during Exhalation

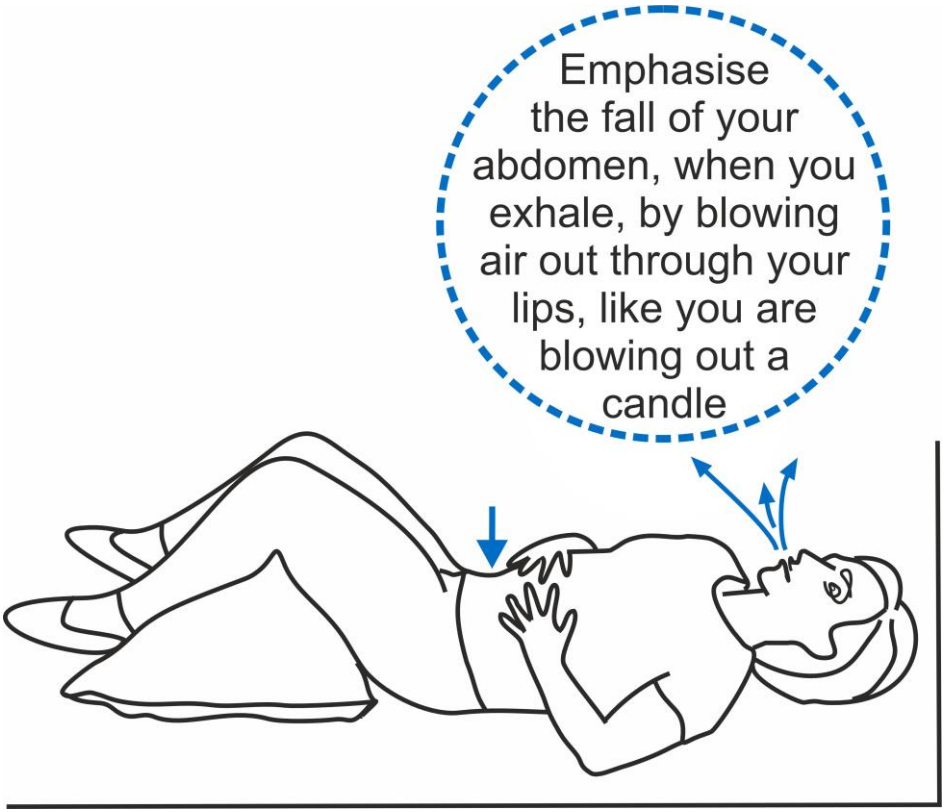
Aim to start on day five after surgery

Purpose: To experience low level abdominal wall activation during exhalation

1. Lie on your back with a pillow under your knees for comfort.
2. Place one or both hands on your abdomen at the level of your belly button.
3. Let your breathing take its natural course. Observe how your abdomen falls slightly as you exhale and presses outward as you inhale.
4. During exhalation, emphasise the fall of your abdomen by blowing air through your pursed lips, like blowing out a candle. Feel the tension of your abdominal wall increasing while you approach the end of exhalation.
5. Then relax, take a few normal breaths before repeating the exercise.

Tips:

- If exhaling takes too long this may feel like being short of breath. Exhaling a bit more actively, taking less time, will feel more comfortable.
- Do not repeat this exercise with consecutive breaths. Instead take some normal breaths in between.


Emphasise the fall of your abdomen, when you exhale, by blowing air out through your lips, like you are blowing out a candle

