**International Headache Congress 2015 late breaking abstracts (orals)**

**LO-01**

**Migraine Pathophysiology**

Visual sensitivity is more enhanced in migraineurs with aura than in migraineurs without aura

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**Background:** Migraine is often accompanied by sensitivity for light and patterns. This is usually interpreted as manifestation of ‘cortical hyperexcitability’, as is the migraine aura. It is not known if migraineurs with and without aura differ in visual sensitivity.

**Aim:** To quantify ictal and interictal visual sensitivity of migraine patients with and without aura using the Visual Sensitivity Questionnaire (VSQ, IHC-abstract Zamanipoor Najafabadi et al), a self-report scale quantifying sensitivity to light and patterns.

**Methods:** Migraineurs with (MA, n = 89) and without (MO, n = 76) aura completed the VSQ twice: to assess visual sensitivity a) outside and b) during attacks of the last month. VSQ sum-scores were compared between MA, MO and healthy controls (n = 99).

**Results:** We found differences in VSQ score between controls and MA and MO outside attacks using one-way ANOVA (F(2,264) = 48.4, p < .0001). Tukey post-hoc testing revealed that scores of MA (12.1 ± 6.3) and MO (9.00 ± 5.6) were higher than of controls (4.6 ± 3.4, both p < .0001). Outside attacks MA also scored significantly higher than MO (p < .001). VSQ score increased during an attack compared to outside an attack for MO (18.6 ± 7.7) and MA (21.8 ± 6.7, paired t-test, both p < .0001). In addition, the score for MA during an attack was higher than for MO (unpaired t-test, p = .004).

**Conclusions:** Migraine patients with aura report enhanced visual sensitivity to light and patterns compared to patients without aura, both outside and during the attacks. This suggests cortical hyperexcitability may be more severe in migraineurs with aura compared to those without aura.

**LO-02**

**Migraine Pathophysiology**

Cerebral FDG uptake changes after supraorbital transcutaneous electrical stimulation with the Cefaly device in patients with migraine

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**Background:** A recent multicentre RCT has shown that supraorbital transcutaneous stimulation (STS) targeting branches of the ophtalmic nerve with the Cefaly® device is effective as a preventive therapy for migraine (Schoenen et al., Neurology 2013). However, the mechanisms of action in the central nervous system remain unknown. Here, we conducted voxel-based analyses of [18]FDG-PET to evaluate metabolic changes immediately after the first STS session and after 3 months of daily treatment in patients with migraine.

**Methods:** Twenty-eight subjects participated in the experiment: 14 patients with episodic migraine (ICHD3 beta criteria) and 14 age-matched controls. Healthy volunteers underwent only one [18]FDG-PET scan whereas patients were scanned at baseline, directly after a first session of STS and after 3 months of daily treatment.

**Results:** Compliant patients showed a significant decrease in the number of attacks (p = 0.03). When compared to controls, patients (n = 14) at baseline were hypometabolic in the fronto-temporal regions (p < .001), especially in the orbitofrontal (OFC) and perigenual anterior cingulate.
OF. OFC hypometabolism was not correlated with medication intake. In compliant patients, daily STS for 3 months was followed by a normalization of the fronto-temporal hypometabolism ($p < 0.001$; OFC: $p_{FWE} < 0.01$).

Conclusion: Our study suggests that the OFC is hypoactive in episodic migraine. STS with the Cefaly® device is able to normalize this hypoactivity. This indicates that STS exerts its beneficial effect via slow neuromodulatory mechanisms, as also previously shown for percutaneous occipital nerve stimulation in refractory cluster headache (Magis et al., BMC Neurology 2011).

LO-03
Migraine Pathophysiology
Transcriptional changes in the trigeminal ganglion in response to glyceryl trinitrate infusion in the rat
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Background: Infusion of glycercyl trinitrate (GTN), a donor of nitric oxide (NO), induces immediate headache in humans, which in migraine patients is followed by a delayed migraine attack. We have developed a rat GTN-infusion model mimicking the human model and aim to investigate transcriptomic changes in the trigeminal ganglion (TG) at different time points after GTN infusion using RNAseq.

