

Sporting events among the disabled between excellence and ideal in motor performance

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Abstract: The identification of mechanical variables in the motor performance trajectory has a prominent role in improving skill performance, error-exceeding, it contributes seriously to solving some problems of learning and training. The study Aims to highlight the indicators of motor performance for Paralympic athletes during the practicing sports between modelling and between excellences in motor performance, this by taking into account the distinction of athlete practicing with special behavioural skills for the Paralympic athletes. In the study we relied on the analysis of some previous research of biomechanical performance indicators during some of the events sports (shooting activities in the Paralympic athletics, shooting skill in the wheelchair basketball). The results of the study highlight the distinction of disabled practitioners of sporting events identified in motor performance during practice, by overcoming some physics indicators in human movement, as a lower centre of body weight, Increase in offset distance, such resistance which requires them to redouble their efforts. However, the results of the study highlighted the strength of the correlation between biomechanical variables of motor performance and the digital level achievement similar to the other practitioners normal.

Key Words: Sports, The disabled, Motor Performance, Paralympic.

1 Introduction

Adaptive sports also known as disability sports, are sports played by persons with a disability, including physical and intellectual disabilities. As many disabled sports are based on existing able bodied sports, modified to meet the needs of persons with a disability, they are sometimes referred to as adapted sports. Organized sport for athletes with a disability is generally divided into three broad disability groups: the deaf, people with physical disabilities, and people with intellectual disabilities. Each group has a distinct history, organization, competition program, and approach to sport [1]. While sport has value in everyone's life, it is even more important in the life of a person with a disability. This is because of the rehabilitative

influence sport can have not only on the physical body but also on rehabilitating people with a disability into society. Furthermore, sport teaches independence. Nowadays, people with a disability participate in high performance as well as in competitive and recreational sport [3]. The number of people with disabilities involved in sport and physical recreation is steadily increasing around the world with organized sports for athletes with disabilities divided into three main disability groups, sports for the deaf, sports for persons with physical disabilities, and sports for persons with intellectual disabilities [2]. From the late 1980s, organizations began to include athletes with disabilities in sporting events such as the Olympic Games and Commonwealth Games.

However, many sports are practiced by persons with a disability outside the formal sports movements, for example: Wheelchair basketball, Wheelchair dancing, Weightlifting, Swimming, and many other sporting activities you can join if you are mentally or physical disabled. The global Special Olympics movement got its start on 20 July 1968, when the First International Special Olympics Games were held at Soldier Field, Chicago, Illinois, USA. But the concept of Special Olympics was born much earlier, when Eunice Kennedy Shriver started a day camp for people with intellectual disabilities at her home in 1962 [3].

Biomechanical analysis of sport performance provides an objective method of determining performance of a particular sporting technique. In particular, it aims to add to the understanding of the mechanisms influencing performance, characterization of athletes, and provide insights into injury predisposition. Whilst the performance in sport of able-bodied athletes is well recognized in the literature, less information and understanding is known on the complexity, constraints and demands placed on the body of an individual with a disability. This paper provides a dialogue that outlines scientific issues of performance analysis of multi-level athletes with a disability, including Paralympians [4]. Paralympic Games - A multi-sport event for athletes with physical, mental and sensorial disabilities. This includes mobility disabilities, amputees, visual disabilities and those with cerebral palsy. The Paralympic Games are held every four years, following the Olympic Games, and are governed by the International Paralympic Committee [5].

2 Methods

The aim of this study is a comparative analysis of the kinematic parameters of the shot put, disc throw, shooting skill in wheelchair basketball of some athlete's in different national elite in the world, and they are the best competitors in the Paralympic & world games, where also recorded the best digital

level. We used the resultants of last researches for analysis the motor performance of these athletes, and for compare this values biomechanics of disabled athletes with the values of normal athletes.

4 Results and Discussion

***Shot Put;** The main difference in the gliding technique was found to be a reduction of the acceleration path of the shot, which is indicated by a reduced horizontal distance travelled by the shot in the gliding and the release phase. No major differences were found for the durations of each functional phase. Therefore ID athletes conduct the gliding technique with a lower average speed, since they cover a shorter distance in the glide and release phase in approx. [6]. The same amount of time. It is a well - accepted theory, that a longer accelerative path of the implement is a positive contributor to release velocity in all throwing events.

