



Original article

## A new sign of inappropriate lower back pain

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**The treatment of lower back pain constitutes a major problem for orthopaedic surgeons. Identifying the patients who have a non-organic component to their lower back pain is often difficult. Waddell *et al.* (Waddell G, McCulloch HA, Kummel E, Venner RM. Non-organic physical signs in low-back pain. *Spine* 1980; 5: 117–25) devised a set of five physical signs to assist in determining this. These signs are time consuming and can be difficult to interpret. We have developed a sign that is simple, quick and easy to perform. In a set of 94 patients, we have compared our sign with Waddell's signs. Our sign has a highly significant correlation with Waddell's signs ( $\chi^2 = 55.093$ ,  $P < 0.001$ ), and thus we would suggest it as an accurate alternative to Waddell's signs.**

*Key words:* Lower back pain – Waddell – Heel-tap test

Lower back pain is common with a life-time cumulative incidence approaching 70% by the age of 40 years, and a 1-year prevalence of 15% for 30–40-year-old men and women.<sup>1</sup> It is difficult to treat, with less than 50% of those disabled for greater than 6 months and almost none of those disabled for more than 2 years returning to work.<sup>2</sup> The treatment of lower back pain is expensive costing in excess of \$50 billion dollars annually in the US alone.<sup>3</sup> The number of disability claims due to lower back pain is rising in both the US and Great Britain.

Distinguishing between the patients who have a substantial non-organic component to their lower back pain and those who do not is often difficult. Based on the systematic observation of 350 patients, Waddell *et al.*<sup>4</sup> devised a set of physical signs to do this. These consisted of 5 signs: (i) over-reaction to the examination; (ii) widespread superficial tenderness not corresponding to any anatomical distribution; (iii) pain on axial loading of the skull or pain on rotation of the shoulders and pelvis

together; (iv) severely limited straight leg raising on formal testing in a patient who can sit forwards with the legs extended; and (v) lower limb weakness or sensory loss not corresponding to a nerve root distribution. Three or more positive signs are strongly suggestive of a non-organic component to the lower back pain. Hirsch *et al.*<sup>5</sup> demonstrated that patients with high Waddell scores performed poorly when lumbar function was measured using the Isostatin B-200 Lumbar Dynamometer. These patients also had low self-esteem as measured by the Coopersmith Self-Esteem Inventory.<sup>5</sup> A significant correlation has been established, in men, between high Waddell scores and Minnesota Multiphasic Personality Inventory scales one (hypochondriasis) and three (hysteria).<sup>6</sup>

Although Waddell's signs have proved to be valuable, they have two drawbacks – they can be time consuming and are sometimes equivocal. We have devised a simple, quick and easy to perform sign that correlates with Waddell's inappropriate signs.

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Table 1 Waddell's signs and heel-tap test in patients complaining of lower back pain

| Waddell's signs | Patients (n) | Heel-tap test positive | Heel-tap test negative |
|-----------------|--------------|------------------------|------------------------|
| 0 positive      | 22           | 1                      | 21                     |
| 1 positive      | 3            | 0                      | 3                      |
| 2 positive      | 2            | 0                      | 2                      |
| 3 positive      | 0            | 0                      | 0                      |
| 4 positive      | 1            | 1                      | 0                      |
| 5 positive      | 31           | 31                     | 0                      |

### Patients and Methods

The patient sits on the examination couch with his hips and knees flexed to 90°. After suggesting that the test may cause lower back pain, the examiner lightly taps the patient's heel with the base of his hand. If the patient complains of sudden lower back pain, the test is considered to be positive. We have named this sign the heel-tap test.

The heel-tap test and Waddell's signs were performed on all adult patients presenting for the first time with lower back pain. They were also performed on a sample of adult patients with no history of back pain in the previous 12 months. The tests were performed independently by four of the authors. AB examined 30 patients, AT examined 24, BO examined 12 and ES examined 28 patients.

### Results

A total of 94 patients were tested; 39 were male and 55 were female. Their ages ranged from 22–65 years. Of the patients examined, 59 had back pain and 35 did not. Of the patients with back pain, 15 had demonstrable pathology and 9 patients presented with acute onset of sciatica. All the patients who had no back pain in the past year were negative for the heel-tap test and all of Waddell's signs. The results from the patients complaining of lower back pain ( $n = 59$ ) are shown in Table 1. Of the 22 patients (95%) with no positive Waddell signs, 21 also had a negative heel-tap test, and all patients (32 out of 32) with at least 3 positive Waddell signs,

also had a positive heel-tap test.

Analysing these data with the  $\chi^2$  test ( $\chi^2 55.093$ ,  $P < 0.001$ ), there is a highly significant association between the heel-tap test and Waddell's signs.

### Discussion

There is a degree of bias in that the same examiner performed both the heel-tap test and Waddell's signs on each patient. However, all four examiners independently found similar results in their cohorts of patients. The heel-tap test has a highly significant correlation with Waddell's signs,<sup>4</sup> which in turn have been validated against recognised psychiatric tests.<sup>5,6</sup> The heel-tap test is much simpler, quicker and easier to perform than Waddell's signs. We would suggest the heel-tap test as an accurate alternative to Waddell's signs. We do not suggest that either the heel-tap test or Waddell's signs be used as an arbiter of whether the patient is malingering or not, but merely as an indicator that the patient has a non-organic component to their pain. We stress that non-organic and organic pathology often occur simultaneously. We would suggest that patients who are positive for the heel-tap test should undergo further evaluation specifically looking for non-organic pathology.

### References

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