



Ian Cooper, Physiotherapist, Myositis Discovery Programme, Perth, WA

Matching your exercises to the strength of your muscles

Muscle weakness in several muscle groups, is the hallmark of myositis. To help gauge any changes in your muscle function, routine monitoring of muscle strength is most likely performed every time you visit your specialist. Without sophisticated testing equipment, the most common method of assessing your individual muscle strength is when the doctor asks you to contract the muscle being tested whilst they try to stop your limb from moving. This is known as the Manual Muscle Test (MMT). It is simple, quick, and inexpensive to perform.

The beauty of the MMT is that it is used throughout Australia and around the world. If a doctor in Perth says you have grade 2 quadriceps then all other health professionals anywhere in the world will know what this means.

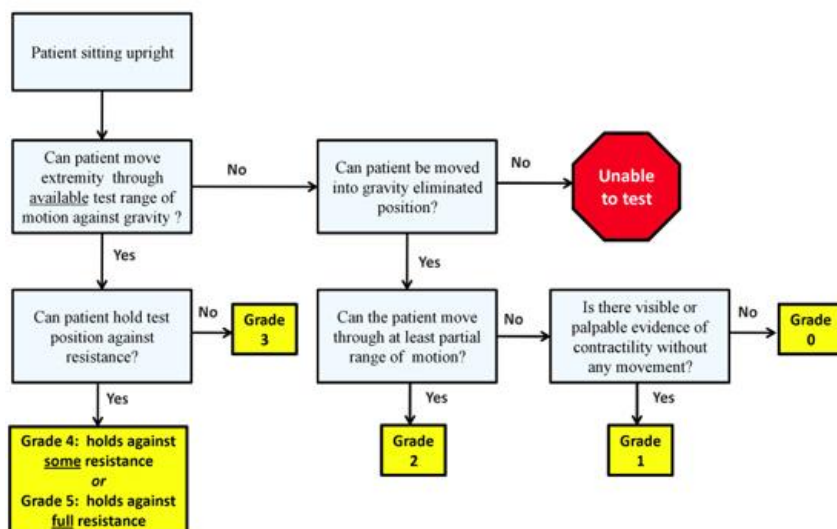
The most common form of MMT measures muscle strength on a scale of 0-5

MMT Grades 0-5		
0	None	No visible or palpable contraction
1	Trace	Visible or palpable contraction with no or limited movement
2	Poor	Full range of movement whilst gravity is eliminated
3	Fair	Full range of movement against gravity
4	Good	Full range of movement against gravity and some resistance
5	Normal	Full range of movement against gravity and maximum resistance

Some centres now quantify the scores further by adding a + or – after the number to indicate that the strength is somewhere between one score and another.

There is some confusion at times around scores 2-4. If you think about your quadriceps muscles whilst sitting on a bench. If your muscles are grade 2 you may be able to move your foot forward slightly but you won't be able to bring your foot all the way up and make the knee straight. When you lie on your side with gravity eliminated the knee can be straightened. This confirms strength at grade 2. If you have grade 3 strength you will be able to straighten your knee fully whilst sitting on a bench, however not with a small weight attached around your ankle. Grade 4 is when you can straighten your knee fully with a weight around your ankle.

Below is an algorithm that may help explain further how different muscle grades are calculated



Ciesla et al 2011

The goal of any strengthening exercise programme is to maintain the strength you have in a muscle and where possible help the muscle move from one grade up to the next. Any improvements in strength will be slow. If you try and perform exercises that your muscles don't have the strength to perform then you will fail, and this can be very disheartening and demotivating. For example, there is no point if you have grade 2 quadriceps in trying to work these muscles with a weight around your ankle or pulling against resistance exercise bands

One thing to remember is that it is common for different muscles or muscle groups in your body to differ in strength. For example, your quadriceps can be grade 2 but your hamstrings and hip muscles can be grade 4 so there will never be a 'one size fits all' scenario.

If you have not done already, at your next appointment, ask your specialist what grade your weaker muscles are if you are unable to work it out yourself.

The following are some examples of exercises that can be performed depending on the strength of your muscles. This is by no means an exhaustive list. Hopefully as you understand what each muscle is capable of, you can devise your own exercises. Note that none of the exercises require expensive exercise equipment. The exercises however include a mixture using small weights or resistance exercise bands. These can be interchangeable. At the end I have attached some exercises devised by an ingenious gentleman from WA who has designed and built his own exercise equipment that you may wish to copy.

