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TEMPORAL CHANGE OF ACTIVITY OF M. STERNOCLEIDOMASTOIDEUS AND M. TRAPEZIUS PARS DESCENDENS WHEN PERFORMING A HEADER AFTER FATIGUE OF THE TRUNK MUSCLES

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Introduction

Precise recommendations on how to plan a training schedule for headers in soccer are rare. To ensure a clean technical and non-hazardous movement when heading the ball, specialized literature postulates the necessity of strengthening the muscles stabilizing the trunk. The question was how the muscles essential for headers would be working in non-fatigued and fatigued conditions. Therefore this study tried to record a potential temporal change of the maximum activity of m. sternocleidomastoideus (SCM) and m. trapezius pars descendens (TPD), after the muscles stabilizing the trunk (m. erector spinae and m. rectus abdominis) had been tired out by a treatment.

Methods

12 nonprofessional soccer players were analyzed in a pre-post-test, performing straight headers using a pendulum header after a two footed take-off. The myoelectric potential of SCM and TPD was recorded with the help of telemetric surface electromyography. A foot pressure sensor was used to register the moment of take-off; an acceleration sensor was attached to the back of the head to register the ball contact. The treatment to tire out the trunk muscles included three abdominal exercises and two back exercises. After determining the moment of maximal activity within the defined time frame, that started at the point of take-off and ended at the point of ball contact, pretest and posttest were compared with the help of a t-test to find out if any significant changes occurred.

Results

1. The moments of maximum muscle activity of SCM and TPD changed heterogeneously but not significantly.

2. Different muscular activation strategies could be identified. The maximum activity of TPD of four subjects occurred in the posttest earlier (15% of the time frame). Three subjects showed an earlier activation of SCM (15% of the time frame), whereas five subjects didn't show any differences at all.

3. Specialized literature postulated a co-contraction of SCM and TPD at the moment of ball contact, but this result could not be found in our tests. In general SCM was inactive at that point in time.

Conclusion
1. Beside the small number of subjects in the survey the reason for the heterogeneous and non-significant activation might be the redundant functioning of the muscles.

2. The different temporal activations of TPD and SCM can be understood as inter-individual motor patterns. The stronger drawing back movement and acceleration originating in the throat-neck-region can be seen as a compensation of the tired trunk muscles.

3. The reason for the missing co-contraction of SCM at the moment of ball contact, could be the standardized test methods with the help of an immovable pendulum header.