

## Section of Physical Medicine

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### DISCUSSION ON THE TREATMENT OF BACKACHE BY TRACTION

**Dr. E. J. Crisp:** Any new method of treatment requires prolonged clinical trial before its worth can be accurately assessed. The conclusions to be drawn from a short series of cases can be very misleading and far too optimistic. For example, a review of the first 50 cases I treated by traction showed that all 17 cases of acute lumbago obtained relief. I have never obtained comparable results since. Nevertheless it is extraordinary how often one may have a run of precisely similar cases.

I have used traction for a number of years now and should have had sufficient experience in its use to know what it can and cannot do. Even if spinal traction has not entirely fulfilled my original high hopes, it has proved a most valuable weapon in the treatment of many painful conditions of neck and back. Provided the right case is selected and the correct technique employed, it usually gives relief.

When I started using traction I was still an ardent disciple of the prolapsed disc. Believing that, if such pathological conditions as tubercle or new growth had been excluded, the usual cause of pain in the back was a disc protrusion, I imagined that by means of spinal traction it should be possible to reduce the prolapse and that after one or more treatments it would stay reduced. A moment's thought should evince that this was wishful thinking for the nucleus is contained within the annulus under considerable pressure. Therefore, though traction may temporarily reduce the prolapse it will obviously tend to recur directly traction is released.

When pain in the back arises from a displaced annular tag I think traction may well correct the condition, especially if the posterior longitudinal ligament is intact. I also feel that traction sometimes gives relief in the case of the contused disc with incipient protrusion, by which I mean the rupture of a few annular fibres only so that little or no bulge occurs. But the one type of disc lesion that spinal traction is unlikely to benefit is complete nuclear protrusion in the lumbar region: and still more so if it has progressed to "extrusion". But the fact remains that by means of traction or manipulation (or both) we can so frequently give relief, and often dramatic relief, of pain that clearly the symptoms cannot always be due to a disc lesion and there must be other causes of pain in the back.

It is an odd fact, but very true, that as each new theory comes along we forget everything we have previously learned. Twenty-five years ago we accepted Putti's theory (1927) that lumbar pain and sciatic pain might be due to an inflammatory condition involving one or more zygapophyseal joints. Furthermore, when we treated such cases in the manner he recommended, recovery was the rule. Shortly before the war we acclaimed Sir Thomas Lewis's and Professor Kellgren's exposition on referred pain and readily agreed that a sensitive intervertebral ligament might well give rise to sciatic pain (Kellgren, 1939; Lewis and Kellgren, 1939). By seeking out the painful ligament, injecting novocain and mobilizing the spine we frequently cured the patient. Surely we should pay more attention to the observations of these great men.

We are apt to make the mistake of focusing attention on the "prolapsed" or "slipped" disc to the exclusion of other equally important intervertebral structures. Now, unlike most other bodily structures the disc tends to degenerate comparatively early in life, especially in those regions of the spine where strain is greatest. Most people over the age of 50, if X-rayed, will be found to have one or more narrowed discs in the lower cervical region. This is because the nucleus has lost its power of osmosis, is dehydrated and consequently narrowed. Though there may be changes in the neurocentral joints, usually there is no pain in the neck or arms. The radiologist may report that there is evidence of a disc lesion but this does not mean that the disc has prolapsed: it has in fact merely degenerated. X-rays should be correlated with the physical signs, for paradoxically it often happens that when a severe lumbar disc protrusion gives rise to acute pain in the back and leg, the only abnormal X-ray findings will be scoliosis or a reversed lumbar curve, and the report will state "No evidence of a disc lesion".

Degeneration of a disc is a slow process and it may take a number of years before it gives rise to pain, and, when it does, the pain frequently arises in the posterior joints rather than the disc. In a paper read to the Congress of the English Speaking Orthopaedic Associations

Macnab of Toronto described the changes he had found in the posterior joints following disc degeneration (Harris and Macnab, 1954). In consequence of the disc narrowing, the superior facet overrides the inferior facet, and this is followed by erosion of articular cartilage, osteoarthritis and thickening of synovia and capsule. In several specimens Macnab found an actual loose body in the zygapophyseal joint. By correlating these various facts and thinking in terms of intervertebral derangements rather than disc lesions, I have begun to understand why traction or manipulation so frequently relieves, but on occasion fails and even aggravates the condition. It has become evident to me that the incidence of genuine disc protrusions or extrusions is far less than is generally supposed, and that in their treatment manipulation or traction has, very often, little to offer. For this type of case bed rest or a plaster jacket is usually the treatment of choice with laminectomy as the last resort should these conservative measures fail.

