Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

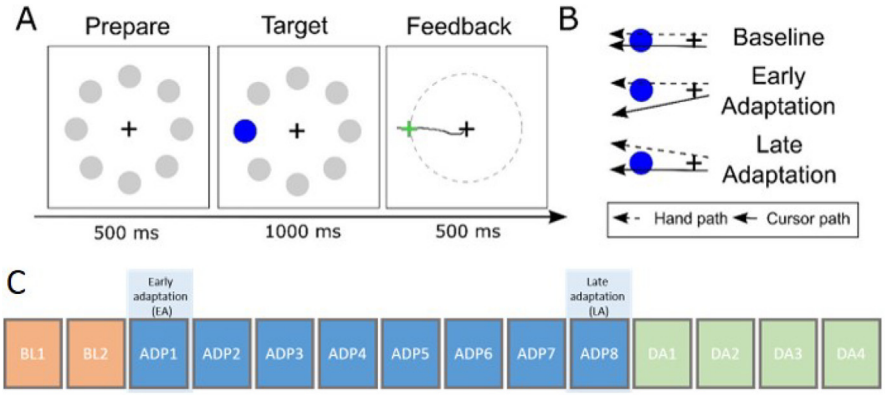

Fig. 1: Experimental setting: A – setup on the screen; B – hand and cursor paths during the different conditions; C – experimental structure (each block consists of 24 trials in one of the eight directions)

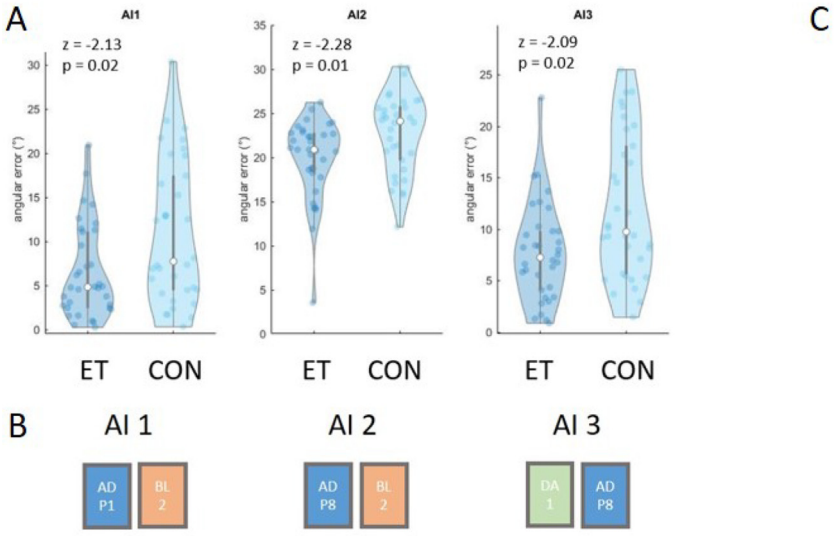

Fig. 2: A – Group comparison for the different AI's. A higher differences symbolizes better performance. B – Calculation of AI 1-3. AI1 compares performance during early adaptation to the baseline performance. AI2 compares the late adaptation state to the baseline phase and AI3 is the comparison of late adaptation to early de-adaptation.

visuomotor impairment in ET may be differentiated from the pathophysiological origin of other cerebellar diseases.

doi:10.1016/j.clinph.2022.01.037

P 7 SARS-CoV2 infection causes a worsening of the modified ranking scale (mRS) in patients with neuromuscular diseases – first results of the German covid19-nme registry—A. Worm [a,*], F. Aust [a], A. Hahn [b], A. Schänzer [c], R. Hasseli [d], H.H. Krämer-Best [a] ([a] Justus-Liebig-Universität Gießen, Klinik für Neurologie – UKGM Gießen/ Marburg, Gießen, Germany, [b] Justus-Liebig-Universität Gießen, Neuropädiatrie – UKGM Gießen/ Marburg, Gießen, Germany, [c] Justus-Liebig-Universität Gießen, Neuropathologie – UKGM Gießen/ Marburg, Gießen, Germany, [d] Justus-Liebig-Universität Gießen, Klinik f. Rheumatologie u. klinische Immunologie Campus Kerckhoff, Gießen, Germany)

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Background: Patients with neuromuscular diseases (NMD) are classified as risk groups for a potentially severe course of a SARS-CoV-2 infection. An online registry (www.covid19-nme.com) was developed to gather information about the severity of COVID19, a potential progression of NMD through the SARS-CoV-2 infection and the possible influence of medication on the course of the infection.

Methods: Since February 2021, patients of all ages (children, adolescents and adults) with NMD and an infection with SARS-CoV-2

have been included in this register. In addition to demographic data, pre-existing diseases and therapies, information about the NMD, the course of the SARS-CoV-2 infection as well as the clinical findings before and after the infection are recorded.

Results: So far 94 patients (37% female, age: median 60 years (1-94 years)) from Germany and Austria have been recorded. The diagnoses represent the entire spectrum of NMD: different forms of polyneuropathies (PN) including CIDP and hereditary PN, ICUAW, myasthenic syndromes, motor neuron diseases (SMA and ALS) as well as various muscle diseases such as dystrophinopathies and myotonic syndromes. The collected mRS (measure for description of neurological impairment) depicts a significant worsening after the SARS-CoV2 infection ($p = 0.02$; Wilcoxon), whereby the patients with ICUAW were excluded from the analysis. The duration of symptoms showed a positive correlation with age ($r = 0.343$; $p = 0.005$) and weight ($r = 0.291$; $p = 0.030$), but not with the type of NMD. In total, 13 patients deceased due to the SARS-CoV2 infection. The probability of a fatal outcome of COVID19 correlates with increasing age ($r = 0.313$; $p = 0.004$) but not the type of NMD. The ventilation situation did not change in NMD patients due to the infection with SARS-CoV2.

