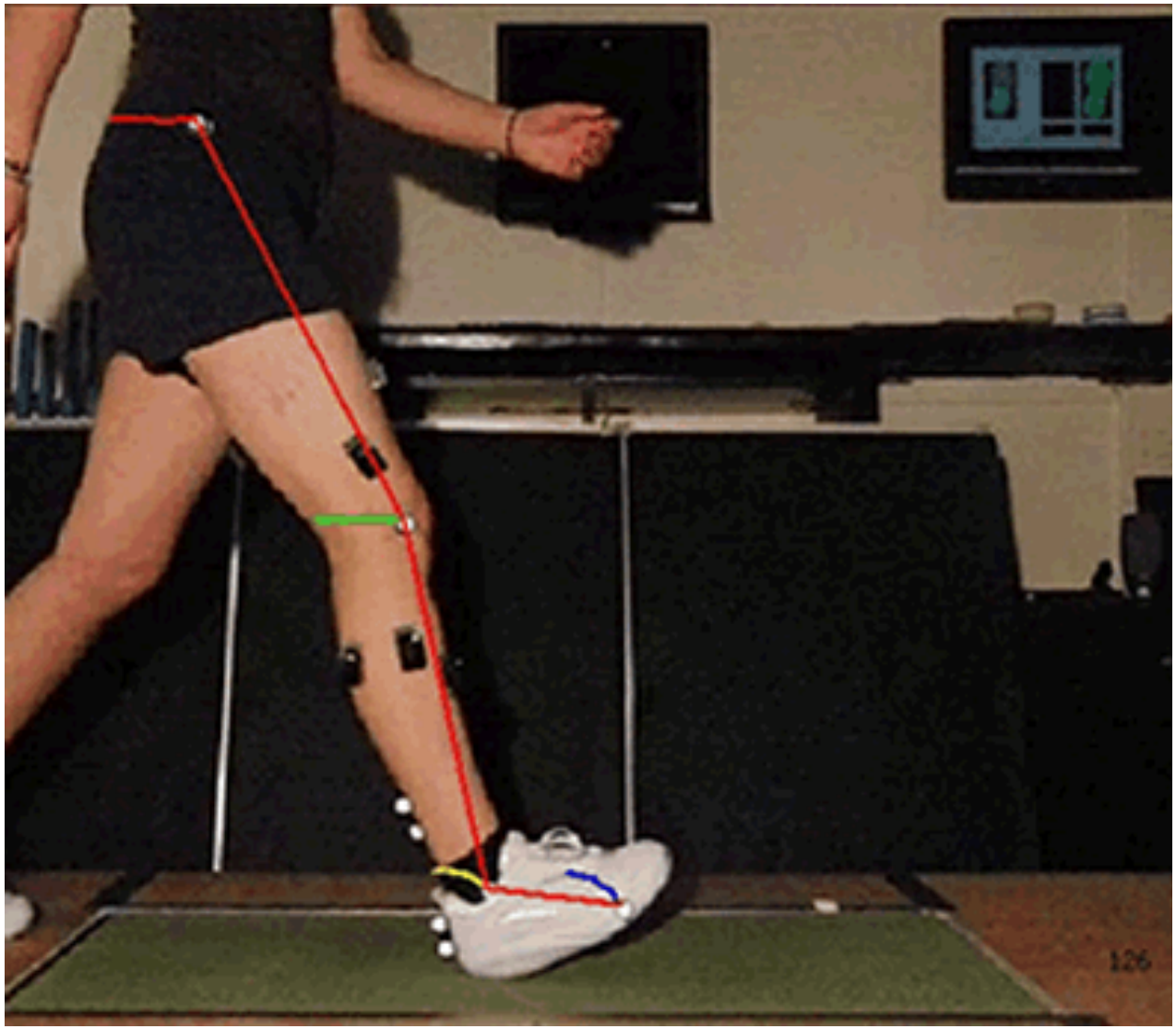
