SUSTAINED TRACTION FOR LUMBAR SPINAL LESIONS

By

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Fig. 1. The traction apparatus.

Introduction

The lumbar intervertebral disc consists of two parts—annulus fibrosus and nucleus pulposus. Protrusions are of three sorts: of a fragment of annulus, a herniation of pulpy material or both together. It has been found that sustained traction is the most effective treatment for most protrusions consisting of the softer central part of the disc. However, it is not suited to cartilagenous displacements, which usually do better with manipulation. Whether the pain is lumbar, or there is root pain in the limb, is immaterial.

Before the time that sustained traction was started, patients with lesions that did not respond to manipulation had no alternative but to lie in bed until they were well. This posture removes the compression strains upon the spinal joints which are present in the upright position. More room is created within the joint cavity, and the disc substance is enabled to return over a period of several months.

It was decided to distract the joint surfaces in the belief that the disc substance would be reduced more speedily. This assumption has proved to be correct, and most of our patients lose their symptoms in from 14 to 21 days.

This decrease in time for recovery and the fact that the patient is able to continue a normal life while having the treatment, compares very favourably with several months' of complete rest in bed.

The pulpy material oozes either above, below or through the surrounding fibrocartilagenous ring when it is damaged. In time it exerts a pressure upon the posterior longitudinal ligament which accordingly bulges, and exerts a pressure upon nervous structures lying in the spinal canal.

Sustained traction increases the distance between the articular surfaces at the affected joint and has three effects:

1. The joint space becomes larger and the original pathway through which the pulp extruded may be re-opened.

2. The posterior longitudinal ligament becomes tautened. A centripetal force is exerted upon the joint contents which are squeezed towards the centre.

3. Suction. As a result the pulpy material is drawn towards the centre of the joint.

Apparatus

A couch is needed and two harnesses (see Fig. 1).

An ordinary high couch may be adapted relatively cheaply by a local handyman. A substantial post is fixed at one end to which the thoracic straps are anchored. A movable post is necessary at the other end, and the pelvic harness is attached to it by a hook. This post is attached to the end of a spindle which is made to move away from the end of the couch by contact with a cogwheel when the handle is operated. A carpenter's vice or car jack works on the same mechanical principle. It is important to make certain that:

(*a*) The spindle is long enough to allow a sufficient distraction of the two harnesses to take place.

(*b*) The operating handle or wheel is at least six inches in diameter otherwise it is tiring to use.

It is possible to produce an adequate number of variations in the angle of pull even with this simple apparatus. Some couches are built in sections which can be tilted to the required degree; these may provide greater scope for experiment, but are much more costly.

It is possible to obtain such a couch from recognized medical supply stores if the conversion of an ordinary couch is impracticable.

The harnesses are made of stout webbing bands. One encircles the thorax and the other the pelvis. Sheets of foam-rubber about 2 cm. thick are used to pad both harnesses and to prevent slipping.

Basic Application (see Fig. 2)

At the patient's first attendance traction is usually given supine; if so, the following method is used.

The pelvic harness and a head pillow are placed on the top of the couch. The thoracic harness, lined with a sheet of rubber, is applied to the patient while he stands. This should be placed as low down on the thorax as possible in order to localize the traction to the lower spine. The belt must be comfortably firm or it will slip.

Fig. 2. Distraction mainly at the anterior part of the joint, i.e. during extension of the lumbar spine. The patient is treated supine. A small pillow may be inserted beneath the lumbar spine.

The patient lies on the couch on the pelvic harness. The thoracic straps are passed beneath the pillow and secured to the fixed hook at the top of the couch.

The under strap belonging to the pelvic harness should be adjusted so that it lies beneath the lower part of the lumbar spine.

The pelvic harness may be arranged in two ways:

(*a*) The strap lies above the anterior superior spines, when traction is exerted from the iliac crests.

(*b*) The strap lies below the anterior superior spines, when traction is exerted from the greater trochanters of the femora.

Some patients find the one position more comfortable than the other and both should be tried to see which the patient prefers.

When the position of the pelvic harness has been decided, a piece of foam rubber and a blanket folded to four thicknesses are placed across the patient's pelvis as padding. The strap is then tightened.

