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Mario Forcione et al., J Pediatr Neurol Med 2018, Volume 3
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Functional near-infrared spectroscopy on acute sport-related concussion: Can a brain activation pattern be used as a biomarker of concussion?

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Statement of the Problem: Currently, the diagnosis and follow-up of acute Sport-Related Concussion (SRC) is based mainly on symptom score. This may lead to underreported or underestimated episodes of concussion among contact-sport players or pre-emptive return to play. Studies using task-related functional Magnetic Resonance Imaging (fMRI) reported abnormal brain activation patterns during neurocognitive tasks in SRC. This can be used as an objective parameter to assess players with suspected concussion and to track their recovery. However, the results are not consistent between fMRI studies. Functional Near-Infrared Spectroscopy (fNIRS) can be a valid alternative to assess the cerebral activation in concussed patients illuminating their brain with NIR light. No study has been conducted on SRC within 72 hours of injury using fNIRS. The objective of this study is to identify a pathological brain activation pattern that can be used as a biomarker for concussion using fNIRS.

Methodology & Theoretical Orientation: An observational study on concussed athletes within 72 hours from injury and non-concussed athletes is conducted using fNIRS. Results are compared with clinical assessment, validated neurocognitive tests (e.g. WAIS-IV) and neuroimaging techniques (e.g. Magnetic Resonance Spectroscopy).

Finding: Preliminary results show the capacity to detect brain activations using fNIRS. Further measurements are needed to detect a constant activation pattern in SRC and establish its relationship with neurocognitive tasks and imaging techniques.

Conclusion & Significance: fNIRS is a valid tool to detect brain activation. Further measurements are needed to define the type of fNIRS signal that can be used as a biomarker of SRC.

Biography

Mario Forcione is a Medical Graduate in La Sapienza, University of Rome in 2015. Currently, he is a PhD student of the University of Birmingham and is working in the project "Brain Injury and Trauma Monitoring Using Advanced Photonics".

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Joshua Deepak Veesa et al., J Pediatr Neurol Med 2018, Volume 3
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Continuous wave near-infrared spectroscopy in monitoring cerebral haemodynamics

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Near-Infrared (NIR) light can propagate deep with biological tissue as compared to other wavelengths of light due to low absorption of tissue at 650-100 nm. It is now commonly used for non-invasive monitoring of brain health, specifically looking at functional response by observing cerebral hemodynamics i.e. the changes in hemoglobin concentrations and level of tissue oxygenation which is defined as the ratio of oxygenated to total hemoglobin. NIR is transmitted through the tissue and the measured transmitted/reflected light depends on the optical properties of the tissue i.e. the spectrally varying absorption and scattering. A spectroscopic analysis of its absorption related properties can then retrieve the concentrations of the light absorbing tissue constituents such as oxygenated and deoxygenated hemoglobin. Among different available NIR Spectroscopy (NIRS) instrumentations, continuous wave NIRS which measure only the attenuation of light intensity is the most widely used due to its low cost, high signal quality and robustness. However, the existing methods utilized for CW NIRS based hemodynamics parameter recovery is based on several factors with the most prominent being the often inaccurate assumption of the underlying scattering properties of tissue (how far the light has travelled, the so-called path-length). This assumption is known and shown to lead to uncertainty in the recovered hemoglobin concentration levels and tissue oxygenation, as the scattering properties show a significant inter-subject variability. Here, we present a new modified method that uses the spatially resolved measurement of measured data at multiple wavelengths, to recover not only the normalized hemoglobin concentrations and absolute tissue oxygenation, but also the often-ignored scattering related parameters. This method is shown to overcome many limitations of the parameter recovery algorithms incorporated into commercial systems and will be demonstrated to be a much more reliable and accurate methodology for absolute parameter recovery, using only 3 CW NIR wavelengths.

Biography

Joshua Deepak Veesa has his expertise in theoretical and computational optics, developing models and algorithms to understand the tissue optical properties by studying the propagation of light in the tissue.