#### THE INTERVERTEBRAL JOINT

Let us consider in a little more detail the individual structures comprising the intervertebral joint, both in regard to the way in which they may give rise to acute and chronic pain, and the tendency towards spontaneous recovery or otherwise. Firstly the disc:

*Acute episodes.*—The annulus may rupture partially or completely following moderate or severe trauma, giving rise to acute lumbago and possibly sciatic pain. This is a condition which tends to recover spontaneously with adequate rest, the tear in the annulus being repaired by scar tissue.

*Chronic episodes.*—The disc may become narrowed by a process of slow degeneration which may or may not be the sequel of trauma. In due course this may result in chronic backache and sometimes pain which radiates to a limb. It is a chronic condition and spontaneous recovery is seldom the rule.

#### THE ZYGAPOPHYSEAL JOINTS

*Acute episodes.*—In certain regions of the spine, especially the cervical and lumbar regions where flexion and rotation are free, it is sometimes possible at the extreme of movement for the synovial membrane to prolapse between the facets and become impacted when the spine is extended. This gives rise to acute pain and the normal curve, whether cervical or lumbar, becomes reversed: and again a zygapophyseal joint will react like any other joint if subject to strain or sprain—pain, stiffness or even synovial effusion resulting. Other obvious causes of acute pain arising in the posterior joints are subluxation or locking due to a loose body.

*Chronic episodes.*—Degeneration and narrowing of a disc affects the normal relationship of the facets and leads to erosion of articular cartilage, osteoarthritis and capsulitis, this last condition being the source of chronic pain. Any form of trauma may well aggravate still further an already sensitive capsule, leading to increased pain.

#### THE NEUROCENTRAL JOINTS

In the cervical region disc degeneration affects the neurocentral joints of Luschka and their capsules rather than the zygapophyseal joints. Though the condition will often be symptomless trauma may well invoke an inflammatory response in an already thickened capsule, giving rise to pain in the neck which may radiate down the arm.

#### THE INTERVERTEBRAL LIGAMENTS

We should not think in terms of disc and posterior joints alone. There remain the intervertebral ligaments, structures richly endowed with sensory nerves, which will give rise to pain in any form of intervertebral derangement, whether acute or chronic. Furthermore the ligamentum flavum responds to trauma by degenerative changes, the elastic fibres being replaced by fibrous tissue. The ligament becomes considerably thickened and movement is restricted in consequence.

#### TREATMENT

Traction frequently relieves pain, by releasing the nipped synovial membrane or subluxation, stretching the tight and painful capsule or ligament, or even freeing an adherent nerve root, but I find it difficult to imagine traction permanently reducing a nuclear protrusion unless the annular lesion is a small one. However, provided the technique is correct, even though traction should temporarily increase pain in the case of a genuine disc protrusion, it seldom aggravates the lesion.

#### TECHNIQUE

Whether we are applying traction to the lumbar spine or the cervical spine, correct positioning of the patient is all-important. In the lumbar region traction is given with the

patient lying prone and it is essential that the lumbar spine is in the flattened or neutral position. This is done by placing a pillow of suitable size under the abdomen. We wish to stretch the capsules of the posterior joints and the intervertebral ligaments. If the lumbar spine is too lordosed we shall apply our stretch to the abdominal wall or the mesentery and may cause the patient severe abdominal discomfort.

I use a very simple table, the top of which has one fixed and one movable portion. The patient's shoulders and thorax are firmly secured to the fixed portion, while the lumbar region, pelvis and legs lie on the movable portion. Traction is applied through a pelvic belt attached to two spring balances at the foot of the table by two adjustable ropes, one on either side. I use a moderate poundage, 40–80 lb. according to the type of case. This may sound so little as to be useless, but by virtue of the movable top, friction between body and table is eliminated and all the pull applied to the patient. An advantage of the twin ropes is that they may be adjusted so as to apply a stronger pull on one or other side of the trunk if thought necessary.

Cervical traction should be given with the patient lying supine. Once again correct posturing of the neck is paramount. Thus the neck should be well flexed to apply traction to the posterior joints, and moderately flexed to stretch the neurocentral capsules. When we want to increase extension, as is the case when posterior marginal liping causes pressure on the cord, traction is given with the neck in the neutral position. Traction may be carried out manually or by means of Sayre's sling, using weights and pulley. In this case I use 25–45 lb. for ten to twenty minutes.

As regards what should be manipulated or stretched, and when it is advisable to leave well alone, one could write a whole book on the subject if only time permitted and one had the energy. But, briefly, to deal first with the lumbar spine.