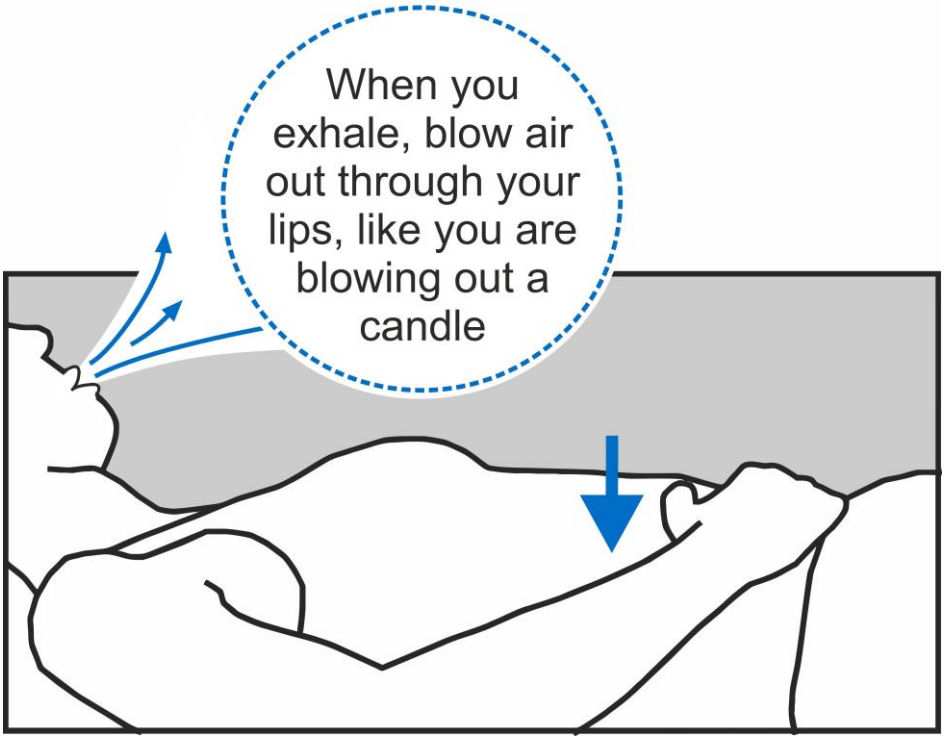


Illustration showing gentle activation of abdominal wall during exhalation.

Exercise 4: Widening Breathing with Emphasis on Exhalation

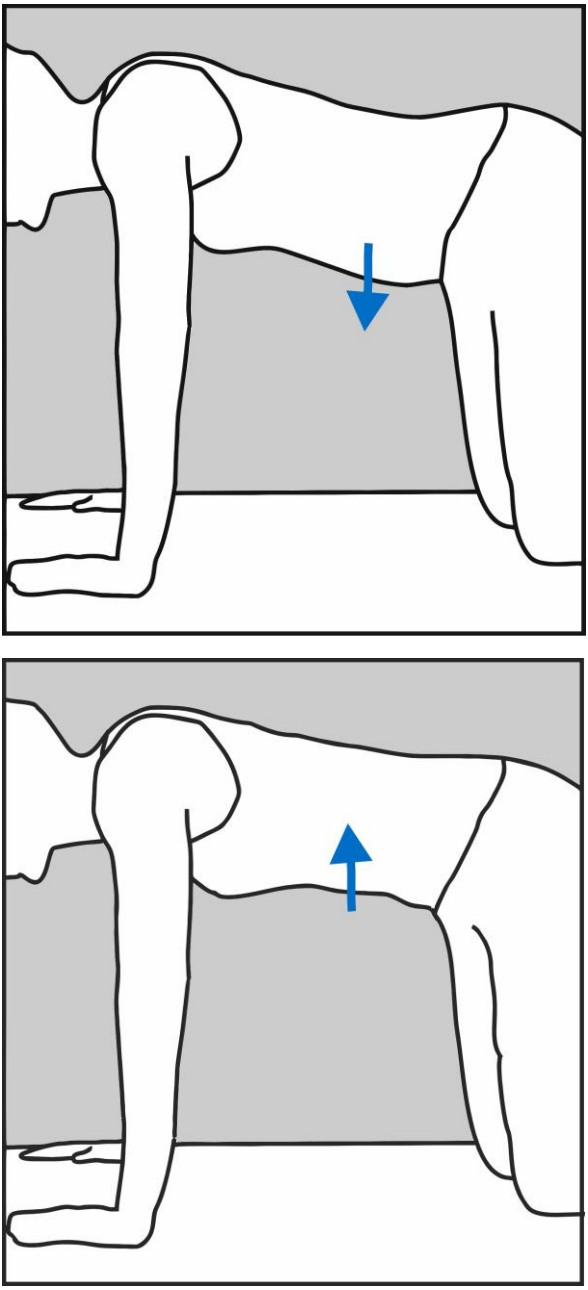
> Aim to start two weeks to a month after surgery

Purpose: To improve control of abdominal muscle tightening and relaxing during breathing.