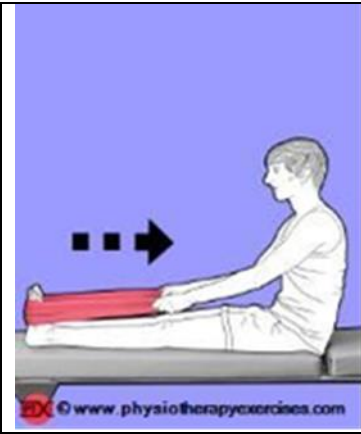
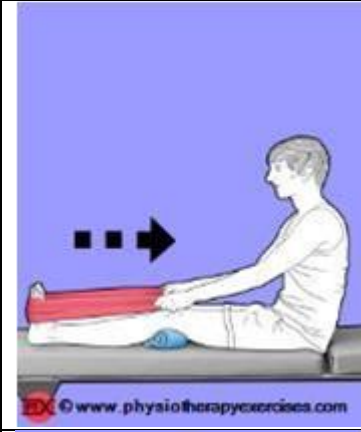

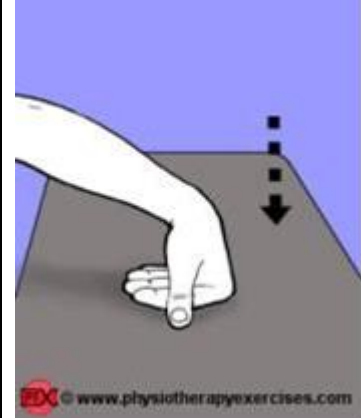
Note that any strengthening exercises should be performed in conjunction with aerobic exercises which are more designed to make the heart and lungs work rather than strengthen the muscles.

Please consult with your doctor or physiotherapist about exercise intensity and for those of you who have grade 4 strength what weights you should be working against.

It is always advisable when performing strengthening exercises to **start slowly** and **gradually increase** the number of repetitions. Remember it is normal to feel some discomfort in your muscles after exercise, but you want to avoid excessive muscle pain and discomfort. The old adage of 'no pain, no gain' isn't always appropriate for people with myositis. The other factor to consider is that after exercise, your muscles may be weaker for a while. Remember to include some recovery time after your routine.

Grade 0

Even if you cannot actively make the muscle contract it is important to keep the joint from stiffening up or the opposite muscles from becoming tight

	<p>Aim of exercise To maintain or improve range of motion in the ankle and calf muscles</p> <p>Exercise instructions Position yourself in long sitting with your knee straight. Place a towel around your foot and gently pull your foot towards your head until you feel a stretch in your calf muscle. Even if the muscles that pull the foot up are very weak, try to make them work as you pull the foot up</p>
	<p>Aim of exercise This exercise differs slightly from the previous one. With a rolled towel under your knee it stretches a different muscle in the calf</p> <p>Exercise instructions Position yourself in long sitting with a rolled up towel under your knee. Place a towel around your foot and gently pull your foot towards your head until you feel a stretch in your calf muscle. Ensure that you keep your heel on the bed.</p>
	<p>Aim of exercise To stretch or maintain range of motion in your wrists and finger flexor muscles.</p> <p>Exercise instructions Position yourself sitting on a bed with your arms out straight behind you. Ensure that your fingers are kept straight.</p>
	<p>Aim of exercise To stretch or maintain range in your knuckle and finger joints.</p> <p>Exercise instructions Position yourself sitting with your hand on a table nearby. Push your hand down with your knuckle joints bent. Slowly drop your wrist down whilst your fingers bend.</p>

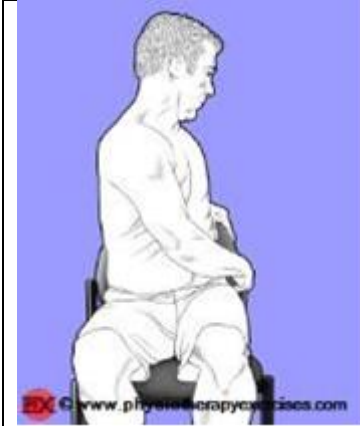


Aim of exercise

To stretch hip muscles on one side whilst stretching thigh muscles on the other

Exercise instructions

Position yourself lying on your back with one knee on your chest and the opposite leg hanging off the end or side of the bed. Pull your hip up as far as it can go and hold for a short while. Repeat by bending up the other leg whilst letting the other knee hang over the end or side of the bed

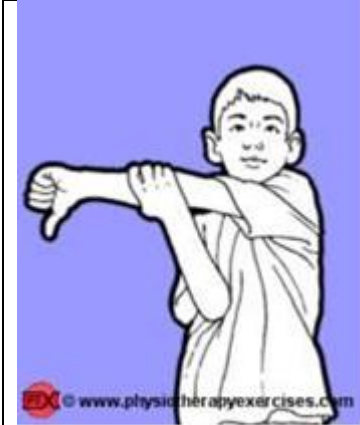


Aim of exercise

To maintain or improve range of motion and stretch tight tissue over the trunk

Exercise instructions

Position yourself in sitting. Twist your body around as far as it can, keeping your feet flat on the floor and your knees still and together. Change your position so that you receive maximal stretch over the trunk. Hold for a short time then repeat to the other side



Aim of exercise

To stretch or maintain length in the muscles behind your shoulder.