#### THE LUMBAR SPINE

*Acute conditions.*—Lumbago, if rested, is a condition which often tends to recover spontaneously in the course of a few days; therefore if the pain is already subsiding when the patient is first seen, I tend more and more to leave well alone, especially in the older age groups. Though many cases respond strikingly to traction or manipulation many others are aggravated.

Acute lumbago with a reversed lumbar curve and of sudden onset is, I think, often due to a nipped synovial fringe. When this is so, as is only to be expected, the condition responds like magic to traction. It is the case with the lumbar spine held in tight lordosis by muscle spasm which presents the problem. Though sometimes relieved dramatically by traction, in my experience such treatment more often aggravates the pain and I think it is because a ruptured annulus is responsible for the symptoms. Nevertheless, I frequently give the patient a gentle trial traction, and if it reduces the pain repeat the treatment. But should it aggravate the pain I advise rest or even a plaster jacket. I occasionally use an epidural injection, but am not altogether convinced of the efficacy of this method.

When the patient has acute sciatica, whether or not in association with lumbar pain, I seldom hesitate to try traction, for it frequently gives relief. But when this happens I feel that if a disc lesion was responsible for the condition it was probably a small one, and that it was more likely the symptoms arose in the posterior joints. There is, however, a time and place for everything. Following a period of bed rest or plaster jacket the crural pain, though diminished, sometimes remains a source of considerable discomfort. Traction or manipulation at this stage is often successful, presumably either by completing the reduction of the prolapse or freeing an adhesion.

There remain a number of cases which by their history, symptoms and physical signs advertise themselves as severe disc lesions with root pressure, and unlikely to benefit from traction. Though such cases may derive temporary relief while pulled out on the traction table the trouble starts when we reduce the traction, and the pain returns with increased intensity. I have on occasion spent more than an hour trying to get the patient down.

*Chronic conditions.*—It is in the treatment of the older age groups with chronic low back pain that I have found lumbar traction of the greatest value. It may sound a dangerous procedure to manipulate or apply traction to a lumbar spine with marked degenerative changes, but in my experience this is not the case. When discs become narrow they lead to secondary changes in the posterior joints, where thickened and sensitive capsules give rise to chronic backache. By stretching the thickened capsules I have found it possible to relieve many patients with chronic backache. Naturally one must select the right case, but fortunately selection is facilitated by easily recognizable distinguishing characteristics. Few patients have backache for twenty-four hours of the day. It will be found that whereas one type of patient will complain that bed rest relieves the pain while activity aggravates it, another class of patient will tell you precisely the reverse. It is the patient whose lumbar pain is relieved by activity who derives such remarkable relief from several treatments on

the traction table. A useful analogy would be the chronic sprained ankle which stiffens up when rested, loosens up if exercised, and is only completely cured by manipulation. In like manner crural pain, whether neuritic or referred, when it occurs in association with degenerative lumbar changes frequently responds to manipulation or traction.

#### THE CERVICAL SPINE

It is remarkable how often pain in the neck develops during the night. The patient retires to bed without a care in the world only to be woken up in the early hours of the morning by acute pain in the neck which is aggravated by every movement.

If by careful differential diagnosis we exclude pathological causes such as tubercle, new growth, &c., painful cervical conditions may be placed roughly in three categories.

(1) In the younger age groups the cause of the pain, more often than not, is a nipped synovia or subluxed posterior joint. X-rays, apart from showing a cervical kyphosis, are negative. The response to manipulation or traction is dramatic.

(2) In the older age group the pain, though first felt in the neck only, sooner or later radiates to the shoulder or arm. X-rays usually show one or more degenerated discs whose presence was previously unsuspected. The symptoms may be the result of a displaced tag of annulus or more often the result of trauma which causes an inflammatory reaction in the capsule of the neurocentral joint. Once again the response to manipulation or traction will be most gratifying, though the period of treatment may often be protracted. Many cases of this type that have derived no relief from prolonged bed rest are rapidly improved by cervical traction.

(3) There remains a small group of patients whose symptoms are due to disc lesions, major or minor, often the result of severe trauma. When there are marked root symptoms following protrusion the ideal procedure is to hospitalize the patient and apply sustained traction for as long as may be necessary. The less severe case will often respond to daily treatments.

In the cervical region there is a more reasonable prospect of a small protrusion staying reduced than there is in the lumbar region. My personal feeling is that acute cervical disc episodes are more often due to trauma deranging an already degenerated disc, than to the sudden rupture of a healthy annulus.