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Distinct mechanisms of perceptual reactivation: An fMRI study using mental imagery of speech

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Sensory cortices can be activated without any external stimuli. Yet, it is still unclear how this perceptual reactivation occurs, and which neural structures mediate this reconstruction process. In this study, we employed fMRI with mental imagery paradigms to investigate the neural networks involved in perceptual reactivation. Participants performed two speech imagery tasks: Articulation Imagery (AI) and Hearing Imagery (HI). We found that AI induced greater activity in frontal-parietal sensorimotor systems, including sensorimotor cortex, subcentral (BA 43), middle frontal cortex (BA 46) and Parietal Operculum (PO), whereas HI showed stronger activation in regions that have been implicated in memory retrieval: Middle frontal (BA 8), inferior parietal cortex and intraparietal sulcus. Moreover, posterior Superior Temporal Sulcus (pSTS) and anterior Superior Temporal Gyrus (aSTG) was activated more in AI compared with HI, suggesting that covert motor processes induced stronger perceptual reactivation in the auditory cortices. These results suggest that motor-to-perceptual transformation and memory retrieval act as two complementary mechanisms to internally reconstruct corresponding perceptual outcomes. These two mechanisms can serve as a neurocomputational foundation for predicting perceptual changes, either via a previously learned relationship between actions and their perceptual consequences or via stored perceptual experiences of stimulus and episodic or contextual regularity.

Biography

Xing Tian is an Assistant Professor of Neural and Cognitive Sciences at NYU Shanghai. Using electrophysiological (MEG/EEG), neuroimaging (fMRI) techniques and behavioral, computational approaches, he investigates sensorimotor integration and transformation, speech and language, memory, mental imagery and other human higher-level cognitive functions. He has published 22 peer-reviewed journal papers, such as in *Nature Human Behavior, Nature Neuroscience, Psychological Science, PLOS Biology, Current Biology, Journal of Cognitive Neuroscience, Cortex, Cognitive Psychology and Brain Topography.*

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Differences between cumulative effects of first and second generation antipsychotics on the cortical thickness: Mega-analysis of 214 patients with schizophrenia from São Paulo, Brazil

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Schizophrenia is a severe mental disorder that impact individual social functioning and defy recent developments and treatment strategies. One fundamental problem to face schizophrenia is to balance the benefits and side effects of Antipsychotics (AP), including their effects on the cerebral cortex. Generally, morphometric studies on schizophrenia suffer from limited sample size. Consequently, they are unable to distinguish many confounding effects of illness-related factors from AP effects. Multi-centric transversal studies are reliable alternatives to evade these limitations. The present study is a conjunction analysis of two studies conducted in the State of São Paulo (5 samples) using data from 214 patients with schizophrenia by DSM-IV. Image quality control and analysis was conducted following ENIGMA consortium standards for surface measures. Brain thickness was taken as response variable, AP class was taken as fixed factor, life cumulative doses of AP and other variables as explain variables. Positive correlations with brain thickness were found bilaterally on the insula and left cingulate ($p<0.001$, corrected), among other regions. Smaller mean thickness for first generation AP were found on the right pre-central, fusiform supramarginal girii, left cingulate and insula ($p<0.001$, corrected). Smaller mean thickness for cumulative doses of first AP relative to the second generation were found, predominantly, on the lateral surfaces of both hemispheres. These findings were located in the right precentral, supramarginal, rostral middle frontal, post-central, supramarginal, fusiform and inferior temporal girii, as well as, in the left lateral occipital, superior temporal, inferior parietal, superior parietal, fusiform, supramarginal, caudal middle frontal, pars opercularis and precentral gyrii ($p<0.001$, GLM, corrected by Monte Carlo simulations). Other tested correlations/covariations did not survive the correction for multiple comparisons. The findings obtained expand previous results obtained for volumetry and introduce novel findings of protective effects of second generation in the treatment of schizophrenia compared to first generation AP.