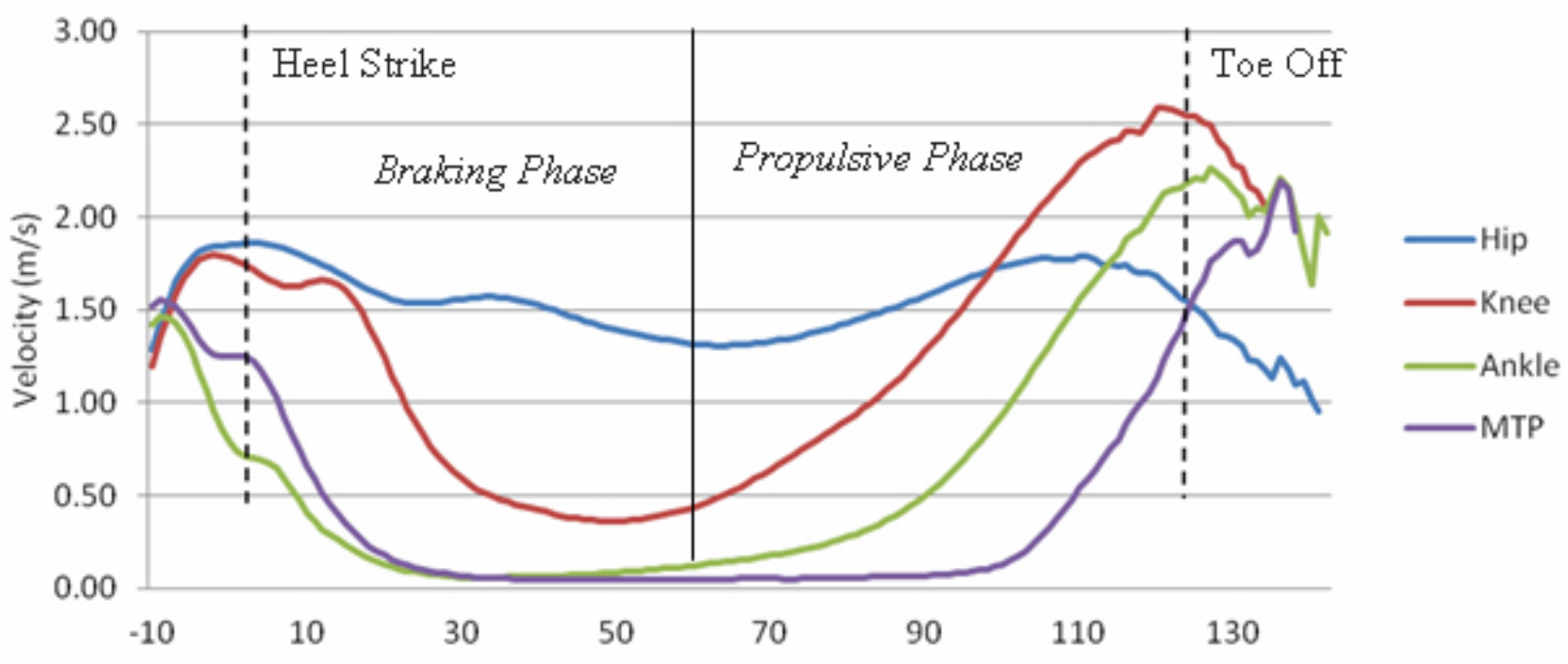
Caminhada



