the Neuroconnection News

May-June 2015 Edition 2, Volume 2

Schools Out for Summer – Train at The Neuroconnection in Preparation for the 2015-2016 School Year

The school days are numbered and at this time, everyone is ready for a break. While the absence of morning time crunches, late nights of homework, and rigid structured routines sounds enlightening, it can be a difficult time for families who have a child with attention deficit hyperactivity disorder (ADHD).

ADHD is a neurodevelopmental disorder with core symptoms of inattention, hyperactivity, and/or impulsivity. According to the U.S. Centers for Disease Control and Prevention, as of 2011 ADHD has a prevalence of approximately 11% for 4-to 17-year-olds (6.4 million) in the United States (CDC, 2015). Recent surveys also indicate that the percentage of children with an ADHD diagnosis continues to increase, from 7.8% in 2003 to 9.5% in 2007 and to 11.0% in 2011 (CDC, 2015). Furthermore, rates of ADHD diagnosis increased an average of 3% per year from 1997 to 2006 and an average of approximately 5% per year from 2003 to 2011 (CDC, 2015).

The school year provides children with ADHD a predictable routine, therefore, transitioning from the school-year routine to summer break can be challenging. Fortunately, with some advanced planning and adaptation of several strategies, the transition into summer break can be less stressful. For instance, it is helpful to maintain structure and a regular routine, plan activities, schedule in playtime, get outside, consider summer camps, all while still continuing to work on academic skills.

The professionals at The Neuroconnection have a special focus on addressing the symptoms of those with ADHD by utilizing the sophisticated Connectivity-Guided Neurofeedback (CGNFB) training. Taking advantage of the most state-of-the-art brain training is a perfect way to ensure your child with ADHD has a smooth transition into the 2015-2016 school year. For this reason, we bring to you in this month's newsletter an overview of the descriptive terms outlining ADHD, the history behind the discovery of neurofeedback for epilepsy and ADHD, and how CGNFB serves as a modality in decreasing ADHD symptoms. Evidence-based research will also be covered in depth, illustrating how students with ADHD who receive in-school computer attention training with neurofeedback report to have fewer ADHD symptoms 6 months after the intervention. A case study concludes this issue, demonstrating how CGNFB has provided success for a specific patient with ADHD.

In This Issue:

Upcoming Events

46th Annual Autism Society National Conference held July 8 – 11, 2015

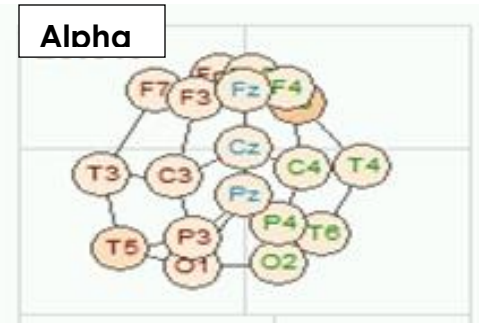
Presenter Topic: This presentation focuses on what the QEEG reveals about the autism brain and how CGNFB works to make functional, lasting changes in the brain. Research and case illustrations of new four-channel CGNFB training will be reviewed.
Date: Friday, July 10, 2015
Time: 10:45 AM -12:00 PM
Location: Denver, Colorado

Descriptive Terms of Individuals with ADHD

Deciding if a child has ADHD is a multifaceted process as there is no single test used to diagnose ADHD. Diagnosis is further complicated by the fact that none of the core symptoms are exclusive to ADHD and the majority of individuals with ADHD suffer from at least one additional psychiatric disorder (Rossiter, 2004). The U.S Centers for Disease Control and Prevention reported that the average age of ADHD diagnosis is 7 years of age, but children reported by their parents as having more severe ADHD were diagnosed earlier (CDC, 2015). Furthermore, boys (13.2%) are more likely than girls to have ever been diagnosed with ADHD (CDC. 2015).

