

## EVALUATION OF THE EFFECTS OF DIFFERENT FORMS OF PHYSIOTHERAPY IN CERVICAL PAIN

Ian Goldie and Annah Landquist

*From the Departments of Orthopaedic Surgery and Physiotherapy, University of Göteborg, Sweden*

**ABSTRACT.** 73 patients suffering from cervical pain with irradiation into the upper extremity have been divided into 3 groups at random one receiving isometric muscle training, the second traction and the third no physiotherapy at all. The treatments were carried out during a period of 3 weeks. The referring physician examined all patients 6 weeks after the institution of treatment without knowing which of the patients had received treatment or not. The physiotherapist also made an independent examination. The results of both examiners correlated well. Follow-up with letter questionnaires has been carried out after 6 months. Improvement in mobility and pain has been the centre of interest. The differences between the groups are very small but a slight tendency can be traced for better results in the traction group.

Cervical pain with irradiation into either upper extremity offers therapeutic difficulties as the underlying cause remains uncertain. It is generally accepted that degenerative changes within the cervical spine contribute to the pain syndrome but on the other hand it is a common fact that severe pain can exist without any radiographic signs of degenerative disease (2, 4, 8, 9, 10, 12, 16, 17).

Certain observations indicate that there exists an association between limited mobility and spondylosis of the cervical spine. According to Frazer (8) the motion of one vertebral body on another is directly related to the height of the intervertebral disc. With the remodeling of a vertebra secondary to degeneration and thus decrease in height of the intervertebral disc it has been assumed on radiologic evidence that diminished motion of the spine ensues (6, 16).

The influence of increasing age on both spinal degeneration and mobility is regarded as a rather natural development and has been demonstrated frequently (2, 4, 11, 12, 13, 17, 18, 19).

Pain and decreased mobility thus based on de-

generative processes including a narrowing of the intervertebral spaces have been regarded as ideal for physiotherapy with special attention to active isometric exercises and traction manoeuvres. The value of physical training has been mentioned by Steinberg et al. (18) and the advantages of traction have been reported by Braaf (3), Bard (1) and Jackson (12). Still however, conclusive evidence is lacking that different physical methods have any greater effect on pain syndromes in the neck and the arm. In 1966 the British Association of Physical Medicine reported in a multicentre trial of the effects of physiotherapy that the rate of improvement was approximately the same in five treatment groups including cervical traction, comparable positioning without traction applied, instruction in posture for everyday activities, a temporary collar and placebo tablets.

As yet no reports have been encountered on the results of treating cervical pain with accepted physical methods like isometric exercises and traction. For this reason a study has been carried out with the object of recording the effects of these methods as compared to no treatment at all.

### SELECTION OF PATIENTS

In all, 73 patients have been studied. The distribution in age groups is seen in Fig. 1 and the distribution in sex in Table I. There is a slight inequality as regards the distribution of sex, but as this investigation is completely randomised this may account for the slight overrepresentation of females unless one wishes to accept the difference in hormonal pattern between the sexes as an explanation, which however may be a bit too speculative. Only such were selected who presented with cervical pain radiating down either of the upper extremities following a segmental pattern. Paraesthesiae were not a common finding and in no instance was paresis present. Spontaneous

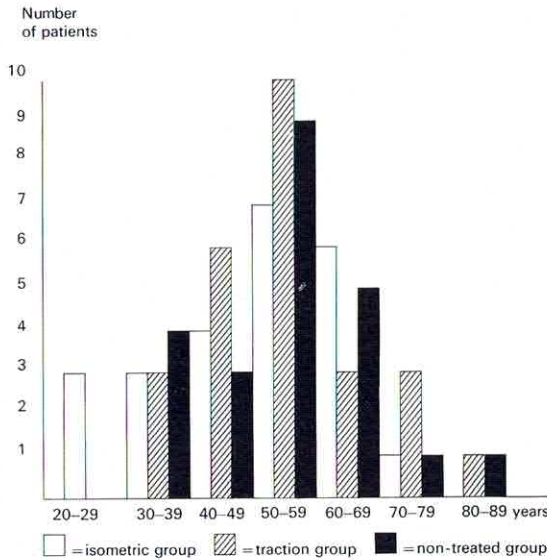


Fig. 1. Distribution of ages in investigated groups.

pain as well as painful movements which most often were limited were found in all patients. Patients with symptoms mimicking cervical conditions but of other origin as e.g. rotator-cuff lesions, carpal tunnel syndrome or rheumatoid arthritis or presenting abnormal neurological signs were excluded.

