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ACCEPTED ABSTRACT

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USER NEEDS ANALYSIS OF CUSTOMIZABLE ROBOTIC EXOSKELETON FOR POST-STROKE PATIENTS

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Background: Flexor hypertonia, one of the most common symptoms in stroke affects flexors and indirectly affects the antagonists- the extensors, which plays an important role in ADL; e.g. wrist extension and fingers grasped, eating, bathing, holding a door-knob or glass of water etc. Commercially available devices focus on shoulder-elbow movements instead of distal-joints, which contribute a lot to ADL. Robotic-exercise therapy offers potential for recovery but are inherently large and demand a semi-permanent or permanent set-up with trained staffs for handling it and are highly expensive, are accessible to less patients and compel for everyday hospital visits.

Material & Methods: We have designed low-cost, portable, 3D printed, brain computer interface hand exoskeleton for upper limb rehabilitation of stroke patients at the Indian Institute of Technology (IIT) Delhi. It focuses on flexion and extension of wrist and fingers in functional pattern to improve Activities of Daily Living (ADL) and reduce spasticity. It is user friendly, patient-specific, muscle-activity controlled. CAD-model of linkages were printed using fused deposition modeling. The embedded-system and control-mechanism allow device to be active-assist with adaptive visual performance-feedback. The Institutional Review Board (IEC/NP-99/13.03.2015) approved the study.

Results: Two hours of testing with robotic device was done on each patient for taking subjective questionnaire feedback and System Usability Scale (SUS) from six patients with chronic-stroke to assess usability. Average SUS score of 81 indicates high acceptance across patients. It allows easy don and doff individually by the patient with time as minimum as 48 and 23 seconds respectively. Device is low cost, lightweight and portable.

Conclusion: It might help faster recovery and prove to be home based rehabilitation device.

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PPARB/Δ ANTAGONISM RESCUES DOPAMINERGIC NEURONS IN AN IN VITRO PARKINSON'S DISEASE MODEL

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Parkinson's disease (PD) is one of the most common neurologic disorder. Motor dysfunctions are assigned as primary symptoms of PD, being all related to events starting on one side of the body. Despite a relevant number of studies, the mechanisms responsible for neurodegeneration in PD are still unknown, but oxidative stress, excitotoxicity and neuroinflammation are believed to play key roles in neuronal death. The pathogenesis of neurodegenerative diseases such as alzheimer's disease (AD) and PD has also been described as reduced neurotrophic support. There has been considerable interest in studying the involvement of neurotrophic factors, that are substances known to be crucial for the survival of specific neurochemical-phenotype classes of neuron. We have previously reported that the peroxisomal proliferator activated receptor β/δ (PPARβ/δ) is involved in the decrease of the TrkBFl in neurodegeneration. PPARs are a class of transcription factors involved in the control of several pathways both in physiological and in pathological conditions including neurodegeneration. A detrimental role for PPARβ/δ has been proposed in AD, being closely related to the decrease of BDNF and TrkBfl. On these bases, in the present work the signal transduction pathways activated in PD were dissected in two 6-OHDA in vitro models of PD (differentiated SH-SY5Y and LUHMES cells) treated with a PPARβ/δ specific antagonist. The 6-OHDA treatments determined a significant increase of neuronal death, while the presence of the antagonist rescued cell viability, thus indicating that blocking PPARβ/δ, neuronal survival pathways, such as BDNF/TrkB, p-CREB, ERK5 were restored to control conditions.

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ASSOCIATION OF OXYTOCIN RECEPTOR (OXTR) GENE POLYMORPHISMS WITH AUTISM SPECTRUM DISORDER (ASD): A CASE-CONTROL STUDY WITH CLINICAL PROFILING

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Autism spectrum disorder (ASD) is a group of sex biased neurodevelopmental disorders characterized by core deficits in social behavior, communication and behavioral flexibility. Several lines of evidence indicate that oxytocin signaling through its receptor (OXTR), is essential in a wide range of social behaviors. Variable clinical profile of ASD with unique presentation of symptoms was found in our study. 92.23% of the ASD patients (n=103), than the control groups (n=30) were found to have significant ($p<0.0001$) social interaction difficulties. Along with that common developmental concerns significantly associated with language impairments ($p<0.001$), behavioral abnormalities like hypo or hyperactivity ($p<0.003$), repetitive behavior, resistance to change ($p<0.001$), self-hurting activities ($p<0.0001$). Co-morbidities as depression ($p<0.01$), dyslexia ($p<0.0001$), intellectual disability ($p<0.001$), sleep disturbance ($p<0.001$) are found to be significantly associated with ASD, which is co-related with anxiety and behavioral problems. Early recognition of symptoms and the risk factors would help in appropriate therapeutic intervention resulting in favorable outcome. In attempts to determine whether genetic variations in the oxytocin signaling system contribute to ASD susceptibility, we have investigated the role of OXTR variants in ASD development in our Bengali of Bangladesh (BEB) population of Chittagong region by analyzing four OXTR variants (rs53576, rs2254298, rs2228485, rs237911) through PCR-RFLP method based on case-control study (37 cases, 15 controls). A significant ($p<0.05$) frequency for OXTR rs53576 AA risk allele was found to be associated with ASD compare to controls which is consistent with the previous study in Chinese but Caucasian and Japanese population. No significant association has been found for OXTR variants (rs2254298, rs2228485, rs237911) in this study. These findings suggested to further investigate in a larger sample size on OXTR rs53576 polymorphism towards ASD in overall BEB population as well as ethnic group to open new avenue for clinical marker development for ASD diagnosis and treatment.