The leather strap is passed through the hook at the bottom of the couch, gently pulled until it feels firm and then secured. The patient will feel an increase in his pelvic tilt, and be conscious of a tension in the lumbar area. Care is taken to ensure that the pelvic harness is properly in place.

The apparatus should be checked for comfort. If the treatment is painful, the muscle spasm thus set up will prevent the patient from relaxing into the harness. As the patient relaxes, more traction is applied by turning the wheel.

The first visit is important; the patient's reactions to a short and gentle pull will provide the physiotherapist with valuable information upon which to base her future treatment. The patient's confidence is gained more easily if he is introduced to an unusual experience gradually. He is told to report the slightest discomfort.

An explanation of what the treatment involves and reactions that may be expected is given. The mechanics of the condition are fully explained, because the patient's co-operation will be necessary in order to maintain the reduction as it is achieved. (See Cyriax, *Orthopaedic Medicine* vol. I., 1957.)

The patient may be warned:

(*a*) Not to cough or sneeze violently during treatment The sudden increase in pressure caused may displace the disc substance further.

(*b*) Not to move about while traction is exerted. This may cause an alteration in the angle at which the joints are being distracted.

(*c*) To expect only a slow and possibly irregular improvement, with a certain amount of stiffness immediately after each treatment.

The patient's comfort is ensured by:

(*a*) Padding the harness by inserting foam rubber sheets, especially at bony prominences.

(*b*) Taking care in applying the thoracic harness in such a way that breathing is not appreciably restricted when patients suffering from respiratory or cardiac complaints are treated. When the webbing belt cannot be borne tightly, a sheet of foam rubber placed beneath the patient will increase the frictional resistance between his thorax and the couch.

(*c*) Teaching apical breathing when patients feel that the thoracic band will prevent adequate breathing.

(*d*) Avoiding a large meal before treatment.

(*e*) In sciatica, placing a pillow beneath the knee of the painful limb. This will relax the tension on the nerve root.

At the end of about twenty minutes the tension is released slowly and the harness straps unbuckled. Care is taken to avoid jolting the patient, because as the joint settles towards its original position, pressure upon nervous structures may return, causing severe twinges of pain. This is a rare occurrence, but if it does happen, the patient rests on the couch until the discomfort has worn off.

It is an advantage to the patient to rest for several minutes after treatment:

(*a*) because the joints are allowed to settle into position without the sudden application of compression strain, such as would be exerted in the upright position.

(*b*) because he should be allowed time to recover himself.

Duration and Frequency of Treatment

If there has been no untoward reaction from the first treatment the length of time may be increased to 35 or 40 minutes subsequently.

The phrase, 'a course of traction treatment' is misleading. It suggests that a series if events take place identically each day for a certain length of time, after which they stop. This implication is false. Treatment is usually given daily at first for an average period of a fortnight to three weeks. However, this is only a very rough guide and it is necessary for the physiotherapist to work out her own regime for each patient.

The plan for treatment is decided upon from day to day.

At each attendance the clinical signs are re-assessed by testing the lumbar movements and straight-leg raising; symptoms are related by the patient and the findings are compared with those found on the previous visit. In this way the degree of success or failure can be estimated, thus enabling the physiotherapist to decide how the treatment should be continued: e.g.

(*a*) If there has been an improvement, the technique used during the previous visit should be repeated.

(*b*) If the condition has remained the same or deteriorated, then an alternative method of applying the harness should be tried. Experiment should be continued until a steady improvement begins.

When great improvement has been maintained for several days and the clinical signs have become minimal, a few days without treatment may be allowed.

After this time either:

(*a*) reduction has already been initiated sufficiently for the improvement to continue spontaneously; if so the patient may be put off treatment and asked to report his progress at the end of a week. Very often he will be quite well by then.

(*b*) reduction is still incomplete. Further sessions, perhaps two or three treatments a week should be given, until the patient is pain-free. If slight relapses occur after reduction has been effected, it is sometimes necessary to give a maintenance dose of traction once or twice a week until these have ceased.