## METHOD

All patients were first seen in the Department of Orthopaedic surgery and examined by the orthopaedic surgeon. A detailed sick history was covered and a thorough clinical examination was carried out of the neck and the upper extremities including palpable pain, mobility and neurological status.

The assessment of neck movements was based on the conclusions reached in the BAPM report (1966) that restriction of movement was present if flexion < 70°, extension < 70°, rotation < 80° and lateral flexion < 50°.

X-ray films were taken of all patients in antero-posterior and lateral projections. These were read independently by two observers, one being a qualified radiologist. Special attention was paid to the height of the intervertebral disc space and apophysial joint degeneration.

After these examinations the patient was sent to the physiotherapist only with the diagnosis but without any ordination as to treatment to be pursued. At the Department of Physiotherapy the patients were divided into 3 groups according to their date of birth. Those born between the 1st and 10th of the month received isometric exercises, between 11th and 20th traction and between 21st and 31st no physiotherapy at all. This latter group has been selected as it was regarded of essential interest to follow the natural course of the ailment without the

interference any treatment may have on the disease or the influence of either physiotherapist or physician on the patient's general condition.

Before instituting treatment the physiotherapist made an evaluation of the neck movements. It was later found that the interobserver error in the respective examinations (physician and physiotherapist) was negligible.

The time of treatment extended just over 3 weeks with a sum of 10 treatments divided into 3 sessions per week each with 20 min effective therapy, which is a standard procedure.

In the isometric group the patients were treated in both a sitting and supine position. The different cervical movements have been exercised against the physiotherapist's gentle pressure to a maximum of the patients' ability under the pain threshold. After each treatment the patients have remained resting for 10 min in the supine position with a low pillow under their head. The patients have been advised not to carry any heavy objects; when resting to lie with a low pillow; not to make any rotation exercises of the head and to rest as much as possible.

In the traction group a Trutracc was used with the patient in the supine position and the head elevated about 20° from the underlying surface. The traction applied has been intermittent and lasted for 8 sec followed by 8 sec rest. The whole treatment lasted for 20 min thus giving the patients about 80 tractions. The force used was for men 30-40 pounds and for women 25-30 pounds. This regimen was followed as it has been accepted as the normal routine in most Swedish physiotherapy departments. Objectively tractions with different intensities have shown that a widening of the intervertebral space follows but so far the clinical results reported have not demonstrated any direct relationship between clinical condition and traction force used (1, 7). In accordance with the observations of Colachis et al. (7) intermittent traction has therefore been used. Each treatment was followed by 10 min rest. The same instructions were given for the traction group as for the isometric.

In the non-treated group instructions were only given. It was explained to the patients that a period of observation was desired before instituting physiotherapy.

It was believed that most patients would take analgesics whether prescribed or not and for this reason partakers in all groups were given a combined musclerelaxant and analgesic, orphenadine citrate and paracetamol (Norgesic®).

Follow-up was made 6 weeks after the institution of the treatment by both the physician and the physiotherapist the former being ignorant of what treatment group the patient belonged to. A letter enquiry 6 months after the treatment has been carried out.

Table I. Distribution of sex in treatment groups

Group	Men	Women	Total
Isometric	12	12	24
Traction	10	16	26
Non-treated	6	17	23
Total	28	45	73

## RESULTS

Most patients had suffered cervical pain for varying time before the actual condition which had brought them to the examination which resulted in this investigation.

In Table II the mean values in years for the different groups are demonstrated. There were very few patients with a shorter period than 1 year of symptoms before the acute onset. This as a rule had occurred 3–5 months before the commencement of this trial (Table III).

Despite the pain many patients experienced a surprising amount were not interested in leaving their work and the times for sick—leave as seen in Table IV are based on a little more than 50% of the entire group.

Degenerative disease as diagnosed by X-ray was a common finding as in Table V.