http://www.quintic.com/education/case_studies/Gait%20Analysis.html

Overall mean velocities during the stance phase of the gait cycle.



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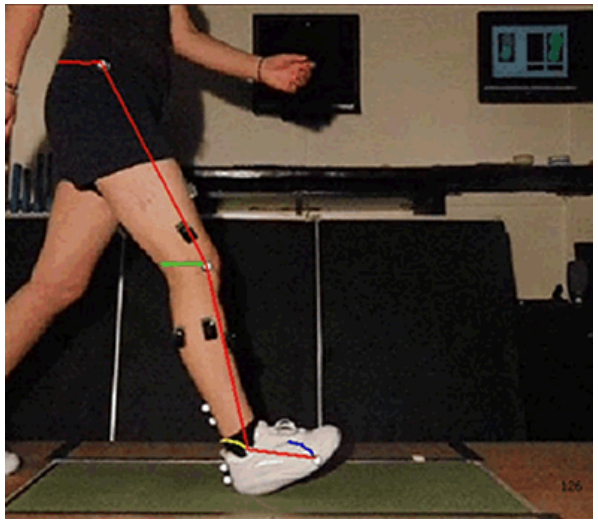


Gasto energético durante caminhada

TABLE 3. Metabolic cost of walking on the level and up and down stairs with various loads

(All values expressed as Calories per hour)

Subject	Total load (kg.)	Standing	Walking			
			on the level	down stairs	up stairs	External work
R.P.	70	82	185	250	480	± 82
D.O.	85	86	175	230	540	± 99
R.P.	85	84	210	270	625	± 99
D.O.	100	83	190	245	640	±117
R.P.	100	110	255	330	850	±117
D.O.	115	83	200	330	795	±134

R.P.: wt. 63 kg.; ht. 182 cm.
D.O.: wt. 77 kg.; ht. 177 cm.
Horizontal motion (all movements) 2230 m./hr.
Vertical motion (climbing up and down) ±490 m./hr.

[Referência: D. Orsini e R. Passmore. The energy expended carrying loads up and down stairs: experments using the K-M calorimeter. J. Physiol. (1951) 115:95-100.