1. Position yourself on all fours (hands and knees), allowing your abdomen to hang naturally.
2. Observe your breathing rhythm. You can place a hand on your abdomen to feel the movement or ask someone to gently assist you.
3. As you exhale, gently tighten your abdomen to deepen the exhalation.
4. During the next inhalation, release the abdominal tension fully, allowing your abdomen to expand naturally.
5. Gradually deepen the exhalation and relaxation on inhalation, ensuring the movement is smooth and unrestricted.

Tips:

- Avoid holding tension in your abdomen after exhaling; this restricts your next breath.
- Practice slowly and calmly to prevent symptoms such as dizziness or tingling, which may indicate over-breathing. If these occur, pause until they subside before continuing.



Illustrations showing widening breathing with emphasis on exhaling.

Summary of Breathing Exercises

The above exercises are designed to stimulate the normal activity of your abdominal wall during breathing. Once you notice positive effects from these basic exercises, begin applying the principles of smooth and coordinated breathing to daily activities, such as walking, bending, or climbing stairs.

Be patient and progress gradually. If your body tends to block your breathing during an activity, stop, focus on your breathing, and try again. If you struggle to do this independently, seek guidance from a physiotherapist or other expert. Avoid rushing this process; building a strong and steady foundation is key to long-term success in your recovery.

Core Strength Exercises: Rebuilding Stability and Power

The following exercises are designed to help rebuild core strength and stability after your surgery.
The muscles in your abdominal wall work together to stabilize your trunk and support movement.
These exercises aim to restore control over your core, improving your ability to move, bend, lift, and perform daily activities without discomfort.

Remember to approach these exercises at a manageable pace, stopping if you experience significant discomfort or pain. The focus is on controlled movements that gradually improve core strength without causing bulging or straining of the abdominal wall.

Some discomfort is okay, but stop if you experience significant discomfort, pain, or shortness of breath.
If these persist, contact a healthcare professional.

You can track your progress in these exercises by marking the below table.

5: Gentle Core Activation in a Lying Position	
6: Core Activation Using a Resistance Band	
7: Transversus Abdominis (TA) Activation	
8: Standing Core Activation	

Exercise 5: Gentle Core Activation in a Lying Position

> Aim to start two weeks to a month after surgery

Purpose: To engage the rectus muscles without increasing pressure in the abdomen.

1. Lie on your back with your knees bent and feet flat on the floor. Place a pillow under your knees if it feels more comfortable.
2. Extend your arms straight up toward the ceiling, keeping your shoulders relaxed.
3. Gently lift your head slightly off the surface, followed by a small lift of your shoulders. Your arms should remain pointing upward, not toward your knees (the lower back and chest is left on the surface and only shoulder blades lift off the surface). Hold this for five seconds.
4. Lower your head and shoulders back down slowly and relax.

Repetitions: Start with three sets of 10 repetitions. If this feels easy, gradually increase to three sets of 20 repetitions.

Tip:

Focus on keeping your abdomen flat throughout the exercise. Avoid any bulging of the belly. If there is bulging you are working to hard or moving in the wrong direction. Try to figure out how to contract the muscle without the bulging.

