PROGRAMA DE PÓS-GRADUAÇÃO
STRICTO SENSU – EDUCAÇÃO FÍSICA

Universidade Católica de Brasília

TÓPICOS ESPECIAIS – COMO ELABORAR UMA MONTAGEM DE TREINO PARA MAXIMIZAR OS RESULTADOS

PROF. DR. JONATO PRESTES

Definição do tema: Impacto da seleção dos exercícios e da montagem de treino para a hipertrofia regional

Objetivo da aprendizagem: proporcionar ao profissional da área do movimento os conhecimentos sobre a escolha acertiva dos exercícios e montagem de treino para correção e melhora de pontos fracos.

Relevância da proposta: A escolha correta dos exercícios e a montagem de treino podem auxiliar sobremaneira na correções de regiões musculares com maior dificuldade de desenvolvimento.

Esse padrão pode ser intermuscular e intramuscular

Atleta: Angela, 35 anos, massa corporal: 65 kg, % de gordura 8-10%. Objetivo de competição Internacional Arnold Ohio. Categoria Wellness. **Outros casos de atletas serão mencionados para fortalecer o entendimento.**

O que devemos avaliar na inspeção visual?
Fotos

Dieta prévia, volume prévio, divisão de treino e recursos bioquímicos uitlizados

Tentativas que funcionaram, exercícios preferidos, exercícios que parecem não funcionar

Pedido de vídeo para análise da técnica de execução para refinamento, avaliação de mobilidade e possíveis músculos que precisem de intervenção não só de treino.

A importância do feedback a cada 30-40 dias. Perguntas sobre a progressão de cargas, cansaço e dores articulares.

POSSÍVEIS MÉTODOS DE CONTROLE DE CARGA E RECUPERAÇÃO

Escala de recuperação TQR

Como você se sente em relação à sua recuperação?	
Índice	**Descritor**
6	Em nada recuperado
7	Extremamente mal recuperado
8	-
9	Muito mal recuperado
10	-
11	Mal recuperado
12	-
13	Razoavelmente recuperado
14	-
15	Bem recuperado
16	-
17	Muito bem recuperado
18	-
19	Extremamente bem recuperado
20	Totalmente bem recuperado

(Kenttã; Hassmén, 1998)

Escala Subjetiva de Recuperação

	5	4	3	2	1
FADIGA	Muito descansado	Descansado	Normal	Mais cansado do que o normal	Muito cansado
QUALIDADE DO SONO	Sono tranquilo e revigorante	Boa	Dificuldade em adormecer	Sono agitado	Insônia
DORES MUSCULARES	Sentindo-se ótimo	Sentindo-se bem	Normal	Dolorido ou palpação com dor	Muito dolorido
NÍVEL DE ESTRESSE	Muito relaxado	Relaxado	Normal	Sentindo-se estressado	Muito estressado
HUMOR	Humor muito positivo	De um modo geral bom humor	Menos interessado em outras atividades que o habitual	Mal humorado com familiares e colegas de trabalho	Muito irritado

(McLean et al.2010)

European Journal of Applied Physiology
https://doi.org/10.1007/s00421-019-04181-y

ORIGINAL ARTICLE

Effects of squat training with different depths on lower limb muscle volumes

Keitaro Kubo[1] · Toshihiro Ikebukuro[1] · Hideaki Yata[2]

Received: 10 January 2019 / Accepted: 19 June 2019

METODOLOGIA

17 sujeitos destreinados

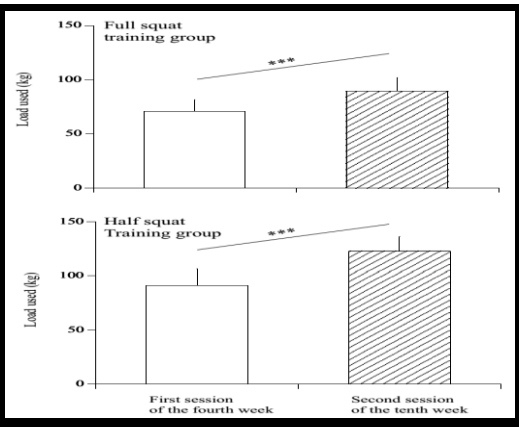
Agachamento completo 140º de flexão dos joelhos e meio agachamento 90º

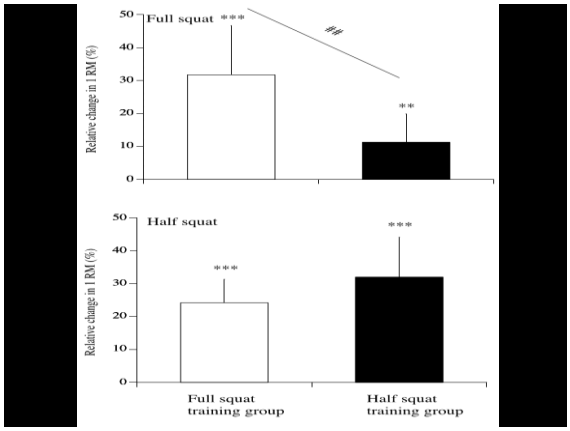
10 semanas, 2 x semana, semana 2 – 3 x 10 com 60% de 1RM, semana 2 – 3 x 8 com 70% de 1RM, semana 80% de 1RM e da 4 até a 10 - 90% de 1RM

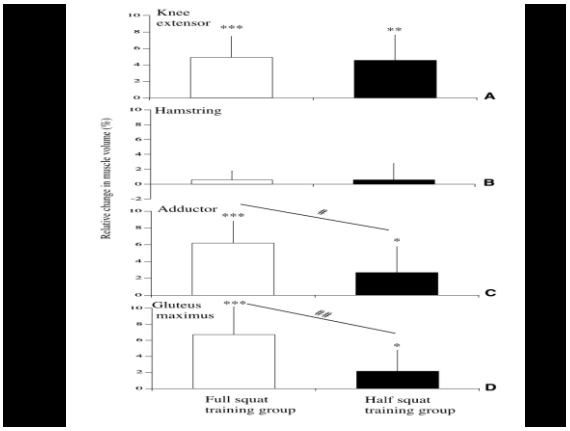
Table 1 Age, physical characteristics, and 1RM before training in both groups mean (sd)

	Full squat training group ($n=8$)	Half squat training group ($n=9$)
Age (years)	20.7 (0.4)	20.9 (0.8)
Height (cm)	173.6 (4.1)	172.3 (5.8)
Body mass (kg)	63.2 (6.6)	64.1 (6.1)
1RM of full squat (kg)	78.8 (14.6)	82.8 (15.2)
1RM of half squat (kg)	95.0 (16.0)	96.7 (15.0)

1RM one repetition maximum







	Full squat training group ($n=8$)		Half squat training group ($n=9$)	
	Before	After	Before	After
Rectus femoris muscle (cm^2)	291.8 (46.5)	290.9 (39.7)	286.2 (31.7)	287.3 (38.8)
Vastus lateralis muscle (cm^2)	639.0 (95.9)	682.7 (93.1)***	653.9 (71.5)	694.1 (83.3)**
Vastus intermedius muscle (cm^2)	556.3 (99.0)	576.0 (94.3)**	499.8 (63.7)	523.8 (63.0)**
Vastus medialis muscle (cm^2)	480.2 (72.5)	512.5 (72.5)***	457.5 (56.0)	488.1 (63.1)***

*Significantly different from before (**$p<0.01$, ***$p<0.001$)

	Full squat training group ($n=8$)		Half squat training group ($n=9$)	
	Before	After	Before	After
Biceps femoris short head muscle (cm^2)	106.2 (20.2)	106.1 (20.3)	104.6 (22.2)	105.4 (22.2)
Biceps femoris long head muscle (cm^2)	194.0 (29.4)	195.2 (27.7)	192.3 (31.9)	193.4 (27.3)
Semitendinosus muscle (cm^2)	179.7 (26.9)	182.1 (24.7)	187.5 (39.4)	186.5 (36.1)
Semimembranosus muscle (cm^2)	237.7 (36.9)	238.2 (39.9)	214.9 (31.2)	217.0 (27.8)

Eur J Appl Physiol (2013) 113:2691–2703
DOI 10.1007/s00421-013-2700-1

ORIGINAL ARTICLE

Inhomogeneous architectural changes of the quadriceps femoris induced by resistance training

Ryoichi Ema · Taku Wakahara · Naokazu Miyamoto · Hiroaki Kanehisa · Yasuo Kawakami

Mudanças não homogêneas na arquitetura do quadríceps induzidas pela treinamento de força

11 Jovens fisicamente ativos

10 controles

TREINAMENTO DE 3 MESES:

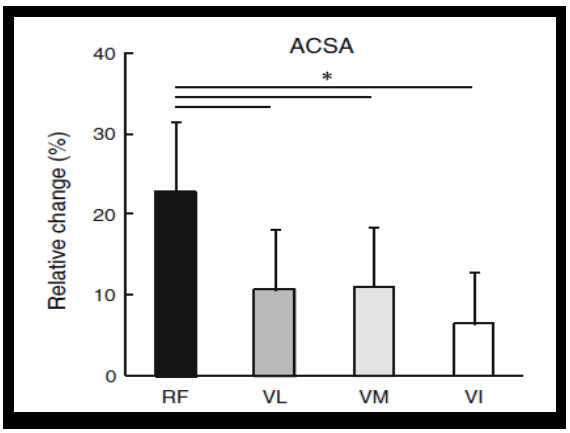
Extensão dos joelhos (2 s conc. e 2 s na exc.)

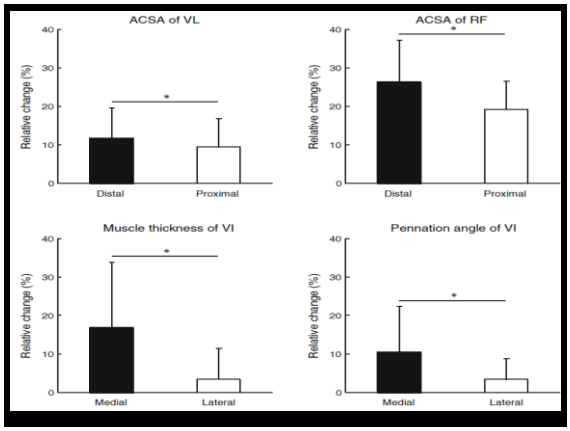
3 x semana

5 x 8 reps a 80% de 1RM

1,5 min intervalo entre as séries

1RM ajustada a cada 2 semanas





European Journal of Applied Physiology
https://doi.org/10.1007/s00421-023-05156-w

ORIGINAL ARTICLE

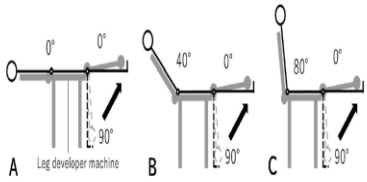
Hip flexion angle affects longitudinal muscle activity of the rectus femoris in leg extension exercise

Hiroku Mitsuya[1] · Koichi Nakazato[1] · Takayoshi Hakkaku[1] · Takashi Okada[1]

Received: 21 October 2022 / Accepted: 8 February 2023

9 fisiculturistas com média de 5 anos de carreira.