As a result of the reduced length of the accelerative path, release speed of the shot is reduced for ID athletes, which explains most of the differences found for the official distance reached by the athletes. This could be a result of a poor execution of the gliding technique. Technique acquisition might be one major factor which is restricted by an intellectual disability. Nonetheless performing the gliding technique properly calls for a high potential force producing, especially for the muscle tendon units of the lower extremity. Without the using of further information concerning for example force producing capacities or training history of the athletes no conclusions concerning the exact reasons of the lower performance of the ID athletes can be drawn [7]. The most basic kinematic differences in shot putting techniques of male athletes with a disability compared to athletes of different levels basic result was that the poorer performance of ID athletes was associated with a reduction of the acceleration path of the shot resulting in a lower speed of the shot at release. We can be see concerning the roots of this poor execution of the gliding technique unless further

individual information of the athletes is included into the biomechanical analysis.

The final release velocity of the shot is the culmination of all the movement units across the circle up to, and including the power position. Poorly executed movement units across the circle negatively affect the final release velocity [8].

Release velocity and release angle are inversely related. As one parameter increases, the other decreases. Release angle can be manipulated depending on the throwers strength and anthropometrics. The goal is to determine the release angle that optimizes the total distance for the release velocity attained for the thrower. For the shot put, the optimum angle of release is between 31° and 36° (Fig 1) [9].

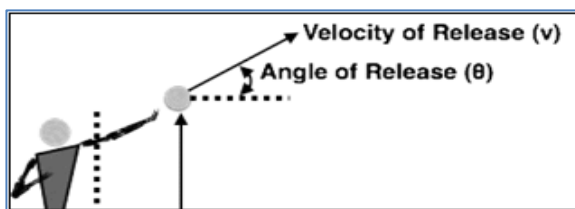


Figure 1 Parameters Affecting Horizontal Release Distance

***Disc Throw;** the aerodynamic forces are significant factors on Paralympics discus flight. The correlation between drag, lift and range (in some cases) has good significant levels. Aerodynamic factors (in low speed of discus) have a true influence on flight distance so that it can be measured and used in equations to predict the range [10]. Other conditions such as atmospheric and wind positions deserve more attention. The drag free equation must be applied only in low velocities and short trajectories (for example e shot put) or high velocity projects with low aerodynamic influences (for instance, the hammer throw). In this case, the drag free equations demonstrate significant differences to official range and can't be applied to predict flight distance on Paralympics discus throw [11].

The throw-like movement pattern of the kinetic chain contributes largely in the performance of a discus throw. This movement allows the

sequential motion of the joints to create the greatest release speed. Newton's third law of motion allows forces to be generated through the reaction to the ground allow for increased force transferred into the discus. Angular motion and arm length combined together to allow for the release speed to be as large as possible. With increase angular motion and the longest possible arm length the release speed will be at its greatest, allowing for peak performance to occur. Finally the optimum height release is said to be at shoulder height at the point where the discus is leaving the hand, to allow for the discus to reach the highest release speed and the optimum angle of release to be created. The optimum angle of release is individual but is aimed to be between 35 and 45 degrees (Fig 2) [12].

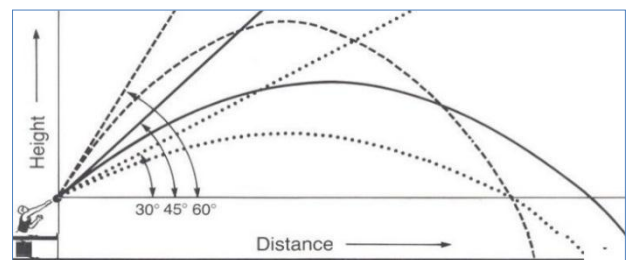


Figure 2 The Parabolic Flight Path for Various Release Angles.

***Shooting wheelchair Basketball;** significant differences were observed between the players classes in FT shooting mechanics employed for a clean shot. Players from different Classes tended to release the ball from a lower height, with greater velocity and release angle. They demonstrated a smaller shoulder flexion angle at release and a greater maximum velocity at the shoulder and elbow [13].

