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Anna Olczak, J Neurol Disord 2018, Volume 6
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The analysis of exercises stabilize the trunk for the co-ordinated movement of the upper limb: The preliminary report

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The motoral co-ordination is the notion which evolves together with the growth of knowledge and development of science in this subject. One of the most current definitions proposed by Starosta is he talk about the motoral co-ordination as the ability of executing quick folded movements exactly and in changing conditions. The aim of the work was the analysis of the movement of the upper limb in relation to the patients stable and unstable trunk after the stroke of brain and also the valuation of practices having the aim on the stability of the trunk. Thirty two patients spending on the department of neurological rehabilitation with the recognition of the stroke at which any functional deficit stepped out in the upper limb took part in the investigation. It was 16 women and 16 men in the group. The meaning of trunk for the co-ordination of the upper limb was estimated on the device Armeo control using three games for estimating hunting perpendicular; hunting horizontal; Time of the reaction and two the authors' tests: wall and abacus. It was observed the essential (p=0.015) difference of results in the game estimating the time of the reaction executed before practices, engaging work on the stable trunk and after the period of 10 days of the therapy. Essential steps out statistically the difference of results between first and second investigation executed in the supervisory group for the author's test abacus, for the game hunting perpendicular and the time of the reaction, before and after 10 days of the standard neurological physiotherapy in the supervisory group. It was also observed statistically the essential (p=0.040) difference of results between groups in the game hunting perpendicular. Both physiotherapy with the practice of the stability of the trunk and standard physiotherapy improves the prehensile efficiency of the hand. Physiotherapy steered on the strengthener of the trunk has the influence on enlargement of the co-ordination of the upper limb in the range of movements executed in the front plane. The improvement of the co-ordination of the upper limb is the effect of standard neurological physiotherapy in the range of movements executed in the arrow and front plane.

Biography

Anna Olczak The doctor n. kf. - The expert of motive rehabilitation - the law executes occupation of the physiotherapist of no. 2139 Doctor, the field of the science: about physical culture in the range of motive rehabilitation, year of conferment 2008 r., the title of the doctor's trial: the Effectiveness of physiotherapy leaning on the elements of Metody McKenzie and PNF in the treatment of the disc disease of the lumbar section of the spine. The profile of the scientific property/professional The Military Medical institute_ Investigative Projects national: 1. No. 45/WIM/2011 the Opinion of the risk of falls at chorych with illnesses urazowo - orthopaedic and neurological. Doctor Ann Olczak, aim as in title, publications, conference reports, the monograph, (Begun - 2011 ended - 2014) 2. No. 46/WIM/2011 the Influence of systemic crymotherapy on with the illnesses of the organ of the movement chorych posturalną stability. the doctor Ann Olczak, aim as in title, publications, conference reports, the monograph, (Begun - 2011, ended- 2014). The professional experience: (beyond the university): -from 1990 to 2006 engaged in The team Care Wholesome in Gostynin- The raven, The department Rehabilitation Illnesses Organ Movement, -from the 01.01.2006 of the year engaged in The clinic Rehabilitation Military Institute of Medical Occupied Positions -from 1996 The deputy Manager Team Rehabilitation about/RSNR -from 1998 to 2006 The manager Team Rehabilitation about/RSNR from 2006 the older assistant in The clinic Rehabilitation WIM Finished courses and trainings: 17.

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Anna Olczak, J Neurol Disord 2018, Volume 6
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The meaning of central stability for the co-ordinated movement: The preliminary report