Fig. 1 Schematic illustrations of the leg extension exercise. The unilateral leg extension exercise that extends the knee joint from 90° flexion to 0° was performed with a randomly selected leg. The hip flexion angles were set to 0°, 40°, and 80°



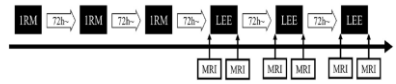
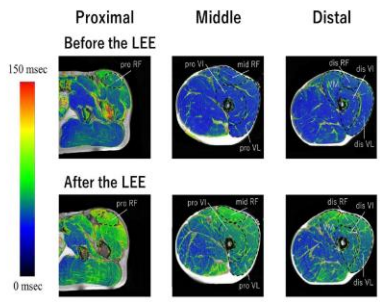
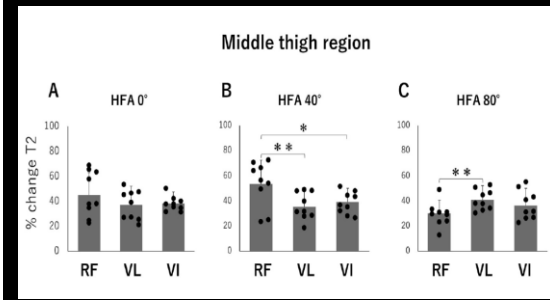
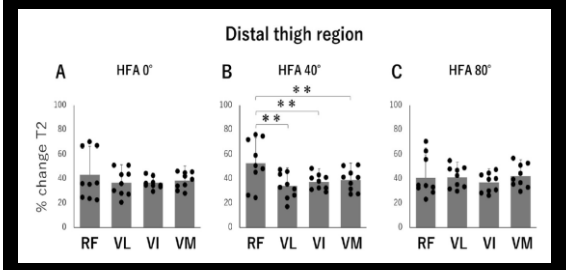


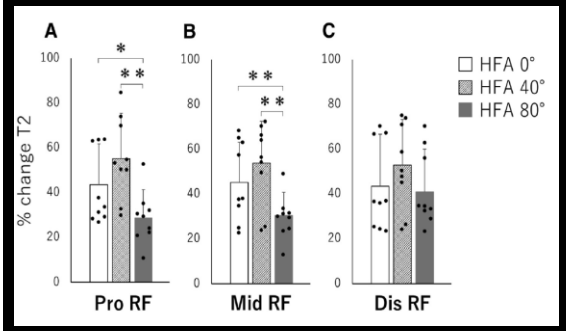
Fig. 2 The schedule for the measurements. At least 3 days prior to exercise, 1RM was measured at each HFA and 1RM measurements of each HFA were taken at least 72 h apart. The HFAs were measured in a randomly selected order. The LEE was performed at a randomly selected HFA, and the LEE for the next HFA was performed at least 72 h later. The measurement schedule did not overlap with the participant's daily leg exercises. 1RM = 1-repetition maximum. *HFA* hip flexion angle, *LEE* leg extension exercise

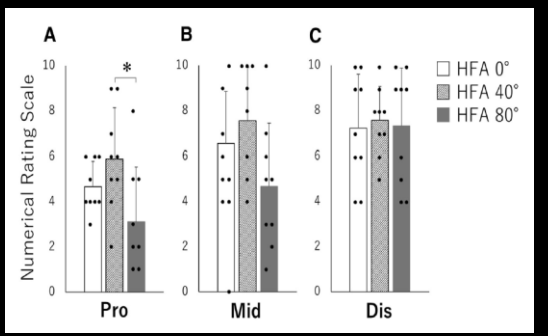
Fig. 3 Example of T2 MRI at the proximal (7th slice of 25), middle (13th slice of the center of the femur), and distal (16th slice of 25) regions of RF before and after the LEE at 0° HFA. The black dotted line indicates the border of the quadriceps femoris. The brighter the color, the higher the T2 value. This image is the 25 ms image of the four TRs (25, 50, 75 and 100 ms). *RF* rectus femoris, *VL* vastus lateralis, *VI* vastus intermedialis, *VM* vastus medialis

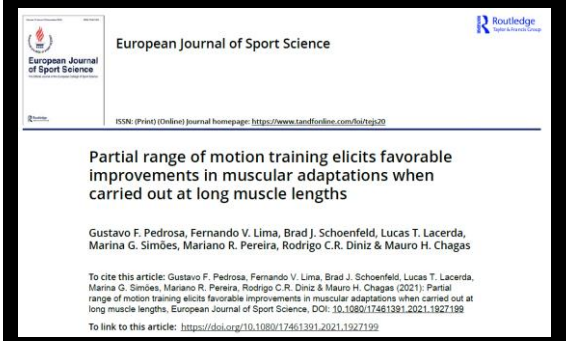











European Journal of Sport Science

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Partial range of motion training elicits favorable improvements in muscular adaptations when carried out at long muscle lengths

Gustavo F. Pedrosa, Fernando V. Lima, Brad J. Schoenfeld, Lucas T. Lacerda, Marina G. Simões, Mariano R. Pereira, Rodrigo C.R. Diniz & Mauro H. Chagas

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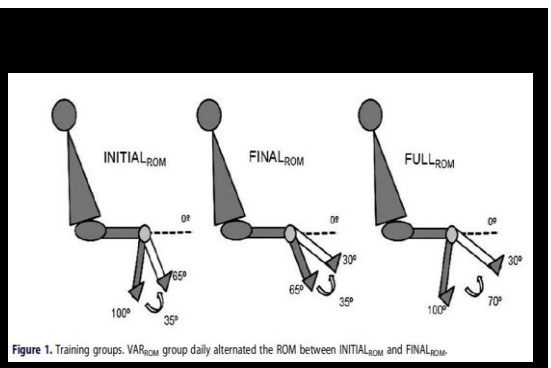


Figure 1. Training groups. VAR$_{ROM}$ group daily alternated the ROM between INITIAL$_{ROM}$ and FINAL$_{ROM}$.

45 mulheres destreinadas

TREINAMENTO DE 3 MESES:

Extensão dos joelhos (2 s conc. e 2 s na exc.)

3 x semana

3-6 x 7 reps a 60% de 1RM

3 min intervalo entre as séries

1RM ajustada a cada 2 semanas na ADM específica treinada

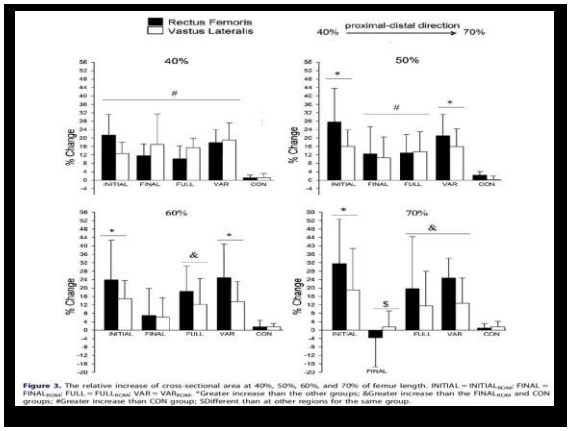


Figure 3. The relative increase of cross-sectional area at 40%, 50%, 60%, and 70% of femur length. INITIAL = $INITIAL_{ROM}$; FINAL = $FINAL_{ROM}$; FULL = $FULL_{ROM}$; VAR = VAR_{ROM}. *Greater increase than the other groups; &Greater increase than the $FINAL_{ROM}$ and CON groups; #Greater increase than CON group; $Different than at other regions for the same group.

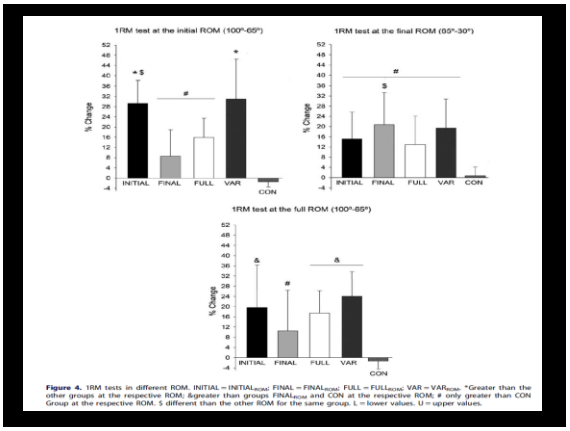


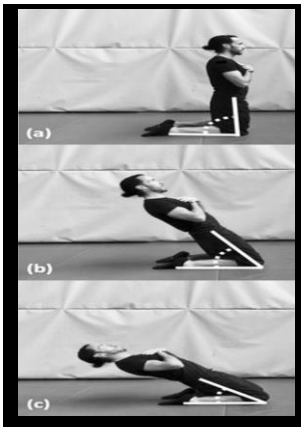
Figure 4. 1RM tests in different ROM. INITIAL = $INITIAL_{ROM}$; FINAL = $FINAL_{ROM}$; FULL = $FULL_{ROM}$; VAR = VAR_{ROM}. *Greater than the other groups at the respective ROM; &greater than groups $FINAL_{ROM}$ and CON at the respective ROM; # only greater than CON Group at the respective ROM. $ different than the other ROM for the same group. L = lower values. U = upper values.

Changes in rectus femoris architecture induced by the reverse nordic hamstring exercises

Diego ALONSO-FERNANDEZ, Rosana FERNANDEZ-RODRIGUEZ, Rocío ABALO

The Journal of Sports Medicine and Physical Fitness 2018 Oct 01

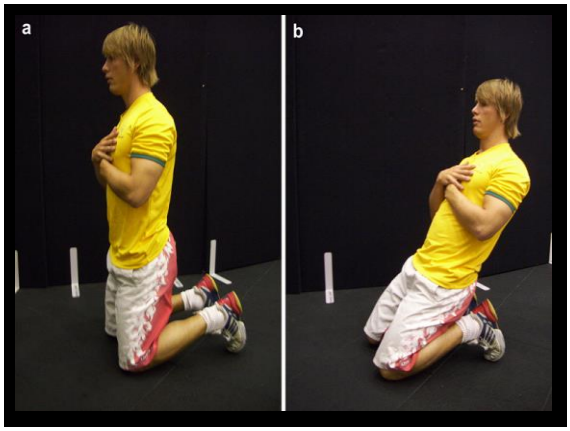
DOI: 10.23736/S0022-4707.18.08873-4

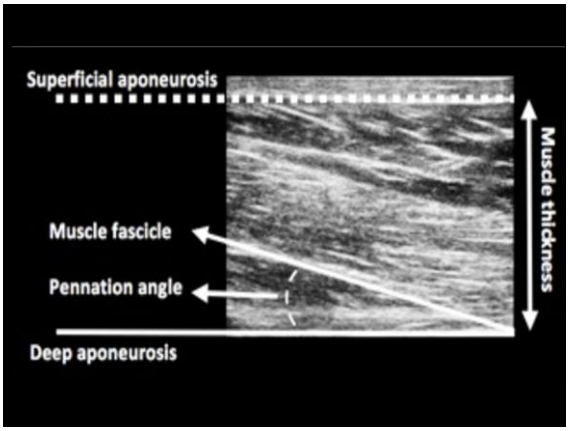


A) Início

B) Meio

C) Fim





TABLES

Table I.— *Characteristics of participants (mean ± standard error of the mean)*

N	Age (years old)	Weight (kg)	Height (m)
26	24.7 ± 2.9	77.6 ± 8.7	1.79 ± 0.08

Table II.—

Eccentric training progression with RNHE

Week	Number of sessions/week	Sets	Repetitions	Total number of repetitions	Rest between sets
1	2	2	6	24	2 min
2	2	2	8	32	2 min
3	3	3	6	54	2 min
4	3	3	8	72	2 min
5	3	3	8	72	2 min
6	3	3	10	90	2 min
7	3	3	10	90	2 min
8	3	3	10-12	90-108	2 min

Table III.— *Eccentric protocol with RNHE (n = 26)*

	M1 (Week 1)	M2 (Week 9)	M3 (Week 13)	% Change M1-M2	% Change M2-M3
FL (cm)	7.82±1.88	8.57±1.14**	8.18±1.35##	9.59	-4.55
RFL	3.70±0.35	3.74±0.38	3.72±0.34	1.08	-0.53
PA (°)	12.44±2.98	13.82±3.81*	13.26±2.02#	11.09	-4.05
MT (cm)	2.1±0.19	2.28±0.31**	2.18±0.26##	8.57	-4.38
CSA (cm2)	9.21±1.86	10.02±1.98**	9.61±1.37##	8.79	-4.26

Table note: * = $P < .05$ vs M1, ** = $P < .001$ vs M1, # = $P < .05$ vs M2, ## = $P < .001$ vs M2.
FL = Fascicle lenght, RFL = fascicle lenght relative to muscle thickness, PA = pennation angle, MT = muscle thickness, CSA = cross-sectional area

+Model
SCISPO-3406; No. of Pages 8 ARTICLE IN PRESS
Science & Sports (2020) xxx, xxx–xxx
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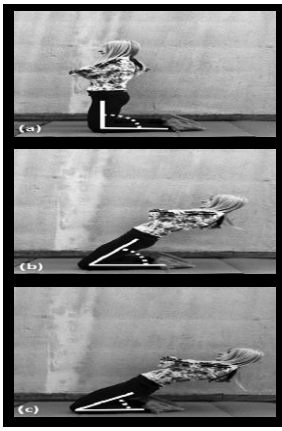
SCIENCE &SPORTS

ORIGINAL ARTICLE

Effects of eccentric exercise on the quadriceps architecture

Effets de l'exercice excentrique sur l'architecture du quadriceps

D. Alonso-Fernandez[a], R. Abalo-Núñez[b,*], C. Mateos-Padorno[c], M.J. Martínez-Patiño[a]



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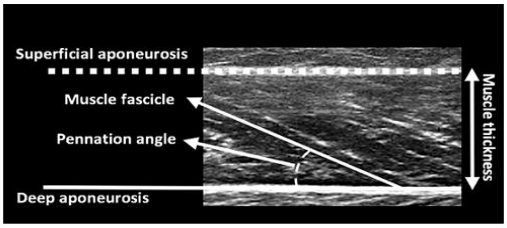

Figure 1 2D-ultrasound image of the vastus lateralis, captured along the longitudinal axis of the anterior side of the thigh. Based on these images, it is possible to identify the superficial and deep aponeurones, the muscle thickness and the angle between the fascicle and the aponeurosis. The fascicle length estimates can be obtained through trigonometric calculations using the muscle thickness and the pennation angle.