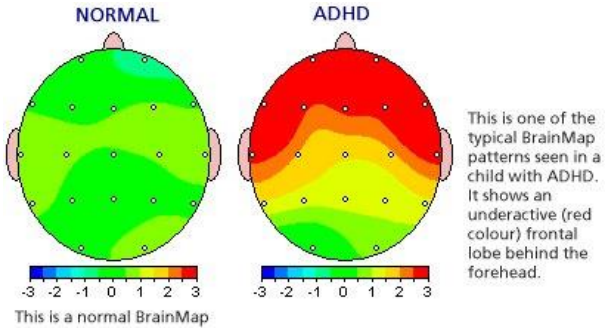
Attention Deficit inhibits a person's ability to concentrate and complete tasks or to fully participate in activities. For children, this can mean poor grades, difficulty maintaining relationships and being subjected to continual criticism and discipline for not paying attention or for acting out. Typical symptoms/behaviors include: difficulty paying attention under ordinary circumstances, inability to follow instructions or finish homework, difficulty with organization, easily distracted, forgetfulness, fidgety, leaving abruptly, talkative and tends to blurt out responses, and impatient.

ADHD essentially involves brain abnormalities – the brainwave patterns are usually slower than normal in the frontal areas of the brain. The front of the brain represents our executive control centers, which regulate attention, emotion, and behavior (Hammond, 1999). Executive functioning is typically impaired in children with ADHD, ultimately affecting their academic achievement (Rossiter, 2004).



Example of frontal hyperconnection in ADHD

When looking at EEG patterns in children with ADHD it has been shown that they have more theta wave activity and increased theta:beta ratio in the frontal cortex, in comparison to children without ADHD (Steiner et al., 2014). It is noted by Steiner et al. that beta waves in the frontal cortex are associated with sustaining attention and thinking, whereas theta waves are prevalent when drowsy or daydreaming (Steiner et al., 2014). As a result of the EEG patterns described above, persons with ADHD typically are easily distracted, have a short attention span, and have difficulty following directions and listening. Likewise they tend to lack control over their emotions, making them more prone to tantrums, mood swings, and emotional outbursts. Oftentimes, people with ADHD also have difficulty controlling their behavior, tending to be impulsive, fidgety, overly talkative, and hyperactive (Hammond, 1999).



Brain Scanning. (2005). Retrieved May 7, 2015, from: http://www.sydneydevelopmentalclinic.com.aubrain_scanina.htm

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Hammond, D. C. (1999). Neurofeedback in the treatment of ADD/ADHD. AmericanDoctor.com, Inc. Handout distributed by Dr. Hammond.

Rossiter, T. (2004). The Effectiveness of Neurofeedback and Stimulant Drugs in Treating AD/HD: Part II. Replication. *Applied Psychophysiology and Biofeedback, 29*(4), 233-243.

Steiner, Naomi J., Elizabeth C. Frenette, Kristen M. Rene, Robert T. Brennan, and Ellen C. Perrin. "In-School Neurofeedback Training for ADHD: Sustained Improvements From a Randomized Control Trial." *Pediatrics* 133.3 (2014): 483-92.

The Discovery of Neurofeedback for Epilepsy and ADD

Back in the late 1960's Dr. Barry Sterman, as part of the research being done in Sterman's labs, taught cats to increase the "Sensorimotor rhythm", also known as SMR. Sterman labeled this wave form "Sensorimotor rhythm," or SMR, because it was most easily measured across the sensorimotor strip of the brain, which runs across the head from ear to ear, and because these waves seemed to reflect both sensory and motor activity (Sears & Thompson, 1998). While experimenting hydrazine's effects on cats (upon being asked to investigate how hydrazine – a fuel used in rockets, including rockets for the first manned space flights – might produce seizures) he observed the cats who were trained during earlier research to increase the SMR brain waves were resistant to seizures (Sears & Thompson, 1998). Further investigation demonstrated that this also held true for people. In other words, when humans who had seizure disorders were trained to increase this wave form, their seizures decreased.

During further experiments in the early 1970's, the observation was made that many of the subjects who displayed hyperactivity and restlessness in addition to having seizure disorders showed a decrease in these symptoms when they were trained to increase SMR (Sears & Thompson, 1998). The question that then arose was if hyperactive people with seizure disorders decrease their hyperactivity when they increase SMR, what happens with hyperactive children who do not have seizures? At the time, Joel Lubar had also been researching brainwaves since the early 1970s and took special interest in children with ADD. It was found that with training to increase SMR, their hyperactivity reduced (Sears & Thompson, 1998). This launched the beginning of continuous studies involving ways in which neurofeedback can improve the lives of children with ADD.

