

## Therapy with Physical Exercise in the Treatment of Chikugunya in the Chronic Phase

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### Abbreviations

CHIK: Chikugunya; CHIKV: Chikugunya virus, ZIKV: zika virus, DENV-1: Dengue virus type 1; DENV-4: Dengue virus type 4, COVID-19: Coronavirus 2019.

Chikungunya virus (CHIKV) is transmitted by the *Aedes* mosquito that belongs to the Flaviviridae family, genus flavivirus, which also includes dengue viruses (DENV-1 to DENV-4), zika virus (ZIKV), West Nile virus, Japanese encephalitis virus and yellow fever virus [1]. It was first isolated in 1958 from patients in Bangkok, Thailand [2], from where it spread across Africa and sporadic outbreaks in several Asian countries.

In Brazil, the first disease's reports are from 2014 in Oiapoque - AM and Feira de Santana - BA, in the North and Northeast regions, respectively, after an outbreak in the Americas that started in December 2013 [3,4]. Some studies attribute the disease's emergence to major sporting events, such as the Confederations Cup in 2013 and the World Cup in Brazil in 2014, which favored the circulation of countless people from all parts of the world, including sick or infected individuals in the incubation period [5].

It is a seasonal disease, extremely influenced by the climate and with a higher incidence in the rainy season and in high temperatures, when the longevity of the *A. aegypti* and the possibility of transmission increase [6,7]. Since the first cases notification of Chikungunya (CHIK) in Brazil, there has been a fluctuation in the cases number over the years. Between 2016 and 2019 there was a 12.6% drop in the confirmed cases number (151,318 vs. 132,205, respectively) [8,9].

With the emergence of the new COVID-19 disease and therefore a pandemic installed in May 2020, there was an expectation of an increase in the CHIK incidence due to a series of factors that included social isolation, contributing to the increase in vector transmission due to the endophilic nature of the vector, suspension of arboviral surveillance programs, to contain the pandemic and redirection of diagnostic tools to detect COVID-19 cases. However, an important reduction was observed in relation to the previous year of 37.6%. Currently, and still living during the COVID-19 pandemic, but with many flexibilities regarding people circulation in urban centers, there was an increase of 31.3% in 2021 and, in 2022, the initial weeks numbers (week 1 to 17) already show a much higher incidence [10].

Even with this oscillation, CHIK is treated as an important public health problem in endemic regions. Its acute phase symptoms involve fever and intense polyarticular pain [11]. However, approximately 50% of cases progress to chronic stages, defined by a duration equal to or greater than three months of persistent or recurrent joint or musculoskeletal pain and joint stiffness (Arthralgia), which can last for years, compromising daily activities, causing disability, and reducing the quality of life due to limited motion range, muscle weakness and pain [12]. This fact has been compromising professional activities leading to absenteeism due to CHIK [13].

The therapeutic approach involves pharmacological and non-pharmacological treatment (physical exercise and neuromodulation). In a recent systematic review, which evaluated 10 studies that involved one or another therapeutic approach, available evidence shows that the use of non-steroidal anti-inflammatory drugs can reduce pain within 24 weeks of treatment, although the long-term residual impact has not been evaluated after treatment. Regarding non-pharmacological treatment, the study pointed out that long term benefits are still not clear due to the lack of robust evidence [14].

Some studies have addressed physical exercises as a form of treatment to improve the condition provided by CHIK. Neuman *et al.* [15], performed treatment with progressive resistance exercises with the objective of evaluating its effectiveness in the functionality, pain, and quality of life of chronic chikungunya fever patients. The protocol involved performing sessions with eight exercises that stabilize shoulders, elbows, wrists, knees and ankles (~50 min/session), with two sets of eight repetitions, an interval between sets and exercises ranging from one to two minutes, respectively, twice a week for 12 weeks. The results showed that at the end of the intervention period, there were improvements in functionality indicators and pain perception, proving to be an alternative treatment of chronic CHIK patients.

The performance of exercises in liquid medium (hydrotherapy) in chronic stage patients to reduce joint pain, swelling and maintenance of joint function has been used and recommended [16] with benefits like other rheumatic diseases already documented [17]. Another alternative is the Pilates method, which after

12 weeks of intervention, patients had less pain, improved functionality, and quality of life, in addition to greater joint motion range [18].

As highlighted by Pegado *et al* [19], CHIK is a neglected tropical disease and that little attention has been given to investigations with additional supportive management, such as adding physical exercise therapy to drug treatment. In addition, making people more active favors the prevention of other health problems, such as cardiopulmonary and metabolic diseases, which are the main cause of morbidity and mortality worldwide [20].

Finally, a greater effort is needed by health managers to create public policies that recommend the adoption of non-pharmacological therapy with physical exercises, associated with pharmacological treatment, as was done recently with COVID-19 patients, taking into account the moments of the day when there is a greater pain sensation (in the morning or after long periods without movement) and the fear of movement due to the pain that these patients experience in the disease chronic stages.

## Conflicts of Interests

The authors declare that there is no conflict of interest of any kind.

