

The role of physiotherapy in the management of acute neck sprains following road-traffic accidents

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SUMMARY

In acute whiplash injuries, early physiotherapy has been shown to reduce pain and increase cervical movement, but the cost-effectiveness of this treatment has been questioned. It is unclear whether the benefits result from manipulative physiotherapy or from the patient's ability to perform the accompanying home exercise programme when instructed about its importance. In a single blind prospective randomized trial 71 patients who received out-patient physiotherapy were shown to have significant improvement in severity of neck pain ($P < 0.01$) and cervical movement ($P < 0.01$) at 1 and 2 months post-injury when compared with 33 patients who received analgesia and a cervical collar. Sixty-six patients who were offered comprehensive advice for home mobilization by a physiotherapist showed a similar improvement. There appears to be no difference in effectiveness between outpatient physiotherapy and home mobilization.

INTRODUCTION

The introduction of the compulsory use of seat-belts has been associated with an increase in the incidence of acute neck sprains (Rutherford *et al.*, 1978). Sixty-two per cent of vehicle-occupant road-traffic accident victims develop neck pain after their accident (Deans *et al.*, 1987), and many develop protracted symptoms which may persist beyond the settlement of litigation (Gotten, 1956). The use of cervical collars in such patients, although the mainstay of treatment (McNab, 1971) appears to confer little benefit (British Association of Physical Medicine, 1966). More recently it has been shown that active early mobilization is effective in improving mobility and reducing pain in the early post injury phase (Mealey *et al.*, 1986). Despite attempts to find prognostic factors in the initial presenting symptoms and signs (Norris & Watt, 1983), it

remains unclear whether the benefits of physiotherapy are universal and should be offered to all new patients. In Belfast's Royal Victoria Hospital, Accident and Emergency Department, 0.5% of all new patients attend for treatment of acute neck sprains following road-traffic accidents. Treatment of all such patients with early physiotherapy would be a heavy burden on a limited service. Recently, doubt has been cast upon whether the beneficial effect conferred by physiotherapy is due to the relatively cost-effective home exercise programme instructed by physiotherapists, or to manipulative physiotherapy itself (Huston, 1988). This study was designed to clarify the point by comparing the outcome for patients treated by out-patient physiotherapy, self-mobilization instructions given by a physiotherapist, and with rest and simple analgesia alone.

METHODS

With the approval of the Hospital Ethics Committee, 247 consecutive patients attending the Accident and Emergency Department of the Royal Victoria Hospital, Belfast, within 72 h of an acute flexion-extension neck sprain ('whiplash') were referred to the study. Having obtained informed consent, patients were entered into a single blind prospective randomized trial, and were studied over a 3-month period. The criteria for exclusion were:

- (1) serious cervical injury (fracture or dislocation);
- (2) previously symptomatic degenerative disease; and
- (3) previous whiplash injury.

Cervical spine radiography was performed on all patients. Cervical range of movement and intensity of neck pain were assessed. Each patient was fitted with a soft cervical collar and was given standard analgesia (Co-dydramol tab 500 mg ii, 6-hourly). Patients were then randomized to one of three treatment groups by sealed envelope:

Group 1. Rest and analgesia.

Group 2. Active out-patient physiotherapy.

Group 3. Mobilization advice.

Group 1

Patients allocated to this group were given general advice about mobilization after an initial rest period of 10–14 days.

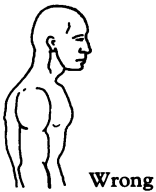
Group 2

Those assigned to active physiotherapy were assessed by a physiotherapist (MR) and a detailed programme of out-patient physiotherapy was customized to their specific requirements. The full gamut of physiotherapeutic aids was available as deemed appropriate. Typically each patient was allocated three 40-min sessions per week for 6 weeks, and received a combination of hot and cold applications, short-wave diathermy,

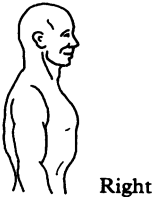
hydrotherapy, traction and active and passive repetitive movements using the principles of McKenzie & Maitland. They were instructed about posture and exercises to perform at home. It was envisaged that this would reflect the normal practice in a general hospital physiotherapy department, and would conform to the treatment generally available to most accident and emergency departments for such patients.

