



The 17th HETI International Congress
June 7(Mon) -10(Thu), 2021 Seoul, Korea
www.heti2021.org



ABST-000053 - Effect of hippotherapy on functional capacity and stomatognathic system in older adults

Mello EC¹; Gonçalves LMN¹; Regalo IH¹; Vasconcelos PB¹; Leite ECS²; Martins CM²; Barbosa Neto O³; Mendes EL³; Regalo SCH¹; Siessere S¹

¹School of Dentistry of Ribeirão Preto, University of São Paulo, SP, Brazil;

²Vassoural Hippotherapy Association, Pontal, SP, Brazil;

³Federal University of Triângulo Mineiro



School of Dentistry of Ribeirão Preto, University of São Paulo, SP, Brazil – FORP/USP



<https://www.forp.usp.br/>

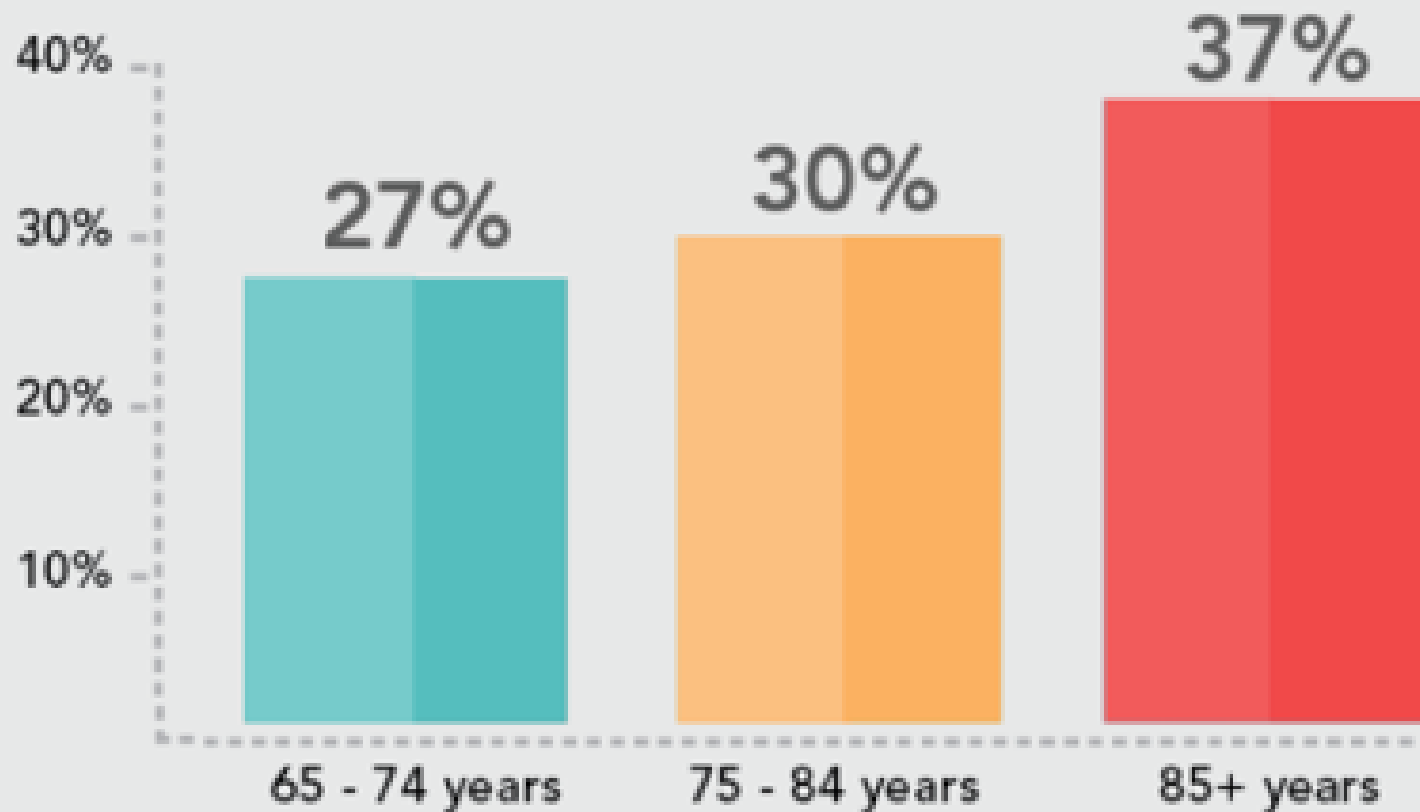


Did you know that
1 in 3 people
over 65
will fall



FALLS INCREASE WITH AGE

Percent of older adults who reported a fall:

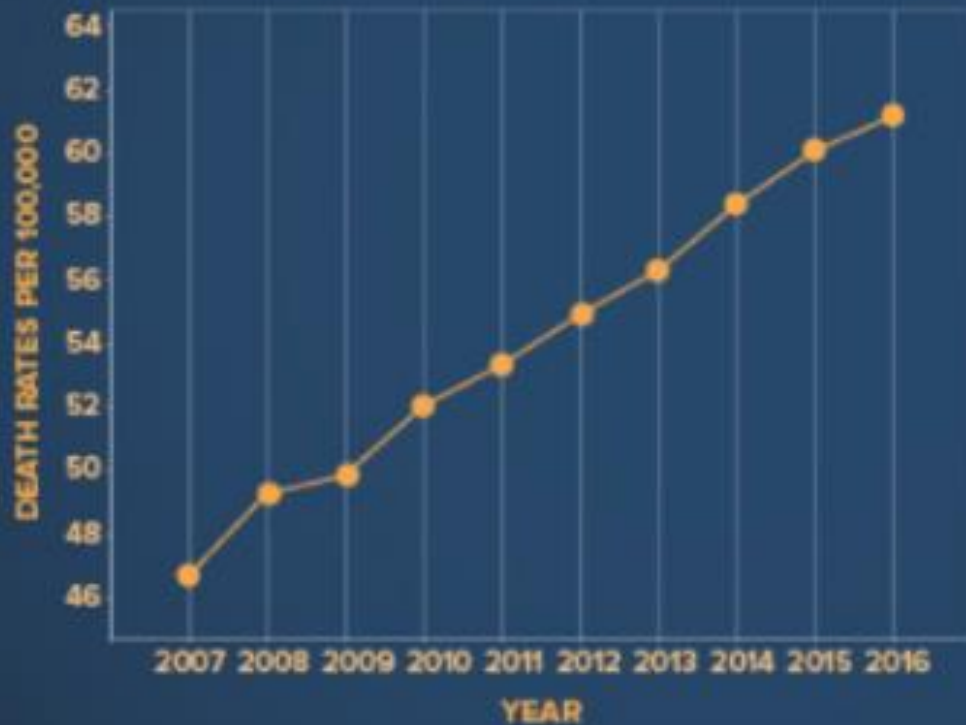


**Centers for Disease
Control and Prevention**
National Center for Injury
Prevention and Control

<https://www.cdc.gov/homeandrecrationalafety/falls/adultfalls.html>

Fall Death Rates in the U.S. **INCREASED 30%**

FROM 2007 TO 2016 FOR OLDER ADULTS



Learn more at www.cdc.gov/HomeandRecreationalSafety.

If rates continue to rise,
we can anticipate

**7 FALL
DEATHS**
EVERY HOUR
BY 2030



**Centers for Disease
Control and Prevention**
National Center for Injury
Prevention and Control

<https://www.cdc.gov/homeandrecreationalafety/falls/adultfalls.html>

Healthcare Spending

Older adult falls cost
the U.S. healthcare system

\$50 Billion

every year.



FALL DEATH RATES

Learn how you can help.
www.cdc.gov/STEADI

STEADI
Stopping Elderly Accidents,
Deaths & Injuries



Centers for Disease
Control and Prevention
National Center for Injury
Prevention and Control