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Separation of carpal tunnel syndrome associated with axonal degeneration using via ratio of carpal tunnel outlet readings by ultrasound

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Nerve Conduction Studies (NCS) and Ultra Sonography (US) have been cross-validated for diagnostic confirmation and gradation of severity of the Carpal Tunnel Syndrome (CTS), a median nerve compression injury at the wrist. However, NCS cannot differentiate the CTS with demyelination alone from the disease with secondary axonal degeneration. Yet it is unknown if Ultrasound (US) can compensate this deficit. This study aimed at exploring US to differentiate CTS with demyelination only from that in association with axonal degeneration. We studied 39 demyelinated CTS hands and 154 demyelinated CTS hands with axonal degeneration in sensory median nerves by comparing Cross-Sectional Area (CSA-W) and Perimeter (P-W) of median nerve at wrist, ratio of CSA (R-CSA) and P(R-P) of wrist over mid-forearm measured by US. Results revealed significant differences in R-CSA (p=0.013) and R-P (p=0.05) while descriptive differences in CSA-W and P-W. ROC curves indicated significant accuracy of R-CSA (Area=0.62, p=0.015) and R-P (Area=0.615, p=0.02). The cut-off value of R-CSA to indicate CTS associated with axonal degeneration is 1.8 with sensitivity of 71% and specificity of 45% while 1.5 for R-P with sensitivity of 70% and specificity of 43%. Our findings were consistent with previous relevant studies and the result would be more robust should more cases be enrolled. We conclude that US may be potentially used to differentiate demyelinated CTS from that with axonal degeneration in clinical practice. This finding can improve diagnostic efficiency in clinical practice and help patients to choose appropriate treatment.

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Cerebral angiitis following pipeline embolization device placement

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Pipeline™ Embolization Device (PED) is a flow-diverter stent used for the treatment of cerebral arterial aneurysms. It is braided mesh cylinder comprising platinum and nickel-cobalt chromium alloy microfilaments. The PED carries a safety profile comparable to other cerebral stents and coil embolization devices. We report a case of localized cerebral angiitis (or arterial vasculitis) following treatment of a right-sided intracranial Internal Carotid Artery (ICA) aneurysm. The patient presented with new onset of unilateral headache one week after treatment. A Magnetic Resonance Imaging (MRI) of the brain showed signal abnormalities, vessel wall enhancement and irregular luminal stenosis just distal to the site of the PED. The possible aetiology may be a localized hypersensitivity vasculitis secondary to component metals such as cobalt, chromium and nickel. This hypothesis was supported by a reported history of skin reactions to ear rings (nickel alloys being one of the common components), which further substantiated the suspected aetiology. This case suggests that PED use may be complicated by hypersensitivity-related vasculitis, the incidence of which is not known and assumed to be rare. However, if it does occur, the outcome can be devastating. Special care should be taken in patients who have a history of possible metal allergies. Pre-procedural allergy testing may be considered in select cases.

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Hyperglycemia induced hemichorea-hemiballismus in a 71-year old female presenting with involuntary unilateral movements: A case report

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Hemichorea-hemiballismus is a rare presentation of non-ketotic hyperglycemia, usually involving elderly females. A 71-year old female with poorly controlled diabetes, presented with a one-month history of involuntary unilateral movement beginning with the left arm spreading to the ipsilateral lower extremity. Computed Tomography (CT) imaging of the brain revealed non-specific hyper density in the right basal ganglia. Further work-up with the use of Magnetic Resonance Imaging (MRI) was done showing abnormal signals in the right basal ganglia. In this case, we note the significance of detecting rare findings in diabetic patients through different imaging modalities such as CT and MRI, as differentiated from other more common pathologies causing neurologic symptoms. Prompt diagnosis would alert the clinician to the cause of the movement disorder. Correcting the hyperglycemia reverses this condition.

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Rare metastatic behavior of biphasic pleural mesothelioma

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A Caucasian gentleman (known asbestos exposure with related pleural changes managed by watchful wait since 2010) was admitted with a 12-week history of reduced sensation in his left leg, back pain, reduced sensation opening his bowels and some difficulty walking reduced proprioception in his leg. This case highlights the variability of clinical presentation given metastatic pleural mesothelioma. Mesothelioma is an uncommon tumor of pleural mesothelioma with a prediction for local invasion. CNS metastasis is rare, particularly intramedullary compression of spinal cord has been seen but remains a rare occurrence and has only been reported merely 8 times. It offers an insight to clinicians to be aware of malignant metastatic mesothelioma as a differential diagnosis is primary cord lesion by taking the relevant clinical history into account. CT chest, abdomen and pelvis with IV contrast performed in June 2016 showed significant size increase of the right pleural disease with disease tapering into the T2/T3 left lateral foramen, which appears obliterated by enhancing mass and loss of the cortical line in the anterior wall of the bony foramen (all this was normal on the previous CT chest, abdomen and pelvis with IV contrast in 2015. There is also new disease on the right chest lower zone affecting the medial and dorsal pleura over the medial and dorsal right lung lower lobe segments. MRI whole spine on the same day of admission showed 23 mm long intramedullary metastasis at T2/T3 level with extensive adjacent cord edema from Upper C6 till T6 and further bony deposit of T8. Biopsy taken under ultrasound from pleural mass tapering into left T3/T4 lateral foramen showed fragments of thickened fibrotic pleura with a biphasic tumor composed of epithelioid and spindle cells. Immunostaining confirmed a biphasic malignant mesothelioma with the tumor cells positive for MNF116 and EMA with focal positivity for CK 5/6 and few cells positive for WT -1, the latter two being mesothelial markers. The tumor was negative for p63, calretinin, desmin, CD34 and TTF-1. Mib-1 showed a proliferative index of about 30%.

