



4th Global Experts Meeting on

Parkinson's & Movement Disorders

May 14-15, 2018 Singapore

Poster

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Usefulness of gait-aid system using smart glasses for freezing gait of parkinson's disease

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Background & Objective: Parkinson's Disease (PD) is a chronic progressive disease caused by loss of dopaminergic neurons in the substantia nigra, degenerating the nervous system of a patient over time. PD symptoms can cause gait disturbance such as Freezing Of Gait (FOG) for patients. Meanwhile, a recent study shows that the gait of PD patients experiencing FOG can be significantly improved by providing the regular visual or auditory patterns for the patients.

Method: Our android based gait-aid system continuously monitors the gait of a PD patient to detect FOG with wearable sensors and upon detection of FOG, it projects the most effective visual patterns on the glasses as if the patterns were actually on the floor.

Result: We demonstrate that our system improves the gait speed and stride length of PD patients by 23% and 36%, respectively. Moreover, our system is much safer than the existing systems where the visual patterns may block the wearer's sight.

Conclusion: Our gait-aid system based on smart glasses can be adapted for and applied to FOG of PD.

Biography

Jung-Eun Kim is currently working as a Senior Researcher in Kyungpook National University Chilgok Hospital. She has received her Master's degree from Kyungpook National University in Electrical Engineering and Computer Science. She has worked as a Clinical Research Coordinator from 2005 to 2012 in Kyungpook National University Hospital, South Korea. Her research interests include parkinson's disease, dementia and other neurological diseases.

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Accepted Abstracts

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Val66Met polymorphism in BDNF has no sexual and APOE ε4 status-based dimorphic effects on susceptibility to Alzheimer's disease: Evidence from an updated meta-analysis of case-control studies and high-throughput genotyping cohorts**Shan Jiang**

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Some studies showed that Val66Met polymorphism of Brain-Derived Neurotrophic Factor (BDNF) conveys susceptibility to Alzheimer's Disease (AD) in females only. However, the confounding effects of some risk factors for AD were omitted in these studies. This meta-analysis comprising 19,604 AD patients and 26,333 controls was aimed to re-examine the association between Val66Met and AD by conditioning the effects of age, sex and Apolipoprotein E (APOE) ε4 status. In general, Val66Met was not associated with AD before (OR=1.02, 95% CI=0.97-1.07; $P=0.40$) and after adjusting for age, sex and APOE ε4 status (OR=1.00; 95% CI=0.94-1.06; $P=0.97$). In agreement with the previous meta-analysis, Val66Met was associated with AD in females without confounding adjustment (OR=1.08; 95% CI=1.03-1.14; $P=0.003$). Nevertheless, after adjusting for age and APOE ε4 status, Val66Met was not associated with AD in either females (OR=1.02; 95% CI=0.94-1.11; $P=0.57$) or males (OR=0.94; 95% CI=0.86-1.04; $P=0.22$). Likewise, after adjusting for sex and APOE ε4 status, Val66Met was not associated with AD in either APOE ε4 carriers (OR=0.97, 95% CI=0.88-1.07; $P=0.56$) or non-carriers (OR=1.02, 95% CI=0.94-1.11; $P=0.64$). This comprehensive meta-analysis with the largest sample size demonstrated no association could be observed between Val66Met and AD in general or by dividing samples based on sex or APOE ε4.

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Clinical and imaging characteristics of atypical parkinsonism: Case series**Escobedo-Martinez Jorge Alberto, Acosta-Castillo Isaac, Bayliss-Amaya Leo and Sosa-Ortiz Ana Luisa**

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Background & Aim: Atypical parkinsonism, accounts for 0.2 to 1.5% of all cases with probable Parkinson's disease and its subtypes are Progressive Supranuclear Palsy (PSP); Multiple Systems Atrophy (MSA), Dementia with Lewy Bodies (DLB) and Cortico Basal Degeneration (CBD); they share clinical presentation and have a poor response to Levodopa. We aimed to investigate the main clinical and imaging characteristics of these diagnostic entities.

Method: 22 patients collected from the dementia laboratory of the National Institute of Neurology and Neurosurgery database were included, from August 2016 to June 2017; 9 PSP, 7 CBD, 3 with DLB and 3 with MSA patients. We report clinical, structural (visual scales - CGA, MTA, Fazekas, Koedam and strategic infarcts) and FDG-PET findings (18F-FDG/DTBZ).