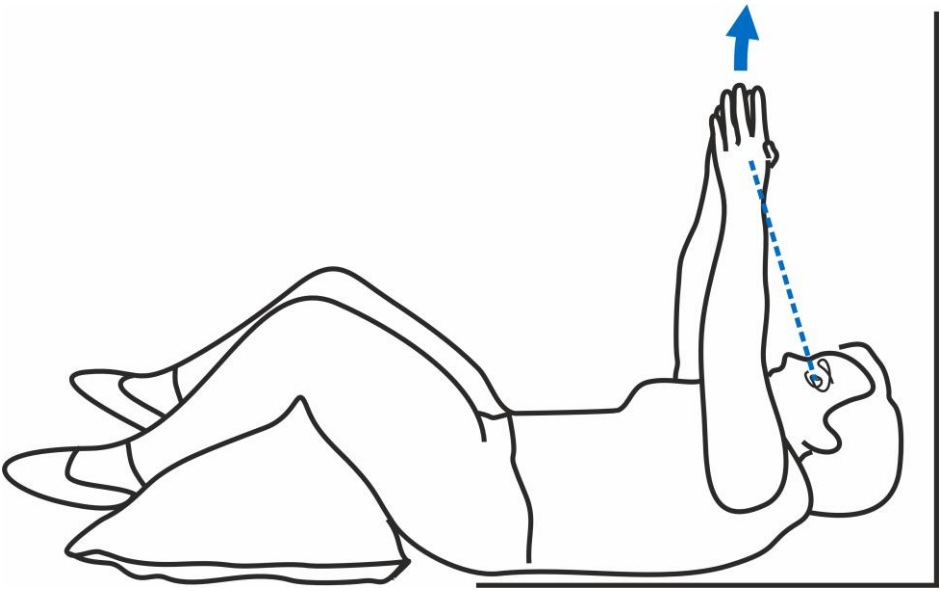


Illustration showing gentle core activation in a lying position with pillow under knees.

Exercise 6: Core Activation Using a Resistance Band

> Aim to start two weeks to a month after surgery

Purpose: To engage the rectus abdominis (RA) muscles in a controlled way using a resistance band.

1. Lie on your back with your knees bent and feet flat. Tie a resistance band to an object **behind** you, such as a firm table leg or bed post (something that does not move when pulled). Hold the resistance band in both hands, with your arms extended behind your head.
2. Gently lift your head slightly off the surface and keep your arms straight as you move them toward your knees. Do not lift your shoulders or upper body—only your arms should move.
3. Return your arms to the starting position behind your head and relax.

Repetitions: Start with three sets of 10 repetitions. If it feels easy, build up to three sets of 20 repetitions.

Tip:

- Ensure your abdomen remains flat and controlled. If your belly bulges, reduce the resistance or adjust your movement.