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Paroxysmal kinesigenic dyskinesia with genetic diagnosis of Wilson's disease

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Paroxysmal Kinesigenic Dyskinesia (PKD), a rare paroxysmal movement disorder often misdiagnosed as epilepsy, is characterized by recurrent, brief dyskinesia attacks from seconds to 5 minutes triggered by sudden voluntary movement like dystonia, tremor, myoclonic jerks. Ion channelopathy has been suggested, since the disease responds well to moderate dosage of like Carbamazepine/Oxcarbamazepine. Secondary causes of PKD which may well be associated with Wilson's disease and other concurrent movement disorders should be sorted out if no evidence of ion channelopathy or genetic mutation is present. A 22 year male patient presented to our OPD with voluntary movement of right hand with minimal dystonia present in resting as well as moving state. The patient was diagnosed initially with PKD because it lasted for few seconds to 2 minutes. Routine labs were performed including blood ceruloplasmin, urine and serum copper which was consistent with diagnosis of Wilson Disease (WD). The ATP 7B gene mutation was positive and Wilson disease diagnosis was confirmed without any other phenotypic feature except dyskinesia/dystonia of right hand. Patient was started on traditional dosage of D-Penicillamine and being continued long term. In view of PKD we gave 50 mg bid dose of Carbamazepine which was later increased to 100 mg bid with complete resolution of symptoms. PKD might be secondary to WD in our case or some unknown ion channelopathy might be present which is not yet reported till date. Response to CMZ and Penicillamine was very obvious. Myoclonus can be easily confused with myoclonic epilepsy and use of anti-epileptic drug may be inappropriate in this setting. So careful monitoring of symptoms as well as associations with other diseases should be considered while evaluating this type of rare treatable cases. Inappropriate treatment can easily exacerbate the symptoms and can degrade the quality of life and living in young patients.

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Many faces of *DCTN1* (Dynactin) gene mutation in neurodegenerative diseases

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Axonal transport machinery is central to neuronal health and survival, with dysfunction implicated in several neurodegenerative disorders including AD, FTLD, MND/ALS and PD and PD plus syndromes, HMN 7B and Perry Syndrome all associated with dynactin pathology. A 45 year old working lady presented to us with bradykinesia for six months, accompanied with difficulty in walking for four months. Six months ago, the patient started feeling clumsy while doing house hold work and her movements became slower as time passed by. Four months ago, she started to have difficulty in walking which gradually aggravated. Since onset, she was depressed and experienced sleep related behavioral issues but never lost weight. Her mother had similar symptoms but was on antiparkinsonian drugs. P/E increased muscle tone in all 4 limbs, right>left with reduced right arm swing, with masked type facies. In view of positive family history, Parkinsonism symptoms, depression/apathy patient was diagnosed with definite PS (Perry syndrome) supported by international diagnostic criteria. To confirm PSG showed airflow restriction and hypoventilation using apnea hypopnea index with no respiratory acidosis in ABG. Genetic test was performed which confirmed novel point DCTN1 gene mutation. Patient was started on antiparkinsonian agents, antidepressants and Clonazepam and her symptoms got somewhat better. We have diagnosed the first Asian case of a PS with a novel point mutation p.G67S of DCTN1 gene in exon 2 not reported in literature yet. Our observation suggests that patients/family members may not present with all the cardinal features of PS but still it has to be ruled out with gene testing mainly because of two reasons: (1) An early timed diagnosis will lead to early symptomatic treatment which can significantly modify the progression of disease, and (2) Improve quality of life by use of diaphragmatic pacing and can prevent life-threatening episodes of acute respiratory failure and eventually death.