Result: Mean ages of onset was: CBD=54.1, PSP=63.4, DLB=70.3, MSA=56 years. Mean delay on diagnosis in years were: CBD=2.1; PSP=1.2, DLB=1.3 and AMS=3.3. Initial symptoms were: Stiffness and alteration of episodic memory in CBD; postural instability with falls and stiffness on PSP; complex visual hallucinations and behavioral disorder related to REM sleep on DLB; dysarthria and falls on MSA.

Conclusion & Discussion: We must suspect an atypical parkinsonism diagnosis when disease onset is between 50-60 year, starting with falls, gait disturbances, working and episodic memory impairment, stiffness and dysarthria. Marked asymmetry and cortical thickness and metabolism are the hallmark on CBD radiological findings. Humming bird and hot cross bun signs are the main characteristics found on MRI in PSP and MSA. On BLD the preserved image on MRI and the functional studies.

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Deep brain stimulation for advanced parkinson's disease multicurrent and multiload electrodes technology

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Parkinson's Disease (PD) surgery has shown efficacy to ameliorate symptoms of advanced PD. Even though, the efficacy and the side effects are directly related to the adequate target in the sub-thalamic area. Multiple loads electrode technology combined with the multi-current and directional electric field were created to improve the efficacy and tolerance of deep brain stimulation. We show in this speech our experience of PD surgery DBS type with the combined multicurrent, directional electric field technique with the multiload electrode technology. The surgical procedure, clinical results and programming procedures in friendly images and videos as well as our results will be presented.

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Is there relationship between *Toxoplasma gondii* IgG seropositivity and idiopathic parkinsonism and does it have correlation with cortisol blood level?**Ahmed Abd El Rahman Daoud, Wesam Mostafa Elgendy, Nabila Abd El Azeem Yassen, Hazem Abd El Rahman Fayed and Marwa Adel Hasby Saad**
Tanta University, Egypt

Background & Aim: Some researches have linked latent toxoplasmosis and neurological diseases, so the main interest is the probable relation between toxoplasmosis and neurological diseases such as epilepsy and parkinsonism. This study aimed to detect the incidence of *Toxoplasma gondii* infection in patients with idiopathic parkinsonism and correlate it to their blood level of cortisol.

Material & Method: This study was conducted on 30 idiopathic parkinson's patients, 30 psychiatric patients and 30 apparently healthy individuals. All subjects were given a questionnaire and anti-*Toxoplasma* IgM, anti-*Toxoplasma* IgG and cortisol level were detected by ELISA.

Result: Of the 90 cases, 41.11% and 1.11% were positive for anti-*Toxoplasma* IgM and IgG, respectively. The percentage of positive anti-*Toxoplasma* IgG cases was in healthy group (46.67%) followed by parkinsonism group (43.3%). Mean cortisol level higher in parkinson's group than other groups but still within normal levels. Contact to cats, drinking unfiltered water and consuming unwashed raw vegetables was significantly higher in *Toxoplasma* IgG seropositive parkinson's patients. Highest anti-*Toxoplasma* IgG positive cases in parkinson's group were detected in stage-3 of the disease.

Conclusion: A high *Toxoplasma* seropositivity is associated with parkinsonism. *Toxoplasma gondii* oocyst was the most probable main mode of transmission of *Toxoplasma gondii* in idiopathic Parkinson's patients. *Toxoplasma gondii* may worsen idiopathic parkinsonism. Cortisol level was higher in parkinson's patients; still it showed no significant relationship with *Toxoplasma gondii* seropositivity.

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Basal ganglionic lesions in Egyptian children: Radiological findings in correlation with etiology and clinical manifestations

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Background & Aim: In childhood, the metabolic activity of the basal ganglia is greater and they are particularly prone to injury. Damage to the basal ganglia cells may cause problems controlling speech, movement, consciousness, muscle tone, posture and cognition. Aim of the study to determine the etiology of basal ganglionic disorders in a sample of Egyptian children.

Method: A cross-sectional observational study was utilized on 34 patients attended at the Pediatric Neuro Outpatient Unit of Neurology Department at Al-Azhar University Hospitals during a period of one year from the beginning of November 2014 to the end of November 2015. A specialized pediatric neurological sheet, cognitive assessment in children using Stanford-Binet Intelligence Scale and Laboratory investigations were performed. The included patients were classified according to MRI into two groups: Ganglionic group that included patients with isolated basal ganglionic lesions (n=23) and para-ganglionic group that included patients with combined ganglionic as well as para-ganglionic lesions (n=11).

