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Breath Relaxation - Two year follow up of breathing pattern in cardiac patients.

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Breath relaxation is a set of procedures that improves coordination in respiratory movement, reducing unnecessary respiratory effort and inducing a pleasant relaxation response. Its effect has been investigated in 156 myocardial infarction patients, all of whom followed a five week program of daily exercise rehabilitation whereas half of them (n=76) were randomly allocated to follow in addition six individual sessions of breath relaxation.

The combined treatment turned out to have better rehabilitation outcome in physical fitness, well-being, return to work and change in coping style at work. There was no effect of breath relaxation on medication, angina pectoris or smoking behaviour. Cardiac events over a two-year period occurred less in the relaxation group (1). At the physiological level, resting respiration rate dropped from 15 cpm to 12 cpm in the combined treatment, whereas it remained 15 cpm in the patients who had participated in exercise training only. The difference between treatments was highly significant ($p<0.001$) and remained stable at three months follow-up (2).

Respiration was measured by way of strain gauges around chest and abdomen, in the supine position. The investigator was a different person than the relaxation therapist and was blind to the treatment condition of the patient. Care was taken to avoid any suggestion to practice a form of good breathing during the measurement. Thus, the reduction in respiration rate was relatively small and may be taken to reflect a change in habitual breathing pattern. By contrast, when patients are asked to perform slow, abdominal breathing, much larger reductions are to be expected, down to 4 - 8 cpm. Such active voluntary breathing, however, will be maintained only temporarily.

The quality of respiratory change can be further investigated by analysing respiratory time components, pattern of respiratory movement and at longer follow-up time. This was done on a subset of the study population who were asked for an interview 2 to 3 years after rehabilitation. Resting breathing pattern in the supine position was measured with strain gauges in 38 patients, 17 of whom from the combined treatment. In the sitting position respiratory movement of the lower ribs was rated hands-on by the experimenter, as the area where sideway expansion with inhalation was felt. This was done on 53 patients, 25 of whom from the combined treatment.

The results showed that respiration rate in the combined treatment was still lower, at 11 cpm, whereas the control group was still breathing at an average of 15 cpm. Two patients in the relaxation group were obviously performing slow, abdominal breathing. They were excluded from the analysis. The difference between treatments was significant ($p<0.01$). A comparison of the time components showed the greatest difference in post-exhalation pauses ($p<0.01$).

In the sitting position, breathing quietly, the area of activity extended more downward in the relaxation group ($p=0.05$). In both groups the area of activity shifted upwards when they were asked to take a deep breath. However, this occurred less in the relaxation group which retained a lower margin ($p=0.03$), both at the lower and upper border of the area of movement.

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Post-exhalation pause time has been shown to be related to relaxation or stress, with shorter pauses occurring during stress (3, 4). Longer exhalation pauses in the combined treatment can be taken therefore as an indication of a more relaxed state in these patients. During inhalation, vagal outflow to the heart is stopped. A longer exhalation time and a longer pause before the next inhalation reflects therefore a higher parasympathetic tonus in the neural control of the heart. Thus, higher heart rate variability can be expected and was indeed found in the relaxation group, after rehabilitation (2).

The area of the lower ribs in the back (thoraco-lumbar junction) is crucial for optimal coordination of breath. When this area is stiff or tightens with inhalation the ribcage is less free to expand sideways and the upper thorax is usually elevated visibly. Such effortfull upper thoracic breathing disappears when the lower ribs are mobilized and expand with inhalation. Also, abdominal expansion will be easy. By contrast, when the abdomen is pushed out to perform slow, deep breathing, the lower ribs usually stiffen. It is remarkable that the relaxation group showed a better coordination of overall respiratory movement, particularly when they were asked to take a deep breath. Thus, respiratory effort, although not measured, was possibly lower, which may also account for the longer pause times (4).

It may be concluded that breath relaxation has a stable effect on breathing pattern, which is more quiet and has better coordination of chest and abdomen. This supports the idea that the procedures of breath relaxation achieve a change that is integrated in the behaviour and the regulation of breathing of the whole person.

