



# IJGDBP

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## Content

<b>Editorial</b> Suneel Godbole .....	2
<b>Development for All – Cradle to Crayons and Beyond</b> Pramod Jog .....	3
<b>Multiple Intelligences in Children: Identification and Applications</b> Suneel Godbole, Ashwini Godbole .....	6
<b>Adolescent Neurodevelopment : Implications for Clinicians</b> Preeti M Galagali .....	9
<b>Recognizing ADHD in Office Practice</b> Monika Sharma .....	14
<b>Specific Learning Disability: Evaluation and Management</b> Anjana Thadhani .....	17
<b>Early Intervention for Children with Specific Learning Disability</b> Rukhshana F. Sholapurwala .....	22
<b>Modern Rehabilitation Approaches for Patients with Cerebral Palsy</b> Volodymyr Kozyavkin, Anjan Bhattacharya .....	24
<b>Changes in Psychomotor Development of Children with Autism During Intensive Neurophysiological Rehabilitation.</b> Kozyavkin V .....	29
<b>Early Intervention : Key To Success</b> Zafar Meenai .....	34
<b>Caveats of Pediatric Endocrine and Growth Disorders in Clinical Practice</b> Vaman Khadilkar .....	36
<b>Enhancing Growth in Chronic Disorders</b> Anju Seth .....	38
<b>Counseling In Pediatric Practice</b> Suchit Tamboli .....	41

## Editorial

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It gives me immense pleasure to present this special issue of Indian Journal of Growth, Development and Behavioral Pediatrics. I feel fortunate for being the editor of this issue as well as the organizing secretary of the 15th National Conference of GDBP organized by GDBP chapter of IAP and Pune branch of IAP. Obviously the highlights of this issue are the articles contributed by the eminent faculty of the conference.

The focus of current issue is "Intervention Strategies in Developmental Disorders in Children". The articles contributed by experts from India and abroad are aiming at these intervention strategies. A multitude of topics ranging from early intervention, growth and endocrine disorders, autism, learning disability, cerebral palsy, difficult adolescence, counselling practices, ADHD, up to applications of multiple intelligences in OPD practice are highlights of this issue. Each and every article reviews the depth and breadth of knowledge and experience in developmental pediatrics. I appreciate from the bottom of my heart, the pain-staking efforts taken by the authors to pen these wonderful articles.

Here is wishing you an academic feast providing stimulating, holistic update with a multidisciplinary approach that has stood the test of time in the management of childhood developmental disorders.

**Suneel Godbole**  
*Editor of this Issue*



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**Jaydeep Choudhury**  
*Editor-in-Chief*

## Development for All – Cradle to Crayons and Beyond

**Pramod Jog**

*National President, Indian Academy of Pediatrics, 2016*

Pediatricians who start their practice afresh know principles of development and milestones by heart. As they start getting busy, the practice starts becoming 'gross motor' and vaccination supersedes developmental assessment! They get fumbled when anxious mothers ask: 'Whether my child is normal or abnormal?' 'What can I do for detection?' 'What will be his future?' 'What can I do to increase my child's intelligence?' 'My child is not behaving properly; is there any way to bring him on the track?'

The program in IAP Action plan 2016 – "*Cradle to Crayons*" – aims at sensitizing a common pediatrician on child development. Development starts from cradle and continues right upto school where child starts performing, writing and drawing using crayons. This critical period of early childhood is very important; the role of pediatricians in child development is multifold and unique. In early years, when a baby is brought for checkup/vaccination, while measuring height and weight, we can watch the development of the child. This developmental watch will hardly take a minute, but it will help us to pick up developmental deviations at the early age. A pediatrician has to be enabled with the knowledge of developmental milestones and simple screening tools for developmental disorders.

Well baby visit or immunization visit is an opportunity for development watch, early intervention and parent counseling. One should not miss it. It will be worthwhile putting up charts providing age-wise information on vaccination, feeding, milestones and red flags, in the clinic. For example, when a child presents at 6 months of age, the pediatrician, after administration of OPV1 and HBV3, can give advice on complementary feeding, check for milestones like rolling over in both directions, bringing things to mouth, responding to own name, and knowledge of familiar faces. Inability to roll-over and absence of babbling/squealing should be considered as red flags.

The survival of high-risk neonates has improved considerably in the past three decades due to improved perinatal care, but the quality of survival is also important<sup>1</sup>. These high risk neonates remain at a substantial risk for long-term morbidity, including cerebral palsy, developmental delay, intellectual disability, school problems, behavioral issues, growth failure and overall poor health status. When it comes to intact survival, the care beyond neonatal intensive care unit (NICU) is forgotten. The job starts right at the doorstep of NICU<sup>2</sup>. The program 'cradle to crayons' starts with NICU advice, identification of high risk,

screening the children, and simple advice for parents to stimulate their child. Pediatricians need to be empowered so as to enable the child to achieve maximum potential.

Although a continuous process, the initial years of life and pre-school years are the most critical period in the child's development<sup>3</sup>. Developmental problems are one of the most prevalent health problems among children and adolescents. We need to be prepared to evaluate and identify factors that may influence normal child development. We are also responsible for prevention, early diagnosis and coordination of the multidisciplinary treatment of these patients in addition to basic medical assistance that is essential to guarantee a good quality of life<sup>4</sup>. We all should know that the developmental and behavioral problems are taken care of by a team of professionals where developmental pediatrician is master of orchestra. The team includes: (a) clinical psychologist who can administer developmental tests as well as can give inventories; (b) educational psychologist who gives guidance on study skills and examination techniques; (c) counselor who is necessary for handling stress in parents as well as to give different ways to solve their problems; (d) physiotherapist who is necessary for correction of tone abnormality as well to manage motor delay in children; and (e) occupational therapist who gives guidance for handling, positioning, bathing, daily care, dressing, feeding etc. Pediatricians – at the centre of this team – can help the parents to coordinate with this team for the best results. The knowledge imparted in 'cradle to crayons' will also help pediatricians to guide the parents with 'Facts and Acts' about various

developmental disorders. Pediatrician should learn simple and quick screening tests. Appropriate use of such screening tests will help pediatricians to diagnose developmental disorders at early age and start early intervention. Research shows that early intervention treatment services can greatly improve a child's development and help children from birth through 3 years of age learn important skills. Services include therapy to help the child talk, walk, and interact with others<sup>5</sup>. Making child emotionally intelligent is also the need of hour. Nurturing emotional intelligence skills at an early age acts as the 'psychological vaccine.' Emotional intelligence is the key to body-mind wellness. Children and their parents should learn emotional skills to become successful as well as to face stress in their life. This also implies understanding parenting style and its emotional consequences<sup>6</sup>.

*The Craze of 'Fast Schooling'*: Parents nowadays are crazy about putting their tiny tots in an aggressive academic oriented pre-school, in spite of awareness of child-centered education, knowing the importance of 'learn through play' and advice by pediatricians and child-friendly educationists. Probably this attitude comes from our 'immediate gratification' culture. We, in our modern, fast, computer-based world, expect to change the world by 'a touch of finger.' Similarly, the parents want their children to achieve great academic feats at an early age. This pushes the child on a wrong track that may ruin their beautiful childhood. Here we should remember a simple analogy – the artificially ripened mangoes may look more attractive than the mangoes which take time to ripen on the tree;

but when you taste them, you know the difference!

Let us **SHARE**:

**S:** Set the tone: create a holding environment in the context of the pediatric visit. Support parent and child, Build a therapeutic alliance.

**H:** Hear the parents' concerns about their child's behavior and development.

**A:** Address specific risk factors for child development and family functioning. Allow parents to reflect how cultural conditions contribute to their expectations of child behavior and development.

**R:** Reflect with parents their experience of their child. Reframe child behavior and development in terms of the child's

developmental level. Revisit the therapeutic goals set.

**E:** Empower the parent and child by formulating an action plan to address the concerns voiced during the visit.

The development of a child is a continuous process. It continues right into adulthood. We too are developing. We need to develop academically too! The experts, I am sure, will take us on a joy ride along this path. We all are torch bearers, and I earnestly expect our colleagues to take this knowledge to each corner of the country and help every child. I hope that our colleagues get 'stimulated early' with 'cradle to crayons', and at the first birthday party, the child 'waves bye bye' to the pediatrician who leaves with an advice on diet and vaccines.

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## Multiple Intelligences in Children: Identification and Applications

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According to a traditional definition, intelligence is a uniform, fixed cognitive capacity people are born with. This capacity can be easily measured by short-answer tests, but this traditional view has many limitations. Instead, Dr. Howard Gardner (1983) proposed theory of multiple intelligences to account for a broader range of human potential in children and adults. He defined the first seven intelligences in frames of mind (1983). He added the last two in Intelligence Reframed (1999). Dr. Gardner says that our schools and culture focus most of their attention on linguistic and logical-mathematical intelligence. However, we should also place equal attention on individuals who show gifts in the other intelligences.

Gardner states that,

- Intelligence is the ability to find and solve problems and create products of value in one's own culture.
- All are smart. We are smart in different ways. One way is not better than another.
- All human beings possess all nine intelligences in varying amounts.
- Each person has a different intellectual composition.
- These intelligences are located in different areas of the brain.
- These intelligences may define the human species.
- These multiple intelligences (MI) can be

nurtured and strengthened, or ignored and weakened.

- There is no hierarchy in importance among the intelligences.

Following is the brief description of these intelligences :

**1. Verbal-linguistic intelligence:**

Well-developed verbal skills and sensitivity to the sounds, meanings and rhythms of words. (journalist, teacher, lawyer)

**2. Mathematical-logical intelligence:**

Ability to think conceptually and abstractly and capacity to discern logical or numerical patterns. (engineer, programmer, accountant)

**3. Musical intelligence:**

Ability to produce and appreciate rhythm, pitch and timber. (musician, composer, disc jockey)

**4. Visual-spatial intelligence:**

Capacity to think in images and pictures to visualize accurately and abstractly. (navigator, sculptor, architect)

**5. Bodily-kinesthetic intelligence:**

Ability to control one's body movements and to handle objects skillfully. (athlete, firefighter, actor)

**6. Interpersonal intelligence:**

Capacity to detect and respond

appropriately to the moods, motivations and desires of others. (counselor, politician, salesperson)

**7. Intrapersonal intelligence:**

Capacity to be self-aware and in tune with inner feelings, values, beliefs and thinking processes. (researcher, novelist, entrepreneur)

**8. Naturalist intelligence:**

Ability to recognize and categorize plants, animals and other objects in nature. (environmentalist, farmer, botanist)

**9. Existential intelligence:**

Sensitivity and capacity to tackle deep questions about human existence, such as meaning of life, why do we die, and how did we get here. (philosopher, theorist)

Many scales are available free on internet. One can use one of them depending upon the age of child and expected application of the scale.