The clean shots of Classes demanded greater accuracy with respect to release velocity and angle, yet the resulting ball trajectory displayed a greater margin for error than the shots observed in the upper classes. However, based on overall shooting percentage, the upper classes did not appear to take advantage of the predicted benefits provided by a higher ball release height [14].

The Pictorial definitions of seven joint angles used to detect upper-limb motions during basketball shooting (Fig 3); (a) Shoulder horizontal adduction (+)/horizontal abduction (-), (b) elbow extension, (c) shoulder abduction, (d) shoulder internal rotation (+)/ external rotation (-), (e) forearm pronation (+)/ supination (-), (f) wrist flexion (+)/ extension (-), and (g) wrist ulnar flexion (+)/ radial flexion (-)[17].

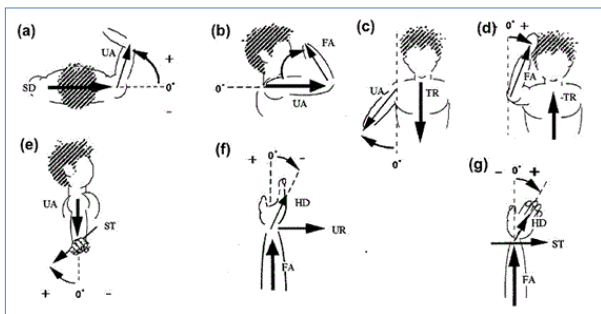


Figure 3 Pictorial Definitions of Seven Joint Angles Used to Detect Upper-Limb Motions During Basketball Shooting.

Biomechanical studies in wheelchair sports mainly aim at optimizing sport performance or preventing sport injuries. The sports performance optimization question has been approached from an ergonomic, as well as a skill proficiency perspective. Sports medical issues have been addressed in wheelchair sports mainly because of the extremely high prevalence of repetitive strain injuries such as shoulder impingement and carpal tunnel syndrome. [15] Sports performance as well as sports medical reflections are made throughout the review. Insight in the underlying musculoskeletal mechanisms of hand rim wheelchair propulsion has been achieved through a combination of experimental data collection under realistic conditions, with a more fundamental mathematical modelling approach. Through a synchronized analysis of the movement pattern, force generation pattern and muscular activity pattern, insight has been gained in the hand rim wheelchair propulsion dynamics of people with a disability, varying in level of physical activity and functional potential. The limiting environment of a laboratory, however, has hampered the drawing of sound conclusions. Through mathematical modelling, simulation and optimization (minimizing injury and

maximizing performance), insight in the underlying musculoskeletal mechanisms during wheelchair propulsion is sought. The surplus value of inverse and forward dynamic simulation of hand rim stroke dynamics is addressed. Implications for hand rim wheelchair sports are discussed. Wheelchair racing, basketball and rugby were chosen because of the significance and differences in sport-specific movement dynamics. Conclusions can easily be transferred to other wheelchair sports where movement dynamics are fundamental [16].

The players having less functional ability (Classes 1 and 2, whose typical disabilities include level L1 and upper paraplegia) tended to release the ball from a lower release height using a greater ball release velocity. Therefore, the vertical component of the ball velocity should be used with the average ball velocities and projected angles.

The kinematic features of wheelchair basketball players in compared with those of able-bodied basketball players in shooting skills. The reduced ball release velocity for the wheelchair players depended on an insufficient angular velocity of the wrist flexion motion, which may be restrained by dysfunction of available musculature. Moreover, for shoulder horizontal abduction motion near the time of shoot ball there is a larger range of shoulder abduction motion and larger displacements of the right shoulder in the tetraplegia players. Maximize the function of available musculature around the elbow and shoulder joints, thereby compensating for dysfunction of the wrist flexor muscles and contributing to the resultant ball release velocity [17].

4. Conclusions

This study tried to analysis of some variables biomechanics of motor performance and interpretation of kinetic performance variables compared to ordinary athletes, Where I discuss the results of the analyses of previous studies to clarify the nature of the link in the values of selected variables Between ideal and perfect, so emphasizing

studies that link the values of kinetic performance variables remains constant in both cases, add highlighting the extra effort for disabled persons in order to achieve performance excellence perfectly.

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Competing Interests

The authors declare that they have no competing interests.

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