#### THE DORSAL SPINE

Though one can often relieve pain in the lower dorsal region by traction I prefer manipulation for the middle and upper dorsal regions. It is only by this means possible to deal with pain which arises in the costo-vertebral articulations. The thoracic cage affords considerable protection to the dorsal discs, so that whereas degeneration of the discs is a common occurrence, acute protrusion is probably very infrequent. Many obscure pains which may radiate to the front of the chest or abdomen undoubtedly have their origin in a dorsal derangement and may be relieved by manipulation or traction.

#### CONCLUSION

Used correctly spinal traction can do little harm, but each case must be treated on its merits. There is a place for physiotherapy, rest, plaster, manipulation and traction, and frequently a combination of several of these measures is the ideal.

There may appear to be certain inconsistencies in my remarks! After making the statement that it would appear impossible for traction to reduce and keep reduced a large lumbar protrusion, I proceed to advocate a trial of traction on every case of sciatica. My excuse must be that "it is the exception which proves the rule", for occasionally one gives the patient rapid relief by means of traction when such a measure appeared a forlorn hope.

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**Dr. J. H. Cyriax** (*in absentia*, read by Dr. R. Barbor): Sustained traction suggested itself to me in 1949 when, pondering the reason for the success of rest in bed in lumbago, it dawned on me that the benefit arose from the avoidance of a compression strain on the joint. The next step thus became obvious, active decompression: in other words, traction. I had already tried manual traction during the reduction of cervical and thoracic disc displacements and found it invaluable, but to my surprise it had proved useless in aiding

manipulative reduction at a lumbar joint. The reason for this was soon apparent, when I discovered by radiography that traction for a few seconds doubles the width of the joint-space at the cervical spine (Fig. 1) but increases it by only a tenth at the lumbar joints (Fig. 2). Fig. 3 shows the traction couch in use, a simplified version of the model illustrated in the *British Medical Journal* (Cyriax, 1950). The traction must be constant, so that the muscles tire and the strain falls on the joint. I mention this because osteopaths use a machine with an electric motor under it giving intermittent traction each few seconds. This I consider much less effective, but it impresses patients enormously.

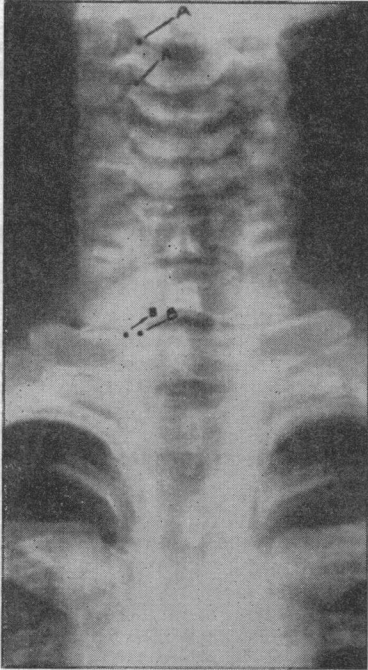


FIG. 1.—Manual traction on cervical spine. Two radiographs have been superimposed, corresponding at the first thoracic vertebra. The first was taken before, the second during, a few seconds' manual traction. Note that the joint spaces have almost doubled in width.

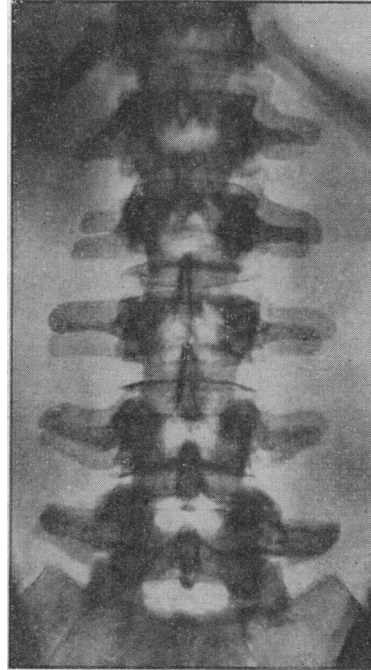


FIG. 2.—Mechanical traction on lumbar spine. Two radiographs have been superimposed corresponding at the sacrum. The first was taken before, the second after, fifteen minutes' mechanical traction of 120 lb. Note that the joint spaces have increased in width by only one-tenth.