Methods: Nine awake rats were infused with vehicle or GTN and sacrificed at 30 min (vehicle and GTN) or 90 min (GTN) after the infusion (approved by the Danish Animal Experiments Inspectorate). TG was dissected for RNA extraction and the samples were paired-end sequenced using next generation sequencing. The RNA-seq data was mapped against the rat genome (rn5) using TopHat2 and tests for differential gene expression conducted using DESeq2. Six significantly regulated genes were chosen for qPCR validation. Significantly regulated pathways were identified using Gene Set Analysis Of Variance (GSANOVA).

Results: 15 genes (RT1-A3, RT1-A2, Per1, Rgs7bp, Tapbp, Rps10, Trim16, Glul, Lxn, Dpysl4, Myh6, Prune2, Daf1, P2rx3 and Apod) exhibited significant changes in expression after GTN infusion. Validation by qPCR showed a similar expression pattern as found with RNA-seq. Among the 30 most significantly regulated pathways we identified changes involving satellite glia cell-neuron signaling, immune responses and neuroplasticity.

Conclusion: GTN infusion results in transcriptional changes in the TG pointing towards activation of satellite glial cells, the immune system and neuroplastic changes. Future in-depth studies of these pathways might increase our knowledge of migraine pathophysiology.

LO-04
Migraine Pathophysiology and CGRP as a Therapeutic Target
TRV250: A novel biased ligand at the delta receptor for the potential treatment of migraine
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Background: The delta opioid receptor (DOR) has long been of interest as a target for potentially non-addictive treatments for a variety of CNS disorders. Recent evidence suggests that DOR activation may be beneficial in the treatment of migraine. However, DOR agonists have caused seizure in preclinical species, hindering the development of selective drugs targeting the DOR.

Aim: We sought to harness ligand bias at the DOR to discover a DOR modulator with efficacy in animal models of migraine and other CNS disorders while minimizing seizure liability.

Methods: Based on data suggesting that G protein coupling without beta-arrestin2 engagement at the DOR would reduce seizure liability, we identified TRV250, a novel small molecule targeting the DOR. Rat and mouse models of migraine pain, and seizure liability were used to assess the potential therapeutic index of TRV250.
Results: Compared to unbiased agonists AZD2327 and SNC80, TRV250 has potent, full efficacy for G protein coupling, but much weaker engagement of beta-arrestin2. TRV250 is highly selective for the DOR over the mu and kappa opioid receptors. In rodent nitroglycerin-induced hyperalgesia models of migraine, TRV250 showed robust efficacy after both subcutaneous and oral dosing. TRV250 was also active in models of nociception, depression, and anxiety. Compared to AZD2327, TRV250 showed a markedly improved margin between efficacious doses and doses associated with seizure.

Conclusion: TRV250 shows promise as a potential new class of therapy for the treatment of migraine, as well as other CNS disorders. Preclinical development to support future clinical trials of TRV250 is underway.

LO-05

Migraine Pathophysiology and CGRP as a Therapeutic Target

A multicenter, randomized, double-blind, double-dummy, placebo-controlled, multi-dose study comparing the efficacy and safety of subcutaneous TEV-48125 with placebo for the preventive treatment of chronic migraine

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Background: Disrupting calcitonin-gene related peptide (CGRP) signaling has proven efficacy in the treatment of episodic migraine, but benefits have not been established for the preventive treatment of chronic migraine (CM).

Objectives: To evaluate the efficacy and safety of two doses of subcutaneous TEV-48125 (LBR-101), a monoclonal anti-CGRP antibody, in the preventive treatment of CM.

Methods: This was a multicenter, randomized, double-blind, double-dummy, placebo-controlled, parallel-group study comparing two doses of TEV-48125 with placebo. Following a 28 day run-in period, participants were randomized and treated subcutaneously once monthly for three months. Headache information was captured daily using an electronic headache diary. The study was conducted in approximately 60 centers in the USA. The primary (change from baseline in the number of hours with headache in month 3), and secondary (change in number of headache days of moderate or severe intensity in month 3) variables were analyzed using a Repeated Measures Mixed-Effects Model with a 2-sided alpha level of 0.05 and adjustments for multiplicity.