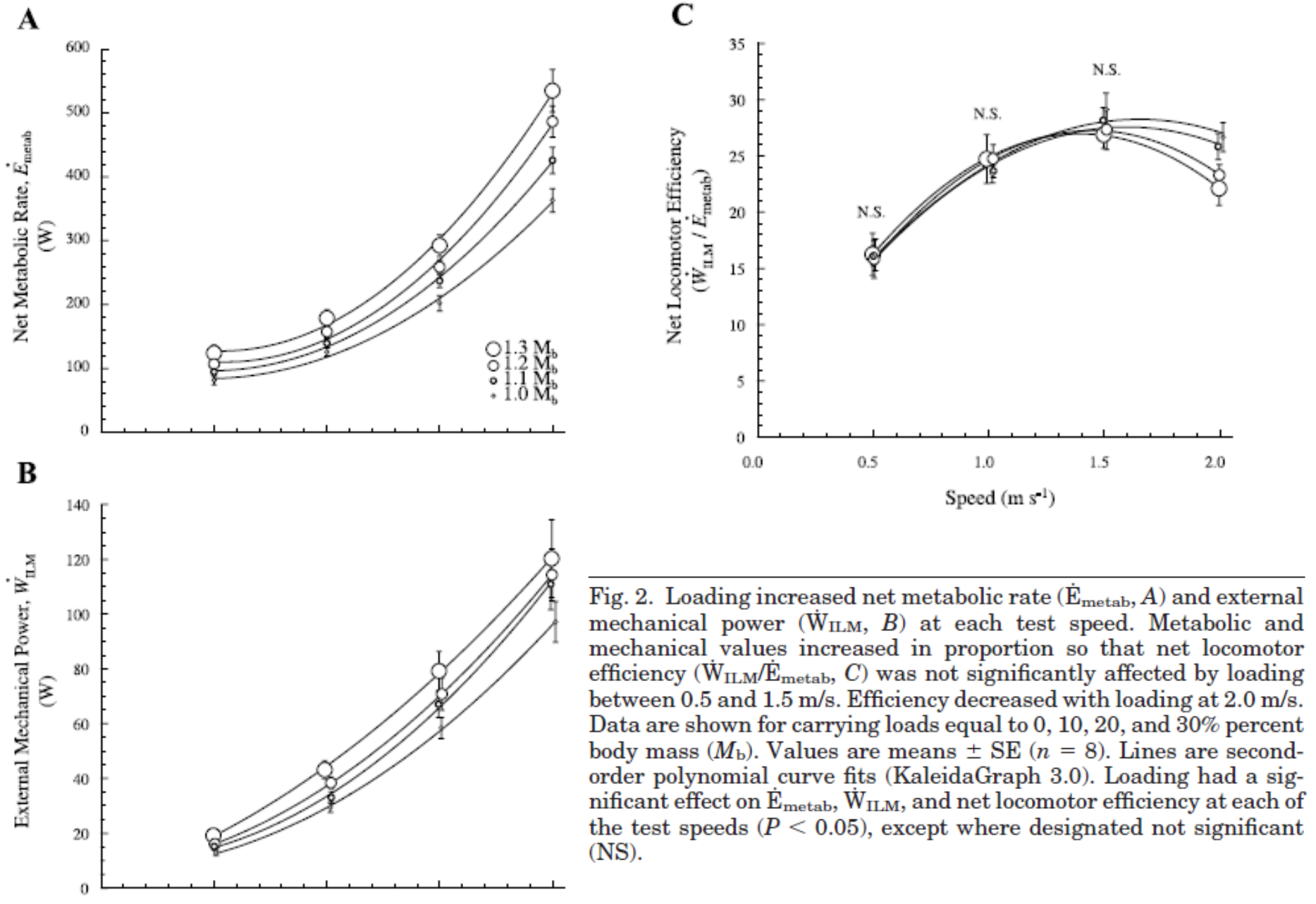
