

STUDY OF POSTURAL SAFETY AND MUSCLE ACTIVITY ANALYSIS FOR DEADLIFT EXERCISE IN GYM

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ABSTRACT: In exercise or workouts, postural safety and ergonomics are some of the factors that need to look into for the safety of humans or athletes. Good postural safety of an athlete can reduce accidents and injury. The lack of postural safety and ergonomic features could result in negative effects, especially on athletes' physical and mental health. To evaluate the posture problem due to comfortability and ergonomics, a survey has been conducted. This was implemented by distributing questionnaires sheets for athletes to find out their experience and opinions regarding uncomfortable feelings and injuries. Ergonomic and injury problems commonly arise due to bad posture. The purpose of this study is to determine the postural safety problems and risk assessment while deadlifting among student-athlete in the gym. It also to study the back muscle activity analysis for three types of position and best angle while deadlifting. The surface electromyography (EMG), Kinovea software and Matlab software were used in this research to assess potential risk areas that occur during deadlifting. This study shows that deadlift in posture can be improved by ensuring the back and shoulder posture is in the proper position. The result shows that the deadlift position of straight shape of leg position with 105° angle is the less time to complete the exercise with less muscle activity for 10 repetitions. Therefore, further study on different deadlift exercises can be done in the future to indicate the postural safety of an athlete.

Keywords: Postural Safety, Muscle activity, Electromyography (EMG), Gym, Deadlift

1. INTRODUCTION

Weightlifting is one form of exercise to build muscles. A good form of weight lifting and give good benefit to the sportsman or athlete. Other than that, doing exercise also can give good health and look younger. As an example of exercise doing sitting and standing with proper posture will physically look 10 years younger and 10 pounds lighter [1]. Nowadays more people are concerned about their good health and good body posture. Therefore, more people love to work out whether at the gym or at-home training. There are many exercises and weightlifting exercises such as deadlift and free weight exercise.

The deadlift exercise is often referred to as the King of Exercises because it develops so many muscles in the body and is so grueling to perform [2]. There are 4 types of deadlift variations which are Sumo Deadlift, Trap Bar Deadlift, Stiff-legged Deadlift and Romanian Deadlift [3]. In order to start deadlift, position for the deadlift is starting with the lifter in a squat position with the knees and hips flexed approximately 80–100°, while the arms must be at straight and pointing down, and an alternating hand grip used to hold a barbell positioned in front of the athlete [4]. The deadlift is a strength-building exercise that is stable for powerlifters and other athletes looking to get stronger. However, many athletes get injured when doing deadlifting because the majority of them have insufficient knowledge about the correct posture of the deadlift.

Some study shows that deadlift mainly activates muscle on the hamstrings and lower back of the athlete [5]. This is where the muscle of an athlete is mostly exposed while doing deadlift exercise. Another study shows that range of motion and peak acceleration during the deadlift and squat

exercises when athletes doing stance-width [6]. As we know, the mechanical characteristics of the deadlift, include the ability to recruit significant muscle groups in the leg and back area, at high contraction rates while it is being used [7]. This is why deadlift can be the King of Exercise due to the muscles that are activated while performing it. In other words, deadlift possesses good health and vital power development for an athlete promising kinetic profile that allows for continued acceleration through the continuous acceleration of significant lifting exercise [8]. Proper posture and good position of the deadlift, will give significant benefit to an athlete. This will lead to increase performance and reduce injury while performing this exercise. By using electromyography, muscles activity can be determined to monitor and reduce injury [9].

Thus, there is limited study on postural safety and back muscle activity analysis among athletes in Malaysia gym. As the general study indicates there are safety issues related to sports that need to be looked into more seriously. Therefore, the purpose of this study is to the postural safety of deadlift exercises and study the muscle activity while doing deadlift exercises in a different position.

2. METHODOLOGY

In this study, the discomfort injuries, pains and stress of athletes in the gym are going to be identify. Investigating and improving the current way on how to minimize the risks of potential injury and accidents towards people and athletes is one of the better ways. This can be done by acquiring better knowledge on how posture affects occupational safety, health and performance levels of people in the gym and athletes.