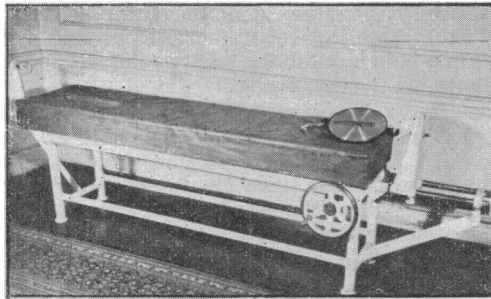


FIG. 3.—Traction couch.

#### EFFECTS OF TRACTION

(1) Distraction of the vertebral bodies, thus enlarging the space into which the protrusion has to recede.

(2) Tautening the posterior longitudinal ligament. When the slack on the ligament is taken up, it can no longer bulge posteriorly and thus exerts centripetal force on the adjacent annulus.

(3) Suction, tending to pull back protruded material into the joint.

#### TECHNIQUE

The patient lies on the couch; some do better supine, others prone. He is treated once or twice a day for half to one hour each time. A small woman may need 100 lb., a large man up to 200 lb. A thoracic and a pelvic belt are applied, and the straps attached to the ends of the couch. The physiotherapist turns the wheel and gradually increases the traction until the patient feels he has enough tension. After a short while he may ask for more. The force is measured on a spring balance which serves two purposes: first to measure this force and thus enable uniform treatments to be given; secondly, to take up slack if either belt slips slightly. As soon as the traction becomes effective, certain alterations in the pain are felt by the patient.

(1) The pain usually ceases. If not:

(2) A unilateral lumbar pain may become central.

(3) A root pain may become a lumbar pain.

(4) A root pain may shorten, for example it may move from the calf to the thigh or buttock.

(5) A root pain may remain in the same place but become less intense.

(6) The pain may remain unaltered.

The patient must attend daily; if he cannot do that, he is not accepted for treatment at all. Treatment is abandoned if he has not begun to improve after twelve sessions. If he improves he continues until reduction is complete, normally one to four weeks. The only exception is the uncommon patient with constant backache of some years' standing causing marked limitation of straight-leg raising on both sides. Apart from operation, these patients are unrelievable except by traction, which may have to continue for two or three months.

#### INDICATIONS

Unlike the state of affairs at the cervical joints, where the indications for manipulation and traction are wholly separate, these two methods of securing reduction are partly interchangeable at the lumbar spine. Lesions reducible by manipulation and not by traction at this level and vice versa are of course encountered, but there is a number of intermediate cases for which either method is satisfactory. Since manipulation is effective at once and traction takes some days at least to become so, in all cases of doubt I manipulate there and then, and put on to traction only those in whom manipulation fails or is only partly successful.

The indications for traction are:

(1) *Nuclear protrusion*.—In typical cases, the onset is gradual, the pain often coming on some time after exertion or after the patient has sat some while. The same suggestion arises if any of the lumbar movements other than flexion cause pain in the limb rather than in the back, or if pain is set up when the protrusion is pinched, that is, when side-flexion towards the painful side hurts.

(2) *Failure of manipulation*.—Sometimes a displacement appears reducible by manipulation, judged by the history and signs, but the attempt fails. Primary postero-lateral protrusions, in which the first pain is felt in the thigh or calf without any backache, are never reducible by manipulation; only traction avails.

(3) *Impaired root conduction*.—Traction should be used when there are two or more neurological signs, e.g. a weak muscle and an absent ankle-jerk or cutaneous analgesia; manipulation is sure to fail. However, the induction of epidural anaesthesia is often the treatment of choice when neurological signs are severe. It should be remembered that neurological signs may be the result of damage from a previous attack of sciatica, and their relevance to a subsequent attack must not be assumed too lightly.

(4) *Relief from pain*.—Cases of sciatica of some months' standing are encountered, in which the treatment of choice is to leave the protrusion where it is and merely ease the pain by the induction of epidural local anaesthesia. Occasionally the injection brings no lasting relief. If the pain is considerable, traction has to be employed.

(5) *Fourth sacral reference*.—Whatever method is adopted, cases with pain referred to the coccyx or genital area must be regarded as in danger of the development of a fourth sacral palsy and should be treated with great care. I, for one, never manipulate in such cases. Traction and epidural local anaesthesia are safer and therefore can be employed.

(6) *First and second lumbar disc lesions.*—Disc lesions at these two levels are rare, and I have never yet succeeded in reducing one by manipulation. By contrast, traction has been successful.

(7) *Recurrence after laminectomy.*—In these cases manipulation is seldom successful, but can safely be attempted. Traction is more often effective but in all patients who have had a laminectomy the prognosis is more unfavourable than in those who have never had the operation.