**MI and Developmental Disorders**

Pediatricians in their routine pediatric practice encounter many developmental disorders in children. As these disorders are on the confluence of medicine, education and psychology; their management is challenging. MI approach can be used as a holistic tool to manage these disorders in simplistic, child-oriented way. Here are some examples.

**MI and LD :**

Students with learning disabilities have long been receiving inappropriate labels and treatment, because of their learning differences. While comparing LD and non-LD students; the musical, bodily/kinesthetic, Intrapersonal, and natural intelligence scores in two groups showed no significant difference. Results also showed: non-LD students were substantially higher in the linguistic. Logical/mathematical and interpersonal intelligence

scores – which are commonly assessed and used in routine academics. Interestingly the visual-spatial intelligence scores in LD students were significantly higher than the regular students. Visual-spatial children remember what they see, so use visuals and hands-on experiences (Mahnaz Akhavan Tafti, 2014).

**MI and ADHD :**

ADHD is now a day very common developmental disorder seen in children and has direct impact on the performance (academic as well as social) of the child. Educators try to find weaknesses in ADHD children and try to help them with medications, behavioral therapy and academic inputs. According to Thomas Armstrong (1999); one needs to look beyond a "deficit" approach to ADHD and embrace a more holistic view of learners that includes teaching to their multiple intelligences, especially using bodily-kinesthetic, musical and naturalistic intelligences.

**MI and autism :**

Children with Autism Spectrum Disorder fail to perform on traditional intelligence tests but they may perform on Multiple Intelligences Scales. Among the 10% of persons who are autistic, there is a wide spectrum of savant abilities. Savant skills can be observed as exceptional memory or exceptional musical or artistic skills in children with autism spectrum disorder. This can be explained by the Weak Central Coherence hypothesis which assumes that people with an autism spectrum disorder tend to have difficulty processing global information, such as context-dependent information; thus, these people frequently show processing biases in favor of local features. This results in a unique cognitive profile of individuals with autism where they show a bias towards processing local, detailed

information and a corresponding weakness in extracting global form or meaning (Happe, *et al*, 2006). As Gardner indicated with MI theory, if musical and artistic abilities are recognized as intelligence, children with savant syndrome can demonstrate exceptional skills in some domains.

**MI and emotional disturbances :**

Traditional psychometric tools are having limitations in assessing children with emotional disturbances like anxiety, depression etc. Gardner's theory of MI comes handy in these children also. The two intelligences namely interpersonal and intrapersonal intelligences correlate well with emotional disturbances (Moshe Zeidner, *et al*, 2009).

**MI and adolescence :**

Adolescents are at the age where they become fully aware of themselves as people. They realize that they are part of a society and they begin to branch out in their thinking. Their thoughts become more abstract and logical. However, in adolescents, because of puberty, the emotional side of the brain is

working in overdrive. All of these factors contribute to the way adolescents function and behave. Adolescents also grow physically during a short period of time during their teenage years and this can cause some to become self-conscious (Gurpreet Kaur *et al* 2008). This turmoil affects all the intelligences in adolescents; especially the interpersonal and intrapersonal ones. The theory of multiple intelligences is an excellent tool or resource for teaching young adolescents because it allows them to explore and nurture their own abilities on various intelligences.

Gardner's Multiple Intelligences theory is a very useful model for developing a systematic approach to nurturing and teaching children and honoring their individual needs and strengths. To extend this idea further; we can utilize this knowledge to understand developmental disorders in a new light and help such children to tide over the problems with his/her own strengths! As pediatricians; we can use this novel tool to connect better with children as well as parents.

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## Adolescent Neurodevelopment : Implications for Clinicians

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### Introduction

Adolescence is a transition period between childhood and adulthood. It is one of the most rapid periods of growth in which many changes occur in physical and psychosocial domains. In this period, puberty sets in, independent thinking begins and the adolescent starts moving away from the parents and family. It is also an age of autonomy bids, emotional reactivity, increased peer affiliation and involvement in sensation seeking behaviour. These changes may push adolescents into risky acts of rash driving, alcohol intake, violence, unsafe sexual behaviour, self harm and drugs.

Interplay of genes, hormones and environment determines brain development and ultimately behavior in adolescence. Latest research on the adolescent brain reveals that complex neuronal growth, reorganisation and myelination occurs in limbic system, amygdala, corpus callosum, cerebellum, pineal gland and finally in frontal lobes. This malleability of the brain helps the adolescent to adapt, change and survive the challenges of the current era.

Scientific evidence regarding plasticity of the adolescent brain has been mounting since the year 2000. Researchers have used imaging techniques like functional MRI, diffuse tensor imaging, mammalian experiments and post

mortem studies to study adolescent brain in detail. Due to limited sample sizes and laboratory constraints, as of now, causal relationships are difficult to establish and confirm. To a large extent, preliminary results have offered neurobiological basis of adolescent behaviour.

### Adolescent Neurodevelopment

Puberty triggers hormone dependent changes in reward circuitry of brain, increased sex drive and aggression. Risk taking behavior prepares the adolescent to face difficulties and crisis in life, sex is important for reproduction and aggression for protection of species. Hence changes in adolescent brain have an evolutionary basis and are essential for adapting to the existing social environment. Testosterone hormone stimulates aggressive behavior while estrogen favours a nurturing response. The important changes are summarised in Table 1.

**Table 1** : Key issues in adolescent neuro-development

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Synaptic pruning and myelination  
Frontalisation  
Alteration in reward circuitry  
Increased reactivity of limbic system  
Immature hypothalamic pituitary adrenal axis

---

**Synaptic pruning and myelination :**

Major 'rewiring' of brain takes place during adolescence. The brain follows the principle of 'use it or lose it'. The synaptic connections that are used the most get 'hardwired' and persist into adulthood while the others are lost. This is called pruning that improves brain efficiency. With pruning, the gray matter decreases with increasing age. It follows an inverted U shaped curve with peak at 11 years in girls and 13 years in boys. Increased myelination of the brain in adolescence results in integration of neural circuitry and increased cognitive ability and information processing.

**Frontalisation :**

Myelination of the brain begins from posterior to anterior. Prefrontal lobes are the last to mature. As the prefrontal cortex matures so do the adolescent's executive functions of organisation, time management, controlling emotional urges, judgment, decision making and problem solving. Frontalisation, i.e, complete maturity of the frontal lobe is completed by 21-24 years. In adolescence, complex emotional situations result in increased activity in amygdala and less in prefrontal cortex. This explains adolescent's highly emotive response to stressful situations. Suicidal tendency in : case of failure in exams or love relationship is the unfortunate result of such impulsive responses. The neuronal network connections between the prefrontal cortex and the limbic system strengthen with time reaching full maturity only in adulthood. Hence the 'top down' control system is relatively weak compared to highly responsive 'bottom up' system comprising of reward circuitry and limbic system.

**Reward circuitry :**

Dopaminergic neurotransmitter system and its

projections into ventral striatum comprise the reward circuitry of the brain. Major changes occur in dopaminergic receptors during adolescence resulting in greater activation in ventral striatum compared to children and adults while receiving rewards. This results in increased tendency towards novelty and sensation seeking behavior.

**Limbic system :**

Intense peer pressure and emotionally arousing situations can produce increased activation of amygdala and slow reaction time in adolescence. This phenomenon is called 'hot cognitions'. Adolescents are known to attain the adult decision making by 15 years of age but in stressful and emotional periods this ability is compromised due to a highly reactive amygdala. Amygdala in adolescence is less sensitive to aversive stimuli. Hence adolescents experience adverse effects of excessive alcohol intake like 'black outs' much later than adults.

**Hypothalamic pituitary adrenal axis :**

Immature hypothalamic pituitary adrenal axis in adolescence results in large surges of cortisol hormone under stress. High prolonged levels of cortisol are neurotoxic and can also compromise cardiovascular and immune systems.

**Other brain regions :**

Myelination in corpus callosum improves creativity, vocabulary, visuo spatial skills and psychomotor functions. Major changes occur in the cerebellum that enhances coordination and motor skills during adolescence. Later onset of melatonin increase by the pineal gland results in resetting of the circadian rhythm and delayed sleep onset.

## Factors Affecting Adolescent Neurodevelopment

Development of brain is a dynamic process and is affected by many factors as summarised in Table 2

**Table 2 :** Major factors affecting adolescent neurodevelopment

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Heredity  
Pre and post natal insult  
Sex  
Nutrition  
Sleep  
Exercise  
Media exposure  
Stress  
Drugs

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Many psychiatric disorders like major depression and schizophrenia are heritable. In many of these disorders there are changes in brain neurochemistry in the form of altered levels of neurotransmitters dopamine and serotonin. Studies have revealed intermediary phenotypes or endophenotypes having predilection for substance abuse based on biological variations in neurochemistry.

Prenatal insult in the form of severe maternal stress alter the fetus's neuroendocrine stress response and results in changes in amygdala and orbitofrontal tracts in utero. These individuals are prone to cardiovascular diseases and anxiety disorders in adolescence and adulthood. Postnatal insult in form of hypoxia can alter neurodevelopment.

Male and female adolescent brains do not differ much structurally. But there may be sex related differences in behaviour due to the influence of sex steroid hormones on brain growth. For example nurturing response in females and aggression in males is due to the effect of estrogen and testosterone hormones respectively.

Diets rich in omega 3 fatty acids promote myelination. Deficiency of dietary omega 3 fatty acids has been implicated in development of ADHD and schizophrenia. This is of special significance to adolescence when important areas of brain like the prefrontal cortex are in the process of maturation and myelination. Exercise improves blood flow to parietal and temporal lobes of the brain. It also stimulates release of brain derived neurotrophic factor that stimulates neuronal growth and myelination. Sleep deprived adolescents have a hyper responsive amygdala and so do the ones who watch excessive violent media. This heralds the onset of impulsive behavior and excessive anxiety in adolescence.

Excessive stress in adolescence results in increased levels of cortisol hormone which can hamper the neuronal growth especially in the hippocampus that is the main seat of learning and memory. Abusive upbringing has an adverse effect on brain neurodevelopment.