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Motoral co-ordination is the ability to execute folded movements: exactly, quickly and in changing conditions. Central stability is the notion translated from English (from ang. core stability). This notion in physiotherapy, is related to the neuromuscular control, thanks to which we can administer functional stability in the connection of the lumbar part with the cross-shaped spine the connection with pelvis and lower limbs. The aim of the work is the settlement of dependence between some parameters of the motoral co-ordination and the central stability. Thirty persons were included in the study (the degenerative changes of the spine, the disease of the intervertebral disc, the stroke of the brain), in the chronic period of the disease. Age of studied: 42-78 years old, the women and men, state of the health general good. The patients were subjected in turn to specific procedures which aim was the improvement of central stability : the exercises activate the transverse muscle of the abdomen, controlled drawing in the abdomen, work in the stabilise belt. The patients central stability was estimated during the movement of the trunk in the frontal and sagittal plane and during executed on time the march in the place with high raised but freely legs. Improvement of the central stability caused the improvement of parameters in analyses motor patterns. In the group of persons subjected stabilise exercises and the other form amplification the central stability took place essential improvement in such parameters as speed, the track of the movement in the frontal and sagittal plane and the range of the movement. The better central control influences on the improvement of co-ordination of the movements of the human body.

Biography

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Ramesh Kumar Thukral, J Neurol Disord 2018, Volume 6
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In India, misconceptions about mental illness are pervasive, and a substantial number of patients suffering from severe mental disorders seek non-professional care. 80% of the population still depends on indigenous treatments consisting of religious treatments, prayers, fasting, as also various witchcrafts and magical rituals

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In our country, the main culprit that is influencing people's attitudes toward mental illness is the stigma associated with mental disorders, which is rooted deep in the cultural beliefs and myths about mental disorders and that result in people avoiding association with individuals who suffer from these ailments. The stigmatization of individuals who are going through psychological distress creates hurdles for people from seeking mental health care; as a result, they may tend to seek help from traditional healers. Some people may visit a general physician for help because it is not as stigmatizing as it is to see mental health professionals. These individuals and their families turn to mental health services as a last resort. There have been many cases where some families have even registered patients under false names at our hospital / clinic to remain anonymous. In India, a substantial number of patients suffering from severe mental disorders seek non-professional care. A study on the treatment of psychiatric disorders in India observed that in view of the paucity of facilities, 80% of the population had to depend on indigenous treatments consisting of religious treatments consisting of prayers, fasting, and so on, as also various witchcrafts and magical rituals. The situation is more or less the same even today, and not surprisingly 68.5% of the cases in our study contacted faith healers as the primary helping agency. Although, the ancient wisdom may have some role in the treatment of mental disorders, there is a need for generating awareness in the psychiatric patients in India to get professional help. When after being tortured by the non-professional helping agencies, the patients avoid the illness and after few months, the symptoms relapse, the psychiatric treatment is then taken as a last resort when all other treatments had failed.

Biography

Ramesh Kumar Thukral, has done MBBS and MD (Psychiatry) from K.G.M.U., Lucknow, INDIA. Further, he has done D.C.M.N. from Delhi, INDIA. He has been in the Practice of Neuropsychiatry in Omnicare House, B-20, Sec-A, Mahanagar, Lucknow since last 30 years and Consultant Neuropsychiatrist in 'Sahara Hospital'. He is the CEO in "Dakshi Diagnostic Services Pvt. Limited": A centre for 3D Brain SPECT for Human Behaviour, Vital Bioenergy & Soul Imaging. He owns 16 Neuropsychiatric satellite centers and sub-centers under the banner of Lucknow Neuropsychiatric Centre. He has Approx 38 Participation in international conferences of Neuropsychiatry, and behavioral sciences, covering almost all the major countries of the world.

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Accepted Abstracts

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Where there is no brain imaging: Safety and diagnostic value of lumbar puncture in patients with neurological disorders in a rural hospital of Central Africa

