Study at
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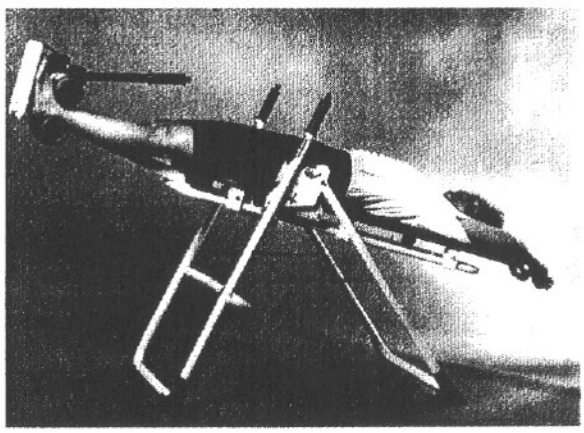

Effects of gravity-facilitated traction of the lumbar spine in persons with chronic low back pain at the workplace.

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Master® SVENSKA HÄLSOBÄNKEN

Project Group

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Reference Group

The Health and Safety Committee of Volvo Aircraft Engine.
The project was accepted as designed at the meeting on February 28, 1992

Background

In 1987 there were in Sweden 15 million paid sick-days for low-back pain (LBP) and for 90% of the sick-listed the average time off work was 73 days. Out of 66,000 filed workers compensation claims in 1988, 41,000 were due to LBP (Nachemson, 1990).

The LBP is thus a societal and industrial problem of major dimensions. A simple calculation taking the cost of $150 per sick day for the employer would, for Volvo Aircraft Engine, with 3,800 sick-days per year for LBP mean a loss of $570,000. If this absenteeism could be reduced by 10% a net savings of $57,000 would be obtained. A number of case reports suggest a positive effect from the autotraction on LBP (Sheffield, 1964; Kane, 1985).

One possibility of lowering sickness absenteeism might be a rehabilitation method that would use autotraction through the Mastercare inversion system at work to reduce pain and prevent disability from LBP.

As a contraindication for this type of treatment has been suggested untreated hypertension, which may be aggravated by the inversion and also possibly increase the intraocular pressure (Klatz et al, 1985). Also, dizziness from low blood pressure caused by the orthostatic mechanism should be cautioned.

The following factors are believed important to evaluate: Dose/effect, development of pain level, measurements of back mobility, sickness absenteeism. Another factor that needs to be observed is whether some particular back problem will benefit more from the treatment than others. The study should use a randomized control group. However, due to the study design and the content of the questionnaires, it would be impossible to perform a blind study.

Design

A randomized controlled study during 1 year of which 3 months were mandatory.

Materials and Methods

Inclusion criteria

Employees that have undergone medical treatment for LBP at the Aircraft Engine Medical department during the last 3 years with

1. on-going LBP and/or
2. LBP more than 3 months during the last 3 years and/or
3. LBP more than 1 week more than once during the last 3 years.

Exclusion criteria

Unwillingness or lack of time to participate. On-going full-time sick-leave at the start of the study.

Employees with the above criteria were randomized into 3 groups: group 1 used the inversion system for ten minutes once daily on paid working time, group 2 used the system for ten minutes twice daily and group 3 performed as control group. The groups were stratified on three criteria: on previous sick-days, gender and worker category (blue- or white collar).

An invitation to the individuals in each group to participate in the study was mailed to their workplace, also asking them to come to an information meeting which was tailored for each group explaining the study in detail and what was expected from each individual. After having received this information they signed to volunteer to participate in the study.

All employees using the inversion system did first have a detailed instruction by a Mastercare representative, who monitored the training during the first weeks. All training episodes were registered by a punch card at each occasion.

Measurements

All employees had been previously examined for their back complaint by the occupational physician.

At baseline, information was collected concerning age, gender, worker category, pain level (Visual Analog Scale), functional level, medication and other treatment, sick-leave during the past three months and other medical complaints using a questionnaire (Dimberg et al, 1993).

A pain drawing was also completed. The result was classified into two variables. The first variable was coded by the pain distribution: local back pain (1), rhizopathy in the leg (2) and combination with other locomotorpain (3). The second variable was coded by pain modality: 1 equals one modality; two equals 2 and three equals 3 or more modalities.

Measurements of back mobility was performed by the nurse using the standardized method by Mildenberg (Mildenberg, 1991) on finger-floor distances and the Schober test.

After three months the above procedure was repeated and information on the number of training episodes was collected together with the subjective impression of the inversion system and free comments, where also side-effects were asked for. Those volunteering to complete the one-year study in the two study groups were registered.