Group 3

Patients assigned to the advice group were assessed by the physiotherapist, and were given verbal and reinforcing written instruction (Fig. 1) on posture correction, the use of analgesia and their collar, and instructions on the use of heat sources and muscle relaxation. Patients were encouraged to perform mobilizing exercises which were also demonstrated. This instruction session by the physiotherapist typically lasted 30 min.



Remember **POSTURE** when sitting, driving, reading and standing. Bad posture will delay your recovery. Avoid slouching forwards with your chin sticking out. Keep your back straight and your shoulders braced. A good exercise is to draw yourself up straight with your chin tucked in, repeatedly ten times every hour.



Getting the movements back is very important. Here are some more exercises to help you. **FIRST** straighten up — then try to touch each ear down onto your shoulder. Straighten up again — now try looking round over each shoulder in turn.

Your exercises will be painful initially but will not harm your neck. You can repeat the exercise as often as you like. The more the better. Try to stretch your neck more each day.



AVOID excessive reliance on a collar . . . it will encourage bad posture and delay mobilization. You will not harm your neck or delay recovery by not wearing your collar. It should only be worn for short periods at a time, or reserve it for night time use. **DISCOMFORT** in your neck will gradually settle, but may be improved by local heat application—use a hot water bottle, heated towel, heat lamp or warming linament.

The pain killing tablets that you have been given can be used to supplement this.



In **BED** . . . don't use too many pillows. Keep your neck supported either with the collar, or by making a firm roll (using a rolled up hand towel) placed inside the bottom edge of your pillow case. If possible sleep on your side or your back not on your face.

In the morning start the day with your exercises to relieve any stiffness in your neck.

Fig. 1 Patient advice sheet.

Emphasis was placed on maintaining a good range of neck movements and on correcting posture, even if this initially caused some increase in discomfort. The physiotherapist checked that the prescribed collar was correctly fitted and patients were told that use of the collar should be restricted to very short periods in situations where their neck was vulnerable to sudden jolting. If a collar was worn the patient was instructed that the exercise programme should be performed immediately afterwards.

All patients reattended a neck review clinic at monthly intervals. The examining doctor was unaware of which treatment group the patient belonged to. Information was collected about the circumstances of the collision, perceived blame and the presence of impending legal action. Range of cervical movement in the three cardinal directions was assessed with a goniometer, and mean lateral flexion was calculated. Reduction in lateral flexion appears to correlate well with reduction in other neck movements, and is easy to measure accurately with a standard goniometer. Assessment of pain was performed using a standard 10-cm 10-point visual analogue scale with standard instructions for its use (Fig. 2) (Scott & Huskisson, 1976). A numerical pain score was thus obtained.

Cervical movement was assessed by parametric statistical analysis using independent sample *t*-tests for differences between the groups, and paired *t*-tests for differences within the groups. Pain scores were assessed statistically using Mann-Whitney *U*-tests for differences between groups and Wilcoxon signed rank tests for differences within groups; these being non-parametric analyses.

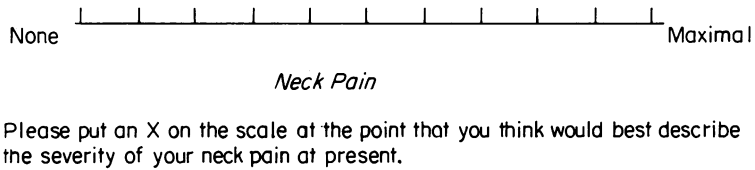


Fig. 2 Visual analogue scale.

RESULTS

Of the initial 247 patients who were entered in the study, 170 reattended for review at 1 and 2 months post-injury, and their outcome is analysed. The 77 patients who are not included failed to attend for review. Ninety per cent of these failed to attend for their first review, the remainder on subsequent occasions. Of these, four had a full range of movement when last seen and are presumed to have settled. The failed attendances are distributed evenly amongst the three groups and do not differ significantly in age, sex or initial severity of clinical signs from those who attended. Non-attenders were contacted by telephone or letter on at least three occasions before being discounted.

Our information about proposed litigation is incomplete and appears inaccurate, as several of those who stated that litigation was not being considered were subsequently found to have instructed a solicitor. No analysis has been attempted on the effect of litigation.

