We have all read, heard or seen that rehabilitation in the form of equestrian or hippotherapy helps the subject to maintain the posture of the trunk and to keep their balance. But what does it do exactly? This is the question we set out to answer using a special platform designed to analyse posture under static and dynamic conditions.

**METHOD**

**Population:** 16 subjects took part in this program: 7 women, 9 men, aged from 14 to 53 (mean - 37.4 years). Of these, six subjects were in rehabilitation as a result of a serious cranio-encephalic trauma resulting in hemiplegia, seven were there also as a result of a serious cranio-encephalic trauma presenting a cerebellar syndrome, four had suffered a serious cerebrovascular accident (stroke), one was there as a result of choreoathetosis (encephalopathy), one with a serious hemiplegia resulting from anoxic encephalopathy, one after a cerebellar syndrome (one after an idiopathic cerebellar ataxia), and, lastly, one with paraparesis from multiple sclerosis.

The selection was limited to those subjects who had recovered their ability to maintain a sufficiently stable standing position to be able to perform the test.

**Recording equipment:** The equipment consisted of a posture analysis platform which had been lent by the Toulouse (France) company, Satel. This platform allowed us to analyse the posture under static and dynamic conditions.

**Posture analysis under static conditions**

The platform used for this test comprised a rigid plate resting on three transducers. The subject is instructed to remain standing on the platform as motionless as possible for 51.2 seconds. By combining the data provided by the three transducers, a computer can tell the test team the position of the subject’s centre of gravity at any moment. This data can be assimilated to the ground projection of the position of the centre of gravity. The computer plots the length of the path followed by this projection onto the screen in real time and calculates the length of the path of the centre of gravity during the test (the less the subject is stable, the greater the length measured); the surface of the ellipse within which the centre of gravity moves (this parameter is the most pertinent for measuring the capacity of an individual to maintain his/her balance under static conditions); the length X of the displacement of the centre of gravity in the frontal plane (right – left); the length Y of the displacement of the centre of gravity in the sagittal plane (front - back).

**Posture analysis under dynamic conditions**

In this test, the platform comprises a flat plate under which two hoops are placed. The platform has just one degree of freedom of movement (slope). The subject is placed on this platform in such a way that the following measurements can be taken successively:
his/her anteroposterior balance, xx, and lateral balance ZZ. The subject was instructed to keep his/her balance on the platform for 26 seconds. The parameters calculated by the software are the same as those for the static test: length XX, surface ZZ, length X, and length Y.

Test protocol

For each subject, we studied before then after a re-education session of hippotherapy the analysis of the posture under static conditions and the analysis of the posture under dynamic conditions. The re-education session with the horse lasted 20 – 25 minutes.

ANALYSIS OF THE RESULTS

Posture analysis under static conditions

The length of the path of the projection to ground of the centre of gravity after the riding session was shorter (16.9%), reflecting a better stability and better trunk tonus after the hippotherapy. The sustention surface after the riding exercise was lower (24%), which denotes a better accuracy/precision of the postural system. The length of the displacements X in the frontal plane and the displacements Y in the sagittal plane are lower (14.6% and 19.7%). This reflects a reduction of the amplitudes required to improve the static (QUOI, substantif svp) by a better postural tonus after the hippotherapy session.

Posture analysis under dynamic conditions

Under dynamic conditions, the parameters calculated by the computer - the length, the surface of the ellipse, the length X of the displacement in the frontal plane, the length Y of the displacement in the sagittal plane are reduced after the riding exercise (see attached table).

DISCUSSION

These results show that rehabilitation in the form of hippotherapy is followed by an improvement in the subject’s balance, which in turn reflects a better postural tonus of the trunk. The balance that concerns us here is the balance on horseback, which is the result of pluri-modal functions comprising a number of sensitive superficial and deep sensory receptors which send data along afferent paths to the central nervous system which, by efferent paths, modulate the muscular tonus allowing the postural adaptations required to maintain posture and coordinated harmony of movement.

CONCLUSION

Postural re-education is an essential element in neurological rehabilitation. Hippotherapy improves the postural maintenance of the trunk, which can lead to better balance in the sitting and standing positions, improvement with walking and greater freedom of the upper limbs. This technique has advantages that cannot be ignored.