

Observation

One traditional approach to scoliosis has been the “wait and see” method of observation. This often happens when a scoliosis is detected in a young child, but the curve is not large enough to recommend traditional treatments such as hard bracing or surgery. A doctor or surgeon will periodically monitor the progression of the curve to see if it gets severe enough to do something about.

Observation makes sense when the only treatment options are invasive such as surgery. However, with the availability less invasive treatments such as dynamic bracing, custom rigid bracing and SEAS and Schroth physical therapy the opportunity for earlier intervention now exists.

The discussion of observation vs. intervention revolves around the ability to be able to predict progression and having an effective treatment that can be used early on. Progression prediction is complicated and involves different factors such as age, curve magnitude, curve location, maturation, family history and a range of other factors. Currently there are two genetic test under trial that may offer some insight into the strength of the genetic component of the progression. In the future, this may lead to a situation where observation and early intervention are selectively chosen based on these test results.

In the absence of these tests we can look to the research on curve progression and curve magnitude at different ages. In 1984 Lonstein and Carlson reviewed 727 children with idiopathic scoliosis. In their study they found that there was a “direct relationship between the incidence of progression and the magnitude of the curve, and an inverse relationship with chronological age and Risser sign”. In other words a larger curve in a younger, less mature child was more likely to progress than a smaller curve in an older, more mature child.

Scoliosis Orthotic Devices

Spinal orthotic devices may be used as an adjunct to scoliosis treatment programs and bracing. They can aid in maintaining and improving spinal flexibility, creates translation and lateral flexion of the spine, and may help to reduce back pain in some cases.

Such devices can be used as a diagnostic or treatment aid and is designed for in-clinic or at home use.

How does it work?

Scoliosis Orthotic devices can aid in:

- Curve Straightening
- De-rotation of the spine
- Ligament Stretch (especially useful for patients in hard braces to maintain spinal flexibility)

They can be used as a diagnostic tool to assess the amount of flexibility in a scoliosis curve. This gives the scoliosis clinician an indication of how much curve correction might be achieved with treatment such as bracing.

Rehabilitation

Specific scoliosis physiotherapy and scoliosis rehabilitation exercise programs can play an important role in scoliosis treatment. Traditionally most surgeons have been of the opinion that “physiotherapy does not work for scoliosis”. While this may be true for general physiotherapy or general exercise programs such as core stability programs being used to try and stop progression of idiopathic scoliosis. The development of scoliosis specific programs such as the Schroth approach among others, offers a new role for physiotherapy in scoliosis treatment. For example in a small adolescent idiopathic curve i.e. less than 20 degrees where there is a family history of scoliosis, a specific scoliosis physiotherapy program may be the most suitable treatment. Another example can be when a curve is non progressive i.e. in late adolescents or middle age. With Physiotherapy alone it maybe be possible to help improve posture, manage pain and stabilize the spine.

In cases of a progressive idiopathic scoliosis where the curve is greater than 20 degrees, physiotherapy is usually used in conjunction with brace treatments.

When specialized scoliosis physiotherapy has been used **in conjunction** with bracing it has improved the results of hard bracing. In this case the physiotherapy helps to strengthen the muscles being weakened by the brace and keep the spine flexible. When physical therapy is not used with hard bracing any correction achieved during the time of bracing is usually lost within 24 months of finishing brace treatment.

It is important to understand that **only** specialized physiotherapy and rehabilitation programs specifically designed to treat scoliosis, such as the SpineCor exercise program or the Schroth program, have been shown to make improvements.

Scoliosis Brace

There are many types of scoliosis braces available. Braces are either hard plastic braces or they are soft and dynamic or second skin pressure garment. The type of brace recommended to a scoliosis patient may depend on the type of scoliosis they have, or the access and understanding the health professional has about particular braces.

Hard Bracing and Rehab approaches

Hard bracing is almost always prescribed in conjunction with scoliosis specific rehabilitation/physical therapy exercise. It is known that hard bracing can stiffen the spine and weaken the muscles and as a result most of the correction seen on x-ray is lost after weaning. It is theorized that by using intensive exercise therapies that are tailored to the individual's curve that spinal mobility and muscle strength can be maintained and that as a result correction seen in the brace is better maintained and progression is better controlled.