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Parkinsonism and cerebellar ataxia and colon adenocarcinoma in anti-Ma2-associated atypical encephalitis

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Anti-Ma2 antibody-associated encephalitis, which usually occurs in young men with germ cell tumors of the testis with features of encephalitis, it can also present in elderly females with basal ganglia disorder features like Parkinsonism and cerebellar ataxia in absence of limbic or brainstem or diencephalic encephalitis. Patients may not present with any form or symptoms of encephalitis but the treatment response rate with steroids, IVIG, plasmapharesis to control the initial symptoms is very high and after resection of the tumor all the symptoms can be totally cured. So, even there is no evidence of tumor on basic contrast CT/MRI scans, other special imaging like FDG-PET or highly advanced tumor searching imaging plus serum tumor markers of different tumors should be considered as the tumor spectrum associated with anti-Ma 2 antibody encephalitis is huge and resection of the tumor can totally cure the patient. A 68-year-old female presented to our department with resting tremor of right hand for 2 years. After 6 months, resting tremor gradually involved her right leg. Antiparkinsonian drugs were initiated but her symptoms worsened gradually. Since last 3 months, she developed features of imbalance with occasional falls and a weight loss of 10 kg. Neurological examination showed features of Parkinsonism. Brisk DTR right side more than left with abnormal cerebellar signs CE MRI mild atrophy of cerebellum. Anti-Ma2 antibodies in serum and CSF positive, serum cancer antigen 72-4 were elevated. A sigmoid colon mass was discovered by colonofiberoscopy and adenocarcinoma was diagnosed via tissue biopsy. Steroids, IVIG and resection of the tumor completely cured the disease. Parkinsonism or cerebellar ataxia as main component of anti-Ma2-associated encephalitis was rarely reported. Colon adenocarcinoma was rarely reported in this disease. Response rate to treatment was relatively very high.

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Assessment for brain damage of carbon monoxide poisoning at different clinical stages with diffusion kurtosis imaging

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Aim is to investige the value of DKI on the damage of brain at different clinical stages after CO poisoning. 79 MRI scans were performed in 58 patients with CO intoxication and 21 controls. The patients were further classified into three groups: Acute group, Delayed Neuropsychiatric Sequelae(DNS) group and chronic group. The DKI parameter values of the four regions of interest were compared among the four groups. In the globus pallidus, MK was 1.51±0.15, 1.07±0.11 and 0.59±0.11 in the acute phase, DNS phase and chronic phase, respectively, and it was significantly higher in the acute phase than in the control group (1.06±0.06, $P<0.05$), significantly lower in chronic phase than DNS phase and control group ($P<0.05$). For the semi-oval center and the corpus callosum, the MK were increased progressively in acute and DNS phase, especially in DNS phase ($P<0.05$). It was not significantly reduced until chronic phase. DKI can quantitatively evaluate the changes of brain gray matter microarchitecture after CO poisoning, which is helpful to understand the characteristics of brain injury of CO poisoning in different clinical stages from the microscopic level.

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Multiple intracranial opportunistic infections in patient with Acquired Immunodeficiency Syndrome (AIDS): Case report and literature review

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Background: Intracranial opportunistic infections which can occur alone or in combination with several others in individuals with HIV infection. As for the diagnosis, the value of laboratory examinations and biopsies is likely limited because of low sensitivity and the risk of complications. Neuroimaging, especially MRI, has evolved as an effective supplementary method for diagnosis.