Statistical Methods

Group comparisons will be performed using traditional statistical tests. The influence of certain variables on other variables will be studied in a multifactorial analysis. All tests will be two-sided. The analysis procedure will follow three lines: following each individual through the study, comparing the two treatment groups with the control group and comparing the two treatment groups with each other to look for a possible dose-response effect.

Result

Drop-outs: eight persons.
6 individuals did enter but not complete the treatments. Two of these experienced more pain after some initial inversion treatments, two felt dizziness, near fainting, after the inversion and two did not have the time to come to the treatments. In addition to this two persons from the control group did not show up at the follow up.

Description of the groups at baseline is shown in table 1.

The three groups have been compared on a group level in regard to all registered parameters measured.

Most mobility parameters did not change on a group basis from baseline to follow up. No significant change between the groups was observed.

No change in medication was observed between the groups during the three month period.

However, distribution of pain last week was lower in group 1 (training once daily), and group 2 (training twice daily) than in group 3 (control group) as is evident in table 2.

Distribution of average sick-days per group during the three months study period show fewer sick-days for group 1 and 2 than group 3 as well for sick days caused by low-back pain (LBP) as shown in table 3.

The difference between training and not training is about 2 days per individual.

Also, the sick episodes total and for low-back pain were fewer for the training groups than for the control group during the study (table 3).

No difference between the groups in regard to headache was seen, where all groups reduced the pain as seen in table 4.

However, in regard to neck/shoulder pain, a clear reduction of pain-level from baseline was seen in the training groups as regard to the control group, shown in table 4.

Table 1
Distribution of participants in the study.

Group 1 - training once daily
Group 2 - training twice daily
Group 3 - control group

Group	Number	Age	gender (m/f) (% males)
1	35	43.4	30/5 (86%)
2	34	44.0	26/8 (76%)
3	39	45.0	27/12 (69%)
All	108	44.1	83/25 (77%)

Table 2
Distribution of pain last week (average per group) at baseline and 3 months follow up.

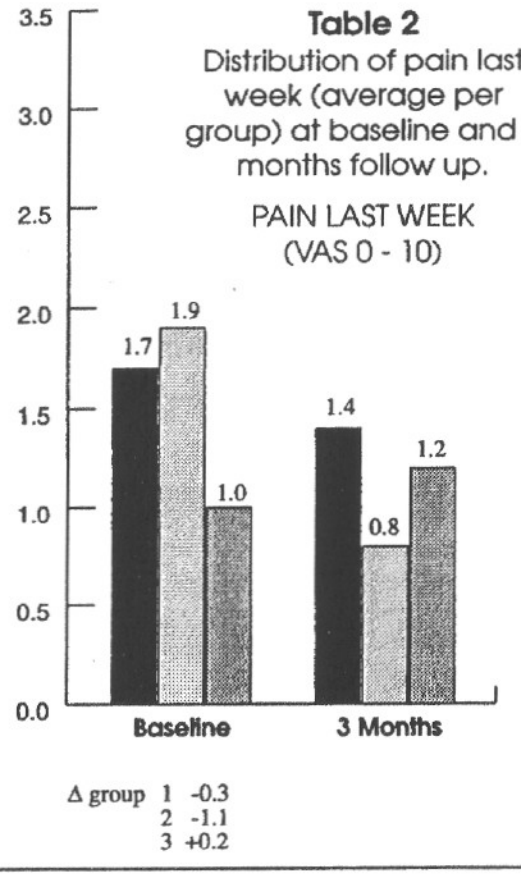
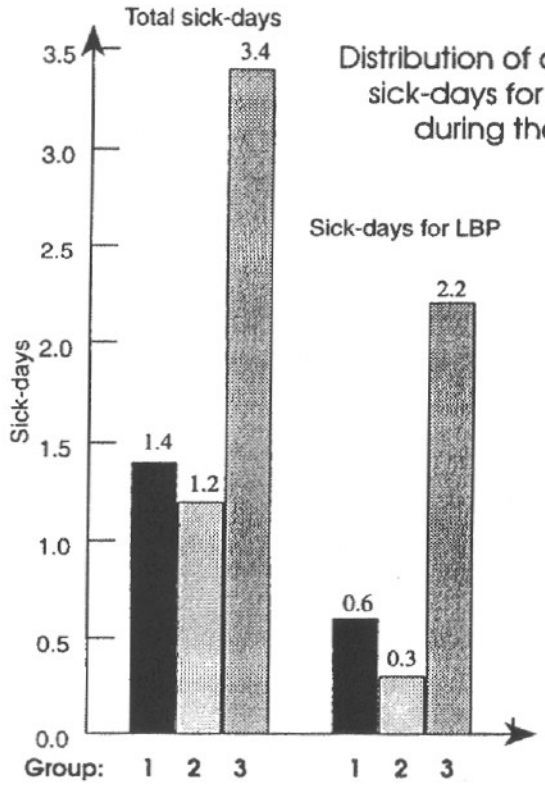


Table 3

Distribution of average sick-days and sick-days for low-back pain (LBP) during the 3 months study.