Results: Results are being fully analyzed and will be presented at the meeting. Sample consisted of 261 patients. Both doses of TEV-48125 achieved the primary (p = 0.030 and p = 0.006) and secondary endpoints (p = 0.034 and p = 0.023). Both doses were also superior to placebo at 1 month for headache hours (p < 0.0001) and days (p = 0.009 and p < 0.001). Treatment was well tolerated and no treatment-related serious adverse events were reported.

Conclusion: Primary, secondary and safety endpoints were achieved, for the first time demonstrating that CGRP inhibition is effective in the preventive treatment of CM.
International Headache Congress 2015 late breaking abstracts (posters)

LP-01

Migraine Pathophysiology and Treatment

Episodic dural stimulation in conscious rhesus monkey: A model for recurrent migraine

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Objectives: To establish a recurrent migraine model in conscious rhesus monkey with episodic dural stimulation.

Background: Several migraine models have been established based on epidural stimulation, however, most of these are built based on single stimulation, while migraineur experiences repeated dural nociceptive activation. In addition, clinical trials in patients have been failed to confirm the efficacy of the anti-migraine drugs which was once useful in this models. Therefore, a recurrent headache model in conscious rhesus monkey might be a potential choice for preclinical migraine study.

Method: Inflammatory soup was infused into dural to induce inflammation through indwelling catheter. The infusion started at 8th day and repeated every 3 days until to the 23th day. We performed behavioral assessment and detected the expression of c-fos, nNOS and CGRP immuno-reactivity in multiple brain areas.

Results: In stimulation group, 2 monkeys showed an increased ipsilateral nose and mouth secretions, 3 showed a disability for daily activities in the period between stimulus. None of these was found in sham-operation group. The stimulation group also presented more c-fos-positive neurons than control group did. Higher expression of c-fos, nNOS and CGRP were found in various brain areas, in particular, expression of c-fos shows a positive linear correlation to nNOS in the inferior medulla oblongata ($r = 0.955$, $p = 0.045$).

Conclusion: Repeated IS stimulation of the dura produced a migraine-like pathologic change and abnormal behaviors in conscious rhesus monkey model. Immunohistochemical analysis suggested a wide pathologic changes across whole brain. Therefore, this model might be a potential choice for preclinical migraine study.

LP-02

Migraine Pathophysiology and Treatment

Calcitonin gene–related peptide induced migraine attacks in patients with high and low genetic load

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Background: Genome wide association studies (GWAS) have identified single nucleotide polymorphisms (SNPs) to be associated with migraine without aura (MO), but their functional roles are yet unclear. Intravenous infusion of calcitonin gene–related peptide (CGRP) provokes migraine attacks in migraine sufferers. Whether SNPs or family history contribute to migraine susceptibility to CGRP infusion is unknown.

Hypothesis: MO-patients with a high genetic load of SNPs associated with MO ($\geq 14$ risk alleles) or a family history of migraine ($\geq 2$ first-degree relatives with migraine) report more migraine attacks after CGRP administration than patients with a low genetic load ($\leq 9$ risk alleles) or no family history ($\leq 1$ first-degree relatives with migraine).

Methods: We conducted a randomized, double-blinded study in 20 genotyped MO-patients with high genetic load and 20 genotyped MO-patients with low genetic load. All participants received intravenous infusion of 1.5 $\mu$g/min human $\alpha$-CGRP. Family history of migraine was obtained by telephone interview using a validated semi-structured questionnaire.

Results: We found no difference in the incidence of migraine-like attacks between patients with high and low (65% vs. 60%) genetic load after CGRP infusion ($p = 0.744$). In addition, CGRP infusion did not induce
more migraine-like attacks in MO-patients with a family history of migraine compared to patients without family history (75% vs. 52%) \((p = 0.150)\).

**Conclusion:** This is the first functional study of a relation between genetics of MO and migraine provocation. We demonstrated that neither the currently known SNPs associated with MO nor family history can explain the hypersensitivity of MO patients to CGRP infusion.