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Analysis of cerebrospinal fluid (CSF) obtained by lumbar puncture (LP) is an essential step for the diagnostic approach of neurological disorders in particular neuroinfections. In low-resource settings, it is often the only available diagnostic method. Despite its key contribution, little is known on the risks and benefits of LP in the large tropical areas where hospital based neuroimaging is not available. The objectives of this study were to assess the safety and diagnostic yield of LP in a rural hospital of Central Africa and to identify predictors of CSF pleocytosis (white blood cell count >5/µL) as surrogate marker of neuro-infections. From 2012 to 2015, 351 patients admitted for neurological disorders in the rural hospital of Mosango, Kwilu province, Democratic Republic of Congo, were evaluated using a systematic clinical and laboratory workup and a standard operating procedure for LP. An LP was successfully performed in 307 patients (87.5%). Serious post LP adverse events (headache, backache or transient confusion) were observed in 23 (7.5%) of them but they were self-limiting and no death or long-term sequelae were attributable to LP. CSF pleocytosis was present in 54 participants (17.6%), almost always associated with neuro-infections. Presenting features strongly and independently associated with CSF pleocytosis were fever, altered consciousness, HIV infection and positive screening serology for human African trypanosomiasis. In conclusion, the established procedure for LP was safe in this hospital setting with no neuroimaging, and CSF analysis brought a substantial diagnostic contribution. A set of presenting features may help for accurately selecting the patients for whom LP would be most beneficial.

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A case report of idiopathic hypereosinophilic syndrome (HES) in a rheumatoid arthritis patient

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Hypereosinophilic syndrome (HES) is a disorder which is characterized by the persistence of eosinophilia that is associated with damage to multiple organs. Anderson is the first one who described peripheral eosinophilia with tissue damage in 1968. Chusid defined the three features required for diagnosis of hypereosinophilic syndrome in 1975. The features are sustained absolute eosinophil count (AEC) greater than >1500/µl which persists for longer than 6 months, No identifiable etiology for eosinophilia and Signs and symptoms of organ involvement. Secondary causes of eosinophilia became more identifiable in a proportion of cases that would have been classified as idiopathic hyper eosinophilic syndrome in the past due to advances in the diagnostic techniques.Secondary eosinophilia is a cytokine-derived (interleukin-5 [IL-5]) reactive phenomenon. Parasitic diseases are the most common cause, whereas in developed countries world widely, but allergic diseases are the most common cause in developed countries. There are other causes such as: Malignancies, Metastatic cancer, Tcell lymphoma, colon cancer, pulmonary eosinophilia, Loffler syndrome, Churg-Strauss syndrome, allergic bronchopulmonary aspergillosis, Connective tissue disorders – Scleroderma, polyarteritis nodosa, Skin diseases, Inflammatory bowel disease, Sarcoidosis and Addison disease. Clonal eosinophilia is diagnosed by bone marrow histology, cytogenetics, and molecular genetics. Like Acute leukemia.

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Association of the presence of neurospheres with treatment response and survival rate of children with astrocytoma

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Background and Aim: Astrocytomas are the most common primary central nervous system (CNS) tumors in children being the leading cause of solid cancer related death in childhood. Neurospheres formation and the ability of tumor cells to proliferate in culture along with key factors such as age, location, histology and Ki67, p53, EGFR markers are deemed as powerful tools to predict the clinical outcome of patients with astrocytomas. In this study we associate the survival rate and the response to treatment according to the formation of self-renewable neurospheres in consecutive passages of cell cultures of patients with astrocytomas.

Results: Our results showed a current survival rate of 18 patients (75%) and 6 deaths with an overall survival rate at 24 months. Patients who had neurospheres in basal culture have 39.51% survival rate at 24 months compared to those without neurospheres in basal culture medium with 81.48% survival rate at 24 months. Of the six patients who have died, four had neurospheres both in the basal culture medium and in the first passage. Regarding treatment response at six months, four out of five patients with progressive disease had neurospheres both in the basal culture medium and in the first passage, three of these patients had neurospheres in the second passage and two in the third passage. Instead of seven patients with complete response at six months, only one patient had neurospheres both in the basal culture medium and in the first passage.

Conclusion: We found a clear association between the development of neurospheres and the evolution of our patients.

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Current trends and future directions in interventional neuroradiology procedures

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Interventional neuroradiology is a subspecialty of radiology focused on the treatment of abnormalities of the central nervous system, spine, and head and neck using neuroimaging techniques. Several radiologic imaging modalities, such as computed tomography (CT), magnetic resonance imaging (MRI) and fluoroscopy/fluorography are used to confirm a diagnosis of a cerebrovascular or spinal abnormality and to perform minimally invasive treatments, among which tumors, aneurysms, and vascular malformations embolization, mechanical thrombectomy for stroke, vertebral augmentation for osteoporotic and pathologic spinal fractures. Innovative scientists and physicians actively collaborate for a constant improvement and amelioration of the hardware and software utilized for procedure guidance as well as development of new more advanced and safe devices and technique to utilize in the interventional procedures.