FALLS AMONG OLDER ADULTS ARE

COSTLY

\$50 Billion Annually

\$29 Billion Medicare

\$12 Billion Private/Out-of-Pocket

\$9 Billion Medicaid



COMMON

1 in 4

Older adults (65+)
falls each year



PREVENTABLE

Clinicians can
use **STEADI**
to prevent falls
& reduce costs



Florence CS, Bergen G, Athey A, Burns ER, Stevens JA, Drake C. Medical Costs of Fatal and Nonfatal Falls in Older Adults. *Journal of the American Geriatrics Society*, March 2019.



U.S. Department of
Health and Human Services
Centers for Disease
Control and Prevention

https://www.cdc.gov/steady/pdf/STEADICostOfFallsPostcard_508.pdf

PREVENTABLE



Health Foundation
for Western & Central New York



Step Up to Stop Falls Toolkit

Toolkit Contents

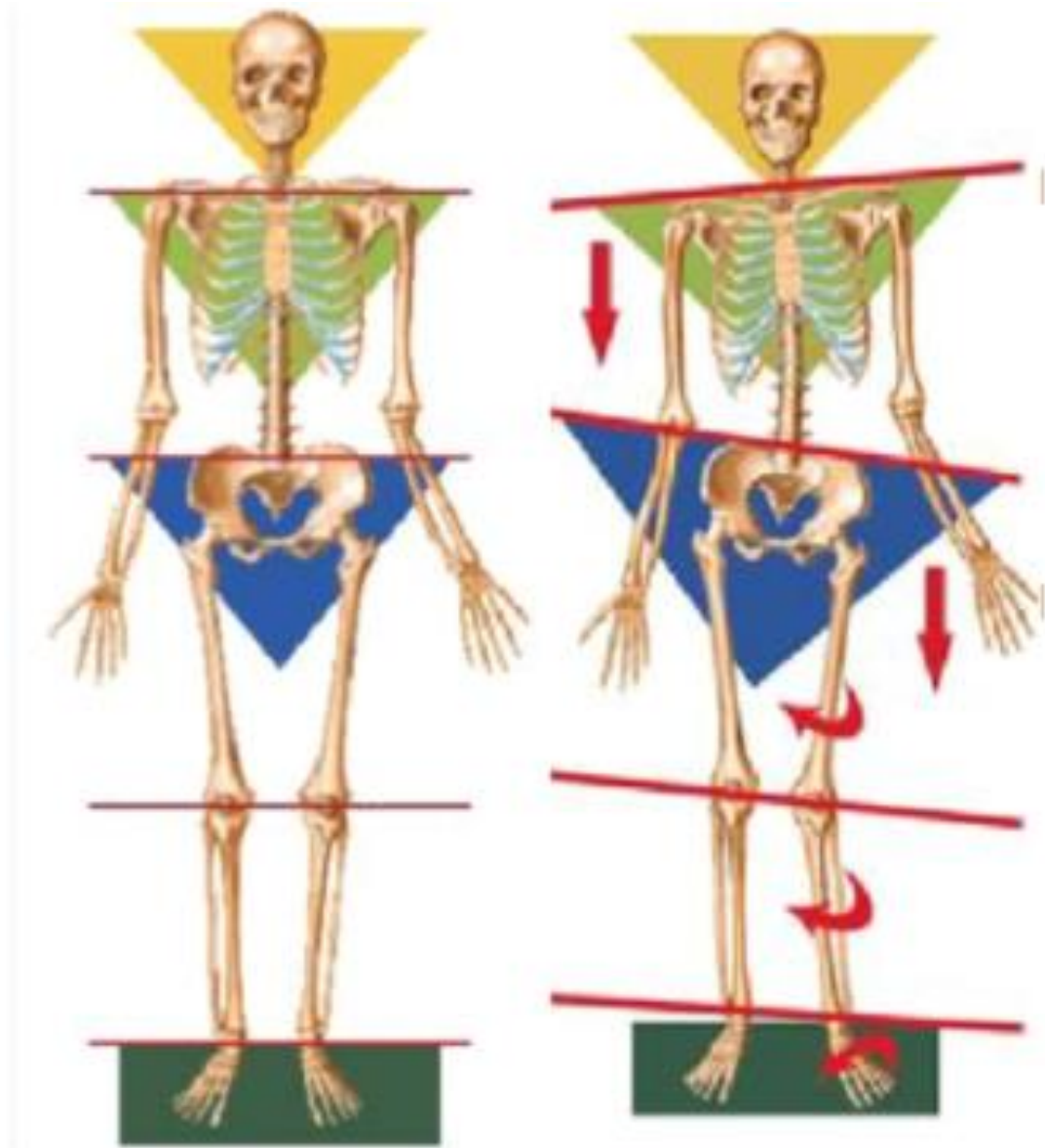
- [Balance and Exercise](#)
- [Home and Environment Safety](#)
- [Health Care Professionals](#)
- [Community Education](#)
- [Video Clips](#)
- [Logo](#)