#### CONTRAINDICATIONS

The contraindications to traction are:

(1) *Purely annular displacements.*—These should be reduced by manipulation immediately the diagnosis is made. An accurate assessment of the nature of the protruded material is therefore essential. The history is usually of sudden onset, with or without a click, often when the lumbar spine is extending after flexion. Certain signs show that an annular displacement is present. The more common are:

(a) A painful arc during trunk flexion.

(b) Pain caused by side-flexion away from the painful side.

This applies particularly to elderly patients (over 60) whose protrusions nearly always respond better to manipulation than to traction.

(2) *Lumbago with severe twinges.*—This is unsuited to traction. The pain ceases as soon as the traction is applied but when it is released even more agonizing twinges appear and the patient may be unable to get off the couch for an hour or two; when at last he can, he finds himself no better for the ordeal. Should such twinges come on, an epidural injection usually stops them lastingly.

(3) *Impaired cardiac or respiratory function.*—Patients so afflicted may find the thoracic band too much of an embarrassment.

#### MAINTENANCE OF REDUCTION

After reduction by traction of a protrusion causing lumbago or sciatica, redisplacement is just as much a possibility as when the reduction has taken place spontaneously, during recumbency, or by manipulation. Hence no lasting result can be expected unless the patient is given clear postural instruction on the maintenance of reduction. The correct methods of sitting, stooping, bending and lifting must be explained. These are simple and the patient must develop the habit, for they are no less important than the reduction itself. This can also be maintained by a corset, properly fitted with shaped metal lumbar supports to fit the lumbar lordosis, but I regard as an error the common practice of applying a corset or a plaster without reduction of the displacement first.

#### RESULTS

The only published figures are by Bang and Sury (1955) who reported good results in 50% of patients selected purely on a basis of intractability by all other methods, including in some cases laminectomy; hence they represent the results of traction at their worst. They first used one of my couches, and then invented an improved model of their own.

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#### Dr. B. G. B. Christie:

It was decided, at the Middlesex Hospital, to undertake an investigation to evaluate the place of traction in lumbar backache. This paper deals entirely with the pilot series which is to be a preliminary to a larger scale investigation.

It was decided to treat half the patients in this series with traction, and the other half with a bland pill. This latter would approximate closely to their receiving no treatment at all, and consequently allow one to compare the results obtained by traction with those that might be expected to obtain as a result of the natural history of the condition. It is appreciated that by giving the patient even a bland pill some effect of a psychological nature may be expected, but if this be true, it must also be true of the traction table with its impressive equipment.

The investigation started early in 1954 when it was decided to hold a special clinic each

week to assess patients before and after treatment. The patients referred to this clinic were carefully selected as all patients with psychiatric or hypochondriacal histories were excluded, as also were those with congenital anomalies of the lumbar spine or sacro-iliac joints. It was not, however, intended to exclude spondylolisthesis or spondylolysis, but unfortunately none has been referred and so none appears in the series. All patients were carefully investigated to exclude other pathologies such as tuberculous caries or secondary deposits.

The patients that were eventually included were treated either by traction or the bland pill, every attempt being made to place roughly similar cases equally in either group. The total number of patients treated was between 60 and 65, there being just over 30 in each group.

All the patients complained of backache in the lumbar region with or without reference of pain down the legs. According to the examination findings they were classed as having root signs, or no root signs. Under the heading of root signs have been included limitation of straight-leg raising on the affected side, as compared with the unaffected leg, alteration in the tendon reflexes, or evidence of motor or sensory involvement. If none of these criteria was elicited the patient was classed as having no root signs.

Some difficulty was experienced in dividing up the patients into acute and chronic. It was decided, for the purpose of this series, to class as acute all backaches of recent origin, and the arbitrary period decided on was six weeks. Therefore those cases in the series classed as acute all have histories of six weeks or less. Backaches of longer duration than this were classed as chronic. It will be appreciated that in many cases it was possible to make a more accurate anatomical or pathological diagnosis, but owing to the confused nature of the nomenclature in lesions of the back, this controversy has been avoided in this series.

All patients were subjected to a searching history and clinical examination, X-rays were taken, and the sedimentation rate estimated. Subjectively the patient's pain was recorded according to a pre-arranged classification. This was as follows:

- Grade 0 No pain.
- Grade I Pain of nuisance value only.
- Grade IIA Pain of more than nuisance value but not crippling. No time off work.
- Grade IIB Pain of more than nuisance value but not crippling. Time off work.
- Grade III Crippling pain. Incapable of work.