**LP-03**

**Migraine Pathophysiology and Treatment**

**A retrospective study in the treatment of menstrual migraine: Comparison of the new multidisciplinary approach with the mono-disciplinary approach**

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**Introduction:** Menstrual migraine (MM) is a disabling headache disorder; mainly treated only by a neurologist. A multidisciplinary clinic where these patients receive treatment from both a neurologist and gynecologist at the same time seems more convenient.

**Aim of the study:** To investigate whether a multidisciplinary approach of MM is superior to the mono-disciplinary treatment which was performed before 2012.

**Method:** This retrospective study was done using data of 88 women with MM who visited the menstrual migraine clinic between March 2012 and December 2014. Follow-up took place after 3, 6 and 9 months. The results were compared to a control group, containing women with MM who were seen before 2012 and received a mono-disciplinary approach.

**Results:** The HIT score improved significantly from 65 points at baseline to 59 points after 9 months. The improvement of HIT score in the control group was less striking (from 65 to 63.5 points). Headache days per month declined in the intervention group from 6 to 3.83 days, while this even increased in the control group (from 6 to 6.5 days). The number of days using pain medication, also showed a significant difference at evaluation in favor of the intervention group. It appeared that 20 out of 27 patients in the control group already required a multidisciplinary approach in course of time, because they were referred to a gynecologist after visiting the neurologist.

**Conclusion:** A multidisciplinary approach for MM gives better results than a mono-disciplinary approach.

**LP-04**

**Migraine Pathophysiology and Treatment**

**Forecasting individual headache attacks: Longitudinal study**

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**Objective:** To develop and validate a prediction model that forecasts future migraine attacks for an individual headache sufferer.

**Design:** Longitudinal design with Bayesian prediction models.

**Setting:** Single-site research center in North Carolina, USA; September 2009 to May 2014.

**Participants:** 95 participants with episodic migraine with or without aura contributed 4624 days of diary data.

**Intervention:** Individual headache forecasts were derived from current headache state and current levels of stress using several aspects of the Daily Stress Inventory (DSI), a measure of daily hassles that is completed at the end of each day.

**Main Outcome Measure:** The presence/absence of any headache attack (head pain $> 0$ on a numerical rating scale of 0 to 10) over the next 24 hour period.

**Results:** Participants in the study experienced a headache on 1239 of 4624 days (26.7%). A simple forecast model using either the frequency of stressful events or the perceived intensity of these events fit the data as well as more complex models that utilized previous days’ stress levels or changes in stress from day-to-day. This simple forecasting model possessed promising predictive utility with an AUC of 0.72 (95%CI: 0.65 to 0.75).

**Conclusion:** This study demonstrates that future headache attacks can be forecasted for a diverse group of individuals over time. The use of Bayesian methods allows individuals to benefit from the past experience of others while enabling forecasts to be delivered immediately (i.e., without having to build an entirely new model for each person).
LP-05

Migraine Pathophysiology and Treatment

Gait and balance impairments in migraine patients: Do we need to offer vestibular rehabilitation?

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Background: In the absence of concurrent vestibular disorders, it is unknown whether dizziness and disequilibrium commonly associated with migraine are subjective symptoms only or if patients have impairments in gait and balance.

Aim: To quantify balance and gait outcomes in patients with migraine.

Methods: This was an observational study. Patients were recruited from secondary care between June and September 2014. The following was collected:

- Patient specific information – gender and age
- Headache specific information – diagnosis, frequency and severity of migraine
- Dizziness/disequilibrium information – frequency, severity, relationship to headache
- Physical Outcome Measures – Balance was assessed using Computerised Dynamic Posturography (specifically the Sensory Organisation Test, SOT), and gait was measured with Functional Gait Assessment (FGA).

Descriptive statistics were derived from Excel.

Results: Over the 6 week period, 21 patients completed testing – a response rate of 26%.