Since the early 70's technology has developed to help in hard brace design and manufacture. Computer assisted design and manufacture (CAD CAM) is now used in some hard bracing approaches. Once such approach are braces offered by ScoliCare.

Custom designed Scoliosis braces

3D designed custom rigid bracing systems have been developed after years of research into the effect of Mirror Image rehabilitation procedures on scoliosis. This approach takes into consideration the postural alignment of the patient and the scoliosis deformity in 3 dimensions. Based on this 3-dimensional assessment computer assisted design and manufacture are used to

produce a brace that attempts to correct the patients postural and spinal deformity in all 3 planes.

Scoliosis braces can be used for infantile, juvenile and adolescent idiopathic scoliosis treatment. In some cases, it can be used in non-idiopathic cases such as congenital and neuromuscular curves. This type of brace can be used as a treatment in its own right, with physical therapy or as an initial treatment for larger or stiff curves that are not manageable with dynamic bracing.

Dynamic Bracing

Dynamic bracing is a unique treatment that utilizes a dynamic brace as part of an overall treatment approach.

The Canadian government commissioned a research project into the cause and treatment of scoliosis. The project employed over 165 researchers at its peak and had a budget of over 12 million Canadian dollars. From the research a better understand of the scoliosis particularly the genetic trigger and the effect of spinal growth on progression were developed. In 1992 as a result of these breakthroughs a new treatment approach was developed.

Dynamic bracing as a treatment method is based on the fact that when a scoliosis develops it does so in a particular pattern and this pattern has a 3-dimensional effect on the body shape and posture. By reversing the abnormal posture and body shape into their opposite position the body and posture correct the abnormal alignment of the spine. This concept is known as spinal coupling. i.e. if I bend my torso to the right my spine will also bend to the right. So, if I have a lower back scoliosis to the right and I bend my torso to the left I can correct some of the scoliosis.

The Montreal team discovered that to have the best chance of stopping progression and even making correction that this concept of over correction is crucial because of the effect it has in balancing back up the growth of the bones of the spine. Another important factor they found was that achieving this over correction dynamically i.e. by using movement rather than forcing the position in a hard brace gave better results. This is because repetitive movement trains the posture and spine to make correction, meaning that this approach treats the muscles rather

than weakening them, keeps the spine flexible rather than stiffening it and help to reprogram the neurological control over the muscles, spine and posture.

Dynamic bracing generally requires the child to have a relatively normal neuromuscular system to be effective, it is generally not used in neuromuscular scoliosis. The primary uses for this type of brace are in Juvenile and Adolescent idiopathic scoliosis and adult scoliosis.

Surgery

When required, surgery is an important and often be life changing procedure. Surgery is usually recommended when a scoliotic curve rapidly progresses to a point where it unbalances the spine. Surgery is not recommended on the degree of curve alone, there are other important factors to consider such as, the patients age, the balance of the spine, the potential growth and many other factors. As a guide surgery, can be indicted for some curves as low as 40 degrees, but in some cases curve of up to 60 degrees may not require surgery.

In adults surgery is usually indicated where a degenerative instability is present and there has been significant progression in a curve. Surgery in adults may not lead to pain relief and as such if pain from a scoliosis is the main concern surgery may not be recommended. Compared to surgery in children it is much more difficult to make correction in the spine of an adult.

There are various different types of surgery depending on the type and location of the scoliosis. The most commonly performed is a posterior approach fusion using pedicle screws and rods. It should be remembered that serious complication from scoliosis such as heart and lung compromise are rare and mostly associated with neuromuscular scoliosis cases. Often the decision to undergo surgery is based on a cosmetic reason i.e. because the patient does not like the way the back, ribs or shoulder look because of the scoliosis. If conservative treatment is undertaken early it is often possible to avoid surgery for cosmetic reasons.