

BIBLIOGRAPHIE

ÉPILEPSIE ET ACTIVITÉ PHYSIQUE

*Vous trouverez ci-après une liste de références sélective et non exhaustive.
Celles-ci sont classées par type puis par année décroissante.*

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SOMMAIRE

INTRODUCTION : QUELQUES DÉFINITIONS	3
LÉGISLATION – TEXTES DE RÉFÉRENCE.....	4
ARTICLES & REVUES	4
OUVRAGES & CHAPITRES D’OUVRAGES.....	26
MÉMOIRES, RECHERCHES, THÈSES.....	27
RAPPORTS, ÉTUDES, EXPERTISES, RECOMMANDATIONS	29
AUTRES RESSOURCES EN LIGNE	30

INTRODUCTION : QUELQUES DÉFINITIONS

L'activité physique est une thérapeutique à part entière et intervient dans la prévention primaire, secondaire et tertiaire de nombreuses maladies chroniques et états de santé.

Il est reconnu et accepté qu'une vie physiquement et socialement active est bénéfique pour la santé.

C'est tout aussi vrai pour les personnes atteintes d'épilepsie. Et, de fait, l'activité physique peut contribuer à réduire la survenance des crises chez un grand nombre de personnes.

La planification des activités physiques sportives et récréatives et la participation à celles-ci doivent cependant être personnalisées.¹

L'activité physique (AP) se définit comme tout mouvement corporel produit par les muscles squelettiques, entraînant une dépense d'énergie supérieure à celle du métabolisme de repos. L'activité physique comprend les AP de la vie quotidienne, les exercices physiques et les activités sportives.²

L'exercice physique est une AP planifiée, structurée, répétitive dont l'objectif est l'amélioration ou le maintien d'une ou plusieurs composantes de la condition physique. À l'inverse des activités sportives, l'exercice physique ne répond pas à des règles de jeu et peut être souvent réalisé sans infrastructures lourdes et sans équipements spécifiques.³

Sport : toute forme d'activités physiques qui, à travers une participation organisée ou non, ont pour objectif l'expression ou l'amélioration de la condition physique et psychique, le développement des relations sociales ou l'obtention de résultats en compétition de tout niveau.⁴

Sport-santé : Sport dont les conditions de pratique sont aptes à maintenir ou améliorer l'état de santé en prévention primaire, secondaire ou tertiaire. Le sport-santé fait appel à des professionnels de l'APA ou à des éducateurs sportifs formés, selon les niveaux de vulnérabilité des publics qui déterminent ou non des besoins spécifiques.⁵

Activité physique adaptée (APA). Selon l'article L. 1172-1 du décret n°2016-1990 du 30 décembre 2016, on entend par activité physique adaptée, la pratique dans un contexte d'activité du quotidien, de loisir, de sport ou d'exercices programmés, des mouvements corporels produits par les muscles squelettiques, basée sur les aptitudes et les motivations des personnes ayant des besoins spécifiques qui les empêchent de pratiquer dans des conditions ordinaires. Les programmes d'APA, ainsi définis, font appel pour leur conception, leur organisation et leur supervision à des professionnels de l'APA ou à des professionnels de santé. Ils concernent des publics fragiles qui ne sont pas encore autonomes dans la gestion de leur pathologie et/ou qui sont très éloignés des pratiques physiques (distance sociale).⁶

¹ Les sports, les activités récréatives et l'épilepsie. BC Epilepsy Society, 2012, 3 p.

http://www.bcepilepsy.com/files/information-sheets/French/French-Sports_and_Recreation_for_People_with_Epilepsy.pdf

² Promotion, consultation et prescription médicale d'activité physique et sportive pour la santé chez les adultes. Organisation des parcours - Outil d'amélioration des pratiques professionnelles. Haute Autorité de Santé, 2018

https://www.has-sante.fr/jcms/c_2876862/fr/promotion-consultation-et-prescription-medicale-d-activite-physique-et-sportive-pour-la-sante

³ Promotion, consultation et prescription médicale d'activité physique et sportive pour la santé chez les adultes. Organisation des parcours - Outil d'amélioration des pratiques professionnelles. Haute Autorité de Santé, 2018

https://www.has-sante.fr/jcms/c_2876862/fr/promotion-consultation-et-prescription-medicale-d-activite-physique-et-sportive-pour-la-sante

⁴ Charte européenne du sport révisée en 2001. Conseil de l'Europe, Comité des Ministres.

<https://www.coe.int/fr/web/sport/european-sports-charter>

⁵ Promotion, consultation et prescription médicale d'activité physique et sportive pour la santé chez les adultes. Organisation des parcours - Outil d'amélioration des pratiques professionnelles. Haute Autorité de Santé, 2018

https://www.has-sante.fr/jcms/c_2876862/fr/promotion-consultation-et-prescription-medicale-d-activite-physique-et-sportive-pour-la-sante

⁶ Promotion, consultation et prescription médicale d'activité physique et sportive pour la santé chez les adultes. Organisation des parcours - Outil d'amélioration des pratiques professionnelles. Haute Autorité de Santé, 2018

https://www.has-sante.fr/jcms/c_2876862/fr/promotion-consultation-et-prescription-medicale-d-activite-physique-et-sportive-pour-la-sante

Parcours sport-santé : C'est un dispositif individuel de développement des ressources de santé physique, mentale et sociale qui vise, par un accompagnement éducatif et motivationnel préventif et/ou thérapeutique, à permettre à tout public pouvant tirer bénéfice pour sa santé de ce parcours (personnes atteintes de maladies chroniques, de maladies rares, en situation de handicap physique, mental ou social, sportifs en situation de pratique intensive ou relevant de blessure) d'accéder à un projet sportif personnalisé. ⁷



LÉGISLATION – TEXTES DE RÉFÉRENCE

Proposition de loi "Démocratiser le sport en France"

Voir le dossier législatif complet :

https://www.assemblee-nationale.fr/dyn/15/dossiers/alt/democratiser_sport_france

Instruction interministérielle n° DGS/EA3/DGESIP/DS/SG/2017/81 du 3 mars 2017 relative à la mise en œuvre des articles L.1172-1 et D.1172-1 à D.1172-5 du Code de la santé publique.

Elle définit les conditions de dispensation de l'AP adaptée prescrite par le médecin traitant à des patients atteints d'une affection de longue durée (ALD). Pour cela, elle précise les critères d'évaluation des «limitations» des patients en ALD. Elle propose une classification de ces patients en quatre «phénotypes fonctionnels». Elle définit les domaines d'intervention préférentiels des différents métiers de l'AP et liste leurs compétences respectives (annexe 9). Elle propose un formulaire spécifique de prescription de l'AP.

<https://www.legifrance.gouv.fr/download/pdf/circ?id=42071>

Loi n°2016-41 du 26 janvier 2016 de modernisation de notre système de santé

La France renforce sa politique de promotion de l'activité physique chez les patients atteints d'une maladie chronique et se propose de développer une politique de promotion de l'activité physique **sur ordonnance** en soins primaires.

Son **article L.144** précise que : « dans le cadre du parcours de soins des patients atteints d'une affection de longue durée, le médecin traitant peut prescrire une AP adaptée à la pathologie, aux capacités physiques et au risque médical du patient ».

<https://www.legifrance.gouv.fr/loda/id/JORFTEXT000031912641/>

Décret n°2016-1990 du 30 décembre 2016 relatif aux conditions de dispensation de l'activité physique adaptée prescrite par le médecin traitant à des patients atteints d'une affection de longue durée.

Il précise que la dispensation d'une AP adaptée a pour but de permettre à une personne d'adopter un mode de vie physiquement actif sur une base régulière afin de réduire les facteurs de risque et les limitations fonctionnelles liés à l'affection de longue durée dont elle est atteinte. Les techniques mobilisées relèvent d'activités physiques et sportives et se distinguent des actes de rééducation qui sont réservés aux professionnels de santé, dans le respect de leurs compétences.

<https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000033748987?r=EnZpIRxZRI>



ARTICLES & REVUES

ARIDA R.M. (2021). **Physical exercise and seizure activity**. Biochimica Et Biophysica Acta. Molecular Basis of Disease 2021 ; 1867(1), 165979.

Neuroprotective and antiepileptogenic therapies have been extensively investigated for epilepsy prevention and treatment. This review gives an overview of the promising contribution of the ketogenic diet, a complementary treatment, on the intestinal microbiota to reduce seizure susceptibility. Next, the relevance of physical exercise is extensively addressed as a complementary therapy to reduce seizure susceptibility, and thereby impact beneficially on the epilepsy condition. In this context, particular attention is given to the potential risks and benefits of physical exercise, possible precipitant factors related to exercise and proposed mechanisms by which exercise can reduce seizures, and its antiepileptogenic effects. Finally, this review points to emerging evidence of exercise reducing comorbidities from epilepsy and improving the quality of life of people with epilepsy. Based on evidence from current literature, physical or

⁷ Société française Sport Santé : <https://www.sfsportsante.com/>

sport activities represent a potential non-pharmacological intervention that can be integrated with conventional therapy for epilepsy.

CARTER J.M., MCGREW C. **Seizure Disorders and Exercise/Sports Participation**. *Current Sports Medicine Reports* 2021 ; 20(1), 26-30.

https://journals.lww.com/acsm-csmr/Fulltext/2021/01000/Seizure_Disorders_and_Exercise_Sports.10.aspx

CAVALCANTE B.R.R., IMPROTA-CARIA A.C., MELO V.H. de, DE SOUSA, R.A.L. **Exercise-linked consequences on epilepsy**. *Epilepsy & Behavior* 2021 ; E&B, 121(Pt A), 108079.

Epilepsy is a brain disorder that leads to seizures and neurobiological, cognitive, psychological, and social consequences. Physical inactivity can contribute to worse epilepsy pathophysiology. Here, we review how physical exercise affects epilepsy physiopathology. An extensive literature search was performed and the mechanisms of physical exercise on epilepsy were discussed. The search was conducted in Scopus and PubMed. Articles with relevant information were included. Only studies written in English were considered.

DO J., WEBSTER R. J., LONGMUIR P. E., REDDY D., POHL D. **Poor adherence to sleep and physical activity guidelines among children with epilepsy**. *Epilepsy & Behavior* 2021 ; 115, 107722.

Objective To assess physical activity and sleep rates in a cohort of children with epilepsy (CWE) and determine if there is a relationship between physical activity and sleep time. **Methods** Children aged 8–14 years with a diagnosis of epilepsy and at least one seizure in the past 12 months were monitored via a wrist-worn activity tracker for 16 weeks, to objectively measure daily physical activity, as assessed by step counts, and sleep time. Adherence to physical activity ($\geq 12,000$ steps/day) and sleep recommendations (≥ 9 h for children aged 8–12 years, or ≥ 8 h for children aged 13–15 years) was determined. To predict daily activity or nightly sleep, a series of multivariable models incorporating age, sex, day-type (all combinations of weekday or weekend and summer holiday or school), participant (as a random effect), daily physical activity (for models predicting sleep), nightly sleep (for models predicting physical activity), and autoregressive terms of previous sleep or physical activity were constructed, and the best-performing models were selected with Akaike information criterion analysis. **Results** Twenty-two children with mild to moderate epilepsy were recruited (54.5% female, median (IQR) age 11 (10, 13) years) and monitored for 16 weeks. They met the recommended level of physical activity only in 38.0% (21.7%, 59.4%), and sleep in 49.1% (30.0%, 68.5%) of days. They met both physical activity and sleep guidelines on the same day in only 17.8% (95% CI 7.1%, 38.0%). There was no association between meeting the recommended levels of daily physical activity and sleep time ($p = 0.86$, $p = 0.03$). In the best-performing model, age, sex, day type, and participant explained 28.9% of the variance in daily physical activity, with no additional insight provided by measures of sleep time. Age, sex, day type, participant, and daily physical activity explained 17.3% of the variance in nightly sleep time, with a statistically discernable but small association between physical activity and sleep time (1.79 ± 0.53 , $p = 0.001$). **Conclusion** Our cohort of children with mild to moderate epilepsy showed poor adherence to sleep and physical activity guidelines. There was no clinically relevant association between daily physical activity and sleep among these children who were similarly active to healthy peers. Future studies should assess the effect of increased sleep hygiene and physical activity on overall well-being and seizure control in CWE.

<https://www.sciencedirect.com/science/article/abs/pii/S1525505020309021>

FETER N., HÄFELE C.A., CASSURIAGA J., SMITH E.C., HÄFELE V., ROSSETO L., COOMBES J. S., ROMBALDI A. J., DA SILVA M. C. **Two-minute exercise testing is sufficient to estimate maximal cardiorespiratory fitness in people with epilepsy**. *Epilepsy & Behavior* 2021 ; 121(Pt A), 108086.

We aimed to examine the agreement between submaximal cardiopulmonary exercise testing (CPET) measures and peak oxygen consumption (VO_{2peak}) in adults with epilepsy. Data from a randomized controlled trial with adults with epilepsy ($N = 21$) were analyzed. VO_{2peak} was assessed using indirect calorimetry during a treadmill graded maximal CPET. Oxygen uptake efficiency slope (OUES) was calculated from the relationship between oxygen uptake and minute ventilation during the entire test ($OUES_{peak}$) and the first 2 ($OUES_{2min}$), 3 ($OUES_{3min}$), and 4 ($OUES_{4min}$) minutes of the CPET. The strength of the association between measures was tested by Pearson correlation. Linear regression models were used to predict VO_{2peak} based on OUES from the different testing durations. Agreement between measured and predicted maximal values was tested using intraclass correlation coefficient (ICC) and Bland-Altman plots. $OUES_{2min}$, $OUES_{3min}$, and $OUES_{4min}$ were highly associated with absolute ($r = 0.84$, $r = 0.76$, $r = 0.75$, respectively) and relative ($r = 0.84$, $r = 0.78$, $r = 0.78$, respectively) VO_{2peak} . Agreement (ICC = 0.83) between CPET-measured and OUES-predicted VO_{2peak} values was stronger with $OUES_{2min}$ than the other time-based OUES markers. Bland-Altman plot showed satisfactory agreement between predicted and measured CPET measures with the narrowest limits of agreement observed with the $OUES_{2min}$. No potential bias was identified between these two measurements ($p = 0.33$). Changes in absolute ($r = 0.77$) and relative ($r = 0.88$) VO_{2peak} were highly associated with the change in $OUES_{2min}$. $OUES_{2min}$ can be used as a surrogate for maximal

cardiorespiratory fitness in adults with epilepsy. Studies with larger samples size are encouraged to confirm our findings in a more heterogeneous population.

GREEN R., ABE C., DENNEY D. A., ZHANG R., DOYLE A., GADELMOLA K., CULLUM C. M., SIMON J., NEAVES S., PERVEN G., DIEPPA M., HAYS R., AGOSTINI M., DING K. **Physical activity status and quality of life in patients with epilepsy—Survey from level four epilepsy monitoring units.** *Epilepsy Research* 2021 ; 173, 106639.

People with epilepsy (PWE) tend to have sedentary lifestyles which may predispose them to a lower perceived quality of life (QOL). Moreover, the relationship between physical activity (PA) and QOL in populations of PWE with high disease burden has been under-studied. The goal of this study was to evaluate PA level and its impact on health-related QOL in PWE who were admitted to Level-4 epilepsy monitoring units (EMU). In this prospective observational study, 200 patients from two EMUs in Dallas, Texas completed the following standard surveys: Rapid Assessment of Physical Activity (RAPA), the Quality of Life in Epilepsy (QOLIE-31), Patient Health Questionnaire-9 (PHQ-9), and [Generalized Anxiety Disorder 7-item \(GAD-7\)](#) questionnaire. Information on self-reported epilepsy history, severity of disease, and socioeconomic status were also collected. The diagnosis of epilepsy was confirmed by video-EEG monitoring.