Drug use in adolescence can 'hijack' the reward circuitry of the brain resulting in lifelong addiction. The drugs bind on dopamine receptors, inhibit reuptake of dopamine and flood the synaptic junctions resulting in a 'high'- a feeling of thrill and pleasure. These adolescents cease to get enjoyment from their involvement in academics, extracurricular activities and sports and get a 'high' only with drugs. Poorly developed control of prefrontal cortex with a highly responsive amygdala in this age makes the adolescent to 'give in' easily to negative peer pressure and thereby into substance use and addiction. The adolescent brain as explained earlier is less sensitive to aversive effects of drugs paving the way to excessive substance use. Neurotoxins like drugs can damage the immature adolescent brain permanently leading to defective

cognition, poor learning due to a smaller hippocampus and increased impulsivity due to impaired development of frontal lobe. Gambling, internet and compulsive consumption of high calorie food also stimulate the reward circuitry of brain and are known addictive disorders.

### **Clinical Implications**

Adolescence is a period of great opportunity and vulnerability. Adolescent health specialist can help adolescents to harness their brain potential. Adolescent physicians should understand the neurobiology of the adolescent brain to impart evidence based anticipatory guidance, to counsel parents and to formulate effective treatment plans and community based prevention programs against high risk behaviour. These are explained in brief below:

- Emotional reactivity, poor executive functions and predilection for high risk behaviour of the adolescent can be explained on the basis of a 'reactive' mature limbic system and an immature 'control' frontal lobe. This scientific explanation would help 'distraught' parents to empathise with the adolescent.
- 'Use it or lose it' principle of pruning and 'hardwiring' forms the basis of providing life skill training to adolescents. If neuronal connections for 'good' judgement are used often in adolescence, they would persist in adulthood. This also explains how life skills taught in adolescence can track into adulthood.
- Sensation seeking behavior of adolescence can be explained on the basis of the reactive reward system. An adolescent who does not have a high self

esteem and does not get rewards or appreciation from trustworthy elders and friends or from involvement in academic and extra academic activities may resort to drugs to seek a dopamine high. As the frontal lobe is still immature, the chances of drug addiction are highest in adolescence.

- Neurotoxins like drugs can damage the immature adolescent brain permanently leading to defective cognition, poor learning due to a smaller hippocampus and increased impulsivity due to impaired development of frontal lobe. The adolescents should be educated regarding the effect of drugs on the developing brain during drug prevention programs.
- Maladaptive learning during brain maturation can herald the onset of bipolar and depressive disorders especially for those who are genetically predisposed.
- Physiological changes in sleep should be explained to the adolescent and parents. Importance of a regular sleep schedule, sleep hygiene, dietary and physical activity counselling should form a part of anticipatory guidance.

Gene encoded, hormone aided development of the brain to a great extent is influenced by the environment in which the adolescent grows. Caring, non judgmental trustworthy adults including parents, teachers, pediatricians and other caretakers, who nurture self esteem and guide and counsel the adolescents appropriately will keep the brain development trajectory on track and help them to grow into responsible independent adults.

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**Development for All: Cradle to Crayons and Beyond  
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## Recognizing ADHD in Office Practice

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ADHD or Attention Deficit Hyperactivity Disorder, is the commonest developmental behavioral problem seen in children. Whilst it is the commonest to be seen, it is also one of the most over diagnosed entity. People in general and parents in particular feel so 'aware' about ADHD, that any child with the slightest of behavioral issues is labelled as having hyperactivity or attention deficit. Though in most circumstances it isn't too difficult to recognize the problem, it is worthwhile to revisit the essential criteria to diagnose ADHD.

#### **What is ADHD?**

Attention deficit hyperactivity disorder is a behavioral disorder characterized by three key features viz inattention, hyperkinesia and impulsivity. Individuals may have features on either one type or a combination of symptoms. Being a developmental disorder, the symptom onset begins early in life and usually persist in adulthood.

#### **What are the Typical Symptoms of ADHD?**

##### ***Inattention :***

Inattention is characterized by an individual moving on to a task without completing the previous apparently losing interest. Such individuals are easily distracted and are unable to organize activities.

##### ***Typical symptoms –***

- (i) Failure to give attention to details

- (ii) Making careless mistakes
- (iii) Difficulty in following instructions
- (iv) Losing things
- (v) Difficulty in organizing tasks
- (vi) Poor attention when being spoken to
- (vii) Easily distracted
- (viii) Avoid activities requiring mental effort

##### ***Hyperactivity :***

This refers to increased motor activity. Symptoms of over-activity vary with age. While a young child may present with too much running and jumping around inappropriately, older children may be fidgety and talkative. Young adults may present with feeling of extreme restlessness.

##### ***Typical symptoms –***

- (i) Fidgetiness with hands or feet
- (ii) Squirming in their seats
- (iii) Often leaves the seat in the classroom
- (iv) Running about or climbing excessively
- (v) Feeling of restlessness in older individuals
- (vi) Talking excessively

Difficulty playing or engaging in leisure activities

##### ***Impulsivity :***

People with impulsivity are reckless and impatient. They find it difficult to wait for their

turn, interrupt others and blurt out answers before a question is completed.

*Typical symptoms are –*

- (i) Blurting out answers before questions are completed
- (ii) Interrupting or intruding others in conversations
- (iii) Difficulty in waiting for their turn

### **Diagnosing ADHD**

Various symptoms of ADHD may present in children with various multisensory problems, chiefly audiovisual deficits. Children with certain types of learning disability also present with co-morbid ADHD. Hence, it is of utmost importance to rule out the presence of underlying problems that may lead to a misdiagnosis of ADHD prior to deciding treatment. Every individual with a suspected ADHD deserves to be observed, preferably in multiple setting and information sought from various sources such as parents, teachers for school going children and from themselves in case of young adults. The entire process of information gathering must be allotted a good amount of time as our further approach to management depends on it.

Data gathering from a clinical interview should be followed by a meticulous clinical examination to rule out underlying neurological disorders. Every individual with suspected ADHD should also have a hearing and visual assessment to rule out these deficits as the cause behind apparent ADHD.

### **DSM 5 criteria:**

The Diagnostic and Statistical Manual (5-TM) is the gold standard in diagnosing an individual with ADHD.

### **Overview:**

- A persistent pattern of inattention and/or

hyperactivity-impulsivity that interferes with functioning or development

- Six or more of the symptoms have persisted for at least six months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities. It has to be noted that the symptoms are not solely a manifestation of oppositional behaviour, defiance, hostility, or failure to understand tasks or instructions. For older adolescents and adults (age 17 and older), five or more symptoms are required
- Several inattentive or hyperactive-impulsive symptoms were present prior to age 12 years
- Several inattentive or hyperactive-impulsive symptoms are present in two or more settings (e.g. at home, school, or work; with friends or relatives; in other activities)
- There is clear evidence that the symptoms interfere with, or reduce the quality of, social, academic or occupational functioning
- The symptoms do not occur exclusively during the course of schizophrenia or another psychotic disorder and are not better explained by another mental disorder (e.g. mood disorder, anxiety disorder, dissociative disorder, personality disorder, substance intoxication or withdrawal)

The criteria for diagnosis have more or less been constant over the years with slight modifications in their use from DSM IV to 5. The DSM 5 has been updated to more accurately characterize the experience of young adults. There is inclusion of examples

to illustrate behaviors in children and young adults. Further adults and adolescents above the age of 17 years need to have minimum of 5 criteria instead of 6 and symptoms should have been present before the age of 12 years against 7 years as previously mentioned in DSM IV. DSM 5 now recognizes the fact that motor symptoms may dissipate with age yet certain difficulties persist which can help in the diagnosis of ADHD.

**Classifying ADHD and role of rating scales:**

Depending on the type of symptoms present ADHD can be categorized as Inattentive type, hyperactivity type or the combined type.

*Combined type* – All three core features are present and 6 symptoms of hyperactivity/impulsivity AND inattention are observed for a period of more than 6 months.

*Inattentive or hyperactive type* – 6 symptoms of either inattention or hyperactivity present for a period of more than 6 months

Severity of ADHD is classified as mild, moderate and severe.

*Mild* – Few symptoms in excess of those required to make a diagnosis and result in minor impairments in social or occupational functioning

*Moderate* – Symptoms or functional impairment between mild and severe

Severe-Presence of many symptoms causing a significantly severe impairment in daily functioning.

Grading the severity of ADHD helps in analyzing and planning approach to management of the behavioral problem.

Use of rating scale is a useful compliment to a clinical interview and observations. There are several rating scales available and choice of which to use should be based on the ease of use by parents and teachers and the pediatricians training to interpret results. Most of these focus on information gathered from varied sources such as the parent, teacher and acquaintances. The rating scales have a series of questions for the respondent to answer to analyze presence of symptoms and their categorization of the type of ADHD. Most of these are easy to use and also help in monitoring improvement in symptoms after intervention over time.

Being a common behavioral problem, overzealous diagnosis has led to a lot of medication overuse besides the mental trauma of being 'labelled' as a problem child. Though diagnosing is not really a difficult process, it deserves to be given due attention and time. Following the age old ritual of a good data gathering followed by clinical examination and stringent use of prescribed diagnostic criteria is an important aid in recognizing and diagnosing ADHD.

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## Specific Learning Disability: Evaluation and Management

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Learning problems are commonly seen and consultation is sought due to increased awareness of the parents and schools. Most of them present with academic failures, behavioural problems at school, anxiety, depression or school refusal. It is generally noticed that at least 15 - 20% of children in a classroom get poor marks, they are 'scholastically backward'. It is important to understand the causes of poor school performance, co-morbidities, evaluation process and management to be able to provide them the long term support needed during the learning years.

### **Causes**

Many causes for poor school performance in children include chronic medical problems and other neurological disorders, below average intelligence, specific learning disability and other learning disorders, attention deficit hyperactivity disorder, emotional problems, poor socio-cultural home environment, psychiatric disorders and environmental causes.

### **Evaluation Procedure**

A thorough evaluation is needed for an accurate diagnosis of a child presenting with learning problems. The evaluation must give special emphasis to the academic history in the specific concerned areas, the factors that contribute to the problems, the available strengths for compensation and the extent of

non-academic difficulties.

The clinical evaluation consists of the following:

### **Medical history and examination :**

A detailed medical history including antenatal history, events at birth, developmental milestones, significant chronic medical history is a must

### **School and academic history :**

Analysis of school performance, school reports, history of failures, change of school and assessment of the child's behavior in school.

### **Intelligence testing :**

Assessment of General Cognitive Functioning as measured on standardized tests for intelligence.

### **Educational testing :**

Assessment of Achievement Level in the various areas of formal learning as measured on educational tests.

### **Behavioral evaluation :**

Assessment of associated behavioral and social problem if any.

### **Cognitive Assessment**

Cognitive function is measured by a test of general intelligence. The main purpose of this test is to assess the level of intellectual functioning which is taken as an indicator of child's potential for learning. The most

commonly used test for school age children is the Weschler's Intelligence Scale for Children (WISC-R) Indian adaptation, Kamat Binet test of intelligence (KBI), Weschler adult performance scale (WAPIS) and Weschler adult Intelligence scale (WAIS).