Exercise instructions

Position yourself with one arm held straight across the front of you at shoulder height. Use your other hand to pull your arm closer to you. Ensure that your arm stays in line with your shoulders. Repeat on the other side






Aim of exercise

To stretch or maintain length in the muscles in your shoulders and chest.

Exercise instructions

Position yourself lying on your back with your hands behind your head. Ensure that your elbows are free to drop down onto the bed.

		<p>Aim of exercise To stretch or maintain range in your shoulder.</p> <p>Exercise instructions Position yourself lying on your back with your shoulder by your side and your elbow bent a little. Instruct a carer/friend to passively move your shoulder to a vertical position and back while keeping your elbow still. If the other arm is strong then link fingers and move both arms together.</p>
		<p>Aim of exercise To stretch or maintain range in your hip adductors.</p> <p>Exercise instructions Position yourself sitting with your hips and knees bent to each side and your feet together. Push your knees gently towards the floor with your elbows.</p>
		<p>Aim of exercise To stretch or maintain range in your hip abductors and rotators.</p> <p>Exercise instructions Position yourself sitting with one leg crossed over the other and your opposite elbow on the outside of your crossed knee. Rotate your trunk to look behind you.</p>

Grade 1

In this grade the goal is to make the muscle contract even if it is not strong enough to cause much movement



Aim of exercise

To help the weak muscles move the ankle. This is a combination of passive and active movement

Exercise instructions

Position yourself sitting with one foot up on your opposite knee. Move your ankle up and down and around in circles. Try and make the muscles do the movement. Where it is not strong enough to move the ankle then use your hand to assist.



Aim of exercise

To make the muscles at the front of your neck work.

Exercise instructions

Position yourself in sitting or standing. Place one hand on your forehead. Push gently against your hand. Keep your head still and only use approximately 10% effort.

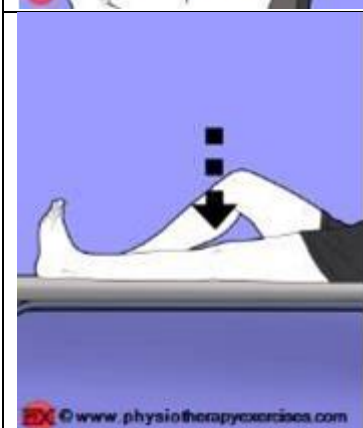


Aim of exercise

To stretch tight tissue over your neck and help weak muscles turn the head.

Exercise instructions

Position yourself in sitting with good posture. Turn your head to the side with your opposite shoulder lowered using your hand to help. You can increase the stretch by over pressing with your hand.






Aim of exercise

To strengthen the thigh muscles.

Exercise instructions

Position yourself lying on your back with your legs straight. Pull your toes up towards you and tighten the muscles at the front of your thigh by pressing the back of your knee into the bed.

 <p>www.physiotherapyexercises.com</p>		<p>Aim of exercise To strengthen the muscles at the back of your hip.</p> <p>Exercise instructions Position yourself lying on your back with your knees bent. You may need someone to hold your feet and knees in place. Squeeze the muscles of your buttock as tight as you can. The goal is to lift your bottom off the bed but that may not be possible. At least aim to feel the buttock muscles contract.</p>
 <p>www.physiotherapyexercises.com</p>		<p>Aim of exercise To strengthen the muscles that bend your wrist forward</p> <p>Exercise instructions Position yourself with your hand resting on its side. Place your other hand on the palm of the hand that is exercising. Try and bend your wrist forward. The other hand is there to feel if the muscles are working and to help the hand move if the muscles are not strong enough</p>
 <p>www.physiotherapyexercises.com</p>		<p>Aim of exercise To strengthen the muscles that extend your wrist.</p> <p>Exercise instructions Position yourself with your hand resting on its side. Place your other hand on top of the hand that is exercising. Bend your wrist and try to move your hand backwards. The other hand is there to feel if the muscles are working and to help the hand move if the muscles are not strong enough</p>

Grade 2

In this grade you are aiming to strengthen the muscle whilst in a gravity eliminated position. The ultimate goal is to progress to grade 3