- 95% had a diagnosis of migraine.
- 95% were female, with mean age 42 years
- Mean frequency was 15 headache days per month
- 90% of the migraine patients reported experiencing dizziness or disequilibrium
- Mean FGA score was 29 – within normal range.
- Mean SOT composite balance scores was 65 – below normal

Conclusion: A high prevalence of dizziness and disequilibrium was found in migraine patients attending secondary care. This was associated with objective signs of imbalance using computerised dynamic posturography. No abnormalities of gait were found. Further research is needed to establish if a vestibular rehabilitation intervention targeted at those migraine patients who have objective signs of imbalance will improve symptoms.

LP-06

Migraine Pathophysiology and Treatment

Migraine headache heritability – twin study

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The aim of this research was to determine heritability of migraine among twin pairs.

Heritability of migraine was investigated by analyzing twins aged 3 to 21 years, on the territory of Northern Province of Serbia with its population of around 3 million people and more than 20 different nationalities. By the method of random sampling 792 twins were surveyed. 396 twin pairs (42.4% monozygotic and 57.6% dizygotic). Within the group 30.2% had recurrent headaches, 21% non-migraine recurrent headaches and 9.2% migraine, (10.1% monozygotic and 8.3% dizygotic).

The concordance for the migraine is 94.1% for monozygotic twins and 57.9% for dizygotic ones, a significant difference (p < 0.05). The heritability quotient for the migraine with monozygotic twins was calculated by using Holzinger’s formula and it is 0.8598. The concordance for the non-migraine was 50.0% for monozygotic and 59.3% for dizygotic twins.

Heritability quotient of 0,3882 confirms the significance of heritability, but, at the same time, it confirms the effect of environmental factors on the appearance of recurrent headaches as well. Migraine syndrome with heritability quotient of 0,8598 clearly shows the hereditability of the migraine.

The very high correlation quotient of the migraine syndrome of all twins r12 0.7498; r2 12 56.12%, (r12 0.8458; r2 12 1.54% of monozygotic and r12 0.6342; r2 12 40.22% of dizygotic) and the determination quotient of the migraine for all the twins 56.12% (71.54% for monozygotic and 40.22% for dizygotic twins) show high degree of mutual dependence between the migraine of siblings, more important with monozygotic twins.
Migraine Pathophysiology and Treatment

Open label effectiveness of sphenopalatine ganglion (SPG) stimulation for high-disability migraine headache – pathway M-1 study interim acute results

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Background: The Pathway M-1 study is a randomized, sham-controlled pilot study of sphenopalatine ganglion (SPG) stimulation with the ATI neurostimulator, for migraine headache. Patients represented a heterogeneous, refractory, highly-disabled population and experienced at least 8 days/month migraine attacks.

Aim: The aim of this interim analysis is to evaluate acute effectiveness of SPG stimulation for refractory, high-disability migraine through one year following insertion of an SPG neurostimulator.

Method: Therapeutic effectiveness (acute pain response following SPG stimulation) was analyzed for all evaluable SPG stimulation attempts through one year. Sham and prophylactic stimulations were excluded. Effective therapy was relief from moderate pain, or freedom from or lack of progression of mild pain, evaluated at 1 or 2 hours following stimulation, as appropriate. As SPG stimulation has no dose limitations, therapy was used as needed/desired.

Results: 33 patients across three European centers underwent insertion of the ATI Neurostimulator. 31 used SPG stimulation acutely, an average of 83.3 evaluable times (range 5-246), through one year post-insertion. 49% of N=2581 treatments achieved Effective Therapy. 58% (18/31) of evaluable patients were considered responders, experiencing Effective Therapy in at least 50% of attacks.

Conclusion: These open label, interim results indicate that SPG stimulation effectively treats pain or keeps mild pain from progressing in a majority of migraine patients implanted with the ATI Neurostimulator. Given these results in this refractory, highly-disabled population, continued research to refine the population of likely responders is warranted.

Migraine Pathophysiology and Treatment

Chiari malformation type 0 (CM0) and hemicrania

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Background: The Pathway M-1 study is a randomized, sham-controlled pilot study of sphenopalatine ganglion (SPG) stimulation with the ATI neurostimulator, for migraine headache. Patients represented a heterogeneous, refractory, highly-disabled population and experienced at least 8 days/month migraine attacks.

