

**Worsening of essential tremor after Sars-CoV-2 infection: 1 year follow up**

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*Introduction:* We recently reported the case of a 60-year-old man diagnosed with essential tremor who complained of significant tremor worsening after asymptomatic SARS-CoV-2 infection. A pre-infection assessment allowed us to demonstrate a temporal relationship between infection and tremor worsening, which probably reflects a causal link. We concluded that tremor worsening was likely due to virus-induced immune-mediated functional alterations in cerebellar networks.

*Aim:* To follow up on clinical and kinematic tremor features as well as non-motor symptoms, neuroimaging, and laboratory changes in our case one-year after SARS-CoV2 infection.

*Methods:* Clinical and kinematic assessment of tremor features, postural, kinetic and rest tremor, as well as cognitive and psychiatric evaluation by means of clinical scales were performed one year after SARS-CoV2 infection (1-year follow up). The data were compared with those collected 4 years and 4 months before the infection and 1 month after the infection. Brain magnetic resonance imaging (MRI) and blood laboratory exams were also obtained before and after infection.

*Results:* At 1-year follow up we observed a reduction in postural tremor amplitude (GRMS<sup>2</sup>) as compared to 1 month after infection (average percentage variation -14%). The value, however, was still significantly higher than before SARS-CoV2 infection (average percentage variation +54%). We found no significant variation in tremor frequency (Hz). Measures of kinetic tremor and rest tremor did not change at 1-year follow up. Finally, psychiatric, and cognitive assessment, brain MRI and blood laboratory exams did not significantly differ from previous evaluations.

*Conclusions:* After the initial worsening due to SARS-CoV2 infection, we observed only a partial recovery one-year after infection. Our observation suggests permanent virus-induced brain damage in key structures responsible for tremor generation, especially the cerebellum and its connections. However, longer follow up may be necessary to better define the effects of Sars-CoV-2 infection in patients with essential tremor.