

# ***Role of Physical Therapy of Aquatic Fitness In Stroke Patients***



***FABIO JAKAITIS  
BRAZIL – São Paulo***



# ***Role of Physical Therapy of Aquatic Fitness In Stroke Patients***

***Fabio Jakaitis\*\* , Daniel Gonçalves dos Santos, Carolina Vilela  
Abrantes, Silvia Gusman, Simone Cristina Bifulco***

**\*\* Physiotherapist, Master in Rehabilitation and Social Inclusion Body  
Balance, Specialist, Physiotherapist Senior Albert Einstein Hospital,  
São Paulo, Brazil, Teacher of Bandeirantes and Anhanguera  
University of São Paulo, Brazil.**

# Objective

- **Evaluate the perceived effort of stroke patients in aquatic therapy with the use of metric tools reviewed BORG scale effort and heart frequency, seeking a better physical conditioning**



# Method

- **13 patients with chronic stroke performed only aquatic therapy underwent two weekly treatments of 45 minutes in the aquatic therapy of Albert Einstein Hospital during the period January to December 2010**



# Method

## PROTOCOL OF TREATMENT

The evaluation was performed BORG:

- 1) before starting therapy
- 2) during (after 20 minutes of aerobic effort to initiation of therapy)
- 3) after the end of the session (5 minutes after leaving the pool)



# Method

## PROTOCOL OF TREATMENT (4 steps)

1) Warming: performed  
with mobilization of  
the joints and stretching  
overall

2) Strengthening:

Strengthening specific legs  
(Quadriceps, Iliopsoas,  
Tibialis Anterior and Gluteus),  
abdomen and upper limbs  
(Triceps Surae, Extensor  
Digitorum Longus and Deltoid)





# Method

## PROTOCOL OF TREATMENT (4 steps)

### 3) Aerobic Conditioning:

20 minutes of aerobic activity with strength resisted marching, swimming and running

### 4) Relaxation:

mobilizations carried out with slow, swirling jets and / or relaxation techniques