Table 1 Eccentric training progression based on the RNHE.

Week	Nr. sessions/week	Sets	Repetitions	Total nr. of repetitions	REST between sets
1	2	2	6	24	2 min
2	2	2	8	32	2 min
3	3	3	6	54	2 min
4	3	3	8	72	2 min
5	3	3	8	72	2 min
6	3	3	10	90	2 min
7	3	3	10–12	90–108	2 min

Table 2 Changes in the muscle architecture of the vastus lateralis and the vastus medialis before week 1and after week 8 the intervention and after the detraining period, week 12, (mean ± SD).

	Eccentric protocol with RNHE (*N* = 28)				
	Week 1	Week 8	Week 12	% Change Week 1–2	% change Week 2–2
Vastus lateralis					
FL (cm)	10.88 ± 1.42	11.14 ± 1.51*	11.03 ± 1.54#	2.39	− 0.99
RFL	5.07 ± 0.69	5.03 ± 0.75	5.05 ± 0.77	− 0.79	0.39
PA (°)	14.21 ± 1.89	14.84 ± 2.03*	14.55 ± 2.11#	4.43	− 1.95
MT (cm)	2.15 ± 0.13	2.24 ± 0.14*	2.19 ± 0.14#	4.18	− 2.23
Vastus medialis					
FL (cm)	11.89 ± 1.27	12.29 ± 1.33**	11.96 ± 1.31##	3.36	− 2.68
RFL	4.27 ± 0.55	4.30 ± 0.57	4.25 ± 0.55	0.71	− 1.16
PA (°)	14.77 ± 1.98	15.29 ± 1.81*	14.94 ± 2.02#	3.52	− 2.29
MT (cm)	2.81 ± 0.33	2.99 ± 0.37*	2.84 ± 0.34#	6.41	− 5.02

SD, standard deviation; RNHE, Reverse Nordic Hamstring Exercise; FL, fascicle length;RFL, fascicle length relative to muscle thickness; PA, pennation angle; MT, muscle thickness. *Footnote*:* = $P < 0.05$ vs. week 1, ** = $P < 0.001$ vs. week 1, # = $P < 0.05$ vs. week 2, ## = $P < 0.001$ vs. week 2.

ACTA PHYSIOLOGICA
Acta Physiol 2014, 210, 642–654

Architectural, functional and molecular responses to concentric and eccentric loading in human skeletal muscle

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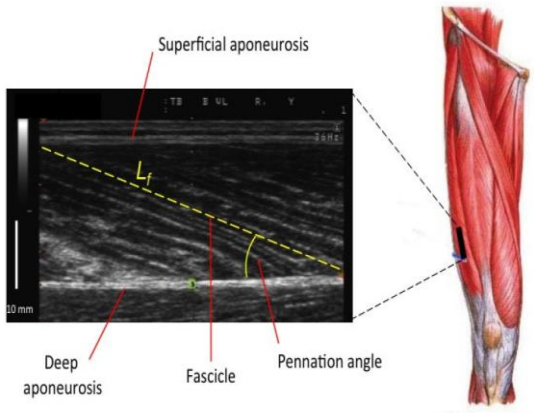
1 School of Graduate Entry Medicine and Health, MRC-ARUK Centre of Excellence for Musculoskeletal Ageing Research, University of Nottingham, Derby, UK
2 School of Healthcare Science, Institute for Biomedical Research into Human Movement and Health, Manchester Metropolitan University, Manchester, UK
3 Department of Orthopaedics, University of Zurich, Balgrist University Hospital, Zurich, Switzerland

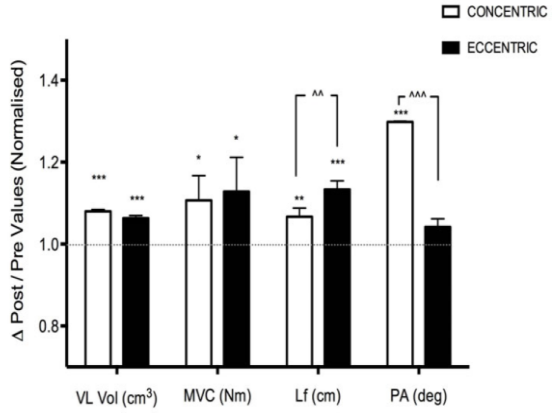
Respostas estruturais, funcionais e moleculares ao TF concêntrico e excêntrico no músculo humano

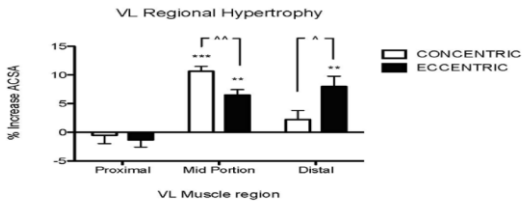
Table 1. Maximum lifting or lowering ability changes for the CON Group (CON) and the ECC one (ECC). EMG values were recorded only at baseline during 1RM leg-press for concentric and eccentric phases. Load ratio is also showed and calculated as the ratio of pre and post ECC/CON training loads.

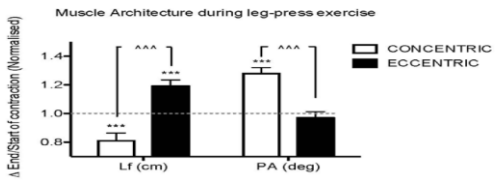
CON 1RM (Kg)			ECC 1RM (Kg)			Load ratio	
Pre	Post	Δ%	Pre	Post	Δ%	Pre	Post
192 ± 16	262 ± 30	36*	233 ± 13	337 ± 9	44*	1.21	1.29
EMG (mV)			EMG (mV)				
0.33± 0.1			0.31± 0.1				

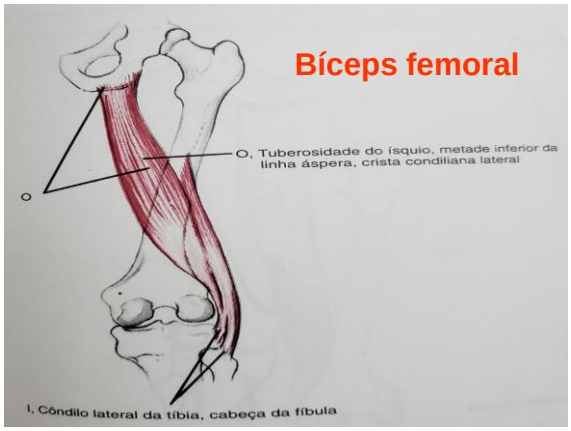
(Pre = baseline, Post = Post-training) values are means ± SEM (** P<0.05, pre-to-post difference*).

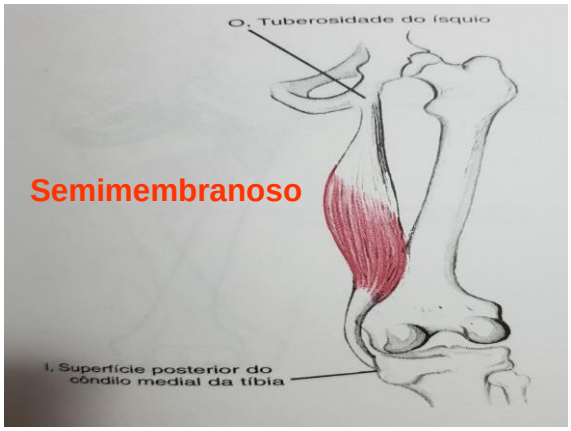


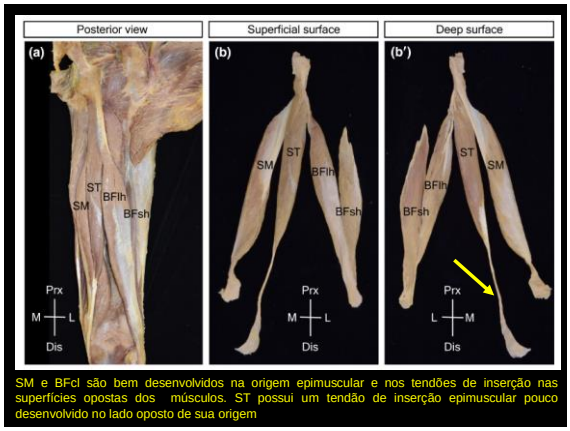




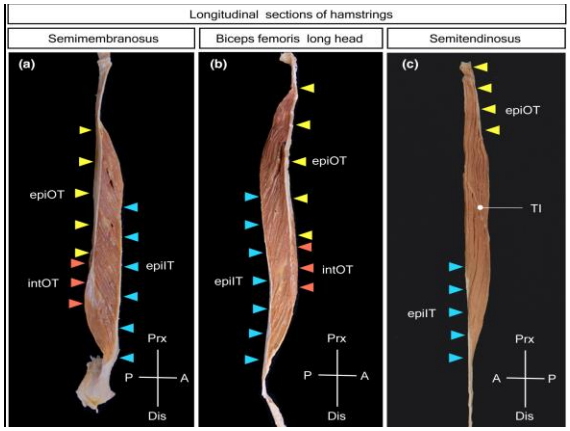








SM e BFcl são bem desenvolvidos na origem epimuscular e nos tendões de inserção nas superfícies opostas dos músculos. ST possui um tendão de inserção epimuscular pouco desenvolvido no lado oposto de sua origem

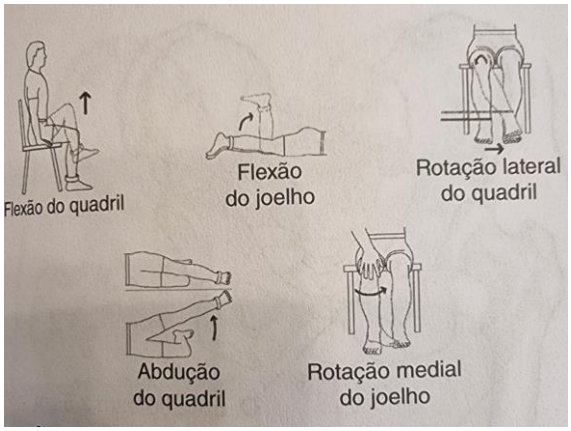


O músculo sartório se origina da espinha ilíaca anterior superior da pelve

Em todo o seu trajeto o músculo é recoberto por uma duplicação fascial da fáscia lata (Floyd, 2016).

Flexão do quadril, flexão do joelho, rotação lateral da coxa à medida que ela flexiona o quadril e o joelho, abdução do quadril, rotação anterior da pelve e rotação medial fraca do joelho.
A inervação é no nervo femoral (L2 e L3).

A sua inserção ocorre na pata anserina (pata de ganso ou pes anserinus) medialmente à tuberosidade tibial.



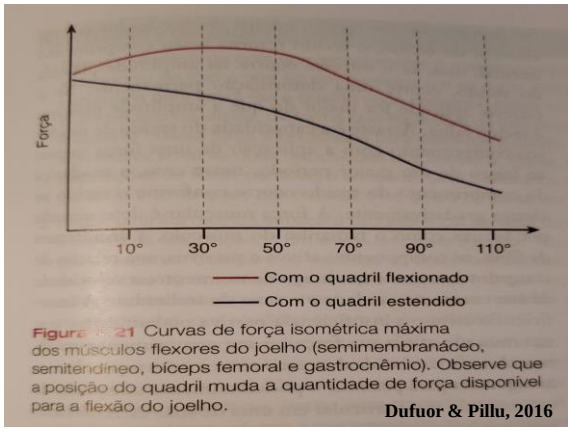


Figura 21 Curvas de força isométrica máxima dos músculos flexores do joelho (semimembranáceo, semitendíneo, bíceps femoral e gastrocnêmio). Observe que a posição do quadril muda a quantidade de força disponível para a flexão do joelho.