In practice this classification worked satisfactorily, and no difficulty was experienced in allotting patients to their respective grade before and after treatment.

The traction table used was of a standard type similar to that used in many hospitals, and was in fact a combination of what were thought to be the better features of several tables being used in London. Traction was exerted by a geared wheel on the side of the table so that the lower part moved away from the fixed upper end. The degree of traction could be measured by the spring balances between the pelvis and the lower end of the table, each balance measuring up to 112 lb. Therefore, with the two in parallel, it was possible in theory to measure degrees of traction up to 224 lb. In practice this was not in fact possible as the limiting factor was the fixation of the upper end of the patient, and at forces in the region of 150 lb. the patient tended to slip.

Those patients who were treated by traction were all treated in the prone position. Traction was exerted until the patient was either relieved of pain or his pain aggravated. In those whose pain was relieved the degree of traction employed was noted and it was maintained at this level for twenty minutes. After this time had elapsed the traction was slowly eased off over a minute or two. This constituted one treatment and patients were treated three times a week for four weeks. All these treatments were carried out and supervised by experienced physiotherapists. In those patients who were aggravated by traction the force required to increase the pain was noted, and if they were made worse on two or three consecutive occasions treatment was abandoned and deemed to have failed. It was our experience that in those patients aggravated by traction, the force employed was frequently small, being in the region of 50 lb. or less, also that the degree of pain in these patients was invariably more severe following such an episode.

Those patients in the series that were not treated by traction were informed that their backache could best be treated at the moment by pills, and were prescribed the bland pill under the name of Tabs. Dormosan B. These tablets were not given any special "build up" in the eyes of the patient, and they were instructed to take two tablets three times a day, and if the pain was very severe, this could be increased by a further two tablets. These patients were sent away for four weeks and reassessed at the end of that period. The tablets in fact contained lactose.

The results of this pilot survey must be considered in the light of the fact that all observations were made by one person, therefore observer bias cannot be excluded. The small number of patients may also give rise to misleading results. When the survey was started over a year



ago it was hoped that at the end of one year we should have been able to collect about 150 to 200 patients, having half in each series. It will be appreciated that the patient complaining of backache is first seen by his family doctor who either immediately, or following some conservative home treatment, refers him to the outpatient department of the hospital, where in due course he is seen by appointment and examined. Radiological and laboratory investigations are ordered, and if he falls into the suitable category he is referred to the special clinic which was performing this survey. These various stages necessarily entail a certain time lapse, and of the cases referred, I was continually disappointed in the early stages by patients informing me that their backache was now better, or that instead of a backache, which according to the history had been present for weeks or years, they now have a pain in their shoulder, neck, knee or elsewhere. These patients were, of course, discarded from the series and treated appropriately for their new complaint. Unfortunately, no record has been kept of the number of patients so discarded, but I know that they exceed 50% of those seen, and believe that the figure may be as high as two out of three. This accounts for the large wastage, and has to be borne in mind in the interpretation of the results of those that were included in the series.

By classification into acute or chronic backache according to the criteria previously mentioned one gets the two main groups, and these are then each further subdivided according to whether there were objective root signs present or not. It will be seen from Table I

TABLE I.—DISTRIBUTION OF CASES IN THE TWO SERIES

Series	Chronic with signs	Chronic with no signs	Acute with signs	Acute with no signs
Traction ..	30%	51%	13%	6%
Dormosan ..	30%	50%	15%	5%

that the numbers in each of these four groups were roughly the same in each series. All numbers have been shown as percentages and fractions have been approximated to the nearest whole number.

The gross results of treatment are shown in Table II where patients are divided into three

TABLE II.—COMPARISON OF RESULTS OF TREATMENT IN THE TWO SERIES

	Better	Worse	Same
Traction .. .. .	30%	18%	52%
Dormosan .. .. .	30%	5%	65%

groups following treatment, better, worse, or the same. The placing of patients into one of these three categories was done when they were assessed at the end of four weeks' treatment, and by using such a broad classification little difficulty was encountered in assessment. Some of the patients who were classed as better or worse had appropriate alterations in the physical signs, but in the majority the improvement or otherwise was entirely subjective, such physical signs as limitation of straight-leg raising or forward flexion remaining unchanged.

From Table II it will also be seen that the majority of patients in each group were unaffected by the treatment, 52% in the case of those on traction and 65% of those on the bland pill. 18% of those treated by traction were aggravated, and 3 patients required admission to hospital, one later requiring a laminectomy. 5% of those having the bland pill were worse, but none so bad as to need admission. On the credit side are 30% in each group that improved. Several of the results with traction were quite dramatic, the patients not requiring to complete the course of twelve treatments, as they became entirely pain-free after several treatments only. This, however, was not entirely confined to those receiving traction, as several patients on the pill informed me that after taking it for some days all their pains had disappeared and had not recurred.

