

# SPINAL TRACTION\*

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This form of treatment has been used in Turkey since 1465 and since the days of Hippocrates (1544) in Italy. A bench for traction and manipulation made to his design and four hundred years old stands today in the Wellcome Historical Museum in London. ((1) Preface p. (xii); (6) Plates 7 & 8, p. 74) The purpose of this article is therefore not to contribute an original concept but to comply with a request to discuss the approaches of Cyriax and Maitland to this method of treatment. It is proposed to discuss the main features of each briefly and to refer the reader to the bibliography at the end of this article for further information.

Dr. James Cyriax is an honorary consultant in orthopaedic medicine (more commonly known as physical medicine) at St. Thomas' Hospital, London and visiting professor in orthopaedic medicine at the University of Rochester Medical Centre, New York. He has been practising his speciality since 1929. His most comprehensive publication is his "Textbook of Orthopaedic Medicine". (Volumes I and II. (1), (2)).

Mr. Geoffrey Maitland is a part-time lecturer in physiotherapy at the South Australian Institute of Technology, Adelaide. He is the principal tutor at the 3 month spinal manipulation course (Australian Physiotherapy Association) and 12 month graduate diploma in manipulative arthrology (S.A. Institute of Technology). He was awarded an honorary Fellowship by the Chartered Society of Physiotherapy for his work in this field. His best-known publications are "Vertebral Manipulation" (3) and "Peripheral Manipulation" (4). The former contains details of spinal traction for the cervical, thoracic, and lumbar regions. It includes a description of his "friction-free" traction table and adjustable cervical halter, (pp. 93-101, 109-115, 138-145). It was my privilege to be taught by both these men. I have been using Dr. Cyriax's methods in South Africa since 1960 and Mr. Maitland's since 1970.

Spinal traction as an out-patient procedure must be used at the discretion of the physiotherapist when indicated ((2) p. 118, 45; (6), p. 76; (5) as part of the overall treatment programme for a patient. It should never be a routine technique carried out for a set period of time, but should be discontinued if the symptoms and signs are not improving or if they get worse. This is probably one of the reasons why clinical trials of traction ((8); (9)) fail to show its undoubted benefit. Patients are allocated to the traction group at random, irrespective of the pathology, speed of onset, behaviour of symptoms, etc. All that is taken into account is that they complain of pain in a certain area, e.g. the neck and arm. Such selection for traction is bound to lead to failure.

## DR. CYRIAX'S APPROACH

Dr. Cyriax devised a method of diagnosis of soft tissue lesions based upon selective tissue tension. A comprehensive history is taken and a detailed physical examination is conducted ((1) pp. 64 et seq.). He recently stated (Cape Town, Jan, 1976) that he may take 45 minutes for an initial back examination. Even with his experience this is essential because diagnosis is not easy yet subsequent treatment can only be selected according to the diagnosis. He regards the value of the X-ray examination as mostly negative ((1) p. 121; (6) p. 46). He has used traction since 1950 to treat lesions involving

the nucleus pulposus that he considers reducible ((1) p. 454 et seq.).

**At the cervical spine** manual traction is used during manipulation ((1) p. 150) for reduction of a displaced annulus. Halter traction is seldom used and is applied as several short pulls with the patient sitting on a chair (head suspension) ((1) p. 157). Traction in recumbency is used for a small nuclear protrusion, or to allow the patient with severe brachial pain to get some sleep ((1) p. 158 & (2) p. 45). Hospital traction is used occasionally ((1) p. 158 & (2) p. 122). Exercises are avoided ((1) p. 154).

**Thoracic traction** is seldom used (for indications see reference (2) p. 45).

**At the lumbar spine** traction is applied on a fixed-top couch by means of thoracic and lumbar harnesses. The pull is exerted through the pelvic harness by a form of winch so that a strong, constant pull is obtained ((1) p. 463 et seq.). The patient may be supine or prone with further adjustments made by placing pillows and application of the harnesses. These are made according to the comfort of the patient and results achieved. It is used for lesions involving the nucleus pulposus where traction is thought to be between about 40 to 85 kgs depending partially on body build; an amount equal to 26% of the body weight is the indicated form of treatment. The amount of pull varies, dissipated in overcoming the friction of the couch (7). It is given daily for 30-45 minutes. Progression is assessed daily before treatment begins using an appropriate sign such as the straight leg raising test. Treatment may have to be given from 1-3 weeks to abolish the symptoms and signs. It may take up to 10 daily sessions to prove effective.

Traction is not combined with manipulation or any other form of physiotherapy. Corsets or supports may be used after reduction if a displacement tends to recur easily. Exercises are not used because the disc is compressed whenever the muscles spanning it contract. This has directly the opposite effect ((1) to the traction which aims at distracting the joint ((6) plate 6; (9)). Prevention of disc trouble should commence as soon as a baby starts to walk ((6) pp. 85-109).

## MR. MAITLAND'S APPROACH

Because he is a physiotherapist, Mr. Maitland treats patients on medical referral and is dependent on the referring doctor for the diagnosis ((3) preface, p. (x) and pp. 1-8). Anyone familiar with this kind of work will know what a variety of clinical labels may be attached to patients complaining of pain of spinal origin ((6) p. 135). Whenever a reliable diagnosis is obtained it helps in the selection of treatment and the estimation of the results that can be expected. The clinical symptoms and signs found on questioning and examining the patient ((4) pp. 1-20; 155-169) are a further guide to selection and progression; or may be the only reliable guide available to the physiotherapist ((3) pp. 156-157; Table 3, traction).

