

Preoperative Home Exercise Programme

For

Selective Dorsal Rhizotomy (SDR) patients

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Dear Parent,

Now that your child has been selected for Selective Dorsal Rhizotomy (SDR) surgery, there are some things you can do in the weeks/months leading up to admission to hospital to prepare your child for this surgery, the postoperative hospital stay and the physiotherapy programme.

The SDR surgery will reduce spasticity (muscle stiffness) in your child's legs and there will be some associated muscle weakness in their legs immediately following surgery. This daily programme includes exercises to strengthen the muscles that will be weak, improve leg range of motion and familiarise your child with the postoperative exercise programme. Please continue with any additional stretches and the orthotic (splint) regime that you have been doing.

If your child is unable to perform any of the exercises as described in this booklet, please do not worry. Attempt the exercises and encourage your child to maintain the positions and perform the movements to the best of their ability. This is important to familiarise your child with this type of exercise as many of the post-operative exercises will be similar or the same. It will also help to establish the exercises into a routine. You can ask your child's community physiotherapist for further advice if you are unsure what to do.

General Information

Your child will need a wheelchair following surgery. If they have a wheelchair with a firm back and seat that provides 90 degree hip and knee angles, please bring that wheelchair to the hospital with you. A wheelchair with sling type seat and back cannot be used. We will discuss the chair in advance and if needed, an appropriate chair can be provided. Please also bring your child's current walking aid and orthoses (splints) if they have them.

Following SDR surgery, with changes to muscle stiffness in your child's feet and legs, it is not uncommon for orthotic (splint) needs to change. Your child's present orthoses, if you have any, will be assessed and recommendations for any changes will be given at the preoperative orthotic assessment.

If all goes as expected, your child will be discharged from the hospital 3 weeks after surgery. That does not include the preoperative assessment day or the day of surgery. A home exercise programme will be given to you (which will be different to this one) and a follow-up letter and copy of the home exercise programme will be given to your child's physiotherapist. We will also talk to your child's physiotherapist at the time of going home.

The physiotherapists at the Hospital where your child's surgery takes place will remain available to you and your child's local physiotherapist for ongoing consultation.

Our hope is that by preparing you and your child well for SDR surgery, his/her recovery will be as fast and easy as possible.

If you or your child's local community physiotherapist have any questions regarding this exercise programme, your child's upcoming surgery, or coming into hospital, please feel free to call The SDR Scotland Service Coordinator on 0141 451 5905.

Flexibility Exercises

1. Hamstring Stretch (Supine)

PURPOSE

To stretch the muscles that bend the knee (tightness may prevent straightening the knee when standing and walking).

DIRECTIONS

Position your child lying face up on floor or other firm surface. Bend one leg at the hip to a 90-degree right angle with the body. Support the thigh with one of your hands. With the other, gently straighten the knee. When you reach the point of tightness, hold 20-30 seconds. Relax your pressure briefly and then repeat. Try to straighten the leg slightly more each time.

IDEAS

Ask your child to count with you as you stretch the leg 20-30 seconds.

You may also try singing a song with your child. This will help prevent them from thinking about the mild discomfort of the stretch.



IMPORTANT

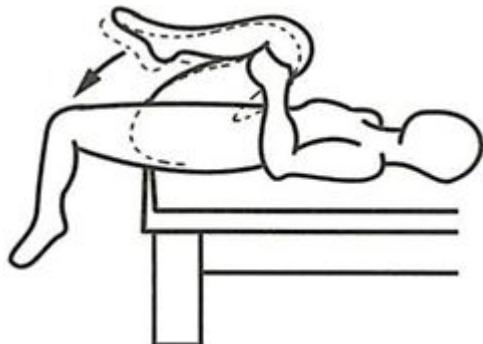
Do not use quick or forceful pressure as you stretch your child's leg. The pressure should be gentle and slow. Observe your child's face for grimacing or other signs of discomfort or pain. Decrease your pressure if you sense that it is hurting your child. Your child may not initially be able to fully straighten their knee as in this picture.

REPEAT 5 TIMES WITH EACH LEG

2. Hip Flexor Stretch

PURPOSE

To stretch the muscles in front to the hip joint. (iliopsoas, iliotibial band and rectus femoris)



DIRECTIONS

Sit your child on the edge of a bed/ table with thighs half way off the edge.

