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Comparison of the right basketball lay-up in hand and foot ipsilateral and contralateral conditions

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ABSTRACT

The purpose of this research was to compare the performance of right basketball lay-up in hands and feet ipsilateral and contralateral conditions in university students, 100 male students were selected by a described questionnaires, Chapman - Chapman hand superiority and Wai - Hong Jackie Lam foot superiority and were randomly divided into four groups:

1) 30 right ipsilateral, 2) 30 left ipsilateral, 3) 20 right contralateral and 4) 20 left contralateral. Participants tried right basketball lay-up in 75 trials for 5 days, and finally 5 efforts for an optimal test were conducted. Data were analyzed by analysis variance to compare the mean scores of groups, and LSD pursuit test was used in case of significant effect of different ipsilateral and contralateral conditions. By analyzing the proposed hypotheses at the $P \leq 0.01$ demonstrated significant differences among groups in performance. In general, contralateral students, especially right contralaterals had better performance compared with other groups.

Key words: lay- up, basketball, right ipsilateral, left ipsilateral, right contralateral, left contralateral.

INTRODUCTION

Human performance can be affected by several variables and recognizing such variables will significantly promote human performance. Some factors, such as body composition, strength, height, age and gender may influence human performance [11]. Communication and complex coordination exists among different systems of the body and this coordination depends on important factors such as dominance of body organs, especially eyes and hands [5]. Ipsilateral individuals are those whose dominant hands, legs and eyes are located in the same side of the body and contralateral are those their dominant organs are located in complex or in a combination form on both sides of their bodies [5]. In trying to explain why the lateral is more effective than contralateral, Grouios et al (2004) stated that people can more easily adapt their

dominant eye, hand, ball and net in a straight line [5]. On the other hand, some scientists such as Coren (1993) concluded that contralateral people act much better than ipsilateral ones in basketball. Because contralateral people's center of mass is closer to the median line of the body, so much more balanced and thus have a more direct shot and not to have to compensate spin to superior side of the body [3]. Rezaiyan (2007) compared the accuracy of students' eye and hand lateral and contralateral superiority in basketball free throw. Results demonstrated that left ipsilateral students perform better than right lateral and contralaterals [9]. Hatzinkolao *et al.* (2001) studied the accuracy of basketball free shot in professional lateral and contralateral players. The results demonstrated contralateral players made much more errors than ipsilateral ones in free throw [9]. Jones and colleagues (1996) studied the relationship between eye preference and shooting practice among soldiers. The result demonstrated learning relates to preferred eye, and ipsilateral soldiers learned shooting easier than contralateral ones [7]. Classe *et al.* (1996) studied relationship between eye and hand preference and hitting in south baseball league players, to examine accuracy of professional baseball players. The result showed no significant relation between the superiority of eye, hand and accuracy of hitting in baseball players [4]. Sheeran (1985) studied the effect of ipsilateral and contralateral in shooting skill. The result supported superiority of lateral ones in shooting [10]. Carey *et al.* (2009) studied two feet dominants and results showed that more professionals use their non-dominant feet more than beginners [2]. Kalaycioglu *et al.* (2008) studied the status of foot dominant, relationship between foot, hand superior and hand and foot hitting performance. The results showed that leg dominant in skilled and unskilled movements related to hands superiority, hand and foot hitting speed [8]. Takeda (2009) studied difference reactions between left and right hands during the rotation of hand mental images. The result showed that the right dominants are faster than left ones [9]. Grouios (2006) studied the Right hand advantage in visually guided reaching and aiming movements. The result concluded that the right people show the aiming tasks faster, more refined and with higher degree of spatial accuracy when performed with right hand [6]. Aftabi and colleagues (2011) studied performance comparison of the right basketball lay-up in hand and foot ipsilateral and contralateral conditions in university male students and understood that contralateral got better result than ipsilateral in this skill, especially this superiority was behalf of right contralateral [1]. Therefore, according to the superiority of ipsilateral and contralateral limbs as complementary physical factors in improving athletic performance, different results obtained from various investigations in this field. In order to complete the previous findings we decided to examine the influence of hand and foot ipsilateral and contralateral in right basketball lay-up among male students.

MATERIALS AND METHODS

One hundred university male students were selected randomly by a described questionnaires, Chapman - Chapman hand superiority and Wai - Hong Jackie Lam foot superiority and were randomly divided into four groups: 1) 30 right ipsilateral, 2) 30 left ipsilateral, 3) 20 right contralateral and 4) 20 left contralateral. Participants tried right lay-up in 75 trials for 5 days and finally 5 efforts for an optimal test were conducted. In order to collect the scores, Zachry *et al.* method (2005) was used. Data were analyzed by analysis variance to compare the mean scores of groups, and LSD pursuit test was used in case of significant effect of different ipsilateral and contralateral conditions.

