Alder Hey Children's NHS
NHS Foundation Trust

Physiotherapy Advice - Selective Dorsal Rhizotomy

A pre-operative exercise programme should be in place prior to the surgical procedure. All patients should be taught a stretching and strengthening programme with emphasis on extensor muscle groups and trunk activity, and stretching of hip flexors and adductors, knee flexors and calf. This exercise programme should be carried out by both the child's physiotherapist / support worker as well as with family members. Children should also be encouraged to participate in their physiotherapy exercise programme and / or in an activity on a daily basis. This will help with recovery in the post-operative period, and must be continued following the procedure and discharge from hospital. As children may continue to make progress over a 2 year period following an SDR, a long-term commitment to following a physiotherapy programme, supported by regular physical activity, is important

Once a date has been agreed for surgery an appointment will be made for an assessment by a physiotherapist and your child's community physiotherapist will be invited to attend. This joint assessment may then be followed by a joint appointment with the Consultant Neurosurgeon You will also have opportunity to visit the neurosurgical ward if you wish

Pre-operative assessment may include

- Baseline assessment of functional abilities
- Physical examination detailing
    - muscle strength, especially hip and knee extensors and hip abductors
    - range of movement, especially of hips and knees
    - muscle length, especially of hamstrings and calf
- Measurement of spasticity, using the Modified Ashworth Scale, and its impact on function, cares, mobility
- If appropriate, a baseline of the child's walking pattern, and limitations
- Current aids and orthoses
- Identification of possible additional equipment needs in the early post-operative period
- Standardised outcome measures will be used pre- and post-operatively and may include:
    - Gross motor measure of functional ability
    - Care questionnaire
    - Pain tool
    - Walking measures
    - Sitting ability
    - Goal setting
    - Measure of activity and participation
  - Quality of life measure

Following surgery:

- Post-operative day one and two – bed-rest only. Begin to raise head of bed in preparation for sitting on day 3
- Day 3
    - Bed mobility
    - Begin to reintroduce strengthening and range of motion exercises, as practised before the procedure
    - Sitting on side of bed, progressing to sitting on a bench and in a wheelchair, if comfortable
- Day 4 onwards
    - Gradually increase frequency and intensity of exercises. Exercises should form part of the daily regime, and progressed following discussion with your physiotherapist
    - Begin stretching regime of hip, knee and ankle muscle groups,
    - Assess ability to transfer from bed to chair and provide equipment if needed
    - Sitting in wheelchair, for up to one hour at a time, regularly throughout the day
    - Sitting, progressing to sideways and standing transfers
    - Muscle strengthening, using eccentric and concentric activity, of lower limbs and trunk, through full range of movement
    - Increase trunk activity
    - Introduce mobile weight bearing for transfers
    - Activities may include rolling, kneeling on all 4's, high kneeling, and standing, with support as necessary
    - Balance and postural alignment.
    - Ambulation skills. The walking pattern may not be ideal but is preferable to crawling or prolonged periods in the wheelchair
    - Review of walking aid and alteration of prescription as needed. If using a posterior walker swivel wheels may need to be fixed, and hip guides or a folding seat may be needed
    - For those children who are not mobile, a standing frame may be used
    - Review of splints to ensure these are giving adequate control. Liaison with the orthotist regarding the type of splints being used; a prescription change may be needed
    - Resting splints and gaiters will be used during rest in the daytime and at night

Precautions

- No passive hip flexion beyond 90^{0} in the initial post-operative period. This can be done actively if there is no back pain.
- No passive trunk rotation or lateral flexion in the initial post=-op period Patients can do these movements actively within tolerance
- When stretching hamstrings, there may be discomfort in the muscle, but there should not be any low back pain
- There may be weakness in the lower legs and therefore splints may be worn during standing and ambulation to provide increased stability

- Sensory changes in the legs and feet are common and the plantar surface of the foot may be hypersensitive. This may be alleviated by firm handling and wearing socks and shoes.
- Movement in the lower limbs may feel different especially when sitting and standing due to a change in motor control or muscle strength, and because of the reduction in spasticity. It may take some time for the child to get used to this different sensation but it is to be expected and will resolve with time
- There may be some swelling around the site of surgery, and a bump may appear above the scar. This is the spinous process of T-12 or L1 vertebra in the spine and should not cause concern
- It is not unusual for the child to tire easily following activity, especially in the early post-operative period
- Hydrotherapy and swimming may begin, once the wound has healed and skin is intact. Consent must be given from the neurosurgical team.
- At 3 months post-op it may be possible to begin, or resume, horse riding, contact sports, electrical stimulation
- 6 months post-op, use of trampoline for rebound therapy

Use of wheelchair

- Children may require use of a wheelchair for mobility around the ward and on discharge. Floor play and other activities should be encouraged so the child is not spending prolonged periods in the chair. Standing and walking should be encouraged, using assistance as needed

At discharge

Provision of physiotherapy will vary for each child. It is important that a programme is in place, with advice regarding progression of exercises. Participation in an activity or structured exercise is necessary each day in the post-operative period.

- A leaflet of exercises and advice will be given for you to practise until you are seen by your community physiotherapist.

Following discharge your community physiotherapist will

- Encourage continuation of strengthening and stretching exercises
- Help correct patterns of movement and teach how to recruit muscles in the correct sequence
- Advise on how to work for lower extremity isolated movements, dissociation and alignment
- Advise on balance activities
- Facilitate and correct movement through transitions of standing and walking
- Progress the discharge exercise programme
- Encourage participation in activities such as riding a bike and walking for longer distances. Advice will be given regarding swimming and horse riding, and participation in structured activity e.g. Dance, gym, outdoor activity

Agreed goals may include:

- Stretching of shortened muscle groups
- Strengthening of previously spastic muscles which will now be weak following surgery. Opposing muscle groups may also be weak at end of range due to increased mobility of the joint
- Proprioception and balance re-education due to reduced sensory feedback.
- Movement re-education and selectivity of movement
- Gait re-education and review of orthoses and walking aid

Suggested activities to supplement physiotherapy programme:

- Swimming
- Walking
- Cycling
- Scooter
- Horse riding
- Wii-fit games
- Outdoor play
- Trampoline
- Dance
- Treadmill
- iJoy ride balance trainer