## Bibliography

1. Musso, D. & Gubler, D. J. (2016). Zika virus. *Clinical Microbiology Reviews*, 29(3), 487-524.
2. Hammon, W. M., Rundnick, A. & Sather, G. (1960). Viruses associated with epidemic hemorrhagic fevers of the Philippines and Thailand. *Science*, 131(3407), 1102-1103.
3. Faria, N. R., Lourenço, J., de Cerqueira, E. M., de Lima, M. M., Pybus, O. & Alcantara, L. C. J. (2016). Epidemiology of chikungunya virus in Bahia, Brazil, 2014-2015. *PLoS Currents*, 8.
4. Nunes, M. R. T., Faria, N. R., de Vasconcelos, J. M., Golding, N., Kraemer, M. U., de Oliveira, L. F., *et al.* (2015). Emergence and potential for spread of Chikungunya virus in Brazil. *BMC Medicine*, 13(102), 1-11.
5. Salvador, F. S. & Fujita, D. M. (2015). Entry routes for Zika virus in Brazil after 2014 world cup: New possibilities. *Travel Medicine and Infectious Disease*, 14(1), 49-51.
6. Câmara, F. P., Gomes, A. F., Santos, G. T. d. & Câmara, D. C. P. (2009). Clima e epidemias de dengue no Estado do Rio de Janeiro. *Revista da Sociedade Brasileira de Medicina Tropical*, 42(2), 137-140.
7. Fundação Nacional de Saúde (2002). Programa Nacional de Controle da Dengue-PNCD. 2002: Brasília.
8. Brasil (2017). Ministério da Saúde. Secretaria de Vigilância em saúde. Monitoramento dos casos de dengue, febre de chikungunya e febre pelo vírus Zika até a semana Epidemiológica 52, 2016. *Boletim Epidemiológico*, 48, 1-11.

9. Brasil (2020). Ministério da Saúde. Secretaria de Vigilância em Saúde. Monitoramento dos casos de arboviroses urbanas transmitidas pelo Aedes (dengue, chikungunya e Zika), Semanas Epidemiológicas 01 a 52. *Boletim Epidemiológico*, 2, 1-11.
10. Brasil (2022). Ministério da Saúde. Secretaria de Vigilância em Saúde. Monitoramento dos casos de arboviroses até a semana epidemiológica 18 de 2022. *Boletim Epidemiológico*, 53, 1-40.
11. Paixao, E. S., Rodrigues, L. C., Costa, M. d. C. N., Itaparica, M., Barreto, F., Gerardin, P., *et al.* (2018). Chikungunya chronic disease: a systematic review and meta-analysis. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 112(7), 301-316.
12. Doran, C., Elsinga, J., Fokkema, A., Berenschot, K., Gerstenbluth, I., Duits, A., *et al.* (2022). Long-term Chikungunya sequelae and quality of life 2.5 years post-acute disease in a prospective cohort in Curaçao. *PLoS Neglected Tropical Diseases*, 16(3), e0010142.
13. Bastos, M. L. A., Abreu, F. S. d. & Silva Junior, G. B. d. (2018). Inability to work due to Chikungunya virus infection: impact on public service during the first epidemic in the State of Ceara, northeastern Brazil. *Brazilian Journal of Infectious Diseases*, 22(3), 248-249.
14. Rodrigo, C., Herath, T., Wickramarachchi, U., Fernando, D. & Rajapakse, S. (2022). Treatment of chikungunya-associated joint pain: a systematic review of controlled clinical trials. *Transactions of The Royal Society of Tropical Medicine and Hygiene*, tract 045.
15. Neumann, I., de Oliveira, D., de Barros, E., Marques, C., Dantas, A., Dantas, D., *et al.* (2021). Resistance exercises improve physical function in chronic Chikungunya fever patients: a randomized controlled trial. *European Journal of Physical and Rehabilitation Medicine*, 57(4), 620-629.
16. Marques, C. D. L., Duarte, A. L. B. P., Ranzolin, A., Dantas, A. T., Cavalcanti, N. G., Gonçalves, R. S. G., *et al.* (2017). Recommendations of the Brazilian Society of Rheumatology for the diagnosis and treatment of chikungunya fever. Part 2-Treatment. *Revista Brasileira de Reumatologia*, 57, s438-s451.
17. Bartels, E. M., Juhl, C. B., Christensen, R., Hagen, K. B., Danneskiold-Samsøe, B., Dagfinrud, H., *et al.* (2016). Aquatic exercise for the treatment of knee and hip osteoarthritis. *Cochrane Database of Systematic Reviews*, (3).
18. de Oliveira, B. F. A., Carvalho, P. R. C., de Souza Holanda, A. S., Dos Santos, R. I. S. B., da Silva, F. A. X., Barros, G. W. P., *et al.* (2019). Pilates method in the treatment of patients with Chikungunya fever: a randomized controlled trial. *Clinical Rehabilitation*, 33(10), 1614-1624.
19. Pegado, R., Cavalcante, A. F. & Morya, E. (2020). Newer rehabilitation therapies: strategies in chikungunya chronic arthralgia. *Clinical Medicine*, 20(1), 119-120.

20. Young, D. R., Hivert, M. -F., Alhassan, S., Camhi, S. M., Ferguson, J. F., Katzmarzyk, P. T., *et al.* (2016). Sedentary behavior and cardiovascular morbidity and mortality: a science advisory from the American Heart Association. *Circulation*, 134(13), e262-e279.