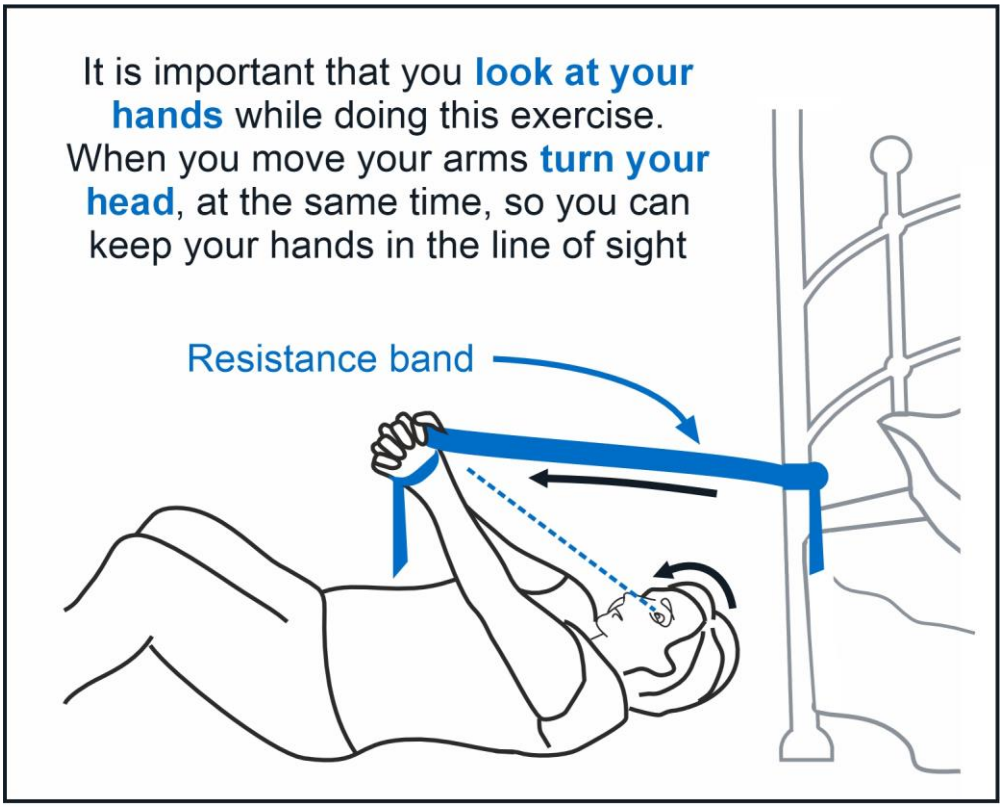


Illustration showing core activation using a resistance band tied to bed post with person lying on floor.

Exercise 7: Transversus Abdominis (TA) Activation

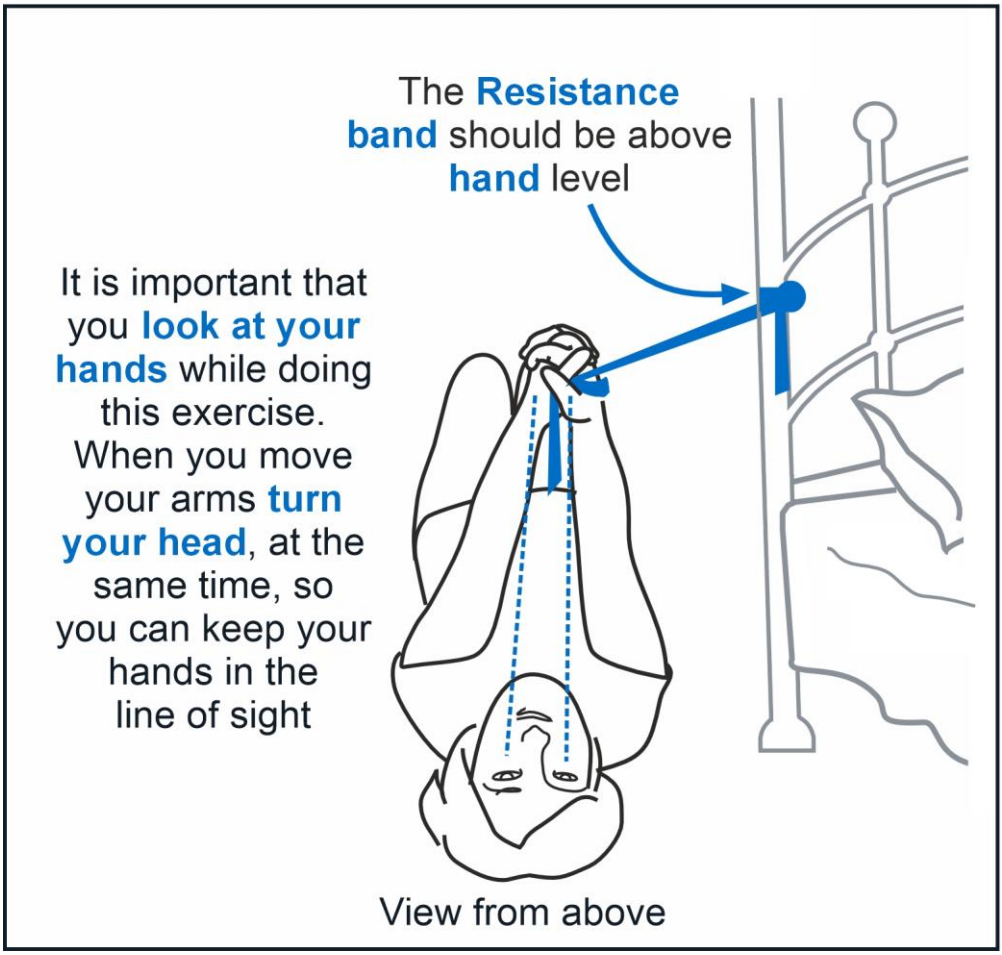
Aim to start two weeks to a month after surgery

Purpose: To strengthen the deep abdominal muscles that help control intra-abdominal pressure and prevent bulging.

