Range of motion

Methods to help with range of motion

Stretching exercises

Stretching exercises can be done actively or passively. Keeping muscles stretched by actively using them is the best way to keep them loose. Often muscle can be stretched through games, sports or daily activities.

Passive stretching is useful for checking whether a muscle is short or as a warm-up for exercises or activities. The lengthening effects are temporary.

Positioning

Positioning involves putting a muscle in a stretched position for a specific length of time. This can help to keep muscles loose and in some cases lengthen them. Positioning can be done by sitting or lying in certain positions. It can also be done by using equipment such as splints or braces. Some splints can also protect muscles and other tissues from being overstretched.

Taping

Taping can help to position a joint to prevent overstretching of the joint or muscles. Taping may also align muscles and joints in positions that make movement easier or more efficient.

Serial Casting

Casting is a type of positioning. A cast is put on with the muscles slightly stretched. It is then changed weekly to allow for a bit more stretch. This can result in more muscle cells developing and the muscle lengthening.

Mobilizations

Mobilizations are specific small movements of the bones at a joint done by a therapist. These help to stretch capsules and ligaments—the tissue joints.

Surgery

Surgery involves cutting, lengthening or moving of tendons to allow a joint to move more freely. This sometimes weakens the muscle's power. In some cases the bones are operated on to improve positioning or movement.

If you have questions about range of motion, how it affects your child’s function or how it can be treated, please talk with your therapist.

What is range of motion?

Range of motion is the term used to describe the amount of movement there is at a joint. Range of motion is either active or passive.

- Active range of motion is the amount of movement your child can move on his or her own.
- Passive range of motion is the amount of movement your child’s joint can be moved by someone or something else.

Why is it important to have good range of motion?

Any movement we perform or position we assume needs range of motion. Walking, dressing and sitting in a chair all need a certain amount of range of motion.

Problems with range of motion can also cause pain, skin breakdown, poor tolerance of orthotics (braces), poor endurance and cosmetic concerns.

Range of motion can be affected by:

- muscle and tendons
- capsules and ligaments—joint tissues
- bones

Muscle and tendons

Muscles are composed of fibres that overlap to contract and relax.

Tendons connect muscles to bones.

If a muscle is weak it may not be able to provide enough force for movement. If a muscle is spastic there may be too much resistance to allow movement.
If a muscle does not move enough because it is too weak or spastic it can become shortened. If a muscle is in a shortened position for a long time it can become tight. If the tightness is not managed early enough the muscle can become stuck in the shortened position. This is called a contracture.

Sometimes during a growth spurt, the bones that a muscle attach to grow faster than the muscle. This can also result in tightness. Muscles can also become overstretched. They cannot work properly if this happens.

**Example:**

If your child is constantly in a sitting position contractures may develop at the hips and knees. The muscle becomes stuck in this shortened position. A shortened muscle does not grow properly.

### Capsules and ligaments - joint tissue

These are the supportive tissues around the bones in a joint. If they are too tight they can restrict or limit range of motion. If they are too loose they do not provide proper support to the bones.

**Example:**

If your child always stands on the inner sides of his feet, the ligaments on the inner side of the foot and ankle will become stretched and loose. The ligaments on the outer side will become tight.

### Bones

The bones of the skeleton need to be lined up properly with each other for good posture and movement. Sometimes the bones are misshapen or they are not lined up with each other properly.

This is called a skeletal deformity.

**Examples** of a skeletal deformity are dislocated hips and Scoliosis. A dislocated hip can limit hip range of motion. Scoliosis can limit trunk range of motion. Some children may be born with skeletal deformities. Skeletal deformities can develop over time.

**What can be done if my child has a problem with range of motion?**

There are many methods to prevent and treat range of motion problems. Often a combination of methods may be used. Figuring out the problems or potential problems is necessary to see if the problem is in the muscle, joint tissue or bone. Your therapists can help you decide which methods are best for your child and family.

Figuring out the problem can usually be done at a therapy appointment. X-rays or special videos may be necessary. Many factors influence the choice of methods such as:

- your child’s age
- the amount of joint tightness
- the presence of weakness or spasticity
- cost
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Children’s Developmental Rehabilitation Programme,
Chedoke Site of McMaster Children’s Hospital

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