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Conclusion: These open label, interim results indicate that SPG stimulation effectively treats pain or keeps mild pain from progressing in a majority of migraine patients implanted with the ATI Neurostimulator. Given these results in this refractory, highly-disabled population, continued research to refine the population of likely responders is warranted.
**LP-09**

**Migraine Pathophysiology and Treatment**

**Treatment cost analysis of chronic migraine patients in the UK NHS setting**

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**Background:** Chronic migraine patients suffer from a considerable burden of disease with only few treatment options being available. Botulinum toxin type A (BOTOX) is the only licensed treatment recommended by NICE (2011) through technology appraisal guidance (TAG) for which commissioners are obliged to provide funding. Transcranial magnetic stimulation (TMS) has been appraised by NICE through Interventional procedure guidance (IPG) for which funding on the NHS is not mandatory. UK migraine clinics are starting to use TMS, hence the objective of this cost analysis was to compare treatment costs of Botox and TMS over one year.

**Methods:** A Markov model was developed in order to obtain validated patient number being treated per quarter. Treatment costs for BOTOX (£349 per cycle) were based on published NICE appraisal figures. TMS cost applied were £450 per cycle acknowledging the fact that based on a risk-sharing scheme only responders are subject for payment.

**Results:** During the modeling horizon of one year a mean responder rate of 36% was expected in both groups. Since the TMS treatment costs are only reimbursable for responders, the annual cost per average patient from a NHS perspective would be £2,208 compared to £2,405 for BOTOX.

**Discussion:** Risk-sharing scheme based costs for TMS are lower compared to BOTOX in a conservative scenario. Future cost analyses have to include current costs resulting from different CCG serving these severely affected patients.

**LP-10**

**Migraine Pathophysiology and Treatment**

**Effect of occipital nerve stimulation on central pain processing in patients with chronic migraine**

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**Background:** Occipital Nerve stimulation (ONS) is a treatment option for therapy-resistant chronic migraine. The precise effect of ONS onto the pathophysiology of migraine and the trigeminocervicale antinociceptive system remains unknown. In this study, the effect of ONS onto experimentally induced pain and antinociceptive reflexes in patients with chronic migraine is assessed.

**Methods:** 10 patients treated with ONS due to chronic migraine participated in this within-subject-design study. Experimental conditions were assessed on two days with stimulation either switched on or off. Order of conditions was balanced. To determine trigeminal antinociceptive activity, we analysed quantitatively the corneal reflex (CR) by measuring the blink frequency over one minute triggered by a standardised stream of air to the eyes. Additionally, we analysed the exteroceptive suppression of temporalis muscle activity (ES).

**Results:** During active stimulation, blink frequency (CR) was significantly reduced compared to without stimulation in standardised corneal irritation (p = 0.014). Also we found a significantly lengthened duration of ES1 (p = 0.040) and a lengthened duration of ES2 during active ONS compared to deactivated ONS (p = 0.085).

**Conclusion:** The data show that ONS activates antinociceptive cervicotriginemal systems. Pain-alleviating reflex mechanisms are activated and the central nervous system is protected from aversive inputs.
Migraine Pathophysiology and Treatment

Headache attributed to pituitary hyposecretion: GH deficiency in a child

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Background: The International Classification of Headache Disorders 3rd Edition β version (ICHD-3 beta) include in code classification 7.4.3 the diagnosis Headache Attributed to Hypothalamic or Pituitary Hyper- or Hyposecretion

The Diagnostic criteria comprehend headache has developed in temporal relation to onset pituitary hyposecretion and headache has significantly improved in parallel with improvement in the pituitary hyposecretion

Patient: We observed a patient 9 years with a frontal headache arose a few months. This boy had a normal neurological examination but he appeared to short stature when compared to parents. A auxological evaluation show stature <2DS and growth velocity < -1DS for age and sex. The bone age was delayed by about two years. Was performed for evaluation of hypotalamic-pituitary axis to GH that showed a severe hormone deficiency. Was diagnosed idiopathic GH deficiency with growth failure due to inadequate secretion of growth hormone.