Lie your child on his/her back and hold both knees toward the chest so the spine is flat. Hold one knee up to his/her chest to prevent the spine and pelvis from rocking forward. Lower the other leg toward the floor. Apply gentle but firm pressure to the top of the thigh, keeping the knee bent.

Do not let the thigh move or roll out to the side.

IMPORTANT

Stabilise the pelvis and keep the spine straight, so the stretch is specific for the muscles in front of the hip.

HOLD THIS FOR 30 SECONDS AND REPEAT 5 TIMES WITH EACH LEG

****NOTE: THIS EXERCISE SHOULD NOT BE DONE IN THE IMMEDIATE POST OP PERIOD**

3. Plantar Flexor (Heel Cord) Stretch

PURPOSE

To stretch the muscles that point the foot down (Tightness may cause toe-walking.)

DIRECTIONS

Position your child lying face up on the floor or other firm surface. Place the heel of one foot in the palm of your hand with the rest of the foot against your forearm. Begin with the knee bent. Gently pull the foot up without turning ankle inwards or outwards. As you stretch the ankle, try to straighten the knee using your other hand to gently push down just above the knee. Keep the ankle position you have achieved as you try to straighten the knee. Hold for up to 30 seconds then relax your pressure.

IDEAS

Ask your child to count with you as you hold the stretch 20-30 seconds.

IMPORTANT

Do not use quick or forceful pressure as you stretch your child's leg. The pressure should be gentle and slow. Observe your child's face for grimacing or other signs of discomfort or pain. Decrease your pressure if you sense that it is hurting your child.



DO THIS EXERCISE 5 TIMES WITH EACH FOOT

4. Abduction with Hip and Knees Flexed (Supine)

PURPOSE

To stretch the muscles that bring legs together (hip adductors)



DIRECTIONS

Have your child lie face up with the knees bent and the feet flat on the floor.

Place your hands on the inside of your child's knees.

Provide slight pressure with your hands to stretch the knees as far apart as possible.

IDEAS

Ask your child to count with you as you hold the stretch for 20-30 seconds.

IMPORTANT

Do not use quick or forceful pressure as you stretch your child's legs. The pressure should be gentle and slow. Observe your child's face for grimacing or other signs of discomfort or pain. Decrease your pressure if you sense that it is hurting your child.

DO THIS EXERCISE 5 TIMES.

Muscle Strengthening Exercises

1. Hip Adduction/Adduction with knees bent

PURPOSE

To strengthen the muscles that bring the legs together and provide a stable base for standing and walking.

DIRECTIONS

Position your child lying face up with the knees bent and the feet flat on the floor. Ask your child to spread the knees apart slowly and with control and then bring the knees together again.

If needed, provide assistance by placing one of your hands at the outside of each knee to help your child bring the knees together. Keep your hands at the outside of each knee for support if needed.

IDEAS

Play "open the door" (or gate or garage) using small toy figures to drop to the floor between the legs when open.

Ask your child to squeeze the toy as the knees come together.



DO THIS EXERCISE 10 TIMES

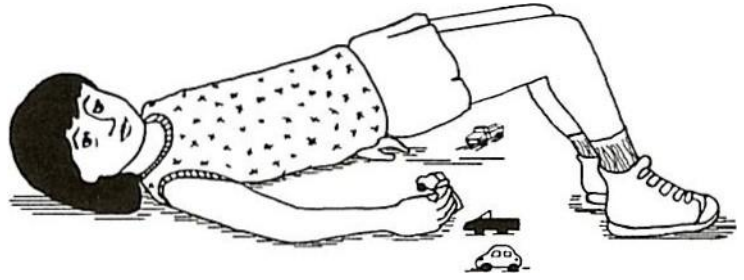
2. Bridging (Supine)

PURPOSE

To strengthen the muscles that straightens the leg at the hip joint.

DIRECTIONS

Have your child lie face up with the knees bent and the feet flat on the floor. Ask your child to raise the hips, keeping the feet flat. You can help your child use the correct muscles by giving light pressure to the buttocks with your hand or fingers. In this way, you can also feel whether they are using the correct muscles.



IDEAS

Using small toy cars or figures, ask your child to "raise the bridge" (the hips) to allow the object to slide under.

IMPORTANT

Do not allow your child to push backwards on the floor by straightening the knees. Do not allow your child to lift the hips by arching the back.

