

# RELATIONSHIP BETWEEN THE WRESTLING DOUBLE LEG TAKEDOWN AND POWER OUTPUT FROM VERTICAL AND HORIZONTAL DIRECTIONS

Koria Pouri-Lane and Dr. Peter Maulder

## INTRODUCTION

Wrestling is a weight categorized sport (Artoli et al., 2010) and is one of the most popular combat sports in the world (Jang, Chang, Chen, Fu, & Lu, 2009). Wrestling began to appear in its modern form in the 776 B.C Olympic Games (Emeric, 2012). This was known as pankration, a form of unarmed combat, which later evolved into the two styles of Greco-Roman and Freestyle wrestling commonly used today (Emeric, 2012).

The double leg attack is defined as an effort to try and gain control over the opponents legs, achieving a takedown (Cipriano, 1993). The double leg takedown is an important and explosive technique which is often used in freestyle wrestling (Cipriano, 1993).

Wrestling primarily uses anaerobic power, and is a sport which often uses sudden explosive attacks implemented repeatedly. Due to this, anaerobic leg power can determine the success in wrestling, as the scoring system urges quick explosive movements (Hübner-Woźniak et al., 2004).

There are various power assessments such as the vertical jump and horizontal broad jump which can be used to determine lower body leg power (Maulder & Cronin, 2005). These jump tests give measures which can be used as a relative measure of functional power, as they are an indirect test for assessing power (Maulder & Cronin, 2005).

## METHODS

The participants for this experiment were recruited from the Waikato and Bay of Plenty Wrestling Teams and the USA Down Under wrestling team. Twelve male participants volunteered to participate in this study. The wrestlers were recruited from the 69kg weight class as this is currently one of the largest weight categories in New Zealand.

Each of the participants performed their own individual warm up before testing begins. They were then split in half. Half of the participants completed the vertical jump first, while the other half performed the horizontal broad jump first. They then swapped over once they had been through their respective jump tests. All participants performed two familiarisation trials before beginning their recorded trials.

Once everyone had been through the jump trials, the participants began the double leg takedowns on the wrestling mat. Participants were required to perform at least two familiarisation takedowns before performing the recorded trials.

The double leg takedown used was standardised, so that the participants all completed the same variation. Participants performed a standard double leg takedown, driving the participant backwards to the ground, similar to a rugby tackle. Participants used the same person as the opponent for all trials. This was to reduce variability with how the opponent reacts. Participants completed 3 trials with a 30 second break between trials. If the participant began to fatigue, they were given a slightly longer break of 45 seconds. There was a 2 minute break between participants' trials to allow the opponent to rest and ensure that they are performing the same for each participant.



## STATISTICAL ANALYSIS

Data was analysed using IBM SPSS Statistics version 22. This software was used for descriptive statistics such as mean and standard deviation, as well as a Pearson Correlation co-efficient. This study primarily used a cross-sectional study. Descriptive statistics were completed for all variables and relationships. The variables that were looked at are; time from the double hand connection to danger position, time from shoot phase to drive phase, and angle of the drive during the drive phase relative to the ground. The angle was taken from the shoulder closest to the camera, and the back foot. The Pearson correlation co-efficient was calculated for the following relationships; the relationship between the double leg takedown performance and the shoot phase, the relationship between the double leg takedown performance and the drive angle, the relationship between the double leg take down and the vertical jump height, and finally the relationship between the double leg takedown and horizontal jump distance.

## RESULTS

The results of the study found little significant differences between power output from vertical and horizontal directions compared to the three variables used in the study. The Pearson's correlation co-efficient was used to analyse the results and the various correlations found in this study were mainly low to moderate. However there were two notable large correlations found. A large relationship of  $R=-.597$  was seen between the vertical jump and the drive angle of the takedown relative to the ground. This indicates that the higher the vertical jump, the more horizontal the drive of the angle relative to the ground. Moderate correlations were found between the vertical jump and shoot phase ( $R=-0.35$ ), and the vertical jump and double hand connection to danger position phase ( $R=-0.33$ ). The horizontal jumps showed lower correlations between the double leg takedown variables, with a low correlation between both the horizontal jump and the shoot phase of the takedown and the drive angle of the takedown relative to the ground. The results did find a large correlation of  $R=.629$ , between the double hand connection to danger phase and the shoot phase of the take down.

Table 1. Correlations between directional power outputs and the double leg takedown variables.

		Vertical Jump	Horizontal Jump	Shoot to Drive Phase	Double Hand to Danger Phase	Drive Angle
Vertical Jump	Pearson Cor-	1	.442	-.346	-.329	-.597*
	Sig. (2-tailed)		.151	.270	.297	.041
	N	12	12	12	12	12
Horizontal Jump	Pearson Cor-	.442	1	.103	.409	-.243
	Sig. (2-tailed)	.151		.750	.187	.447
	N	12	12	12	12	12
Shoot to Drive Phase	Pearson Cor-	-.346	.103	1	.629*	.358
	Sig. (2-tailed)	.270	.750		.028	.253
	N	12	12	12	12	12
Double Hand to Danger Phase	Pearson Cor-	-.329	.409	.629*	1	.221
	Sig. (2-tailed)	.297	.187	.028		.489
	N	12	12	12	12	12
Drive Angle	Pearson Cor-	-.597*	-.243	.358	.221	1
	Sig. (2-tailed)	0.41	.447	.253	.489	
	N	12	12	12	12	12

Note: \*.Correlation is significant at the 0.05 level (2-tailed)

## DISCUSSION

The findings of this study support the hypothesis as a greater relationship was seen with the double leg takedown and vertical jump, than the horizontal jump. These findings suggested that the higher the vertical jump height, the more horizontal the drive angle of the takedown was. It also suggested that the higher the vertical jump height, the faster the shoot phase and the double hand connection to danger phases were. This therefore suggests that the higher the vertical jump height was, the more anaerobically powerful the wrestler was as the vertical jump is used as an indirect measure of anaerobic leg power (Callan et al., 2000; Hübner-Woźniak et al., 2004).

Findings also supported the hypothesis as the raw data from this study showed that the participants' who performed the shoot phase of the takedown faster, performed the double hand connection to the danger position slower. Data also showed that the participants who performed the double hand connection to the danger position phase slower, had a greater drive angle relative to the ground.

Currently there is little to no research surrounding this area which makes it difficult to see how these results would compare to a study similar to this. Despite this, it is known that lower body power is an integral part of wrestling and can often be a determinant of success as it is used to perform the powerful techniques which are often used (Demirkan, Kutlu, Koz, Ozal, & Favre, 2014; Hübner-Woźniak et al., 2004; Koc, 2013). Literature suggests that the vertical jump has often been used by wrestling coaches in order to assess their lower body power (Callan et al., 2000; Pallarés, López-Gullón, Torres-Bonete, & Izquierdo, 2011; Utter, O'Bryant, Haff, & Trone, 2002). This may also indicate that this is a more relative indicator of power for wrestling than the horizontal jump, as this test is used more than a horizontal jump is.

Further research could be completed using similar parameters as this one in order to compare this study with and find more out more on whether there is a relationship between the directional power outputs and the double leg takedown. It is also recommended that further research could be completed on the relationships between directional power output and other powerful techniques used in wrestling in order to establish training strategies to enhance each technique. Finally, further studies may use these results to establish appropriate training strategies for enhancing the double leg takedown using vertical power. When completing this study, it is recommended that ensuring that a minimum of 15 wrestlers be used to complete the study, as wrestlers vary in technique. With a larger range of participants, larger correlations may be seen within the results.