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## The natural history of trunk list, its associated disability and the influence of McKenzie management

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**Abstract** Lumbosacral list is a clinical sign that is frequently associated with low back pain and intervertebral disc lesions. This study examines the influence of McKenzie management on the natural history of trunk list. Patients with trunk list and low back pain were randomised into two groups: a control group receiving non-specific back massage and general back care advice, and a group treated according to the McKenzie protocol. Trunk list was measured over a period of 90 days and patients completed Oswestry Disability Questionnaires. There was a significantly greater resolution of list after 90 days

in the group receiving McKenzie treatment compared to the control group. There was poor correlation between list magnitude and Oswestry scores. These data support previous observations that trunk list is not necessarily related to the degree of physical disability. The McKenzie method of assessment and treatment may assist in the resolution of trunk list, but it was ineffective in improving clinical condition.

**Key words** Low back pain · Lumbosacral list · Oswestry Disability Questionnaire · McKenzie physical therapy

### Introduction

Lumbosacral list or trunk list is an important clinical sign often observed in patients presenting with low back pain (LBP). In contrast to patients with structural lumbar scoliosis, this trunk list is a temporary lateral deviation of the lumbar spine which is characteristically gravity induced. It can be abolished by lying down or hanging from a bar. It is thought to be related, at least in a subgroup of patients, to a symptomatic disc protrusion [4, 7, 8]. However, its natural history and its relationship to the time course of pain and dysfunction has not been evaluated.

The efficacy of exercise regimes such as the McKenzie regime in the management of LBP requires more rigorous examination [2]. In this study we have attempted to examine the ability of McKenzie diagnosis and management [1, 5] to correct list, by comparing patients receiving this management programme with a group receiving standard back care advice. Trunk list was measured using a plumbline

and was defined as the lateral deviation in millimetres (mm) of the spinous process of T12 relative to S1. Our previous studies indicated that, using the plumbline technique, trunk list could be measured to within 5 mm [6].

### Materials and methods

#### Recruitment

Patients with an acute episode of LBP (less than 12 weeks duration) and a lateral shift of the lumbosacral spine were recruited into the study. Patients with chronic back pain or previous spinal surgery and those who needed immediate surgical intervention (e.g. failure to respond to 6 weeks of conservative management) were excluded. All trial patients were recruited over an 18-month period from patients referred by their general practitioner to the orthopaedic outpatient clinic at Aberdeen Royal Hospitals Trust, Aberdeen Royal Infirmary for a specialist opinion, or to Aberdeen Royal Hospitals Trust, Woolmanhill Hospital for outpatient physiotherapy.

## Randomisation

Having given written consent, patients received physical and neurological examinations. Patients were stratified according to their duration of symptoms (< 7 days, 7–41 days and 42–84 days) and randomly allocated, using a list of random numbers, to one of two groups for management.

## Interventions

The first group received no physical intervention except non-specific back massage and standard back care advice. The second group received McKenzie management from a physiotherapist (JCR) holding the McKenzie diploma in mechanical diagnosis and therapy. Both groups were treated by the same therapist (JCR) using a standard protocol, and attended two to three times during the 1st week and thereafter at the discretion of the therapist.

An independent observer (MGCG) assessed the patients initially by measuring trunk list with a plumbline and straight leg raising (SLR) using a Rippstein fluid-filled goniometer. All patients completed Oswestry Disability Questionnaires [3].

## Outcome measures

Trunk list and SLR were assessed blindly by the independent examiner on day 1, prior to randomisation, and subsequently after 7, 14, 28 and 90 days. The Oswestry Disability Questionnaire was completed on days 1, 28 and 90.

Although the outcome assessor was blind to the management status of the patients, it was not possible to blind the treatment provider. Although patients would generally be unaware of the nature of the management programmes utilised in the study, blinding of patients was not possible.

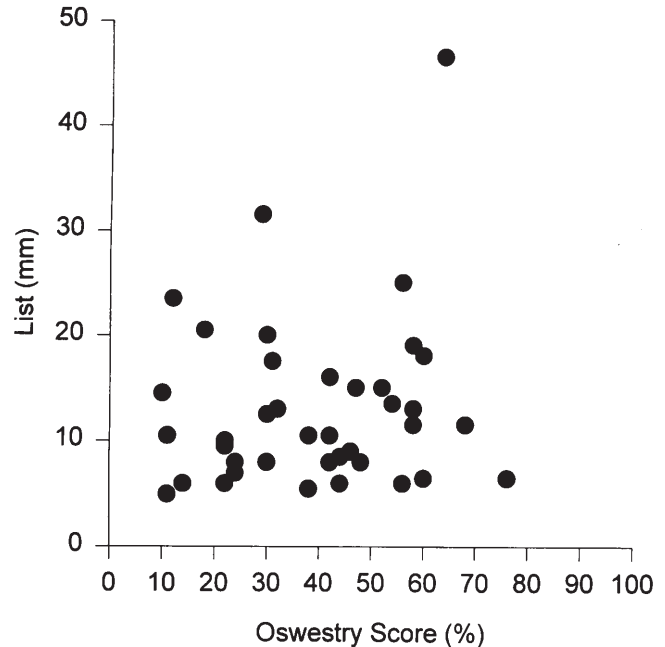
## Statistical analysis

Students *t*-test analysis was used to compare Oswestry Disability Scores for each group of patients over the 90-day study and the Fischer Exact test to compare the restricted SLR and the presence of leg pain radiating below the knee in both groups.