It was found at the first examination by the physician that besides the pain all patients experienced some limitation of movement in one or more qualities. For the whole group an impairment was found in flexion in 33/73 (45%), in extension in 34/73 (47%), in right rotation in 30/73 (41%), in left rotation in 31/73 (42%),

Table II. Duration of diffuse symptoms in years before exacerbation leading to treatment

Group	Men	Women
Isometric	5	5.7
Traction	6	5.5
Non-treated	3	5.9

Table III. Duration of intense symptoms in months prior to treatment

Group	Men	Women
Isometric	4.6	3.4
Traction	4.4	3
Non-treated	5.8	5.6

Table IV. Time for sick-leave in months

Group	Men	Women
Isometric	4.6	2.5
Traction	3.8	2.7
Non-treated	3	2

Table V. X-ray findings indicative of degenerative disease

Group	Men	Women
Isometric	7/12	10/12
Traction	10/10	14/16
Non-treated	4/6	14/17

Table VI. Physician's assessment of increase in joint range 6 weeks after treatment

Movement	Isometric	Traction	Non-treated
Flexion	10.5°	12.5°	5°
Extension	6°	8.5°	5°
Rotation			
Right	5.5°	8°	5°
Left	5°	6°	4°
Lateral extension			
Right	4.8°	6°	6.5°
Left	5°	6.5°	4.4°

Table VII. Physician's assessment of patients' condition at 6 weeks

	Isometric	Traction	Non-treated
Improved	11/24	18/26	11/23
Not improved	11/24	5/26	11/23
Worse	2/24	3/26	1/23

Table VIII. Patients' assessment at 6 weeks

	Isometric	Traction	Non-treated
Improved	17/24	17/26	7/23
Not improved	3/24	3/26	10/23
Worse	4/24	6/26	6/23

in right lateral extension in 24/73 (33%) and in left lateral extension in 28/73 (38%). As is seen in Table VI a general increase in joint range was noted in all groups with a very slight preponderance for the physically treated groups though statistically not significant.

For those patients who experienced a relief of symptoms this was as a rule noted after the second treatment. This permanent relief after the second treatment was noted in 8/17 of the traction group and in 6/17 of the isometric group. The assess-

ment by the physician after 6 weeks included an additional sickhistory covering the treatment period and an objective examination. The physician's impressions are summarized in Table VII. The letter enquiry after 6 months follows on the whole the results registered at 6 weeks.

The patients' own opinions which no doubt are of greatest value have been compiled in Table VIII.

### COMMENT

In this investigation no greater difference has been registered between the two groups receiving physiotherapy. Neither of the physical methods employed—*isometric exercise* or *traction*—has proved to be very much superior to the other though in the traction group a somewhat larger number had improved. This difference is however not statistically significant. This is totally in line with the results presented by the British Association of Physical Medicine 1966 who concluded as a result of their trial that physical treatment cannot influence the natural history of cervical pain with upper extremity radiation. With traction as compared to other sham treatments and placebo the BAPM reported that 75% had a complete relief of pain or getting better. Similar results were obtained by Lishman et al. (14) who found that 84% of 130 patients with pain in the neck and arm improved in 6 weeks.

It is, however, interesting to note in this investigation that the non treated group behaved only in a slightly different way. Improvement at 6 weeks as registered by the physician showed equal results to the *isometric* group. It was expected that these patients would be much worse off an indication of which can be traced in the patients' own opinion. The objective assessment which shows better results than the patients' own concept points to the fact that from a pathophysiological point of view it is difficult to realise how physical treatment influences a painful condition encountered in the neck and arm. No doubt relieving pressure from a nerve root as may e.g. occur in traction where a separation of facets and intervertebral discs has been demonstrated as long as the traction lasts may alleviate pain temporarily but often the nerve root itself is the site of changes which are pain provoking and which do not always subside to biomechanical therapeutic meas-

ures. A psychologic factor may be of some importance implying that the patients' feeling of being looked after in an expert way may help to alleviate a pain condition.

It was noted in this investigation that patients with severe, acute pain benefitted well from physiotherapy and this has been observed by others (4, 14, 18; BAPM, 1966). No preference for either treatment group could be detected. A slight tendency was seen also in the non treated group but the numbers are far too small to draw any definite conclusions. There was no statistical difference with the  $\chi^2$  test in a comparison of the results of the treated groups. The effective handling of the acute painful neck is still a problem which serves well for further extensive studies.

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*Key words:* Exercise therapy, pain, spine, traction

*Address for reprints:*

Ian Goldie  
Västra Frölunda Sjukvårdscentral,  
Marconigatan 31,  
421 44 Västra Frölunda