To read the full length article, please see the reference below:

Sears, W., & Thompson, L. (1998). Neurofeedback. The A.D.D. Book: New Understandings, New Approaches to Parenting Your Child (205-227). Little, Brown and Company.

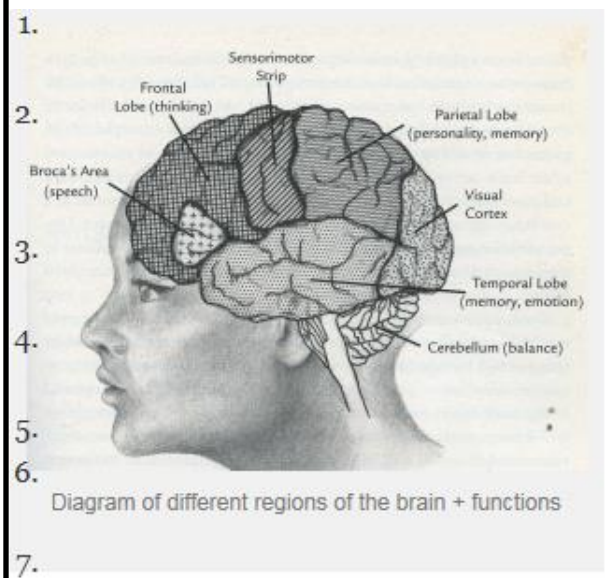

Diagram of different regions of the brain + functions

Broca's Area– speech, facial neuron control, language processing

Frontal Lobe– thinking (planning, reasoning, judgement), impulse control, higher order functions

Sensorimotor Strip– controls the five senses

Parietal Lobe– personality, memory, cognition

Visual Cortex-sight

Temporal Lobe– memory, emotion, speech

Cerebellum– balance, coordination

Small, Gary & Gigi Vorgan. (2008). *iBrain: Surviving the technological alteration of the modern mind*. New York: Collins Living.

Connectivity-Guided Neurofeedback as a Modality to Decrease ADHD Symptoms

Reports documenting the use of EEG neurofeedback for the treatment of ADHD began to appear in literature in the mid-1970's (Rossiter & La Vaque, 1995). For more than three decades, stimulant drugs have been the treatment choice for ADHD (Rossiter, 2004). However, while medication is a viable treatment option for children with ADHD, it is also associated with significant limitations. According to Steiner et al., "Medication frequently improves symptoms, although it may not lead to complete normalization of symptoms, and long-term adherence to medication as prescribed varies between 13.2% and 64%, with long-term effectiveness yet to be found. When medication is discontinued, symptoms usually return. Furthermore, Some children (20-30%) do not show clear benefit and/or experience adverse effects from stimulant medication, such as decreased appetite, insomnia, and growth suppression, which has been reported to reverse only after stopping medication" (Steiner et al., 2014)

It was not until the 1990s that neurofeedback became widely available as an alternative to stimulant drugs (Rossiter, 2004). Due to previous research, it is now supported as an efficacious treatment for children with ADHD (Steiner et al., 2014). ADHD is currently the most researched disorder that neurofeedback addresses. Over 80 studies support the use of neurofeedback in decreasing symptoms of ADHD.

The professionals at The Neuroconnection have been utilizing neurofeedback since 2001 and in 2008 we began training our clients using an advanced form of neurofeedback called "Connectivity-Guided Neurofeedback" (CGNFB). State-of-the-art brain mapping today enables us to evaluate regions of the brain, looking at areas that are too loosely or too tightly connected and aims to make changes to these abnormalities in functioning. Only NeuroRep, a multivariate coherence measurement, developed by Dr. William Hudspeth, correctly assesses the 3-dimensionoal waveforms in the brain and produces the statistical computations that show how the brain is communicating with itself.

As mentioned earlier, previous research and studies showed that individuals with ADHD have decreased prefrontal cortex activity. However, through the use of brain SPECT imaging we now know that other patterns of increased complexity exist. According to Amen, "SPECT is a sophisticated nuclear medicine study that looks directly at cerebral blood flow and indirectly at brain activity (or metabolism) (Amen, 2001). It is through SPECT studies that the discovery of a number of different brain systems involved with ADHD was discovered. The table below outlines the brain-imaging findings for the different types of ADHD that was identified by Amen's studies.