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IgG4-related disease mimicking cholangiocarcinoma

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Immunoglobulin G4-related disease (IgG4-RD) is an immune mediated fibro inflammatory disease that consists of a collection of disorders that share particular pathologic, serologic, and clinical features. These disorders were previously thought to be unrelated. The most characteristic features include tumor like swelling of involved organs, a lymphoplasmacytic infiltrate enriched in IgG4 positive plasma cells and a variable degree of fibrosis that has a characteristic storiform pattern. In addition, elevated serum concentrations of IgG4 are found in 60 to 70 percent of patients with IgG4-RD. IgG4 related sclerosing cholangitis (IgG4-SC) is a characteristic type of sclerosing cholangitis, with an unknown pathogenic mechanism. Patients with IgG4-SC display increased serum IgG4 levels and dense infiltration of IgG4-positive plasma cells with extensive fibrosis in the bile duct wall. Circular and symmetrical thickening of the bile duct wall is observed in the areas without stenosis that appear to be normal on cholangiography, as well as in the stenotic areas. IgG4-SC has been recently recognized as an IgG4-related disease. IgG4-SC is frequently associated with autoimmune pancreatitis (AIP). IgG4-related dacryoadenitis/sialadenitis and IgG4-related retroperitoneal fibrosis are also occasionally present with IgG4-SC. However, some IgG4-SC cases do not involve other organs. IgG4-SC is most common in elderly men. Obstructive jaundice is frequently observed in IgG4-SC. A number of diseases such as cystic fibrosis, chronic obstructive choledocholithiasis, biliary structures (secondary to surgical trauma, chronic pancreatitis), anastomotic structures in liver graft, neoplasms (benign, malignant, metastatic), infections, hypertonic saline instillation in the bile ducts, posttraumatic sclerosing cholangitis, systemic vasculitis, amyloidosis, radiation injury, sarcoidosis, systemic mastocytosis, hypereosinophilic syndrome and Hodgkin's disease may easily be confused with IgG4-related sclerosing cholangitis, or coexist in a patient. In this case report a 57 years male patient presented with jaundice, fatigue, weight loss and oral moniliasis and right sided neck swelling. He was misdiagnosed as Cholangiocarcinoma.

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What is trained develops! theoretical perspective on skill learning

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Knowledge about developmental theories is important for experts or specialists working with children following normal development and children who have various kinds of dysfunction, in order to better understand what happens with processes associated with motor behavior. In this article, we have explored how theories of development and learning can be used to understand processes associated with motor behavior. A probabilistic perspective emphasizes that the changes taking place in the development is a result of interaction: structural changes in the nervous system leading to changes in function and behavior and opposite, functional changes resulting in changes in structure. This bidirectional interaction between biological and experiential aspects is a continuous process which cannot be reduced to either organism or environment. Dynamical systems theory (DST) emphasizes that it is the interaction between the person, the environment, and the task that changes how our movements are, also in terms of how we develop and learn new movements. The interplay between these factors will, over time, lead to changes in motor development. The importance of experience is central to Edelman's theory of neuronal group selection (NGST). Activation of the nervous system increases the connections between certain areas of the brain, and the selection processes in the brain are a result of enhancement of neural connections involved in a "successful" motion. The central nervous system adapts its structure and function in response to internal and external influences, and hence neural plasticity is a prerequisite for learning and development. We argue that Edelman's approach supports the theory of specificity of learning. From the perspectives of probabilistic epigenesis, DST, and NGST, we can see that being physically active and having the opportunity to get different movement experiences are of great significance for promoting motor development and learning. A variation of purposeful or rewarding physical activity in a variety of contexts will provide individual opportunities for changes of behavior in terms of both quantitative and qualitative changes in motor development.