DO THIS EXERCISE 10 TIMES

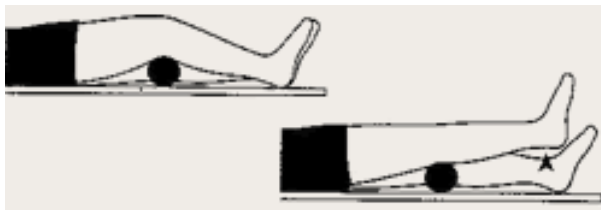
3. Inner Range Quads (Knee Straightening)

PURPOSE

To strengthen the inner portion of the muscle that straightens the knee.

DIRECTIONS

Have your child sit with their back against a wall or reclined on pillows if they cannot long sit with hips at 90 degrees. Be sure that the hips are positioned against the wall if long sitting. Place a rolled towel under both knees. One leg at a time, ask your child to straighten one knee so that the lower leg is raised as high as possible.



IDEAS

Blow a bubble and catch it on the blower wand.

Hold it where your child can pop it with the foot as the knee is straightened.

An inflated balloon may also be held where

your child can kick it as the leg is straightened. A playground ball may be used under the knee instead of a rolled towel.

IMPORTANT

Do not allow your child's hips to slide forward and cause the back to round.

DO THIS EXERCISE 10 TIMES WITH EACH LEG.

4. Knee Flexion – Prone

PURPOSE

To strengthen the muscles that bend the knee.

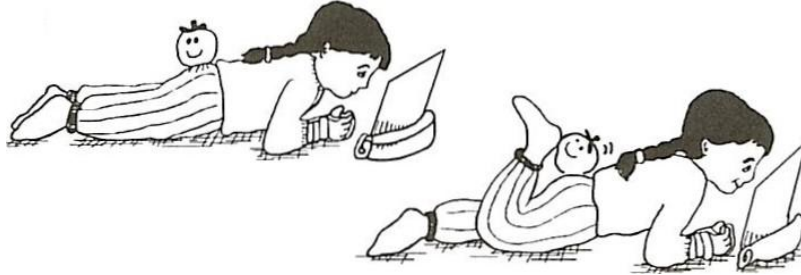
DIRECTIONS

Place the child lying on the floor, supporting the body on the forearms. Ask the child to bend the leg at the knee, bringing the heel up toward the buttocks. Assist the child with the movement if necessary.

IDEAS

Place a toy on top of the child's buttocks. Have the child try to hit the toy with the heel of the foot as the knee bends.

Position a mirror so that the child is able to see the foot from over the head as the knee bends.



IMPORTANT

Do not allow the child to bend the leg at the hip as the knee bends.

DO THIS EXERCISE 10 TIMES WITH EACH LEG.

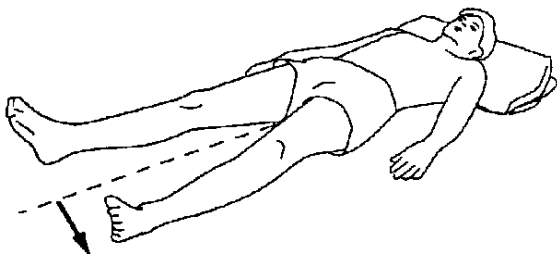
5. Hip Abductor/Adductor Strengthening in Supine (or Side Lying)

PURPOSE

To strengthen the muscles on the inside and the outside of your child's hip.

DIRECTIONS

Position your child lying on their back. Start with their legs together. Move one leg away from the other. Ensure that their foot points to the ceiling. Move the leg back towards the other.

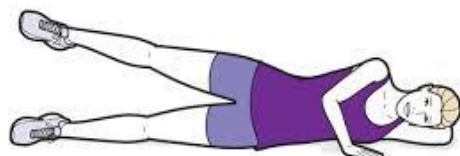
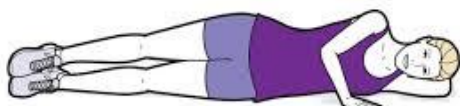


IDEAS

Less Advanced – See Exercise 1

More Advanced – Use your hand to resist the movement (this can be done with legs straight or bent).

Variation: If this is really easy try lifting the leg in side lying as shown in the second image.