HÄFELE C. A., ROMBALDI A. J., FETER N., HÄFELE V., GERVINI B. L., DOMINGUES M. R., DA SILVA M. C. **Effects of an exercise program on health of people with epilepsy : A randomized clinical trial.** *Epilepsy & Behavior* 2021 ; 117, 107904.

To evaluate the effects of an exercise program on the health of people with epilepsy (PWE) and seizure frequency. A randomized clinical trial was carried out in Pelotas/Brazil. Recruitment was conducted through social media, in local press, and Public Health System facilities. The intervention program was performed at the gym of the Physical Education School/Federal University of Pelotas. A total of 21 people, aged 18–60 years, diagnosed with epilepsy and who were not engaged in systematic physical exercise in the last three months were divided into two groups: (1) exercise (EG) – 12 weeks of a structured physical exercise program; (2) control (CG) – no exercise and maintenance of usual activities. The allocation rate 1:1 was used. The exercise program consisted of two 60-min weekly sessions including warm-up (5-min), aerobic training (15–25 min at 14–17 on Borg scale), resistance training (2–3 sets, 10–15 repetitions), and stretching. Sociodemographic, clinical and health variables (frequency and number of seizures, quality of life, depression, anxiety, and side effects), anthropometrics (weight, height, hip and waist circumferences), cardiorespiratory fitness (VO_{2max}), and strength (dynamometry) were measured at baseline and after the 12-week intervention. Generalized Estimating Equations (GEE) and Bonferroni posthoc tests were used for the comparison between moments and groups. Eleven participants were randomized to EG and 10 to CG. One EG participant did not complete the study. There was a reduction in frequency of epileptic seizures during the 3-month intervention period in EG ($p = 0.010$) with no improvement in CG. Improvement in quality of life ($p = 0.004$), stress levels ($p = 0.017$) and physical fitness ($p = 0.017$) were also observed in the EG compared to CG. A structured physical exercise program improved overall health of PWE and decreased seizure frequency.

MCKEON G., PALMER E. E., MACINTOSH R., NEVIN S. M., WHEATLEY L., ROSENBAUM S. **Feasibility of a mental health informed physical activity intervention for the carers of children with developmental and epileptic encephalopathy.** *Epilepsy & Behavior* 2021 ; 121(Pt A), 108022.

Parents and carers of children with developmental and epileptic encephalopathies (DEEs) experience high rates of mental health disorders including depression and posttraumatic stress disorder. Physical activity is an evidence-based strategy which may help to improve the wellbeing of this population. We delivered a 4-week physical activity group program via a private Facebook group for carers of children with DEEs and their nominated support person. The facilitators provided education and motivation on different weekly topics (e.g. goal setting, overcoming barriers to exercise) and encouraged social support between participants. All participants were provided with a physical activity tracker (Fitbit). The primary outcome was feasibility and secondary outcomes included psychological distress, quality of life, physical activity levels, and PTSD symptoms.

MINO JC, PERRIN C. **Physical activity and chronic illness, a theoretical framework.** *Revue d'épidémiologie et de santé publique* 2021 ; 69(3) : 127-133.

The positive effects of adapted physical activity (PA) in patients with chronic illness are scientifically recognized, and PA promotion is part and parcel of public policy. In this context, one task in public health research consists in improving knowledge of PA practice in persons with chronic illnesses. As a complement to studies evaluating the importance of various determinants of PA practice, qualitative research is called for. In this framework, the present article will propose a theoretical analytical framework for study of PA in chronic illness. It will be built around two key concepts, namely the "standards of life" drawn from the notion of health in the philosophy of Georges Canguilhem and the "illness trajectory" drawn from the interactionist sociology of Anselm Strauss. We will attempt to improve understanding of the important yet frangible "labor" of patients at work in transformation of their habits and life standards involving PA professionals.

POPP J. L., SZAFIARSKI J. P., KAUR M., MARTIN R. C., BROKAMP G. A., TERRY D. M., DIGGS M. D., ALLENDORFER J. B. **Relationships between cognitive function, seizure control, and self-reported leisure-time exercise in epilepsy.** *Epilepsy & Behavior* 2021 ; 118, 107900.

Exercise may be a strategy for improvement of cognitive deficits commonly present in people with idiopathic generalized epilepsies (IGE). We investigated the relationship between cognition and level of physical exercise in leisure (PEL) in people with IGE who have been seizurefree for at least 6 months (IGE-) as compared to those who have not been seizurefree (IGE+) and healthy controls (HCs). We hypothesized that higher level of physical exercise is associated with better cognitive functioning in patients with IGE and HCs, and that seizure control affects both PEL levels and cognitive functioning in patients with IGE. We recruited 75 participants aged 18-65: 31 people with IGE (17 IGE-, 14 IGE+) and 44 HCs. Participants completed assessments of quality of life (SF-36), physical activity levels (Baecke questionnaire and International Physical Activity Questionnaire (IPAQ)) and cognition (Montreal Cognitive Assessment (MoCA), Hopkins Verbal Learning Test - Revised (HVLT), and flanker task). Group differences (HCs vs. IGE; HCs vs. IGE+ vs. IGE-) were assessed. Pearson correlations examined linear relationships between PEL and cognitive performance. Groups were similar in age and sex. Compared to HCs, patients with IGE had higher body mass index, fewer years of education, and consistently scored worse on all measures except flanker task accuracy on incongruent trials. When examining IGE- and IGE+ subgroups, compared to HCs, both had higher body mass index, and fewer years of education. Healthy controls scored significantly better than one or both of the IGE groups on SF-36 scores, PEL levels, IPAQ activity level, MoCA scores, HVLT learning and long-delay free-recall scores, and flanker task accuracy on congruent trials. Among patients with IGE, there were no significant differences between age of epilepsy onset, duration of epilepsy, number of anti-seizure drugs (ASDs) currently being used, or the group distribution of type of IGE. In the combined sample (IGE+, IGE- and HCs), PEL positively correlated with MoCA scores (Pearson's $r = 0.238$; $p = 0.0397$) and with flanker task accuracy on congruent trials (Pearson's $r = 0.295$; $p = 0.0132$). Overall, patients with IGE performed worse than HCs on cognitive and physical activity measures, but the cognitive impairments were more pronounced for IGE+, while physical exercise levels were less for patients with IGE regardless of seizure control. While positive relationships between leisure-time PEL and cognitive performance are promising, further investigations into how exercise levels interact with cognitive functioning in epilepsy are needed.

SAHAI Nikhil, BARD Angela M, DEVINSKY Orrin, KALUME Franck. **Disordered autonomic function during exposure to moderate heat or exercise in a mouse model of Dravet syndrome.** *Neurobiology of disease* 2021 ; 147 : 105154.

To examine autonomic regulation of core body temperature, heart rate (HR), and breathing rate (BR) in response to moderately elevated ambient temperature or moderate physical exercise in a mouse model of Dravet syndrome (DS). We studied video-EEG, ECG, respiration, and temperature in mice with global heterozygous *Scn1a* knockout (KO) (DS mice), interneuron specific *Scn1a* KO, and wildtype (WT) mice during exposure to increased environmental temperature and moderate treadmill exercise.

<https://reader.elsevier.com/reader/sd/pii/S0969996120304290?token=B0B07D52F2E2318951DE02CCF87BCD34C16BD99BB066D2372DBB08A6C02BFD207A9C31422A5E2807F8D58F68FA1F4792&originRegion=eu-west-1&originCreation=20210723102014>

SHAWAHNA R., NAIRAT Q. **Research productivity in the field of physical exercise and epilepsy : A bibliometric analysis of the scholarly literature with qualitative synthesis.** *Epilepsy & Behavior* 2021 ; 121(Pt A), 108058.

This study aimed to quantitatively, qualitatively, and visually analyze, describe, evaluate, and identify trends of the published scholarly documents on physical activity/exercise in epilepsy. Scopus database was systematically searched using the keywords relevant to "exercise" and "epilepsy". The Bibliometrix R-Tool was used to quantify, analyze, visualize, and describe the data set of the scholarly documents identified through the systematic search. Data collected from the retrieved documents were synthesized qualitatively.

BIGARD Xavier. **Recommending physical activity for primary prevention of chronic diseases.** *La revue du praticien* 2020 ; 70(3) : 268-272.

Recommending physical activity for primary prevention of chronic diseases. Low level of physical activity (i.e. inactivity) is recognized as the second preventable common risk factor of chronic diseases after the tobacco use. Nonlinear dose-effect relationships are found between the volume and intensity of physical activity, and the global mortality and incidence of chronic diseases. A sedentary behavior, characterized by prolonged periods of very low energy expenditure, is also related to the global mortality and the incidence of chronic diseases. The deleterious effects of sedentary behavior are especially marked beyond seven hours a day sitting, or three hours a day in watching the television. All the results of recent survey demonstrate that in order to reduce the incidence of chronic diseases, both physical activity recommendations and decrease in sedentary time are recommended, whatever the age of the population.

CARTAGENA Y, CARDONA-GALLÓN D.C., ISAZA S.P, LADINO L.D. **Exercise as a therapeutic strategy in epilepsy : A literature review.** Revista De Neurologia 2020 ; 71(1), 31-37.

Epilepsy is a common neurologic disease with emotional and physical consequences. Thirty percent of patients have drug-resistant epilepsy, therefore adjuvant non-pharmacological therapies, such as physical activity, have been proposed. This study reviews the literature about physical activity in people with epilepsy, to evaluate the benefits, potential side effects, impact on comorbidities, the risk classification of sports, and the barriers to their practice. DEVELOPMENT. Multiple animal and human models evaluate the benefits of exercise in epilepsy, explained by modulation on neurotransmitters, hormones, and neurotrophic factors. Furthermore, exercise demonstrates positive impact on comorbidities such as obesity, cardiovascular disease, depression, and osteoporosis. Despite being a practice that has been shown to be safe, people with epilepsy are less physically active due to barriers that limit their practice.

<https://neurologia.com/articulo/2020028/eng>

CHURILLA J.R., BOLTZ A.J., JOHNSON, T.M., RICHARDSON, M.R. **Epilepsy and Physical Activity in US Adults.** Southern Medical Journal 2020 ; 113(2), 81-86.

To examine the prevalence of self-reported aerobic leisure-time physical activity (LTPA) and muscle-strengthening activity (MSA) participation using a representative sample of US adults (18 years old and older) with a seizure disorder or epilepsy. Data from the 2010, 2013, and 2015 National Health Interview Survey cycles were used to examine the prevalence and odds of meeting the 2018 PA guidelines with a nationally representative sample of US adults. Descriptive analyses and logistic regression were used in calculating estimates.

FETER N., ALT R., HÄFELE C.A., DA SILVA M.C., ROMBALDI A.J. **Effect of combined physical training on cognitive function in people with epilepsy : Results from a randomized controlled trial.** Epilepsia 2020 ; 61(8), 1649-1658.

To examine the effect of 12-week exercise program on cognitive function in people with epilepsy.

Twenty-one physically inactive subjects were randomized into two groups: the exercise group (EG) or the control group (CG). EG performed 12 weeks of combined physical training. CG was advised to maintain usual daily activities. EG received a structured, individually supervised exercise program with two 60-minute sessions per week. Each session included warmup (5-minutes), aerobic (15-20 minutes at 14-17 on Borg scale), strength (2-3 sets, 10-15 repetitions), and 5-minute active stretches. Sociodemographic characteristics, clinical information, memory (Digit Span Test [DST]), executive function (Trail Making Test [TMT] A and B), Stroop Color and Word Test, a verbal fluency task, global cognitive function (Montreal Cognitive Assessment [MoCA]), anthropometric measurements (weight, height, and hip and waist circumferences), cardiorespiratory fitness (maximal oxygen consumption [VO₂max]), and strength (dynamometer) were measured at baseline and after the 12-week intervention.

JOHNSON E. C., HELEN CROSS J., REILLY C. **Physical activity in people with epilepsy : A systematic review.** Epilepsia 2020 ; 61(6), 1062-1081.

This study aimed to systematically review studies focusing on levels of physical activity (PA) in people with epilepsy (PWE) compared with non-epilepsy controls, and identify factors associated with PA in PWE. Intervention studies were also reviewed to consider the effects of psychological interventions on levels of PA, and the effects of PA-based interventions on seizure activity, psychiatric comorbidity, and health-related quality of life (HRQoL). PRISMA guidelines were followed. Searches were conducted using PubMed, Cochrane Controlled Register of Trials, PsycINFO, and Embase. Forty-six studies met inclusion criteria, including case-control, cross-sectional, and intervention studies. Assessment measures included questionnaires, activity trackers, and measures of physiological fitness. Twelve of 22 (54.5%) case-control studies utilizing self-report questionnaire measures reported that PWE were performing lower levels of PA, less likely to be engaging in PA, or less likely to meet PA guidelines than controls. The remaining studies did not find a difference between PWE and controls. Eight of 12 (67%) case-control studies utilizing exercise/fitness tests reported that PWE performed significantly poorer than controls, whereas in two studies PWE performed better than controls. One of three studies investigating the relationship between PA and seizure frequency found that increased self-reported PA was associated with having fewer seizures, whereas two did not find a significant relationship. All seven cross-sectional studies that included measures of HRQoL and depression/anxiety found a positive relationship between levels of PA and HRQoL/reduced levels of depression and anxiety. All four studies that used PA-based interventions demonstrated improvements in levels of PA and increased HRQoL. Study quality was almost universally low. In conclusion, there is some evidence that PWE engage in less PA than peers, and that interventions can improve PA levels and HRQoL. However, there is a need for more robust study designs to better understand PA in individuals with epilepsy.

LEMONNIER Fabienne, VAN HOYE Aurélie, FURRER Philippe, BUNDE-BIROUSTE Anne W, ROSTAN Florence. **Promouvoir la santé par l'activité sportive et physique [dossier]**. La santé en action décembre 2020 ; (454).

L'activité, qu'elle soit sportive ou physique, est favorable à la santé physique et psychique des individus. Or les écrans, la sédentarité et bien d'autres facteurs sociétaux sont désormais des obstacles croissants à la pratique, en particulier chez les enfants et adolescents. Dans ce contexte, comment stimuler la pratique de l'activité sportive et physique ? Et quelle part peuvent prendre les clubs sportifs, les collectivités et les différents lieux de vie pour promouvoir la santé des populations ? Une quinzaine d'experts ont contribué à ce dossier central qui présente un état des connaissances scientifiques et des pratiques, et synthétise les recommandations pour les professionnels de l'éducation, du social, de la santé.

<https://www.santepubliquefrance.fr/determinants-de-sante/nutrition-et-activite-physique/documents/magazines-revues/la-sante-en-action-decembre-2020-n-454-promouvoir-la-sante-par-l-activite-sportive-et-physique>

LION Axel, PERRIN Claire, ISSANCHOU Damien, PETIT Jérôme. **L'intégration de l'activité physique dans le parcours de soins de l'épilepsie : l'exemple de l'Établissement Médical de La Tepe**. Ergothérapies 2020 ; (78) : 63-66.