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Microbial dysbiosis and probiotic treatment in a genetic model of autism spectrum disorders

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Gut microbiome may influence brain development and behavior, mainly through the modulation of physiological metabolism and the immune system. Recent studies have determined that the microbiome has direct effects on behavior, and may be dysregulated in neurodevelopmental conditions. Considering that neurodevelopmental conditions such as autism have a strong genetic etiology, it is necessary to understand if genes associated with neurodevelopmental disorders, such as *Shank3*, can influence the gut microbiome, and if probiotics can be a therapeutic tool. Using 16S high-throughput sequencing, we have determined the gut microbiome community of the *Shank3* KO mouse model, and its relative controls. In this study, we have identified dysregulation of several genera and species of bacteria in both the gut and colon of *Shank3* KO mice, in addition to a sex-dependent dysregulation of the immune system. *L. reuteri*, a species with decreased relative abundance in the *Shank3*KO mice, positively correlated with the expression of GABA receptor subunits in the brain. Treatment of *Shank3* KO mice with *L. reuteri* induced an attenuation of unsocial behavior and a decrease in repetitive behaviors, in males and just decrease in repetitive behaviors in females, without affecting anxiety. *L. reuteri* treatment also induced an increase in GABA receptor expression in multiple brain regions, and affected serum immune system markers. This study has confirmed that genetic differences associated with autism can induce changes in the microbiota profile. In addition, this study identifies bacterial species that are sensitive to an autism-related mutation, and further suggests a therapeutic potential for probiotic treatment.

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Why neuroregeneration in CNS is slow?

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The environment within the CNS, especially following trauma, counteracts the repair of myelin and neurons. Growth factors are not expressed or re-expressed; for instance, the extracellular matrix lacks laminins. Glial scars rapidly form, and the glia actually produce factors that inhibit remyelination and axon repair. For instance, chondroitin sulfate proteoglycans (CSPGs): astrocytes up regulate the production of chondroitin sulfate proteoglycans. Keratan sulfate proteoglycans or keratosulfate (KSPG): reactive astrocytes up regulate the chondroitin sulfate proteoglycans as part of glial scar formation and inhibit neurite outgrowth extension, limiting nerve regeneration. Proteins of oligodendritic or glial debris origin that influence neuroregeneration including NOGO: the protein family Nogo, especially a myelin-associated neurite outgrowth inhibitor (Nogo-A) acts as an inhibitor of remyelination in the CNS; antagonising this inhibitor results in improved remyelination, as it is involved in the RhoA pathway. NI-35 (neurite growth inhibitor) a non-permissive growth factor from myelin, MAG (myelin-associated glycoprotein): acts via the receptors NgR2, GT1b, NgR1, p75, TROY and LINGO1, OMgp (oligodendrocyte myelin glycoprotein), ephrin B3 inhibits remyelination and Sema 4D (semaphorin 4D) inhibits remyelination. Sema 3A (semaphorin 3A) is present in the scar that forms in both the central nervous system and peripheral nerve injuries, and contributes to the outgrowth-inhibitory properties of these scars. The axons themselves also lose the potential for growth with age, due to a decrease in GAP 43 (growth associated protein 43) expression among others.

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Beneficial effect of oral supplementation of virgin coconut oil on methotrexate induced cerebral neurotoxicity and inflammation in rats

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Background: Methotrexate is an anticancer drug associated with several toxicities on organs through oxidative stress and inflammation. The study evaluated oral supplementation of virgin coconut oil (VCO) against cerebral neurotoxicity and inflammation induced by methotrexate (MTX) in rats.

Methods: Eighteen Wistar rats were divided into three groups (n=6) as Control, MTX and VCO + MTX. Rats were orally administered VCO (5 mL/kg) for 17 consecutive days, while a single dose of MTX (20 mg/kg bw, i.p.) was administered on day 14 only. Homogenate samples obtained from the cerebrum were used to analyze antioxidant enzymes, reduced glutathione (GSH), malondialdehyde (MDA), nitric oxide (NO), acetylcholinesterase (AchE) and inflammatory cytokines tumor necrosis factor-α (TNF-α) and interleukin-6 (IL-6).