Case Report: A 30-year-old male patient was admitted to the Department of Gastroenterology with abdominal pain, diarrhea and palpable mass on the neck. During the workup, he was conclusively diagnosed with AIDS and lymphatic tuberculosis and he received treatment of Highly Active Antiretroviral Therapy (HAART) and anti-tuberculosis therapy. Eight weeks later, as the result of drug withdrawal, he was readmitted to the hospital and diagnosed Tuberculous Meningocephalitis Q2 (TBMC) based on the cranial Magnetic Resonance Imaging (MRI) and Cerebrospinal Fluid (CSF) examination. Anti-tuberculosis therapy was restarted again. After 5 months, there was improvement of the original lesion on imaging. However, with the weakness of right side of the body, a new infarction (in the distribution of left middle cerebral artery) appeared on the Diffusion Weighted Imaging (DWI). Meanwhile, *T. gondii* immunoglobulin (Ig) G antibodies were positive and two new ring-like enhancing masses with eccentric target signs appeared in the left parietal lobe and cerebellum, which supported the diagnosis of Toxoplasmosis Encephalopathy (TE). Therefore, treatment of toxoplasmosis was initiated immediately. Here, we report a case of multiple intracranial opportunistic infections including TBMC and TE in an AIDS patient.

Conclusion: This case alerted us to pay close attention to the multiple intracranial opportunistic infections in individual with AIDS such as bacterial, fungal, viral and parasitic infections. MR findings, combined with clinical presentation, serum and CSFIgG examination, could be helpful to the differential diagnosis.

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Neurobrucellosis

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Brucellosis is an infectious disease that is caused by the bacterium *Brucellosis melitensis* that can infect cattle and is transmitted to humans by ingestion of unpasteurized milk or cheese. Neurological complications are rare and according to reports in the literature may appear in less than 5% of cases of brucellosis. We present a case of an 11-year-old male patient who is sent to the neuro-ophthalmology clinic.

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Optic neuritis in western Nepal

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Background & Objective: Optic neuritis is a common cause of sudden visual loss. The objective was to report the clinical features, demographic pattern and response to treatment in patients with optic neuritis in western Nepal.

Materials & Method: The hospital data of patients with idiopathic optic neuritis admitted to the Department of Ophthalmology in a tertiary level center in mid-western Nepal between January 2017 to November 2017 were retrospectively analyzed. The parameters studied were demographic pattern, clinical features, visual acuity and MRI findings.

Result: 16 patients (20 eyes) were found to have optic neuritis (Papillitis in 13 and Retrobulbar optic neuritis in 7 eyes). The male to female ratio was 1:1.29. The mean age of the patients was 27.63±12.48 years (95% CI=21.88-34.00). The most common modes of presentation were loss of visual acuity and color vision defect. One patient had features suggestive of multiple sclerosis at the presentation proved by MRI. Vision improved in all eyes at discharge from the hospital. Visual outcome was rewarding to pulse steroid therapy even in eyes with no perception of light.

Conclusion: Response to pulse Methylprednisolone therapy is good in patients of optic neuritis even in late presentation. Demographic and clinical features of our patients were different from those reported from the eastern part of country.

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Relationship between temperament and binocular vision for kindergarten children

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Introduced & Purpose: Many clinical optometrists have indicated that binocular vision might be influence on children's behavior or performance, but is short of references for verifying. The purpose of this study was to investigate the relationship between temperament and binocular vision for kindergarten children.

Method: There were totally 32 healthy children age from 5 to 6 participated in the study, parents and school teachers were also included. Binocular examination included refractive errors, habitual distance and near visual acuity, dextrocularity or sinistrocularity, cover-uncover test, pupillary response, fixation, pursuit, saccades, stereoacuity, color vision, near point of accommodation and visual-motor integration (The Beery-Buktenica Developmental Test of Visual-Motor Integration, VMI). In addition, an questionnaire about children's health, nutrition, upbringing, sleep hours, leisure activities, TV and mobile or iPAD use; attaching Temperament Assessment Battery for Children (TABC) were all asked to finish by parents and school teachers before binocular examination.