Aim of exercise

To strengthen your muscles and maintain full range of motion at the ankle

Exercise instructions

Position yourself lying on your back. Start with your toes pointing down. Finish with your toes pointing up.
If unable to bring your foot right up, then try this exercise whilst lying on your side and foot is supported

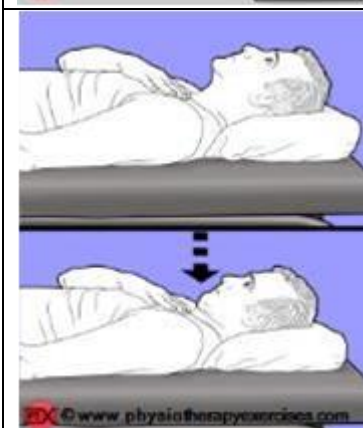


Aim of exercise

To work both the quadriceps and hamstrings using a slidesheet to help

Exercise instructions

Position yourself sitting with one foot on the floor and the other on a slidesheet. Practice bending and straightening your knee using the slidesheet to help. Try to go further each time

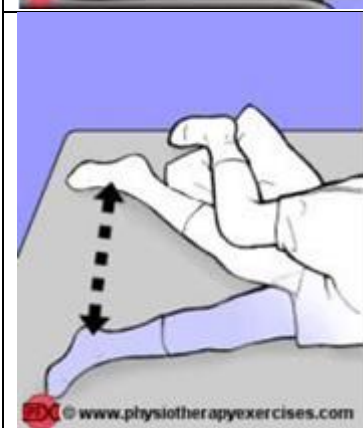


Aim of exercise

To improve control of your neck muscles.

Exercise instructions

Position yourself in lying with a soft pillow under your head and your knees bent. Gently nod your head. Gently move back to the start position. You may not feel much movement but should feel the muscles contracting

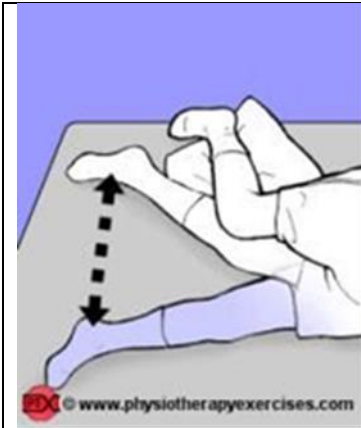


Aim of exercise

To strengthen the muscles at the back and front of your knee

Exercise instructions

Position yourself lying on your side. Start with your knee bent. Finish with your knee straight. It may be easier if you place a polished board between your legs



Aim of exercise

This exercise differs from the previous one. This is aimed at strengthening the muscles at the back and front of your hip

Exercise instructions

Position yourself lying on your side. Start with your foot behind your hip. Finish with your foot in front of your hip. It may be easier if you place a polished board between your legs



Aim of exercise

To improve your ability to bend your finger tip.

Exercise instructions

Position yourself with one hand blocking the joints near the tip of your finger. Slowly bend and straighten your fingers from the joint near the tip of your fingers.



Aim of exercise

To improve your ability to bend and straighten your fingers.

Exercise instructions

Position yourself with one hand blocking the large knuckle joints of the fingers. Bend and straighten your fingers into a hook fist.





Aim of the exercise

To improve your ability to manipulate objects with your hand.


Exercise instruction

Position yourself with your hand resting on the side of the little finger. Practice touching the tip of your little finger to the tip of your thumb. Then repeat by touching the index of the other fingers

 <p>www.physiotherapyexercises.com</p>	<p>Aim of the exercise To improve your ability to bend and straighten your wrist.</p> <p>Exercise instruction Position yourself with your hand resting on the side of the little finger. Bend your wrist letting the fingers straighten and pull your wrist back, letting the fingers bend.</p>
 <p>www.physiotherapyexercises.com</p>	<p>Aim of the exercise To strengthen and mobilise your shoulder blades</p> <p>Exercise instruction Position yourself lying on your side with your uppermost arm resting on two pillows. Draw your shoulder blade towards the centre of your back. Hold for 10 seconds. Repeat on the other side</p>

Grade 3

In this grade the aim of each exercise is to make the muscle contract throughout its full range of motion against gravity. The ultimate goal is to be able to work the muscle against a resistance.