Results: MTX administration significantly ($p<0.05$) reduced activities of antioxidant enzymes and level of GSH in cerebrum, whereas MDA, NO, AchE, TNF-α and IL-6 levels significantly ($p<0.05$) increased in cerebrum relative to normal control. In contrast, oral supplementation of VCO attenuated the MTX induced biochemical alterations relative to MTX group in the current study.

Conclusion: Our findings suggest beneficial effect of VCO against MTX neurotoxicity. Oral supplementation of VCO may prevent MTX neurotoxicity in cancer patients.

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Phantom phenomena and level of limb amputation: The mirror therapy

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Background: About 70% of the amputees will sooner or later experience phantom phenomena. Phantom sensations and phantom pain may occur immediately after the limb amputation or many months or even years later. One of the factors affecting the intensity of phantom phenomena is height of limb amputation.

Objective: To assess the relationship between height of limb amputation and the type of phantom phenomena.

Material: The study included 45 adults after single or multiple-limb amputations: 35 men and 10 women. The mean age was 68, 24±13.9 years.

Method: The pilot study used a survey questionnaire, numerical scale and McGill Pain questionnaire. The utility of mirror therapy was tested as well.

Results: The relationships were demonstrated between the height of limb amputation, age and the intensity of phantom phenomena (rho= -31, $p<0.05$; rho=0.34, $p<0.05$, respectively). The time since putting on the prosthesis, total daily wear time and walking time during the prosthesis negatively correlated with phantom pain ($p<0.01$). The mirror therapy supports effect of treatment.

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Comparative study of percutaneous pedicle screw fixation after direct decompression with anterior column reconstruction for thoracolumbar burst fracture

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Background: Thoracolumbar burst fractures (TLBFs) are among the most common spinal traumas, and its appropriate management remains undetermined. This study aimed to compare the clinical and radiological results between anterior corpectomy and fusion technique versus posterior decompression with percutaneous pedicle screw fixation technique in the treatment of TLBFs.

Methods: A total of 46 patients (from 2002 to 2015) with TLBFs were included in this study. The inclusion criteria were single-level Magerl type A3 burst fracture of the thoracolumbar spine (T12–L2). These patients were divided into two groups: Group A (22 patients) was treated by anterior corpectomy with fusion, while Group B (24 patients) was treated by posterior decompression with percutaneous pedicle screw fixation (PPSF). For the radiologic parameters, kyphosis angle was measured preoperatively, early postoperatively, and at the last follow-up using Cobb angle. The average correction in degrees and loss of correction were calculated accordingly. All neurological deficits were identified on the initial evaluation and graded using the ASIA grading system. Operation time and intraoperative blood loss were also measured.

Results: The patients consisted of 17 males and five females in Group A and 13 males and 11 females in Group B. The involved levels were three T12, twelve L1, and seven L2 in Group A and one T12, thirteen L1, and ten L2 in Group B. The average follow-up period was 44.9 months in Group A and 14.7 months in Group B. The corrections of kyphotic change were 6.4 degrees in Group A and 9.2 degrees in Group B. Among the patients with neurologic deficit, 11 of 15 patients in Group A and 20 of 23 patients in Group B demonstrated at least one ASIA grade improvement on the final observation. However, there was no significant difference between two groups ($p = .13$). In addition, a shorter mean operating time and less mean perioperative blood loss were observed in Group B than in Group A ($p < 0.01$ and $p < 0.01$, respectively; 167.3 minutes and 305.9 mL in Group A; 365 minutes and 1566.7 mL in Group B).

Conclusions: Spinal canal decompression via a small laminotomy followed by PPSF in the treatment of TLBFs with neurological deficits offers excellent biomechanical stability with clinical and radiological improvement. Furthermore, it can be a safe and effective surgical option with the advantages of less invasiveness for the treatment of TLBFs.