DO THIS EXERCISE 10 TIMES WITH EACH LEG

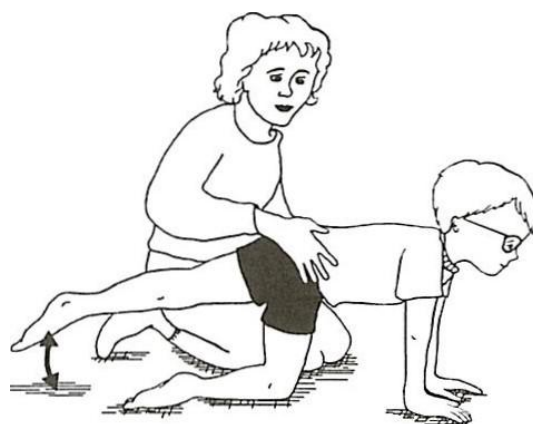
6. Leg Lift When on Hands and Knees

PURPOSE

To strengthen the muscles that straighten the hips and improve core strength.

DIRECTIONS

Have your child get onto a hands and knees (four-point) position on the floor. Instruct your child to lift one leg straight up as high as possible and then return it straight with the toes touching the floor.



Variation: If your child performs this activity without much difficulty, try it with a raised leg bent at the knee.

IMPORTANT

Do not allow your child to arch their back to "throw" the leg upward.

DO THIS EXERCISE 10 TIMES WITH EACH LEG.

7. Side Stepping in High Kneeling (at a wall)

PURPOSE

To strengthen the muscles that moves the legs sideways and stabilises the hips for standing and walking.



DIRECTIONS

Place your child in a kneeling position facing a wall or at a low table/sofa.

Ask your child to step sideways, using open hands on the wall as needed for support and balance.

You may help your child to stay stable by placing your hands on their hips from behind.

You may also need to help shift your child's weight to the left leg so that the right leg may move. Likewise, help shift the weight to the right leg so that the left leg may move.

IDEAS

Place a small table or bench to one side of the child and another one several feet away.

Place puzzle pieces or similar toy on one bench and a puzzle frame on the other. Have the child take one piece at a time to the puzzle, side-stepping on the knees to get there.

IMPORTANT

Do not allow your child to turn their body forward to walk on the knees instead of side-stepping. If unable to tall kneel at a wall, this exercise can be done at a long bench or coffee table.

DO THIS EXERCISE FOR APPROXIMATELY 10-20 STEPS IN EACH DIRECTION.

8. Ankle Dorsiflexion – Sitting (in adult lap)

PURPOSE

To strengthen the muscles that moves the foot up at the ankle.

DIRECTIONS

Sit cross-legged on the floor with the child sitting in your lap. The child's legs should be forward over your legs, with the feet on or near the floor.

Ask the child to move one foot up at the ankle, causing the toes to point toward the ceiling.

IDEAS

Blow soap bubbles. Catch one bubble on the blower wand and position it where the child can pop it with the toes as the foot moves up at the ankle. Also, try hanging "jingle bells" from a string where the child can ring them with the toes as the foot moves up.



IMPORTANT

Do not allow the child to bend the leg at the hip and knee as the foot moves up at the ankle. Do not allow the child to move both feet up at the same time.

DO THIS EXERCISE 10 TIMES EACH ANKLE

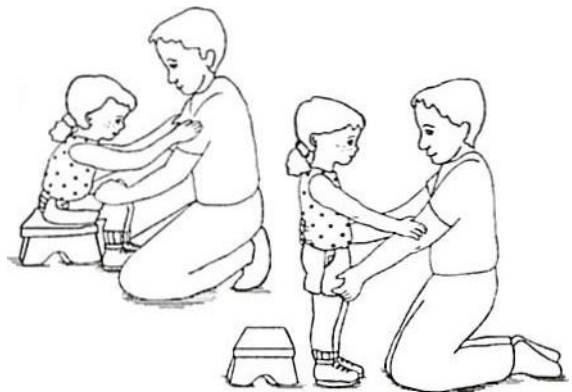
9. Sit to Stand (from bench or parents knee)

PURPOSE

To strengthen the muscles that straighten the knee and help maintain the child upright for standing and walking.

DIRECTIONS

Seat the child at a bench with the feet flat on the floor. Place one of your arms across the child's upper legs. Have the child place their hands on your shoulders. Direct the child's weight forward over the feet. As the child stands up, provide gentle pressure with your arm across the upper legs. Assist as necessary with your other hand across the buttocks to help the child lift the hips. Help the child control the movement when returning to sitting on the bench.