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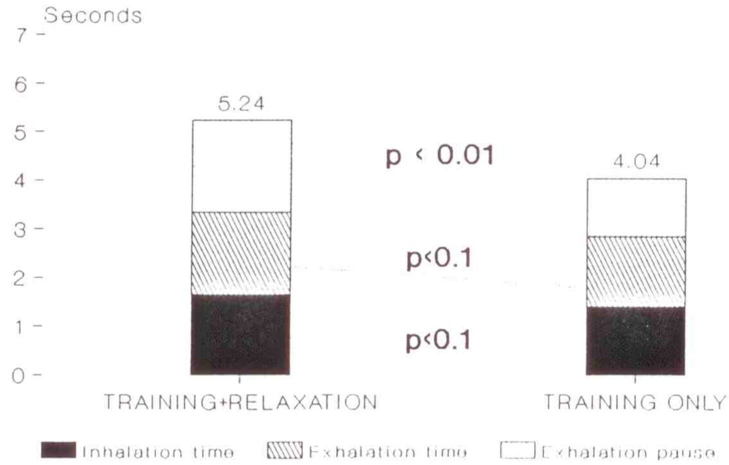
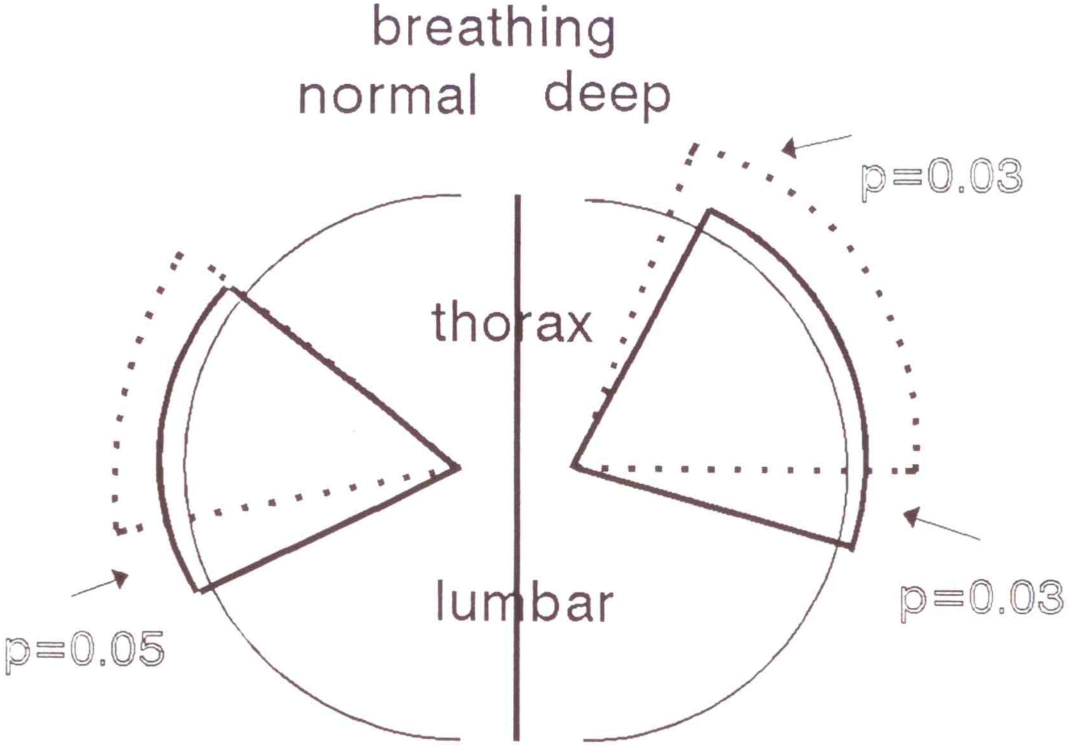
Respiration cycles
Two year Follow-Up

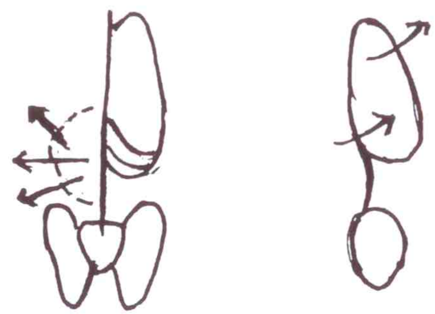


2 pts from relaxation group excluded
who practiced deep breathing during test

location of inhalation movement



rating of outward movement by hand, positioned on lower ribs (thoraco-lumbar area)



cardiac patients, two year follow-up

— exercise + relaxation: n=25

····· exercise only: n=28