At this stage one should again face the question of whether traction is an effective form of treatment in lumbar backache. From the results of this series we relieved 30% of cases, and in the majority of these cases there was no backache after successful treatment. In the minority the improvement amounted to nothing more than an amelioration of the symptoms. As a disadvantage one has to consider the 18% that were worse during or after treatment. No doubt with a more exact knowledge of the nature of the cases that respond, and those that do not one could reduce the number of cases that were aggravated. This was the second aim of this investigation, namely to discover the most suitable cases for traction. Unfortunately, the small numbers to date do not allow any predictions to be made, but it is interesting to compare the results in chronic backache in the two series. Chronic backache formed 81% of the cases on traction and 80% of those on the bland pill, so formed the majority of the cases in both series.

Chronic backache with root signs showed results better than those of all cases considered together, where 30% were better, 18% worse, and 52% the same when treated by traction. The results as shown in Table III show improvement in 30%, deterioration in 10%, and

TABLE III.—COMPARISON OF RESULTS IN CHRONIC BACKACHE

Better	Dormosan			Traction		
	Worse	Same		Better	Worse	Same
17%	0	83%	With root signs	30%	10%	60%
30%	10%	60%	Without root signs	24%	29%	47%

60% who were unaffected. These figures are significantly better than those treated by the bland pill where only 17% were improved. In chronic backache without root signs the very high figure of 29% aggravated by treatment was found.

It is unfortunate that the number of acute backaches according to the criteria has been so small, as it has been said that traction is often of value in these cases. No figures are presented from this series for acute backs, but of the small number treated by traction none have been worse following treatment.

In considering traction as a method of treating lumbar backache the interesting question of what happens when one subjects the patient to the distracting force arises. In an attempt to answer this question two student volunteers were fixed to the traction table, and lateral view X-rays were taken of the lumbar spine before and five minutes after traction with a force of 75 lb. An experienced radiologist reported on the films and in his opinion there was a lengthening of the lumbar spine in both cases. The lumbar disc spaces were widened after traction, and in the case of the 5th lumbo-sacral disc, and that between the 4th and 5th lumbar vertebrae, the widening was 10–15% of the preliminary figure before traction. Precautions were taken to ensure that the distance between the patient and tube, and patient and film were identical in each case. It is interesting to note that this widening during traction got progressively less as one ascended the lumbar spine so that in both cases there was no measurable difference after 75 lb. traction for five minutes in the disc space between the 12th thoracic vertebra and the 1st lumbar. If this is true, and widening in the disc spaces in the lumbar spine is always genuine, whereas narrowing may be apparent only, then it would appear that traction is more likely to be effective in the treatment of lower lumbar than higher lumbar disc lesions. As, however, in practice the lower discs comprise the vast majority of disc lesions, this is probably of theoretical value only. If nevertheless widening does take place in the lower lumbar disc spaces with traction, then there must also be sliding of the facet joints which in the lumbar spine allow an appreciable range of flexion and extension.

It would have been interesting to subject these student volunteers to greater degrees of traction, but in both cases, and in several other normal people without backache who have been stretched, it has been the rule for increase of traction to cause a backache which increases with the tractive force. This differs from what is usually found when patients who have backache before treatment are subjected to traction. In most of the patients treated, with the exception of the 18% who were definitely made worse, the majority experienced considerable relief during the period of traction which in some cases was maintained for some hours following treatment. Unless this improvement was maintained from the end of treatment to being assessed, which was often a week, these patients were not regarded as having benefited from traction. This is a possible source of error if one sees the patients immediately after they have finished treatment, as then the majority are much improved, if not free of pain, only to be as bad the following day.

These observations are of interest in considering the pathology of disc lesions, especially if traction can exert a hydrostatic negative pressure in the nucleus pulposus, which is only presumptive. If, however, this is the case, then hydration of the disc tissue in the normal person, achieved by traction, falls fairly well into the category described by Charnley (1955) under the name of raised disc tension. It would also explain the relief of symptoms in patients with degenerate and desiccated disc tissue. Unfortunately, these statements are difficult to prove by scientific methods.

These are the results of a small controlled pilot series, and it is hoped that at a later date more conclusive results will be available.

#### REFERENCE

CHARNLEY, J. (1955) *Brit. med. J.*, i, 344.