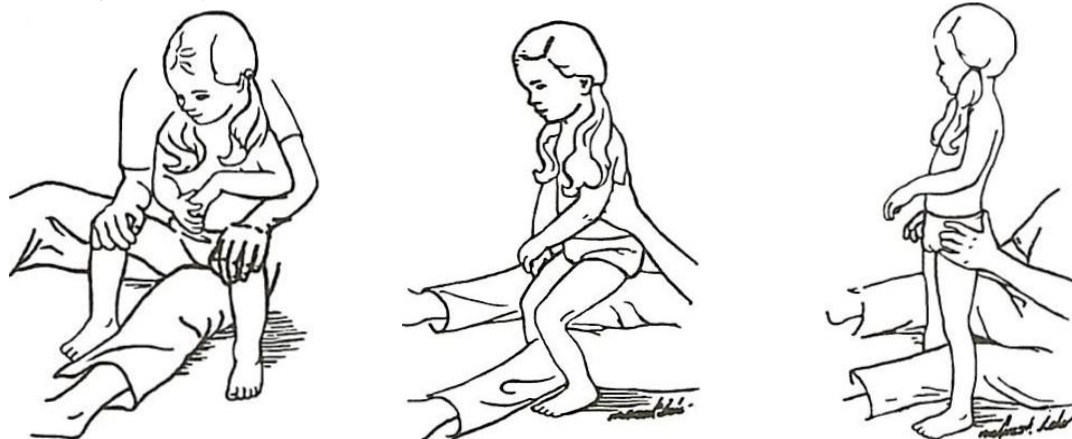


IDEAS

Before trying to stand, have the child practice shifting the weight forward while sitting on the bench.

Child can sit while peeling sticker off a sheet, then stand to place on a paper taped to a wall.

You can also practice this activity from sitting astride your knee on the floor as an alternative (as with pictures).



IMPORTANT

Do not allow the child to begin standing by pushing backward rather than shifting the weight forward and knees should stay apart.

DO THIS EXERCISE 10 TIMES

10. **Sitting: Child Balancing on Your Lap**

PURPOSE

Develop head control, balance and muscles of the body, back (spine) and hips.

DIRECTIONS

Sit on a couch or a chair, and seat the child on your lap facing away from you. Hold the child's hips and keep them bent to 90 degrees, with legs forward. Lean your body against the back of the couch or chair, away from the child's body. Make sure the child's back is straight and upright, not leaning on you.

Encourage your child to keep arms folded by giving the child a toy to hold. Then slide one of your feet forward, away from the couch or the chair, until one knee drops lower than the other knee. This will tip your child to one side and cause the child to have to balance.

Slide your foot back toward the couch or chair to bring your knee back up, to help the child return to an upright position.

Tip the child to the other side by sliding your other foot forward. Move slowly at first, to give the child's body time to adjust and balance.

As the child's balancing skills improve, move your legs faster.



IDEAS

Sing a song as you move your knees up and down. Encourage your child to tip head and curve body in order to balance by kissing the child on the left ear or saying "peek-a-boo" on the child's left side as you lower your right knee. Then repeat to the other side.

IMPORTANT

Head upright, chin tucked, then tipped slightly when balancing.

Body upright and straight, then curved to the side when balancing.
Supported hips, hips bent to 90 degrees, legs forward and together.
Sitting flat on bottom, not on tailbone.
Arms folded.

DO THIS EXERCISE 10 TIMES TO EACH SIDE

11. Squatting Against A Wall

PURPOSE

To strengthen the muscles that straightens your child's leg and improves ability to stand or walk.



DIRECTIONS

Position your child with their back against a wall and both feet a little away from the wall. Ask them to practice bending and straightening their knees to slide their back up and down the wall. Ensure that their feet and knees are held together, their knees do not lock back past straight and both of their feet point forwards.

IDEAS

Less advanced: Decrease knee flexion.
More advanced: Increase knee flexion. Use a therapy ball behind them to lean against the wall.

REPEAT 10 TIMES

12. Side Stepping With Assistance

PURPOSE

To strengthen hip muscles and improve the ability to walk.

DIRECTIONS

Position the child in standing with their hands resting on your hands or furniture. Instruct and encourage the child to step sideways, while holding hands or furniture.

Ensure child keeps facing forwards and is not turning in the direction of movement.

REPEAT 10 TIMES