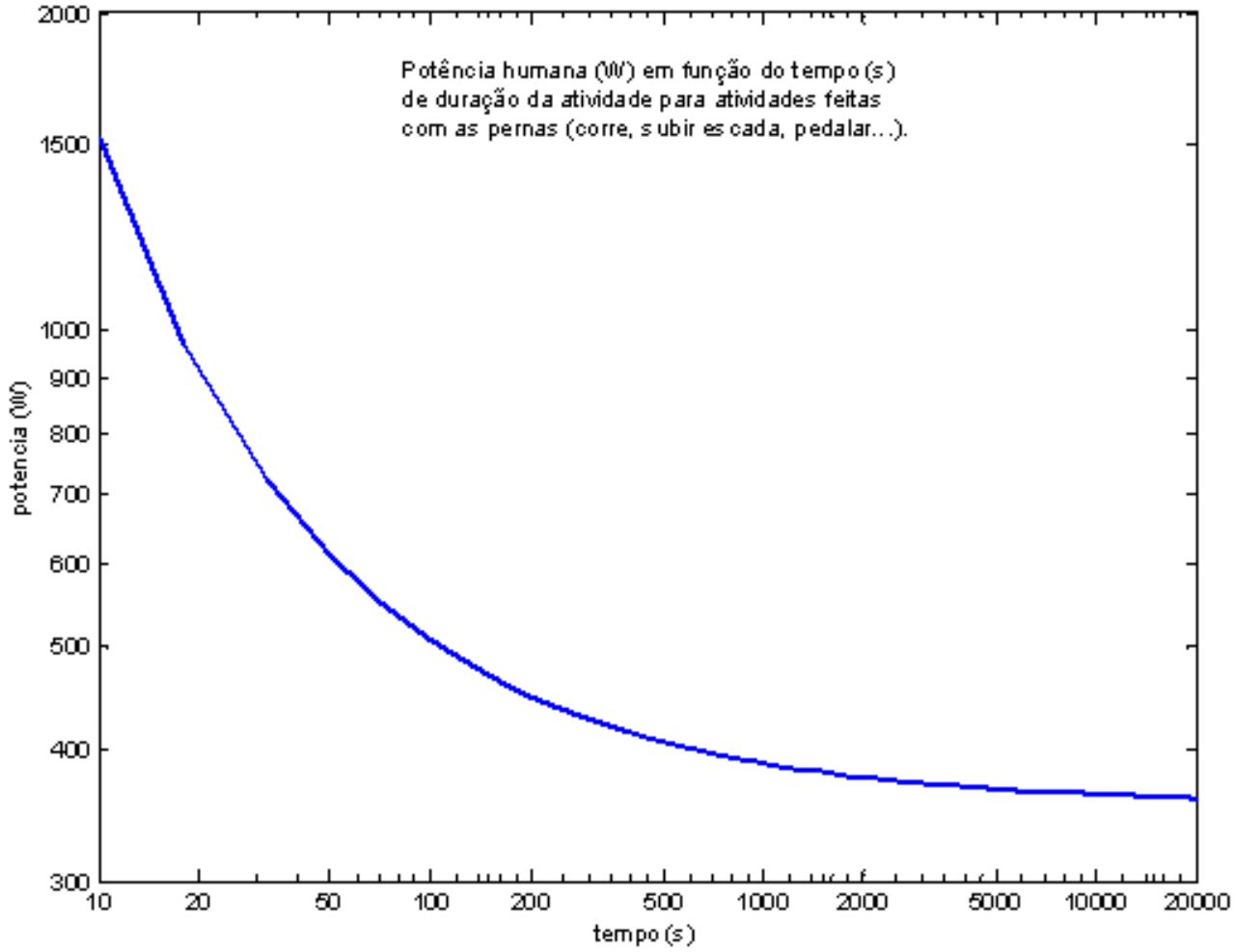


