DOUBLE KNEE BEND IN THE POWER CLEAN

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INTRODUCTION: The power clean is well established as the “gold standard” exercise for the development of lower extremity propulsive forces (Garhammer, 1982). The power clean has become a sprint specific strength and conditioning exercise, which is incorporated into periodised training programmes (Siff, 1992). Specifically the occurrence of a double knee bend (DKB) provides a mechanism to elicit a sprint specific stretch shortening cycle (SSC), maximising power output (Enoka, 1979). The aim of this exploratory study was to investigate whether the DKB occurred in power cleans as relative load increased.

METHODS: One elite male rugby player (age: 23 years; height: 1.72 m; mass: 85.5 kg), experienced in performance of the power clean, completed four lifts at each loading (60%, 70%, 80% and 90% of one repetition maximum lift (1RM)) in a randomized order over two days. Markers were placed on the 5th metatarsophalangeal joint, lateral malleolus, knee joint centre, greater trochanter and shoulder joint centre by the same researcher on both days. Kinematic data was recorded using four CODA CX1 scanners (Charnwood Dynamics, UK) sampling at 200 Hz. The DKB was defined as a local minimum in knee angle immediately prior to the catch phase of the power clean.

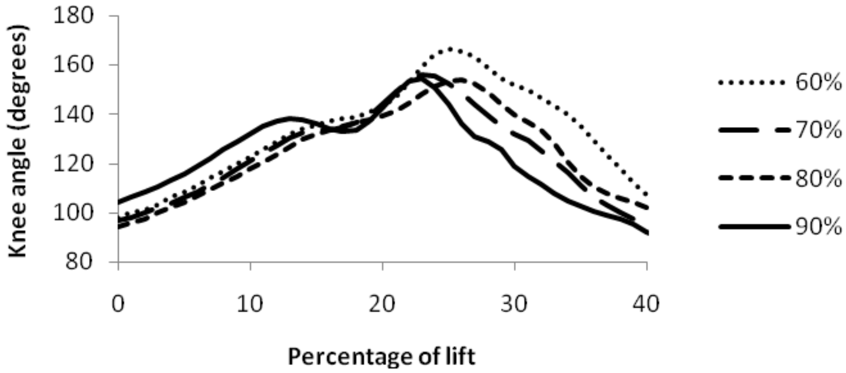

Figure 1. Knee angle during the first 40% of the power clean (A clear decrease in knee angle highlighting the occurrence of the DKB is shown during loading at 90% of 1RM)

RESULTS AND DISCUSSION: Figure 1 shows how the DKB does not occur until the bar is loaded at 90% of 1RM, as shown by a local minimum at 17% of the lift at 90% of 1RM. At low relative loads, bar velocity may have been high; decreased bar velocity with increased relative load increases time taken to complete the lift, allowing the DKB to occur.

CONCLUSION: The power clean appears to replicate the SSC seen in sprinting only when the bar is loaded at 90% of 1RM, but this is excessive for regular training. Further study with a larger sample of athletes would add power to this study and determine if this pattern is replicated.

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