1. Lie on your back with your knees bent and feet flat on the floor. Hold a resistance band in both hands, positioned **above** the level of your shoulders. The resistance band should be next to one of your shoulders, not behind you.
2. Before moving your arms, focus on engaging your abdominal muscles by drawing your belly gently inward. This is a subtle movement that should not feel like holding your breath.
3. Once your core is engaged, move your arms in a smooth, controlled motion across your body not further than the opposite shoulder. You should feel the resistance band tightening with the movement.
4. Turn your head looking at your hands as they move (see figure).
5. Return to the starting position while maintaining core engagement. Only relax your abdomen once you've completed the full movement.

Repetitions: three sets of 10 repetitions, building up to three sets of 20 as you progress.

Tip: Keep your abdomen flat. If you notice bulging or experience discomfort, adjust the resistance or reduce the range of motion.



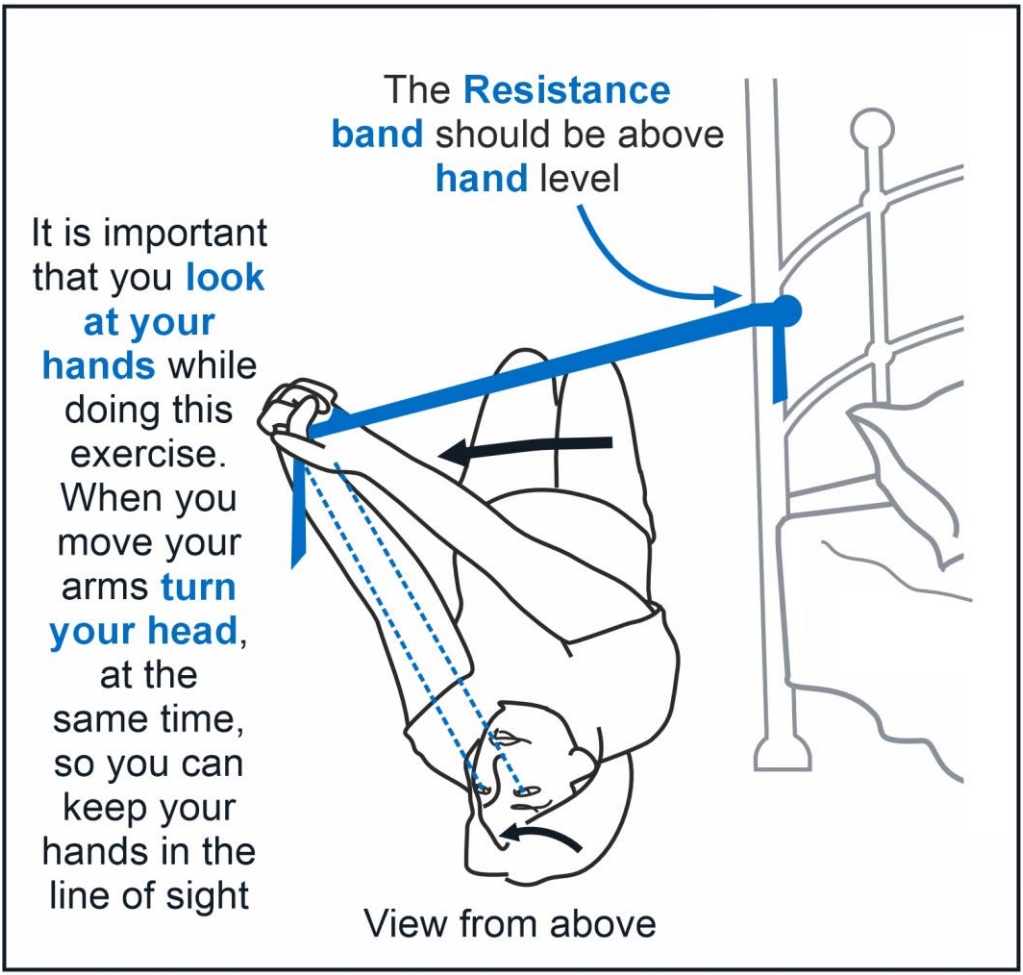


Illustration showing Transversus Abdominis (TA) activation using resistance bands tied high on bed post.

Exercise 8: Standing Core Activation

> Aim to start two weeks to a month after surgery

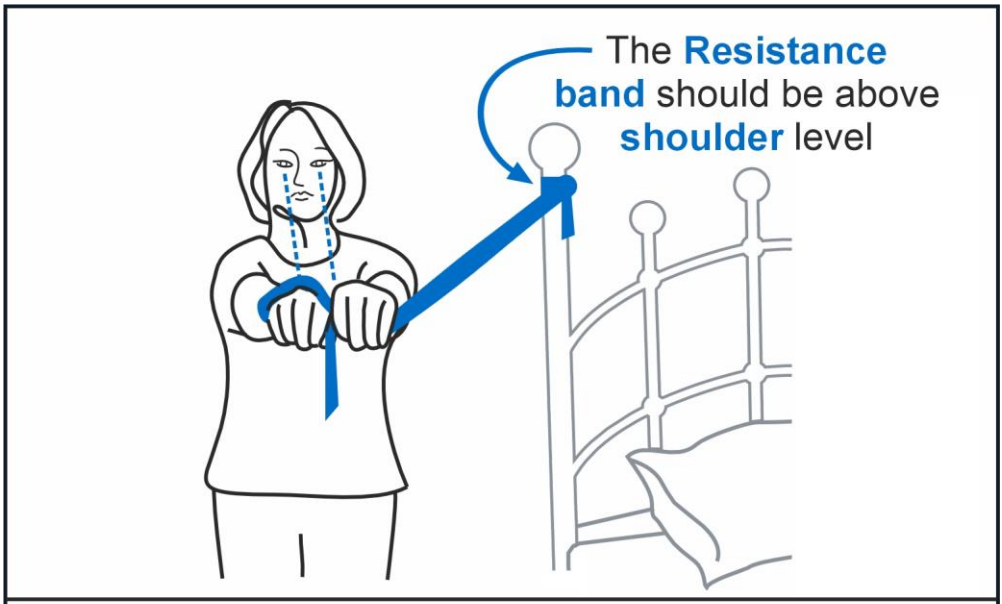
Purpose: To activate the core muscles in a more functional, upright position.