L'épilepsie est une affection neurologique chronique provoquant des crises généralisées ou focales. Elle peut entraîner des troubles importants, transitoires ou pérennes et alimenter un processus de stigmatisation. La pratique d'activité physique a montré de nombreux bénéfices sur cette pathologie, de la réduction de la fréquence, de l'intensité de ses crises et ses comorbidités à l'amélioration de la participation sociale et de l'estime de soi. L'Établissement Médical de La Tepe est une structure spécialisée qui intègre la pratique d'activité physique dans la « trajectoire » de l'épilepsie à travers différentes disciplines : la kinésithérapie, l'ergothérapie, la psychomotricité, l'Activité physique adaptée (APA), l'éducation thérapeutique du patient et le sport santé. La question était de déterminer la contribution de chacune des disciplines aux parcours de soins des personnes. Ainsi trois logiques d'intervention ont pu être identifiées : médicale, éducative et culturelle. Ces logiques sont investies par les professionnels qui mettent à profit leur « cœur de métier » respectif que sont le soin, l'enseignement et la pratique comme fin en soi. Ce faisant, les professionnels favorisent les passerelles entre les secteurs sanitaire, médicosocial et le milieu ordinaire et plus largement l'engagement des patients dans une « carrière de pratiquant d'activité physique » dessinée par la « trajectoire de maladie ».

PERRIN Claire, CHENU Catherine, BOICHE Julie. **L'activité physique pour les maladies chroniques : entre politiques publiques, organisations innovantes et pratiques professionnelles émergentes**. BEH – Bulletin épidémiologique hebdomadaire 2020 ; novembre 2020 : 13-17.

http://beh.santepubliquefrance.fr/beh/2020/HS/pdf/2020_HS_3.pdf

QUEVAL Isabelle. **Itinéraires du corps augmenté : déficiences et performances dans le sport**. Corps & psychisme: recherches en psychanalyse et sciences, L'Esprit du temps 2020 ; 1 (76) : 21-32.

<https://hal-inshea.archives-ouvertes.fr/hal-03044298/document>

VAN DEN BOGARD F., HAMER H. M., SASSEN R., REINSBERGER C. **Sport and Physical Activity in Epilepsy**. Deutsches Arzteblatt International 2020 ; 117(1-2), 1-6.

For many years, people with epilepsy were advised not to engage in sports. In this systematic review, we investigated whether persons with epilepsy exercise less than the general population, and what effect physical activity has on epilepsy. A literature search was carried out in PubMed and the Web of Science, and 14 269 studies were entered into the selection process. The selected studies were assessed for their methodological quality and accordingly assigned an evidence level.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7008149/>

VAN DER KOP M. L., EKSTRÖM A. M., ARIDA, R. M. **Reduction in seizure frequency with a high-intensity fitness program (CrossFit) : A case report**. Epilepsy & Behavior Reports 2020 ; 13, 100354.

Few studies have reported the impact of intensive exercise on seizure susceptibility. Here, we present a case in which a patient developed drug-resistant focal epilepsy after craniotomy for a low-grade glioma. She had a marked reduction in seizure frequency after switching from moderate exercise to a high-intensity exercise program. Psychological benefits of exhaustive exercise included decreased suicide ideation, in part mediated by fewer seizures.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6950769/>

YAKASAI A. M., DANAZUMI M. S., ZAKARI U. U., USMAN I. L., ABDULLAHI A., SHEHU, U. T. **Knowledge and current practices of physiotherapists on the physical activity and exercise in the rehabilitation of children with epileptic seizures**. Epilepsy & Behavior 2020 ; 104(Pt A), 106891.

Background: Physiotherapists play a key role in the rehabilitation of children with epileptic seizures. Regular physical exercise generates psychological and physiological benefits for people with epilepsy. Design: This study was a cross-

sectional design. Purpose: The purpose of this study was to evaluate the knowledge and current practices of physiotherapists on the physical activity and exercise in the rehabilitation of children with epileptic seizures in Nigeria. Methods: Physiotherapists with minimum bachelor's degrees were invited to participate in the study using an electronic questionnaire. The subjects (N = 117) answered a questionnaire comprising 33 simple closed-ended questions with three domains: personal information, knowledge, and current practices. Results: Out of the 117 physiotherapists, 77.7% (n=91) had postgraduate degrees, 16.2% (n=19) had bachelor's degree in physiotherapy, and only 5.9% (n=7) had Doctor of Physical Therapy (DPT). The results also indicated that 79.5% (n=93) of physiotherapists had sufficient knowledge about epilepsy, and 86.3% (n=101) of physiotherapists were using current skills/physical activity to rehabilitate children with epileptic seizures. Conclusions: It was concluded that physiotherapists had sufficient knowledge about epilepsy and were using current skills/physical activity in the rehabilitation of children with epileptic seizures.

https://www.researchgate.net/publication/339104815_Knowledge_and_current_practices_of_physiotherapists_on_the_physical_activity_and_exercise_in_the_rehabilitation_of_children_with_epileptic_seizures

Les activités physiques dans les occupations [dossier]. Ergothérapies 2020 ; (78).

De nombreuses études prouvent l'intérêt de la pratique sportive dans la prise en charge curative des patients, comme dans la prévention, primaire, secondaire comme tertiaire, de nombreuses maladies chroniques. L'action « À Reims Sportez votre santé » a pour but de remettre dans une pratique sportive régulière des patients sédentarisés et présentant des pathologies chroniques. L'objectif principal de l'étude était d'analyser les effets de la pratique d'une activité sportive adaptée sur cette population, sur une durée d'une année pleine, par comparaison des bilans médico-sportif d'entrée et de sortie dans le projet.

C'était une cohorte prospective de patients rémois, atteints de pathologies chroniques, inclus entre janvier 2013 et juin 2015. Les affections chroniques étudiées étaient l'obésité, le diabète, les cancers, les lombalgies, les maladies cardiovasculaires, les déficits neurologiques et les douleurs articulaires. La comparaison des résultats des bilans médico-sportifs entre avant et après les parcours a été faite par un test t apparié.

ABITTEBOUL Y, ROUGE BUGAT ME, LE NAOURES H, LASSOUED S, OUSTRIC S, RIVIERE D. **Efficacité d'un programme d'entraînement individualisé basé sur la mesure directe du VO2max chez les malades porteurs de maladies chroniques ; le protocole PEP'C.** Science et sports 2019 ; 35(1) : 12-19.

L'objectif principal est de mesurer l'impact d'un programme d'entraînement personnalisé en créneaux sur les capacités aérobies des patients en affection de longue durée et sur leur qualité de vie. Matériels et méthode Étude prospective utilisant une mesure directe du VO2max avant et après 20 séances d'activités physiques individualisées. La qualité de vie est évaluée par le questionnaire MOS SF36. Résultats Le VO2max des 153 patients inclus augmente de près de 10 % (p < 0,05). La puissance développée au premier seuil ventilatoire (SV1) augmente d'environ 30 % (p < 0,05) et de près de 40 % pour le sous-groupe « maladie neurodégénérative ». La qualité de vie augmente aussi de manière significative. Le protocole PEP'C améliore les capacités aérobies et la qualité de vie des patients porteurs d'une maladie chronique après 20 séances d'activités physiques basées sur la fréquence cardiaque mesurée au cours de la mesure directe du VO2max.

AHL M, AVDIC U, STRANDBERG M.C, CHUGH D, ANDERSSON E, HÅLLMARKER U, JAMES S, DEIERBERG T, EKDAHL C.T. **Physical Activity Reduces Epilepsy Incidence : A Retrospective Cohort Study in Swedish Cross-Country Skiers and an Experimental Study in Seizure-Prone Synapsin II Knockout Mice.** Sports Medicine 2019 ; 5(1) : 52.

Epilepsy patients commonly exercise less than the general population. Animal studies indicate beneficial effects of physical activity in established epilepsy, while its effect on the development is currently less known.

Here, we investigated the incidence of epilepsy during 20 years in a cohort of participants from the long-distance Swedish cross-country ski race Vasaloppet (n = 197,685) and compared it to the incidence of non-participating-matched controls included in the Swedish population register (n = 197,684). Individuals diagnosed with diseases such as stroke and epilepsy before entering the race were excluded from both groups. Experimentally, we also determined how physical activity could affect the development of epilepsy in epilepsy-prone synapsin II knockout mice (SynIIKO), with and without free access to a running wheel.

<https://sportsmedicine-open.springeropen.com/articles/10.1186/s40798-019-0226-8>

VANCAMPFORT D., WARD P. B., STUBBS, B. **Physical activity and sedentary levels among people living with epilepsy : A systematic review and meta-analysis.** Epilepsy & Behavior 2019 ; 99, 106390.

How physically active and sedentary people with epilepsy are is unclear. We conducted a meta-analysis to investigate physical activity and sedentary behavior levels compared with the general population in people with epilepsy across the lifespan. Embase, PubMed, PsycARTICLES, and CINAHL Plus were searched from inception until 1/3/2019. A random effects meta-analysis was conducted. Adults with epilepsy (mean age range = 30–47 years) were significantly less likely to comply with physical activity recommendations [odds ratio (OR) = 0.68; 95% confidence interval (CI) = 0.53–0.87;

P < 0.001; N analyses = 10; n epilepsy = 1599; n controls = 137,800] and more likely to be inactive (as defined by individual study criteria) (OR = 1.57; 95% CI = 1.34–1.84; P < 0.001; N analyses = 6; n epilepsy = 6032; n controls = 928,184). Data in children (mean age range = 10–12 years) were limited (N = 4; n = 170) and inconsistent while there were no data available for middle-aged and old age (>65 years) people with epilepsy. Our data demonstrate that adults with epilepsy are less physically active than the general population. Public health campaigns specifically targeting the prevention of physical inactivity in adults with epilepsy are warranted. More research on physical activity and sedentary levels in children, adolescents, middle-aged, and old age but also adult people with epilepsy is needed before specific recommendations can be formulated.

VANCAMPFORT D., WARD P. B., STUBBS B. **Physical fitness levels and moderators in people with epilepsy : A systematic review and meta-analysis.** *Epilepsy & Behavior* (2019b) ; 99, 106448.

Cardiorespiratory fitness (CRF) is a modifiable risk factor for mental and physical chronic conditions and premature mortality. Cardiorespiratory fitness levels and moderators among people living with epilepsy are unknown. The aim of the current meta-analysis was to (1) determine mean CRF in people living with epilepsy and compare levels with age- and gender-matched healthy controls (HCs), and (2) explore moderators of CRF. Major electronic databases were searched systematically for articles reporting CRF expressed as maximum or peak oxygen uptake (ml/min/kg). A random effects meta-analysis calculating the pooled mean CRF including subgroup- and meta-regression analyses was undertaken. Across 4 studies, the CRF level was 31.4 ml/kg/min (95% confidence interval [CI] = 27.3 to 35.5) (n = 121; mean age = 29–43 years). Compared with age- and gender-matched controls (n = 39), in people with epilepsy (n = 39), CRF levels were 4.9 ml/kg/min (95%CI = –5.9 to –3.9) lower (P < 0.001). Cardiorespiratory fitness levels obtained via maximal tests were significantly (P < 0.001) lower than obtained via submaximal tests. Future research should explore underlying mechanisms for the observed impairment in CRF in people with epilepsy.

ARDOIN A, CANOT B. **Bénéfices physiques et psychologiques de l'activité sportive adaptée dans une cohorte de malades chroniques.** *Science et sports* 2019 ; 34(1) : 10-15.

De nombreuses études prouvent l'intérêt de la pratique sportive dans la prise en charge curative des patients, comme dans la prévention, primaire, secondaire comme tertiaire, de nombreuses maladies chroniques. L'action « À Reims Sportez votre santé » a pour but de remettre dans une pratique sportive régulière des patients sédentarisés et présentant des pathologies chroniques. L'objectif principal de l'étude était d'analyser les effets de la pratique d'une activité sportive adaptée sur cette population, sur une durée d'une année pleine, par comparaison des bilans médico-sportif d'entrée et de sortie dans le projet.

C'était une cohorte prospective de patients rémois, atteints de pathologies chroniques, inclus entre janvier 2013 et juin 2015. Les affections chroniques étudiées étaient l'obésité, le diabète, les cancers, les lombalgies, les maladies cardiovasculaires, les déficits neurologiques et les douleurs articulaires. La comparaison des résultats des bilans médico-sportifs entre avant et après les parcours a été faite par un test t apparié.

ALLENDORFER J. B., ARIDA R.M. **Role of Physical Activity and Exercise in Alleviating Cognitive Impairment in People With Epilepsy.** *Clinical Therapeutics* 2018 ; 40(1), 26-34.

Many persons with epilepsy (PWE) experience problems with a wide range of cognitive functions, including learning, memory, attention, and executive control. These deficits in cognition result in diminished quality of life for PWE and are related to many factors, including the etiology of their epilepsy, recurrent seizures, side effects of antiseizure medications, or a combination of these factors. Various treatments to ameliorate cognitive deficits experienced by PWE have been implemented, although noninvasive and nonpharmacologic strategies may be more appealing options due to their relatively low cost, reduced risk of side effects, and/or reduced potential interactions with antiseizure medications. Physical activity and exercise may improve cognition in PWE but have not been well researched in this respect. To date only 1 study has directly investigated the effects of exercise on cognition in PWE, and it showed improved performance on tests of attention and executive function. The goal of the present article was to examine how increased physical activity and exercise contributes to 3 strategies (reducing seizure frequency, reducing epileptiform discharges, and decreasing symptoms of depression) that have been described as having a positive impact on cognition in PWE, as well as highlight related findings in experimental models of epilepsy. There is a definite need for more randomized controlled trials to establish greater clinical evidence for the use of physical activity and exercise in ameliorating cognitive impairment in PWE. We also need to better understand the factors contributing to reduced physical activity in PWE, as well as ways to overcome such barriers. With the available research in the area of exercise in epilepsy showing positive results, and a supportive research climate encouraging PWE to engage in greater physical activity overall, further investigations into the relationships between physical activity and cognition in epilepsy are warranted.

[https://www.clinicaltherapeutics.com/article/S0149-2918\(17\)31109-8/fulltext](https://www.clinicaltherapeutics.com/article/S0149-2918(17)31109-8/fulltext)

CARRIZOSA-MOOG Jaime, LADINO Lady Diana, BENJUMEA-CUARTAS Vanessa, OROZCO-HERNANDEZ Juan Pablo, CASTRILLON-VELILLA Diana Marcela, RIZVI Syed, TELLEZ-ZENTENO José Francisco. **Epilepsy, physical activity and sports : a narrative review.** Canadian journal of neurological sciences 2018 ; 45 (6) : 624-632.

People with epilepsy (PWE) are less physically active compared with the general population. Explanations include prejudice, overprotection, unawareness, stigma, fear of seizure induction and lack of knowledge of health professionals. At present, there is no consensus on the role of exercise in epilepsy. This paper reviews the current evidence surrounding the risks and benefits associated with physical activity (PA) in this group of patients. In the last decade, several publications indicate significant benefits in physiological and psychological health parameters, including mood and cognition, physical conditioning, social interaction, quality of life, as well as potential prevention of seizure presentation. Moreover, experimental studies suggest that PA provides mechanisms of neuronal protection, related to biochemical and structural changes including release of β -endorphins and steroids, which may exert an inhibitory effect on the occurrence of abnormal electrical activity.

Epileptic discharges can decrease or disappear during exercise, which may translate into reduced seizure recurrence. In some patients, exercise may precipitate seizures. Available evidence suggests that PA should be encouraged in PWE in order to promote wellbeing and quality of life. There is a need for prospective randomized controlled studies that provide stronger clinical evidence before definitive recommendations can be made.

FIALHO G. L., WOLF P., WALZ R., LIN, K. **Increased cardiac stiffness is associated with autonomic dysfunction in patients with temporal lobe epilepsy.** Epilepsia 2018 ; 59(6), e85-e90.