**At the cervical spine:** ((3) p. 93-101) halter traction is used rather than manual traction, the latter being applied where indicated as a longitudinal mobilising technique ((3) p. 71). The halter is adjustable for different sized heads and for head-on-neck position ((10); (3) p. 94). Traction may be applied in sitting or supine lying. The pulling force may be supplied by double pulley blocks and rope, hanging weights or an electronic intermittent traction apparatus. The latter is capable of applying constant traction at a set pull, or intermittent traction with "hold" and "rest" periods

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variable from 0 to 14 seconds. Constant traction may be applied on a 24 hour basis in hospital or at home and is indicated for patients with severe root pain. Constant traction may be applied as an out-patient procedure for periods of up to 15 minutes (30 minutes or longer for disc protrusions). It may be used daily or several times a day. Maximum distraction of a joint is obtained when it is positioned in the mid-positions of all its ranges of movement. In the neutral (or anatomical) position, the upper cervical joints are in mid range, but the lower cervical joints are nearer their extended position. Traction for the upper cervical spine is done in sitting as a neutral pull is comfortable and easily applied.

For the lower cervical spine it is done in lying with the neck in flexion ( $\pm 30^\circ$ ) and the upper cervical spine ("head-neck" position) in neutral ((3) p. 97). The amount of pull must be sufficient to cause movement at the desired level, so the joint is palpated while intermittent traction is applied and the pull adjusted until movement is felt. It is then held (for constant traction) or the "hold" and "rest" periods are set (for intermittent, variable traction) for the desired treatment time. The poundage and duration of traction are governed by the changes in symptoms and signs — the position is not. Treatment is given daily at first but may at a later stage be given less frequently especially in the case of intermittent variable traction.

Progression involves changing the duration of pull, amount of pull, changing the type of traction given or discontinuing treatment by traction. Progression is based on the assessment of the relevant symptoms and signs found on examination at the beginning of each treatment session. Traction may be used during the same session, at end (usually following) manipulation. ((3) p. 152, Table 2). Treatment including traction takes about 1-3 weeks to abolish all symptoms and signs (or reduce them as far as possible). (See "principles applied" cases No. 1, 2, 4, 5, 7, 9, 14, 17, 19, 21, 22 from "Vertebral Manipulation" (3)).

Traction is discontinued if no benefit accrues after the fourth treatment (or, of course, if the patient gets worse). A collar may be used at the same time if it is felt that this would reduce relapses and produce a more favourable progress.

**At the Lumbar Spine** harness traction is done with a thoracic and pelvic harness. The couch top is movable to eliminate as much friction as possible. This is essential for intermittent variable traction (with set hold and rest periods). The traction is applied through the pelvic harness ((3) p. 141) by means of double pulley blocks and a rope (constant) or by means of an intermittent traction apparatus (constant and intermittent variable). The manufacturer of the electronic traction apparatus supplies a couch with a movable top, but it may be made more economically using a couch with a flat, unupholstered top ((3) pp. 112-115; pp. 138-145—lumbar traction).

**Thoracic Traction** is applied via a cervical halter and a pelvic harness (upper thoracic) or lower thoracic traction by placing the thoracic harness as high as possible under the axillae ((3) pp. 109-112).

The patient may lie supine or prone, according to comfort but the best position is that which places the affected joint in a neutral position.

For the upper lumbar spine the legs should be extended (no pillows); for the mid-lumbar spine one pillow may be placed under the knees and for the low lumbar spine two (or more) under the knees in order to produce more lumbar flexion.

The amount of pull should be sufficient to produce palpable movement to the affected level and thereafter it is controlled by the behaviour of the symptoms while on traction, and the progress of symptoms and signs over the treatment period. On a friction-free

couch it could be as little as 10 kgs. It is given daily for a maximum of 15 minutes unless it is a case of disc pathology where 30 minutes or more could be given. Other factors controlling treatment are as for the cervical spine. Ultrasound may be used, but not shortwave diathermy. A corset may be worn while treatment by traction is given (but not during treatment of course). A corset decreases the intradiscal pressure by 25% (11). Hospital traction may be required for patients with severe root pain.

Exercises may follow successful treatment by traction. These may be of a mobilising type in cases of degenerative changes, which are usually treated by intermittent variable traction or of a stabilising type. That means that muscles supporting the vertebral column are strengthened in order to prevent recurrence, improve posture and prevent strain on joints. An exercise used by Maitland for this purpose may be mentioned here. The back and abdominal muscles are involved in a strong co-contraction with the spine supported and the muscles working in the range in which they are normally required to work. The patient places a pillow on the edge of a large table (or treatment couch in the practice) and lies with his hips level with the edge, holding onto the sides. He takes in a breath and holds it, lifting his feet from the ground for about 6 seconds, and lowers them, breathing out. This is repeated about ten times. Progression is in the number of times and degree of difficulty, which is increased by moving the pelvis further over the edge of the table.

To my knowledge few clinical trials using traction have been reported in the English literature ((8); (9)) and they tend to conclude that traction is not a very worthwhile technique. This is unfortunate, because when one reads how the trials were conducted, the techniques of traction used, the frequency of application and how other modalities were used in conjunction with the traction, there is much to be commented upon. Those of us who have been using traction, properly applied, for years know from our clinical results that it is a modality from which patients may benefit. Sometimes it is the only treatment to which a patient responds. Having used both methods I find they are all one needs to cope with any patient that comes along requiring traction.

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