Fig. 2. Loading increased net metabolic rate ($\dot{E}_{metab}$, *A*) and external mechanical power ($\dot{W}_{ILM}$, *B*) at each test speed. Metabolic and mechanical values increased in proportion so that net locomotor efficiency ($\dot{W}_{ILM}/\dot{E}_{metab}$, *C*) was not significantly affected by loading between 0.5 and 1.5 m/s. Efficiency decreased with loading at 2.0 m/s. Data are shown for carrying loads equal to 0, 10, 20, and 30% percent body mass (M_b). Values are means ± SE (n = 8). Lines are second-order polynomial curve fits (KaleidaGraph 3.0). Loading had a significant effect on $\dot{E}_{metab}$, $\dot{W}_{ILM}$, and net locomotor efficiency at each of the test speeds ($P < 0.05$), except where designated not significant (NS).

Referência: *J Appl Physiol* 95: 172–183, 2003; 10.1152/japplphysiol.00944.2002.

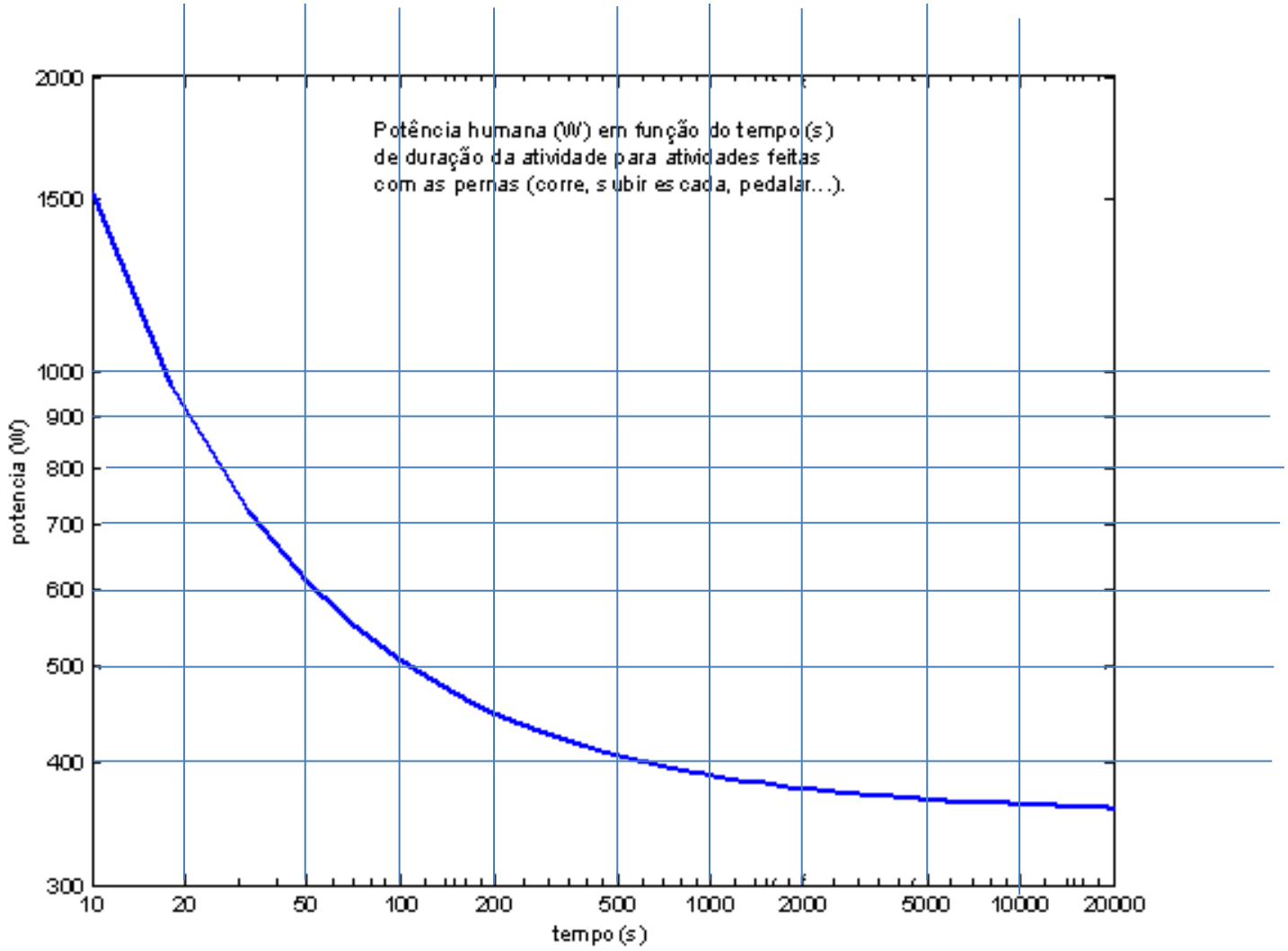
Potência mecânica conseguida por um atleta

O gráfico mostra a potência média em função da duração da atividade. Exemplo: para atividades que durem 10s a potência média é 1500W; para as que durem 1 minuto a potência média é 600W. Adicionalmente é necessário levar em conta que a eficiência do corpo é 0,25.



Potência mecânica conseguida por um atleta

O gráfico mostra a potência média em função da duração da atividade. Exemplo: para atividades que durem 10s a potência média é 1500W; para as que durem 1 minuto a potência média é 600W.



