Does the evidence for spinal manipulation translate into better outcomes in routine clinical care for patients with occupational low back pain: a case-control study

Fritz J M, Brennan G P, Leaman H

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
The authors studied thrust manipulation, defined as a high-velocity thrust procedure, for low-back pain (LBP). They compared this health technology with non-thrust manipulation and no manipulation.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients with LBP of less than 16 days’ duration and no symptoms distal to the knee. Patients were excluded if they were aged over 60 years, had a history of surgery to the lumbar spine, had signs of nerve root compression on examination, had a baseline Oswestry (OSW) score of less than 20%, or were pregnant. These criteria defined a sub-group of patients likely to benefit from thrust therapy.

Setting
The setting was tertiary care. The economic study was carried out in the USA.

Dates to which data relate
The effectiveness and resource use data were collated between 1 January 2004 and 31 December 2004. A price year was not reported.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was carried out retrospectively on the same sample of patients as that used in the effectiveness study.

Study sample
The authors carried out power calculations retrospectively. They reported that the sample had at least 80% power to detect the minimum clinically important differences for the outcome measures used. The sample was selected by applying the inclusion and exclusion criteria to all patients treated at any of 10 outpatient physical therapy clinics of Intermountain Health Care (IHC). A total of 215 patients met the criteria, of whom 107 (71% male) received thrust manipulation, 36 (75.0% male) received non-thrust manipulation and 72 (59.7% male) received no manipulation. The
average age of the patients was 35.2 years in the thrust manipulation group, 39.2 years in the non-thrust manipulation group and 35.4 years in the no manipulation group, and prior LBP history was 40.7% (thrust), 27.8% (non-thrust) and 40.3% (no manipulation), respectively.

Study design
The authors designed a retrospective cohort study with groups defined by their exposure to either thrust manipulation, non-thrust manipulation or no manipulation. The study was based at 10 outpatient physical therapy clinics of the IHC, Salt Lake City. Patients were identified using the IHC Rehabilitation Division Rehab Outcomes Management Systems (ROMS), an electronic database storing baseline and follow-up data for patients. The patients were followed for the duration of their visits to the therapist. No loss to follow-up was reported.

Analysis of effectiveness
The analysis was based on the treatment received by the patient, in accordance with the study design. The primary health outcomes were baseline and change in Oswestry Disability Index score, and baseline and change pain scores. Pain was rated from 0 (no pain) to 10 (worst imaginable pain). The authors reported that there were no statistically significant differences between patients who did or did not receive manipulation therapy. However, there were statistically significant differences between patients who received thrust manipulation and those who received non-thrust manipulation. Patients receiving thrust manipulation were younger (mean difference 4.0 years, 95% confidence interval, CI: 0.30 to 7.7; p=0.03) and had lower baseline OSW scores (mean difference 7.1 points, 95% CI: 1.4 to 12.9; p=0.02).

Effectiveness results
Patients receiving manipulation experienced greater improvements in pain (mean difference 0.87, 95% CI: 0.21 to 1.5; p=0.01) and disability (mean OSW difference 6.4 points, 95% CI: 1.7 to 11.1; p=0.008).

No significant differences in outcomes were found between patients in the thrust and non-thrust treatment groups.

Clinical conclusions
The authors concluded that they found comparable clinical outcomes between patients receiving thrust and non-thrust manipulation, but found statistical differences between those who received some form of manipulation and those that did not.

Measure of benefits used in the economic analysis
The authors did not estimate a summary measure of health outcome. The study was therefore categorised as a cost-consequences analysis.

Direct costs
The authors did not aim to carry out a full cost-effectiveness analysis. Instead they aimed to observe the resource use associated with thrust therapy, encompassing the number of therapy sessions, length of stay and the cost of physical therapy during the clinical study. Resource use was taken from the ROMS database. Although the perspective of the study was unclear, the costing appears to have been carried out from the perspective of the third-party payer and was informed by charges billed to the patients’ worker compensation provider. The costs and the quantities were reported separately. Discounting was not needed because of the short time horizon of the study. A price year was not reported.