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EFFICACY OF GABAPENTIN GEL PHONOPHORESIS ON POST BURN SCAR NEUROPATHIC PAIN: SINGLE BLIND RANDOMIZED CONTROLLED TRIAL

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Purpose: To investigate efficacy of gabapentin phonophoresis for neuropathic pain management in postburn scar.

Methods: 50 patients with postburn scar neuropathic pain of both gender were randomly collected then allocated into two equal groups, Group A (gabapentin phonphoresis) and Group B (gabapentin gel). Group (A): received gabapentin phonphoresis day after day for 4 weeks using continuous ultrasound (1 MHz, 1.5 W/cm2, for 5 minutes). Group (B): received topical 6% w/w gabapentin gel three times per day for 4 weeks on the affected site. The methods of assessment included visual analogue scale (VAS) and Neuropathic Pain Scale (NPS). All measurements were collected before the beginning of the study and after the end of the treatment (after one month).

Results: There was no significant difference between both groups in VAS ($p=0.432$) and NPS ($p=0.460$) pre-treatment. Comparison between groups post treatment revealed a significant decrease in VAS and NPS of group A compared with that of group B ($p \leq 0.05$). The percent of decrease in VAS of group A and B was 51.32% and 43.03% respectively while the percent of decrease in NPS was 50.79% and 45.05% respectively.

Conclusion: It was concluded that conduction of gabapentin gel topically or by using phonophoresis is safe and effective method for neuropathic pain management and can alleviate pain intensity; however phonophoresis achieved better results and was superior to topical gel application.

Keywords: Gabapentin Phonphoresis, Visual Analogue Scale (VAS) and Neuropathic Pain Scale (NPS).

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THE ROLE OF TEMPORAL LOBE ATROPHY IN PRE- SENILE DEMENTIA

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Background and objective: Dementia is a collection of signs and symptoms such as memory impairment, difficulties of communication and planning, changes in mood and behaviour, and the gradual loss of control of physical functions due to damage of the brain. It is of greater prevalence in older subjects, but many cases can begin in an early age, affecting people in a productive phase of their lives. The aim of this study to investigate the association of the temporal lobe atrophy in causing early onset dementia in Sudanese patients

Material & Methods: Magnetic resonance imaging (MRI) method was used to detect atrophy of temporal structures in thirty two patients diagnosed with dementia and Image-Pro Plus 6.0 to measures the volume. Age of patients range between 52 to 65 years, and compared with 32 healthy control subjects of the same age.

Results: A total of thirty tow files of subjects diagnosed with presenile dementia were examined, 21(65.6%) of them were males and 11(34.4%) were females. the mean age of study subject was 60.15 year. A positive family history was reported in tow patients (6.3%).

The imaging confirmed the expected temporal lobe atrophy in pre- senile dementia relative to controls, In 12 patients (38%), MRI show bilateral atrophy of the hippocampi. The volume of the hippocampus on the right side of the patients was range between 9.39 – 10.23 cc while on the left side of the patients the volume range 8.94 - 9 cc compare to the controls that recorded 13.55-15.36cc and 12- 15.20 cc on the right and left side respectively . Eight patients (25 %) had atrophy on medial temporal lobe include amygdala, insula, and orbitofrontal cortex and two (6 %) patients being parieto temporal atrophy. In addition to that, MRI showing atrophy in the anterior part of left temporal lobe in the seven patients (22%).The volume of the left temporal lobe of the patients was 26.7- 28 compare to the controls that range 39.83- 40cc. Other three (9.3%) showed bifrontal and the temporal lobes atrophy the volume of the frontotemporal lobes were 47.81-47.90cc and 46.65-47cc on the right and left side of the patients respectively compare to the control that measures 98.92 - 97.8cc on the right and left side respectively.

Conclusions: We conducted that hippocampal; amygdala, temporal pole, fusiform and infero lateral temporal gyri atrophy are seen in patients with pre- senile dementia. These findings have a role for diagnosis and understanding of the pre- senile dementia.

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