<https://hfwcnny.org/resource/step-stop-falls-toolkit/>

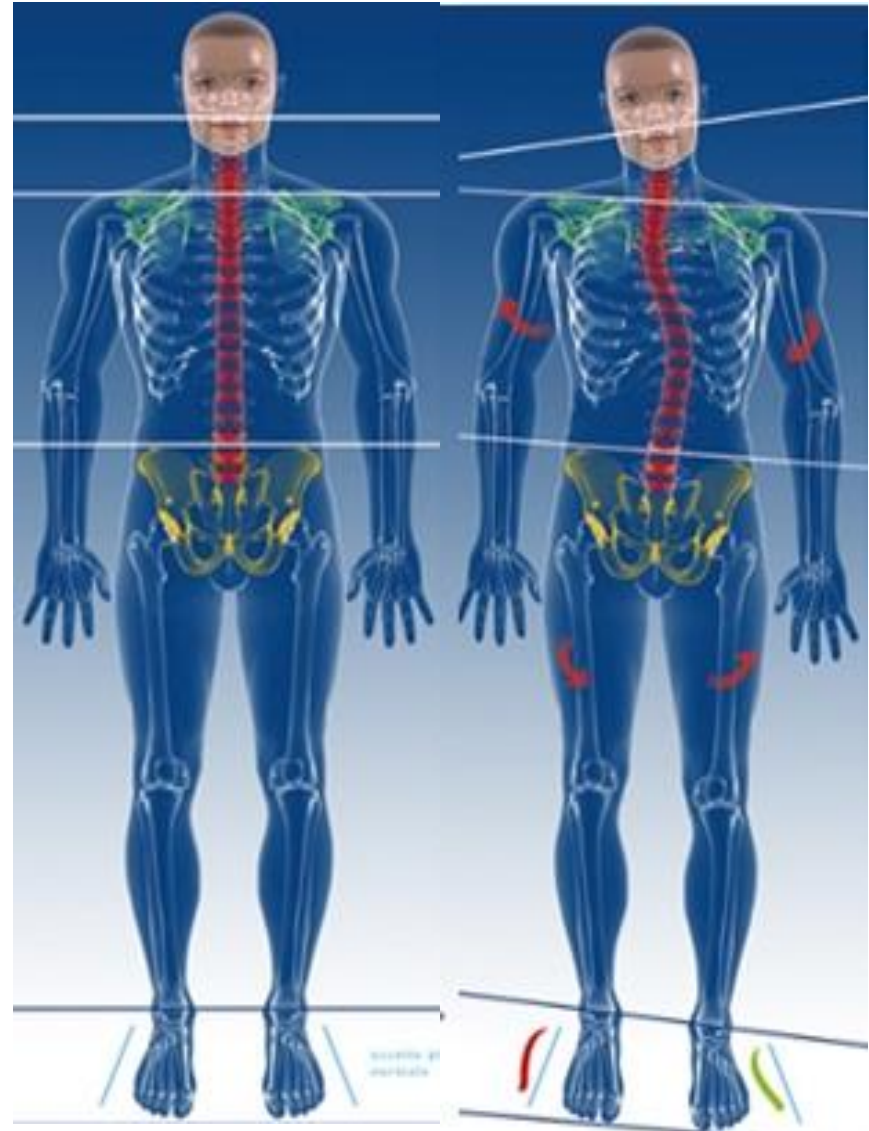
- Balance and Exercise



Compensatory Postural Adjustments



<https://odontodivas.com>

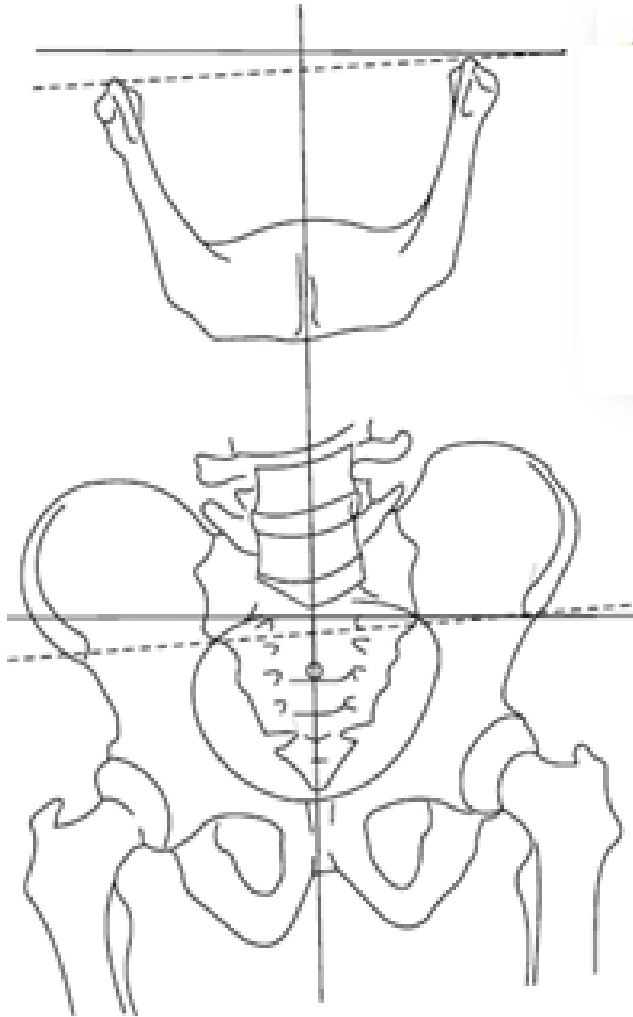


Souchard, 1986; Mason et al., 2018/

Changes of postural status in patients undergoing orthodontic treatment

[V V Ivanov](#)¹, [E E Achkasov](#)¹, [N M Markov](#)², [E K Krechina](#)²

•DOI: [10.17116/stomat201897150-53](https://doi.org/10.17116/stomat201897150-53)



<https://nl.dreamstime.com>



<http://sbdof.com>

Orofacial Functions

- **Chewing**
- **Sucking,**
- **Swallowing**
- **Speech**
- **Breathing**

Electromyographic analysis of stomatognathic muscles in elderly after hippotherapy

•Edneia Corrêa de Mello, Simone Cecílio Hallak Regalo, Luanna Honorato Diniz, et all

•Published: August 27, 2020
•<https://doi.org/10.1371/journal.pone.023806>

Masticatory Muscle



Temporal Muscle

Masseter Muscle

<http://auladeanatomia.com.br/novosite>



FORP / USP Image Archive

Conclusion

These findings suggest that hippotherapy promotes a reduction in the myoelectric activity of the masticatory muscles of the elderly.

Objective

**To investigate the effect of hippotherapy on
the functional capacity and the
stomatognathic system of older adults**



Sample size

Software G* Power 3.1.9.2

Level of $\alpha = 0.05$

Power of 95%

$n = 16$

Research Ethics Committee of the FORP/USP

(CAAE: 98201118.2.0000.5419)

Brazilian Registry of Clinical Trials (ReBEC)

