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Active self correction during different exercises and movements: a biomechanical study

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Introduction

SOSORT Consensus Conference (Milan 2005) developed about the main important features of a correct treatment based on physical exercises states that the main point is self correction. The SEAS school of treatment focuses on Active Self Correction (ASC) that is the series of movements of reallignemnt as a whole that the patients autonomously performs in order to reduce the scoliotic curves. This movement has to be performed as much as possible in three dimension so the ASC movement sometimes is not easy to be understood and also not easy to be realized by the patient. Aim of this paper is to check ASC in different exercises and during gait through a not-invasive optoelectronic gait analysis system.

Material and methods

For data collection a VICON gait analysis system was used. This system is made of 8 infrared camcorders that capture the motion of reflector markers positioned on the patients and give datas about the patient movements.

In this study 10 scoliotic patients were observed and 19 markers were positioned as follows: 2 on the Acromions, 2 on the ASIS, 2 on the PSIS, 2 on the iliac crests, 2 in the popliteal cavity and 9 on the trunk in rows of three. To identify where to apply the trunk markers, humps were detected. One marker was positioned on the apex of the hump, one on the spinous process at the same level of the hump and one on the other side of the trunk at the same distance of spine as the hump.

Subjects performed different kinds of ASC movements [(1) controlled self-elongation, (2) correction of the primary curve in the frontal plane, (3) correction of two contiguous curves in the frontal plane, (4) correction of the primary curve in the horizontal plane] and a series of exercises.

Results

The processing of the collected images shows that the more easy ASC movement to be performed is the controlled self-elongation and that this movement is corresponding to a well visibile reallignemnt on the frontal plane and this can be used as a biofeedback by the patient. The less easy to perform movement is the correction in the horizontal plane of the curve (4). Full numerical analysis has been performed and will be presented.

Discussion

ASC can be maintained in different tasks of various difficulties in trained patients. Marker positioning allows a complete view of the trunk behaviour. Future studies will concentrate on the markers that best reflect the ASC movement so to allow physiotherapist to easily check quality of ASC.

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