RESULTS

Table 1. Results of ANOVA for comparing means in different right ipsilateral and contralateral conditions

| Sources of changes | Sum of Squares | df | Mean of Squares | F | P |
|--------------------|----------------|----|-----------------|-------|-------|
| Between groups | 212.173 | 3 | 70.724 | 6.891 | 0.000 |
| Within groups | 985.217 | 96 | 10.263 | | |

Table 2. Pursuit LSD test to study the real effect of right ipsilateral and contralateral

| Right lay-up performance Group 2 | Group 1 | Mean difference | St. dev. | P | Low | High |
|-------------------------------------|---------------------|-----------------|----------|-------|-------|-------|
| Right ipsilateral | Left ipsilateral | 2.067* | 0.827 | 0.014 | 0.42 | 3.71 |
| Right contralateral | Left ipsilateral | -2.083 | 0.925 | 0.027 | -3.92 | -0.25 |
| Left contralateral | Left ipsilateral | -0.133 | 0.925 | 0.886 | -1.97 | 1.70 |
| Left ipsilateral | Right ipsilateral | -2.067* | 0.827 | 0.014 | -3.71 | -0.42 |
| Right contralateral | Right ipsilateral | -4.150* | 0.925 | 0.000 | -5.99 | -2.31 |
| Left contralateral | Right ipsilateral | 2.200* | 0.925 | 0.019 | -4.04 | -0.36 |
| Right ipsilateral | Right contralateral | 2.083* | 0.925 | 0.027 | 0.25 | 3.92 |
| Left ipsilateral | Right contralateral | 4.150* | 0.925 | 0.000 | 2.21 | 5.99 |
| Left contralateral | Right contralateral | 1.950 | 1.013 | 0.057 | -0.06 | 3.96 |
| Left contralateral | Right ipsilateral | 0.133 | 0.925 | 0.886 | -1.70 | 1.97 |
| Left ipsilateral | Right ipsilateral | 2.200* | 0.925 | 0.019 | 0.36 | 4.04 |
| Right contralateral | Right ipsilateral | -1.950 | 1.013 | 0.057 | -3.96 | 0.06 |

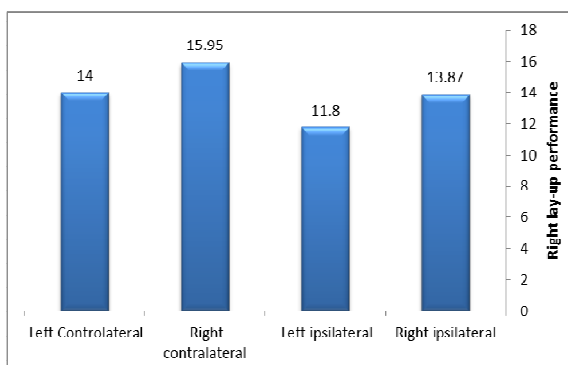


Figure. Basketball lay-up in different ipsilateral and contralateral conditions

CONCLUSION AND DISCUSSION

As it is shown in table 1, there was a significant difference among right lay-up performance in four right and left ipsilateral and contralaterals (p= 0.000).

According to the results of table 2, we conclude:

- There was a significant difference between performance of right and left ipsilateral lay-up.
- There was a significant difference between performance of right ipsilateral and left contralateral lay-up.
- There was a significant difference between performance of left ipsilateral and contralateral lay-up.
- There was a significant difference between performance of right contralateral and left ipsilateral lay-up.

Shiek research (1974-1997) showed there was no difference in superiority of ipsilaterals

compared with contralaterals in basketball free throw [9]. Coren (1993) found the superiority of contralaterals than ipsilaterals in basketball free throw. They described it as intransfer of center of mass to one side of the body and having a desired balance during shooting [3]. Aftabi et al (2011) showed contralaterals, especially right ones have better performance in basketball lay-up and it might be due to the use of both hemisphere, induced motor conditions in childhood and a better balance in free shot for contralaterals [1]. Results of this study is inconsistent with Grouios et al. research (2004). They expressed lateral ones can adapt their dominant eyes, hands, balls and net in a straight line and have less error. Results of this study is inconsistent with Grouios et al. research (2002). They expressed lateral ones can adapt their dominant eyes, hands, balls and net in a straight line and have less error. Hatzinkolao (2002) reviewed carefully the professional ipsilateral and contralateral players in free throw and concluded that contralaterals have more errors [9]. However, despite contradictory findings about the effects of ipsilateral and contralateral of hand and foot, much research is needed.

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