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ScienceDirect

Procedia - Social and Behavioral Sciences 191 (2015) 372 – 377

Procedia
Social and Behavioral Sciences

WCES 2014

Biomechanical Characteristics Of Key Elements Of Gienger Salto Technique On Uneven Bars

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Abstract

The purpose of the paper is to highlight the biomechanical characteristics of Gienger salto on uneven bars at junior girl gymnasts aged 12 to 14. The results of the spatial – temporal characteristics of sports technique key elements of stretched Gienger salto on uneven bars highlights the phasic sequence of execution, namely the preparatory movement of launching from forward giant, moment of bar release, multiplication of body posture and the concluding posture of regrasping the bar in accordance with the technical requirements of FIG Code of Points. The effective use of the video biomechanical analysis method of stretched Gienger salto on uneven bars highlighted the kinematic and dynamic characteristics of sports technique key elements in accordance with the performances achieved in competitions.

Selection and peer-review under responsibility of the Organizing Committee of WCES 2014

Keywords: Gymnastics, kinematics, dynamics, technical structure, performance ;

1. Introduction

At the present moment, artistic gymnastics has recorded remarkable progresses, highlighting the fact that it develops in accordance with the trends of performance sport, but it has its specific features too, such as: increase of sports mastership, increase and rivalry of competitive programs, processing of new complex routines, sports mastership that reaches virtuosity; improvement of components that provide the training of high classification gymnasts (Arkaev & Suchilin, 2004; Vieru, 1997). In gymnastics, the role of the technical training is very important

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Selection and peer-review under responsibility of the Organizing Committee of WCES 2014
doi:10.1016/j.sbspro.2015.04.311

and in close interdependence with the other components; so, a poor physical training of the gymnasts leads to a bad, wrong technique, thus to lack of success in competition. Also, a good technical training based on a good physical training, but in the absence of an adequate psychological training, results in poor performances (Grigore, 2001). In conformity with the requirements and the specific character of women's artistic gymnastics apparatus, the elements on uneven bars can be divided into several structural groups, defined not only according to their execution way, but also according to their purpose, namely: handstands, hip circles (small and big), free passing over bars, somersaults and regrasping, simple switches on longitudinal axis or made during different basic movements, transitions from one bar to another, mounts and dismounts (Bibire & Dobrescu, 2008; Grosu, 2004; Vieru, 1997); the stretch Gienger salto belongs to the group of elements with release and regrasping of bars, having the value of difficulty D – 0.4 points. In the specialized literature, the general problems of biomechanical analysis of contemporary technique and the knowledge of factors decisive for the technical training and contents of the optimization of gymnastics training are insufficiently treated and known. Current concerns in scientific research on the biomechanical issues in gymnastics and the characteristics of rotation routines were expressed by Hochmuth & Marthold, 1987; Bruggmann, 1994; Witten, Brown & Espinoza, 1996; Prassas, Papadopulous & Krug, 1998 (Crețu, Simăn & Bărbulescu, 2004). "Biomechanical researches in artistic gymnastics can be performed using both biomechanical methods and methods taken from other fields of knowledge (pedagogical, mechanical, physiological, psychological, medical ones, etc.), mainly intended to highlight the features of movement on various apparatus by selecting the means of data recording, processing and analysis" (Potop, 2007, p. 140). The review of specialized literature certifies about the importance of the research on gymnastics exercises technique and its learning, taking into accounts the body postures and positions. In connection with this fact, V.N. Boloban and E.V. Biriuk (1979) propose the use of the movement postural orientation method for studying the technique of gymnastics sports branches (Potop, Grad, & Boloban, 2013). The concept and methodology of using this method by studying the papers have been perfected during the recent years (Boloban, 1988-2013; Sadovski, Nizhnikovski, Mastalezh, Vishiovski & Begajlo, 2003-2013; Potop, 2012, 2013; Andreeva, 2013 etc.). The *purpose of the paper* is to highlight the biomechanical characteristics of Gienger salto on uneven bars at junior girl gymnasts aged 12 to 14.

Research hypothesis: we considered that the use of the video biomechanical analysis method of Jaeger salto on uneven bars would highlight the kinematic and dynamic characteristics of sports technique key elements according to the performances achieved in competitions.

2. Material and methods

This scientific approach led to the organization of a case study conducted during the National Master Championship from 16 to 18th of November 2012. The study involved two gymnasts (C.A. & T.P.) belonging to the junior team of Deva, aged 12 to 14. The following anthropometric and biomechanical indicators of the gymnasts were necessary for the computerized video biomechanical analysis (mean ± SD): Weight - 35.8 ± 3.82 kg; Height with arms up – 1.88 ± 0.11m, inertia of rotation (IR) – 126.82 ± 27.68 kgm^2, radius of movement (RM): GCG – 0.97 ± 0.07 m, Toes – 1.47 ± 0.08 m, Shoulder – 0.61 ± 0.05 m, Arms – 0.17 ± 0.03 m. This case study is part of the pedagogical experiment of the post-doctoral thesis; it is included in the research plan in the field of Physical Education and Sport of Ukraine for 2011 -2015. National registration number: 0111U001726. Index UDK: 796.012.2. The following methods have been used in this research: method of bibliographic study, method of pedagogical observation, method of video biomechanical analysis, using Physics Toolkit program, method of movement postural orientation (body launching posture, multiplication of body posture and concluding body posture), method of pedagogical experiment (case study), statistical method (KyPlot) and method of graphical representation.

3. Results

Table no. 1 and figure 1 shows the characteristics of spatio-temporal indicators of the key elements of sports technique of Gienger salto on uneven bars, executed by two gymnasts (C.A. and T.P.), during the all-around event in National Master Championship Onesti, 2012, in terms of preparatory movement for launching from backward giant, body launching posture (LP) – release of high bar, MP – multiplication of body posture, highlighting the maximum