### **Educational Assessment**

Standardized test scores from psychometrically sound tests are considered the most valuable source of information in diagnosing learning disorders. A variety of standardized and non standardized tests are available. Components of tests include reading, letter word identification, handwriting, capitalization and punctuation, spelling, vocabulary, word usage, sentence and paragraph structure, production (amount), overall quality, automaticity or fluency, and understanding of types of written material (text structure).

Children's writing always should be evaluated with an awareness of skills that are developmentally appropriate. When assessing handwriting, consider the child's posture, pencil grip, and paper position along with any issues related to hand dominance of the child. Evaluate the writing for letter formation quality, size, spacing, slant alignment, rate, and overall legibility.

The tests for educational evaluation are done by special educator or a clinical psychologist and are selected on the basis of the specific problems in learning. Commonly used tests are Woodcock Johnson Psycho-educational test battery, Wide range Achievement test – Revised, Diagnostic test of Learning Disability, Curriculum based test etc.

### **Investigations**

A routine ophthalmic check up with vision acuity needs to be done and a hearing

evaluation along with an audiogram has to be done in all the children with poor school performance.

Routine CT Scan or MRI studies have no role in the diagnosis of specific learning disorder (SpLD). These studies do not show any consistent structural abnormality. Functional studies are more useful but are reserved for research purposes only. EEG studies are found to be abnormal in about 50% of children with SpLD but no specific pattern of abnormality has been identified. These need to be done in children with associated epilepsy.

### **Management**

Management of SpLD needs a multi-disciplinary intervention with the help of the professionals from the respective fields. The pediatrician should be aware of the role of these professionals so that the clinician can effectively understand and monitor the progress of the child.

Prior to the evaluation if the clinician comes across a child with learning problems, the pediatrician could spend some sessions to educate the parents about possibility of a learning disorder. After the evaluation and diagnosis of Specific Learning disability, it is very important to communicate the long term intervention to the parents appropriately.

Usually it is seen that the initial parental reaction is denial followed by anger, depression, anxiety and finally acceptance. It is also important that the parents understand the exact extend of disability and help their children overcome the disability and achieve academic competence in regular mainstream schools.

### **Remedial education:**

Remedial education is the mainstay of intervention for children with learning disability.

There is enough scientific evidence about the role of early stimulation with reference to neuroplasticity and sensitive learning period during early childhood. It is therefore suggested that remedial education should begin early when the child is in primary school.

Remedial education is done by a special educator who is trained to handle children with such academic difficulties. After the evaluation the special educator formulates an Individual Educational Program to reduce or eliminate the child's deficiencies in specific learning areas of reading, writing and mathematics as identified. The Remedial Teacher uses specific teaching strategies and teaching materials and aids. The child has to undergo remedial education sessions twice or thrice weekly for a few years to achieve academic competence. During each session the Remedial Teacher has a one-to-one interaction with the child.

***Role of occupational therapist:***

During early learning years, some children with SpLD, (less than 10 years of age) have problems in fine-motor co-ordination, balancing, and left-right and spatial orientation. They may have abnormal grip of the pencil while writing and have difficulties in letter formation. These children may also have visual and auditory perceptual difficulties which interfere in reading, writing and related tasks. Also there could be problem of integration of sensory and motor areas in a child. These children need to be referred to an Occupational Therapist who will evaluate the child, formulate and do the necessary therapy. These children need to undergo the occupational therapy sessions twice or thrice weekly for a few months to few years till their problems get tackled.

***Role of psychiatrist:***

In our country parents are still reluctant to visit

a child psychiatrist however it is necessary in few cases. In most of the cases of SpLD, the delayed diagnosis due to poor awareness or acceptance leads to severe behavioral problems like poor self esteem, peer relations, aggression, anxiety or depression. If severe these would require medication and counseling. Up to 20% of children with SpLD may also have attention-deficit hyperactivity disorder (ADHD). The diagnosis of co-occurring ADHD can be made by the pediatrician or by a psychiatrist by ascertaining that the child's specific behaviors met the diagnostic and statistical manual of mental disorders-IV revised (DSM-IV-T-R) criteria. Children with other co-morbid conditions like anxiety, depression, school phobia etc need psychiatric consultation for counseling, behavior modification, and medications. Medications have been shown to be effective in significantly reducing the symptoms of inattention, impulsivity and hyperactivity resulting in improved remedial sessions and school performance. At times it may be necessary to prescribe anxiolytics or anti-depressants to tide over the crisis situations.

***Role of school Principal and class room teacher:***

The school Principal and management play a crucial role in rehabilitation of children with SpLD. If these authorities are pro-SpLD then these children do not face any discrimination or harassment. In such "SpLD-friendly" schools children with academic difficulties get assessed for SpLD without delay. A general awareness about SpLD is usually lacking in the school teachers. In a school this awareness needs to be initiated by the principals, in our experience it is observed to be low in most of the urban English medium schools also let alone the vernacular or

government schools. The teachers need to understand their disability and provide classroom modifications. The support for these children is needed through all academic years.

**Resource room at school :**

The resource room with a counselor and special educator is needed to fulfil the educational and psychological needs of these children for effective mainstreaming. The counselor may be the first one to note the academic difficulties. Ideally along with awareness among all the teachers the school should also provide the rehabilitation at school. The school counselor plays a crucial role in ensuring that parental and student stress is effectively minimized by explaining them the meaning of the disability, the importance of remedial education, and the rationale of provisions.

Remedial teachers in a resource room focus on particular goals as mandated by an Individualized education program and remediate general education curriculum and emphasize the development of executive skills, including homework completion and behavior. Depending on individual needs, students usually attend resource rooms three to five times per week for about 45 minutes per day. Resource rooms have proven to be successful in significantly improving academic skills of children with SpLD.

**Provisions at school and educational board:**

Children with SpLD have difficulty in various areas of learning and slow processing of information and output. Hence their performance tends to be low during time bound examination or evaluations. Simple provisions like giving extra time during examinations, reader, writer, calculator etc helps them perform better. Provisions are intended to

function as a corrective lens and help these students as their academic performance would now be matching with their intellectual abilities. In a recent study carried out at LD clinic, LTMGH, children with SpLD who availed the benefit of provisions showed a significant improvement in their academic performance at the Secondary School Certificate board examination. Their mean total marks increased by 22%; from 41% before diagnosis of SpLD to 63% after availing provisions.

Provisions enable children with SpLD, including those who have undergone some or even adequate remedial education, complete education in regular mainstream schools. They are given from class standard I to class standard XII and comprise: (i) extra time for all written tests with spelling mistakes being overlooked, (ii) employing a writer for children with dysgraphia, (iii) exemption of a second language (Hindi or regional language in an English medium school) and substituting it with a work experience subject, and (iv) exemption of algebra and geometry and substituting it with lower grade of mathematics (standard VII) and another work experience subject. These provisions vary slightly from state education boards and central boards.

**Recommendations for parents**

It is very important to counsel parents regarding various aspects of learning disability. The pediatrician or the counselor could explain to the parents in simple language the meaning of the term "SpLD". Parents need to be carefully explained that SpLD is a common disorder. It is important to emphasize that their child has normal or even above normal intelligence and learning disability is a processing disorder and their child's brain is "differently wired". Parents should be explained that the only proven

treatment for SpLD is through special education, counseling and occupational therapy. They also should be aware that these interventions need to continue on a long term basis for 2 to 3 years for a significant change in the academics as well as behavior. Parents should be explained the meaning of the term “provisions / accommodations” and also the help provided by the school.

### Summary

A comprehensive evaluation is required by a multidisciplinary team to diagnose and plan early intervention. Secondary behavioural problems affecting all the social domains are usually seen and need to be addressed. The Pediatrician plays a pivotal role with the help of other consultants and therapists involved in the intervention.

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## Early Intervention for Children with Specific Learning Disability

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Your young child has just started school. He is happy, motivated and eager to learn.

Soon afterwards, you notice that he is struggling to master skills that seem relatively easy for other children. No matter how hard he tries, he finds it difficult to complete tasks on time. His self-esteem is affected too. He is not as confident or as happy as he used to be. He is constantly frustrated and you realize that his motivation to learn is quickly disappearing.

You wonder ... what you can possibly do to help?

The earlier the child's learning disabilities are identified and an intervention program is started, the better the chance of improving.

Early intervention helps children to catch up with their peers before their difficulties become more intense.

And early intervention during primary years also functions as a preventative factor against the development of learning disabilities such as reading, writing, spellings and arithmetic problems in later grades.

The purpose of early identification is to determine which children have developmental problems that may be obstacles to learning or that place children at risk. For some children, differences and delays in abilities are temporary and are resolved during the normal

course of development. For other children, delays may persist in different domains of functioning. At present, no clear distinction can be made in the early years between the children whose problems may persist from those who will make adequate progress with time. Therefore, young children who demonstrate difficulties in early development may or may not be at risk for LD. Enhanced learning opportunities, and possibly intervention services should be provided. It is not in the child's best interest to "wait and see" or hope that the child will "grow out of" his or her problems. At the same time it is important to guard against the premature identification of a disability. It is often during the early years that parents first suspect a problem and may share their concerns with qualified professionals. However, some parents initially may deny the existence of a problem because they are fearful of, or threatened by, its possibilities and consequences. Family cooperation is critical to early identification. Thus, professionals must recognize and be sensitive to differences in family responses and provide appropriate support.

As it is a known fact that learning disability is not a disease and so the only intervention that these children need is remedial education.

### **What is Remedial Education**

Remediation means methods of instruction to

correct deficits of student's performance.

#### **Role of Remedial Educator**

1. Undertake individual assessments
2. Prepares an IEP
3. Works as a team
4. Keep the parents informed
5. Keep monitoring the progress
6. Praise and encourage

#### **Role of the Special Educator**

- Preparing the worksheets, games in sufficient quantities.
- Explaining clearly what is to be done.
- Checking answers at the end of an activity.
- Controlling the time of each game.
- Games help teachers to employ meaningful and useful language in real contexts.
- Games are motivating as they are amusing and interesting. All children enjoy playing games and having fun.
- Games are a welcome break from the usual routine.
- A shy student gets more opportunity to express his/ her opinions and feelings.

#### **Important Points About Remedial Education**

1. To be done on one- to –one basis.
2. Friendly environment.
3. Minimum one hour duration.
4. Minimum requirements 2 to 3 session per week.
5. Should continue all round the year.
6. Should be started as early as possible.
7. It has to be done by special educator only.
8. IT IS NOT GIVING TUTIONS.