Variations of Application

A basic technique for giving sustained spinal traction has been described, but the variations of this are manifold. The physiotherapist cannot see the protruding intervertebral material that has to be relpaced, so she watches it move by interpreting changes in symptoms and signs. She should vary her technique until the distraction of adjacent vertebrae occurs in the way best calculated to bring about reduction. For example: if the sciatica increases as soon as traction is applied, and persists, it is often possible to abolish the pain by readjusting the harness. Such a change alters the force acting on the intervetebral joint, and consequently the relationship between the nerve root and the protrusion.

Disc lesions vary no less than temperament, and the traction apparatus should therefore be used imaginatively. A few variations of the basic technique follow, but there is endless scope for experiment.

1. Distraction mainly at the anterior part of the joint, i.e. during extension of the lumbar spine.

The patient is treated:

(*a*) Supine. A small pillow may be inserted beneath the spine. (Fig. 2)

(*b*) Prone. The thoracic harness is applied so that the straps run beneath the patient. (See Fig. 3.)

2. Distraction of the joints with the articular surfaces held parallel.

The patient is treated prone and the thoracic harness is arranged so that the straps pass behind the patient's head. (Fig. 4.)

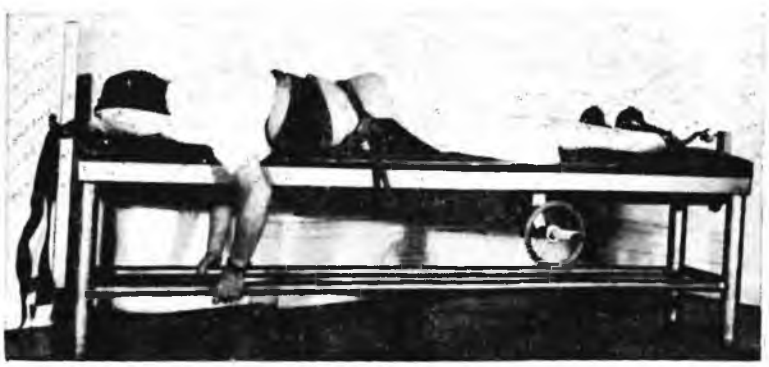

Fig. 3. Distraction mainly at the anterior part of the joint, i.e. during extension of the lumbar spine. The patient is treated prone. The thoracic harness is applied so that the straps run beneath the patient.

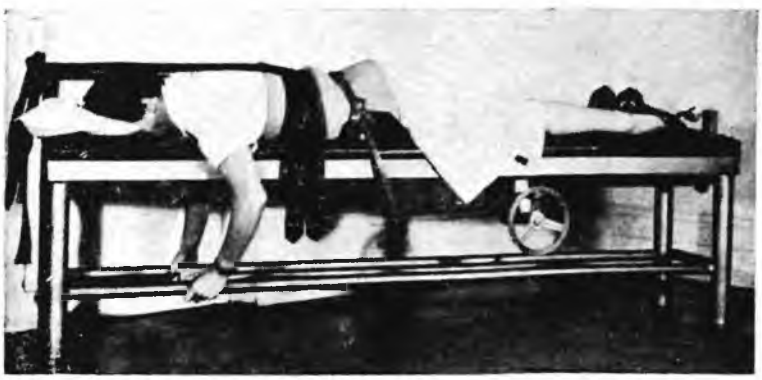

Fig. 4. Distraction of the joints with the articular surfaces held parallel. The patient is treated prone, and the thoracic harness is arranged so that the straps pass behind the patient's head.

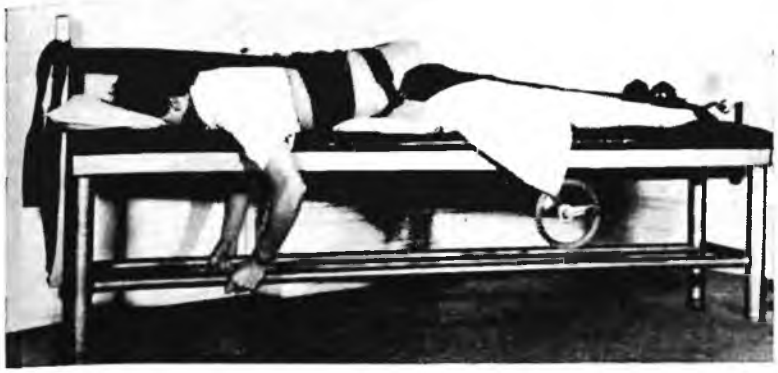

Fig. 5. Distraction mainly at the posterior part of the joint. The patient is treated prone: the pelvic harness is applied so that the Y-shaped strap passes over the top of the patient. The thoracic harness is applied so that the straps pass behind the patient's head.