 <p>www.physiotherapyexercises.com</p>	<p>Aim of exercise To strengthen the muscles at the front of your ankle.</p> <p>Exercise instructions Position yourself sitting with your feet together in front of you. Start with your feet flat on the floor. Finish with your toes lifted up. Ensure that you keep your heels on the ground.</p>
---	--

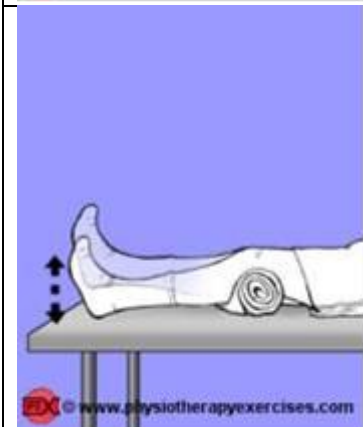


Aim of exercise

To strengthen the muscles in the front of your thigh (quadriceps)

Exercise instructions

Position yourself sitting with your legs over the side of a bed or chair. Start with your knee bent. Finish with your knee straight.



Aim of exercise

To strengthen the part of the quadriceps that pulls the knee fully straight

Exercise instructions

Position yourself lying on your back with a rolled towel under your knee. Start with your knee bent. Finish with your knee straight. Do not lift your thigh off the bed, just your foot

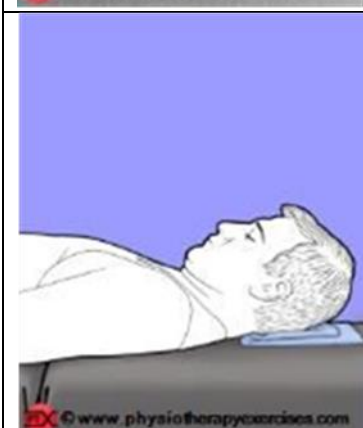


Aim of exercise

To strengthen the muscles in the back of your knee. (hamstrings)

Exercise instructions

Position yourself standing holding onto the back of a chair. Start with your knee straight. Take your heel towards your bottom. Finish with your knee bent. Ensure that you keep your thigh straight.

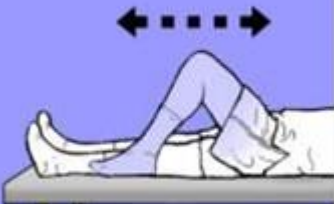





Aim of exercise

To make the muscles at the front of your neck work.

Exercise instructions

Position yourself on your back with your knees bent. Do not place a pillow under your head. If you are uncomfortable place a small folded towel under your head for support. Look at a spot on the wall just above your knees. Try to slide your head up the bed and perform a slow and gentle head nod.

 <p>www.physiotherapyexercises.com</p>		<p>Aim of exercise To increase movement and strength of the hip and knee.</p> <p>Exercise instructions Position yourself lying on your back. Start with your hip straight. Slide your heel along the bed towards your bottom as far as possible.</p>
 <p>www.physiotherapyexercises.com</p>		<p>Aim of exercise To strengthen your hip muscles.</p> <p>Exercise instructions Position yourself on your side with your affected hip uppermost. Bend your knees, keep your ankles together and raise your uppermost knee away from the bottom one.</p>
 <p>www.physiotherapyexercises.com</p>		<p>Aim of exercise To strengthen the muscles at the side of your hip. This differs slightly from the previous exercise and works a different part of the hip muscles</p> <p>Exercise instructions Position yourself lying on your side. Start with your top leg resting on the bed. Lift your leg away from the bed leading with your heel. Finish with your leg away from the bed. Ensure that your hip and knee are kept straight and your foot points forwards.</p>
 <p>www.physiotherapyexercises.com</p>		<p>Aim of exercise To strengthen the muscles that straighten your elbow (triceps)</p> <p>Exercise instructions Position yourself lying on your back with your arm held vertically. Start with your elbow straight. Finish with your elbow bent and your palm touching your forehead. Ensure that your upper arm doesn't move and only your forearm moves.</p>

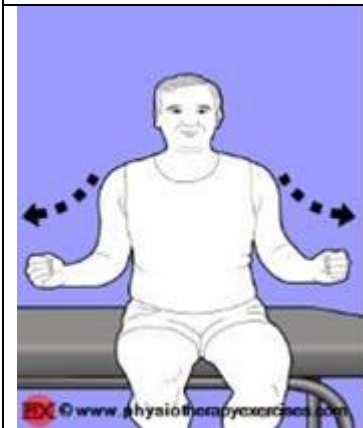


Aim of exercise

To improve muscle control around your shoulder blades while maintaining neck posture.

Exercise instructions

Position yourself in sitting. Ensure that your posture is good by sitting up tall, drawing your shoulder blades towards the centre of your spine, and nodding your chin. Lift one arm so that your elbow is beside your ear and then lower your arm. Lift your other arm so that your elbow is beside your ear and then lower your arm. Maintain a good posture while you continue alternating your arms.



Aim of exercise

To improve control around your shoulder blades while using your arms.

Exercise instructions

Position yourself in sitting. Ensure that your posture is good by sitting up tall, drawing your shoulder blades towards the centre of your spine and nodding your chin. Maintain this shoulder blade position while rotating your arms in and out.

