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Case report

Low back pain in the overhead athletes: Evaluation and treatment based on movement system

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ABSTRACT

Introduction: Low back pain (LBP) is a common problem in sports. There is high risk for back pain occurrence in athletes. The knowledge about LBP in overhead athletes is limited. The Movement System (MS) approach is based on association of symptoms and incorrect movements of the spine. The main goal is to identify the localization and direction of improper movements and to restore appropriate motor control of the movement pattern.
Aim: To present functional evaluation and therapeutic approach based on the MS in the case of LBP in overhead athlete.
Case study: The study presents a 26-year-old overhead athlete with chronic mechanical LBP, which is related to his sports activity. He reported exacerbation incidents, which had eliminated him from physical activity.
Results and discussion: Physical examination of the patient had shown deficit of lumbar motor control in directions of extension and rotation of pelvis coupled with functional alterations in muscles. These movements were associated with pain symptoms. The patient had undergone a 4-month-lenght-therapy program, which was focused on spine motor control training and functional reeducation of muscles. A subsequent examination showed an improvement in motor control of the movement and considerable decrease of pain symptoms.
Conclusions: (1) The MS approach allows to identify the incorrect movement and to relate it with pain symptoms. (2) Reeducation of motor control based on movement system evaluation allows decreasing pain symptoms.

1. Introduction

Low back pain (LBP) is one of the most common reasons why adult people look for medical help.[1–3] It generates work absenteeism and great social costs.[4] Generally, LBP is associated with predominance of the sitting position and lack of physical activity, but on the other hand with overloads.[5,6] Physical activity is recommended as one of the therapeutic and preventive instruments in LBP [7,8]; however, its influence on back pain has not been fully explained.[9] Sports training might be linked with high risk of injuries, overloads and pain.[10–12] Overhead athletes are exposed to high risk of shoulder impingement symptoms, which is widely described in the literature.[13–16] However, the information about LBP in overhead athletes is insufficient.[17]

The Movement System (MS) is founded on the hypothesis that the reason of back pain is linked to incorrect trunk movement in a specific direction through motions of trunk and limbs. Such a situation might be caused by daily application of specific motor strategies, which are composed of repetitive movements in a precise direction. Then adaptive functional changes might occur in musculoskeletal tissues, such as decrease of several muscles elasticity, functional insufficiency of other muscles, and alterations in muscle timing. Prolonged inherence of this state might result in mechanical overload of musculoskeletal tissues, micro-trauma, tissue adaptation and pain.[18,19] The MS evaluation is focused on detecting these functional changes and identifying the direction of the movement causing pain. It is hypothesized that restoring normal control of the direction should result in decrease of pain.[18,20,21,22]

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Table 1
Movement and motor control tests.

Test	Testing task	Points to observe
Forward bending	To bend trunk forward to about 50°	To observe motions and alignment of pelvis and trunk: is the patient able to maintain stability of lumbar spine in sagittal plane during motion?
Hip extension in standing	To extend lower limb in hip joint in standing position	To observe alignment of pelvis and trunk: is the patient able to maintain stability of lumbar spine in sagittal plane and stability of pelvis in horizontal plane during leg motion?
Hip extension in quadruped	To extend lower limb in hip joint with knee flexed in quadruped position	To observe alignment of pelvis and trunk: is the patient able to maintain stability of lumbar spine in sagittal plane and stability of pelvis in horizontal plane during leg motion?
Small knee bending (SKB)	To perform a single-leg small knee bending in standing position	To observe alignment of loaded lower limb: especially is the patient able to maintain leg alignment in frontal plane? To observe alignment of pelvis and trunk: is the patient able to maintain stability of lumbar spine in sagittal plane and stability of pelvis in horizontal plane during SKB?
Hip abduction	To abduct lower limb in the hip joint with hip and knee flexed in supine lying position	To observe alignment of pelvis: is the patient able to maintain stability of pelvis in horizontal plane during leg motion?

2. Aim

The aim of this study is to present possibilities of functional evaluation based on the MS in the case of LBP in the overhead athlete, and to present a potential therapeutic approach based on the MS evaluation and its short-term effects.