## Results

Forty patients with trunk list ranging from 5 to 50 mm were assessed for recruitment into the trial. When trunk list was compared with the Oswestry score on day 1 (Fig. 1) there was a poor correlation between the magnitude of the trunk list and the Oswestry score. Twenty-two patients had back pain only, whilst 18 had pain radiating to the thigh or lower leg. Twelve had restricted SLR (<50°) and of these only eight had leg pain.

Twenty-five patients completed the trial and were available for the final assessment at day 90. The numbers of patients completing various stages of the trial are shown in Fig. 2. Over the 90-day follow up period a total of five patients (one in the control group and four in the McKenzie group) were withdrawn from the trial for clinical reasons, one elderly patient died, and another returned overseas. The remainder failed to attend their outpatient appointments.

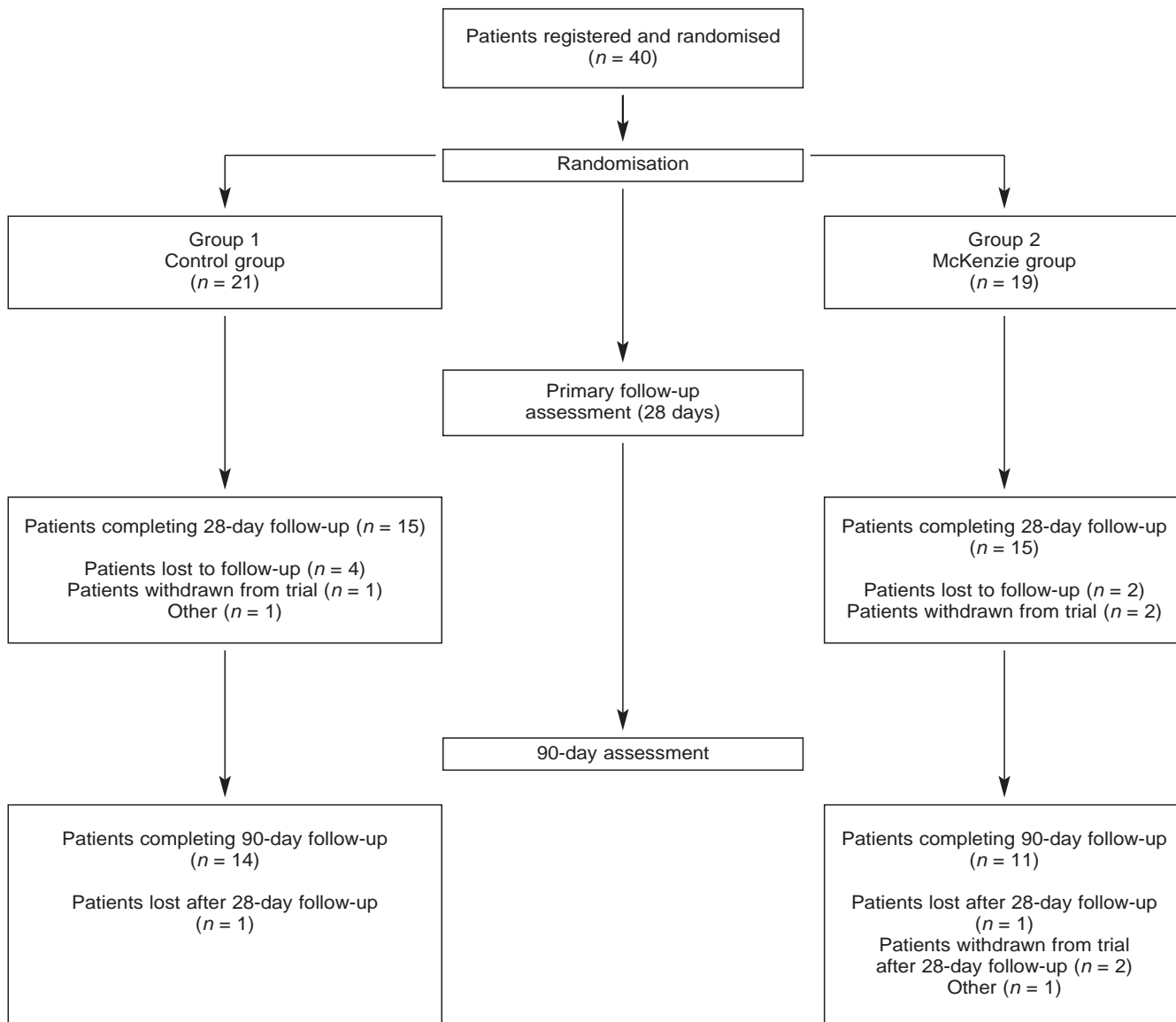


**Fig. 1** Scatter plot of trunk list measurement (mm) against Oswestry score (%) for 40 patients. Coefficient of correlation,  $R^2$ , = 0.0134