Type	SPECT Findings	Primary Symptoms
Type 1: Classic ADD	A normal resting brain. During concentration, decreased activity in the underside and lateral prefrontal cortex with concentration.	Inattentive, distractible, disorganized, hyperactive, restless, and impulsive.
Type 2: Inattentive ADD	A normal resting brain. During concentration, a decreased activity in the lateral prefrontal cortex.	Inattentive, sluggish, slow-moving, low motivation, often bored
Type 3: Overfocused ADD	At rest and during concentration there is increased activity in the anterior cingulate gyrus. During concentration there is also decreased activity in the underside and lateral prefrontal cortex.	Has trouble shifting attention, frequently gets stuck in loops of negative thoughts or behaviors, obsessiveness, excessive worrying, inflexibility, frequent oppositional and argumentative behavior
Type 4: Temporal Lobe ADD	At rest and during concentration there is increased (and infrequently increased) activity in the temporal lobes. During concentration there is also decreased activity in the underside and lateral prefrontal cortex.	Inattentiveness, irritability, aggressiveness, dark thoughts, mood instability, learning problems, inattention, and impulsivity
Type 5: Limbic ADD	At rest there is increased deep limbic activity (thalamus and hypothalamus) and decreased activity in the underside and lateral prefrontal cortex. During concentration there remains increased deep limbic activity and decreased prefrontal cortex activity.	Inattentiveness, chronic low-grade depression, negativity, "glass-half-empty" syndrome, low energy, and frequent feelings of hopelessness and worthlessness.
Type 6: "Ring of Fire" ADD	At rest and during concentration (often worse during concentration) there is patchy increased uptake across the cerebral cortex with focal areas of increased activity, especially in the left and right parietal lobes, left and right temporal lobes, and left and right prefrontal cortex. In addition there is often increased activity in the cingulate gyrus.	Inattentiveness, extreme distractibility, anger, irritability, oversensitivity, moodiness, hyperverbal, and extreme opposition

Connectivity-Guided Neurofeedback as a Modality to Decrease ADHD Symptoms

NeuroRep allows us to see patterns of EEG activity similar to the SPECT imaging for the different types of ADHD. CGNFB enables us to treat ADHD by addressing the specific connections in regions of the brain. We take into account not only power abnormalities but also abnormalities with connectives and connections between areas. By training connections of the brain in the affected regions, we are able to make changes in the way the brain communicates with itself. Furthermore, through our unique way of looking at the abnormalities within the EEG we are able to consider subclinical epileptiform activity. In such cases where paroxysmal events are present, we can then refer out to a neurologist for closer examination and treatment. Ultimately, NeuroRep, in combination with our spike detection capability reviewed by a trained neurologist, makes our work with ADHD far more accurate and successful with what we train.

In essence, CGNFB provides individuals with immediate auditory and/or visual feedback, regarding their level of attention during each session. Changes are enabled for individuals with ADHD because of the brain's neuro-plasticity. CGNFB trains individuals to monitor and change their brainwave, leading to behavioral changes. It allows the participant to learn what concentration feels like. Much of the learning happens at an unconscious level, which explains how young children can set their brain wave pattern without much conscious awareness of what they are supposed to do.

For instance, the following has been found as a result of CGNFB training: decreased impulsiveness and hyperactivity, improved focus and ability to concentrate, increased IQ scores and better grades for school children, improvement in organizational skills and ability to follow through, less time spent on homework, improvement in self-esteem and sociability, greater emotional control and stability of moods, and improved sleep patterns are generally found as well. In addition, several studies have consistently found that IQ scores improved, usually from 10-23 points, due to the enhanced intellectual efficiency (Hammond, 1999). The results are lasting and most often stimulant medications can be eliminated or reduced.

References:

Amen, D. (2001). *Healing ADD: The breakthrough program that allows you to see and heal the 6 types of ADD*. Ney York: G.P. Putnam's Sons.

Hammond, D. C. (1999). Neurofeedback in the treatment of ADD/ADHD. AmericanDoctor.com, Inc. Handout distributed by Dr. Hammond.

Rossiter, T. (2004). The Effectiveness of Neurofeedback and Stimulant Drugs in Treating AD/HD: Part II. Replication. *Applied Psychophysiology and Biofeedback, 29*(4), 233-243.