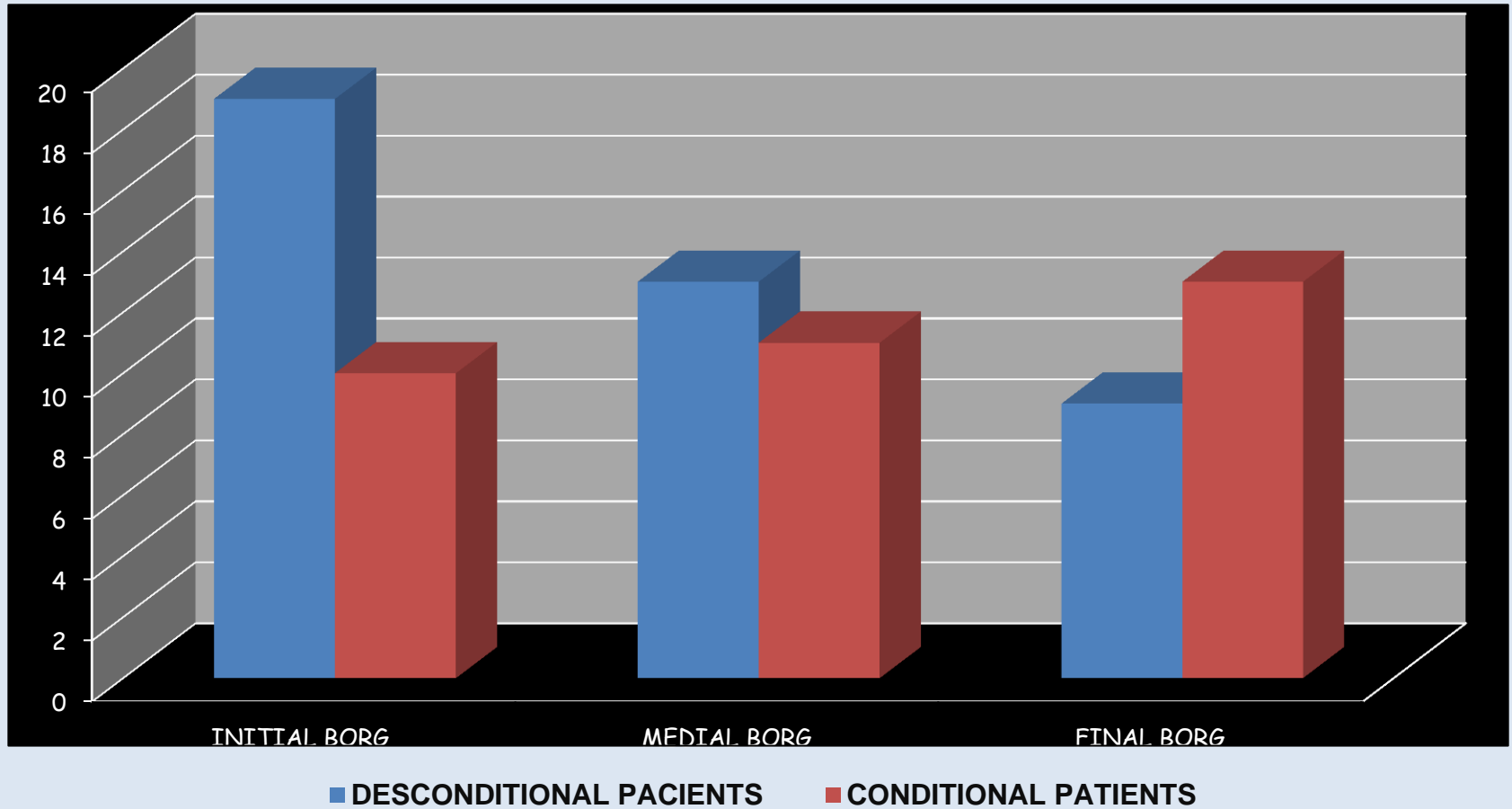


# Results

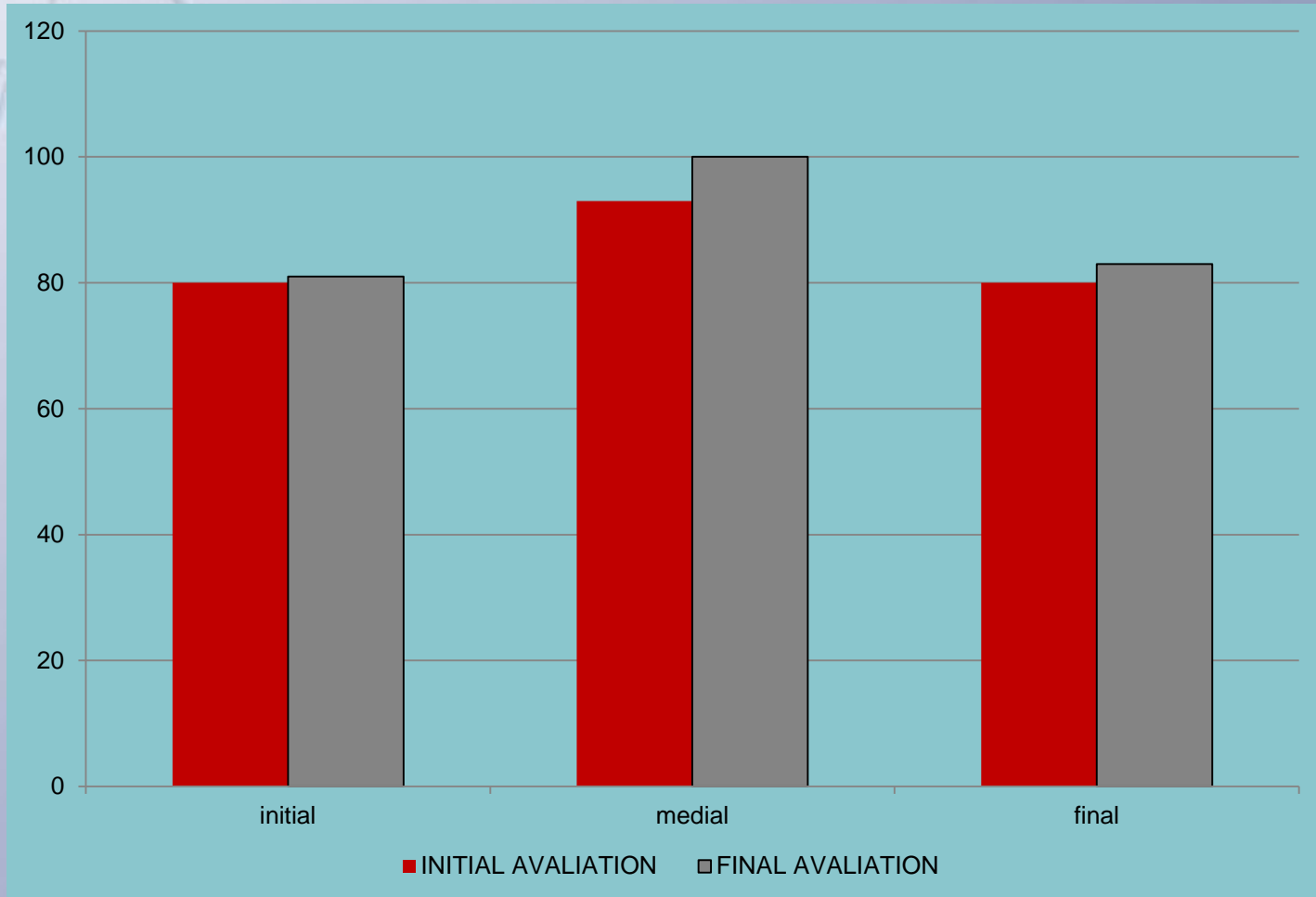
- **31 sessions were performed in 13 patients within 12 months of treatment, and there was an improvement in overall fitness in 50% of patients after six months of therapy**
- **In the first quarter, the BORG went from 17 to 15 points and frequency heart rate went from 120x80 to 150x90 mm Hg in the second quarter**
- **the perception of effort maintained the two points reduction (from 15 to 13 points) and heart rate 120x80 mm Hg**



# Results



# Results




# Discussion

- Patients with stroke have worse physical conditioning and studies show an improvement in conditioning work with low load and 10 minutes of aerobic activity twice a week with improved effort after **nine months** of therapy and in this study we observed that the increased time of aerobic activity for 20 minutes, the anticipated conditioning for **six months** after the beginning of activities in half the population



# Conclusion

- 
- **After six months of commencement of aerobic activity, there was an improvement in 50% of patients perceived exertion, with progress BORG and Heart Rate, favoring an improvement of fitness on stroke. Further research is needed to evidence significant with a larger sample and a control group without aerobic work.**