Dufuor & Pillu, 2016

International Journal of Sports Physiology and Performance, 2009, 4, 84-96

Hamstring Activation During Lower Body Resistance Training Exercises

William P. Ebben

METODOLOGIA

34 atletas de futebol americano,

Contração isométrica voluntária máxima - 60º de flexão do joelho na flexora e na extensora para cálculo da razão I/Q

2 repetições com amplitude completa e carga referente a 6RM nos exercícios flexora sentada, flexão nórdica, good morning (bom dia), stiff bi e unilateral, e agachamento.

Table 1 Subject Characteristics

Variable	All Subjects	Women (N = 13)	Men (N = 21)
Age (y)	20.38 ± 1.78	20 ± 0.70	20.61 ± 0.71
Age range (y)	18–26	19–21	18–26
Weight (kg)	77.94 ± 18.30	63.64 ± 18.30	86.80 ± 17.90
Weight range (kg)	54.55–133.64	54.55–72.73	65.90–133.64
Training (days/week)	4.15 ± 1.79	4.00 ± 1.77	4.24 ± 1.84
Squat 6 RM (kg)	101.47 ± 34.08	68.18 ± 12.31	122.07 ± 25.65
Squat 6RM range (kg)	52.27–184.09	52.27–88.64	84.09–184.09

Values are mean ± SD.

Table 2 Percentage of H RMS EMG of the MVIC for Each of the Resistance Training Exercises Evaluated (Analysis of All Subjects; N = 34)

	Russian Curl (RC)	Seated Leg Curl (SLC)	Stiff Leg Dead Lift (SLDL)	Single Leg Stiff Leg Dead Lift (SGLDL)	Good Morning (GM)	Squat (S)
RMS normalized as % RMS MVIC	98.0 ± 39.0[a]	81.0 ± 28.0[a]	49.0 ± 27.0[b]	48.0 ± 39.0[c]	43.0 ± 16.0[d]	27.0 ± 20.0[e]

Table 3 Percentage of Q RMS EMG of the MVIC for Each of the Resistance Training Exercises Evaluated (Analysis of All Subjects; N = 34)

	Squat (S)	Single Leg Stiff Leg Dead Lift (SGLDL)	Good Morning (GM)	Stiff Leg Dead Lift (SLDL)	Seated Leg Curl (SLC)	Russian Curl (RC)
RMS normalized as % RMS MVIC	74.0 ± 40.0[a]	20.0 ± 10.0[b]	12.0 ± 8.0[b]	12.0 ± 20.0[c]	7.0 ± 5.0[d]	5.0 ± 4.0[d]

Table 4 H (% RMS EMG MVIC)-to-Q (% RMS EMG MVIC) Ratio for Each of the Resistance Training Exercises Evaluated (Analysis of All Subjects; N = 34)

	Russian Curl (RC)	Seated Leg Curl (SLC)	Stiff Leg Dead Lift (SLDL)	Good Morning (GM)	Single Leg Stiff Leg Dead Lift (SGLDL)	Squat (S)
Hamstring-to-quadriceps ratio	25.09 ± 14.47	14.85 ± 9.77	8.23 ± 5.18	4.87 ± 3.15	2.91 ± 1.56	0.37 ± 0.21

Values are mean ± SD. All exercises are significantly different from each other ($p < 0.05$).

Table 5 Gender Differences in H-to-Q Quadriceps Ratio Expressed as RMS EMG Normalized as a Percentage of RMS EMG of the MVIC

	Russian Curl (RC)	Seated Leg Curl (SLC)	Stiff Leg Dead Lift (SLDL)	Good Morning (GM)	Single Leg Stiff Leg Dead Lift (SGLDL)	Squat (S)
Men (N = 21)	29.14 ± 16.23	17.45 ± 8.80	8.96 ± 5.96	5.90 ± 3.38	3.36 ± 1.70	0.38 ± .20
Women (N = 13)	18.56 ± 7.90	10.65 ± 10.13	7.06 ± 3.50	3.18 ± 1.80	2.20 ± 0.98	0.34 ± .23
H:Q of women expressed as a percentage of male H:Q	64.7%*	61.0%*	78.8%	53.9%*	65.5%*	89.5%

Values are mean ± SD. H:Q, hamstrings-to-quadriceps ratio.

*Mean H:Q ratios are significantly different between men and women ($P < .05$).

Table 6 Gender Differences in H-to-Q Ratio Expressed as RMS EMG Normalized as a Percentage of RMS EMG of the MVIC for Strength Matched Men and Women

	Russian Curl (RC)	Seated Leg Curl (SLC)	Stiff Leg Dead Lift (SLDL)	Good Morning (GM)	Single Leg Stiff Leg Dead Lift (SGLDL)	Squat (S)
Men (N = 3)	46.96 ± 14.50	27.59 ± 10.90	17.21 ± 1.99	7.76 ± 1.21	5.86 ± 2.37	0.25 ± .0.07
Women (N = 3)	16.84 ± 7.58	17.78 ± 21.04	9.50 ± 3.87	3.12 ± 2.22	2.38 ± 0.10	0.19 ± .02
H:Q of women expressed as a percentage of male H:Q	35.9%*	64.4%*	55.2%*	40.2%*	40.6%*	76.0%*

Values are mean ± SD. H:Q, hamstrings-to-quadriceps ratio.

*Mean hamstrings to quadriceps ratios are significantly different between men and women ($P < .05$)

TITLE

Impact of the Nordic hamstring and hip extension exercises on hamstring architecture and morphology: implications for injury prevention

Authors

Matthew N. Bourne[1,3,4] Steven J. Duhig[2,3], Ryan G. Timmins[5], Morgan D. Williams[6], David A. Opar[5], Aiman Al Najjar[7], Graham K. Kerr[2,3], Anthony J. Shield[2,3].

Bourne MN et al. Impact of the Nordic hamstring and hip extension exercises on hamstring architecture and morphology: implications for injury prevention. British Journal of Sports Medicine, 51(5), 2016.

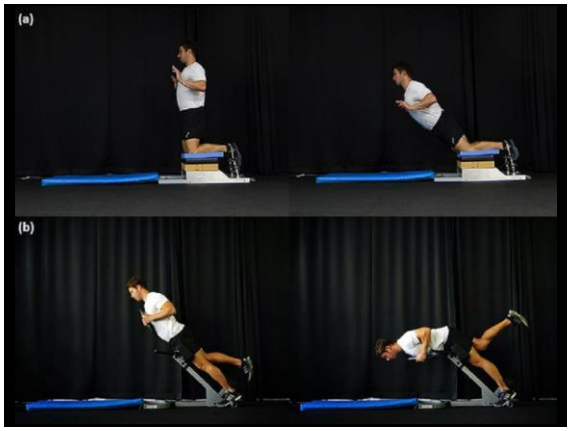


Table 3. Participant characteristics

Group	Age (years)	Height (cm)	Mass (kg)
HE	23.1±4.1	180±6.3	81.6±9.7
NHE	21.6±3.2	182.8±8.7	85.0±10.9
CON	21.3±3.7	178.5±5.4	75.9±11.8

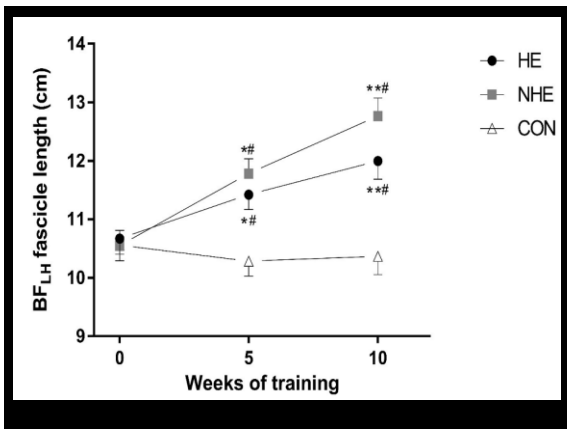
20 sessões, 2 x semana durante 10 semanas.

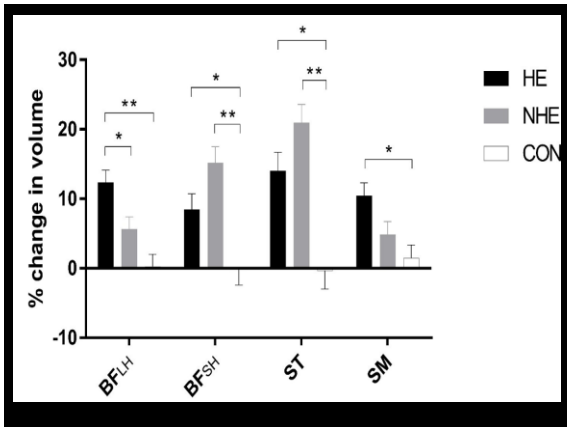
Os participantes realizaram de 2 até 6 séries com 6 até 10 repetições que variaram ao longo das 10 semanas.

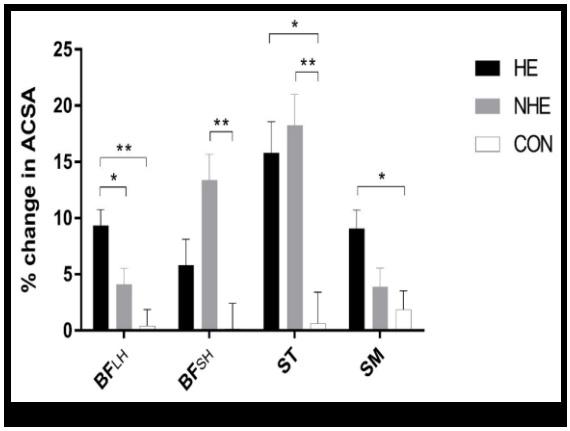
Table 1. Training program variables for both the Nordic hamstring and hip extensio training groups

Week	Frequency	Sets	Repetitions
1	2	2	6
2	2	3	6
3	2	4	8
4	2	4	10
5-8	2	5	8-10
9	2	6	6
10	2	5	5

Week	Training Intensity (Load)	
	Nordic Hamstring exercise	Hip extension exercise
1	Load was added to the chest in increments of 2.5kg when participants developed sufficient strength to stop at the end of the range of motion.	60-70% of 1-RM
2		70-80% of 1-RM
3		All exercise was completed at maximal intensity of effort. Loads were progressively increased when desired repetitions and sets were achieved.
4		
5-8		
9		
10		







Medicine & Science in Sports & Exercise, Publish Ahead of Print
DOI: 10.1249/MSS.0000000000002523

Greater Hamstrings Muscle Hypertrophy but Similar Damage Protection after Training at Long versus Short Muscle Lengths

Sumiaki Maeo[1], Huang Meng[2], Wu Yuhang[2], Hikaru Sakurai[2], Yuki Kusagawa[2], Takashi Sugiyama[3], Hiroaki Kanehisa[2], Tadao Isaka[2]

[1]Research Organization of Science and Technology, Ritsumeikan University, Kusatsu, Shiga, Japan; [2]College of Sport and Health Science, Ritsumeikan University, Kusatsu, Shiga, Japan; [3]Ritsumeikan Global Innovation Research Organization, Ritsumeikan University, Kusatsu, Shiga, Japan

The Journal of Strength and Conditioning Research, September 2020

METODOLOGIA

20 sujeitos saudáveis sem experiência no treinamento de força

1 coxa flexora deitada e a outra flexora sentada. Parte 1

- **5 séries de 10 repetições com 50, 60 e 70% de 1RM**

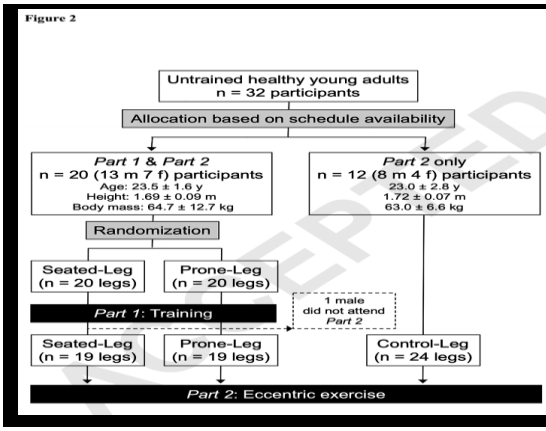
Cadência 2:2s, 120s de descanso, 2 s semana, 12 semanas