Autonomic dysfunction is linked to sudden death regardless of the presence of structural heart disease. The pathway from autonomic dysfunction to sudden death is not fully understood, but myocardial sympathetic stimulation leading to arrhythmia and/or cardiac fibrosis might play a role. Our goal was to evaluate cardiac stiffness by echocardiography and its association with clinical, structural, and autonomic variables in people with epilepsy (PWE) compared to healthy controls. A 12-lead electrocardiogram, treadmill testing, and transthoracic echocardiography from 30 patients with temporal lobe epilepsy (TLE) without any known cardiovascular disorders were compared to 30 individuals without epilepsy matched by sex, age, and body mass index. Distribution of cardiovascular risk factors was similar in both groups. PWE had a higher left ventricle stiffness, left ventricle filling pressure, and greater left atrial volume as well as markers of autonomic dysfunction such as impaired chronotropic index and percentage achieved of predicted peak heart rate at effort. In multiple regressions, autonomic dysfunction explained 52% of stiffness and carbamazepine treatment and polytherapy with antiepileptic drugs (AEDs) explained, additionally, 6% each. Stiffness is increased in young patients with TLE and is related to autonomic dysfunction and to a lesser extent, carbamazepine use and polytherapy with AEDs.

HAUT Sheryl R, LIPTON Richard B, CORNES Susannah, DWIVEDI Alok K, WASSON Rachel, COTTON Sian, STRAWN Jeffrey R, PRIVITERA Michael. **Behavioral interventions as a treatment for epilepsy.** Neurology 2018 ; February 14

To evaluate the effect of a stress-reduction intervention in participants with medication-resistant epilepsy.

Adults with medication-resistant focal epilepsy (n = 66) were recruited from 3 centers and randomized to 1 of 2 interventions: (1) progressive muscle relaxation (PMR) with diaphragmatic breathing, or (2) control focused-attention activity with extremity movements. Following an 8-week baseline period, participants began 12 weeks of double-blind treatment. Daily self-reported mood and stress ratings plus seizure counts were completed by participants using an electronic diary, and no medication adjustments were permitted. The primary outcome was percent reduction in seizure frequency per 28 days comparing baseline and treatment; secondary outcomes included stress reduction and stress-seizure interaction.

UNGUREANU J., TOUSSAINT J.-F., BRETON É. **Améliorer les politiques nationales de promotion de l'activité physique favorable à la santé.** Santé publique 2018 ; 30 (2) : 157-167.

Afin d'appuyer les États dans l'élaboration de stratégies et politiques agissant sur l'ensemble des déterminants de la sédentarité et de la pratique de l'activité physique, l'OMS a mis en place un outil d'analyse des politiques, le Health Enhancing Physical Activity Policy Analysis Tool (HEPA PAT) qui permet d'évaluer la qualité des politiques nationales et de prendre en compte le maillage complexe de ces déterminants. Cet article vise un double objectif : d'une part présenter cet outil pour préciser sa nature et son utilité pour la définition des politiques nationales de promotion de l'activité physique et d'autre part offrir une illustration de son application aux politiques françaises.

https://labos-recherche.insep.fr/sites/default/files/2021-03/2018_ungureanu_ameliorer_les_politiques_nationales_de_promotion_de.pdf

WILLIS J., HOPPING L., MAHLBERG N., RONEN G. M. **Youth with epilepsy : Their insight into participating in enhanced physical activity study.** *Epilepsy & Behavior* 2018 ; 89, 63-69.

We aimed to explore (i) the impact that a motivated walking program had on youth with epilepsy and (ii) the facilitators and barriers to implementing and sustaining the program. Data were gathered using semi-structured interviews with the intervention group of a [randomized controlled trial](#) to study the effect of enhanced physical activity on youth with epilepsy. Participants had active epilepsy and were 8–14 years at recruitment. All wore an activity tracker for a year and received coaching via phone calls during the first six months to encourage reaching a step goal, which they then attempted to maintain independently for the following six months. Nine participants and one parent per child were separately interviewed at six months. Eleven participants including the original nine, and one parent per youth, were interviewed at twelve months. Data collection and analysis used a phenomenological research framework and coded the data according to the International Classification of Functioning, Disability and Health (the ICF). This was done in order to capture all relevant impacts of the intervention.

BARNAULT Matthieu, DUTRUEL David. **Place de l'activité physique dans la prise en charge des pathologies neurologiques.** *Actualités pharmaceutiques* 2017;56(563):26-32.

Les déficits moteurs associés aux maladies neurologiques amènent les professionnels de santé à s'intéresser à un aspect de la prise en charge déjà bien connu dans le domaine cardiovasculaire, l'activité physique. Les bénéfices recherchés ne sont pas les mêmes selon la pathologie, ce qui sous-entend que la pratique doit être adaptée. Cependant, cette démarche répond à un objectif commun qui est d'empêcher l'altération de la qualité de vie.

HÄFELE C. A., FREITAS M. P., DA SILVA M. C., ROMBALDI A. J. **Are physical activity levels associated with better health outcomes in people with epilepsy?** *Epilepsy & Behavior* 2017 ; 72, 28-34.

The aim of the study was to investigate the association of physical activity in three categories (inactive, insufficiently active and active) with health outcomes in people with epilepsy. The dependent variables and the instruments used in the study were: a) quality of life - measured by Quality of Life in Epilepsy-31 for adults and Quality of Life in Epilepsy for Adolescents, b) side effects of medication - measured by Adverse Events Profile, c) depression - measured by Neurological Disorders Depression Inventory for Epilepsy, and d) state and trait anxiety - measured by State-Trait Anxiety Inventory. Physical activity levels were analyzed using the International Physical Activity Questionnaire (IPAQ) for adults in the commuting and leisure domains and Physical Activity Questionnaire for Adolescents (PAQ-A). Simple and multiple linear regression was used in the statistical analysis. The cross-sectional study with one hundred and one individuals was conducted in Pelotas/RS, Brazil, at the Neurology Clinic of the Faculty of Medicine of the Federal University of Pelotas. In the crude analysis, physical activity was positively associated with quality of life ($p < 0.001$) and negatively associated with depression ($p = 0.046$), state of anxiety ($p = 0.014$), trait of anxiety ($p = 0.015$) and side effect of medication ($p = 0.01$). In addition, physical activity levels explained 10% of the quality of life ($R^2 = 0.10$). In the adjusted analysis, physical activity remained associated with side effect of medication ($p = 0.014$) and was not associated with trait anxiety ($p = 0.066$). However, quality of life showed a positive linear trend ($p = 0.001$) while depression ($p = 0.033$) and anxiety state ($p = 0.004$) showed a negative trend according to physical activity levels. Physical activity was associated with health outcomes, and can be a nonpharmacological treatment in people with epilepsy for improving health and life conditions.

[https://www.epilepsybehavior.com/article/S1525-5050\(17\)30053-7/pdf](https://www.epilepsybehavior.com/article/S1525-5050(17)30053-7/pdf)

PANEBIANCO Mariangela, SRIDHARAN Kalpana, RAMARATNAM Sridharan. **Yoga for epilepsy.** *The Cochrane database of systematic reviews* 2017 ; 10(10) : CD001524.

This is an updated version of the original Cochrane Review published in the Cochrane Library, Issue 5, 2015.

Yoga may induce relaxation and stress reduction, and influence the electroencephalogram and the autonomic nervous system, thereby controlling seizures. Yoga would be an attractive therapeutic option for epilepsy if proved effective.

To assess whether people with epilepsy treated with yoga:

- (a) have a greater probability of becoming seizure free;
- (b) have a significant reduction in the frequency or duration of seizures, or both; and
- (c) have a better quality of life.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6485327/>

TEDRUS G. M. A. S., STERCA G. S., PEREIRA R. B. **Physical activity, stigma, and quality of life in patients with epilepsy.** *Epilepsy & Behavior* 2017 ; 77, 96-98.

Indication of physical activity (PA) for people with epilepsy (PWE) is debatable. This study investigated whether the International Physical Activity Questionnaire (IPAQ) score is related to the clinical aspects of epilepsy, QOLIE-31, and the Stigma Scale of Epilepsy (SSE) score of 67 PWE at a significance level of 5% ($p < 0.05$). About one-third (32.8%) of the PWE were sedentary/irregularly active. Lower QOLIE-31 scores and higher SSE scores were found in PWE who did not practice

PA for fear of seizures and in sedentary/irregularly active PWE. Twenty-three percent of the PWE stopped practicing PA for fear of seizures. The predictive factors in the logistic regression equation for not practicing physical activity for fear of seizures were the presence of depressive disorder ($p=0.049$) and temporal lobe epilepsy with hippocampal sclerosis (TLE-HS) ($p=0.024$). Most PWE are sedentary and do not practice PA for fear of seizures. Physical activity is negatively influenced by clinical aspects of epilepsy. Less PA is associated with depressive disorder, worse quality of life, and higher perception of stigma.

<https://isiarticles.com/bundles/Article/pre/pdf/132145.pdf>

VOLPATO N., Kobashigawa J., YASUDA C. L., KISHIMOTO S. T., FERNANDES P. T., CENDES, F. **Level of physical activity and aerobic capacity associate with quality of life in patients with temporal lobe epilepsy.** PloS One 2017 ; 12(7), e0181505. Epilepsy is more than seizures and includes a high risk of comorbidities and psychological disorders, leading to poor quality of life (QOL). Earlier studies have showed a sedentary lifestyle in people with epilepsy (PWE), which could contribute to poorer health and psychological problems. The purpose of the present study was to compare habits of physical activity (PA), aerobic capacity, and QOL between PWE and healthy controls in order to identify the necessity of intervention of habits and information on physical exercise (PE) and to better understand the importance of PE for PWE. The study included 38 patients with temporal lobe epilepsy and 20 normal controls. Both groups answered the WHOQOL-Bref, which assesses the level of QOL, and IPAQ to evaluate the level of PA. In addition, they were submitted to a treadmill maximal cardiopulmonary effort test to identify physical capacity. The continuous variables were compared between groups by t-test and a general linear model, and the frequencies were compared by Chi-Square test through SPSS software. There was no difference in the level of PA between groups by questionnaire evaluation. However, there were significant differences in overall QOL, physical health, and level of PA in relation to work and physical capacity between groups; controls demonstrated better scores than PWE. Controls presented better physical capacity than PWE by cardiopulmonary effort test. According to intra-group analyses, PWE who were physically active had better QOL than inactive PWE. The study concluded that questionnaires about PE may not be the best instrument of evaluation, as demonstrated by the discrepancy of results compared to the validated objective cardiopulmonary evaluation of level of PA and physical capacity in this study.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5517033/>

CAPOVILLA G, KAUFMAN KR, PERUCCA E, MOSCHE SL, ARIDA RM. **Epilepsy, seizures, physical exercise, and sports : A report from the ILAE Task Force on Sports and Epilepsy.** Epilepsia 2016 ; 57 (1) : 6-12.

People with epilepsy (PWEs) are often advised against participating in sports and exercise, mostly because of fear, overprotection, and ignorance about the specific benefits and risks associated with such activities. Available evidence suggests that physical exercise and active participation in sports may favorably affect seizure control, in addition to producing broader health and psychosocial benefits. This consensus paper prepared by the International League Against Epilepsy (ILAE) Task Force on Sports and Epilepsy offers general guidance concerning participation of PWEs in sport activities, and provides suggestions on the issuance of medical fitness certificates related to involvement in different sports. Sports are divided into three categories based on potential risk of injury or death should a seizure occur: group 1, sports with no significant additional risk; group 2, sports with moderate risk to PWEs, but no risk to bystanders; and group 3, sports with major risk. Factors to be considered when advising whether a PWE can participate in specific activities include the type of sport, the probability of a seizure occurring, the type and severity of the seizures, seizure precipitating factors, the usual timing of seizure occurrence, and the person's attitude in accepting some level of risk. The Task Force on Sports and Epilepsy considers this document as a work in progress to be updated as additional data become available.

Activités physiques et santé [dossier]. Santé publique 2016 ; HS S1.

<https://www.sfsp.fr/content-page/item/3022-sante-publique-n-1-supplement-janvier-fevrier-2016>

BARTH Nathalie, LEFEBVRE Blandine. **S'engager dans une activité physique pour apprendre à gérer sa maladie : l'exemple de deux expériences de patients.** Santé publique 2016 ; HS S1 : pp. 109-116

<https://bdsp-ehesp.inist.fr/vibad/controllers/getNoticePDF.php?path=/Sfsp/SantePublique/2016/1Supp/1.pdf>

FAVIER-AMBROSINI, B. **Socio-histoire du lien entre activité physique et santé de 1960 à 1980.** Santé Publique 2016; S1(HS), 13-24.

Objectif : Nous inscrivant dans une sociologie pragmatique de l'étude des problèmes de santé publique, nous nous attachons à éclaircir l'émergence et la constitution du discours amenant à considérer l'Activité Physique et Sportive (APS) comme facteur de santé pour le plus grand nombre dans la période 1960-1980. Méthodes : Notre travail se base sur l'étude de trois corpus. Le premier est constitué des articles de la revue La Santé de l'Homme depuis 1950 qui traitent de la question de l'APS comme facteur de santé. Le deuxième se compose de l'ensemble des thèses françaises produites

autour de cette question depuis 1940. Le troisième représente un corpus hétérogène, sur la base de renvois intertextuels, constitué d'études scientifiques, de textes de cadrage des politiques de santé ainsi que d'ouvrages de vulgarisation fréquemment cités et repris autour de cette thématique. Résultats : La trajectoire de la question de l'APS comme facteur de santé subit une inflexion au milieu des années 1960 par un dé-confinement depuis l'arène scientifique pour être portée sur le devant de la scène publique en lien avec la gestion du problème des maladies cardiovasculaires. Dans le cadre d'un paradigme épidémiologique où sont identifiés des facteurs de risque susceptibles d'augmenter la probabilité de contracter ce type de pathologies, la sphère médicale va travailler à rendre tangible l'idée selon laquelle l'APS est une solution légitime pour répondre à ce problème. En France, ce sont les cardiologues de la Fédération Française de Cardiologie qui vont s'inscrire comme les détenteurs légitimes du problème.

https://www.researchgate.net/profile/Brice-Favier-Ambrosini/publication/305209331_SOCIO-HISTOIRE_DU LIEN ENTRE ACTIVITE PHYSIQUE ET PREVENTION DE LA SANTE DE 1960 A 1980/links/5784c26b08ae3f355b4bbf3c/SOCIO-HISTOIRE-DU-LIEN-ENTRE-ACTIVITE-PHYSIQUE-ET-PREVENTION-DE-LA-SANTE-DE-1960-A-1980

PIMENTEL J, TOJAL R, MORGADO J. **Epilepsy and physical exercise**. *Seizure* 2015 ; (25) : 87-94.

Epilepsy is one of the commonest neurologic diseases and has always been associated with stigma. In the interest of safety, the activities of persons with epilepsy (PWE) are often restricted. In keeping with this, physical exercise has often been discouraged. The precise nature of a person's seizures (or whether seizures were provoked or unprovoked) may not have been considered. Although there has been a change in attitude over the last few decades, the exact role of exercise in inducing seizures or aggravating epilepsy still remains a matter of discussion among experts in the field. Based mainly on retrospective, but also on prospective, population and animal-based research, the hypothesis that physical exercise is prejudicial has been slowly replaced by the realization that physical exercise might actually be beneficial for PWE. The benefits are related to improvement of physical and mental health parameters and social integration and reduction in markers of stress, epileptiform activity and the number of seizures. Nowadays, the general consensus is that there should be no restrictions to the practice of physical exercise in people with controlled epilepsy, except for scuba diving, skydiving and other sports at heights. Whilst broader restrictions apply for patients with uncontrolled epilepsy, individual risk assessments taking into account the seizure types, frequency, patterns or triggers may allow PWE to enjoy a wide range of physical activities.

