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KINETIC STUDY OF PATIENTS WITH LOW BACK SYNDROME AND ITS THERAPEUTIC CONSEQUENCES

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A clinical study has been undertaken to investigate the daily movements of patients suffering from the low-back syndrome, to determine what their special manner of moving means in terms of stress on the structures of the back.

This report concerns the movements in the sagittal plane when patients seat themselves. Similar movement goes into many daily activities, including lifting. Three factors will be dealt with: the visible movement, the force applied, and the muscles involved.

Most of the study was carried out at the Institute of Physical Medicine and Rehabilitation, New York, on patients with chronic back complaints of varied aetiology. The findings seemed independent of aetiology, but related to pain.

This analysis was made possible by the techniques of Eutonia as used by Gerda Alexander, Copenhagen, and by the English system « Conscious Control ».

The movement from erect to sitting position

The nature of joint constructions invites movement in ankle, knee and hip, and only a slight elastic response in the spine with minimal movement and no change in the spinal curves (fig. 1 A).

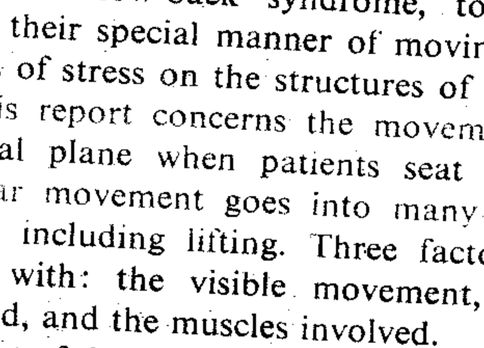

Fig. 1 Spinal movements while getting seated.

Healthy people often make some spinal movements while seating themselves. These movements do not serve in the act of sitting. They happen without much extra force and the extra demand on the spine and muscles is fairly small; well within tolerance of a normal spine.

Patients with the low-back syndrome try to fixate the lumbar spine by muscle guarding, but, as will be shown, they rarely succeed. The movements are often small but clinically significant because they happen under considerable compression. Movement plus compression make demands on the spine that soon pass beyond tolerance.

Most common is an initial tuck-under which necessitates slight flexion in the lumbar area (fig. 1 B), later often followed by slight extension just before the patient reaches the chair (fig. 1 C). At the same time there is nearly always an extension of the neck which influences the statics of the whole back. There are other types such as the forward bend high in the back (Fig. 1 D), rather benign, but still increasing the demands on the back because of the longer lever arm created. Many combinations of these types may be seen. Occasionally a patient manages to seat himself without any visible spinal movement; he will however look stiff and shortened due to the extra compression force. Clinically a patient experiences immediate relief if he is taught to go back to movements in conformity with the joint construction (fig. 1 A).

The active forces can be evaluated by applying a horizontal force anteriorly toward the hip joint of the standing patient, just enough to feel some give in the joint without interfering with balance and thus without provoking increased guarding. In this way an estimate of the compression on the hip joint can be obtained. In normal persons the force needed is quite small: the response is elastic. In patients with the low-back syndrome the force needed is markedly increased: the response is rigid. There is good reason to believe that a similar increase in pressure is present elsewhere, e.g. on the spine.

The muscles involved in guarding

The elements of guarding come out most clearly with movement in which some muscles go into a stronger and often more sudden action than normal. This can be seen and palpated. In the

subsequent study this will be refered to as muscular overactivity. When the overactivity of a muscle results in a visible increase or decrease in joint movement, it will be refered to as overweighting of that muscle.

In the acute patient the position of trunk fixation and hip flexion involves a predominant overactivity of the spinal erector, the abdominals, and the psoas (Fig. 2 A). In the chronic