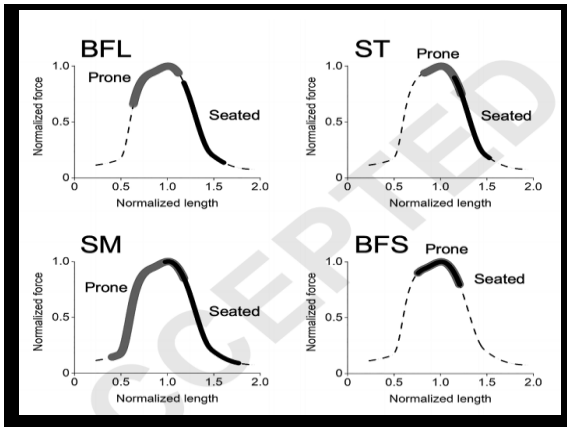
METODOLOGIA

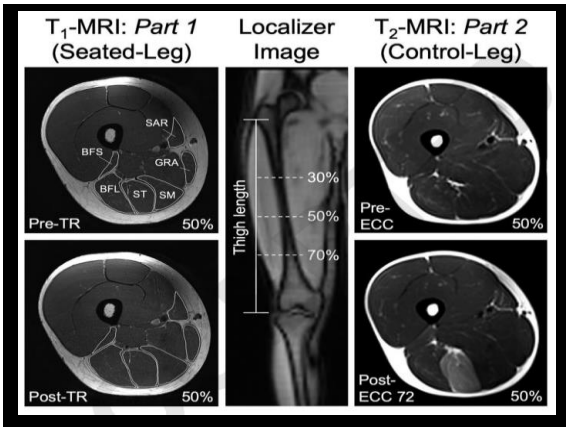
19 sujeitos saudáveis da parte 1 e 12 destreinados controles

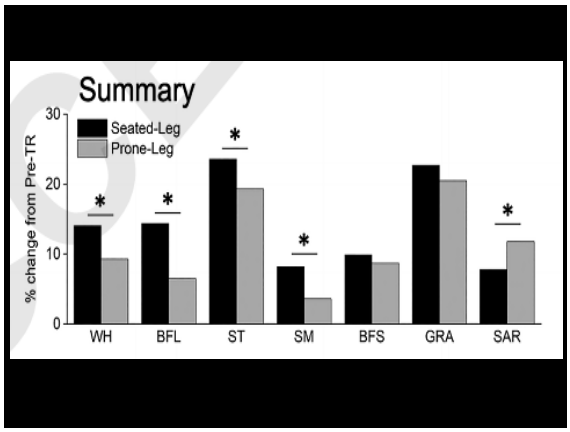
1 coxa flexora deitada e a outra flexora sentada. Parte 2

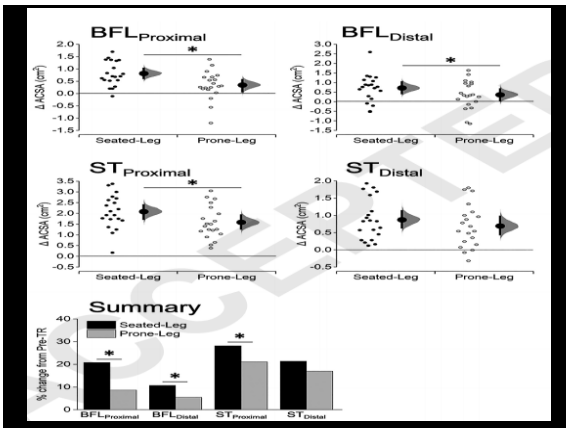
- **3 séries de 10 repetições com 90% de 1RM só excêntrico**












APPLIED SCIENCES

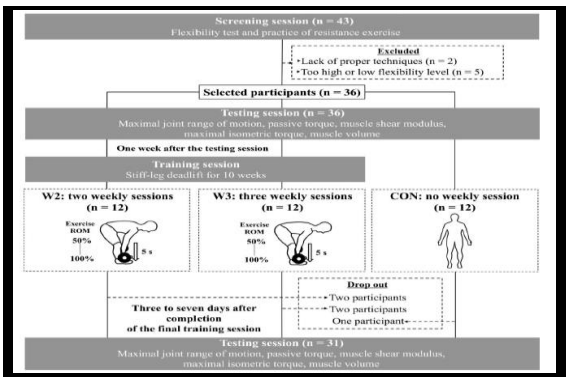
OPEN

Can Eccentric-Only Resistance Training Decrease Passive Muscle Stiffness While Increasing Size and Strength of Hamstrings?

RAKI KAWAMA[1,2], KATSUKI TAKAHASHI[1], HARUKI IKIFUNE[3], HIRONOSHIN TOZAWA[3], TAKAFUMI OBATA[3], RYO ITO[3], TATSUYA HOJO[1,2], and TAKU WAKAHARA[1,3,4]

[1]Faculty of Health and Sports Science, Doshisha University, Kyoto, JAPAN; [2]Research Fellow of Japan Society for the Promotion of Science, Tokyo, JAPAN; [3]Graduate School of Health and Sports Science, Doshisha University, Kyoto, JAPAN; and [4]Human Performance Laboratory, Waseda University, Saitama, JAPAN

Med. Sci. Sports Exerc., Vol. 56, No. 12, pp. 2349–2361, 2024



3 séries de 10 repetições com cargas de 60, 65 e 70% da massa corporal nas semanas 1-4, 5-7 e 8-10, respectivamente. Sujeitos sem TF por 1 ano.

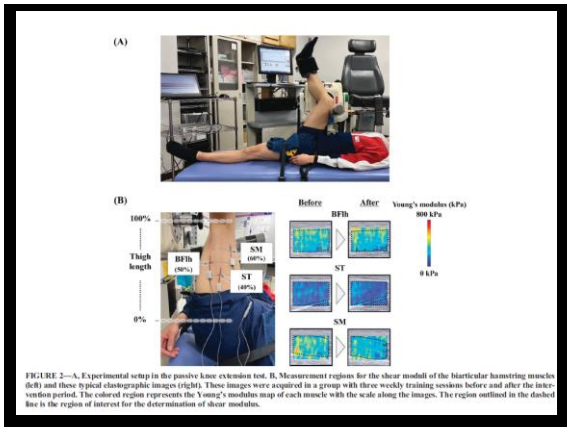
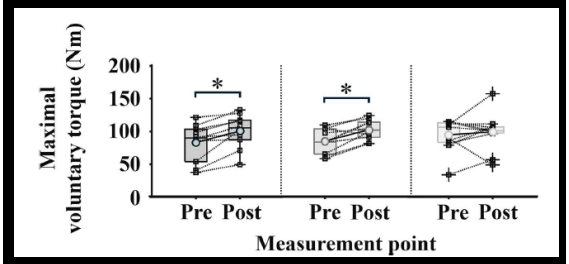
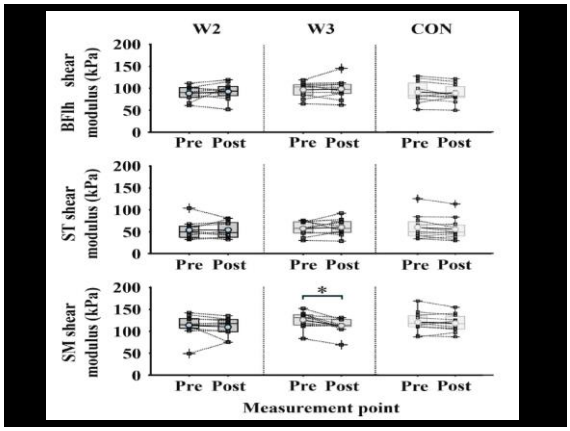
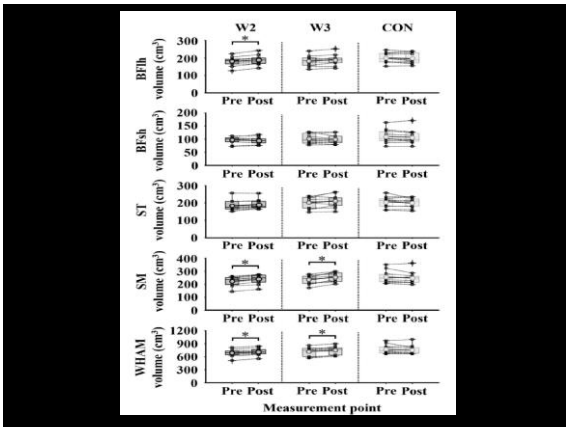


FIGURE 2—A, Experimental setup in the passive knee extension test. B, Measurement regions for the shear moduli of the biarticular hamstring muscles (left) and these typical elastographic images (right). These images were acquired in a group with three weekly training sessions before and after the intervention period. The colored region represents the Young's modulus map of each muscle with the scale along the images. The region outlined in the dashed line is the region of interest for the determination of shear modulus.







Gluteal Muscle Forces during Hip-Focused Injury Prevention and Rehabilitation Exercises

TYLER J. COLLINGS[1,2], MATTHEW N. BOURNE[1,2], ROD S. BARRETT[1,2], EVY MEINDERS[1,2], BASÍLIO A. M. GONÇALVES[1,2], ANTHONY J. SHIELD[3,4], and LAURA E. DIAMOND[1,2,5]

[1]School of Health Sciences and Social Work, Griffith University, Gold Coast Campus, Queensland, AUSTRALIA; [2]Griffith Centre of Biomedical and Rehabilitation Engineering (GCORE), Menzies Health Institute Queensland, Griffith University, Gold Coast Campus, Queensland, AUSTRALIA; [3]School of Exercise and Nutrition Sciences and Institute of Health and Biomedical Innovation, Queensland University of Technology, Kelvin Grove, Brisbane, Queensland, AUSTRALIA; [4]Institute of Health and Biomedical Innovation, Queensland University of Technology, Brisbane, Queensland, AUSTRALIA; and [5]Centre of Clinical Research Excellence in Spinal Pain, Injury and Health, School of Health and Rehabilitation Sciences, The University of Queensland, Brisbane, AUSTRALIA

Med. Sci. Sports Exerc., Vol. 55, No. 4, pp. 650–660, 2023.

METODOLOGIA

14 jogadoras de futebol (18-32 anos) - pelo menos 3 meses de experiência em treinamento de membros inferiores.

8 exercícios focados no quadril quanto as forças musculares

do músculo glúteo

corpo e carga de 12 RM.

Medidas realizadas: captura de movimento, forças de reação do solo e a eletromiografia (EMG) num modelo para estimar as forças do glúteo máximo, médio e mínimo.

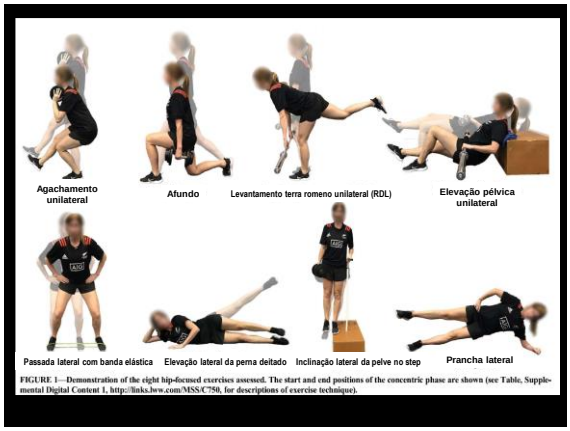


FIGURE 1—Demonstration of the eight hip-focused exercises assessed. The start and end positions of the concentric phase are shown (see Table, Supplemental Digital Content 1, http://links.lww.com/MSS/C750, for descriptions of exercise technique).