3. Case study

The study object is a 26-year-old man engaged in regular volleyball training (4 times per week). His actual problem is mechanical LBP. Symptoms are permanent but pain intensity changes. There were three exacerbation incidents during last 6 months before the patient reported he required therapy. To evaluate pain intensity the numerical rating scale (NRS) (0–10°) was used. The patient defined his pain intensity as 7–8 in

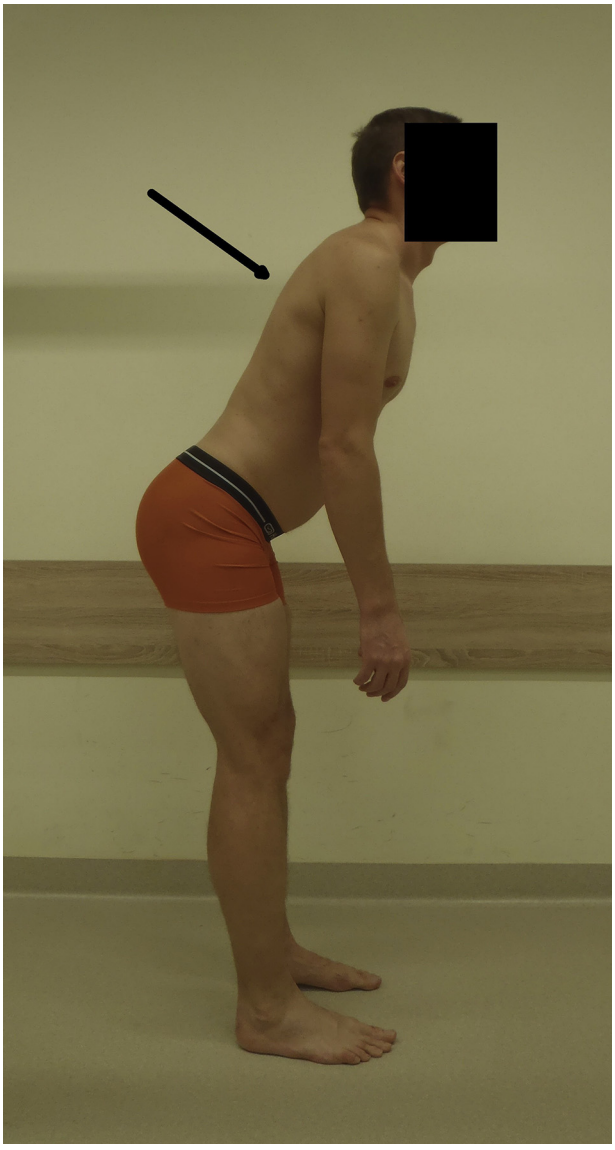

Fig. 1. Forward bending test: final position.

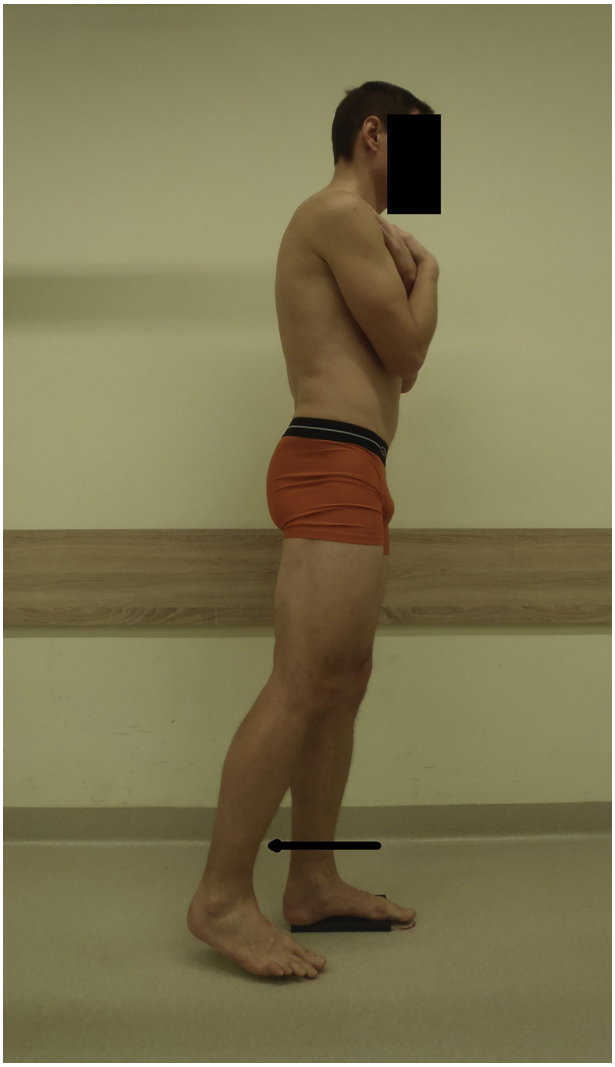

Fig. 2. Hip extension test in standing: final position.

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