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Steiner, Naomi J., Elizabeth C. Frenette, Kristen M. Rene, Robert T. Brennan, and Ellen C. Perrin. "Neurofeedback and Cognitive Attention Training for Children with Attention-Deficit Hyperactivity Disorder in Schools." *Pediatrics* 35.3 (2014): 18 27.

Evidence-Based Research

A randomized control study, conducted by Steiner et al in 2014, utilized 104 children with a formal ADHD/ADD diagnosis between the ages of 7-11 years old in public elementary or urban schools in the Greater Boston area. The objective of this study was to evaluate sustained improvements 6 months after a 40-session, in school computer attention training intervention using neurofeedback or cognitive training (CT). The children were randomly assigned to receive either neurofeedback, CT, or a control condition and were then evaluated 6 months postintervention. A 3-point growth model assessed change over time across the conditions on the Conners 3-Parent Assessment Report (Conners 3-P), the Behavior Rating Inventory of Executive Function Parent Form (BRIEF), and a systematic double-blinded classroom observation (Behavioral Observation of Students in Schools).

The results of this study found that neurofeedback participants made more prompt and greater improvements in ADHD symptoms, which were sustained at the 6-month follow-up, than did CT participants or those in the control group (Steiner et al, 2014). Steiner et al (2014) concluded the article by stating, "The finding that neurofeedback was superior to CT on multiple scales further supports its efficacy as a treatment of children with ADHD. Effects were reported earlier in the neurofeedback condition than in the CT condition and were also stronger at the 6-month follow-up period, showing the promise of neurofeedback as a treatment with sustained gains for children with ADHD." (p. 490)

***For more information pertaining to this study, please review the reference below.**

Steiner, Naomi J., Elizabeth C. Frenette, Kristen M. Rene, Robert T. Brennan, and Ellen C. Perrin. "In-School Neurofeedback Training for ADHD: Sustained Improvements From a Randomized Control Trial." *Pediatrics* 133.3 (2014): 483- 92.

@ Home Training through The Neuroconnection

The Neuroconnection @ Home Training brings Connectivity-Guided Neurofeedback to the convenience of your home.

Call (630) 858-5105 now to find out more!

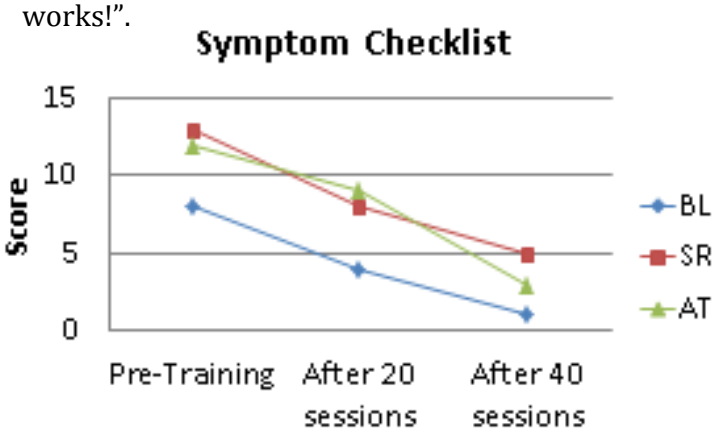
CGNFB Provides Success for a Patient with ADHD at The Neuroconnection

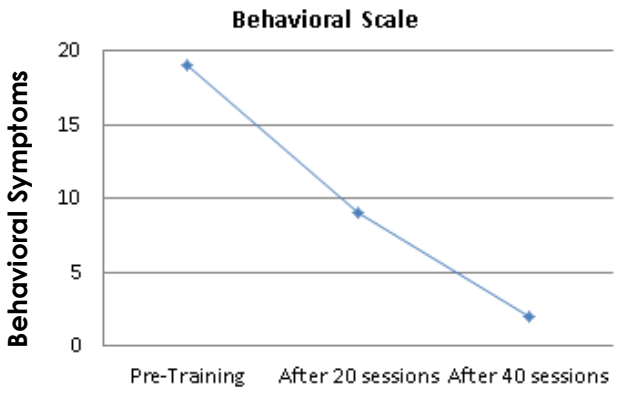
The experts at The Neuroconnection have had a great deal of success addressing ADHD symptoms with Connectivity-Guided Neurofeedback (CGNFB). One such client was "Jack", who started CGNFB training when he was 7 years old at The Neuroconnection in January 2013. Jack was formally diagnosed with the combined form of ADHD. Jack's mother was seeking improvement regarding: difficulty in focusing, inattention, hyperactivity, low self-esteem, learning difficulties, and anxiety. His mother reported that around 1st grade, Jack's teachers started to mention that his behaviors were not appropriate. For instance, Jack could not stay seated, he was very active, he had a difficult time following directions, he displayed poor eye contact, developed tics, and would chew on clothes.