<https://ensaiosclinicos.gov.br/rg/RBR-6phs67/>



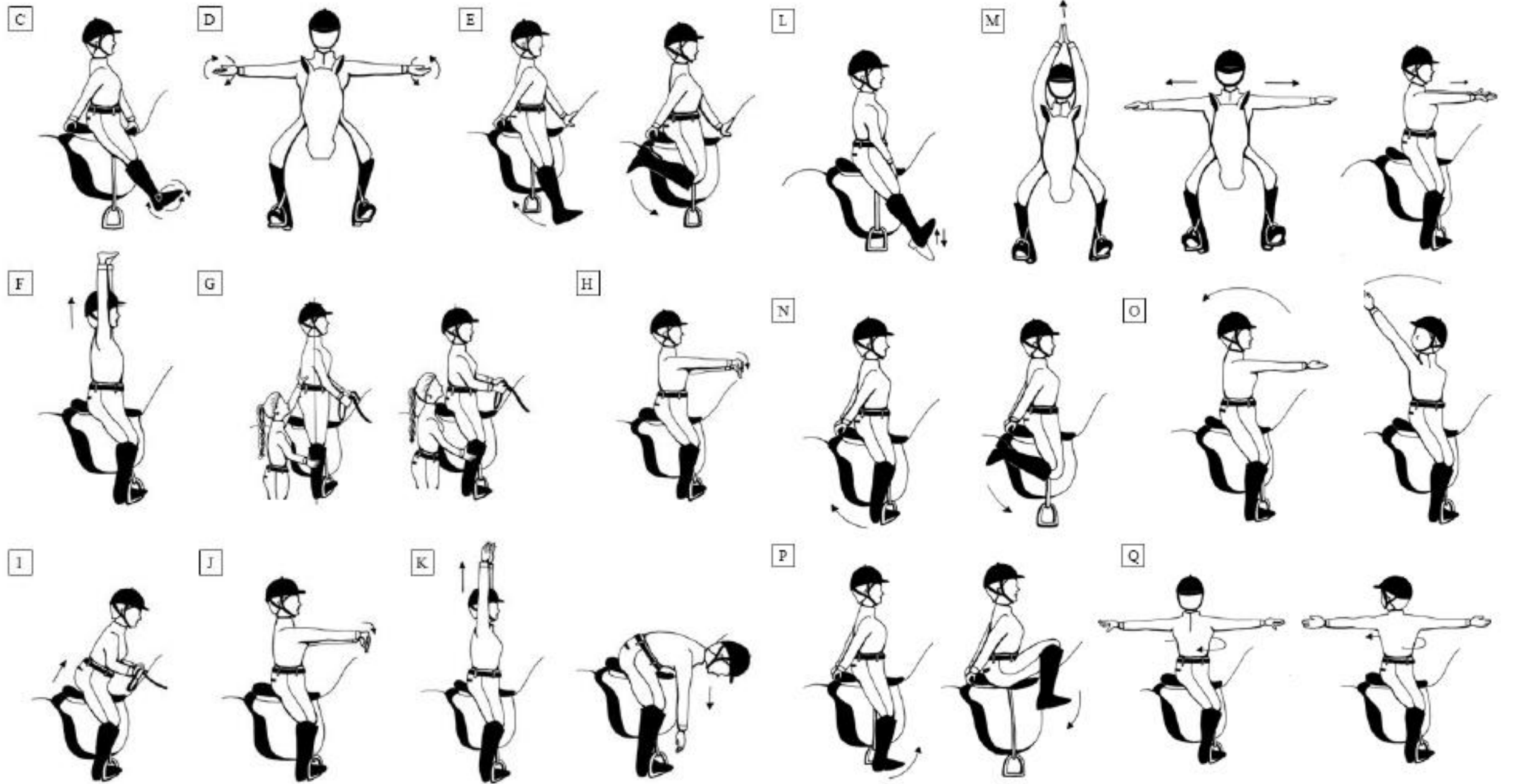


Illustration by Silvana Quintino Rodrigues

Berg's Balance Scale (BBS)



Functional Reach Test (FRT)



Timed Up and Go (TUG)



Six Minute Walk Test (6MWT)



Arm Curl Test (ACT)



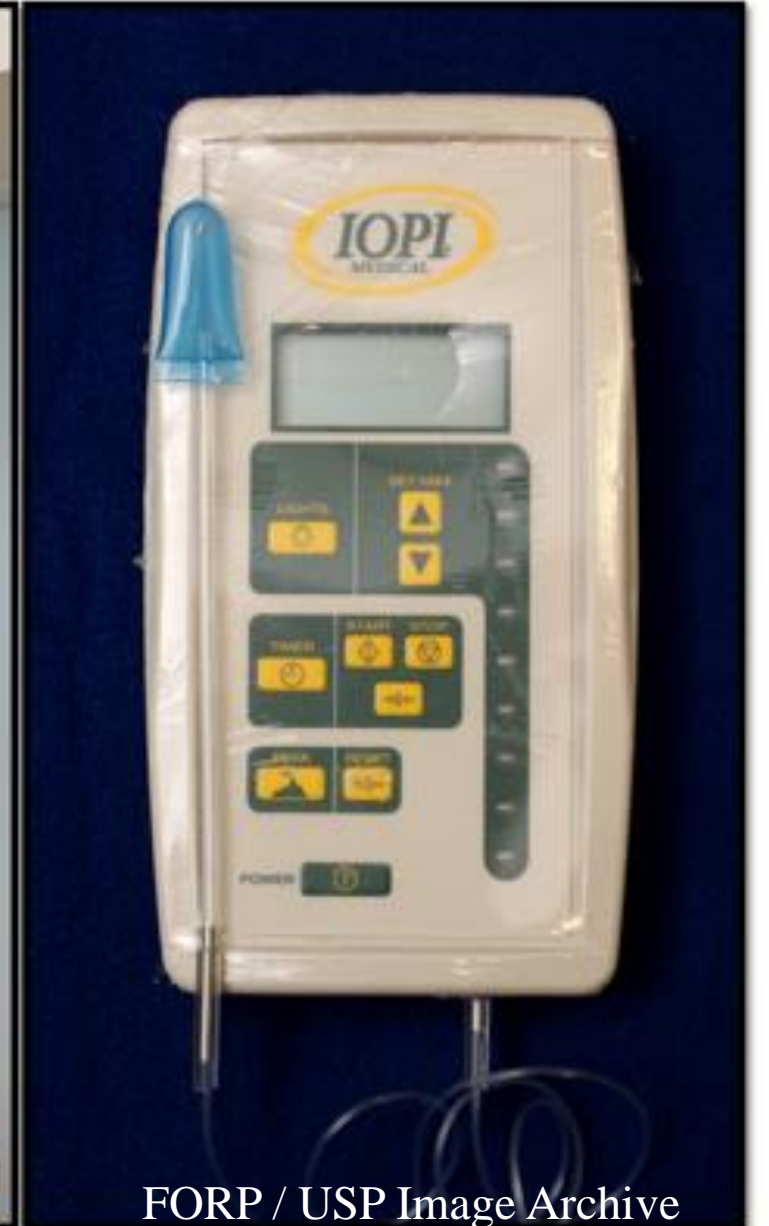
30 Second Sit to Stand Test (30CST)



Sit and Reach Test (SRT)



Iowa Oral Pressure Instrument (IOPI)