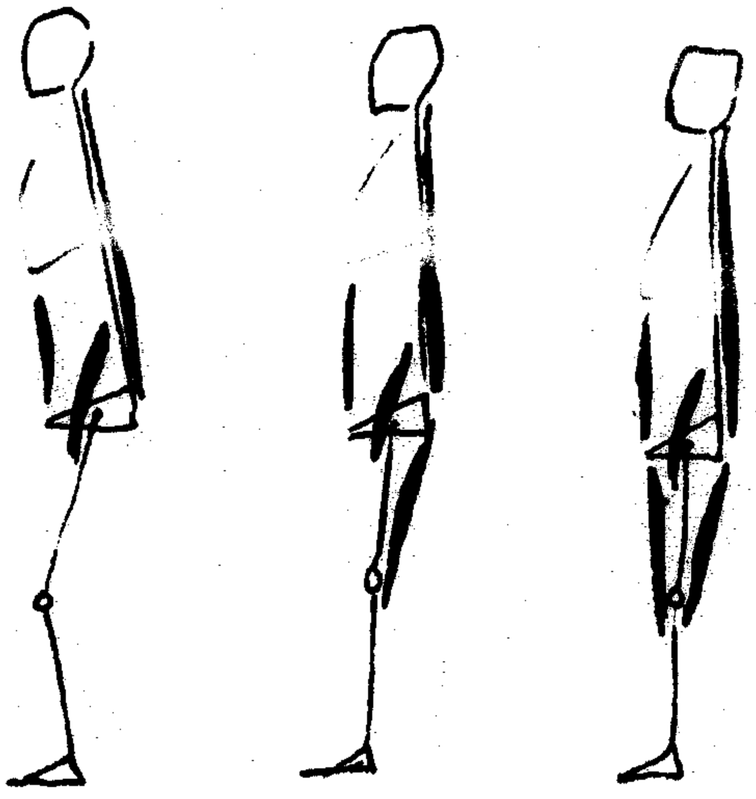

Fig. 2 Muscles involved in guarding.

patient the same pattern is found in a modified form: hip flexion is compensated by increased activity of the hamstrings and the gluteal muscles (Fig. 2 B). Also the quadriceps seems always to be overactive (Fig. 2 C). Subsequent hip and knee movement takes place against considerable resistance. Clinically the patient appears reluctant to bend his legs, and when he does, the movement is often jerky, compensated by movement in the back. The pelvis acts like a meniscus between legs and spine, meant to follow the spine, but by the strong muscle pull made to follow the legs part of the way.

It should be noted that the findings obtained while observing *whole body movement* are different from the findings in the commonly used spinal movements test wh[illegible] the legs [illegible]nxed.

During movement the overactive spinal erector may show only in neck extension. The psoas was found central in significance: the overactivity in other muscles was often persistent until the psoas was released, whereafter release spread rapidly, often with a spontaneous improvement in alignment.

Conclusion

Study of whole body movements in patients with the low-back syndrome shows that muscle guarding, meant to fixate the back, also interferes with hip and knee movement. Compensatory movements occur in the lumbar area. This guarding may be found with or without a sciatic scoliosis.

Clinically it can be tested by making the patient do a small knee bend while the examiner holds his hands lightly on the sides of the pelvis. Beside pelvis movements their relation to move-ments in other joints can also [illegible]ther an estimate of the amount [illegible] applied is obtained by this test.

This guarding thus increases the stress on the back in form of extra compression and unnecessary movement. The patient experiences immediate relief when the guarding is released.

The study shows that the poor body mechanics of patients with the low-back syndrome are not purely mechanical phenomena, but to a great extent constitute a neuromuscular problem.

Treatment should aim primarily at a release of the guarding.

As back troubles tend to be recurrent it is practical to teach the patient to treat them on his own. This has a tremendous influence on the patient's morale. Since guarding goes into action as soon as the patient moves he has to be taught how to move, beginning with how to turn in bed and extending to any daily activity. Normalization of his moving pattern has a direct analgesic effect.

But how can we change his moving pattern? If he is told, e.g. "keep the sway of your back" he will do this actively, adding a tension on top of his guarding, thus increasing the compression on the spine. With Eutonia, movement can be normalized through fine adjustment of muscle action without increasing compression. The patient feels the way he moves as right, as normal and he repeats the same pattern very neatly; the same pathways are used each time. A new organization of the cortical control of motor function must be brought about; movement must be prepared. This is done through work on the sensory-cortical connections: the patient must develop his body awareness and the awareness of his body in contact with the environment. This includes the proprioceptive and all the other sensory qualities. A conscious regulation of the level of muscular excitability and activity can be obtained in this way, corresponding very well with our present knowledge of neurophysiology.