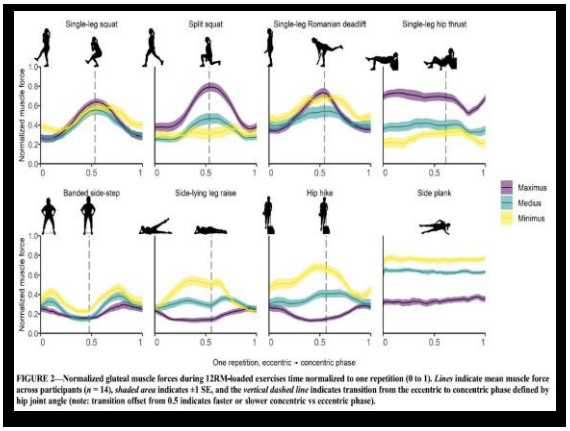


FIGURE 2—Normalized gluteal muscle forces during 12RM-loaded exercises time normalized to one repetition (0 to 1). *Lines* indicate mean muscle force across participants ($n = 14$), *shaded area* indicates ±1 SE, and the *vertical dashed line* indicates transition from the eccentric to concentric phase defined by hip joint angle (note: transition offset from 0.5 indicates faster or slower concentric vs eccentric phase).

RESULTADOS

Nível 1 para o glúteo máximo:
Afundo (495-688 N), RDL unilateral (500-655 N) e Elevação pélvica unilateral (505-640 N) com carga de 12RM

Nível 1 para o glúteo médio:
Prancha lateral com peso corporal (338-483 N), Agachamento unilateral com 12RM (278-422 N) e RDL unipodal com 12RM (283-405 N)

Nível 1 para glúteo mínimo:
RDL unilateral (267-389 N)
Prancha lateral com peso corporal (272-382 N)

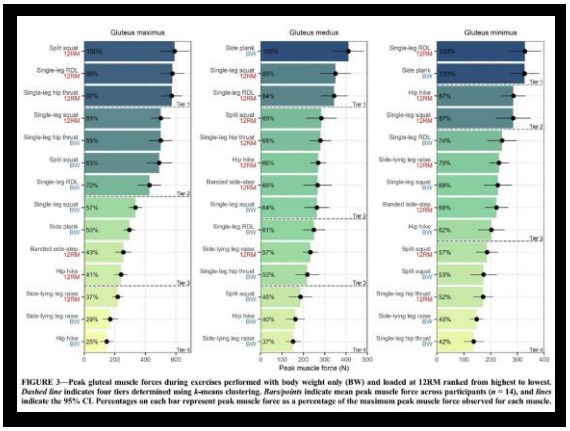


FIGURE 3—Peak gluteal muscle forces during exercises performed with body weight only (BW) and loaded at 12RM ranked from highest to lowest. *Dashed line* indicates four tiers determined using *k*-means clustering. *Bars/points* indicate mean peak muscle force across participants ($n = 14$), and *lines* indicate the 95% CI. Percentages on each bar represent peak muscle force as a percentage of the maximum peak muscle force observed for each muscle.

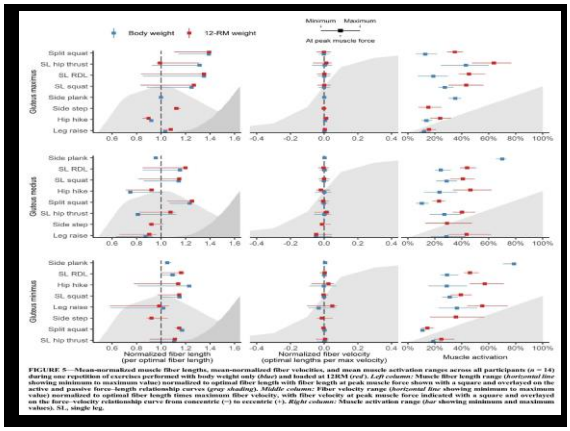


FIGURE 5—Mean-normalized muscle fiber lengths, mean-normalized fiber velocities, and mean muscle activation ranges across all participants ($n = 14$) during one repetition of exercises performed with body weight only (*blue*) and loaded at 12RM (*red*). *Left column:* Muscle fiber length range (*horizontal line* showing minimum to maximum value) normalized to optimal fiber length with fiber length at peak muscle force shown with a square and overlayed on the active and passive force–length relationship curves (*gray shading*). *Middle column:* Fiber velocity range (*horizontal line* showing minimum to maximum value) normalized to optimal fiber length times maximum fiber velocity, with fiber velocity at peak muscle force indicated with a square and overlayed on the force–velocity relationship curve from concentric (−) to eccentric (+). *Right column:* Muscle activation range (*bar* showing minimum and maximum values). SL, single leg.

CONCLUSÕES

O pico de força do glúteo aumentou em 28-150 N com resistência externa de 12RM comparado ao peso corporal.

O pico de força muscular coincidiu com o comprimento máximo da fibra para a maioria dos exercícios.

Elevação pélvica unilateral atingiu o pico de força do glúteo máximo no seu comprimento ótimo,

Sem contribuição de forças passivas, e teve a maior ativação do glúteo máximo (77%) para produzir força.

[RESEARCH REPORT]

DAVID M. SELKOWITZ, PT, PhD, OCS, DAAPM[1] • GEORGE J. BENECK, PT, PhD, OCS[2] • CHRISTOPHER M. POWERS, PT, PhD, FAPTA[3]

Which Exercises Target the Gluteal Muscles While Minimizing Activation of the Tensor Fascia Lata? Electromyographic Assessment Using Fine-Wire Electrodes

FEBRUARY 2013 | VOLUME 43 | NUMBER 2 | JOURNAL OF ORTHOPAEDIC & SPORTS PHYSICAL THERAPY

TABLE 1 NORMALIZED ELECTROMYOGRAPHIC AMPLITUDE OF EACH MUSCLE FOR EACH EXERCISE*

Exercise	Tensor Fascia Lata	Gluteus Medius	Superior Gluteus Maximus
Sidelying hip abduction	32.3 ± 13.1	43.5 ± 14.7 (*P* = .012)†	23.7 ± 15.3 (*P* = .033)‡
Bilateral bridge	8.2 ± 7.4	15.0 ± 10.5 (*P* = .011)†	17.4 ± 11.9 (*P* = .008)†
Clam	11.4 ± 11.4	26.7 ± 18.0 (*P* = .006)†	43.6 ± 26.1 (*P*<.001)†
Hip hike	31.4 ± 14.4	37.7 ± 15.1 (*P* = .196)	17.7 ± 15.2 (*P* = .001)‡
Lunge	21.6 ± 14.5	19.3 ± 12.9 (*P* = .623)	20.1 ± 11.1 (*P* = .728)
Quadruped hip extension, knee extending	15.6 ± 9.3	27.3 ± 14.9 (*P*<.002)†	28.5 ± 16.6 (*P*<.007)†
Quadruped hip extension, knee flexed	18.7 ± 10.6	30.9 ± 15.2 (*P* = .001)†	30.1 ± 12.5 (*P* = .012)†
Sidestep	13.1 ± 7.1	30.2 ± 15.7 (*P* = .002)†	27.4 ± 16.7 (*P* = .002)†
Squat	4.6 ± 3.8	9.7 ± 7.3 (*P* = .017)†	12.9 ± 7.9 (*P*<.001)†
Step-up	21.4 ± 11.4	29.5 ± 14.9 (*P* = .065)	22.8 ± 15.6 (*P* = .754)
Unilateral bridge	18.1 ± 12.9	30.9 ± 20.7 (*P* = .007)†	34.6 ± 16.8 (*P* = .001)†

**Values are mean ± SD percent maximum voluntary isometric contraction.*
†Significantly greater than tensor fascia lata (P<.05).
‡Significantly less than tensor fascia lata (P<.05).

TABLE 2 GLUTEAL-TO-TFL INDEX FOR EACH EXERCISE

Exercise	Gluteal-to-TFL Activation Index
Clam*	115
Sidestep*	64
Unilateral bridge*	59
Quadruped hip extension, knee extending*	50
Quadruped hip extension, knee flexed*	50
Sidelying hip abduction	38
Step-up	32
Bilateral bridge*	32
Squat*	28
Hip hike	28
Lunge	18

Abbreviation: TFL, tensor fascia lata.
**Exercises in which both gluteal muscles demonstrated significantly higher normalized electromyographic signal amplitude than the TFL.*

Exercise	Description	Image
Clam in sidelying, with elastic resistance around thighs	Starting position was lying on a treatment table on the side opposite the tested limb. The table was placed along a wall. Both limbs were flexed to 45° at the hip and 90° at the knee, with the tested limb on top of the other limb. The subject's back and plantar surface of the foot were placed against the wall for control of position and movement. The subject raised the tested limb's knee up off the other limb, such that the hip was in 30° of abduction, before returning to the starting position while keeping both heels in contact with each other and the wall. Subjects performed this activity with blue-colored Thera-Band (The Hygenic Corporation, Akron, OH) tubing around the distal thighs, with no stretch or slack on the tubing prior to raising the limb. The elastic resistance was used because the motion involved is a multiplanar arc that is only minimally resisted by gravity.	
Bilateral bridge	Starting position was hook-lying with the knees at 90° of flexion, hips at 45° of flexion, 0° of rotation and abduction, trunk in neutral, and feet flat on the table. The subject then pushed both feet into the table to raise the pelvis until a position of 90° of knee flexion was achieved bilaterally before returning to the starting position. The hips remained at 0° of rotation and abduction during the exercise, with the trunk in neutral.	
Unilateral bridge	Starting position was unilateral hook-lying, as that described for the bilateral bridge, except that the nontested lower limb remained on the table (0° at the hip and knee). The subject then pushed with the tested limb's foot into the table to raise the pelvis until a position of 90° of knee flexion was achieved ipsilaterally, before returning to the starting position. The nontested lower limb moved up and down with the pelvis, without changing the positions of its joints. The hips remained at 0° of rotation and abduction during the exercise, with the pelvis and trunk in neutral.	

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Hip thrust and back squat training elicit similar gluteus muscle hypertrophy and transfer similarly to the deadlift

Daniel L. Plotkin[1]*, Merlina A. Rodas[2], Andrew D. Vigotsky[3,4], Mason C. McIntosh[1], Emma Breeze[1], Rachel Ubrik[1], Cole Robitzsch[1], Anthony Agyin-Birikorang[1], Madison L. Mattingly[1], J. Max Michel[1], Nicholas J. Kontos[1], Sarah Lennon[5], Andrew D. Frugé[5], Christopher M. Wilburn[1], Wendi H. Weimar[1], Adil Bashir[6], Ronald J. Beyers[6], Menno Henselmans[7], Bret M. Contreras[8] and Michael D. Roberts[1]*

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METODOLOGIA

Universitários destreinados durante 9 semanas, 2 x semana.

3–6 séries por sessão de EP ou AG.
Esquemas de séries semanais por sessão foram os seguintes: semana 1, 3 séries; semana 2, 4 séries; semanas 3–6, 5 séries; semanas 6–9, 6 séries. A zona de treino foi de 8-12RM; sendo a carga foi ajustada de acordo.

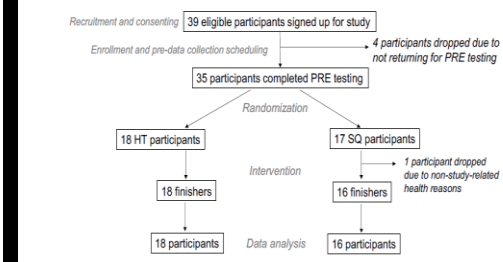

Figure 3. CONSORT diagram
Figure depicts participant numbers through various stages of the intervention. All participants were included in data analysis unless there were technical issues precluding the inclusion of data (e.g., EMG clipping).

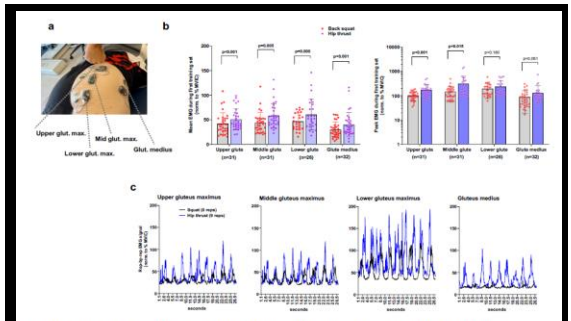

Figure 4. Surface electromyogram (sEMG) amplitudes during the back squat and barbell hip thrust
Legend: During the first session, all participants performed both back squats and barbell hip thrusts while we recorded sEMG amplitudes. (**a**) Representative sEMG electrode placement is depicted on a co-author in panel. (**b**) Data depict mean (left) and peak (right) sEMG amplitudes during one 10RM set of hip thrusts and one 10RM set of back squats. As 34 participants partook in this test, sample sizes vary due to incomplete data from electrode slippage or clipping. Bars are mean ± SD, and individual participant values are depicted as dots. (**c**) Representative data from one participant.

