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The Deadlift -Part 1

Luke Delvecchio*

School of Medical and Applied Sciences, Central Queensland University, Australia

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***Corresponding author:** Luke Delvecchio, School of Medical and Applied Sciences, Central Queensland University, Rockhampton, Australia, Email: l.delvecchio@cqu.edu.au

Introduction

Historically, athletes and non-athletes alike have used deadlift, to strengthen the hip, thigh, and back musculature[1]. Interestingly, many strength coaches believe the squat and deadlift have very similar characteristics. To the naked eye, the squat and deadlift appear very similar (both exercises involve triple joint extension). However, from a biomechanical point of view, the two lifts are in fact, entirely different. For example, compared to the squat, the deadlift requires force production without the aid of the stretch-shortening cycling, so unlike the squat; the deadlift starts with a concentric contraction and ends with an eccentric contraction[2]. Thus, the squat differs because,it allows viscoelastic energy stored in the muscles and tendons on the way down, to be expressed, on the wayup. In contrast,thedeadlift, however, the deadlift starts in a mechanically difficultposition, requiring the lifter to generatethe entire force needed to move the bar off the floor, without the assistance of the stretch shortening cycle[2]. Finally, in the deadlift, the load is applied perpendicular to the bodyand loadedin the horizontally plane, unlike the squat, which is a loaded in the vertical plane [3]. Horizontally loaded movements may be more beneficial for horizontally based sporting movements such as sprinting and long jump, which implies deadlifts may provide a greater transfer effect to these activities[3]. Taken as a whole, the results of this research suggests the biomechanical profile of the squat and deadlift.

Traditionally, Lifting technique for the deadlift has been broken down into to two distinct techniques[4]. The first lifting strategy, known as the "leg-lift" utilises a bent leg position (knee flexion) with a mostly vertical trunk position. This technique utilises similar joint angle changes at the hip, knee and ankle and more closely resembles a squat. In contrast, the "back-lift" technique involves an extended knee and flexed trunk position during the initial lifting phase of the deadlift. During the back-lift technique, the hips rise more rapidly than the leg-lift, creating an increase in the trunk angle.According to Hales et al. the leg-lifting technique imposes lower loads on the lumbar spine, which may be more beneficial for reducing the risk of lower back injury. However, this lifting technique imposes asignificant load on the knees. Conversely, the back-lift style exposes the lumbar spine to significantly greater loads. Interestingly, depending on the lifting technique, the lower limb muscle groups are recruitedsynergistically (leg-lift technique) orin a sequential manner (back-lift), to create the necessary muscle forces to lift the bar off the ground. Intriguingly, researchers [5]observed trained deadlifters when lifting heavy loads, changed their technique, mid-lift, from a leg-lift to a back-lift technique, due to an inability to maintain lumbar lordosis. Furthermore, some other researchers [6,7]have reported the leg-lift t is not the preferred deadlifting technique for when lifting heavier loads.In summary, deadlifting appears to involve a combination of leg dominant and back dominant lifting technique depending on how much weight is being lifted. During heavier deadlifts, it seems lifters opt for the back-lift technique.Another deadlift variation that has been popularised of late is the Hex-bar deadlift; the Hex-bar allows deadlift be performedusing a trap-bar, with a neutral grip, the load, which is lateral to the centre of mass, shortens the spinal lever on the horizontal axis, reducing pressure on the lower back. The configuration of this lift can be replicated with kettlebells or sandbags.Researchers recently compared the effects of a hex-bar deadlift versus a barbell deadlift on force output and joint impact forces. The participants in this study performed deadlifts with loads ranging from 40-80% of 1RM; the researchers observed the subjects in the study were able to lift approximately 20 kilos more using the hex-bar deadlift in conjunction with greater peak force, peak velocity and peak power outputs.Importantly, the researchers also observed the Hex-bar deadlift imposed significantly lower peak torque moments in the lumbar spine. These results suggest the Hex-bar deadlift or similar variations, such as a bilateral kettlebell deadlift (suitcase position) may be a viable alternative to barbell deadlifts for reducing pressure on the lower back and increasing lower body strength.

For FTI instructors and practitioners, the practical implications of these studies are:

a. The deadlift may provide better transfer for sporting activities that take place in the horizontal plane, such as sprinting.

b. To protect the lower back during deadlifting, clients should be instructed to keep their knee's bent and avoid using the back-lift technique.

c. Despite the obvious safety concerns, more advanced lifters/clients may utilise the back-lift technique when performing heavy deadlifts. It is suggested, these lifters/clients undergo additional strengthening exercises for the lumbar and thoracic portions of the erector spinae.

d. A suitcase style deadlift performed with a Hex-bar, kettlebell or sandbag due to its lower loads on the lumbar spine, may be an ideal starting point to commence deadlift training in beginners or clients with a history of lower back pain.

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