Distribution of average sick-periods and sick-periods of LBP during the 3 months study.

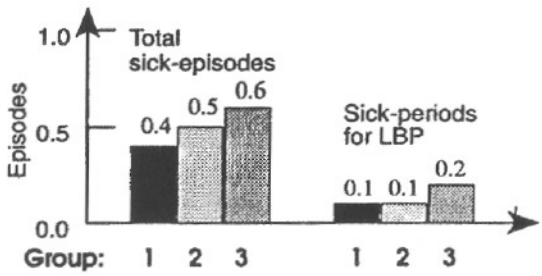
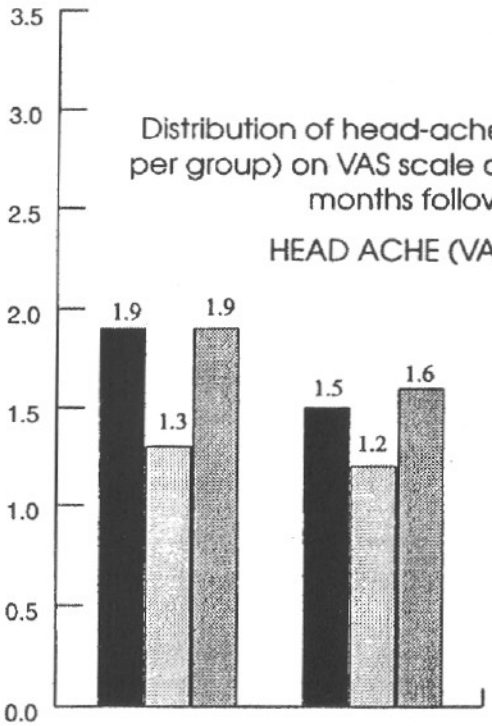


Table 4

Distribution of head-ache pain (average per group) on VAS scale at baseline and 3 months follow up

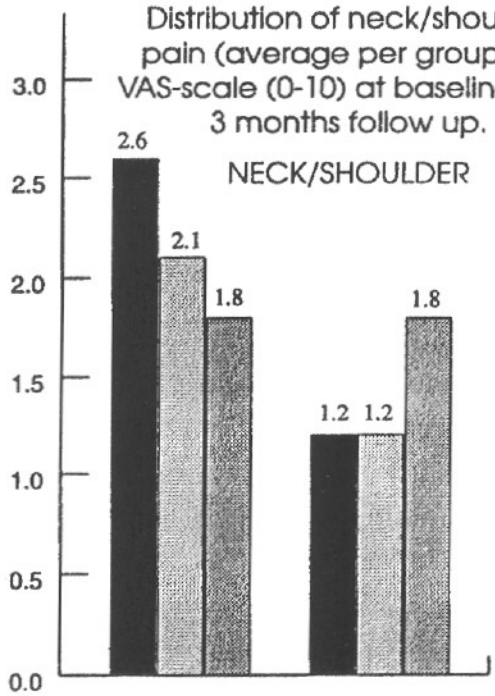
HEAD ACHE (VAS 0-10)



Δ group 1 -0.4
2 -0.1
3 -0.3

Distribution of neck/shoulder pain (average per group) on VAS-scale (0-10) at baseline and 3 months follow up.

NECK/SHOULDER



Δ group 1 -1.4
2 -0.9
3 -0

Discussion

This study shows about 1/3 days off for sickness in the training groups compared with the control group and lower pain during the last week of the study. The tendency is also clear that in regards to these parameters a better effect is seen in those training twice daily compared to those training once daily. This dose-response effect is supportive of the inversion therapy as the main causal factor.

A positive effect was also seen on the pain level in patients with neck/shoulder pain. The treatment effect meant a 50% improvement of the pain.

It should be emphasized that in many parameters, especially the mobility measurements, no effect was seen. Also, this preliminary report does not include more complex statistical analysis that also needs to be performed.