There were 14 patients in group 1 (control) (8 men, aged 29–58 years and 6 women, aged 32–53 years) and 11 patients in group 2 (McKenzie) (4 men, aged 29–55 years and 7 women, aged 26–53 years). There was no significant difference in the degree of list or in the Oswestry Disability scores at the start of the study (day 1) of patients who completed the 90-day assessment and those who failed to complete 90-day assessment. At the start of the study there was no significant difference between the two groups in terms of restricted SLR ( $P = 0.41$ ; Fischer analysis). On day 1, 3 patients out of 11 in group 2 (McKenzie) had restricted SLR, but none had leg pain radiating below the knee. In group 1 (control) 7 of the 14 patients had restricted SLR and 3 of these patients also had leg pain radiating below the knee.

After 28 days, trunk list had resolved in 50% of group 1 (control) and in 64% of group 2 (McKenzie) (not significant). After 90 days, 8 of the 25 patients (32%) still had a trunk list. Resolution was significantly higher in group 2 (McKenzie), at 91%, than in group 1 (control), at 50% (Table 1). There was no association between the ages of the patients nor their history of back pain in resolved and non-resolved lists. In group 2 (McKenzie), one patient had restricted SLR on day 90 although their list had resolved. In group 1 (control), two patients with residual list at 90 days had restricted SLR and leg pain.

For both groups the Oswestry Disability scores were significantly lower after 28 and 90 days. There was no significant difference in the mean Oswestry score between those patients whose list had resolved and those



**Fig. 2** Profile of trial participants over a 90-day assessment period

**Table 1** Resolution of trunk list after 90 days

	Number of patients with trunk list (> 5 mm)	
	Day 1	Day 90
Group 1 (control)	14	7
Group 2 (McKenzie)	11	1*

\* Resolution in McKenzie group significantly different from control group as determined by the Fischer Exact test ( $P = 0.04$ )

whose list had not resolved at 90 days. Similarly there was no significant difference between group 1 and group 2 at 90 days (Table 2).

**Table 2** Oswestry disability scores (%) over 90 days

	Oswestry score (%)		
	Day 1	Day 28	Day 90
Group 1 (control) (n = 14)	38 (20)	17 (12)	10 (12)
Group 2 (McKenzie) (n = 11)	43 (15)	19 (15)	15 (12)

**Discussion**

This is the first study of which we are aware that has examined the natural history of trunk list and the ability of treatment to influence it. We recruited patients who had a short history of acute back pain and who had been un-

aware of any previous deformity. Unequal leg length was excluded by clinical assessment and lumbar lateral deviation due to unilateral disc degeneration and structural scoliosis by reference to pre-study radiographs. We consider that, in the majority if not all of our patients, the list was a new phenomenon associated with the onset of back pain. Trunk list did not appear to be correlated with the presence of sciatic root tension. Of the 40 patients with trunk list assessed at the start of the study, only 45% had leg pain and 30% had restricted SLR.

Trunk list is generally believed to be associated with disc protrusion, although many patients with a protrusion do not have a list [7]. The data collected from this small group of patients suggests that the presence of trunk list is not necessarily related to the degree of physical disability, there being a poor correlation between the degree of trunk list and the Oswestry score. In addition, after 28 and 90 days the mean Oswestry scores in patients with and without resolution of trunk list were not significantly different. Thus, McKenzie treatment does not appear to be effective in improving clinical condition. Since only two of the seven patients with unresolved lists at day 90 in group 1 (control) had restricted SLR ( $< 50^\circ$ ) and leg pain radiating below the knee, it seems unlikely that the poorer resolution of the list in these patients could be related to the presence of radicular syndrome.

It is not certain whether patients with a residual list at 90 days still had a temporary displacement of the lumbar spine or whether this would remain as a permanent structural scoliosis. However, our data show that list can remain when disability has resolved.

Only 63% of the recruited patients were available for assessment at 90 days, and we appreciate that this high loss to follow-up in both groups undermines the overall validity of our data. A worst-case analysis would show no significant difference between the two groups. Nevertheless, in 91% of the patients treated with the McKenzie regime, trunk list had resolved at 90 days. Although the results of those who were seen at 90 days might suggest that McKenzie treatment is effective in treating trunk list, the high loss to follow-up and the worst-case scenario do not support this conclusion. It would require a larger study and better compliance to show that McKenzie treatment was effective [2]. In addition, although one might expect McKenzie treatment to be most effective in the early phase rather than at 90 days, this regime is a self-treatment programme with potential long-term advantages.

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