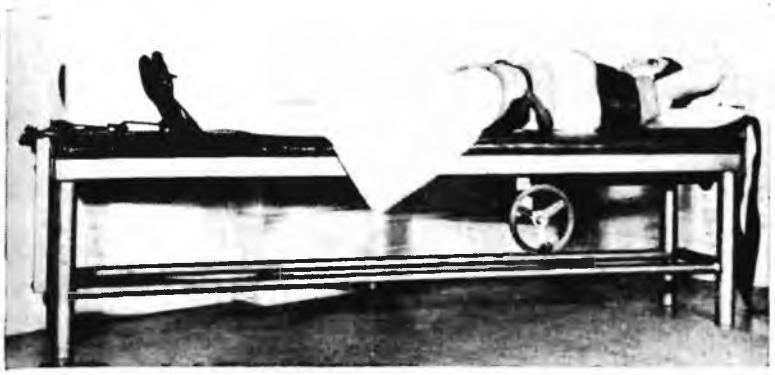

Fig. 6. When treating high lumbar or low thoracic lesions the patient is placed in the reverse direction on the couch so that the thoracic harness is fixed to the mobile end.

3. Distraction mainly at the posterior part of the joint i.e. in slight flexion of the lumbar spine.

The patient is treated prone: The pelvic harness is applied so that the Y-shaped strap passes over the top of the patient. The thoracic harness is applied so that the straps pass behind the patient's head. (Fig. 5.)

4. When treating high lumbar or low thoracic lesions the patient is placed in the reverse direction on the couch so that the thoracic harness is fixed to the mobile end. (Fig. 6.)

Indications for Traction

1. *Pulpy protrusions.*

These are distinguished by a gradual onset, together with signs of irreducibility by manipulation—namely:

(*a*) Trunk side-flexion towards the painful side increases the pain.

(*b*) Trunk movements other than flexion give rise to pain down the lower limb.

(*c*) Primary postero-lateral protrusion.

2. *Mixed Lesions.*

Both cartilage and pulp may protrude together. These may be only partially reducible by manipulation. A few sessions of traction often completes the reduction.

3. *Fourth Sacral Reference.*

Here manipulation is contra-indicated but traction may be given cautiously and is often successful.

4. (*a*) *First and Second Lumbar Disc Lesions.*

(*b*) *Recurrence after Laminectomy.*

Here manipulation usually fails, but traction is often a success.

Contra-Indications to Traction

1. *Cartilaginous Displacements.*

These are distinguished by a sudden onset, together with signs showing that manipulation will be successful, namely:

(*a*) Trunk side-flexion away from the painful side increases the lumbar pain.

(*b*) Lumbar movements do not cause pain in the limb.

2. *Lumbago with Acute Twinges.*

This is usually aggravated by traction and is an indication for the induction of epidural local anaesthesia.

3. *Awaiting Spontaneous Recovery.*

Successful reduction is undesirable in those who will get well after a few months if left untreated. Once spontaneous recovery has taken place, future recurrences are rare. (Cyriax, 1957.)

When Traction should be Abandoned.

1. There has been no improvement after about twelve sessions.

2. There is steady deterioration during the first few days in spite of variations in the way in which the treatment is given.

3. Neurological signs, previously absent appear. In such cases the most suitable treatment is the induction of epidural local anaesthesia and so the doctor should be informed of the patient's state. (Cyriax, 1957.)

Conclusion

Statistics show that 13 per cent. of all cases of backache, and 25 per cent. of all cases of sciatica have been found suited to treatment by traction. Of these the surprising fact emerges that in backache 57 per cent. were put right or made much better by traction, whereas in sciatica the figure is 80 per cent. (Cyriax, 1957.)

The techniques, described here have been elaborated as a result of Dr. Cyriax's teaching and are those used by his staff.

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