STANUSZEK A, WNĘKOWICZ E, KUŹNIAR E, KRAKOWSKA K, GERGONT A, KACIŃSKI M. **Seizure-Precipitating Factors in Relation to medical Recommendations : Especially Those Limiting Physical Activity**. *Journal of child neurology* 2015 ; 30 (12) : 1569-73.

Identification of factors precipitating epileptic seizures should always have practical implications and should always result in special recommendations given to patients. The purpose of our study is to analyze the relation between seizure-triggering factors and restrictive recommendations involving limitation of physical activity in particular. The research group consisted of 407 children hospitalized due to seizures. Their precipitants were identified in 27.5% of the patients. The most common included infection/fever, stress, and flashing lights. Although sport was documented as a precipitant in only 3.4% of all children, 8.1% of the investigated group were recommended to limit physical activity. As some episodes of epileptic seizures are reported to be provoked by sport, multiple restrictions are imposed on children. In the light of the worldwide academic literature and the present study, the recommendation of limiting sports activity is no longer supported.

CARRE François. **La mort subite liée à la pratique sportive**. *La presse médicale* 2014 ; 43 (7-8) : 831-839.

La mort subite non traumatique lors de la pratique sportive est un événement rare, mais toujours dramatique. Les causes sont principalement cardiovasculaires. Sa prévention repose sur une visite médicale efficace associant un interrogatoire, un examen physique et un ECG de repos, une éducation des sportifs qui doivent respecter les règles de bonne pratique du sport, et enfin une formation aux gestes d'urgence de la population.

<http://www.em-consulte.com/en/article/907308>

CRUTCHFIELD KE. **Managing patients with neurologic disorders who participate in sports activities**. *Continuum (Minneapolis)* 2014 ; 20 (6 Sports Neurology) : 1657-1666.

Purpose of review : Patients with neurologic conditions have been discouraged from participating in organized sports because of theoretical detrimental effects of these activities to their underlying conditions. The purpose of this article is to review known risks associated with three specific clinical conditions most commonly encountered in a sports neurology clinic (epilepsy, migraines, and multiple sclerosis) and to add to the neurologist's toolkit suggested interventions regarding management of athletes with these disorders. Recent findings : Increased participation in sports and athletics has positive benefits for patients with neurologic conditions and can be safely integrated into the lives of these patients with proper supervision from their treating neurologists. Summary : Patients with neurologic conditions can and should be

encouraged to participate in organized sports as a method of maintaining their overall fitness, improving their overall level of function, and reaping the physical and psychological benefits that athletic competition has to offer.

EOM S, LEE MK, PARK JH, JEON JY, KANG HC, LEE JS, KIM HD. **The impact of an exercise therapy on psychosocial health of children with benign epilepsy : a pilot study.** *Epilepsy & Behavior* 2014 (37) : 151-156.

OBJECTIVES : The purposes of the current study were to test the feasibility of exercise therapy for children with benign epilepsy with centrottemporal spikes (BECTS) and to collect pilot data about the impact of exercise therapy on neurocognitive, emotional, and behavioral outcomes. **METHODS:** Ten children with BECTS (9.7±1.42 years) participated in a therapeutic exercise program consisting of ten supervised exercise sessions and home-based exercises for five weeks. Electroencephalography (EEG), seizure frequency, and neurocognitive and psychological factors, including attention, executive function, depression, anxiety, behavioral problems, and quality of life, were assessed before and after the exercise program. **RESULTS :** No clinical symptoms were observed to worsen during the study, demonstrating that the exercise therapy was safe and also feasible. After five weeks of exercise therapy, significant improvements in neurocognitive domains such as simple visual and auditory attention, sustained attention, divided attention, psychomotor speed, and inhibition-disinhibition were observed. Furthermore, parent ratings of internalizing behavioral problems and social problems and mood-related well-being from quality of life improved after exercise therapy. Although not statistically significant, trends were noted toward improvement in children's self-reports of negative mood/somatization, parent reports of somatic complaints, and general health on a quality-of-life measure. **CONCLUSIONS :** A five-week structured exercise program was successfully implemented, with preliminary data suggesting beneficial impact on neurocognitive and psychobehavioral function. Exercise therapy should be further evaluated as a part of a comprehensive treatment program for children with benign epilepsy.

GASPARINI William, KNOBE Sandrine, DIDIERJEAN Romaine. **Physical activity on medical prescription : a qualitative study of factors influencing take-up and adherence in chronically ill patients.** *Health education journal* 2014 ; 74(6) : 720-731.

This study sought to determine the effects of an innovative public health programme offering physical and sports activities on medical prescription to chronically ill patients.

Semi-structured interviews were conducted with programme participants at two time points: at the start of their activity ($n = 33$) and 3 months after the first interview ($n = 25$).

HRNCIC D, RASIC-MARKOVIC A, LEKOVIC J, KRSTIC D, COLOVIC M, MACUT D, SUSIC V, DJURIC D, STANOJLOVIC O. **Exercise decreases susceptibility to homocysteine seizures : the role of oxidative stress.** *International journal of sports medicine* 2014 ; 35 (7) : 544-50.

The aim of the study was to examine the effects of chronic exercise training on seizures induced by homocysteine thiolactone (HCT) in adult rats. Rats were assigned to: sedentary control; exercise control; sedentary+HCT; exercise+HCT group. Animals in the exercise groups ran 30 min daily on a treadmill for 30 consecutive days (belt speed 20 m/min), while sedentary rats spent the same time on the treadmill (speed 0 m/min). On the 31st day, the HCT groups received HCT (8.0 mmol/kg), while the control groups received vehicle. Afterwards, convulsive behavior and EEG activity were registered. Lipid peroxidation, superoxide dismutase (SOD) and catalase (CAT) activity were ascertained in the rat hippocampus. No signs of seizures were registered in sedentary and exercise control rats. Seizure latency was increased, while number of seizure episodes and spike-and-wave discharges (SWD) in EEG were decreased in the exercise+HCT compared to the sedentary+HCT group. Seizure incidence, the severity thereof and duration of SWDs were not significantly different between these groups. Exercise partly prevented increase of lipid peroxidation and decrease of the SOD and CAT activity after HCT administration. These results indicate beneficial effects of exercise in model of HCT-induced seizures in rats, what could be, at least in part, a consequence of improved antioxidant enzymes activity.

KIM HJ, SONG W, KIM JS, JIN EH, KWON MS, PARK S. **Synergic effect of exercise and lipoic acid on protection against kainic acid induced seizure activity and oxidative stress in mice.** *Neurochemical Research* 2014 ; 39 (8) : 1579-1584.

Anti-convulsant effects of physical exercise and lipoic acid (LA), also referred to as thioctic acid with antioxidant activity, were investigated using chemical induced seizure model. We investigated the synergic effect of physical exercise and LA on kainic acid-induced seizure activity caused by oxidative stress. After 8 weeks of swimming training, body weight decreased and endurance capacity increased significantly compared to sedentary mice. Kainic acid (30 mg/kg, i.p.) evoked seizure activity 5 min after injection, and seizure activity peaked approximately 80 min after kainic acid treatment. Median seizure activity score in KA only treated group was 4.55 (range 0.5-5), 3.45 for "LA + KA" group (range 0.5-4.3), 3.12 for "EX + KA" group (range 0.05-3.4, $p < 0.05$ vs. "KA only" group), 2.13 for "EX + LA + KA" group (range 0.5-3.0, $p < 0.05$ vs. "EX + KA" group). Also, there was a synergic cooperation of exercise and LA in lowering the mortality in kainic acid treated mice ($\chi^2 = 5.45$, $p = 0.031$; "EX + KA" group vs. "LA + EX + KA" group). In addition, the synergic effect of

exercise and LA was found in PGx activity compared to separated treatment ("LA + EX + KA": 37.3 ± 1.36 ; $p < 0.05$ vs. "LA + KA" and "EX + KA" group). These results indicate that physical exercise along with LA could be a more efficient method for modulating seizure activity and oxidative stress.

NASHEF L, CAPOVILLA G, CAMFIELD C, CAMFIELD P, NABBOU R. **Transition : driving and exercise.** *Epilepsia* 2014 ; (55 Suppl 3) : 41-45.

There are many social aspects to consider at the time of transition of adolescents with epilepsy. The role of both pediatric and adult health care providers includes education and guidance within the larger framework of family, society, and country. This section focuses on driving and exercise considerations for those undergoing transition.

Accessible en ligne : <http://onlinelibrary.wiley.com/doi/10.1111/epi.12717/epdf>

PAUMARD C. **Les bénéfices de l'activité sportive dans les pathologies chroniques.** *NPG Neurologie Psychiatrie Gériatrie* 2014 ; (82) : 201-208.

Les systèmes de santé des pays industrialisés doivent faire face à l'émergence des pathologies chroniques, maladies de civilisation. Leur prise en charge doit être globale et au long cours, elle consiste en un accompagnement qui comprend, outre les traitements pharmacologiques, des mesures non médicamenteuses. Nous étudions les bénéfices et l'intérêt de l'activité physique dans les pathologies chroniques les plus courantes. Son rôle sur les effets du vieillissement est également évoqué et les mécanismes physiopathologiques sont analysés. Des expériences locales sont déjà en cours et l'on peut penser qu'elles feront école dans les prochaines années, augurant d'une nouvelle approche du traitement et aussi de la prévention de ces maladies.

ARIDA Ricardo Mario, GUIMARAES DE ALMEIDA Antonio-Carlos, CAVALHEIRO Esper Abrao, SCORZA Fulvio Alexandre. **Experimental and clinical findings from physical exercise as complementary therapy for epilepsy.** *Epilepsy & behavior* 2013 ; 26 : pp. 273-278.

Complementary therapies for preventing or treating epilepsy have been extensively used. This review focuses on the positive effects of physical exercise programs observed in clinical studies and experimental models of epilepsy and their significance as a complementary therapy for epilepsy. Information about the anti-epileptogenic and neuroprotective effects of exercise is highlighted. Considering that exercise can exert beneficial actions such as reduction of seizure susceptibility, reduction of anxiety and depression, and consequently, improvement of quality of life of individuals with epilepsy, exercise can be a potential candidate as non-pharmacological treatment of epilepsy.

<https://reader.elsevier.com/reader/sd/pii/S1525505012005094?token=DCFA9E49EAC0CC7DA8AB70713EE01FB34627B468292B3EA29DD44B41BF69D05214D9399DAA9B8744AF1756D873A8351E>

O'TOOLE Lynn, CONNOLLY Deirde, SMITH Susan. **Impact of an occupation-based self-management programme on chronic disease management.** *Australian occupational therapy journal* 2013 ; 60(1) : 1440-1630.

There is a need for the development and evaluation of occupational therapy interventions enabling participation and contributing to self-management for individuals with multiple chronic conditions. This pilot study aimed to assess the feasibility and potential impact of an occupation-based self-management programme for community living individuals with multiple chronic conditions.

Sixteen participants completed a six-week programme. Assessments were conducted at baseline, immediately post-intervention and at eight-week follow-up. Sixteen participants provided immediate follow-up data and 15 participants provided eight-week follow-up data. Outcome measures included participation in occupations; perceptions of occupational performance and satisfaction; self-efficacy; depression, anxiety and quality of life. Focus groups explored participants' perceptions of the programme.

NINO G. **Bénéfices psychologiques des activités physiques adaptées dans les maladies chroniques.** *Science & sports* 2013 ;28(1) :pp. 1-10

Objectifs : Cet article propose une synthèse de la littérature des effets des pratiques d'activités physiques adaptées sur les principales variables psychologiques et psychosociales chez des patients malades chroniques avec le parti pris d'une lecture transversale de ces maladies (et non spécifique à une en particulier) et du respect de l'approche Evidence-Based Medicine/Psychology.

Actualités : Malgré l'hétérogénéité des méthodologies et des programmes utilisés, quatre catégories de bénéfice en lien avec la santé peuvent être distingués, les retentissements subjectifs globaux, les ressources psychologiques et cognitives, les indicateurs comportementaux et les indices sociaux. Les résultats mettent en évidence des bénéfices psychosociaux liés à la santé de la pratique régulière, dosée et individualisée d'activités physiques chez les personnes malades chroniques. Cette pratique améliore la santé mentale, réduit les effets secondaires des traitements, favorise

l'appropriation de la maladie chronique, améliore l'autogestion de la maladie, réduit les soins non programmés et retarde l'apparition de nouvelles maladies. Les effets aversifs sont mineurs.

Perspectives et projets : Des travaux restent à mener sur les mécanismes physiopathologiques, sur les fonctions cognitives et sur la survie afin d'augmenter le niveau de preuve. Des recherches interventionnelles sur les doses et le contenu des pratiques devraient également être menées.

Conclusion : Les preuves s'accumulent sur les bénéfices psychosociaux liés à la santé de la pratique régulière, dosée et individualisée d'activités physiques chez les personnes malades chroniques tant en phase de traitement qu'après.

ARIDA RM, SCORZA FA, CAVALHEIRO EA. **Role of physical exercise as complementary treatment for epilepsy and other brain disorders.** *Current pharmaceutical design* 2013 ; 19 (38) : 6720-6725.

The impact of exercise on mental health, on cognition, brain function and brain structure as well as the possible underlying molecular systems important for maintaining neural function and plasticity has been extensively examined. Moreover, numerous studies have reinforced the important and beneficial role of exercise for those with neurological disorders. This article reviews general aspects of physical exercise against neurodegenerative diseases and the relevant contributions of physical exercise programs as complementary therapy for epilepsy. We first give an overview of the plasticity induced by exercise in the damaged brain, the impact of exercise in reducing brain injury as well as in delaying onset of and decline in several neurodegenerative diseases. We address the relationship between epilepsy and exercise and report the neuroprotective and antiepileptogenic effects of exercise on epilepsy based on experimental and clinical studies. Overall, we conclude that physical or sport activities represent an exciting intervention that should be integrated with conventional therapy for the improvement of brain function and resistance to neurodegenerative diseases as well as a complementary non-pharmacological treatment of epilepsy.

EPPS S, Alisha, KAHN Alexa B., HOLMES Philip V., BOSS-WILLIAMS Katherine A., WEISS Jay M., WEINSHENKER David. **Antidepressant and anticonvulsant effects of exercise in a rat model of epilepsy and depression comorbidity.** *Epilepsy & behavior* 2013 ; 29 (1) : 47-52.

The bidirectional comorbidity between epilepsy and depression is associated with severe challenges for treatment efficacy and safety, often resulting in poor prognosis and outcome for the patient. We showed previously that rats selectively bred for depression-like behaviors (SwLo rats) also have increased limbic seizure susceptibility compared with their depression-resistant counterparts (SwHi rats). In this study, we examined the therapeutic efficacy of voluntary exercise in our animal model of epilepsy and depression comorbidity. We found that chronic wheel running significantly increased both struggling duration in the forced swim test and latency to pilocarpine-induced limbic motor seizure in SwLo rats but not in SwHi rats. The antidepressant and anticonvulsant effects of exercise were associated with an increase in galanin mRNA specifically in the locus coeruleus of SwLo rats. These results demonstrate the beneficial effects of exercise in a rodent model of epilepsy and depression comorbidity and suggest a potential role for galanin.

Accessible en ligne : <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3783960/>

de LIMA C, de LIRA CA, ARIDA RM, ANDERSEN ML, MATOS G, DE FIGUEIREDO FERREIRA GUILHOTO LM, YACUBIAN EM, DE ALBUQUERQUE M, TUFIK S, DOS SANTOS ANDRADE M, VANCINI RL. **Association between leisure time, physical activity, and mood disorder levels in individuals with epilepsy.** *Epilepsy & behavior* 2013 ; 28 (1) : 47-51.