Special educators are trained to observe our student's learning over the time. We gain insight into what causes student's poor academic performance and teach them tools and strategies to increase their effectiveness. The understanding between the teacher and the student personality wise should be catered to. We need to work with the child's strength rather than their weakness. The material and aids used should be appropriate to the child. A lot of encouragement and motivation that "you can do it" is a must. There needs to be a deep understanding by the teacher about the child. The motto of the teacher should be

***IF CHILDREN CAN'T LERAN THE WAY WE TEACH  
THEN WE MUST AND MUST  
TEACH THEM THE WAY THEY CAN LEARN.***

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## Modern Rehabilitation Approaches for Patients with Cerebral Palsy

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Cerebral Palsy (CP) is the most common movement disorder in children and one of the most common causes of childhood disability. It occurs in about 2.1 per 1,000 live births. Its history goes back to deep antiquity, starting from ancient Egypt. There are at least two pictures of people from 5th century BC, which is believed to have spastic cerebral palsy (Pakula, 2009)<sup>1</sup>. In Ancient Indian culture, disability was respected by one of its most popular Hindu God, Jagannath as physically disabled idol. Ancient texts even depicts a personality, an ancient scholar, Ashtavakra who was born deformed (description akin to today's multiplex congenital) with savant skills!

Despite its long history now there is no consensus in interpretation of this problem. There are different perspectives on the syndromes included in this diagnosis, their causes and course of disease and scholars of different schools keep different meanings of this notion.

An important milestone in establishing common views on cerebral palsy was the adoption at a seminar in Maryland in 2004 following definition "Cerebral palsy (CP) describes a group of disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of cerebral palsy are often accompanied by disturbances of sensation,

cognition, communication, perception, and/or behaviour, and/or by a seizure disorder» (Bax, 2005)<sup>2</sup>.

It is important to remember, however, one of the most relevant confusion met in the clinical fields viz. although the lesion remains permanent, the physiological and developmental changes, especially in a growing child, may continue to change, giving a false sense of changing pathophysiology. Hence, it is perhaps, prudent to conceptualise CP with the WHO (World Health Organisation) definition of CP as a group of clinical conditions leading to functional limitation involving control of movements and posture.

Despite the polymorphism of the clinical picture, most existing classifications of CP are based only on type of muscle tone disorder and localization of motor disorders. Often patients with quite different motor abilities have the same diagnosis, not taking into account the level of motor development. That was a prerequisite for development and successful implementation in clinical practice of Rehabilitation classification of Cerebral Palsy (Kozyavkin, 1999)<sup>3</sup>. In addition to conventional parameters, this classification also includes a description of locomotor and postural capabilities of patients.

### **Cause and Effect**

Cerebral palsy often causes severe neurological disability, complicates social

adaptation and quality of life of patients. CP Prevalence ranges from 1.9 per 1000 live births in western Sweden (Himmelmann, 2005)<sup>4</sup> to 3.6 per thousand in Alabama, Atlanta and Wisconsin, USA (Yeargin-Allsopp, 2008). In Ukraine this number is 2.4 per thousand children (Moiseenko, 2005). In India, current quoted prevalence is that of 33,000<sup>5</sup> affected people registered with Indian Institute of Cerebral Palsy. Whereas, WHO says over a billion people, about 15% of the world's population, have some form of disability<sup>6</sup>. According to World Health Organization (WHO) estimation, 10% of the global population has some form of disability due to different causes; in India, it is 3.8% of the population<sup>7</sup>. The expected actual figures must be much higher! Cerebral palsy can be caused by more than 400 factors; each patient is special and individual, has different functional abilities. This is why International Classification of Functioning (ICF) has been developed and became popular in daily rehabilitation practice. It classifies disability in people as per its functionality. CP was used as its first Pediatric module to devise Core Sets of ICF for use in the clinical fields. India, along with Pakistan, Sri Lanka and Poland has jointly led a globally pioneering validation study of Core Sets to be used in CP children<sup>8</sup>.

There are many different approaches to the treatment of this disease in the world. Widely known are neurodevelopmental treatment (NDT) by Bobath, reflex locomotion by Vojta, conductive education by Peto, dynamic proprioceptive correction by Semenova and many others. Nowadays many publications have appeared aiming at exploring the effectiveness of relatively new treatment approaches. The keen interest has the results of constraint induced treatment. Numerous studies show the effectiveness of this method (Huang, 2009)<sup>9</sup>, which stimulates compensatory reorganization of the nervous

system. There are many research studies of Botulinum toxin also. For localized/segmental spasticity, botulinum toxin type A is established as an effective treatment to reduce spasticity in the upper and lower extremities, however there is conflicting evidence regarding functional improvement (Delgado, 2010)<sup>10</sup>. Also some research results suggest that BoNT-A can be effective in reducing muscle tone over a longer period, but not in preventing development of contractures in spastic muscles (Tedroff, 2009)<sup>11</sup>.

Most rehabilitation programs are aimed at the correction of different consequences of the brain lesions, but they underestimate the value of the pathological effects of the musculoskeletal system, especially the structures of the spine, for further motor and mental development of children.

The damage of the central nervous system in cerebral palsy is accompanied by spasticity, pathological reflexes, poor voluntary movement control and other secondary changes of the musculoskeletal system. These phenomena are studied in detail on muscles and joints of extremities. However the spine that has more than 100 joints and great number of muscles may not have received proper attention. The spine is the main axis of human body and during phylogenesis all the major systems of the body formed around it according to segmental principle.

### **Pathological Changes**

In cerebral palsy all structures of the spine, especially joints, have secondary changes with restricted movements and development of functional blockages (also known as vertebral subluxation). According to the WHO definition<sup>12</sup> accepted in 2005 vertebral subluxation is "a lesion or dysfunction in a joint or motion segment in which alignment, movement integrity and/or physiological function are altered, although contact between joint

surfaces remains intact. It is essentially a functional entity, which may influence biomechanical and neural integrity.” Important to note that this definition is different from the current medical definition, in which subluxation is a significant structural displacement, and therefore visible on static imaging studies. Vertebral subluxations are not limited only to movement disorders – they are causing the whole group of pathological changes that are called vertebral subluxation complex.

Theoretical model and description of the subluxation complex has been described by Charles A. Lantz (Lantz, 1995)<sup>13</sup> and Anthony L. Rosner (Rosner, 1997)<sup>14</sup>, and incorporates the interaction of pathological changes in nerve, muscle, ligamentous, vascular and connective tissue. According to this model, restricted movements of the spine are causing a range of changes that include neurological (pathological afferentation) and muscular changes, connective tissue and vascular changes. They are reinforcing each other and create a pathological vicious circle that further distorts and delay motor development of the child with cerebral palsy.

Many hypothesize that a fundamental component of the vertebral subluxation complex is the development of adhesions in the zygapophysial joints (Z joints or facet joints) after hypomobility of these structures<sup>15</sup>. Spinal adjusting of the lumbar region is thought to separate the articular surfaces of the Z joints<sup>16</sup>. This “gapping” is theoretically the action that “breaks up” adhesions. Elimination of adhesions would allow the Z joints to become more mobile, thus helping the motion segment (two adjacent vertebrae and the ligamentous structures connecting them) to reestablish a physiologic range of motion.

Cramer *et al*<sup>17</sup> in a blind randomized MRI study on 64 people found that the lumbar Z joints did gape during chiropractic adjusting. Currently

he is conducting similar large study on patients with low back pain.

### **Intervention**

Spinal adjustments restore mobility of joints and contribute to the elimination of vertebral subluxation complex and its negative influence on the organism of the child. The results of the adjustment are not limited to the changes in joint mobility, but are accompanied by complex changes in the organism – the so-called new functional state is created. The muscle tone is normalized, and tissue trophicity, blood circulation, and metabolism are improved. The new functional state significantly enhances the possibility for the faster motor and mental development.

Actually on these principles our method of biomechanical correction of the spine has been built. It is adapted to the peculiarities of the infant spine and aimed at elimination of vertebral subluxation and restoration of normal spine movements (Kozyavkin, 1992)<sup>18</sup>.

Biomechanical correction of the spine is carried out after the manual diagnostics consecutively in lumbar, thoracic and cervical regions. Lumbar spine correction includes simultaneous mobilization of all blocked movement segments using our method of “backward rotation”. Correction of the thoracic blockages is performed starting from upper regions to lower using special impulse techniques. Corrections of the cervical spine are performed using movement with complex trajectory to simultaneously influence all blocked segments. Finally, the mobilizing impulse method is used on blocked iliosacral joints.

### **Treatment**

Human body is a complex self-organizing system consisting of many subsystems each have its safety margin, recovery and plasticity resources. So the treatment system should

be holistic. Biomechanical correction of the spine became the basis for developing an integrated multimodal rehabilitation system which incorporate different treatment modalities that complements and potentiates each other. The main complex of therapeutic programs includes: biomechanical correction of the spine, mobilization of extremity joints, reflexotherapy, mobilizing physical exercises, special system of massage, rhythmic exercises, apitherapy and mechanotherapy.

The treatment according to the intensive neurophysiological rehabilitation system consists of two fundamental subsystems: the intensive correction subsystem and the subsystem aimed at stabilizing and potentiating effects. Intensive correction is carried out at the rehabilitation center and lasts for two weeks. The treatment period indicated for stabilizing and potentiating the effects is continued at home according to doctors' recommendations. This period usually lasts from 6 to 12 months. Then patient is re-admitted to the center for the next course of intensive treatment if so instructed (Kozyavkin, 1995)<sup>19</sup>.

One current focus of our research work is finding ways to activate the patient's motivation, his emotional immersion in the rehabilitation process. American psychologist, O'Gorman (1975)<sup>20</sup> has mentioned that: "Motivation of the patient is the most important, yet the most difficult part of the work of the therapeutic professions". Keeping this in mind, we have developed a series of special game-training devices aimed at the improvement of different movements and the activation of the patient's motivation for training sessions. This stimulates the development of movement speed, increases movement amplitude, shortens reaction time and improves eye-hand coordination. These games are accessible free of charge on [www.game.reha.lviv.ua](http://www.game.reha.lviv.ua).

All these therapeutic measures are aimed at achieving the main goal - to develop daily life skills and improve patients quality of life. This can be best measured by ICF Core Sets which allows us to document the improvement in mobility and functionality and compare abilities over time<sup>21</sup>.

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## Changes in Psychomotor Development of Children with Autism During Intensive Neurophysiological Rehabilitation.