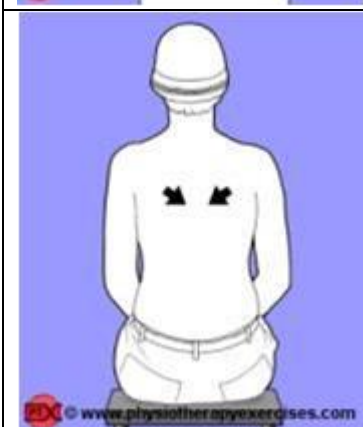


Aim of exercise

To improve range of motion and strength in your biceps.

Exercise instructions

Position yourself in sitting or standing with your arm down beside your body. Start with your elbow straight. Move your hand towards your shoulder. Finish with your elbow bent. Ensure you keep your elbow tucked in beside your body.


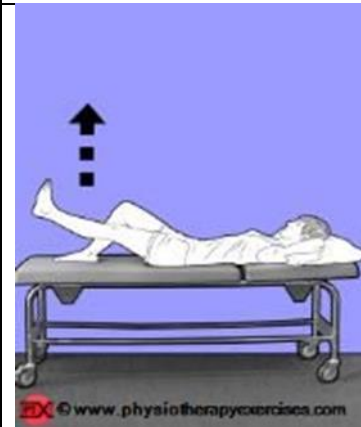


Aim of exercise

To strengthen the muscles at the back of your shoulder.


Exercise instructions

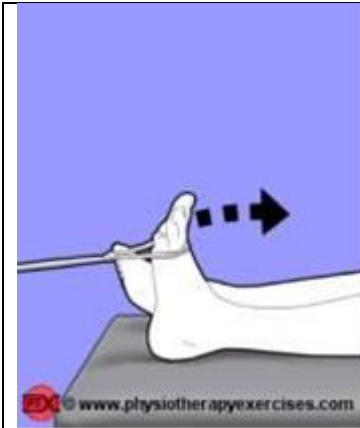
Position yourself sitting up straight. Practice pulling your shoulders backwards and downwards.

	<p>Aim of exercise To strengthen the muscles at the front and side of your shoulder and stretch or maintain length of the muscles at the back of your shoulder.</p> <p>Exercise instructions Position yourself standing facing the wall. Place the palm of your hand against the wall and slowly `walk` your fingers up the wall.</p>
	<p>Aim of exercise To strengthen hip flexors and knee extensors</p> <p>Exercise instructions Position yourself on your back with one knee straight and the other knee bent. Tighten the muscles in your thigh and lift your leg off the bed. Ensure that you keep your knee straight. Do not lift too far off the bed.</p>

Grade 4

In this grade the goal is to make the muscles work against a resistance gradually increasing the resistance over time.

	<p>Aim of exercise To strengthen the muscles at the front of your ankle.</p> <p>Exercise instructions Position yourself sitting with a weight attached around your toes. Start with your toes on the floor. Finish with your toes off the floor.</p>
---	--

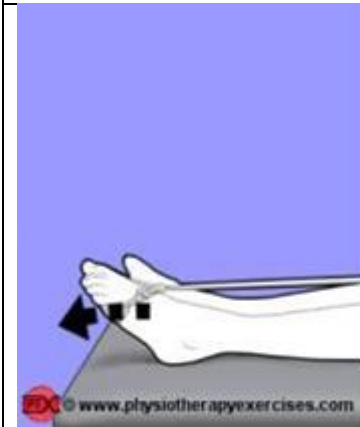


Aim of exercise

To strengthen the muscles at the front of your ankle.

Exercise instructions

This is an alternative to the previous exercise if you prefer resistance bands or tubes over free weights. Make sure the resistance band or tube is securely fastened



Aim of exercise

To strengthen the calf muscles

Exercise instructions

Position yourself lying on your back with some resistance band around your forefoot. Adjust the resistance band so that the direction of pull is from your knee. Start with your ankle upwards. Finish with your ankle downwards.



Aim of exercise

To strengthen the calf muscles and improve balance

Exercise instructions

Stand behind a supporting surface and raise up onto your toes and then lower back down. Try to do one leg at a time if able.



Aim of exercise

To strengthen the quadriceps muscles at the front of your thigh.

Exercise instructions

Position yourself sitting with your legs over the side of a bed and a weight around your ankle. Start with your knee bent. Finish with your knee straight.