During the study it was felt that simple instruction about effective mobilization could not reasonably be withheld, and because of this ethical objection to the rest/analgesia

limb it was discontinued before the conclusion of the trial; thus the numbers in this group are smaller. Seventy-one patients were allocated to the physiotherapy group and 66 to the advice group. Thirty-three patients belonged to the rest/analgesia group. The three groups were similar initially in age and sex distribution and in delay time prior to initial attendance. Fifty-two per cent of the analysed patients were male, with mean age of 30.65 years (standard deviation 10.78)

Table 1 Age distribution

	Physiotherapy	Advice	Rest	
<i>n</i>	71	66	33	(170)
Mean age	31.6 (11.3)*	30.2 (11.3)*	28.7 (8.9)*	(30.6)

*(standard deviation)

Initial mean lateral flexion was similar for all three treatment groups, but at one month post-injury both the physiotherapy and advice groups had made a significant improvement ($P < 0.01$), whereas the rest group had not. There was no difference between the improvement gained by the physiotherapy and advice groups ($P = 0.81$). At 2 months post-injury there was no significant difference between mean lateral flexion in the physiotherapy and advice groups, and both had improved significantly when compared with the previous month ($P < 0.01$), and with the current range of movement of the rest group ($P < 0.01$).

Table 2 Neck movement (mean lateral flexion) degrees

<i>n</i>	Physiotherapy 71	Advice 66	Rest 33
Initial ROM	45.6 (18.5)*	47.3 (20.7)*	44.4 (14.7)*
1 month	53.3 (20.3)*	54.1 (19.7)*	41.8 (18.9)*
2 months	64.0 (12.9)*	64.1 (12.7)*	55.1 (14.8)*

*(standard deviation)

Pain severity scores were initially similar for all three groups. At one month post-injury there was no difference between the physiotherapy and advice groups, but both groups were significantly better than the rest group ($P < 0.01$), which had shown no improvement over this period. There was a similar significant improvement in the

Table 3 Neck pain severity (median pain score)

<i>n</i>	Physiotherapy 71	Advice 66	Rest 33
Initial pain	5.32	5.3	5.6
1 month	3.28	3.37	4.97
2 months	1.94	1.82	3.0

actively treated groups over the following month, both of which were still comparable. A significant improvement had also occurred in the rest group, but the difference between this and the other groups was still significant ($P < 0.01$).

DISCUSSION

As has been shown previously (Mealey *et al.*, 1986), physiotherapy appears to be effective in improving cervical movement and reducing pain severity in the early post-injury period. However, the benefit obtained when assessed by cervical movement or neck discomfort, is no better than that obtainable with good advice about posture and mobilization exercises, supplemented where appropriate by written instruction. The improvement obtained in neck movement, compared to conventional treatment with rest and analgesia is approximately 10° of lateral flexion, or a reduction of neck pain of approximately 10–15%. The recovery of those who are advised to rest will lag behind those mobilized early by approximately 1 month. The beneficial effect, in addition to being statistically significant is clinically evident. Were all new patients to be given physiotherapy, it has been calculated that in our hospital, under normal conditions each would receive approximately 10 h in the physiotherapy department over a 4–6-week period. With approximately 350 new patients per year the total physiotherapy time involved (3500 h) is equivalent to an additional requirement of two full-time physiotherapists. Providing advice and encouragement for self-help in mobilizing after an acute neck sprain, may allow physiotherapists to devote more time to specific problem patients with severe injury, rather than being swamped by a mass of patients with relatively minor and largely self-limiting injuries.

Efforts were made to contact the non-attenders, and they were only discounted after three letters or telephone calls had produced no effect. We felt that non-attenders were also more likely to have failed to follow their treatment programme, and that more strenuous efforts towards their re-inclusion in the study would thus corrupt our data. However, it is possible that the reasons for non-attendance were different between the groups—for example adequate recovery in one group and dissatisfaction and continuing symptoms in another. However, this would only serve to heighten the difference between those who are actively treated and those who are not.

We conclude that good advice and tailored practical instruction on early mobilization, when given by a suitably experienced physiotherapist, is as effective as out-patient physiotherapy in reducing pain and increasing mobility and would recommend this as an ideal alternative in the management of the increasing number of patients with acute neck sprains, within the constraints of limited physiotherapy resources.

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