Selective Dorsal Rhizotomy (SDR) in SCOTLAND

INFORMATION FOR FAMILIES and CARERS who are considering SDR Surgery
What is Selective Dorsal Rhizotomy?

Selective Dorsal Rhizotomy (SDR) is an operation used to reduce spasticity (muscle stiffness) in some children with cerebral palsy.

Cerebral palsy occurs when a child sustains a brain injury early in life. This most often happens before birth but can happen around the time of birth and even in the first two years of life.

Spastic diplegia (which affects the leg muscles more than the arms) is the most commonly occurring type of cerebral palsy, often associated with premature birth. Nerve fibres running from the muscles back to the spinal cord play a major role in maintaining the typical muscle stiffness seen in spasticity.

SDR is a surgical procedure performed on these spinal nerve fibres to reduce levels of spasticity in the legs.

We have listed below some of the questions most commonly asked by parents and clinicians of prospective patients.

Which patients are suitable for SDR?

Children with cerebral palsy can be very different from each other. This is because the condition depends on precisely which parts of the brain are affected. Cerebral palsy is divided into different types, and it is the spastic type which may be treated with SDR.

Every child who has spastic cerebral palsy will have different amounts of spasticity. Children whose problems are mostly due to weak muscles or poor muscle control will not necessarily be helped by SDR.

- Children between 5 and 10 years of age with typical spastic diplegia may be good candidates for SDR
- Children suitable for SDR need to demonstrate adequate muscle strength in the legs and trunk
- They should be able to stand up and support their body, hold their posture against gravity and make appropriate movements to crawl or walk
- Very young children who are still learning to walk are changing very rapidly. For this reason it is important to wait until their walking pattern has settled down before deciding whether SDR is the best option for them
- Children whose cerebral palsy is due to periventricular leucomalacia (PVL) related to prematurity tend to have a good response to SDR. This is not the case for all causes of cerebral palsy
- If other areas of the brain involved in balance and coordination are also affected, the child may not be a good candidate for SDR
- Children with severe cerebral palsy involving the whole body may benefit more from consideration of intrathecal baclofen pumps than SDR surgery
- In children with severe scoliosis, SDR is not recommended as it may cause the existing spinal curvature to deteriorate
- It is also important the child has stable hips
- Children must also be able to understand and comply with rehabilitation.
Regular post-operative exercise and activity, with advice from a physiotherapist, is necessary to obtain the best results after SDR. Families need to be committed and the child needs to be motivated and show that they are able to cooperate with a daily home exercise programme. They also need to be able to comply with wearing recommended orthoses (sometimes known as splints). We need to make sure that a plan is made and agreed with the family and the team looking after your child (e.g. school) to support their post-operative exercises and activities. This should be in place before SDR is considered. Commitment to attend follow up assessments will also be required.

Are there alternatives to SDR?

SDR is just one option in the management of spastic diplegia in children with cerebral palsy. It is the only procedure which permanently removes the spasticity in the legs which contributes to difficulties in walking and potential deformity. Some anxieties remain about the irreversible nature of this procedure; however its effectiveness at reducing spasticity and improving quality of life has been clearly demonstrated in several research studies.

Alternatives to SDR in spastic diplegia include medication, long-term exercise and activity as supported and advised by a physiotherapist, use of botulinum toxin injections into the spastic muscles and orthopaedic procedures.

In growing children additional or repeated orthopaedic procedures may be required for existing or progressive muscle stiffness and joint deformities. Even following successful SDR surgery some orthopaedic surgery may be required but evidence suggests the requirement is reduced.

- Botulinum toxin injections need to be repeated frequently and become less effective over time.
- Oral baclofen medication results in some improvement in spasticity but high doses can cause drowsiness and interfere with the child’s ability to learn and concentrate at school.
- Baclofen given into the spine (intrathecal baclofen therapy) is another possible option however it is generally reserved for patients with severe cerebral palsy involving the whole body.

Not every child with cerebral palsy requires intervention and many children are able to lead full and happy lives with exercise and activity alone.
How will a decision be made on whether my child is suitable for this surgical procedure?

If your local team think your child is suitable for SDR they will arrange for more detailed assessments including gait analysis, a spine MRI and specialist physiotherapy assessment. Your child may also require x-ray of his/her hips and in some cases a brain scan. The next step is that your child will be referred to the National SDR service.

Once your child has been referred into the National SDR service, there will be a National Multidisciplinary Team of experts, including Specialist Physiotherapists, Orthotists, Orthopaedic Surgeons, Neurologists and Neurosurgeons who will review all the information required from your local team, regional clinic and gait analysis to discuss optimising your child’s tone management and whether SDR surgery might be recommended. If SDR surgery is considered you will then be offered an appointment with the Neurosurgeon, Specialist Physiotherapist and Orthotist in one of the provider centres in either Edinburgh or Glasgow and a further assessment will take place.

At the end of the assessment the team will discuss with you the likelihood of your child benefitting from SDR surgery. It is also important for us to understand what you want SDR to achieve and to discuss treatment goals and expectations.

As this procedure cannot be reversed, we need to be sure that it is the best option for your child at that particular point in their development before recommending it. Sometimes we may advise alternative interventions (e.g. botulinum toxin injections) before deciding that SDR is suitable. This would give us an indication of how your child will respond once some of the spasticity is taken away.

What can I do to help my child be as “ready” as possible?

It is very important that you discuss any plans to be considered for this operation as early as possible with your local doctor and physiotherapist to ensure they will be able to support you and your child after the surgery.

The National SDR tone management team will also contact your local team to discuss the plan for surgery and advise them on the post-operative recommendations for your child.

We may recommend that you work with your child for a defined period of time on targeted exercises (with some support from your child’s physiotherapist) to increase strength in their body and legs if it is felt that they are still too weak for a final decision to be taken. In such cases, the hospital physiotherapist will discuss recommendations with your child’s local physiotherapist to agree a plan to support you to do this.

Intensive rehabilitation is essential both before and after the surgery to maximize your child’s abilities. It is therefore expected that parents/carers carry out an exercise programme or appropriate activity on a daily basis. It is important that parents/carers talk with their child about the exercise programme to ensure that they understand what is required and are able to comply.

Before your child attends the hospital for their surgery it is important to continue with their regular stretching programme and orthotic regime.
The surgery will reduce the spasticity in their legs but there will be some muscle weakness immediately following surgery. A detailed exercise programme as advised by your child’s physiotherapist will help to strengthen the muscles that will be weak and will familiarise your child with the post-operative programme.

All children experience different things. The weakness post-surgery will mean your child may not be able to perform some of the movement tasks that they could pre-operatively. Their walking may appear different or they may require some form of walking aid where they didn’t previously. This is normal and will improve, as your child grows stronger. It is expected that your child will return to their preoperative level of function within the first month; however this will vary from child to child and their endurance levels may take a lot longer to improve. It is expected most children requiring Ankle Foot Orthoses (AFO) will use these for the first 6 months to optimise their walking pattern. The need for orthoses will be regularly reviewed on an individual basis. After SDR surgery unstable foot joints or unequal muscle power around the ankle may mean orthoses are needed long term to optimally support walking.

The more strengthening activities a child does, the quicker they will improve. The more a child walks the stronger they will get.

It is important to familiarise your child with the type of exercise they will be doing after surgery and it will also help to establish them doing exercises routinely.

Please feel free to contact the SDR Co-ordinator who will pass your questions on to the most appropriate person:

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