The aim of this study was to investigate the association between physical activity levels (occupational, sports, and leisure time activities), depression, anxiety, and epilepsy. The behavioral outcomes of individuals with epilepsy (E) were also compared with healthy control subjects (C). The sample included 31 individuals with epilepsy (12 with idiopathic generalized epilepsy and 19 with partial epilepsy) and 31 control subjects. Self-rating questionnaires were used to assess mood (State-Trait Anxiety Inventory and Beck Depression Inventory), anxiety, and depression as well as habitual physical activity. Patients with epilepsy were more severely impaired compared to control subjects in both mood questionnaires and presented higher levels of depression (35%), state anxiety (18%), and trait anxiety (12.6%) when compared to the C group. Although physical activity level did not differ significantly between groups, linear regression analyses showed that the physical activity leisure level predicted 31% of depression levels and 26% of anxiety levels in the E group. These data suggest that low levels of physical activity may be considered a risk factor for the development of depression and anxiety and can play an important role in the quality of life of individuals with epilepsy.

WHITNEY R, BHAN H, PERSADIE N, STREINER D, BRAY S, TIMMONS B, RONEN GM. **Feasibility of pedometer use to assess physical activity and its relationship with quality of life in children with epilepsy : a pilot study.** *Pediatric neurology*, 2013 Nov ; 49 (5) : 370-373.

BACKGROUND: Children and youth with epilepsy have lower rates of self-reported and parent-reported physical activity as well as quality of life when compared with their peers. Increased physical activity may be associated with improved health and quality of life in children and youth with epilepsy through biopsychosocial mechanisms; however, supportive

evidence is lacking. **METHODS:** This pilot study aims to determine the feasibility of pedometer use-an objective method-to assess daily steps and ability to complete quality of life-related questionnaires in children and youth with epilepsy. Feasibility was determined by percentage of study completion and participant enjoyment of physical activity in the form of walking as determined by the Childhood Self Adequacy and Predilection in Physical Activity. Secondary measures included the KidScreen 27 Quality of Life questionnaire, Childhood Depression Index, Body Mass Index, Harter's Self Perception Scale, and Parental Stress Index. **CONCLUSIONS:** Eight of 12 eligible participants completed the study. Step counts ranged from 266 to 17,220 steps per day. Seven participants found physical activity enjoyable regardless of step count, suggesting they would be amenable to participate in a future physical activity program.

ARIDA RM, SCORZA FA, CAVALHEIRO EA, PERUCCA E, MOSHÉ SL. **Can people with epilepsy enjoy sports?** *Epilepsy Research*, 2012 Jan ; 98 (1) : 94-95.

STREETER CC, GERBARG PL, SAPER RB, CIRAULO DA, BROWN RP. **Effects of yoga on the autonomic nervous system, gamma-aminobutyric-acid, and allostasis in epilepsy, depression, and post-traumatic stress disorder.** *Medical Hypotheses*, 2012 May ; 78 (5) : 571-579.

A theory is proposed to explain the benefits of yoga practices in diverse, frequently comorbid medical conditions based on the concept that yoga practices reduce allostatic load in stress response systems such that optimal homeostasis is restored. It is hypothesized that stress induces (1) imbalance of the autonomic nervous system (ANS) with decreased parasympathetic nervous system (PNS) and increased sympathetic nervous system (SNS) activity, (2) underactivity of the gamma amino-butyric acid (GABA) system, the primary inhibitory neurotransmitter system, and (3) increased allostatic load. It is further hypothesized that yoga-based practices (4) correct underactivity of the PNS and GABA systems in part through stimulation of the vagus nerves, the main peripheral pathway of the PNS, and (5) reduce allostatic load. Depression, epilepsy, post traumatic stress disorder (PTSD), and chronic pain exemplify medical conditions that are exacerbated by stress, have low heart rate variability (HRV) and low GABAergic activity, respond to pharmacologic agents that increase activity of the GABA system, and show symptom improvement in response to yoga-based interventions. The observation that treatment resistant cases of epilepsy and depression respond to vagal nerve stimulation corroborates the need to correct PNS underactivity as part of a successful treatment plan in some cases. According to the proposed theory, the decreased PNS and GABAergic activity that underlies stress-related disorders can be corrected by yoga practices resulting in amelioration of disease symptoms. This has far-reaching implications for the integration of yoga-based practices in the treatment of a broad array of disorders exacerbated by stress.

ARIDA RM, VIEIRA DE, CAVALHEIRO EA, SCORZA FA. **Judo: Ippon scored against epilepsy.** *Epilepsy & Behavior*, 2010 Jan ; 17 (1) : 136.

People with epilepsy most often cite emotional difficulty, such as depression from underemployment, undereducation, and social isolation, as being the greatest problem they come across. Consequently, people with epilepsy experience emotional problems as a result of their disease, which decreases their quality of life. Persons with epilepsy suffer a considerable lack of physical fitness that is likely to impact their general health and quality of life. It has been hypothesized that some of the psychological benefits of exercise may be due to the realization that people with epilepsy can gain from sports, which may improve their sense of control over their disease.

TUTKUN E, AYYILDIZ M, AGAR E. **Short-duration swimming exercise decreases penicillin-induced epileptiform ECoG activity in rats.** *Acta Neurobiologiae experimentalis (Wars)*, 2010 ; 70 (4) : 382-389.

The aim of the present study is to understand the basic relationship between swimming exercise and natural course of epilepsy in animals by performing an electrophysiological study. For this purpose, male Wistar rats were submitted to daily swimming exercise program of three different durations. Animals were swim-exercised for 90 days with either 15 minutes, 30 minutes or 60 minutes/day. Thereafter, the epileptiform activity was induced by a single microinjection of penicillin (500 units) into the left somatomotor cortex. Short-duration swimming exercise (15 min per day for 90 days) decreased the mean frequency and amplitude of penicillin-induced epileptiform activity in the 70 and 90 minutes after penicillin injection compared to penicillin administered group, respectively. Moderate-duration (30 min per day for 90 days) and long-duration (60 min per day for 90 days) swimming exercise did not alter either the frequency or amplitude of epileptiform activity. The results of the present study provide electrophysiologic evidence that short-duration swimming exercise partially inhibits penicillin-induced epileptiform activity. These data also suggest that moderate and long-duration swimming exercise do not increase either the frequency or severity of seizure in the model of penicillin-induced epilepsy.

Accessible en ligne : <http://www.ane.pl/linkout.php?pii=7043>

ARIDA RM, SCORZA FA, CAVALHEIRO EA. **Favorable effects of physical activity for recovery in temporal lobe epilepsy.** *Epilepsia* 2010 ; 51 (suppl 3) : 76-79.

Strategies that are efficacious for preventing or treating of epilepsy have been extensively used. This review discusses the positive effects of physical exercise program in experimental models of epilepsy, and considerations of the potential application of physical exercise strategy for preventing or treating temporal lobe epilepsy (TLE) are highlighted. Findings from animal studies indicate that exercise can modulate neuronal vulnerability to epileptic insults. Exercise treatment before a precipitating brain insult demonstrates a reduced brain susceptibility in the kindling or the pilocarpine model of epilepsy. In view of the beneficial effect of exercise during the epileptogenesis process, studies analyzed the influence of exercise after the development of chronic epilepsy. Behavioral analysis showed a reduced frequency of seizures during physical exercise program. Metabolic, electrophysiologic, and immunohistochemical studies have confirmed the positive influence of exercise on epilepsy. Taken into account that exercise can exert beneficial actions such as reduction of seizure susceptibility as observed in animal studies, and improvement of quality of life and reduction of anxiety and depression of individuals with epilepsy, physical exercise can be a potential candidate to be integrated with conventional therapy for epilepsy.

<https://onlinelibrary.wiley.com/doi/full/10.1111/j.1528-1167.2010.02615.x>

GORDON KE, DOOLEY JM, BRNA PM. **Epilepsy and activity--a population-based study.** *Epilepsia*, 2010 Nov ; 51 (11) : 2254-9.

To compare the activity profiles of a nationally representative sample of individuals with epilepsy compared to the general population. **METHODS:** The Canadian Community Health Survey is a cross-sectional survey that uses a stratified cluster sample design to obtain information on Canadians 12 years of age or older. Data on activity and energy expenditure, among those aged 12-39 years, were compared for those who reported having epilepsy and the remainder of the population. **RESULTS:** Of the 53,552 respondents, 341 reported having epilepsy. There was no difference in the monthly frequency of leisure physical activity of >15 min duration between those who did and did not have epilepsy. The daily energy expenditure related to leisure physical activity was also similar between the two groups. The choice of leisure activity was similar, but those with epilepsy were more likely to use walking as a leisure physical activity and were less likely to be involved in ice hockey, weight training, and home exercise. **DISCUSSION:** These results suggest that the negative attitudes toward restricting access to physical activity do not appear to be adversely affecting the leisure activity of Canadian youth and young adults with epilepsy.

Accessible en ligne : <http://onlinelibrary.wiley.com/doi/10.1111/j.1528-1167.2010.02709.x/epdf>

GRANDISSON M, TETREAU S., FREEMAN A.R. **Le sport : promoteur de la santé et de la participation sociale en déficience intellectuelle.** *Revue francophone de la déficience intellectuelle* 2010, 21 : 54-65.

Étant donné la vulnérabilité des personnes ayant une déficience intellectuelle au plan de la santé physique et mentale, les bienfaits du sport s'avèrent comme étant encore plus importants pour elles. Le Processus de production du handicap (PPH) permet d'illustrer les éléments impliqués dans la participation de ces personnes dans les sports. La présente recension des écrits scientifiques explore les retombées du sport pour les individus présentant une déficience intellectuelle ainsi que les éléments pouvant favoriser ou nuire à leur participation aux sports et à leur intégration dans les groupes sportifs réguliers. La discussion aborde la promotion de la santé et le développement de la participation sociale par l'intermédiaire du sport. Elle aborde aussi les conditions devant être créées pour favoriser une expérience positive d'intégration dans les sports réguliers. (RA).

https://www.rfdi.org/wp-content/uploads/2013/05/GRANDISSON_v21.pdf

YUEN Alan WC, SANDER Josemir W. **Can slow breathing exercises improve seizure control in people with refractory epilepsy ? A hypothesis.** *Epilepsy & behavior* 2010 ; 18 : 331-334.

Studies on various medical conditions have shown that poor health is associated with lower parasympathetic tone. People with epilepsy appear to have decreased parasympathetic tone, with a greater decrease in those with intractable seizures than in those with well-controlled epilepsy. Slow breathing exercises have been shown to increase parasympathetic tone in healthy volunteers. Slow breathing exercises have been shown to improve a number of medical conditions including asthma, hypertension, anxiety states, and posttraumatic stress disorder. We hypothesize that slow breathing exercises in people with epilepsy can lead to an increase in parasympathetic tone and an accompanying reduction in seizure frequency. The slow breathing exercises, probably through baroreceptors, chemoreceptors, and pulmonary stretch receptors, affect cortical activity and hence seizure thresholds. It is also possible that slow breathing exercises might reduce seizure frequency by reducing anxiety. The hypothesis can be tested by employing devices and protocols that have been used to reduce breathing rates and have been shown to improve health outcomes in other medical conditions.

ARIDA RM, SCORZA FA, SCORZA CA, CAVALHEIRO EA. **Is physical activity beneficial for recovery in temporal lobe epilepsy ? Evidences from animal studies.** Neuroscience and biobehavioral reviews 2009 ; 33 : 422-431

Exposure to different physical and cognitive stimulus have been shown to induce extensive neuronal plasticity in both undamaged and injured central nervous system, such as enhanced neurogenesis in the dentate gyrus of the hippocampus, up-regulation of neurotrophic factors and improved learning and memory. Neuronal plasticity also is found during certain neurodegenerative conditions, including the temporal lobe epilepsy (TLE). TLE is the most common form of partial epilepsy, characterized by atrophy of mesial temporal structures, mossy fiber sprouting, spontaneous recurrent seizures and cognitive deficits. In view of the fact that physical activity has been found to be beneficial for treating animal models of Parkinson's, Alzheimer's and Huntington's diseases, there is considerable interest in determining the efficacy of this strategy for preventing or treating chronic TLE. This review discusses the positive effects of program of physical exercise in experimental models of epilepsy. Thus, considerations of the potential application of physical exercise strategy for preventing or treating TLE are highlighted.

ABLAH E, HAUG A, KONDA K, TINIUS AM, RAM S, SADLER T, LIOW K. **Exercise and epilepsy: a survey of Midwest epilepsy patients.** Epilepsy & Behavior, 2009 Jan ; 14 (1) : 162-166.

Obesity and lack of physical activity are an increasing problem. In addition to common barriers to physical activity, people with epilepsy also face fear of exercise-induced seizures, medication side effects, and, often, confusing advice regarding the safety of exercise. To explore barriers faced by people with epilepsy, we mailed a survey to 412 adult patients with epilepsy from an epilepsy center in Kansas. Survey items assessed patients' exercise habits, attitudes regarding exercise, and barriers to exercise. Forty-seven percent completed the survey. Most respondents reported that they did exercise, though most did so 3 or fewer days per week and at light intensity. Respondents who reported seizures as a barrier to exercise did not exercise with less frequency or intensity than those who did not report seizures as a barrier, but these respondents reported greater fear of seizures. Patient-specific education about the benefits of exercise needs to be initiated by physicians.

ARIDA RM, SCORZA FA, TERRA VC, SCORZA CA, DE ALMEIDA AC, CAVALHEIRO EA. **Physical exercise in epilepsy: what kind of stressor is it?** Epilepsy & Behavior, 2009 Nov ; 16 (3) : 381-387.

Stress has been considered the most frequently self-reported precipitant of seizures in people with epilepsy. The literature documents that physical stress, that is, physical exercise, can have beneficial effects in people with epilepsy. In view of evidence indicating that sensitivity to stress is reduced after a physical exercise program, physical activity could be a potential candidate for stress reduction in people with epilepsy. This review considers how physical exercise could contribute to reduce seizure susceptibility and, hence, seizure frequency. Possible mechanisms by which exercise can be beneficial for people with epilepsy are highlighted. Hypothalamic-pituitary-adrenal axis adaptation, neurotransmitter system modulation, and metabolic and neuroendocrine changes may interfere with seizure susceptibility. The psychological stress of different sports activities is an important concern that must also be taken into account. Overall, among stress reduction therapies for the treatment of seizures, exercise might be a potential candidate.

ARIDA RM, CAVALHEIRO EA, DA SILVA AC, SCORZA FA. **Physical activity and epilepsy: proven and predicted benefits.** Sports Medicine, 2008 ; 38 (7) : 607-615.

Epilepsy is a common disease found in 2% of the population, affecting people from all ages. Unfortunately, persons with epilepsy have previously been discouraged from participation in physical activity and sports for fear of inducing seizures or increasing seizure frequency. Despite a shift in medical recommendations toward encouraging rather than restricting participation, the stigma remains and persons with epilepsy continue to be less active than the general population. For this purpose, clinical and experimental studies have analysed the effect of physical exercise on epilepsy. Although there are rare cases of exercise-induced seizures, studies have shown that physical activity can decrease seizure frequency, as well as lead to improved cardiovascular and psychological health in people with epilepsy. The majority of physical activities or sports are safe for people with epilepsy to participate in with special attention to adequate seizure control, close monitoring of medications, and preparation of family or trainers. The evidence shows that patients with good seizure control can participate in both contact and non-contact sports without harmfully affecting seizure frequency. This article reviews the risks and benefits of physical activity in people with epilepsy, discusses sports in which persons with epilepsy may participate, and describes the positive effect of physical exercise in experimental models of epilepsy.