Following the initial intake, A QEEG was performed and the results showed some frontal hyperconnectivity in the Theta and Beta frequencies. Frontal hyperconnectivity is associated with inattention, difficulty shifting attention and problems with planning and organization. Based on the QEEG findings, a protocol was developed to train specific areas of the brain which correlated with clinical symptoms. Jack participated in twice-weekly CGNFB sessions in order to decrease presenting symptoms.

After completing the first protocol of 20 CGNFB sessions, Jack's mother noticed considerable improvements with his behavior and some improvement with attention. She reported that his hyperactivity decreased, his tics were gone, he no longer chewed on his clothing, and his anxiety decreased. Furthermore, he was falling asleep more easily. Progress was also tracked through re-administration of several checklists that were completed during the initial intake, including a Behavioral Scale and a Symptom Checklist. His progress (shown in the graphs) represents the symptom reduction. Overall, Jack's mother reported a 53% reduction in behavioral symptoms.

Although Jack's mother shared his focus improved as a result of his first protocol, it was still a problem that she wanted to see addressed further. We then remapped Jack and the comparison from the 1st map showed considerable improvement in frontal hyperconnectivity. As a result, we pursued further by training the right side – front to back – in order to target Jack's impulsivity, inattention, and anxiety. Jack completed 20 additional CGNFB sessions. Jack continued to make significant and steady gains during his second protocol. At the completion of his 40th CGNFB session, his mother reported that "everything" improved. For instance, she reported that Jack was less impulsive and hyperactive, more attentive, his tantrums decreased, his ability to transition improved, his stress levels were down, learning abilities improved, sleep improved, and ability to follow directions improved. His mother noted that "everything makes sense to him now". Not only was this noticed by his mother but his father and relatives noticed a huge difference as well. With being able to focus and attend to tasks more easily, Jack's teachers noticed a significant change. They shared that he is now more motivated in school. Jack himself reported that school was "easier". Of further significance, Jack's mom reported a 90% drop on the behavioral scale with just 40 sessions of CGNFB training. Her final comment with us at The Neuroconnection was "This brain therapy is great and it really works!".





*Name has been changed to maintain confidentiality.

Learn more about The Neuroconnection's director:

Ann L. Rigby, MSW, LCSW, BCN has over 25 years of experience in the mental health field. She has specialized training and extensive experience in the areas of Autism, Attention Deficit Hyperactivity, Anxiety, and Mood Disorders. Ms. Rigby has been providing Neurofeedback services since 2001. She founded "The Neuroconnection", a Brain Mapping and Neurofeedback clinic that provides an advanced, research-based form of Neurofeedback known as Connectivity Guided Neurofeedback.

Ms. Rigby is the Board Chair for the Autism Society of Illinois and is a field placement instructor for graduate students from Benedictine University. She holds memberships with the International Society for Neurofeedback and Research (ISNR), the Association of Applied Psychophysiology and Biofeedback (AAPB), the Biofeedback Certification Institute of America (BCIA), and the National Association of Social Workers (NASW).

Ms. Rigby is a frequent speaker and exhibitor at many national and regional conferences throughout the year on topics related to the benefits of Connectivity Guided Neurofeedback. In the past year, Ms. Rigby spoke at the following conferences: The 45th Autism Society of America National Conference, The Special Needs Expo, The Family Time Magazine Autism and Special Needs Seminar, and the Autism Society of Illinois 10th Annual Parent and Professional Networking Conference.

To learn more about up and coming speaking engagements, go to our website www.theneuroconnection.com and visit our Resources tab.

Financing available with low monthly payments!

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