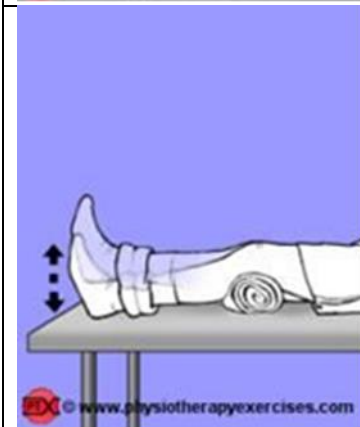


Aim of exercise

This is an alternative to the previous exercise if you prefer resistance bands/tubing

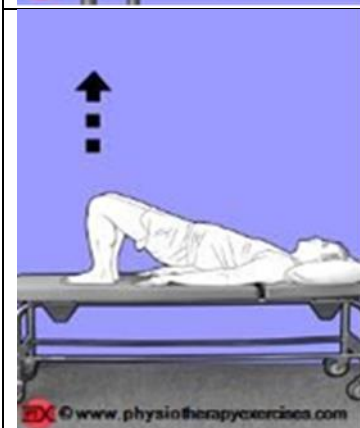
Exercise instructions

Tie resistance band just above your ankle and around the leg of the chair. Position yourself in sitting in a chair, thighs supported and feet on the floor. Tighten the muscles in your thigh and straighten your knee.



Aim of exercise

Exercise instructions

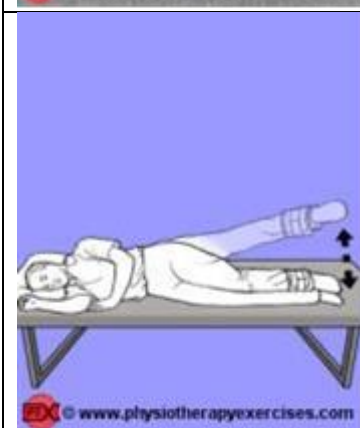


Aim of exercise

To strengthen your buttock muscles.

Exercise instructions

Position yourself lying on your back with your knees bent. Tighten the muscles in your bottom and lift your bottom off the bed.



Aim of exercise

To strengthen the muscles at the side of your hip.

Exercise instructions

Position yourself lying on your side with a weight on your ankle. Start with your top leg resting on the bed. Finish with your leg away from the bed. Ensure that you keep your hip and knee straight and your foot pointing forwards.



To strengthen the muscles at the front of your hip.
Position yourself standing with a weight around your ankle. Start with your hip straight. Finish with your hip bent.



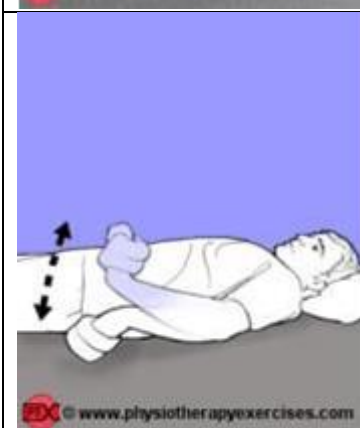
Aim of exercise
To strengthen the muscles at the front of your hip. This is an alternate method of the previous exercise if you prefer resistance band

Exercise instructions
Position yourself lying on your back with the resistance band attached to your ankle. Start with your hip straight. Finish with your hip bent.



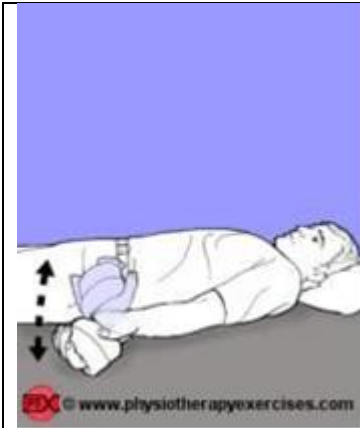
Aim of exercise
To strengthen the muscles that straighten your leg.

Exercise instructions
Position yourself standing holding onto the back of a chair or table. Start with your knees straight. Bend your knees and move your bottom back. Ensure to keep your back straight and your heels on the floor and your weight is equally borne through both legs. Start with small movements initially



Aim of exercise
To strengthen your wrist extensor muscles.

Exercise instructions
Position yourself lying on your back with a weight attached around your hand. Start with your wrist dropped downwards. Finish with your wrist pulled upwards. This can also be done in sitting with your forearm resting forward on a table



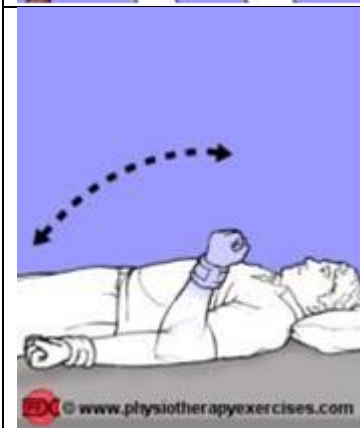
Aim of exercise
To strengthen the wrist flexor muscles.