Treatment and Results: The patient was treated with recombinant GH therapy (Zomacton Ferring 0.20 mg/Kg body weigh) with a recovery of the rate of growth and disappearance of specific headache

Conclusion: The idiopathic GH deficiency can be a cause of headache attributed to pituitary hyposecretion.

The correct treatment by recombinant GH for this disease has significantly improved in parallel with replacement therapy for the pituitary hyposecretion.

Primary Headaches Pathophysiology and Treatment

New theory in treatment of headache

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Objectives: this prospective study over seven hundred of people who suffer from chronic and sever type of headache who were treated by applying definition and explaining of theorized causes of their headache.

Explanation of theory: whatever the cause of nasal congestion or blockage and or whatever the cause of decreased air flow through the nasal cavity, will not ventilate sufficiently the sinuses, that inducing elevation in the internal temperature of the sinus cavity, that will not allow the brain to lose its temperature, that cause increasing of the temperature of the brain tissue which enhance the vasodilatation of the brain vessels and increasing the intracranial pressure, that explain the headache.

Methods: we performed a special data sheet with the consent form to be applied by the patient, all patients suffer from headache for not less than one year, were investigated to exclude secondary headache, we used a modified intensive inspirometer to calculate the amount of air entry from the mouth and from both nostrils; we used the ten score pain scale pictures.

Results: male to female ratio were 8.3:1.7; 88% decreased nasal air flow, 8% respiratory, and 47% mixed; 91% of them were cured or passed without treatment; 3% had respiratory problems, 5% psychological causes mainly depression, and 4% had severe form of nasal septum deviation or chronic sinusitis.

Discussion: we can investigate our theory by applying this study over thousands of patients at a special centers, using some other modified techniques.
Peripheral nerve field stimulation for trigeminal neuropathic pain syndromes and persistent idiopathic facial pain

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Background: Peripheral nerve field stimulation (PNFS) is a promising modality for treatment of intractable facial pain. However, evidence is sparse.

Aim: To evaluate the potential use of this technique in a small patient cohort.

Methods: Records of 10 patients (5 men, 5 women) with intractable facial pain who underwent implantation of one or several subcutaneous electrodes for trigeminal nerve field stimulation were retrospectively analyzed. Patients’ data, including pain location, etiology, duration, previous treatments, long-term effects and complications, were evaluated. All patients gave written informed consent for publication of their data.

Results: Four patients suffered from recurrent classical trigeminal neuralgia, one had classical trigeminal neuralgia and was medically unfit for microvascular decompression. Two patients suffered from trigeminal neuropathy attributed to multiple sclerosis, one from post-herpetic neuropathy, one from trigeminal neuropathy following radiation therapy and one from persistent idiopathic facial pain. Average patient age was 74.2 years (range 57–87), and average symptom duration was 10.6 years (range 2–17). Eight patients proceeded to implantation after successful trial. Average follow-up after implantation was 11.3 months (range 5–28). Using the visual analogue scale, average pain intensity was 9.3 (range 7–10) preoperatively and 0.6 (range 0–3) postoperatively. Six patients reported absence of pain with stimulation; two had only a slight constant pain without attacks.

Conclusion: PNFS may be an effective treatment for refractory facial pain and yields a high patient satisfaction.
LP-14

Primary Headaches Pathophysiology and Treatment

Use of the Non-medication in the Treatment of Tension-type Headache

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Background and Aims: The effect of the complex (acupuncture, d’arsonval currents and variable magnetic field) on the pain intensity of the patients having tension-type headache was investigated.

Method: 80 patients aged from 18 to 55 (51 females and 29 males) having tension – type headache were observed. The pain was examined and measured according to the visual analogue scale (6 – 7 points). All patients were observed (MRI, doppler ultrasound vessels of the head and neck, spondylography etc.)

