The Respective Correlation Between Body Balance and Cognition and Mood of Dancesport Athletes in Different Levels

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ABSTRACT: Dancesport is an activity that combined the dance and the competitive sport, and becomes more and more popular. The respective correlation between balance and cognition and mood become hot issues. The purpose of this research is to investigate the respective correlation between body balance and cognition and mood of dancesport athletes in different levels through testing and analysis their static postural balance, cognition and mood. Eighteen dancesport athletes in different levels are classified into 3 groups by years of training and weekly training time, including the high level group (HG), the middle level group (MG) and the primary level group (PG). All subjects are tested their static postural balance, simple reaction time (SRT), spatial positional memory span (SMS), Beck Depression Inventory (BDI), State-Trait Anxiety Inventory (STAI). The results suggested that both the cognition and mood of athletes in different levels are related to the body balance, but they have different linear correlations in three groups.

1. INTRODUCTION

Dancesport is a competitive art which is on the high-heeled shoes. It has the complicated variable technical movement in space, and high degree of precise time control. What’s more, it is also needed to show the rich artistic connotation. Dancesport athletes’ balance emphasizes mainly on the direction and power control. So balance is a basic motor skill for them. Cognition and mood are also important influential factors to competitive ability. Dancesport athletes’ requirements are stringent in not only physically but also mentally. (Yuhan Wang et al 2014) Cognition is about the brain ability of processing and storing and drawing information from the matters. It is the most important psychology condition. (Luis CA et al 2002)

Moods are produced by a series of neurochemical conduction and information processing in the brain. Emotion disorders (anxiety and depression) are emotional disturbance that may cause cognitive biases and behavioral mistakes. (McCabe TR et al 2013) However, few studies report about the respective correlation between body balance and cognition and mood in this kind of sports. The purpose of this research is to investigate the respective significant correlations between body balance and cognition and mood of dancesport athletes in different levels. This research is very meaningful to provide a theoretical basis for improving technical capacity for athletes.

2. METHODS

2.1 Subjects

Eighteen different levels dancesport athletes from Beijing Sport University were recruited. According to years of training and weekly training time, they were classified to high level group (HG), middle level group (MG) and primary level group (PG). Every group had 6 persons, half of which were male. The subjects of HG had been trained dancesport training 10~15 years, 16 hours of weekly training time. The subjects of MG had been trained
dancesport 6~10 years, 6 hours of weekly training time. The subjects of PG had been trained dancesport 2~3 years, 6 hours of weekly training time. Subjects were excluded from this research if they have diseases that may affect their body balance ability. All the subjects involved have no pre-test abnormal emotional impact and have been required to have sufficient rest and normal life behavior. (Yuhan Wang et al 2014)

2.2 Tests

2.2.1 Balance test
We used a system for stabilometric analysis (Postural Equa, Eletronica Pagani Co., Italy) to test all the subjects’ static postural balance. All subjects rested 1min before test and stood on the test platform without shoes. The balance test had 4 conditions: 1) in unipedal stance and closed eyes; 2) in unipedal stance and opened eyes; 3) in bipedal stance and closed eyes; 4) in bipedal stance and opened eyes. Every test lasted 10s, respectively. This research observed main measures including Center of Pressure (COP), Total Length of swinging pathway (TL), Maximal Length of swinging pathway (ML), Area of swinging pathway (Area) and LFS. (Yuhan Wang et al 2014)

2.2.2 Cognition test
We used the PsyKey psychological education system to test the cognition. This research tested cognition in two indicators, simple reaction time and spatial positional memory span.

When tested visual simple reaction time, all subjects should press green key as fast as possible when the visual stimulation were appearing. This test included 30 times, each time intervals for 2 seconds. (Yuhan Wang et al 2014) The time spent was recorded as their simple reaction time.

The spatial positional memory span test was a 5*3 grey form on the computer. When the test began, three pink circles were appearing in random location in sequence at the beginning of the test. After the pink circles disappeared, the subjects clicked the dot form in the position presented in sequence. After this breadth done three times, if not all wrong, then add 1 breadth continues until a breadth of three consecutive wrong or until the task was complete number 12. The subjects should remember and click dot forms as much as possible. The main indicator was the spatial position memory span value.

2.2.3 Mood assessment
This research assessed mood by BDI and STAI. The subjects should choose the option that conformed to emotional circumstance.

The BDI contained 13 items, every item had 4 options to describe the depressive degree. The assessment had a minimum score of 0 and a maximum score of 39. We summarised each item score as the total score of BDI.

The STAI consisted of state anxiety inventory and trait anxiety inventory. The STAI contained 40 items: 1 to 20 were the state anxiety inventory (S-AI), 21 to 40 were the trait anxiety inventory (T-AI). We calculated scores for each 20 items in S-AI and T-AI and accumulated as the total score of STAI.