Exercise instructions
Position yourself lying on your back. Start with your wrist dropped downwards. Finish with your wrist pulled upwards. This can also be done in sitting with your forearm facing upwards on a table



Aim of exercise
To strengthen your triceps.

Exercise instructions
Position yourself in standing with a bench or chair in front of you. Lean forward and place one hand on the bench or chair for balance. Hold a weight in your other hand and extend the elbow. Start with your elbow bent. Finish with your elbow straight. Ensure that you keep your shoulder still.



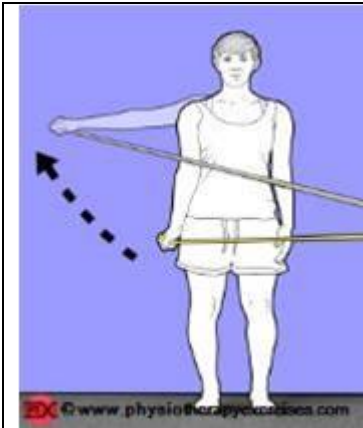
Aim of exercise
To strengthen your biceps.

Exercise instructions
Position yourself lying on your back. Start with your arm down beside your body. Finish with your hand up near your shoulder. Ensure that your elbow is held beside your body.



Aim of exercise
To strengthen your shoulder external rotators

Exercise instructions
Position yourself standing side-on to the resistance band. Adjust the band so that the direction of pull is at the level of your elbow. Start with your far hand across your body and your elbow bent. Finish with your hand out to the side. Ensure that you keep your elbow bent and tucked in beside your body.



Aim of exercise

To strengthen the muscles at the side and top of your shoulder.

Exercise instructions

Position yourself standing side-on to the resistance band. Adjust the band so that the direction of pull is across your body. Start with your arm beside your body. Move your arm out to the side. Finish with your arm out from your body. Ensure that you keep your elbow straight.



Aim of exercise

To strengthen the finger flexors

Exercise instructions

Position yourself sitting with a piece of foam, soft ball or putty held in your hand. Practice squeezing the foam to make a fist.

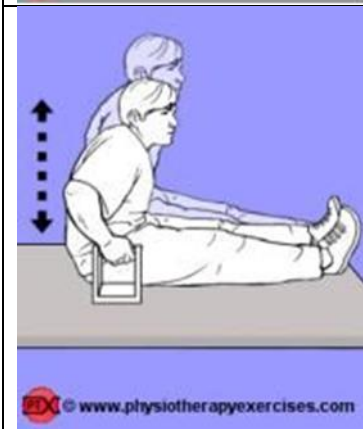


Aim of exercise

To exercise both your wrist and finger flexors

Exercise instructions

Position yourself with putty in the palm of both hands. Make a fist around the putty and twist it apart. If you don't have putty you can use a towel to squeeze and twist.




Aim of exercise

To strengthen your shoulder girdle and muscles at the side of your trunk

Exercise instructions

Position yourself sitting on the floor with your legs out straight in front of you and a pile of books under each hand. Practice lifting your body upwards off the floor.

	<p>Aim of exercise To strengthen the muscles at the front of the shoulder</p> <p>Exercise instructions Position yourself in sitting or standing with a weight in your hand. Start with your elbow bent and your fist facing towards the ceiling. Punch slowly to the ceiling with your elbow straight. Finish with the weight above your head.</p>
---	--

Acknowledgement

<https://www.physiotherapyexercises.com/>

This is a good exercise to strengthen your hip and knee extensor muscles. This is a board with wheels and a foot plate. The resistance bands can be interchangeable to match your strength



The same board can be used to help with exercising the knee muscles whilst in sitting. The resistance band can be moved depending on what muscles you are exercising



This is good use of a shower chair with its high arm rests to help with step up exercises



A note on resistance bands and tubing

Resistance bands have become increasingly popular over the years and for good reason as they are lightweight and can be rolled up and taken anywhere to let you keep up with your exercises no matter where you are.

These bands are sometimes known as Theraband after the company that made the first resistance bands to come on to the market. There are different manufacturers now. Whilst the quality of bands and tubes differ, generally speaking, the colours are consistent. Each colour represents a different level of resistance. It is important that you know what you can work against before purchasing any band for home use. The following is a colour chart and descriptor of the type of resistance they will provide from lightest to heaviest

Colour	Resistance Level
	Extra Thin
	Thin
	Medium
	Heavy
	Extra Heavy
	Special Heavy
	Super Heavy

Note that the bands and tubes can snap especially as they age so never perform an exercise where the band or tube is holding your body weight