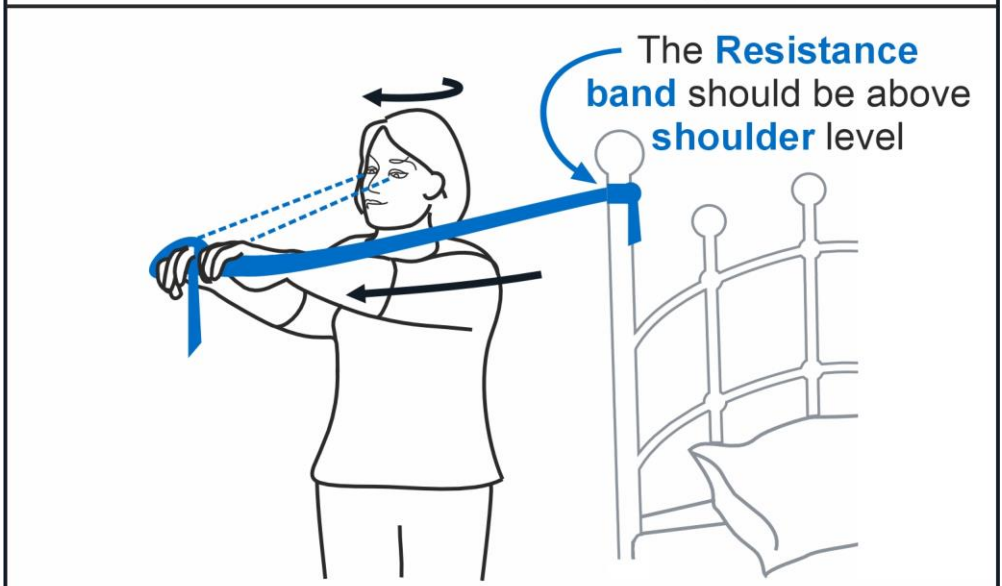
1. Stand with your feet shoulder-width apart and your knees slightly bent to avoid locking them.
2. Hold a resistance band in both hands, similar to Exercise 3. The band should be placed **above** the level of your shoulders. focus on engaging your abdominal muscles by drawing your belly inward slightly.
3. Move your arms across your body in a controlled motion, similar to Exercise 3, while maintaining core engagement. Keep your hips stay facing forwards throughout this exercise.
4. Return to the starting position and relax your abdomen before repeating.

Repetitions: three sets of 10 repetitions, increasing to three sets of 20 over time.

Tip:

- Keep the motion controlled and avoid jerking movements. Ensure your abdomen remains engaged without bulging.





It is important that you **look at your hands** while doing this exercise. When you move your arms **turn your head**, at the same time, so you can keep your hands in the line of sight

Illustration showing person standing and pulling on resistance bands tied to bed post to activate Transverse Abdominis.

Summary of Core Strength Exercises

The above exercises are designed to help restore your core strength by engaging the muscles of the abdominal wall in a safe and controlled way. These exercises focus on improving your ability to stabilize your trunk during movements like bending, twisting, and lifting, which are essential for daily activities.

As you practice, aim to keep your abdomen flat and avoid any bulging or straining. Progress at a pace that feels comfortable, gradually increasing repetitions as your strength improves. If you notice a positive effect from these exercises, begin applying core control principles to other activities, such as walking, standing from a seated position, or climbing stairs.

Take your time with each movement and avoid rushing. If you experience any discomfort or find it difficult to maintain control, adjust the exercise or seek guidance from your physiotherapist. A gradual, steady approach will give you the best chance of building strength and preventing injury.

Tell us what you think of this leaflet

We hope that you found this leaflet helpful. If you would like to tell us what you think, please contact:
York Abdominal Wall Unit, Department of Surgery
4th floor Admin block. York Hospital, Wigginton Road, York, YO31 8HE.

Teaching, training and research

Our Trust is committed to teaching, training and research to support the development of health and healthcare in our community. Healthcare students may observe consultations for this purpose. You can opt out if you do not want students to observe. We may also ask you if you would like to be involved in our research.

Patient Advice and Liaison Service (PALS)

PALS offers impartial advice and assistance to patients, their relatives, friends and carers. We can listen to feedback (positive or negative), answer questions and help resolve any concerns about Trust services.

PALS can be contacted on 01904 726262, or email yhs-tr.patientexperienceteam@nhs.net.

An answer phone is available out of hours.

Leaflets in alternative languages or formats

If you would like this information in a different format, including braille or easy read, or translated into a different language, please speak to a member of staff in the ward or department providing your care.

Patient Information Leaflets can be accessed via the Trust's Patient Information Leaflet website: www.yorkhospitals.nhs.uk/your-visit/patient-information-leaflets/

Special mention

This leaflet was developed in conjunction with Dr Jan-Paul van Wingerden, Director of the Spine and Joint Centre (Rotterdam).

Owner	Srinivas Chintapatla, Jan-Paul Wingerden, Henri Toone-Watkiss, Asim Abbas
Date first issued	January 2026
Review Date	January 2029
Version	1 (issued January 2026)
Approved by	Surgery Care Group Clinical Governance Group
Document Reference	PIL1773 v1