ARIDA RM, SCORZA CA, SCHMIDT B, DE ALBUQUERQUE M, CAVALHEIRO EA, SCORZA FA. **Physical activity in sudden unexpected death in epilepsy: much more than a simple sport.** Neuroscience Bulletin, 2008 Dec ; 24 (6) : 374-380.

Sudden unexpected death in epilepsy (SUDEP) is the most important direct epilepsy-related cause of death. Additionally, potential pathomechanisms for SUDEP is unknown, but it is very probable that cardiac arrhythmia during and between seizures, electrolyte disturbances, arrhythmogenic drugs or transmission of epileptic activity via the autonomic nervous

system to the heart may play a potential role. Quite interestingly, clinical and experimental data have shown that physical activity can decrease seizure frequency, as well as lead to improved cardiovascular health in patients with epilepsy. Based on these facts, the purpose of this article is to review the body of literature of the possible contribution of physical exercise to the SUDEP prevention in a comprehensive manner.

HARRISON BK, ASPLUND C. **Sudden unexplained death in epilepsy during physical activity.** Currents Sports Medicine Reports, 2007 Jan ; 6 (1) : 13-15.

SETKOWICZ Z, MAZUR A. **Physical training decreases susceptibility to subsequent pilocarpine-induced seizures in the rat.** Epilepsy Research, 2006 Oct ; 71 (2-3) : 142-148.

Regular motor activity has many benefits for mental and physical condition but its implications for epilepsy are still controversial. In order to elucidate this problem, we have studied the effect of long-term physical activity on susceptibility to subsequent seizures. Male Wistar rats were subjected to repeated training sessions in a treadmill and swimming pool. Thereafter, seizures were induced by pilocarpine injections in trained and non-trained control groups. During the acute period of status epilepticus, we measured: (1) the latency of the first motor sign, (2) the intensity of seizures, (3) the time when it occurred within the 6-h observation period, and (4) the time when the acute period ended. All these behavioral parameters showed statistically significant changes suggesting that regular physical exercises decrease susceptibility to subsequently induced seizures and ameliorate the course of experimentally induced status epilepticus.

WONG J, WIRRELL E. **Physical activity in children/teens with epilepsy compared with that in their siblings without epilepsy.** Epilepsia, 2006 Mar ; 47 (3) : 631-639.

PURPOSE: To determine (a) whether children and teens with epilepsy participate in less physical activity and have higher body mass index (BMI) percentiles for age than do their siblings without epilepsy; and (b) what epilepsy-specific factors limit their participation.

METHODS: Patients 5-17 years, with a ≥ 3 month history of epilepsy, a development quotient ≥ 80 , no major motor or sensory impairments, and at least one sibling without epilepsy in a similar age range, were identified from the Neurology Clinic database or at the time of clinic visit. Parents completed a questionnaire regarding sedentary activities and group, individual, and total sports activities. Children aged 11-15 years also completed the physical activity portion of the Health Behavior in School Aged Children questionnaire. Clinic charts were reviewed for seizure type, etiology, frequency, duration of epilepsy, and number of antiepileptic drugs (AEDs) ever taken.

RESULTS: Teens with epilepsy participated in fewer group and total sports activities than did controls and were more likely to be potentially overweight or overweight. Receiving three or more AEDs in the past showed a significant negative correlation with sports participation. Although a trend was noted for those with higher seizure frequency to be less active, no other epilepsy-specific factors or prior seizures or seizure-related injury during a sports event correlated with participation in physical activity.

CONCLUSIONS: Programs that promote exercise in adolescents with epilepsy should be encouraged to improve their physical, psychological, and social well-being.

Accessible en ligne : <http://onlinelibrary.wiley.com/doi/10.1111/j.1528-1167.2006.00478.x/epdf>

ELLIOTT John O, LU Bo, MOORE Layne, MCAULEY James W, LONG Lucrecia. **Exercise, diet, health behaviors, and risk factors among persons with epilepsy based on the California Health Interview Survey, 2005.** Epilepsy & behavior 2008 ; 13(2) : 307-315.

Based on the 2005 California Health Interview Survey, persons with a history of epilepsy report lower educational attainment, lower annual income, and poorer health status, similar to other state-based epidemiological surveys. Previous studies have found persons with epilepsy exercise less and smoke more than the nonepilepsy population. The medical literature has also shown that antiepileptic drugs may cause nutritional deficiencies. Persons with a history of epilepsy in the 2005 CHIS report they walk more for transportation, drink more soda, and eat less salad than the nonepilepsy population. Exercise and dietary behaviors at recommended levels have been found to reduce mortality from many comorbid conditions such as cardiovascular disease, stroke, depression, anxiety, and osteoporosis for which persons with epilepsy are at increased risk. Health professionals in the epilepsy field should step up their efforts to engage patients in health promotion, especially in the areas of exercise, diet, and smoking cessation.

HOWARD GM, RADLOFF M, SEVIER TL. **Epilepsy and sports participation.** Current Sports Medicine Reports, 2004 Feb ; 3 (1) : 15-19.

Epilepsy is a common disease found in 2% of the population, affecting both young and old. Unfortunately, epileptics have previously been discouraged from participation in physical activity and sports for fear of inducing seizures or increasing seizure frequency. Despite a shift in medical recommendations toward encouraging rather than restricting participation,

the stigma remains and epileptics continue to be less active than the general population. This results in increased body mass index, decreased aerobic endurance, poorer self-esteem, and higher levels of anxiety and depression. Although there are rare cases of exercise-induced seizures, studies have shown that physical activity can decrease seizure frequency, as well as lead to improved cardiovascular and psychologic health. The majority of sports are safe for epileptics to participate in with special attention to adequate seizure control, close monitoring of medications, and preparation of family, coaches, or trainers. Contact sports including football, hockey, and soccer have not been shown to induce seizures, and epileptics should not be precluded from participation. Water sports and swimming are felt to be safe if seizures are well controlled and direct supervision is present. Additional care must be taken in sports involving heights such as gymnastics, harnessed rock climbing, or horseback riding. Sports such as hang-gliding, scuba diving, or free climbing are not recommended, given the risk of severe injury or death, if a seizure were to occur during the activity. This article reviews the risks and benefits of physical activity in epileptics, discusses sports in which epileptics may participate, and addresses how to decrease possible risks for injury.

NEBOJSA J. Jovic. **La pratique sportive des enfants et des adolescents avec épilepsie stabilisée.** *Epilepsies*, 2004 ; 16 (2) : 87-94.

La pratique sportive est possible pour la majorité des épileptiques. Avec quelques restrictions et certaines précautions, la majorité des sports n'aggrave pas les crises. Un groupe de 182 malades, enfants et adolescents, âgés de 8 à 18 ans, n'ayant plus de crise ou ayant des crises rares sous traitement, sans déficit neurologique ou mental, a été analysé pour sa participation à la pratique sportive. Trois questionnaires ont été complétés : l'un par les patients, le deuxième par les parents et le troisième par les enseignants. D'après le questionnaire complété par les patients, dans 25,3 % des cas, les activités sportives et les exercices physiques étaient déconseillés par les parents et/ou les enseignants. Près de la moitié des épileptiques (47,2 %) pratiquait un sport (football, athlétisme et basket le plus souvent). La participation à une compétition sportive n'était autorisée que pour 28 adolescents. Cinquante-six (30,8 %) des épileptiques ne savaient pas nager. Les résultats du questionnaire donné aux épileptiques montraient que la prise des antiépileptiques, le risque de crises liées à l'effort sportif, le manque de motivation pour les activités physiques et la notion que les épileptiques ne sont pas capables de faire du sport étaient désignés comme les raisons principales de l'abstention. Presque la moitié (41,7 %) des parents trouvait que l'activité sportive peut aggraver les crises épileptiques de leurs enfants. Parmi les 86 sujets faisant du sport, des crises ne sont survenues pendant l'exercice sportif que chez quatre d'entre eux. Il n'a pas été observé d'accident grave ou de trauma crânio-cérébral. Une épilepsie stabilisée, un traitement bien adapté et bien toléré ne suffisent pas pour rassurer le nombre considérable de parents et d'enseignants dont les préjugés et la surprotection entraînent la restriction ou l'interdiction de l'activité sportive pour les enfants et adolescents épileptiques. Une meilleure éducation des patients, de leurs parents et de la société sur l'épilepsie est nécessaire pour favoriser la confiance en eux des enfants et adolescents épileptiques et améliorer leur qualité de vie. [résumé d'éditeur]

ARIDA RM, SCORZA FA, DE ALBUQUERQUE M, CYSNEIROS RM, DE OLIVEIRA RJ, CAVALHEIRO EA. **Evaluation of physical exercise habits in Brazilian patients with epilepsy.** *Epilepsy Behavior* 2003 ; 4 : 507– 510.

In this study we present data from a survey that aimed to assess the physical activity of a sample of adult outpatients with epilepsy. One hundred adult outpatients of both sexes with epilepsy answered a survey addressing exercise habits. Fifty-eight males and forty-two females participated in this study. The mean age of onset of seizures was 18.6 years and the mean duration of epilepsy was 16.1 years. Sixty patients had controlled or rare seizures, 8 infrequent seizures, 17 frequent seizures, and 11 very frequent seizures. Eighty-six had partial epilepsy and only 3 had abnormal neurological examinations. Of the total, 51 engaged in physical activity, 85 did not believe that sports precipitate seizures, and 15 were forbidden by their physicians to engage in physical activities. Moreover, 14 were cautioned against participation in sports by their relatives and friends. Eight-four patients had never experienced seizures during physical exercise, 36 believed that physical activity has a positive influence on treatment, and only 1 related injuries associated with seizures. Forty-five are afraid of having seizures during exercise because the seizures might attract the attention of others and they would make fools of themselves. Our data show that although most of our patients do not regularly engage in physical activity, they believe that it might improve medical treatment.

DUBOW JS, KELLY JP. **Epilepsy in sports and recreation.** *Sports Medicine*, 2003 ; 33 (7) : 499-516.

In the US, millions of people participate in physical activity on a regular basis. However, among the many people with epilepsy, few incorporate exercise into their daily routine. Whether it is because of parental or physician restriction, the fact remains that people with epilepsy are less fit and are not getting the exercise they need. For many years, patients with seizure disorders have been discouraged from participating in physical fitness and team sports due to the fear that it will exacerbate their seizure disorder. However, this overprotective attitude has been slowly changing in light of more recent data on this subject. The evidence shows that patients with good seizure control can participate in both contact and non-contact sports without adversely affecting seizure frequency. This article reviews the effects of exercise on seizure control among patients with epilepsy. It examines the morbidity and mortality associated with exercise, as well

as its psychological and physiological effects. Various topics concerning antiepileptic drugs and exercise are also discussed.

ARZIMANOGLU Alexis. **Epilepsies et sports**. *Epileptic disorders* 2002 ; 4 (NS1) : S163-S167.

La grande majorité des patients ayant une épilepsie sont capables d'évaluer les risques encourus par la pratique d'une activité sportive. Les conseils des médecins doivent systématiquement tenir compte du type de crise, du type d'épilepsie, de la fréquence des crises, de la sensibilité au traitement en cours, du type de sport et les souhaits du patient. Les conséquences d'un isolement social, résultat d'une attitude protectionniste et restrictive, sont considérables. Nous réfugier derrière une simple interdiction, pour ne pas nous obliger à prendre les mesures de protection nécessaires, aura des conséquences directes et indirectes sur l'intégration sociale des patients. Les risques sont réels mais peuvent être expliqués aux patients. Il est important de garder en mémoire qu'un patient faisant des crises d'épilepsie pouvant entraîner la chute risque de se blesser et cela indépendamment du type d'activité en cours. Donc, à lui seul, ce risque ne justifie pas l'exclusion des activités sportives. Dans la grande majorité des cas, l'activité physique ne favorise pas le déclenchement des crises. [résumé d'éditeur]

DERAMBURE Philippe. **Pratique du sport chez un épileptique : quelles recommandations ?** *Act. Med. Int. Neurologie*. 2001 ; 2 (5) : 86-88.

Les médecins, les parents, les professeurs expriment souvent beaucoup de prudence, voire d'inquiétude quand il faut conseiller un épileptique qui souhaite pratiquer un sport. Pourtant, tout doit être fait pour que l'épileptique puisse bénéficier d'une intégration naturelle dans son milieu social, scolaire ou professionnel

Accessible en ligne : <http://www.edimark.fr/Front/frontpost/getfiles/2043.pdf>

YARDI Nandan. **Yoga for control epilepsy**. *Seizure* 2001 ; 10 : 7-12.

Yoga is an age-old traditional Indian psycho-philosophical-cultural method of leading one's life, that alleviates stress, induces relaxation and provides multiple health benefits to the person following its system. It is a method of controlling the mind through the union of an individual's dormant energy with the universal energy. Commonly practiced yoga methods are 'Pranayama' (controlled deep breathing), 'Asanas' (physical postures) and 'Dhyana' (meditation) admixed in varying proportions with differing philosophic ideas. A review of yoga in relation to epilepsy encompasses not only seizure control but also many factors dealing with overall quality-of-life issues (QOL). This paper reviews articles related to yoga and epilepsy, seizures, EEG, autonomic changes, neuro-psychology, limbic system, arousal, sleep, brain plasticity, motor performance, brain imaging studies, and rehabilitation. There is a dearth of randomized, blinded, controlled studies related to yoga and seizure control. A multi-centre, cross-cultural, preferably blinded (difficult for yoga), well-randomized controlled trial, especially using a single yogic technique in a homogeneous population such as Juvenile myoclonic epilepsy is justified to find out how yoga affects seizure control and QOL of the person with epilepsy.

[https://www.seizure-journal.com/article/S1059-1311\(00\)90480-1/pdf](https://www.seizure-journal.com/article/S1059-1311(00)90480-1/pdf)

NAKKEN KO. **Physical exercise in outpatients with epilepsy**. *Epilepsia*, 1999 May ; 40 (5) : 643-51.

PURPOSE: To compare the exercise habits in a sample of adult outpatients with epilepsy with those of a general population of the same age and sex and furthermore to study physical exercise as a seizure precipitant and the risk of sustaining seizure-related injuries while exercising. **METHODS:** Two hundred four adult outpatients with active epilepsy responded to two questionnaires. The first one, addressing exercise habits, was a selected part of a broad self-assessing screening used every second year by a marketing and media research institute to reveal changes in the average Norwegian's lifestyle. The exercise habits of the epilepsy population were compared with those of the average population. The other questionnaire, addressing seizures and injuries related to physical exercise, consisted of eight sections and was developed at the National Center for Epilepsy in Norway. **RESULTS:** The portion of those never exercising was significantly higher among the patient group compared with the average population. Otherwise, the exercise patterns were very similar in the two populations. However, the patients exercised more often in fitness centers and together with friends, whereas individual activities like skiing and swimming were more often preferred by the average Norwegian. Of the 204 patients, 53 and 63% had never experienced seizures during or immediately after exercise, respectively. About 10% of the patients claimed that they had seizures quite often in connection with exercise. However, only 2% had genuine exercise-induced seizures, here arbitrarily defined as having seizures in >50% of the training sessions. Among those prone to have exercise-related seizures, there was a predominance of patients with symptomatic localization-related epilepsy (i.e., with an underlying structural brain lesion). Most exercise-related seizures occurred during strenuous activity. About 38% of the patients claimed to have personal experience regarding whether regular physical exercise influenced their seizure disorder; of these, 53% claimed there was no influence, 36% claimed there was a positive influence, and 10% reported a negative influence. Thirty-six percent of the patients had experienced injuries in connection with physical exercise, but in only 10% were these injuries associated with seizures. The injuries were mostly mild. **CONCLUSIONS:** The surveyed sample of epilepsy outpatients was more active than expected, and their exercise

pattern closely resembled that of the average Norwegian population. In the majority of the patients, physical exercise had no adverse effects, and a considerable proportion (36%) claimed that regular exercise contributed to better seizure control. However, in approximately 10% of the patients, exercise appeared to be a seizure precipitant, and this applied particularly to those with symptomatic partial epilepsy. The risk of sustaining serious seizure-related injuries exercising seemed modest.