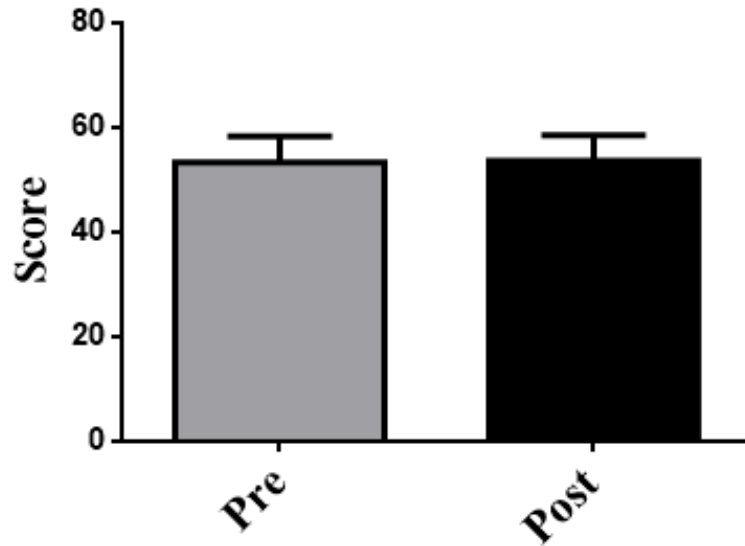


Kratos digital gnathodynamometer



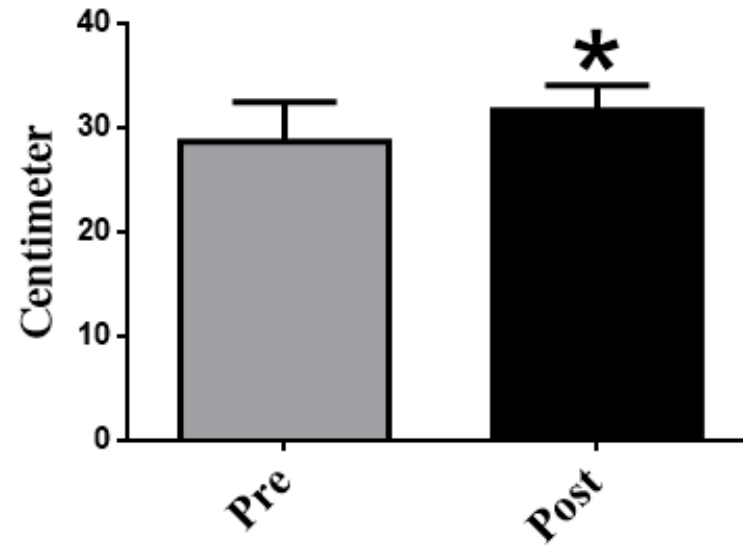
Functional Capacity

Berg's Balance Scale (BBS)



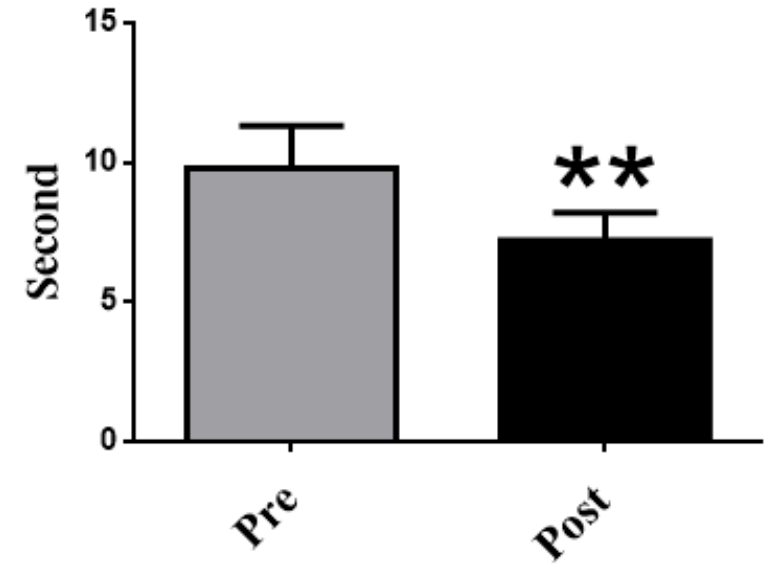
$p=0.1250$

Functional Reach Test (FRT)



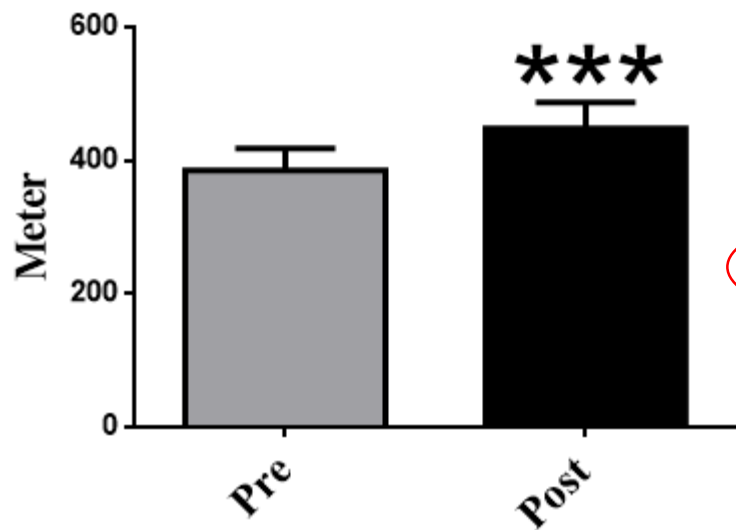
$p=0.0431$

Timed Up and Go (TUG)



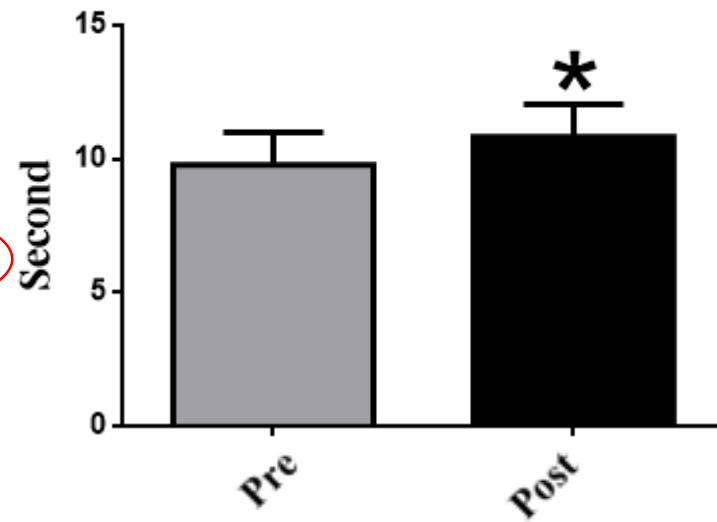
$p=0.0011$

Six Minute Walk Test (6MWT)