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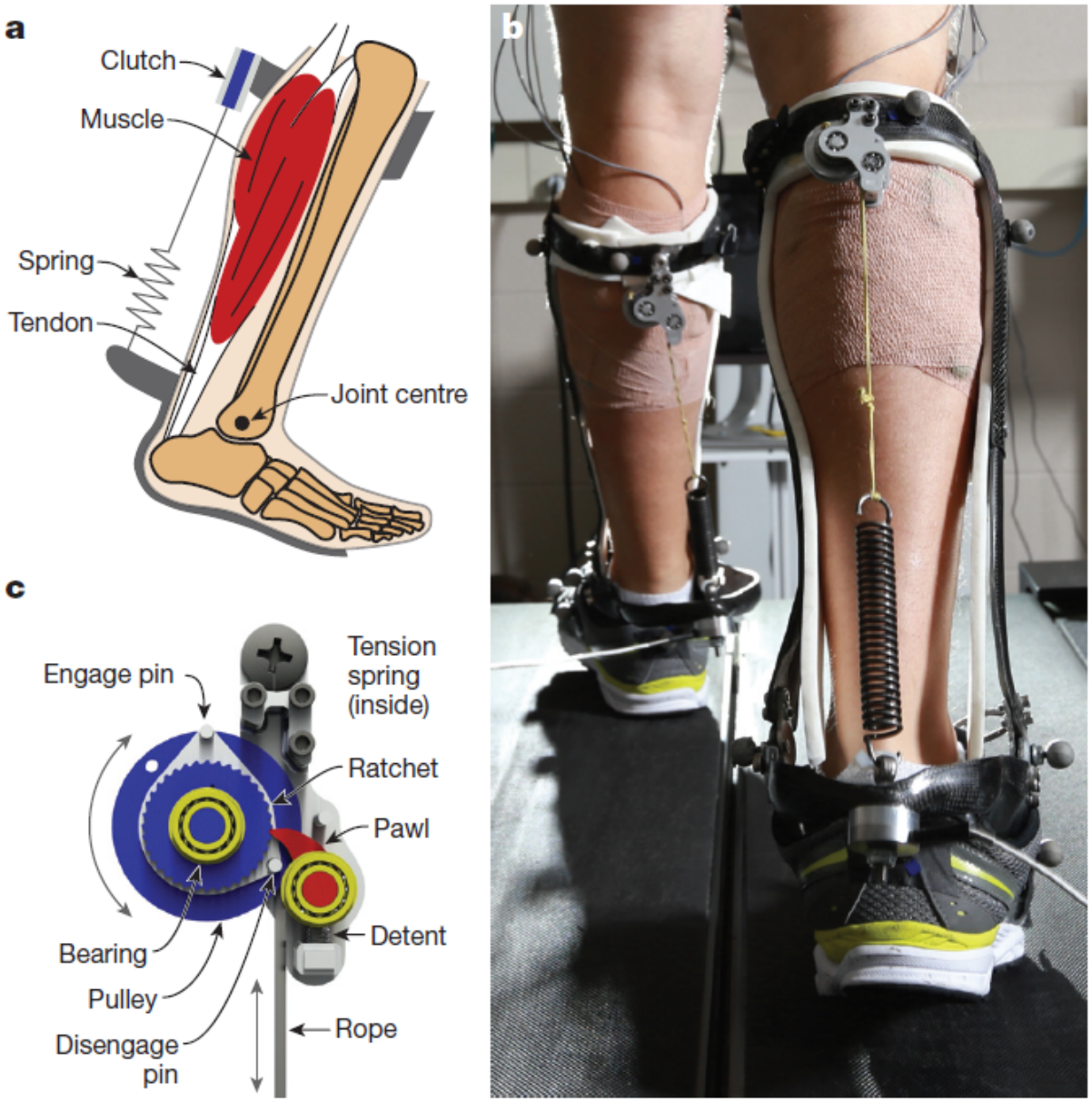

Referência: S. H. Collins, M. B. Wiggin e G. S. Sawicki. Reducing the energy cost of human walking using an unpowered exoskeleton NATURE, 212 VOL 522, 11 JUNE 2015.