Summary: The first results of the evaluation of the covid-19.nme registry indicate that the clinical symptoms of NMD progress due to an infection with SARS-CoV2. The underlying cause for this remains unclear. Autoimmunological processes and a possible neurotropy can be considered as pathophysiological mechanisms.

doi:10.1016/j.clinph.2022.01.038

P 8 Eliciting a dystonic phenotype in genetically predisposed rodents for DYT-TOR1A dystonia via an overuse paradigm—P. Dubey [a,*], L. Rauschenberger [a], S. Knorr [a], K. Grundmann-Hauser [b,c], T. Ott [d,c], M. Mendonca [e,f], R. Costa [g], J. Volkmann [a], C.W. Ip [a] ([a] Universitätsklinikum Würzburg, Department of Neurology, Würzburg, Germany, [b] Unversity of Tübingen, Centre for Rare Diseases, Tübingen, Germany, [c] Unversity of Tübingen, Institute of Medical Genetics and Applied Genomics, Tübingen, Germany, [d] University Hospital of Tübingen, Core Facility Transgenic Animals, Tübingen, Germany, [e] Champalimaud Centre for the Unknown, Champalimaud Research, Lisbon, Portugal, [f] Universidade Nova de Lisboa, NOVA Medical School | Faculdade de Ciências Médicas, Lisbon, Portugal, [g] Columbia University, Champalimaud & Zuckerman Mind Brain Behavior Institute, New York, NY, United States)

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Introduction: Abnormal postures or movements caused by sustained or intermittent muscle contractions typically characterize the hyperkinetic movement disorder dystonia. DYT-TOR1A dystonia is the most common form of monogenic dystonia and follows an autosomal dominant pattern of inheritance. Although a trinucleotide deletion in the torsinA encoding gene, TOR1A, forms the genetic basis of this disorder, its reduced penetrance of 30-40% suggests the presence of disease modifying factors. Indeed, the induction of task specific forms of dystonia such as musician's dystonia and writer's cramp upon repetitive peripheral limb overuse lends strong support to a "second-hit" hypothesis, which states that exposure to environmental triggers could result in overt manifestation of dystonia in mutation carriers.

Based on the hypothesis that an environmental trigger in the form of repetitive limb overuse induces dystonia-like movements in asymptomatic, but genetically predisposed rats expressing mutant human TOR1A, we have been working towards developing a clinically relevant model of dystonia.

Materials and methods: Rats overexpressing mutant torsinA protein (ΔETorA) and their wildtype (wt) littermates were trained to perform a single-limb overuse task. The animals learned to press a lever by receiving a sugar water reward for each successful press in an operant testing chamber. Two overuse protocols were tested: 1000 presses/day, 6 days/week and 2000 presses/day, 3 days/week.

Results: 1000 presses/day, 6 days/week did not affect motor performance of ΔETorA rats compared to the wt control group. In contrast, 2000 presses/day, 3 days/week over 5 weeks resulted in pronounced differences between wt and ΔETorA animals. Wt rats showed a consistently high success rate of ∼80% for pressing the lever. The velocity of forelimb movement and the accuracy in hitting the lever remained on a stable level. ΔETorA rats, however, were increasingly and significantly less successful at pressing the lever (∼75%) as compared to their wt littermates over the observational period. In addition, the average velocity of the movement towards the lever was shown to be reduced in the ΔETorA group compared to wt animals. Moreover, ΔETorA animals needed more trials to successfully hit the lever for the first time in a series of presses.

Discussion/Conclusion: Our results indicate that the 1000 presses, 6 days/week protocol is insufficient to induce behavioural changes. The 2000 presses, 3 days/week protocol revealed that ΔETorA rats show a lower success rate in pressing the lever, a lower average velocity of movement of the right forelimb and difficulties in hitting the target successfully compared to their wt littermates. This points towards motor abnormalities induced by the overuse paradigm in ΔETorA rats compared to the wt control group.

doi:10.1016/j.clinph.2022.01.039

P 9 A multi-modal *in vivo* staging approach to amyotrophic lateral sclerosis—A. Behler *, H.P. Müller, D. Lulé, A.C. Ludolph, J. Kassubek (Universitätsklinikum Ulm, Ulm, Germany)

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Introduction: The neuropathological process underlying amyotrophic lateral sclerosis (ALS) can be classified as a four-stage propagation scheme. An ***in vivo*** transfer of these stages using diffusion tensor imaging (DTI) in specific tract systems has been established [1]. Since cognitive functions are closely linked to microstructural changes, an analogous classification into four cognitive stages, with high congruence to DTI stages, was demonstrated [2]. Alterations in oculomotor functions in ALS can be characterized by two stages in oculomotor parameters [3]. The objective of the current study is to show congruence of methods by combining neuroimaging, cognitive testing, and video-oculography (VOG) and to potentially improve ***in vivo***staging classification.

Methods: A total of 4 microstructural, 2 cognitive, and 9 oculomotor parameters were obtained from each of 193 patients with ALS. To this end, patients underwent VOG und cognitive testing using Edinburgh Cognitive and Behavioural ALS Screen (ECAS). The regional fractional anisotropy (FA) of the tract systems involved in ALS [1] were studied using a tract-of-interest (TOI)-based approach. After z-standardization of all parameters, principal component analysis was performed. Hierarchical and ***k***-means clustering of principal components was used to obtain an optimal cluster solution.

Results: After reducing the considered parameters to four uncorrelated principal components, the patients were iteratively merged using pairwise distances. A division of patients into four clusters was used for further analysis. These clusters were different with regard to FA values during the progression of ALS-associated tract