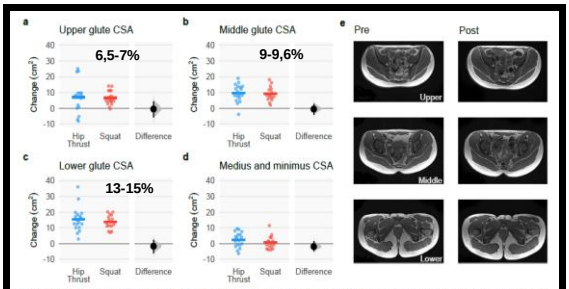

Figure 6. Gluteus musculature mCSA changes following back squat and barbell hip thrust training, assessed using MRI
Legend: Figure depicts pre-to-post intervention MRI-derived muscle cross-sectional area (mCSA) summed values for (**a**) left + right (L+R) upper gluteus maximus, (**b**) L+R middle gluteus maximus, (**c**) L+R lower gluteus maximus, (**d**) L+R gluteus medius+minimus. Data include 18 participants in the hip thrust group and 16 participants in the back squat group. Graphs contain change scores with individual participant values depicted as dots. (**e**) Three pre and post representative MRI images are presented from the same participant with white polygon tracings of the L+R upper gluteus maximus and gluteus medius+minimus (top), L+R middle gluteus maximus (middle), and L+R lower gluteus maximus (bottom).

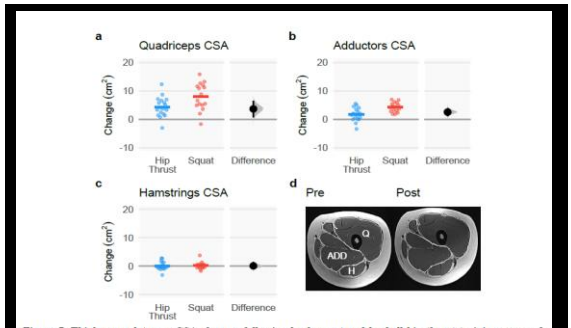

Figure 7. Thigh musculature mCSA changes following back squat and barbell hip thrust training, assessed using MRI
Legend: Figure depicts MRI-derived muscle cross-sectional area (mCSA) average change scores for left and/or right (**a**) quadriceps, (**b**) adductors, and (**c**) hamstrings. Data include 18 participants in the hip thrust group and 16 participants in the back squat group. Bar graphs contain change scores with individual participant values depicted as dots. (**d**) A representative pre- and post-intervention MRI image is presented with white polygon tracings of the quadriceps (denoted as Q), adductors (denoted as ADD), and hamstrings (denoted as H).

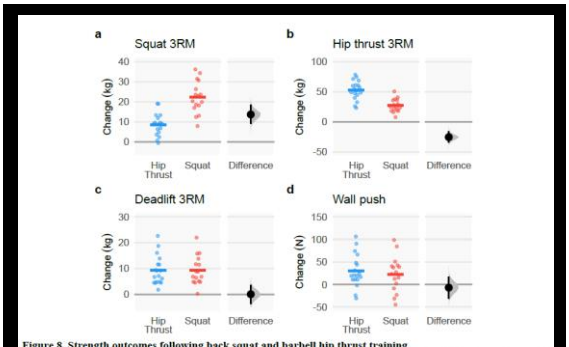

Figure 8. Strength outcomes following back squat and barbell hip thrust training
Legend: Figure depicts change scores for (**a**) 3RM barbell back squat values, (**b**) 3RM barbell hip thrust values, (**c**) 3RM barbell deadlift values, and (**d**) horizontal ground reactive forces (GRF) during the wall push as demonstrated in Figure 2. Data include 18 participants in the hip thrust group and 16 participants in the back squat group.

Table 1. Descriptive scores for each training variable

Variable	SQ PRE	SQ POST	SQ Δ	HT PRE	HT POST	HT Δ
SMM (kg)	21.6 (5.0)	22.2 (5.3)	0.7 (0.8)	21.9 (4.8)	22.4 (5.0)	0.5 (0.9)
FM (kg)	20.3 (5.0)	19.5 (4.2)	-0.7 (1.7)	19.7 (6.2)	19.4 (6.0)	-0.4 (1.5)
Squat 3RM (kg)	49.8 (17.6)	71.9 (22.2)	22.1 (8.4)	53.2 (15.7)	61.9 (15.4)	8.68 (5.2)
Hip Thrust 3RM (kg)	79.8 (24.0)	106.7 (31.9)	26.9 (11.7)	81.8 (25.3)	134.4 (27.7)	52.7 (15.4)
Deadlift 3RM (kg)	61.5 (17.5)	70.7 (21.1)	9.2 (5.7)	59.0 (17.0)	68.2 (15.6)	9.2 (5.5)
Wall push (N)	299.3 (97.2)	322.1 (101.1)	22.8 (39.1)	298.1 (80.9)	327.9 (84.3)	29.8 (36.7)
Gmax Upper CSA (cm²)	52.0 (17.9)	58.5 (16.7)	6.5 (4.9)	50.9 (13.9)	58.0 (15.7)	7.1 (9.8)
Gmax Middle CSA (cm²)	92.2 (22.9)	101.3 (23.1)	9.16 (4.4)	88.71 (16.6)	98.31 (19.2)	9.6 (5.7)
Gmax Lower CSA (cm²)	72.4 (21.0)	86.2 (23.9)	13.8 (4.8)	71.0 (17.2)	86.3 (18.3)	15.3 (7.6)
MED+MIN CSA (cm²)	79.1 (16.4)	79.6 (14.9)	0.5 (4.6)	76.4 (14.1)	79.0 (14.1)	2.6 (4.8)
QUAD CSA (cm²)	61.8 (16.4)	69.8 (17.7)	7.9 (4.8)	63.8 (12.5)	68.1 (12.8)	4.3 (3.4)
ADD CSA (cm²)	41.4 (9.4)	45.6 (9.5)	4.2 (1.7)	40.6 (8.9)	42.2 (9.5)	1.7 (2.3)

Abbreviations: SMM, skeletal muscle mass; RM, repetition maximum; GRF, ground reaction force; mCSA, muscle cross-sectional area; Gmax, Gluteus Maximus; MED+MIN, Gluteus medius and minimus; QUAD, quadriceps; ADD, adductors; HAM, hamstring. Symbol: Δ, pre-to-post intervention change score. Note: all data are presented as mean (standard deviation).

IJSPT

ORIGINAL RESEARCH

PERCEIVED LOADING AND MUSCLE ACTIVITY DURING HIP STRENGTHENING EXERCISES: COMPARISON OF ELASTIC RESISTANCE AND MACHINE EXERCISES

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ATIVAÇÃO MUSCULAR E PSE DURANTE EXERCÍCIOS PARA O QUADRIL: COMPARAÇÃO DE BANDAS ELÁSTICAS COM MÁQUINAS

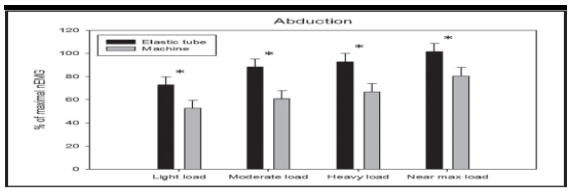

Figure 2. *nEMG for the abduction exercise. * indicate statistically significance.*

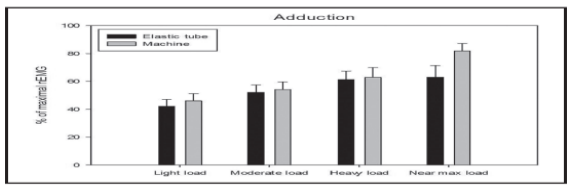

Figure 3. *nEMG for the adduction exercise.*

EXEMPLO DE PROGRAMA DE TREINAMENTO COM DIVISÃO, VOLUME, EXERCÍCIOS E OUTROS DETALHES.

- Treino A – Glúteo
- 1- Leg press unilateral 45° ou horizontal (ou similar)
- 2 séries de 10-12 reps sem falha
- 1 série de 10-12RM
- 2 séries de 8-10 RM
- 1 série de 4-6RM
- 2-3 minutos de descanso entre as séries

- 2 – Frog reverso no Smith
- 4 séries de 8-10RM
- 2 minutos de descanso entre as séries

- 3 – Elevação pélvica livre ou máquina com band no joelho
- Método ondulatório
- 1 série acima de 15 repetições pausa de 2 minutos, 1 série abaixo de 6 repetições, pausa de 2 minutos, completar 4 séries acima de 15 reps e 4 séries abaixo de 6 reps.
- 2 minutos de descanso entre as séries

- 4 – Búlgaro na máquina articulada ou similar
- 3 séries de 10-12RM
- 2 séries de 6-8 RM

- 5 – Abdução na máquina quadril em 45º
- 5 séries de 8-12RM
- 1,5 minutos de descanso entre as séries

- 6 – Panturrilha em pé
- Método ondulatório
- 1 série acima de 15 repetições pausa de 2 minutos, 1 série abaixo de 6 repetições, pausa de 2 minutos, completar 4 séries acima de 15 reps e 4 séries abaixo de 6 reps.
- 2 minutos de descanso entre as séries

- TREINO DE POSTERIORES – C
- 1 – Stiff barra livre
- 2 séries de 10-12 reps sem falha
- 1 série de 10-12RM
- 2 séries de 8-10 RM
- 1 série de 4-6RM
- 2-3 minutos de descanso entre as séries
-
- 2 – Flexora deitada
- Método ondulatório
- 1 série acima de 15 repetições pausa de 2 minutos, 1 série abaixo de 6 repetições, pausa de 2 minutos, completar 4 séries acima de 15 reps e 4 séries abaixo de 6 reps.
- 2 minutos de descanso entre as séries

- 3- Flexora sentada
- 4 séries de 8-12RM
- 1,5 minutos de descanso entre as séries
-
- 4 – Banco romano com os joelhos flexionados no smith
- 4 séries sem contar repetições
- 1,5 minutos entre as séries
-
- 5 – Abdutora quadril tronco inclinado 10º
- 6 séries de 8-12RM
- 1,5 minutos de descanso entre as séries

- 6 – Abdução em pé na polia baixa com rotação externa do pé
- 2 séries de 10-12RM
- 2 séries de 8-10 RM
- 2-3 minutos de descanso entre as séries
-
- 7 – Panturrilha no leg.
- 2 séries de 10-12RM
- 2 séries de 8-10 RM
- 2 séries de 4-6 RM
- 1,5 minutos de descanso entre as séries
- Variar posição dos pés, aberto, fechado e neutro em cada série

Definição do tema: Impacto da seleção dos exercícios e da montagem de treino para a hipertrofia regional, função muscular e prevenção de lesões.

Objetivo da aprendizagem: proporcionar ao profissional da área do movimento os conhecimentos sobre a escolha acertiva dos exercícios e montagem de treino para melhora de função muscular, prevenção e hipertrofia muscular.

Relevância da proposta: A escolha correta dos exercícios e a montagem de treino podem auxiliar sobremaneira na melhora da função e hipertrofia muscular.