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### Background

Prevalence of autism in USA is now assessed as 1 in 68 children<sup>1</sup>. Scientists don't know the exact causes of autism, but research suggests that genes and environment play important role. Risk factors include: gender - boys are much more likely to be diagnosed with autism than girls; existence of a sibling with autism; having a mother older than 35, and/or a father more than 40 when the baby was born; genetics - 20% of children with autism also have certain genetic conditions like fragile X syndrome, Down syndrome, tuberous sclerosis<sup>2</sup>. It is observed that children with ASD are on the higher side of height and on the lower side in their weight when compared to normal children due to malnutrition and low energy intake<sup>3</sup>. This is reflected in their BMI which is below the normal value<sup>4</sup>.

There is a huge amount of treatment approaches for treatment of children with autism. In the manual of National Autistic Society of Great Britain "Approaches to correction of autism" more than 70 methods of treatment are described<sup>5</sup>. Generally two main kinds of treatment for autism exist: psychopharmaceutical and psychocorrectional<sup>6</sup>. Because of insufficiency of current rehabilitation approaches, effectiveness there is an urgent need to search for new therapies for this disease. In this context attention should be paid on the data represented in the article of J. Alcantara about effectiveness of a relatively

new approach for rehabilitation of autism spectrum disorders (ASD), namely manual therapy<sup>7</sup>. Currently in medical databases exist only few articles focused to this kind of treatment for autism. According to these data, usage of manual therapy for treatment of autism is effective but sanogenetic mechanisms of the influence are yet to be discovered<sup>8</sup>.

Highly effective system of Intensive neurophysiological rehabilitation (INRS) has been created. INRS has been developed for treatment of kids with Cerebral Palsy (CP), is used for more than 30 years and combines more than a dozen of multidirectional treatment techniques which potentiate and complement each other<sup>9</sup>. Pivotal part of the therapy is biomechanical correction of the spine as a type of a manual therapy adapted to the needs and anatomical peculiarities of the child's body. Numerous unbiased examinations of changes in mental abilities of children with cerebral palsy showed that this method has a positive influence not only on motor functioning but also on cognitive functions like memory, attention, intellect, speech and emotional state<sup>10</sup>.

The purpose of the research has been an assessment of INRS rehabilitation efficacy by studying changes in their psychopathological, neurological indicators as well as motor capabilities.

In retrospective study. observation period took

place during 20 years from 1995 to 2014. Criteria for inclusion were age of the child from 3 to 18 years old, correspondence to diagnostic criteria child with autism described in DSM-5, presence of autistic signs according to Childhood Autism Rating Scale (CARS) for children more than 3 years or Autism Spectrum Screening Questionnaire (ASSQ) for children more than 6 years, passing at least one course of INRS treatment.

A total of 387 children took part in the study with an established diagnose is "Childhood autism" (F84.0). 32 children were excluded because of different biased and unbiased reasons. Table 1.

**Table 1.** Demographic characteristics of the children.

Variable	Distributions (n=355)
Age(year):Mean (SD)	4y2months ± 8 months
Min-Max	3 -18
Age<4 yr 87 (35%), 4 to 8 yr 114 (32%), 8 to 12 yr 68 (19%), older than 12 yr 86 (14%)	
Sex: Male	268 (78.9%)
Female	87 (21.1%)

Comparison of the data has been done 3 times: before the onset of the rehabilitation, after completion of a 2 week treatment course and at the end of the last treatment course (if patient visited clinic more than once).

In order to assess the effectiveness of rehabilitation psychopathological method, complemented by child autism rating scale (CARS), Autism treatment evaluation checklist (ATEC), neurological (neurological status, assessment of muscle tone according to Ashworth scale, goniometry) and psychodiagnosical (coloured Raven matrices) methods were used. Also videorecording of gross motor functions before and after each treatment was done.

*Results* – After collecting detailed data about

history of the disease and neuropsychiatric examination in 108 (30,4%) children the classic version of childhood autism (F84.0) without other neuropsychiatric deviations was diagnosed, 92 (25,9%) children had one-sided / double-sided pyramidal insufficiency (R29.2), 77 (21,7%) children had perinatal CNS lesions (F82), 45 (12,7%) children diagnosed cerebral palsy (G80), 36 (10%) with epilepsy (G40), 30 (8,5%) had psychomotor or other genetic disorders.

Analysis of the results showed that after a course of treatment by INRS method in 145 of 149 (97±10%) patients with autism with a presence of increased muscle tone in the distal parts of lower extremities was observed to reduce it, increase the volume of active and passive movements observed in 139 of 149 (93±9%) patients. We can see better fine hand functioning if it is impaired in 118 (41±6%) of 288 children, accompanied by improving skills in 85 (24±5%) patients.

In 35 (9,9±3,1%) patients new motor functions appeared: 15 (4,2±2,2%) kids started to hop on one leg, 7 (2±1%) —stand without aid, 6 (1,7±1,1%) to hop on both legs, 5 (1,4±1,0%) to walk by themselves, 2 (0,6±1,0%) to sit without aid.

The psychoverbal development delay was observed in 316 (89±9%) children before the beginning of the treatment according to the INRS. In 58 (18±4%) children the reduction in the signs of the psychoverbal development delay was observed immediately after the first treatment course and in 224 (63±8%) children after passing the following treatment course/ courses (p<0.05).

Obligatory for this group of patients is diverse and complex infringement of communication, for example disorder of contacting others before the treatment was observed in 344 (97±10%) children. After passing the following treatment

courses there was complete reduction of socialization disorders in 160 (45±7%) children, however, in 184 (53±7%) children signs of violations were kept, though their manifestation was less intense ( $p < 0.01$ ).

Deficiency in focusing of an attention was observed in 341 (96±10%) children with autism before the treatment. The significant improvement of characteristics of voluntary attention was marked in 79 (23±5%) children after passing the treatment course according to INRS and in 151 (44±7%) children after passing the following treatment course/ courses ( $p < 0.05$ ).

There were positive changes in appearance of new speech functions: new sound spoken by 45 (13±4%) patients, syllables—40 (12±4%), words—35 (11±3%), began to speak by phrases—16 (5±2%), sentences—15 (4±2%) Understanding of spoken language improved in 135 (38±6%) children, speech speed increased in 103 (29±5%), dyslalia became less severe in 85 (24±5%).

After repetitive courses of INRS rehabilitation in 54±7% patients new speech functions appeared and passage to higher level of speech development was observed. In 48 (13,5±3,8%) children, which could pronounce only separate words and in 18 (5,1±2,3%) patients, who could pronounce only sounds/ syllables, phrase speech appeared.

Before the rehabilitation by INRS the average score on a scale ATEC was 66,8±9,9 points, indicating the presence in children of severe disorders in communication, language functions, socialization and behavior. After completion of rehabilitation, this score decreased to 52,6±6,1 points, there was a positive trend of estimated parameters. According to the scale emotional state improvement was observed in 89±9% of children. The biggest changes were noted in the speech area (17.0 points to 14.6 points

before and after course), socialization (15.9 points and 12.2 points, respectively) and behavior (22.2 points and 18.1 respectively).

During evaluation of children with autism by CARS (during the last year of treatment in International Clinic of Rehabilitation) in 61,3±7,8% of children has been a significant or marked improvement, in 29±5% of children slight improvement or preservation of light / moderate clinical manifestations, in 9,7±3,1% of children – mental state remained without significant changes, remained pronounced manifestations of autism. In any child dynamics of a CARS score showed no deterioration. In the final evaluation of the overall dynamics of the clinical condition by CARS in 90,3±9,5% of children with regular INRS treatments changes in the form of reduction of autistic symptoms were observed.

According to a survey by Raven test before treatment 39±6% of patients with autism were in the area of intellectual defect (V-th area) 35,5±6.0% in the area of intellectual boundary condition (IV-th area), 22±5 % in zone of average intellectual development (III-rd zone) .Good norm (II-nd zone) revealed only in 3,5±2,0% of patients, high level of intellectual development in these children was missing. Results of the study of intellectual abilities mostly correlated with clinical and psychopathological findings. They have convincingly shown that cognitive impairment in a child with autism is one of the leading and frequent syndromes in the clinical picture of the disease.

Analysis of the dynamics of the intellectual development by Raven test after the first course of INRS rehabilitation revealed the presence of distinct improvements in intellectual performance. The dynamics of intellectual performance in different clinical groups of children with autism were unidirectional. The most significant positive changes of intellectual development occurred in patients with low

performance (after rehabilitation course in the area of intellectual defect left  $30,5 \pm 5,5\%$  of children compared to  $39 \pm 6\%$  before treatment, in the zone of intellectual boundary condition  $25,5 \pm 5,0\%$  compared to  $35,5 \pm 6,0\%$  before treatment). After repetitive courses of treatment amount of children with normal development of intelligence was  $73 \pm 8\%$  (before the onset of treatment  $25,5 \pm 5,0\%$ ,  $p < 0,01$ ), of which  $4 \pm 2\%$  with high development of intelligence (zone I). The number of patients with mental defect (V area) after repeated courses of rehabilitation reduced from  $39 \pm 6\%$  to  $14 \pm 4\%$  ( $p < 0,05$ ).

### Conclusions

The results of research show that after the rehabilitation of children with autism by INRS positive dynamics of motor development is observed, namely muscle tone in the distal parts of lower extremities decreased, the volume of active and passive movements increased, fine hand functions improved and new gross motor skills were learned. During rehabilitation communication and socialization improves, reduction of autistic symptoms is observed, level of cognitive performance increases, significantly increases the number of children with the normative levels of intellectual development. It is noted that the positive dynamics in the formation of speech happens: understanding of spoken language

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improves, speech tempo increases, dyslalia signs decrease, transition of the child to a higher stage of language development is observed. Overall, patients after INRS treatment have positive transformation of indicators reflecting the current state of neuropsychiatric, communicative, intellectual and language development. Given the above data, we can conclude that INRS is a modern rehabilitation technology which can be used for treatment of patients with childhood autism.

*Limitations* – As this was a retrospective study, there was no control group with randomized allocation or blind testing of participants or examiners.

### Disclosure

Examinations of patients were performed by doctors working in International clinic of rehabilitation. Institute of medical rehabilitation works on studying ways of influence of INRS. Prof. Shestopalova has received consulting fees from International clinic of rehabilitation. Research support has been done by SI “Institute of neurology, psychiatry and narcology of NAMS of Ukraine”, Shupyk National Medical Academy of postgraduate education, Ministry of Health of Ukraine. The authors declare that they have no competing interests.

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## Early Intervention: Key To Success

### Zafar Meenai

Director, Ummeid Child Development Centers, Bhopal, Bilaspur, Nagpur

Maximum potential for recovery is contributed 50% by nature and 50% nurture. Target is initial 3 years of life, which is the critical period, as maximum synaptogenesis takes place during this period.

