of too slight functional importance to warrant recommendation of muscle vibration as a standard type of therapy in spastic paralyses, but of course the results obtained in this study do not generally rule out this treatment as a physiotherapeutic tool. Unfortunately, the patients responding satisfactorily to vibration did not exhibit any special characteristics which would enable selection of those most likely to profit by this therapy. Our material consisted of patients with stationary lesions of cerebrovascular origin. In cases with recent lesions more satisfactory results may be achieved, although the therapeutic effects will be difficult to evaluate because of concomitant spontaneous regression. It is also conceivable that patients with other types of motor disturbances may respond more satisfactorily to vibration. Thus, for instance, very encouraging observations have been reported from screening tests performed on children with cerebral palsy (6). It will be of interest to get further information about those results as well as the outcome of the other investigations of vibration effects in routine therapeutic work now in progress at various rehabilitation clinics. Comparisons between results obtained by muscle vibration, the one hand, and by other methods used to facilitate activation of paralysed muscles, on the other hand, should also be of interest, since the data so far available are not sufficient for a critical assessment of the relative advantages of the different techniques.

ACKNOWLEDGEMENTS

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Key-words: Reflex Facilitation, Muscle Vibration, Treatment of Spastic Hemiplegia


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

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ABSTRACT. 73 patients suffering from cervical pain with irradiation into the upper extremity have been divided into 3 groups at random one receiving isometric exercise 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 Braf (5), 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, in traction 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 randomized this may account for the slight overrepresentation of females since one wishes to accept the differences 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 paralysis present. Sponaneous 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 Braf (5), 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, in traction 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.

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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, carpel 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 BAFM report (1966) that restriction of movement was present if fixation <70°, extension <70°, rotation <40° 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 apophyseal 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 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 mean 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 point of 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 traction 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 patient about 80 traction. The force used was an average 50-40 pounds and for women 25-30 pounds. This treatment was followed as it has been accepted as the normal routine in most Swedish physiotherapy depart- ment. Objectively traction 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 Carlsson et al. (7) intermittent traction has therefore been used. Each treatment was followed by 10 min rest. The same instructions were given to 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 observa- tion was desired before instituting physiotherapy.

It was believed that most patients would take analgesics whether prescribed or not and for this reason participants in all groups were given a combined muscle relaxant and analgesic, paracetamol 400 mg and paracetamol (Norgesc 400 mg). Follow-up was made 6 weeks after the initiation of the treatment by both the physician and the physiotherapist the former being ignorant of what treatment group the patient belonged to. A letter every 6 months after the treatment has been carried out.

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 commo- nacement 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 beside the pain all patients experienced some limitation of movement in one or more qualities. For the whole group an impair- ment 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 different symptoms in years before exacerbation leading to treatment

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

Table IV. Time for sick-leave in months

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.

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In Table II Duration of different symptoms in years before exacerbation leading to treatment

<table>
<thead>
<tr>
<th>Group</th>
<th>Men</th>
<th>Women</th>
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<tbody>
<tr>
<td>Isometric</td>
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<td>5.7</td>
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<tr>
<td>Traction</td>
<td>6</td>
<td>5.5</td>
</tr>
<tr>
<td>Non-treated</td>
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<td>5.9</td>
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Table III Duration of intense symptoms in months prior to treatment

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<th>Women</th>
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<tr>
<td>Traction</td>
<td>6.4</td>
<td>5.2</td>
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<td>Non-treated</td>
<td>5.8</td>
<td>5.6</td>
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Table IV Time for sick-leave in months

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<th>Women</th>
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<tr>
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<td>5.5</td>
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<tr>
<td>Traction</td>
<td>3.8</td>
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<td>Non-treated</td>
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TABLE V. X-ray findings indicative of degenerative disease

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<th>Group</th>
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</thead>
<tbody>
<tr>
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<td>Traction</td>
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<tr>
<td>Non-treated</td>
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<td>14/17</td>
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TABLE VI. Physician's assessment of increase in joint range 6 weeks after treatment

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<th>Movement</th>
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<th>Non-treated</th>
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</thead>
<tbody>
<tr>
<td>Flexion</td>
<td>10.5°</td>
<td>12.5°</td>
<td>5°</td>
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<tr>
<td>Extension</td>
<td>6°</td>
<td>8.5°</td>
<td>3°</td>
</tr>
<tr>
<td>Rotation Right</td>
<td>5°</td>
<td>8°</td>
<td>5°</td>
</tr>
<tr>
<td>Left</td>
<td>5°</td>
<td>6°</td>
<td>4°</td>
</tr>
<tr>
<td>Lateral Extension Right</td>
<td>4.8°</td>
<td>6°</td>
<td>4.5°</td>
</tr>
<tr>
<td>Left</td>
<td>3°</td>
<td>6.5°</td>
<td>4.5°</td>
</tr>
</tbody>
</table>

TABLE VII. Physician's assessment of patients' condition 6 weeks

Table VIII. Patients' assessment 6 weeks

<table>
<thead>
<tr>
<th>Isometric</th>
<th>Traction</th>
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<tbody>
<tr>
<td>Improved</td>
<td>11/24</td>
<td>10/26</td>
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<tr>
<td>Not improved</td>
<td>11/24</td>
<td>5/26</td>
</tr>
<tr>
<td>Worse</td>
<td>2/24</td>
<td>3/26</td>
</tr>
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</table>

TABLE IX. Patients' assessment 6 weeks

<table>
<thead>
<tr>
<th>Isometric</th>
<th>Traction</th>
<th>Non-treated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved</td>
<td>17/26</td>
<td>17/26</td>
</tr>
<tr>
<td>Not improved</td>
<td>3/24</td>
<td>3/26</td>
</tr>
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ment by the physician after 6 weeks included an additional sick history 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 BAfMM reported that 75% had a complete relief of pain or getting better. Similar results were obtained by Lishman et al. (4) who found that 94% 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 a pathophysiological point of view it is difficult to realize how physical treatment influences a painful condition encountered in the neck and arm. No doubt relieving pressure from a nerve root as may 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 measures.

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; BAfMM, 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 t-s 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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