Result: The frequency of male patients was slightly higher than the female patients in both groups without significant difference: 13 (56.5%) versus 6 (43.5%) and 10 (54.5%) versus 5 (45.5%), in ganglionic and para-ganglionic groups, respectively. Acute ischemic stroke was the most frequent cause, which was found in 12 (35.3%) cases, followed by 10 (29.4%) had metabolic and infectious causes and lastly 2 (5.9%) had toxic causes. The incidence of toxic causes (CO poisoning) was significantly higher among ganglionic group compared to para-ganglionic group: 2 (8.7%) versus 0 (0.0%), respectively. According to brain MRI imaging, bilateral basal ganglion affection was the most frequent lesions among ganglionic group 16 (69.7%). While temporal affection [temporal was 2 (18.2%), temporoparietal were 2 (18.2%) and temporo-occipital was 1 (9.1%)] was the most frequent lesions among para-ganglionic group 5 (45.5%).

Conclusion: Acute ischemic stroke was the most frequent cause of basal ganglionic lesion in a sample of Egyptian children.

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Contribution of optogenetics in mitochondrial dysfunction in parkinson's disease: A new therapeutic perspective

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Parkinson's disease is a chronic, slowly progressive neurodegenerative condition. It is related to the progressive disappearance of the dopaminergic neurons of the black substance, essential to the control of the movements of the body. Although the exact cause of parkinson's disease remains unknown, evidence from neuroscientific research suggests that mutations in certain genes, including the gene for parkin and the *PINK1* gene, play an important role in the evolution of parkinson's disease. These genes help preserve the activity they exert on the mitochondria, cellular structures responsible to produce energy. Indeed, mitochondria, power plants must eliminate their protein waste damaged by oxidation. Thus, this mitochondrial process is coded by these two genes whose products are proteins called cargo because they are responsible for transporting this waste to the outside of the mitochondria. If this cleaning process is not performed properly, the mitochondrion self-ligates and the damage to the cell is considerable. And we know that when nerve cells are hungry for energy, we can easily consider the consequences. As a result, a mutation in these genes causes the degeneration of dopaminergic neurons, which predisposes to the onset of parkinson's disease. Today, we are not unaware that taking oral pharmacological treatment for parkinson's disease causes, after a few years, side effects sometimes very disabling. These adverse effects are related to intermittent intake of L-DOPA. Therefore, finding a solution to this process of neuronal death is one of the main unanswered questions in parkinson's research: Optogenetics is a technique of genetically modifying cells to make them reactive. Light, represents one of the emerging and promising strategies that has evolved over the last decade offering a new field of research to expand the therapeutic arsenal of parkinson's disease. In the native state, parkin is tightly folded back on itself, making it inactive. It cannot fulfill her role. To be active, it must undergo a conformational change. The goal of this work is to use optogenetics to activate parkin and thus prevent the death process of dopaminergic neurons in parkinson's disease.

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Effective diagnostic and treatment methods in vascular parkinsonism and parkinson's disease: Temporhythmical correction**Dilshoda Akramova, Rakhimbaeva G S, Azizova R B**
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Background: It is known that, in vascular parkinsonism and parkinson's disease it is observed shortening of steps, bradi, oligokinesia and tremor disturb such kind of patients. Despite, there have been developed several methods to differentiation, diagnostics and effective treatment maintaining to be one of the most important topics of the nowadays.

Method: For early and effective differential diagnostics, also to properly treat of tremor and short steps in vascular parkinsonism and parkinson's disease, temporhythmical correction was used. 80 patients have participated in our research and the mean age of them was 62.3 ± 4.7 years. All patients were divided into 4 groups. Group-1 of patients who have vascular parkinsonism and they have received both medicamentous treatment and temporhythmical correction. In the group-2 were patients with parkinson's disease, they have also received both medicamentous treatment and temporhythmical correction. Group-3 was a group of patients with vascular parkinsonism, they have received only medicamentous treatment. Group-4 of patients with parkinson's disease, they have received only medicamentous treatment. First, there is measured height, weight and body mass index. Calculated and scheduled common length of steps, number of steps passed in 500 m and sum of spent kcal. Patients were observed for 10 days was selected quiet music and have measured number of steps and length of passed distance for 3 times during the 10 days. Patients walked in the morning under quiet music, on the midday under quickened and on the evening under fast rhythm music.