#### **Evidences of Positive Role of Early Intervention and Comprehensive Multidisciplinary Rehabilitation Program**

In the randomized controlled trial at Child Development center, Medical College Thiruvananthapuram to measure the developmental out-come of early stimulation and intervention among low birth weight babies the following observation were made that without intervention 44.6% of this group at 1 year have a developmental outcome level below 25th percentile position as against 26.2% in the group with intervention. This clearly shows a difference of 18.4% meaning a 41.3% reduction in poor performance in intervention group<sup>1</sup>. Role of critical period is 0 - 3 year as per UNICEF draft 2001<sup>2</sup>.

Early intervention program for premature infants have positive influence on cognitive outcome in short to medium term. (Cochrane Database syst Review April 2007, overall 16 studies included)<sup>3</sup>. These are concrete evidences that early intervention is effective so active action is required.

#### **Preventive Strategies**

Preventive strategies should focus on maternal nutrition and anemia, iron, folate, iodine, zinc, infection prevention, rubella vaccine, chronic

medical illnesses, gynecological issues and better obstetric care.

Antenatal steroids should be administered in premature deliveries, proper inutero and neonatal transport services should be available, IUGR and girl child should be provided better neonatal care, literacy and life skills.

#### **Red Flags**

Following are the red flag signs as per American Academy of Pediatrics (AAP)

##### **9 months:**

Inability to

- (i) Roll over to both sides
- (ii) Sit well with support
- (iii) Motor symmetry without established handedness
- (iv) Should be able to grasp objects
- (v) Transfer objects from hand to hand.

##### **18 months:**

Inability to

- (i) Sit, stand and walk independently
- (ii) Should grasp and manipulate small objects
- (iii) Any sign of regression in GM/FM skills
- (iv) Drooling.

#### **Direct Observation Card<sup>1</sup>**

As per Center for Disease Control (CDC).

2 months – social smile.

4 months – head holding.

8 months – sitting

12 months – standing

Confirm that child can see and hear

### **Gross Motor Function Classification System (GMFCS): Before 2nd Birthday**

#### **Level I:**

Infants move in and out of sitting and floor sit with both hands free to manipulate objects. Infants crawl on hands and knees, pull to stand and take steps holding on to furniture. Infants walk between 18 months and 2 years of age without the need for any assistive mobility device.

#### **Level II:**

Infants maintain floor sitting but may need to use their hands for support to maintain balance. Infants creep on their stomach or crawl on hands and knees. Infants may pull to stand and take steps holding on to furniture.

#### **Level III:**

Infants maintain floor sitting when the low back is supported. Infants roll and creep forward on their stomachs.

#### **Level IV:**

Infants have head control but trunk support is required for floor sitting. Infants can roll to supine and may roll to prone.

#### **Level V:**

Physical impairments limit voluntary control of movement. Infants are unable to maintain antigravity head and trunk postures in prone

and sitting. Infants require adult assistance to roll.

### **Early Intervention Strategies<sup>4</sup>**

#### **Early intervention for head control:**

- (i) Carry the child in upright position.
- (ii) Slowly lift the child from lying down position holding axilla, to sitting position and then slowly put him back to lying position thereby stimulating to lift and hold head. (5 minutes x 4 times/day)\*
- (iii) If child do not lift his head, gently stroke downwards over the neck muscle.

#### **Early intervention for sitting:**

- (i) Make her come to sitting position, hold her in this position and then make her lie down. (5 minutes x 4 times a day)\*.
- (ii) Make the child sit across his mother's knee, just tilt the child forward and sideways, so that he outstretches the hand. This helps in development of righting reflex.
- (iii) Make the child sit provide support and toys, slowly reduce support.

#### **Early intervention for standing:**

- (i) Helps him in coming to sitting position on its own.
- (ii) Make him come to standing position holding a stool and put toys.
- (iii) Help him to balance on an inclined surface.
- (iv) Help him to walk with support using both hands and later with one.

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## **Caveats of Pediatric Endocrine and Growth Disorders in Clinical Practice**

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A pediatric disease can present in many ways sometimes with straightforward clinical symptoms and signs which direct you to the involved system but more often it will present with symptoms that span multiple systems such as growth, neurology, endocrine, respiratory or gastrointestinal system. An astute paediatrician can disentangle this mess by good history taking, clinical examination and logical thinking.

Many disorders of childhood present as growth related issues such as short stature and growth failures, obesity, poor weight gain, failure to thrive and sometimes tall stature. Paediatricians who routinely take height, weight and calculate BMI and monitor their patients regularly on growth charts are likely to pick up a paediatric illness before it gets too late<sup>1</sup>. It is therefore imperative to use growth charts in routine paediatric practice. Indian academy of paediatrics and growth and development chapter recommends the use of IAP 2015 growth charts for 5-18 year old children and IAP modified WHO growth charts for under five children's growth monitoring and analysis<sup>2</sup>. IAP has produced a mobile phone App that can be downloaded for easy growth monitoring of Indian children. The App can be downloaded on the Google playstore or istore of ipad and iphone users.

Common symptoms that direct to a pediatric

endocrine disorder are growth failures, short stature, tall stature, obesity, genital abnormalities, goitre, bone disorders, dark skin pigmentation, menstrual irregularities and hirsutism in adolescent girls, gynecomastia in boys, virilisation in girls, premature sexual maturation and delayed puberty in both sexes.

Certain symptoms however can be tricky and mislead a paediatrician to think of another system abnormality. Children with Grave's disease can present as sleep abnormalities, clumsiness, poor handwriting and scholastic performance, eye abnormalities or as diarrhoea. Each symptom can present in isolation thus misleading the doctor to think of psychological issues, neurological disease, eye disease or gastrointestinal problems respectively.

Similarly a child with adrenoleucodystrophy may present with hypoglycaemia mimicking a metabolic disorder, convulsions or intellectual deterioration suggesting a neurological disease or presenting as isolated hyperpigmentation leading a clinician to a dermatological problem.

A child with severe obesity and polycystic ovary syndrome may end up going to skin doctor for hyperpigmentation of the neck and acne or to a cardiologist for hypertension before being diagnosed by an endocrinologist as PCOS, metabolic syndrome and type 2 diabetes.

Triple A or Algrove syndrome can present to a neurologist for vague neurological symptoms or to an ophthalmologist for lack of tears or to a gastroenterologist for difficulty in swallowing before diagnosed as adrenal failure due to triple A – Achalasia, adrenal failure, alacrimia syndrome<sup>3</sup>.

In a paediatric intensive care setting it is quite common to misdiagnose diabetic ketoacidosis as either typhoid fever, malaria, encephalitis,

urinary tract infection or even as acute abdomen or pancreatitis.

It is therefore important for a busy practicing pediatrician to keep a broader outlook while looking at symptomatology and examining patients. Some lateral thinking along with proper growth monitoring and high index of suspicion will lead to proper diagnosis of disorders which can present with multisystemic symptoms and signs.

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8) Nagpur	–	10/07/2016	20) Agartala	–	06/11/2016
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10) Delhi	–	31/07/2016	22) Pondicherry	–	27/11/2016
11) Karamsad	–	07/08/2016	23) Dibrugarh	–	02/12/2016
12) Thane	–	14/08/2016	24) Pune	–	09/12/2016

## Enhancing Growth in Chronic Disorders

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Growth impairment occurs with many chronic conditions. In fact, it may be the presenting feature of many disorders. Unchecked growth faltering leads to permanent short stature.

#### Cause of Growth Failure in Chronic Disorders

Disruption of GH-IGF-I axis is the most common cause of growth failure in chronic disorders. The main contributing factors towards this are under-nutrition, chronic inflammation and effect of medication specially corticosteroids (Table1). In a few disorders direct inhibitory effect on growth plate maybe a contributing factor.

Under-nutrition is commonly associated with chronic disorders. This is due to a combined effect of anorexia, mal-absorption and increased energy requirements. Chronic inflammation associated with some chronic disorders leads to increased energy expenditure, proteolysis and anorexia. IL-1 $\beta$  and TNF $\alpha$  produced during inflammation have a direct inhibitory influence upon the growth plate by causing inhibition of chondrocyte proliferation and stimulation of apoptosis. Corticosteroids, used in management of many chronic disorders, cause growth failure by leading to disruption of GH-IGF-I axis, by inhibiting gonadotrophin production and by having a direct effect upon the epiphyseal growth plate.

The impairment in linear growth that starts during childhood gets further exaggerated by delayed onset of puberty which is commonly associated with chronic disorders.

**Table 1:** Factors contributing to disruption of GH-IGFI axis in chronic disorders

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#### Major factors

1. Undernutrition
2. Chronic inflammation
3. Medication specially corticosteroids

#### Other factors

1. Anemia
  2. Hypoxia
  3. Acidosis
  4. Repeated infections
- 

Important chronic disorders associated with growth impairment and the contributing mechanism in each are presented in table 2. These exclude disorders that lead to direct growth failure viz, thyroxine and GH deficiency states.

#### Optimizing Growth in Chronic Disorders

It is evident that many factors play a role in causing growth faltering in chronic disorders. The relative contribution of each factor varies in different disorders. Therefore, a multi-pronged approach tailored as per the specific disorder concerned is needed to optimize growth in chronic disorders.

