

Abstract Submitted  
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**Physics of Weightlifting**<sup>1</sup> CAROLINE COHEN, LadHyX, Ecole Polytechnique — In the footsteps of J.B. Keller who determined the optimal strategy to run a race [1], we investigate weightlifting records. We measure the dynamics of lifting barbells of different masses at Bench Press for different athletes. To understand the shape of experimental results, we need both a macroscopic mechanic model and microscopic description of muscle contraction. We dive into muscle in order to understand the relation between force generated by the muscle and its contraction velocity [2,3] and draw a capillary analogy of muscle contraction. Finally we use the Deshcherevskii kinetic model [4] and derive the dynamics of the barbell. From the fit between data and predictions, we extract microscopic characteristics of muscles. We consider to apply this protocole to diagnose muscle aging or dysfunctions.

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[4] Deshcherevskii, V. I. (1971). A kinetic theory of striated muscle contraction. *Biorheology*, 7(3), 147-170.

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