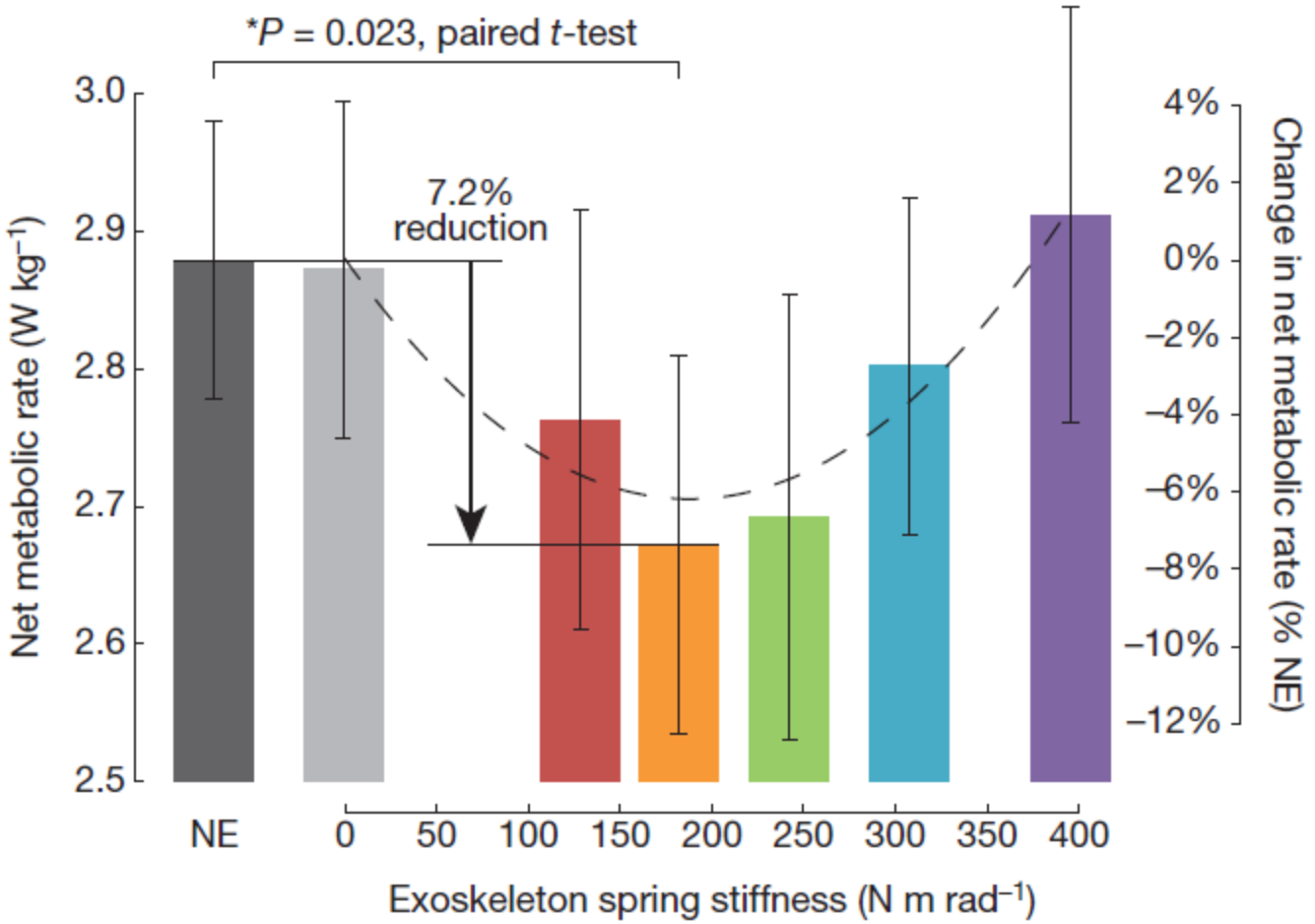

Figure 3 | Human metabolic rate. Spring stiffness affected metabolic rate ($N = 9$; ANOVA with second-order model; $P_{stiffness} = 0.016$, $P_{stiffness^2} = 0.008$). Net metabolic rate, with the value for quiet standing subtracted out, was $7.2 \pm 2.6\%$ (mean ± s.e.m.) lower with the 180 N m rad^{-1} spring (orange bar) than during normal walking (dark grey bar; paired two-sided t-test with correction for multiple comparisons; $P = 0.023$). The dashed line is a quadratic best fit to mean data from exoskeleton conditions ($R^2 = 0.91$, $P = 0.029$). Wearing the exoskeleton with the spring removed (light grey bar, $k = 0$) did not increase energy cost compared with normal walking (paired t-test; $P = 0.9$). Error bars, s.e.m., dominated by inter-participant variability.

Referência: S. H. Collins, M. B. Wiggin e G. S. Sawicki. Reducing the energy cost of human walking using an unpowered exoskeleton NATURE, 212 VOL 522, 11 JUNE 2015.