Result: The results were recorded while there were walking. All patients were evaluated by the Parkinson's Disease Questionnaire (PDQ-39) scale. According to the results of our 10-day observations; in group-1, the maximal positive result according to PDQ-39 was on vital activity and was 2.87 ± 1.36 . Patients said that they had felt easiness while dressing, bathing, eating and serving to themselves. In normal people the average length of step is 40% of the height, in the first days of tempo-rhythmical correction in all patients this index was 25 or 28% and 30 or 32% on the last day of correction. In patients of group-2 according to PDQ-39 the maximal positive outcome was on vital activity and is 2.23 ± 1.16 . Patients of this group said that they felt more easiness on dressing and eating. The average length of steps in patients with parkinson's disease was 21 or 23% on the first day of the temporhythmical correction, and 22.24% in the last days of the temporhythmical correction. Groups 3 and 4 received only medicamentous therapy, and correction was not conducted in group patients. The PDQ-39 consisted in group-3: 1.9 ± 2.16 and group-4: 2.03 ± 1.37 .

Conclusion: In conclusion, we can say that temporhythmical correction is method of treatment and rehabilitation, which is effective in each type of vascular parkinsonism and parkinson's disease also in economical aspect that patient can use both in the hospital and in the home. The average length of steps in parkinson's disease is shorter than in the vascular parkinsonism. Temporal correction is an effective and cost-effective method of differential diagnosis of vascular parkinsonism and parkinson's disease.

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Electropuncture diagnostics as a method of non-invasive diagnosis of diseases of the nervous system

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Analytical synthetic activity is featured not only of the central nervous system, but also of the peripheral nervous system and even to individual cells in a primitive form. Therefore, in the corresponding exteroceptive devices of the skin, direct and reverse transmission of efferent impulses occurs, as a result which the optimal interrelation of the organism with the external environment is established. It was established by electrophysiological methods, that in response to the disease, the skin reacts by changing all its electrical features. It is also confirmed the value of the study of the electrical features of the skin to characterizing the condition of the organism on which electropuncture diagnostics method (The method of Nakatani) based on. This method allows to determine the functional condition of the body according to the characteristics of 24 biologically active points located on the hands and feet on both sides. Electropuncture diagnostics Method by Nakatani is a method is characterized by non-invasiveness, accessibility and great informativeness. We examined 124 children with functional diseases (neuroses, MMD, VSD, migraines, etc.) and 40 children with organic CNS lesions/leptomeningitis, post-traumatic encephalopathy, epilepsy, etc.) and 30 healthy children (control group). The results of investigation showed that the average electrical conductivity in healthy children is 64.1 ± 1.52 , while in both groups of patients there's a significant increase to 79.0 ± 2.3 (P 0.005). There was an increase in electrical conductivity in the meridians of the liver, gall bladder, triple heater, thick and small intestine in functional damages, whereas in organic damages was an increase in electrostatic tension in the pericardial meridian with an asymmetry of indicators on the right and left sides of the trunk, more expressed on the right. Thus, one can consider the functional state of the organism by changing the bioenergetic features of the human body, differentiate functional and organic damages and the method of diagnostics can complete the existing various damages of the nervous system.

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Detection of parkinson's disease in *Homo sapiens* using supervised approach

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Cognitive impairment is an early stage symptom of premature onset dementia. About 20-50% of neurodegenerative Parkinson's Disorder (PD) occur due to non-motor cognitive abilities like memory power. Modern brain imaging techniques such as Magnetic Resonance Imaging (MRI), Positron Emission Tomography (PET), Single-Photon Emission Computed Tomography (SPECT) and so on, have been used for early attack diagnosis of PD with a wide stretch. Existing works made a manual discrimination of control from PD affected. In this paper, we propose supervised approach based automated PD labelling system, which effectively identifies parkinson's disease in *Homo sapiens*. We used Parkinson's Progression Marker Initiative (PPMI) dataset and considered OSTU algorithm for segmenting the affected super colliculus region of brain. In this work, we compared various spatial texture feature extraction techniques such as Gabor Filter (GF), Fast Fourier Transform (FFT), Fused GF-FFT, two level FFT-GF and two-level GF-FFT on the segmented region of both affected and not affected brain images. A supervised approach is used to classify as parkinson's disease affected or not affected based on their features of segmented region. Finally, the recital of the proposed system is estimated based on its recognition accuracy, which attained the maximum of 85% when we use two level GF-FFT feature extraction for the detection of parkinson disease affected person.

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