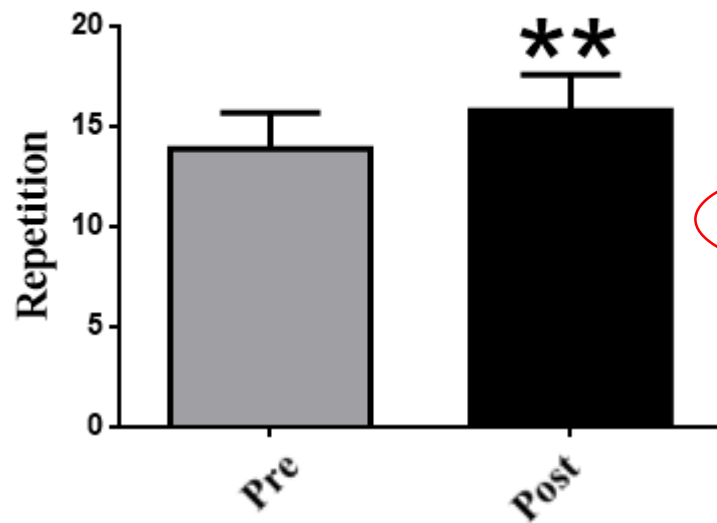
p < 0,0001

30 Second Sit to Stand Test (30CST)



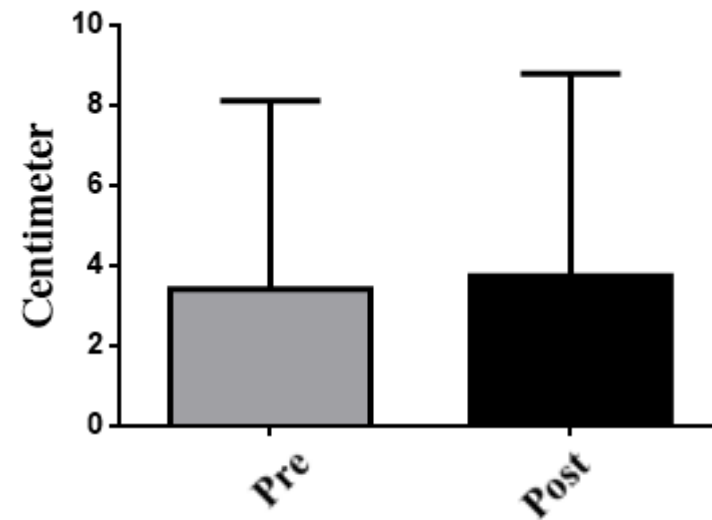
p = 0,0302

Arm Curl Test (ACT)



p = 0,0100

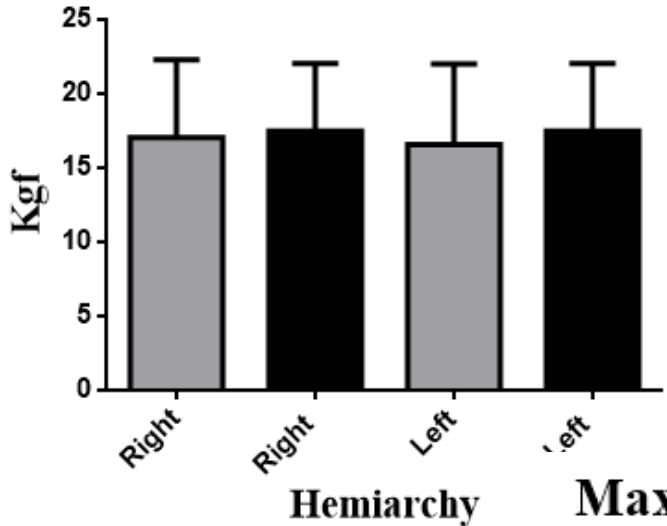
Sit and Reach Test (SRT)



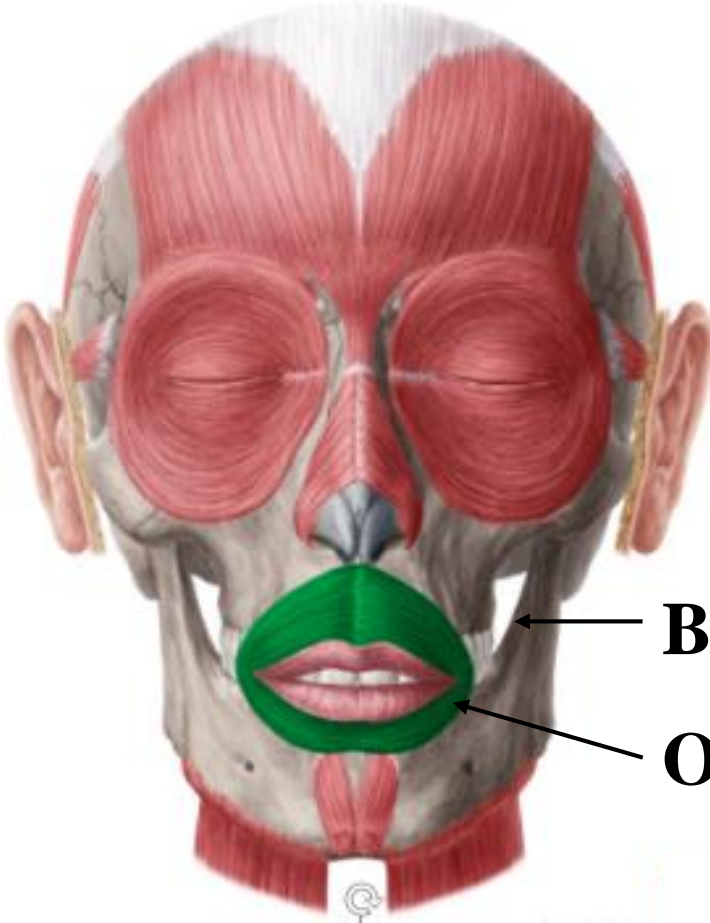
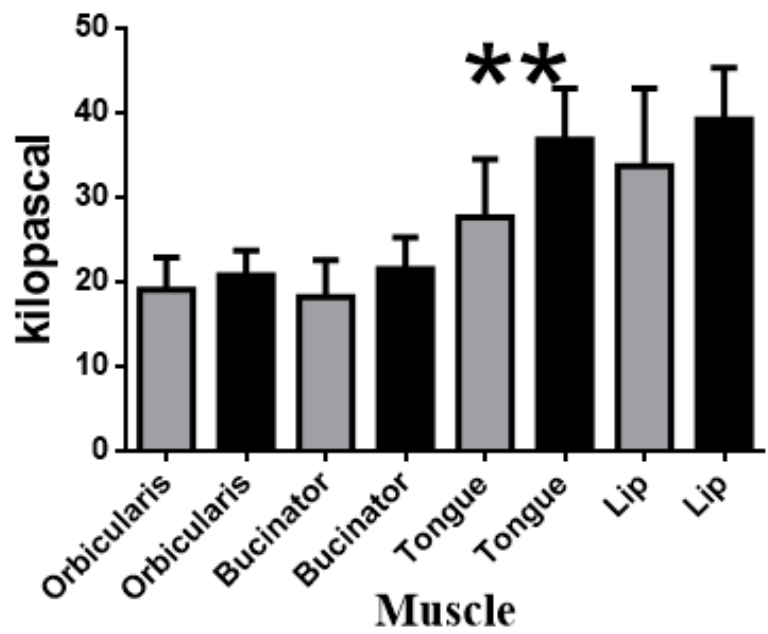
p = 0,0786