2.3 Statistics
We used SPSS 20.0 to analyze the data. The data of body composition were presented as means ± SD. Subjects’ data of balance, cognition and mood were recorded. To verify the association with balance, cognition and mood the Spearman’s rank correlation coefficient was used. A p-value smaller than 0.05 on the two-tail was considered to indicate statistical significance. Tables are used for displaying the results.

| Table 1. Body composition of different level athletes. |
|-----------------|-----------------|-----------------|-----------------|-----------------|
|                 | HG              | MG              | PG              | Total           |
| Height(cm)      | 167.48±8.10     | 169.0±7.17      | 174.8±8.91      | 170.4±8.27      |
| Weight(kg)      | 53.28±8.37      | 58.7±4.91       | 63.6±9.51       | 58.5±8.54       |
| BMI             | 18.88±1.52      | 20.6±1.61       | 20.7±1.85       | 20.1±1.78       |

3. RESULTS

3.1 Body composition of athletes in different levels
Table 1 presented basic body composition information of all athletes. There was no significant difference of body composition in different levels of athletes.

3.2 The correlation between balance and cognition of athletes in different levels
Table 2 showed the correlation coefficients between balance and cognition of athletes in different levels. The correlations of SMS and static postural balance were negative in HG, but were positive in PG, and were no significance in MG. The correlations of SRT and static postural balance were that both of HG, but were negative in MG, and were no significance in PG.
4. DISCUSSION

Balance is a kind of the physical attribute that resists exterior forces and helps to keep the body in a steady state. The dancesport requires high balance activity of athletes. The dancesport athletes maintain body balance and do complex dance on the high-heeled shoes. They need to have not only dynamic balance ability but also static balance. In this study, the static test system is used to test subjects’ balance in unipedal stance and bipedal

| Table 2. The correlation of balance and cognition of athletes in different levels. |
|---------------------------------|---------------------------------|---------------------------------|
|                                  | HG                              | MG                              |
|                                  | PG                              |                                  |
|                                  | Unipedal Stance | Bipedal Stance | Unipedal Stance | Bipedal Stance | Unipedal Stance | Bipedal Stance |
| COP(mm)                          | 0.20                            | 0.20                            | 0.20            | 0.20            | 0.20            | 0.20            |
| X line                           | -0.03                           | 0.03                            | -0.03           | 0.03            | -0.03           | 0.03            |
| Y line                           | -0.03                           | -0.03                           | -0.03           | -0.03           | -0.03           | -0.03           |
| TL(mm)                           | 0.18                            | -0.18                           | 0.18            | -0.18           | 0.18            | -0.18           |
| ML(mm)                           | 0.05                            | -0.05                           | 0.05            | -0.05           | 0.05            | -0.05           |
| Area(mm sq)                      | 0.01                            | -0.01                           | 0.01            | -0.01           | 0.01            | -0.01           |
| LFS                              | 0.20                            | 0.20                            | 0.20            | 0.20            | 0.20            | 0.20            |

* At the 0.05 level (bilateral) significant correlation. ** At the 0.01 level (bilateral) significant correlation.
stance with opening eyes and closing eyes, respectively.

This research tests SMS and SRT that may have relationship with balance. Previous researches showed that highly concentrate oxygen administration can increase in cognitive performance. (Choi M et al 2013) We observed the cognition of different level athletes by testing SMS and SRT. SMS is a psychology parameter that distinguish spatial orientation perception individual. (Kessels RC et al 2002)

Cognitive function is an ability to hold the things constitution, development and the relationship to others. The technology of dancesport is combined with many body movements, such as turning, squatting, jumping, walking and running, and various in space. What’s more, the athletes should work closely with the partner following music. So the athletes need to have quick action response capability.

Mood is an important factor for competitive ability. (Wolframm IA et al 2010) It includes relaxation, calm, depression, anxious and so on. BDI and STAI can accurately reflect the depression and anxious degree. The athletes of dancesport should have good mental state in dancing to keep balance and show the emotional connotation of art.

As results, in unipedal stance, the significant correlation coefficients between BDI and balance of MG are more than HG and PG. Except that, the others significant correlation coefficients between mood and balance of HG are more than MG and PG. Besides, the significant correlation coefficients between cognition and balance of HG are more than MG and PG. The reason for these may be that the athletes of GH had been more training and more experience to deal with situation that mood is depression or anxious. They are more sensitive than athletes of MG and PG.

Among the correlation coefficients between mood and balance of HG, positive correlations are more than negative correlations. In addition, among the correlation coefficients between cognition and balance of HG, correlations between SMS and balance are positive, but correlations between SRT and balance are negative.

5 CONCLUSIONS

The respective correlations between body balance and cognition and mood of HG athletes are more significant than MG and PG. Except the correlation between BDI and balance of MG in unipedal stance are more than HG and PG. Besides, among the correlation coefficients between mood and balance of HG, positive correlations are more than negative correlations. In addition, among the correlation coefficients between cognition and balance of HG, correlations between SMS and balance are positive, but correlations between SRT and balance are negative.

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