Statistical analysis of costs
Resource use and cost data were compared using t-tests and Mann-Whitney U-tests for normal and skewed distributions, respectively. A significance level of 0.05 was used for all tests.
Indirect Costs
Indirect costs were not relevant to the perspective adopted and were not estimated. The authors acknowledged that this was a limitation of the study, as lost productivity might have increased the cost-difference between treatment regimens.

Currency
US dollars ($).

Sensitivity analysis
The authors did not report that sensitivity analyses were carried out.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
Patients who received manipulation had a shorter stay in physical therapy (median length of stay 12 days versus 17 days; \( p=0.02 \)).

There were no differences between those receiving manipulation and no manipulation with respect to the number of visits or the cost of physical therapy.

Patients receiving thrust manipulation had significantly fewer therapy sessions (median number of sessions 4 versus 5; \( p=0.04 \)). They also had a shorter length of stay in physical therapy (median stay 10 days versus 15 days; \( p=0.02 \)) and lower costs in physical therapy (median cost $586.63 versus $753.99; \( p=0.03 \)).

Synthesis of costs and benefits
Not relevant.

Authors' conclusions
"Thrust manipulation may improve outcomes and efficiency of care" for the study population, that is, patients younger than 60 years with symptoms for less than 16 days, with no symptoms distal to the knee or signs of nerve root compression.

CRD COMMENTARY - Selection of comparators
The authors compared thrust manipulation, the technology of interest, with non-thrust manipulation and no manipulation. These alternatives seem exhaustive, although readers may wish to explore other alternatives available in their own setting. The authors justified the choice of alternatives with a discussion of the available treatments and the very slow uptake of thrust manipulation, despite supporting evidence.

Validity of estimate of measure of effectiveness
The authors designed a retrospective cohort study. This design was ideal for the objectives set in examining the evidence supporting thrust manipulation for a sub-group of patients defined as being likely to benefit from thrust manipulation. The study took patients treated in a real world situation, with all their potentially confounding factors, and made no attempt to randomise patients, exactly as would happen in any real world situation. However, the authors acknowledged that they could not exclude the influence of other factors in creating the observed differences between groups. The study sample was representative of the study population and the patients were shown to be comparable at analysis. Statistical analyses were used to establish differences in treatment outcomes, thus providing confidence in the results reported.
Validity of estimate of measure of benefit
The authors did not estimate a summary measure of health benefit. The study was therefore categorised as a cost-consequences analysis.

Validity of estimate of costs
The authors did not aim to carry out a full cost-effectiveness analysis. They aimed to estimate the broad costs associated with resources use for treatment, and the analysis carried out reflected this aim. The costs were estimated from the perspective of the third-party payer. Charges may not represent the true opportunity costs of the resources used, but this is appropriate given the study objective and perspective. The authors provided a breakdown of resource use; the analysis may have been improved by reporting the unit costs separately. The costs were left undiscounted as all costs in the base-case were incurred during less than one year. The price year was not reported, which will hinder any future inflation exercises.

Other issues
The lack of similar studies meant that the authors were not able to draw comparisons with their results. The issue of generalisability to other settings was addressed, with the authors acknowledging that the characteristics and outcomes of those with occupational LBP may differ from those with LBP in the general population and, therefore, that the results may not be widely applicable. Readers should thus consider their own setting when interpreting the results. The authors presented very cautious conclusions about the applicability of the results given the scope and design of the study. Several limitations were presented. These focused on the retrospective nature of the study and the resulting inability to exclude the influence of potential confounding factors.

Implications of the study
The authors noted that the choice of thrust or non-thrust manipulation was influenced by a number of demographic factors that did not actually have an impact on the results of treatment. They therefore recommended educating therapists about the insignificance of such factors, to help alleviate misconceptions and improve treatment decisions. Further work in the current group and the need for prospective studies were noted as areas for further work.

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