Orofacial Performance

Maximum Molar Bite Force



Maximum Tongue and Lip Pressure



Buccinator
Orbicularis

$p=0,0087$

<https://www.kenhub.com/pt/library>

Palinkas et al 2016; Oliveira et al., 2017

Conclusion

**Regular participation in a moderate-intensity
Hippotherapy Program promotes an
improvement in the functional capacity and
performance of the stomatognathic system of
older adults**

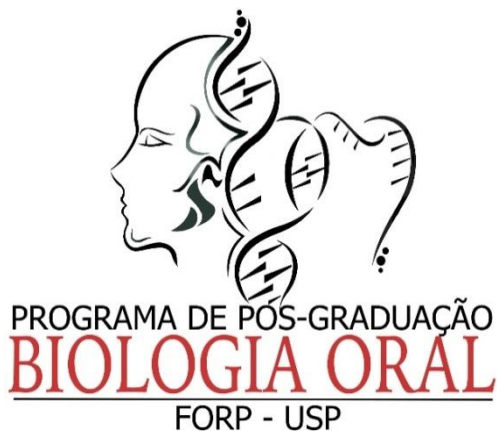
References

- Costa IMPF, Nunes PS, Neves ELA, Barreto LCLS, Garcez CA, Souza CC, Oliveira PMP, Ferreira LAS, Lima VNB, Araújo AAS. Evaluation of muscle strength, balance and functionality of individuals with type 2 Charcot-Marie-Tooth Disease. *Gait posture*. 2018; May;62:463-467
- Diniz LH, de Mello EC, Ribeiro MF, Lage JB, Bevilacqua Júnior DE, Ferreira AA, et al. Impact of hippotherapy for balance improvement and flexibility in elderly people. *Journal of Bodywork and Movement Therapies*. 2020 Apr 1;24(2):92–7. pmid:32507159
- Ivanov VV, Achkasov EE, Markov NM, Krechina EK. Changes of postural status in patients undergoing orthodontic treatment. *Stomatologia (Mosk)*. 2018;97(1):50-53.
- Julià-Sánchez Alvares-Hermes, Gatterer H, Burtscher H, Pages T, Viscor. Dental occlusion influences the standing balance on unstable platform. *Motor Control*. 2015;19(4):341-54.
- Mason M, Spolaor F, Guiotto A, De Stefani A, Gracco A, Sawacha Z. Gait and posture analysis in patients with maxillary transverse discrepancy, before and after RPE. In *Orthod*. 2018;16(1):158-173.
- Mello EC de, Regalo SCH, Diniz LH, et al. Electromyographic analysis of stomatognathic muscles in elderly after hippotherapy. *PLOS ONE*. 2020;15(8):e0238036. doi:10.1371/journal.pone.0238036
- Oliveira LF, Palinkas M, Vasconcelos PB, Regalo IH, Cecílio FA, Oliveira EF, Semprini M, Siéssere S, Regalo SCH. Influence of age on the electromyographic fatigue threshold of the masseter and temporal muscles of healthy individuals. *Archives of Oral Biology*. 2017;84:1-6..
- Palinkas M, Bataglioni C, Canto GL, Camozeli NM, Theodoro GT, Siéssere S, Semprini M, Regalo S. Impact of sleep bruxism on masseter and temporalis muscles and bite force. *The Journal of Craniomandibular e Sleep Practice*. 2016;34(5):309-315.
- Souchard PE. *Reeducação postural global: método do campo fechado*. 2ª edição. São Paulo: Editora Ícone 1986:104.

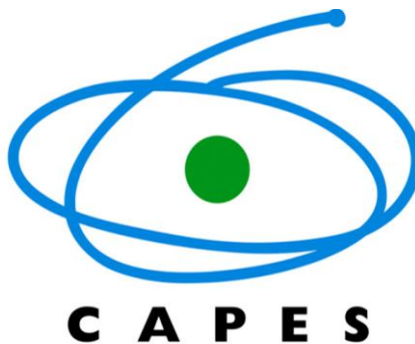
Acknowledgment



PREFEITURA MUNICIPAL DE
PONTAL/SP



PREFEITURA MUNICIPAL DE
SERTÃOZINHO/SP



Associação de
Equoterapia
Vassoural

Contact

edneia.mello@usp.br

Thank you