# Bibliography

- 1.Wolfe CD. The impact of stroke. Br Med Bull 2000;56:275-86.
- <http://dx.doi.org/10.1258/0007142001903120>
- 2.Sistema de Informações sobre Mortalidade, Ministério da Saúde. Indicadores de Dados Básicos – Brasil 97. Brasília (DF): Ministério da Saúde; 1999, citado em 2005. Disponível em <http://www.datasus.com.br>.
- 3.Moura RMF, Lima RCM, Lage DC, Amaral EA A - Efeitos do treinamento aeróbio na qualidade de vida e na capacidade funcional de indivíduos hemiparéticos crônicos Acta Fisiatr 2005;12(3):94-9.
- 4.Silva VDR, Sant’Ana JE, Vanderlei LCM, Carvalho AC. Análise do comportamento de parâmetros cardiovasculares durante a realização de exercícios físicos em hemiplégicos crônicos Arq Ciênc Saúde 2006;13(4):181-5.
- 5.Fukujima MM, Martinez TLR. Dislipidemia e acidente vascular cerebral isquêmico. Rev Soc Cardiol Estado de São Paulo 1999;9(4):529-36.
- 6.Lessa I. Epidemiologia das doenças cerebrovasculares no Brasil. Rev Soc Cardiol Estado de São Paulo 1999;9(4):509-18.
- 7.Cramer SC. Editorial comment. Spasticity after stroke: what’s the catch? Stroke 2004;35:139-40.
- <http://dx.doi.org/10.1161/01.STR.0000105387.38892.98>

# Bibliography

- 8.Gordon NF, Gulanick M, Costa F, Fletcher G, Franklin BA, Roth JE, et al. Physical activity and exercise recommendations for stroke survivors; an American Heart Association scientific statement from the Council on Clinical Cardiology, Subcommittee on Exercise, Cardiac Rehabilitation, and Prevention; the Council on Cardiovascular Nursing; the Council on Nutrition, Physical Activity, and Metabolism; and the Stroke Council. *Stroke* 2004;35:1230-40.  
<http://dx.doi.org/10.1161/01.STR.0000127303.19261.19>
- 9.Dean CM, Shepherd RB. Task-related training improves performance of seated reaching tasks after stroke: A randomized controlled trial. *Stroke* 1997;28:722-8.  
<http://dx.doi.org/10.1161/01.STR.28.4.722>
- 10.Teixeira-Salmela LF, Oliveira ESG, Santana EGS, Resende GP. Fortalecimento muscular e condicionamento físico em hemiplégicos. *Acta Fisiatr* 2000;7:108-18.
- 11.Potempa K, Lopez M, Braun LT, Szidon JP, Fogg L, Tincknell T. Physiological outcomes of aerobic exercise training in hemiparetic stroke patients. *Stroke* 1995;26:101-5.  
<http://dx.doi.org/10.1161/01.STR.26.1.101>
- 12.Monga TN, Deforge DA, Williams J, Wolfe LA. Cardiovascular responses to acute exercise in patients with cerebrovascular accidents. *Arch Phys Med Rehabil* 1988;69:937-40.
- 13.Macko RF, Smith GV, Dobrovoly CL, Sorkin JD, Goldberg AP, Silver KH. Treadmill training improves fitness reserve in chronic stroke patients. *Arch Phys Med Rehabil.* 2001;82:879-84.  
<http://dx.doi.org/10.1053/apmr.2001.23853>



# Bibliography

- 14. Radanovic M. Características do atendimento de pacientes com Acidente Vascular cerebral em hospital, secundário. Arq Neuropsiquiatr 2000;58:99-106.
- <http://dx.doi.org/10.1590/S0004-282X2000000100015>
- 15. Kabuki MT, Sá TS. Os efeitos da hidroterapia na hipertensão arterial e frequência cardíaca em pacientes com AVC. Rev Neurocienc 2007;15:131-4.
- 16. Lewis RM. Tratado de Neurologia. 10<sup>o</sup> edição, Rio de Janeiro: Guanabara Koogan, 2000, 460p.
- 17. Greenberg DA, Michael JA, Simon RP. Neurologia Clínica. 5<sup>o</sup> edição, São Paulo: Artmed, 2005, 170p.
- 18. Souza SEM. Tratamento das doenças neurológicas. Rio de Janeiro: Guanabara Koogan, 2000, 960p.
- 19. Ekman LL. Neurociência fundamentos para a reabilitação. 2<sup>o</sup> edição. Rio de Janeiro: 2004, 477p.



# THANK YOU

[fjfioterapia@ig.com.br](mailto:fjfioterapia@ig.com.br)