Idosa: Hedvirges Prestes, 70 anos, menopausada, massa corporal: 65 kg, % de gordura 30%. Objetivo de reduzir dor patelofemoral, dores lombares e melhorar a função muscular nas atividades dárias. **Outros casos serão mencionados para fortalecer o entendimento.**

VARIÁVEIS DO TREINAMENTO DE FORÇA

Número de exercícios por grupo muscular

- **Iniciantes** → **1 exercício**
- **Intermediários** → **2 exercícios**
- **Avançados** → **3 a 4 exercícios**

Dependendo do intervalo entre os treinos para este grupo muscular e da intensidade

MONTAGENS

1. ***Programas alternados por segmento (para iniciantes em TF);***
2. ***Programas localizados por articulação (para intermediários em TF);***
3. ***Programas direcionados por grupamento muscular (para avançados em TF).***

EXEMPLO DE PROTOCOLO PARA INICIANTES

PROGRAMA DE BASE

TIPO E SEQÜÊNCIA DO EXERCÍCIO
Agachamento ou *leg press*
Supino
Flexão dos joelhos
Remada baixa
Flexão plantar
Extensão dos cotovelos
Exercício abdominal
Flexão dos cotovelos
Extensão do quadril
Elevação lateral

NÚMERO DE SÉRIES
Comece com 1 série e progrida até 2 ou 3 séries para cada exercício

INTENSIDADE DO TREINAMENTO
12-15 repetições submáximas progredindo para repetições máximas

DURAÇÃO DO INTERVALO DE DESCANSO
1-2 minutos conforme necessário

Adaptado de Kraemer e Fleck, 2009

QUADRO 2. Alternado por segmento parcial (ASP)

TREINO 1 (segmento superior/tronco)

Músculos priorizados	Movimentos articulares priorizados	Denominação popular do exercício
Peitoral maior Deltoide anterior Tríceps braquial	Flexão horizontal de ombros Extensão de cotovelos	Supino máquina
Reto do abdome	Flexão da coluna em 30°	Abdominal supra
Latíssimo do dorso Deltoide posterior Bíceps braquial	Extensão de ombros Flexão de cotovelos	Remada sentada
Reto do abdome	Flexão da coluna em 30°	Abdominal supra com coxas a 90°
Deltoide anterior Deltoide médio	Abdução de ombros	Elevação lateral
Oblíquos (interno e externo) e quadrado do lombo	Inclinação lateral	Inclinação lateral na polia baixa

TREINO 2 (segmento inferior/tronco)

Músculos priorizados	Movimentos articulares priorizados	Denominação popular do exercício
Quadríceps femoral Glúteo máximo	Extensão de joelhos Extensão de quadril	*Leg press*
Eretores da coluna	Extensão da coluna	Hiperextensores da coluna
Isquiotibiais	Flexão de joelhos	Mesa flexora
Eretores da coluna	Extensão da coluna	Banco inversor
Gastrocnêmios e sóleo	Flexão plantar	Pressão de sóleos

Marchetti, P; Charro. M. Estrutura Metodológica para Montagem de Programas e Sistemas de TF. In: Prestes, J; Foschini, D; Marchetti, P; Charro, M. Prescrição e Periodização do TF em academias. São Paulo: Manole, 2010.

LOCALIZADA POR ARTICULAÇÃO

Os próximos 2 exercícios deverão trabalhar o agonista/antagonista utilizando novas articulações.

Field e Roberts, 1999

QUADRO 5. Localizado por articulação – agonista/antagonista

Músculos priorizados	Movimento articular priorizado	Denominação popular do exercício
Quadríceps femoral Glúteo máximo	Extensão de joelhos Extensão de quadril	*Leg press*
Isquiotibiais	Flexão de joelhos	Mesa flexora
Peitoral maior, deltoide anterior, tríceps braquial	Adução horizontal de ombros Extensão de cotovelos	Supino máquina
Latíssimo do dorso Deltoide posterior Flexores do cotovelo	Abdução horizontal de ombros Flexão de cotovelos	Remada horizontal
Glúteo médio e tensor da fáscia lata	Abdução de quadril	Cadeira abdutora
Adutores magno, longo e curto, grácil e pectíneo	Adução de quadril	Cadeira adutora
Latíssimo do dorso, redondo maior Flexores do cotovelo	Adução de ombros Flexão de cotovelos	*Pulley* frente
Deltoide (porção média) Supraespinal, tríceps braquial	Abdução de ombros Extensão de cotovelos	Desenvolvimento máquina
Gastrocnêmios e sóleo	Flexão plantar	Panturrilha no *leg press*
Tibial anterior e fibular terceiro	Dorsiflexão	Polia baixa (ponta do pé)
Tríceps braquial	Extensão de cotovelos	Polia alta – tríceps *pulley*
Bíceps braquial e braquial	Flexão de cotovelos	Banco *Scott* – rosca *Scott*
Reto e oblíquos do abdome	Flexão de coluna	Aparelho abdominal
Eretores da coluna	Extensão da coluna	Máquina *lower back*

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QUADRO 6. Localizado por articulação – completo

Músculos priorizados	Movimento articular priorizado	Denominação popular do exercício
Peitoral maior, deltoide anterior, tríceps braquial	Adução horizontal de ombros Extensão de cotovelos	Supino máquina
Latíssimo do dorso, redondo maior, flexores de cotovelo	Adução de ombros	*Pulley* frente
Latíssimo do dorso, deltoide posterior, bíceps braquial	Extensão de ombros Flexão de cotovelos	Remada sentada
Latíssimo do dorso, deltoide posterior, flexores de cotovelo	Abdução horizontal de ombros Flexão de cotovelos	Remada horizontal
Deltoide (porção média) Supraespinal, tríceps braquial	Abdução de ombros	Desenvolvimento máquina
Glúteo máximo e isquiotibiais	Extensão de quadril	Glúteo máquina
Glúteo médio e tensor da fáscia lata	Abdução de quadril	Cadeira abdutora
Iliopsoas e reto femoral	Flexão de quadril	Polia baixa (*cross over*)
Adutores magno, longo e curto, grácil e pectíneo	Adução de quadril	Cadeira adutora
Reto e oblíquos do abdome	Flexão de coluna	Aparelho abdominal
Oblíquos do abdome e quadrado lombar	Flexão lateral da coluna	Banco inversor
Eretores da coluna	Extensão da coluna	Máquina *lower back*

Marchetti, P; Charro. M. Estrutura Metodológica para Montagem de Programas e Sistemas de TF. In: Prestes, J; Foschini, D; Marchetti, P; Charro, M. Prescrição e Periodização do TF em academias. São Paulo: Manole, 2010.

TF E DIABETES PRESCRIÇÃO

1. Leg press
2. Extensão do quadril
3. Crucifixo máq.
4. Desenvolvimento
5. Abdominal
6. Mesa flexora
7. Bicicleta
8. Esteira

8 semanas, 3 x semana, circuito - estações 7 exercícios de força alternando com exercícios aeróbios

Adaptado de Maiorana et al., 2002

TF E DIABETES PRESCRIÇÃO

Estação: 45s para os exercícios aeróbios e de força (15 repetições, 3s cada), **intervalo** entre as estações: 15s, totalizando 1h

Intensidade do TA: 70% da FCM e após 5 semanas, 85%

Intensidade do TF: 55% de 1RM, após 3 semanas, 65% e 5 min na esteira para finalizar o circuito

Adaptado de Maiorana et al., 2002

RESULTADOS DO ESTUDO

Redução significativa da FC e DP no exercício submáximo

↘

Aumentou o limiar ventilatório

↘

Melhora na força e na captação de O_2

↘

Diminuição das pregas cutâneas, %G, da RCQ e da glicemia em jejum

EXERCÍCIO E DIABETES: PRESCRIÇÃO

Aquecimento 5 minutos e alongamento antes e depois

1. Cadeira extensora
2. Supino reto
3. Mesa flexora
4. bíceps c/ halteres
5. Puxada por trás
6. Flexão plantar
7. Desenv. c/ halteres
8. Remada sentada
9. Extensão tríceps
10. Flexão do tronco

8 semanas, 3 x semana, circuito, alternância c/ exercícios aeróbios

Dunstan et al., 1998

TF E DIABETES: PRESCRIÇÃO

4 primeiras semanas foram realizadas 2 séries, depois 3 séries, a 50-55% de 1RM

10-15 reps por exercício (30s) + 30s de aeróbio

Sessão de 1h no total

Intensidade dos exercícios aeróbios: < 50 W a 60 rpm

Dunstan et al., 1998

TF E DIABETES: PRESCRIÇÃO

EXERCÍCIO aumenta à ação da insulina e diminui seus níveis plasmáticos

Pessoas de 50-63 anos

Aumento na força, massa magra e redução na gordura corporal

Miller et al., 1994

Frontiers in PHYSIOLOGY

ORIGINAL RESEARCH ARTICLE

Polarized training has greater impact on key endurance variables than threshold, high intensity, or high volume training

Thomas Stöggl[1,2] and Billy Sperlich[3]*

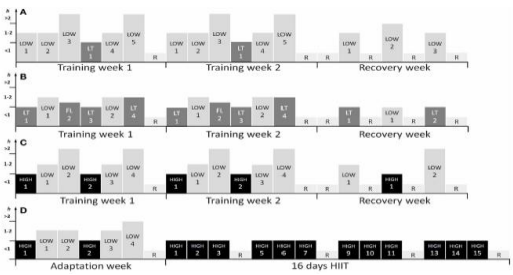


Table 2 | Changes in physiological variables from pre- to post-training.

		POL		HIIT	
		Pre	Post	Pre	Post
VO_{2peak}-test	VO_{2peak} [$L \cdot min^{-1} \cdot kg^{-1}$]	60.6 ± 8.3	67.4 ± 7.7*** 11.7 ± 8.4%	63.7 ± 7.1	66.6 ± 5.8* 4.8 ± 5.6%
	VO_{2peak} [$L \cdot min^{-1}$]	4.4 ± 1.0	4.9 ± 1.1*** 10.4 ± 7.9%	4.6 ± 0.5	4.7 ± 4.9 1.1 ± 7.6%†
	HR_{peak} [bpm]	187 ± 7	186 ± 7 −0.6 ± 1.9%	185 ± 9	182 ± 11 −1.3 ± 2.3%
	LA_{peak} [$mmol \cdot L^{-1}$]	10.2 ± 1.7	10.7 ± 1.7 7.5 ± 20.4%	9.6 ± 1.7	10.2 ± 1.7 6.4 ± 8.3%

obesity reviews

doi: 10.1111/obr.12536

Etiology and Pathophysiology

A systematic review and meta-analysis of interval training versus moderate-intensity continuous training on body adiposity

S. E. Keating,[1,2] N. A. Johnson,[1,3] G. I. Mielke[2,4] and J. S. Coombes[2]

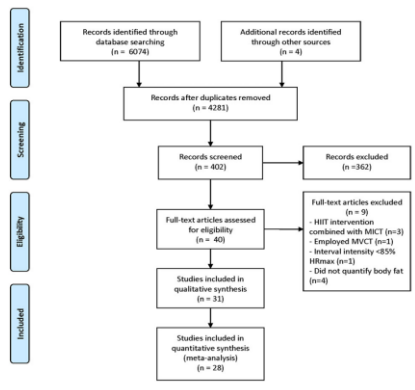
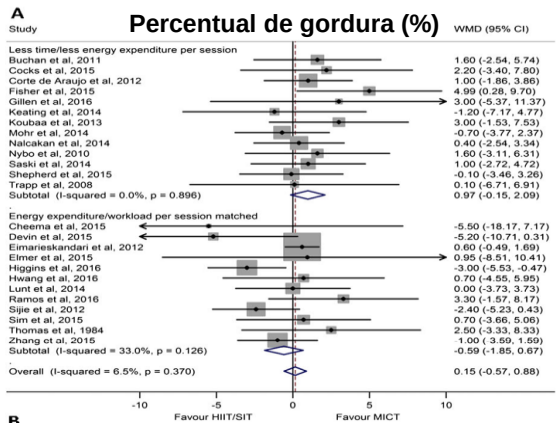
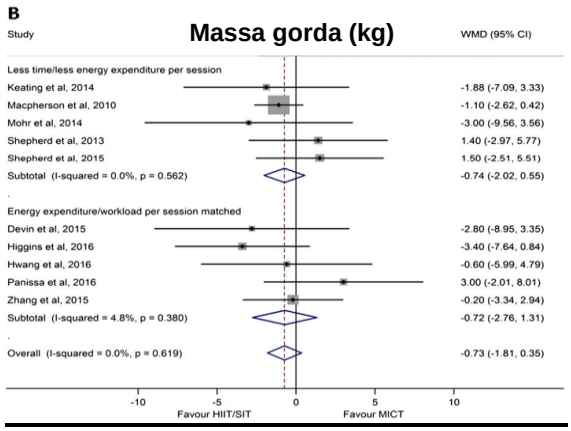


Figure 1 Preferred Reporting Items for Systematic Reviews and Meta-Analysis (2009) flow diagram of outcomes of review. HIIT, high-intensity interval training; MICT, moderate-intensity continuous training; MVCT, moderate-vigorous continuous training. [Colour figure can be viewed at wileyonlinelibrary.com]





EXERCÍCIO FÍSICO, DIETA OU AMBOS?