Result: There were 14 boys (43.8%) and 18 girls (56.3%), participants showed lower BMI index (n=28, 87.5%), high percent of irritable physique (n=18, 56.3%) and sleep inadequate (n=23, 71.9% under 8-9 hour). Most children were the eldest child in their families (n=25, 78.1%) and 10 of them (31.3%) were singleton. Binocular examinations indicated all participants had more or less refractive errors, 40.6% (n=13) children were myopic; 37.5% (n=12) were hyperopic; 84.4% (n=27) were astigmastic and 31.3% (n=10) were anisometropia. It was astonished that 8 (Distance VA) to 10 (Near VA) children had poor visual acuity, but only one child had been prescribed corrective lenses. 59.4% children were dextrocularity (n=19) and 40.6% were sinistrocularity (n=13). Most children had normal pupillary response (n=31, 96.9%); normal color vision (n=31, 96.9%); normal pursuit (n=32, 100%); fixation (n=30, 93.8%) and scaccades (n=31, 96.9%), but showed poor stereoacuity (n=5, 15.6%) and poor accommodation (n=13, 40.6%). Moreover, cover-uncover test detected above half children were phoria (eso n=3, 9.4%; exo n=15, 46.9%). Additionally, VIF (Variance Inflation Factor) values of linear regression analysis indicated that each variable is an independent factor. Processed foods stood out as the main factor for modulating children's activity level, other positive and negative modulating factors included phoria, TV, fast food, hyperopia and fixation (adjusted X^2=0.764); the modulating factors about children's adaptability and approach included habitual eye (adjusted X^2=0.191 and 0.126) and near visual acuity (adjusted X^2=0.277); quality of mood included processed foods, habitual eye, sleep, parents' education, BMI index, mobile phone use and premature (adjusted X^2=0.895); distractibility included myopia, processed foods, phoria (exo and exo) and TV (adjusted X^2=0.827); persistence included BMI index, sleep, accommodation and carnivorous (adjusted X^2=0.487).

Conclusion: The cross-sectional pattern of molding children's temperament might be the first study in Taiwan. It is still unknown if this pattern reflects longitudinal effects, as environment is generally diversified and complex. Some of these modulators may be due to the part of the learning process that requires attention or adaptability. It should be mentioned that binocular vision, especially hyperopia and fixation, habitual eye, near visual acuity, phoria (exo and exo) and accommodation might play the leading role in children's temperament cultivation and might have influence on their learning and social skill in the future.

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The effectiveness of refractive correction for low vision patients in Taiwan

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Purpose: To investigate refractive correction (including refractive lenses and filter lenses) efficiency for patients with low vision.

Method: There were totally 220 patients from 7 to 99 years of age (51.31±19.54) who were referred from Taiwan Resource Portal of Assistive Technology, the Ministry of Health and Welfare during 2016 to 2017, patients who could not identify hand moving at 40 cm were excluded in the study. There were 119 males (54.1%) and 101 females (45.9%); 42 (19.1%) patients were identified as mild visual impaired, 76 (34.5%) were moderate and 102 (46.4%) were severe.

Result: Eye disease and examination data were listed. 90% patients showed more or less refractive errors (spherical≤-0.75D, ≥+0.75D or astigmatism over 0.50D) and about half of patients' visual acuity could be promoted by refractive correction, the best corrective VA (LogMAR value) were significant effective when comparing with un-correction (LogMAR VA mean difference=0.17±0.3, t=7.285, p=0.000); in addition, eye frame prescription was also positive correlated with light sensitivity or photophobia (Pearson X^2=4.028, p=0.045), nystagmus (Pearson X^2=8.477, p=0.004) and visual field (Pearson X^2=10.192, p=0.001). Moreover, filter lenses were also correlated with presbyopia patients (Pearson X^2=4.408, p=0.044), light sensitivity or photophobia (Pearson X^2=18.630, p=0.000) and contrast sensitivity (Pearson X^2=27.293, p=0.000).

Conclusion: Refractive correction is the first step when proceeding low vision examination, patients' VA increased about 1.48 times and might decrease near ADD from 16.7D (uncorrection LogMAR VA 1.2) to 10.0D (after correction LogMAR VA 1.0). In the meanwhile, light sensitivity or photophobia, nystagmus, contrast sensitivity and even visual field were improved. To yield twice the result with half the effort, refractive correction plays the main role before prescribing low vision aids.

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Causes of papilloedema in pediatric age group: A 8 year hospital based study in northeastern India

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Aim: The purpose is to study the various causes of papilloedema in pediatric age group.

Method: 140 cases of papilloedema from Jan 2010 to Dec 2017 were studied prospectively. Detailed history, C/F, neuroimaging mostly CT scan were done and followed up-to 3 months.

