



## INFLUENCE OF COMPETITIVE EXPERIENCE ON STATIC POSTURAL BALANCE IN A GROUP OF RHYTHMIC GYMNASTICS OF HIGH LEVEL

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### Introduction

**R**hythmic gymnastics is the unique female sport which includes aspects of both artistic gymnastics and dance and is characterized by the use of small apparatuses (e.g., rope, clubs, ribbon, hoop and ball). Many studies compared the balance ability of athletes from different sports, underlying that gymnasts tended to have the best balance ability (Hrysomallis, 2011; Bressel, Yonker, Kras & Heath, 2007). No literature analysed the influence of the competitive experience of rhythmic gymnasts on the static postural balance.

### Objective

The purpose of the study is to evaluate the influence of years of competitive experience, hours of physical training and competition level on static postural balance in elite rhythmic gymnastics female athletes.

### Method

#### *Participants.*

22 elite rhythmic gymnastics female athletes (14,5 ± 2,0 years old), height (150±12cm), weight (43,5±10,0kg) were involved in the study. Athletes were divided in two groups based on their competitive experience (e.g., years of experience, hours of training and level of competition).

#### *Instruments.*

Static postural balance test were conducted on the TecnoBody Prokin PK 214 P balance board and a biaxial accelerometer (TK- Trunk Sensor) was used to record trunk movements of the athletes.

#### *Set Up.*

6 static postural balance tests in different sensorial conditions: bipodalic stance (BIPO) with (EO) and without visual inputs (EC) last (60 s), monopodalic stance (MONO) standing on the right leg (R) and on the left leg (L) with (EO) and without visual inputs (EC) last (30 s). Non parametric test were used to analyse differences between the two groups of elite athletes (U-Mann Whitney test), intra-groups differences were analysed using (Wilcoxon test), the significance of p value was set to (p<0.05).

## Results and discussion

Both the two groups of elite athletes showed a real dependence on visual inputs during stabilometric tests. Trials in bipodalic and monopodalic stance with (EO) reported the best balance performances of the athletes compared to the trials without visual inputs ( $p < 0.05$ ) (Asseman, Caron & Crémieux, 2008). Trials on right leg stance (R) showed the best stabilometric results for both groups compared to the trials on left stance ( $p < 0.05$ ). At the U-Mann Whitney test the best postural balance performances were recorded by the group of athletes of the highest level, based on competitive experience for center of pressure (COP) perimeter length and ellipse area and COP mean velocity in all MONO different sensorial conditions ( $p < 0.05$ ).

Tab. 1. Differences between the two groups of athletes

COP variables	MONO OE R	MONO CE R	MONO OE L	MONO CEL
Perimeter length (Mean velocity anterior posterior axe)	*		*	
(Mean velocity medium lateral axe)	*			*
Ellipse area				*

$p < .05$ \* Statistical significant level of difference between top level and lowest level groups

## Conclusions

Findings underlined the importance of the static balance capability in this sport and the dominant role of the visual inputs in elite rhythmic gymnastics athletes in accordance with athletes of other sports (Korobeinikova & Makarchuk, 2013). Competitive experience has an effect on monopodalic stance condition both with and without visual inputs. Moreover, results based on monopodalic test with (EC) suggest to pay greater attention to the proprioceptive inputs during balance training (e.g., by using dynamic balance boards) and to train those balance difficulties specific of the gymnasts' competition routines without visual inputs to compensate for the sight lack.

## Bibliography

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