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CNS clinical trials-the challenges

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The failure rate for drugs in late-stage clinical trials is high; however, in CNS disorders it is spectacularly high. For example, in Alzheimer's disease, 99.6% of drugs in phase III clinical trials have failed. Since the burden of CNS disease is extremely high, the demand for treatments exists and is ever growing. From all the trial failures, there are, therefore, a huge amount of lessons that can be learnt if you are willing to look honestly at what has gone wrong and consider taking a different path. This talk will look at the lessons that can be learned from poor patient selection, endpoint selection and poor trial design resulting in high screen failures and withdrawals.

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Increased miR-21-3p in injured brain microvascular endothelial cells following traumatic brain injury aggravates blood-brain barrier damage by promoting inflammation and apoptosis through targeting *MAT2B*

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Our previous researches have reported that increased miR-21-5p in brain following traumatic brain injury (TBI) could improve the neurological outcome through alleviating blood-brain barrier (BBB) damage. miR-21-3p is another mature miRNA derived from pre-miR-21 after dicer procession other than miR-21-5p. Its roles in various diseases, such as tumors and myocardial disease aroused great interest for research in recent years. To further explore the function and underlying mechanism of miR-21, especially miR-21-3p in regulating the pathological development of BBB damage after TBI, we recently focused on studying the impact of miR-21-3p on apoptosis and inflammation in brain microvascular endothelial cells (BMVECs), the major cellular component of BBB. We performed controlled cortical impact on mouse brain, and employed the oxygen glucose deprivation/reoxygenation (OGD)-treated bEnd.3 cells injury model. We found that miR-21-3p level in BMVECs from injured cerebral cortex of controlled cortical impact (CCI) mice, and bEnd.3 cells with OGD treatment were both increased after injury. For *in vitro* experiments, downregulation on miR-21-3p level by transfecting miR-21-3p antagomir in cultured cells alleviated OGD-induced BBB damage, characterized by decreased BBB leakage and increased expression of tight junction proteins. Besides, miR-21-3p antagomir could control inflammatory response by inhibiting the activity of NF-κB signaling, and suppress cell death by anti-apoptosis. Using luciferase reporter assay and a *MAT2B*-silenced shRNA vector, we further proved that miR-21-3p exerted above functions through targeting *MAT2B*. In addition, *in vivo* experiments also confirmed that intracerebroventricular infusion of miR-21-3p antagomir could alleviate BBB leakage after TBI. It reduced Evans blue extravasation and promoted the expression of tight junction proteins, thus contributed to improve the neurological outcome of CCI mice. Taken together, increased miR-21-3p in BMVECs after TBI was bad for restoration of injured BBB. Downregulation on miR-21-3p level in injured brain could be a promising therapeutic strategy for BBB damage after TBI.

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Neural coordination

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Neural coordination is a link between body organs and brain. Our nervous system plays important role in neural coordination. Nervous system has two parts e.g. central nervous system and peripheral nervous system. Central nervous system in all vertebrates is dorsal and hollow while in case of invertebrates, it is ventral. Central nervous system is further divided into brain and spinal cord. In brain there are two hemispheres. Right cerebral hemisphere controls and monitors the left side of human body and left cerebral hemisphere controls the right side of body. Both these hemispheres are linked by a band of axons called corpus callosum. It is responsible for transmitting neural messages between two hemispheres. Spinal cord controls most of the reflex movements of the body e.g. withdraw of hand when it touches to something hot or painful. It also provides a pathway for the conduction of nerve impulses. Nerve impulse travels from receptors to CNS and then to effectors. The final response is given by effectors. Effectors include glands and muscles. After CNS, the next one is peripheral nervous system that is a link between CNS and other body organs. It comprises of nerves and ganglia. Ganglia are a cluster of nerve cells or a group of nerve bodies and are being divided into autonomic and somatic nervous system. Somatic nervous system is associated with sensory organs while autonomic nervous system is associated with internal organs and glands. Autonomic nervous system is further divided into sympathetic and parasympathetic divisions. Both these divisions work in emergency situation. All these components of nervous system thus help in neural coordination in this way.

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