Result: Cases were divided into 3 age groups: (0-3) years, (4-12) years and (13-18) years. 46.88% cases were infection, 34.38% Space Occupying Lesion (SOL), 9.37% otogenic intracranial complication and 9.37% pseudo-tumor cerebri. Among infective groups there were 26.04% tuberculosis, 12.5% viral, 6.25% bacterial and 2.08% of fungal etiology. Among SOL there were 12.5% tumors, 6.25% intracranial haematoma, 6.25% tuberculoma and 3.18% neurocysticercosis. Earliest regression was at the end of 1 month and maximum in infective group. Important findings were: (1) Tuberculosis (meningitis and tuberculoma) due to urban overcrowding and rural poverty, (2) Middle ear infection due to the higher altitude location of the region, and (3) Neurocysticercosis due to the habit of taking smoked pork.

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Treatments for Irlen Syndrome: A case report

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Introduction & Aim: Irlen Syndrome is not an optical or visual acuity problem, but is a perceptual processing dysfunction that might lead to reading difficulties, poor handwriting, poor depth perception light sensitivity, academic underachievement or even headaches, migraines and fatigue. This case report aimed to prescribe progressive optometric treatments for a clinical case of Irlen Syndrome. Resulting improvement in reading efficiency for this instance was also presented.

Case Report: Diego, a ten-year-old student, was noticed exotropia when watching TV at five of age. However, Diego did not express any visual discomfort until he was a fourth grade as his reading requirement increased. He experienced reading difficulties and was then referred to dyslexia identification. Except refractive errors, the optometrist indicated that Diego had EOM, accommodation problem, combining with Intermittent Alt-XT at D and N; the experienced optometrist prescribed eye frame, filter, single aperture rule vision therapy and typescope or ruler for Diego. The first step was to prescribe refractive correction and prisms (OD: -1.75DS, 0.5Δ BI; OS: -2.00DS, 0.5Δ BI). The second step was to apply a filter intervention (orange) and followed with single aperture rule vision therapy for 30 minutes every day. Finally, a typescope or ruler was employed for reading. Diego mentioned that the phenomena of word floating and partial disappearance of words were ameliorated. Also, his EOM check results showed significant improvements in eye jitter and overshoot. Consequently, his attentiveness and reading efficiency increased due to alleviation of eye fatigue.

Discussion: Refractive correction and prism addition could apply better convergence and fixation. Once treated with the appropriate refractive correction, prism and Irlen filter glasses, Diego gained several positive treatment effects including enhancement in optical focus, lessening in photophobia and eye fatigue, decrease in skipping words or missing lines and improvement in reading perseverance and efficiency. These observed effects were encouraging and indicated that the treatments employed for the current case could be applicable for future large-scale clinical studies. Meanwhile, the same treatment mode as in Diego's instance is recommended for ADD or ADHD cases in improving their attentiveness and reading ability as well as moderating their dependence on medicines.

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Inhibition of mTOR pathway to prevent photoreceptor cell damage

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Introduction: mTOR is a cytoplasmic kinase that regulates cell growth and metabolism in response to mitogens [such as IGF-I and Vascular Endothelial Growth Factor (VEGF)], nutrients (amino acids, glucose and fatty acids), hormones including insulin and cytokines. This pathway is essential for development and growth of the young organism. But later in life, when growth has been completed, mTOR drives cellular and organismal aging by acquiring pro-inflammatory and signal resistant characteristics. mTOR pathway also takes part in retinal degenerative diseases.

Method: 10 patients with mid stage Retinitis Pigmentosa (RP) were treated by intravitreal Rapamycin and oral Metformin plus Resveratrol for 6 months. 10 other RP patients were given placebo. The average age of the patients was 28. After 1 year, change in visual acuity and Visual Fields (VF) was recorded.

Result: Difference in change in visual acuity did not reach a significant statistical result between the two groups whilst the visual fields were either protected or slightly improved in the treatment group. The difference in mean deviation before and after 1 year follow up between the two groups was statistically significant. (P=0.001) VF deteriorated in the placebo group but was preserved in the treatment group.

Conclusion: Inhibition of mTOR maintains cellular proteostasis and attenuates oxidative stress by reducing misfolded protein synthesis and augmenting autophagy to remove misfolded proteins caused by gene mutations. The combination of Rapamycin, Metformin and Resveratrol may help to stabilize VF loss in hereditary retinal diseases.

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