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ARIDA RM, SCORZA FA, SANTOS NF, PERS EA, CAVALHEIRO EA. **Effect of physical exercise on seizure occurrence in a model of temporal lobe epilepsy in rats.** *Epilepsy Research* 1999 ; 37: 45– 52.

Although the favorable effect of physical fitness on general health is unquestionable, physical exercise and fitness programs in patients with epilepsy are still a matter of controversy. Little objective evidence regarding the effect of exercise on seizure frequency and severity has been reported. One sought to clarify the relationship between exercise and epilepsy in an animal model of temporal lobe epilepsy (the pilocarpine model of epilepsy). To evaluate the effect of an aerobic physical program on seizure frequency, 29 epileptic animals were continuously monitored during 24 h for 135 days after the first spontaneous recurrent seizure (SRS) and divided into three groups. The first group (N = 14) was submitted to an aerobic exercise program (training group). The second group (N = 7) was maintained in the treadmill for the same time as the training group without being submitted to physical exercise (sham group). The third group (N = 8) served as control. The behavioral observation was divided in three periods of 45 days. The first period was used to determine the number of seizures before physical training program. The second period was utilized to determine the number of seizures during the physical training program. The third period was used to analyze the frequency of seizures after the physical training program. The mean frequency of seizures in the control and sham groups increased significantly from period 1 to period 2 and from period 1 to period 3. However, in the training group, the frequency of seizures did not change significantly between the three periods of 45 days of observation. When the same periods of the three groups were analyzed together, a significant reduction in seizure frequency was observed comparing the training group with the control and sham groups during the period of physical training. The data presented in this study suggest that physical exercise is not a seizure-inducing factor in this experimental model of epilepsy.

SIRVEN JI, VARRATO J. **Physical activity and epilepsy: what are the rules?** *The physician and sports medicine*, 1999 Mar ; 27 (3) : 63-70.

Exercise has important benefits for patients who have epilepsy, but several factors must be considered when making activity recommendations. Seizures during sports activity are rare, and exercise may have anti-epileptic effects acutely, but physicians, coaches, and parents should know what to do if a seizure occurs. Many sports activities are permissible as long as patients avoid overexertion, dehydration, and hypoglycemia. Some antiepileptic drugs may adversely affect sports performance, and exercise in turn may reduce serum drug levels by increasing circulating liver enzymes.

ARIDA RM, VIEIRA AJ, CAVALHEIRO EA. **Effect of physical exercise on kindling development.** *Epilepsy Research* 1998 ; 30 : 127– 132.

The relationship between epilepsy and exercise is a subject of controversy and needs more investigation. We report a study of the effect of physical activity on the development of amygdala kindling in rats. To analyze the acute and chronic effects of exercise on kindling development, 45 rats were divided randomly into three groups. The first group (acute group, n=15) was submitted to a daily bout of aerobic exercise (40 min running on the treadmill at 20 m/min) and kindling stimulated 1 min post-exercise; the second group (chronic group, n=15) was submitted to an aerobic training program (40 min running on the treadmill at 20 m/min, 7 days per week, for 45 days) and then submitted to the same procedure as the first group (daily bout of aerobic exercise -- 40 min running on the treadmill at 20 m/min and kindling stimulated 1 min post-exercise); and the third group (n=15) served as control. All groups were kindling stimulated until they reached stage 5 of kindling. The number of stimulations required to reach stage 5 was statistically higher for the chronic exercise group when compared to the acute exercise group and the control group. A longer time spent in stage 1 and a shorter after-discharge duration in stage 1 was observed in the acute and chronic exercise groups in relation to the control group. This finding suggests that chronic physical exercise inhibits development of amygdala kindling in rats.

JALAVA M, SILLANPÄÄ M. **Physical activity, health-related fitness, and health experience in adults with childhood-onset epilepsy: a controlled study.** *Epilepsia*, 1997 Apr ; 38 (4) : 424-429.

PURPOSE: To show any possible associations between childhood-onset epilepsy and physical activity, health-related fitness, and health experience.

METHODS: A population-based cohort of 176 patients with epilepsy since childhood was monitored for a mean of 35 years. Patients with recurrent, unprovoked epileptic seizures with no associated initial neurologic impairment or

disability, termed those with "epilepsy only" (n = 100), were compared with matched controls for self-reported physical activity, health experience, laboratory tests, body mass index, and muscle power tests.

RESULTS: On the basis of muscle tests, physical fitness proved to be significantly poorer in patients with "epilepsy only" than in matched controls. During the preceding year, 22% of patients and 24% of controls had reduced their physical activities because of some illness; only 2% reduced their physical activities because of epilepsy. No significant difference was found in blood status, except for a lower serum creatinine level in the patients. Current antiepileptic drug (AED) therapy appeared significantly associated with lower hemoglobin and creatinine levels and higher high-density lipoprotein values. The patients perceived their health status to be comparable with that of controls, irrespective of physical inactivity, continued seizures, or AED monotherapy. However, patients receiving AED polytherapy perceived their health as rather poor or very poor significantly more often than did controls.

CONCLUSIONS: Based on objective muscle tests, adults with childhood-onset "epilepsy only" have poorer physical fitness than do matched controls, but they have a feeling of good personal health.

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STEINHOFF BJ, NEUSÜSS K, THEGEDER H, REIMERS CD. **Leisure time activity and physical fitness in patients with epilepsy.** *Epilepsia*, 1996 Dec ; 37 (12) : 1221-7.

PURPOSE: To assess social and physical activity by means of a controlled study based on a questionnaire and standardized clinical tests of physical fitness. **METHODS:** In this controlled study, we assessed several issues of social and physical activity in 136 patients with epilepsy and 145 controls by using a questionnaire. In addition, we investigated physical fitness based on physical parameters such as body mass index and body composition and standardized tests of aerobic and muscle strength endurance and physical flexibility in 35 adult patients and 36 healthy controls. **RESULTS:** Leisure time habits both at home and outside the home were mainly similar except for visits of friends, which were significantly reduced in patients. Although the general attitude toward sports and physical activity was positive in both groups, and although controls judged sports to be dangerous significantly more often ($p = 0.007$), controls participated in regular sports significantly more frequently ($p = 0.005$). The clinical study demonstrated a lack of physical fitness, as suggested by the questionnaire data. Statistical analysis demonstrated significant differences of aerobic endurance ($p < 0.001$), muscle strength endurance ($p < 0.001$), and physical flexibility ($p < 0.001$) in favor of the control subjects. The body mass index was significantly higher in patients ($p = 0.03$), whereas the body composition revealed a higher body fat ratio only in female patients ($p = 0.04$). **CONCLUSIONS:** We conclude that patients with epilepsy suffer from a considerable lack of physical fitness that might have an important impact on their general health and quality of life. In addition to overprotection and reduced mobility, the questionnaire revealed insufficient knowledge among health professionals and sport instructors as a major factor contributing to these results.

ERIKSEN HR, ELLERTSEN B, GRØNNINGSÆTER H, NAKKEN KO, LØYNING Y, URSIN H. **Physical exercise in women with intractable epilepsy.** *Epilepsia*, 1994 Nov-Dec ; 35 (6) : 1256-64.

Fifteen women with pharmacologically intractable epilepsy were given physical exercise (aerobic dancing with strength training and stretching) for 60 min, twice weekly, for 15 weeks. Seizure frequency was recorded by the patients for 3-7 months before the intervention, during the intervention period, and for 3 months after the intervention. Medication and other known seizure-influencing factors were kept as constant as possible. Self-reported seizure frequency was significantly reduced during the intervention period. The exercise also led to reduced level of subjective health complaints, such as muscle pains, sleep problems, and fatigue. The exercise reduced plasma cholesterol ratio and increased maximum O₂ uptake. Because most of the patients were unable to continue the exercise on their own after the intervention period, the exercise effects were not maintained during the follow-up period. The patients were not unwilling to continue the exercise, but it was not sufficient to offer them the possibility of continuing similar types of exercise. We believe that 15 weeks is too short a time to establish a life-style change and that continued physical exercise for these patients requires a well-organized and supportive program, requiring experienced and dedicated instructors.

OUVRAGES & CHAPITRES D'OUVRAGES



MINO Jean-Christophe, MULLER Jean-Daniel, RICARD Jean-Michel. **Soins du corps, soin de soi : activité physique adaptée en santé.** PUF, 2018

Le corps, centre névralgique de notre vitalité, conditionne l'ensemble de notre vécu. De fait, qu'est-ce que la maladie, si ce n'est l'entrave de notre puissance d'agir, une atteinte directe à notre « corporéité » ? En parallèle de l'approche classique sur le traitement médical, l'ouvrage développe une nouvelle théorie, s'appuyant sur de nombreuses recherches

scientifiques, autour des bienfaits de l'activité physique adaptée, afin de lutter contre les pathologies et les conséquences du vieillissement. Bien plus qu'une simple méthode pour réparer un « corps machine », l'activité physique adaptée permet de saisir la santé comme l'expérience d'un « corps vivant », à la fois individuelle et singulière. Ainsi par-delà ses vertus thérapeutiques, le programme d'APA offre aux patients la possibilité de retrouver le sentiment d'unité et de complétude, abîmé par la maladie.

DEPIESSE Frédéric, COSTE Olivier, CAYRAC Claude et. al. **Prescription des activités physiques en prévention et en thérapeutique**. Elsevier Masson, 2016.

L'objectif de cet ouvrage sur l'activité physique est d'apporter les connaissances nécessaires dans un but de prescription au quotidien par les médecins et de conseils par les autres professionnels de santé. Les auteurs abordent successivement : les données physiologiques, les risques et les outils d'évaluation de la pratique de l'activité physique ; les recommandations pour la pratique de l'activité physique en cas de pathologie : obésité, diabète, maladies cardiovasculaires, arthrose, ostéoporose, asthme, pathologies neurologique et psychiatrique, etc. ; les particularités dues à la grossesse et les spécificités selon l'âge.

MÉMOIRES, RECHERCHES, THÈSES



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Ce mémoire met en avant l'hypothèse de crises épileptiques partielles pour expliquer certains troubles de comportement chez des adultes porteurs d'autisme associé à une déficience mentale. Le cadre est celui d'un accueil de jour médicalisé dont l'accompagnement s'appuie sur l'éducation structurée et dans lequel les hypothèses somatiques et épileptiques ont été peu prises en compte lors de l'ouverture. On s'appuiera pour cela sur l'anatomophysiologie cérébrale, sur les recherches concernant le fonctionnement cérébral chez les personnes atteintes d'autisme, sur la symptomatologie épileptique et sur les résultats publiés quant aux liens entre épilepsie, autisme et déficience mentale. On étudiera également la prise en compte des troubles de comportement et de l'épilepsie par les familles, les professionnels et les partenaires du centre. Celle-ci est facilitée par la transdisciplinarité, par les formations et le lien avec les familles, et par une ébauche de collaboration avec les partenaires du soin extérieurs. Certains troubles de comportement que l'hypothèse épileptique ou somatique pourrait expliquer, est illustrée par un cas concret. La conclusion porte sur la nécessité d'affiner les supports d'observation, d'apprendre à reconnaître les manifestations d'épilepsie partielle et de favoriser l'accès aux soins préventifs et curatifs.

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Outre la prescription d'un traitement médicamenteux, la pratique régulière d'une Activité Physique Adaptée (APA) est recommandée aux personnes atteintes d'un diabète de type 2 (DT2), au même titre qu'un nouvel équilibre alimentaire (HAS, 2006). Cette incitation à opérer des changements concrets dans son « style de vie » rencontre des résistances, qui sont accentuées pour les malades n'ayant pas préalablement construit de dispositions à la pratique physique. Des dispositifs innovants ont été imaginés dans certaines organisations de santé (réseau de santé, unité transversale d'éducation) pour rendre possible cet engagement physique et lui permettre de se développer de manière autonome dans le cadre d'« une carrière de pratiquant d'APA » au sens où la définit Becker (1985). L'objectif est d'étudier ce processus d'engagement dans ses relations avec la « trajectoire de maladie » au sens où l'entend Strauss (1985), en rendant compte des différentes étapes de sa construction. A l'interface de la sociologie de la santé et de la sociologie du sport, l'approche mobilise ainsi des concepts interactionnistes. La méthodologie articule une observation de terrain avec 52 récits d'expériences de personnes atteintes de maladie(s) chronique(s) (dont 39 de DT2) qui ont évolué dans deux dispositifs d'APA différents : l'un proposant des séances théoriques d'information/explication (n=17), l'autre mettant en place des séances pratiques dans un cycle éducatif en APA puis une orientation vers une association sportive de patients (n=35). L'analyse des récits utilise un logiciel de traitement de données textuelles (Prospéro). Trois types d'engagement ont ainsi été repérés : Le premier s'inscrit dans la « trajectoire de maladie » mais suppose un rapport au corps renouvelé après une remise en question des représentations de l'AP du patient et de ses capacités. Le second ouvre une « carrière de pratiquant d'APA » et ajoute une sociabilité de l'entre-soi, initiée par les dispositifs « à et via » l'APA. Le troisième consolide cette « carrière » dans une pratique davantage culturelle que médicale, en l'inscrivant dans une sociabilité plus ouverte. Ces trois formes d'engagement se succèdent selon un continuum au cours duquel s'affirment simultanément une recherche croissante d'autonomie par rapport aux prescriptions médicales, une attention grandissante au corps et un développement du réseau relationnel.

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Décrite depuis longtemps, l'association entre autisme et épilepsie est maintenant clairement établie. Nous avons souhaité mieux décrire cette association. Une méta-analyse nous a permis d'identifier deux facteurs de risque au développement d'une épilepsie dans l'autisme : le retard mental et le sexe féminin. Par ailleurs, une étude clinique rétrospective portant sur des adolescents autistes hospitalisés dans une unité de soins intensifs pédopsychiatrique a montré qu'une décompensation comportementale aiguë avait fréquemment pour cause des convulsions non contrôlées. Les bases physiopathologiques de l'association entre autisme et épilepsie sont complexes et encore mal comprises. Compte tenu de la fréquence élevée de l'épilepsie dans la population générale, une association fortuite est probable chez certains individus. Dans certaines situations, lorsqu'elle débute à un stade précoce du développement cérébral, une épilepsie semble pouvoir intervenir dans le développement de symptômes autistiques. Chez d'autres, la coexistence fréquente d'un retard mental lorsqu'un autisme et une épilepsie sont associés permet de suggérer l'implication de mécanismes neuro-développementaux communs. Ainsi, nombre de gènes impliqués dans des réseaux ayant un rôle dans le développement et le fonctionnement cérébral ont été associés dans l'épilepsie, l'autisme et/ou le retard mental. L'identification de l'autisme avec épilepsie comme un sous-groupe de l'autisme pourrait permettre d'avancer vers une meilleure connaissance et compréhension des mécanismes physiopathologiques impliqués dans l'autisme.



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Tél. 09 69 36 86 46 - documentation@fahres.fr - <http://doc.handicapsrares.fr/fahres>

