Scoliosis

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Oral presentation

Lower limb muscle shortening in structural versus non-structural spinal deformity

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Background

Muscle shortening within the lower limbs can be observed in adolescents with either structural or non-structural spinal deformities. Whether or not it is related to the spinal deformity remains unclear. The aim of the study was to evaluate the lower limb muscle shortening in a group of adolescents with structural spinal deformity (idiopathic scoliosis, Scheuermann's juvenile kyphosis) compared to adolescents with non-structural postural trunk asymmetry. The hypothesis was that structural spinal deformities are related to a specific pattern of muscle shortening.

Materials and methods

Sixty-one adolescents, ages 10 to 17 years, were divided into four groups according to their diagnosis. Nineteen had idiopathic scoliosis with Cobb angles from 25° to 60°, seventeen had idiopathic scoliosis with Cobb angles from 10° to 25°, eight had Scheuermann's juvenile kyphosis, and seventeen had non-structural postural trunk asymmetries having the Bunnell angle of trunk rotation of 3° or less (therefore, neither scoliotic nor kyphotic structural deformity was present in the last group).

All children were examined by the same observer (first author), using clinical tests to detect muscle shortening within the lower limbs and additionally within the pectoralis major, latissimus dorsi and quadratus lumborum muscles.

Results

The results were recorded as 0 (no shortening) or 1 (presence of muscle shortening).

The results showed a broad spectrum of muscle shortening in each of the four groups. The muscles which were most often shortened comprised: hamstrings, gastrocnemius, soleus, rectus femoris, and hip adductors. The non-shortened groups comprised: pectoralis major, latissimus dorsi, piriformis and quadratus lumborum. No relationship was found between the etiology and the shortening of any examined muscle, however, the limited number of patients prevented the observed tendency to reach statistical significance.

Conclusion

Lower limb muscle shortening seems to be very common both in structural spinal deformities and in non-structural trunk asymmetries ("poor posture"). The initial hypothesis could not be confirmed; no relationship between spinal and limb pathology could be put into evidence. Larger study groups are needed to explore the question why some lower limb muscles undergo shortening in patients with structural spinal deformities and whether this shortening presents a separate therapeutic problem.