The patients were divided into two groups. The first group (62 patients) received in addition their basic medication and complex: acupuncture (GI 4, GI 11, E 36, RP 6, P 7, MC 6, TR 5, F 2, IG 3, T 12–18, T 20, IG 10, IG 12 – 15, GI 14 – 16, V 7 –15, VB 19 – 21, VB 3 – 9, TR 17, TR 21 – 23, VB 1, V 2 – 6, VB 14 – 16, T 22 – 24); variable magnetic field to the neck paravertebrally and d’arsonval current on the scalp, on neck and shoulder region. The complete course was 10 – 12 procedures. The second group (control, 18 patients), received only the basic medication.

Result: The pain intensity of the patients in the first group was reduced after 6 – 7 days of treatment (96.7% patients) compared to the control group, where pain reduction after 12 – 16 days of treatment (44.4% patients); p < 0.01.

Conclusion: The addition of the acupuncture, variable magnetic field and d’arsonval current to the treatment of tension-type headache resulted in earlier remission.

LP-15

Primary Headaches Pathophysiology and Treatment

Eye pain and secondary headache in the course of infection caused by Demodex

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Demodex is a parasite. Exists in hair follicles and sebaceous glands of the skin. There are two main species pathogenic for people: Demodex folliculorum and brevis.

Changes are most often located near nose, around the eyes, on the forehead, chin and other parts of the body. Can also induce a chalazions, or acne rosacea.

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Demodex can induce blepharitis or blepharoconjunctivitis.

**Objective:** Demonstration of the incidence of eye and head pain in the course of infection with Demodex.

**Material and methods:** The investigated group included 320 patients (180 women and 140 men 25–82 years old) with blepharitis or blepharoconjunctivitis with eye pain, swelling of the eyelids, and headache. Each patient was previously treated with long-term neurological ophthalmologist and no effects.

The diagnostics material included parasitology and microbiology examination. Were epilated 4 eyelashes from each eyelid and also swab from conjunctivitis for bacteriological culture. Eyelashes were placed on slide in 10% KOH. Under the microscope (100X) was observed presence or no forms of Demodex. To culturing used blood agar and selective agar.

**Results:** In 290 (90%) (160 (88.9%) women and 130 (93%) men) patients showed the presence of occurrence Demodex. In 30 (9%) patients, 14 women and 16 men were S. aureus bacterial co-infection or S.epidermidis.

**Conclusion:** Patients with chronic blepharitis or blepharoconjunctivitis with pain eyes should be taken after the ophthalmic examination make parasitological and bacteriological investigation.

Eyestrain in the course of Demodex cause secondary headaches temporal and frontal. Exact microbiological diagnostics will reduce the costs of treatment and diagnosis.

**LP-16**

**Primary Headaches Pathophysiology and Treatment**

**Risk factors of headache in children in Cheongju, Korea**

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**Background:** Headache is an extremely frequent symptom in childhood and adolescence, and a common reason for neurological consultation. So we studied risk factors that cause headache to children or adolescence in Cheongju, Korea.

**Methods:** In this study, 596 children were asked whether they had a headache at march 2014. And we analyzed according to grade, sex, exercise, eating breakfast, sleep time, caffeine intake.

**Results:** The prevalence of headache in Cheongju is 20.5%. The migraine is 11% and tension headache is 5.8%. And 30% of high school students has headache, 21% of middle school students has headache and 16.6% of elementary school students has headache. P value is 0.002. High school students has more severe headache than middle school students or elementary school students. High school students has the fewer mean sleep time of high school students the more severe headache (P 0.069).

Students taking caffeine has more severe headache than students not taking caffeine.

**Conclusion:** This study is the primary study of the headache prevalence and the headache risk. And this study is the starting point about headache study in Cheongju, Korea.
Results: The average number of days with headache per month was reduced in the entire study population from 19.4 before duloxetine treatment to 15.1 after its initiation; headache severity was reduced from 7.1 to 5.1, and anxiety was reduced, from 22.1 to 17.2. Duloxetine was well tolerated, the principal adverse event was somnolence and none patient abandoned the treatment for that reason.

Conclusion: Duloxetine has efficacy in TTH and anxiety reduction. According to our results, this drug may be a safe and effective agent in patients with TTH and anxiety. Double-blind studies are warranted to confirm these findings.
# International Headache Congress 2015 late breaking abstracts (author index)

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