**Table 2:** Chronic disorders associated with growth failure

Disorders	Mechanism of growth failure
1. Chronic malnutrition	↓IGF-I production, repeated infections, anemia
2. Chronic renal disorders including chronic renal failure and RTA	Anorexia, acidosis, anemia, electrolyte loss, ↓1,25 (OH) <sub>2</sub> D production.
3. Cardiac diseases – congenital cyanotic heart disease, chronic/ repeated congestive heart failure	Hypoxia, anorexia, ↑ energy demand of failing heart and ↑work of breathing
4. Gastro-intestinal diseases – celiac disease, crohn's disease, inflammatory bowel disease	↓ absorption, anorexia, anemia, chronic inflammation, steroids use
5. Pulmonary diseases – bronchiectasis, cystic fibrosis, bronchial asthma	Chronic hypoxia, repeated infections, ↑ work of breathing, steroid use
6. Chronic haemolytic anemias specially thalassaemia major	Anemia, hypoxia, energy demand for hematopoiesis, hemosiderosis leading to poly-endocrine failure
7. Juvenile idiopathic arthritis	Chronic inflammation, steroids use, anorexia
8. Inborn errors of metabolism – mucopolysaccharidosis, mucopolipidosis, glycogen storage disorders	Associated skeletal dysplasia
9. Endocrine disorders – Cushing syndrome, diabetes mellitus	Direct inhibitory effect of corticosteroids on growth plate, calorie wasting from hyperglycemia, chronic acidosis, glucocorticoid production, mal-absorption due to celiac disease
10. Chronic infections specially HIV	Anorexia, repeated opportunistic infections, ↑energy demand

**Various Strategies Useful for the Purpose**

1. Early diagnosis of underlying disorders; for example celiac disease, cystic fibroses and congenital hypothyroidism.
2. Optimal therapy to ensure adequate and prompt control of underlying disorder; for example institution of gluten free diet in celiac disease, correction of acidosis and potassium replacement in RTA.
3. Regular monitoring to ensure compliance with therapy and titrating drug dose; for example insulin dose in diabetes mellitus; alkali supplementation in RTA
4. Screening for associated co-morbidities and emerging complications; for example endocrinopathies in thalassaemia major, celiac disease and autoimmune thyroiditis in diabetes mellitus.
5. Appropriate dietary support and supplementation; for example high calorie,

- high fat diet in cystic fibrosis, increased calorie intake in HIV infection.
6. Steroid sparing strategies to minimize use of corticosteroids where required; for example use of inhaled corticosteroids in bronchial asthma and topical steroids in atopic dermatitis.
7. Corrective surgery; for example in cyanotic heart disease.

Regular and accurate growth monitoring is a vital tool to detect early growth failure and assess impact of the treatment on growth. Table 3 shows the specific strategies that might help optimizing growth in some important chronic disorders.

**Use of Newer Strategies to Optimize Growth**

Growth hormone therapy has been found to have value in improving growth potential in

patients with CRF. It is also being tried in management of growth failure associated with cystic fibrosis and JIA.

Recent evidence indicates that monoclonal anti TNF $\alpha$  antibody, infliximab may improve growth potential in chronic inflammatory disorders like Crohn's disease and JIA.

Aromatase inhibitors have been used to delay onset of puberty and skeletal maturation, there by prolonging period of growth before the epiphysis fuse . This group of drugs has been found to be useful in management of short stature associated with peripheral precocious

puberty, congenital adrenal hyperplasia and GH deficiency where institution of GH therapy has been delayed.

### Conclusion

Studies over the last decade have provided greater understanding of etiology of growth impairment in chronic diseases. It is possible to optimize and enhance growth in a variety of chronic disorders using a multi-pronged approach. Regular growth monitoring is the first step in recognition of management of growth failure in chronic disorders.

**Table 3 :** Strategies to optimize growth in some common chronic disorders :

Disorders	Growth Optimizing Strategies
1. Celiac disease	Early diagnosis, institution of and adherence to glucose free diet
2. Heart disease	Calorie support, control of CHF, alleviation of hypoxia, corrective surgery
3. Renal disease	Combating acidosis, electrolyte replacement, correction of anemia & osteodystrophy, GH therapy, renal transplantation for end stage disease
4. Chronic haemolytic anemia	Regular transfusion and chelation, screening for endocrine failure and timely institution of hormone replacement.
5. Pulmonary disease	Prompt control of infections, calorie supplementation, steroid sparing strategies
6. HIV	Nutritional support, ART when indicated, control of associated infections.
7. Diabetes	Good glycomic control, screening for and treatment of associated celiac disease and auto immune thyroiditis.

### Further reading :

1. Patel L. Growth and chronic disease. Ann Nestlé [Engl] 2007;65:129–136. DOI: 10.1159/000112235.
2. Grimberg A, Lifshitz F. Worrisome growth. In, Pediatric Endocrinology, Ed. Fima Lifshitz, Pub. Informa Healthcare, New York, 2007: 1-39

## Counseling in Pediatric Practice

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Counseling in simple language is the provision of professional assistance and guidance in resolving personal or psychological problems.

Medical definition of counseling is professional guidance of the individual by utilizing psychological methods especially in collecting case history data, using various techniques of the personal interview and testing interest and aptitudes.

The majority of the counselees and counselor is to produce personal solutions for them. Those in stressful experience anticipate that counseling will bring them relief.

In pediatric practice counseling starts from NICU. Pediatrician has to explain the seriousness of the child and management given as well as he has to discuss daily progress report with consequences and early intervention with parents. Early intervention is the key for development of the high risk neonate and must be started from NICU.

At the time of discharge from NICU pediatrician must have session with parents and should explain importance of Cleanliness, Breast feeding, Rest to mother, Hearing screening by OAE and vision screening to rule out ROP. Early stimulation with toys stimulation and environmental stimulation is discussed. Mother is considered as a therapist of the child and counseling is required to explain stimulation program. Standardized stimulation programs

like TDSP (Trivandrum Developmental Stimulation Program) or Indian National Portage Program can be used.

Importance of vaccination and major milestones for monitoring the growth and development must be explained to parents. The child needs follow up for various milestones as well as for prevention of illness. Pediatrician's role is to help the parents to bring best out of them.

Steps in counseling process – Rogers has described twelve steps.

1. The individual comes for help.
2. The helping situation is usually defined.
3. The counselor encourages free expression of feelings in regard to the problem.
4. The counselor accepts, recognizes and clarifies these negative feelings, which is quiet fully expressed. They are followed by the faint and tentative expressions of the positive impulses which make the growth.
5. When the individual's negative feelings have been quite fully expressed, they are followed by the faint negative tentative expression of the positive impulse, which makes for growth.
6. The counselor accepts and recognizes the positive feelings, which are expressed in the same manner he has accepted and recognized the negative feelings.

7. This insight, this understanding of the self and acceptance of the self, is the next important aspect of the whole process.
8. Intermingled with this process of insight – and it should again be emphasized that the steps outlines are not mutually exclusive, nor do they proceed in a rigid order – is a process of clarification of possible decisions, possible course of actions.
9. Then comes one of the fascinating aspects of such therapy, in the initiation of the minute, but highly significant, positive reactions.
10. This is, first of all, a development of further insight more complete and accurate self understanding as the individual gain courage to see more deeply into his own actions.
11. There are increasingly integrative positive actions on the part of the client there is less fear about making a choice and more confidence in self-directed action.
12. There is a feeling of decreasing need for help, recognition on the part of the client that the relationship must end.
- Types of Counseling (Table 1)**
- The counseling techniques could be classified as supportive counseling that provide support, guidance, advice, and reassurance. Re-educational counseling is an attempt to teach individuals new patterns of behavior and social functioning (CBT). Reconstructive counseling aims to dismantle and rebuild a new personality (Psycho analysis)
- The therapies commonly given are RET (Rational Emotive Therapy) and CBT (Cognitive Behavioral Therapy)
- Rational emotive therapy :**
- Albert Elis, has set forth the basic tenets of RET. Elis has stated that humans are both rational as well as irrational. People behave in a certain way because they believe that they should or must act in these ways.
- The rational-emotive practitioner believes that no person is to be blamed for anything he or she does, but each person is responsible for his or her behavior. Blame, anger, is viewed as dysfunctional and irrational feelings.
- Rational emotive therapy recognizes that

**Table 1.** Classification of counseling-based on its therapeutic process

<i>Types</i>	<i>Function</i>	<i>Examples</i>	<i>Indications</i>
Reconstructive therapies	Give insights by focusing on psychological mechanisms, unlearning and relearning healthy relationships, behavior and handling of emotions	<ul style="list-style-type: none"> <li>• Psychoanalysis</li> <li>• Psychodynamic counseling</li> </ul>	Personality disorder
Re-educative therapies	Emphasizes on teaching alternative techniques that are often problem-specific	<ul style="list-style-type: none"> <li>• Behavior therapy</li> <li>• Cognitive therapy</li> <li>• Interpersonal</li> <li>• Family therapy</li> <li>• Play therapy</li> </ul>	<ul style="list-style-type: none"> <li>• Anxiety disorder</li> <li>• Depressive disorder</li> <li>• Conduct disorder</li> </ul>
Supportive therapies	Relief from the immediate crisis, and removal of symptoms to pre-morbid levels using adolescents own emotional, intellectual and social skills	<ul style="list-style-type: none"> <li>• Crisis intervention</li> <li>• Grief support</li> </ul>	<ul style="list-style-type: none"> <li>• Suicidal attempt</li> <li>• Grief</li> </ul>

human events include external causal factors, but human beings are not completely determined. They can transcend their biological and social limitations, difficult though it may be, and act in ways that will change and control the future. This reorganization of the individual's ability to determine, in good part, his or her own behavior and emotional experience and expressed in the A-B-C theory of behavior and personality disturbance.

- A is the Activating event.
- B is the individual Belief system; and
- C is the Consequences.

***Cognitive-behavioral therapy:***

- CBT is used effectively in school
- CBT treats depression by addressing emotional, behavioral and cognitive skill deficits linked with the onset and maintenance of depression.

*Core components of CBT –*

- Psycho education about the nature of depression and the treatment rationale.
- Effective education and mood monitoring (the child learns to recognize and label his or her own feelings and the feelings of others, and to monitor and chart his or her mood).
- Relaxation training – A class of techniques that include slow, controlled breathing, deep muscle relaxation (wherein the major muscle groups are tensed and relaxed), guided imagery (e.g., the child is encouraged to imagine a calm, soothing scene).
- Pleasant activity scheduling (the child learns to increase pleasant activities and decrease unpleasant and solitary activities).

- Cognitive restructuring (the child learns to identify and challenge irrational, negative thoughts and replace them with realistic, positive thoughts).
- Thought stopping or interruption (the child learns to distract him or herself to stop ruminating or obsessively thinking, about depressing topics).
- Social skills and assertive communication (the child learns strategies to make friends improve his or her social support system and resolve interpersonal conflicts).
- Problem solving (the child learns to generate and evaluate potential solutions to problems and to make plans to implement the chosen solution)
- Reinforcement and self reinforcement (the child is awarded, and learns to reward himself or herself, for a variety of behaviors, including increasing activity level, problem solving and social interaction).

Adolescent needs intervention in many areas as this is most important period where they feel that nothing seems smooth. We need counseling in prevention of malnutrition, anemia, and iodine deficiency. We need to prevent obesity, diabetes and hypertension all foundation for future heart problems. Adolescent Reproductive Health Services (ARHS) should reach to the adolescent in need. We must give guidance for scholastic backwardness issues and improving study habits. We can train them in life skills and give guidance to build career by counseling. The WHO recommended therapeutic counseling for priority mental health disorders in adolescents is shown in Table 2.

**Table 2.** Therapeutic counseling for priority mental health disorders of adolescents as recommended by the World Health Organization.

Disorder	Treatment modality as recommended by WHO					
	Family therapy	School intervention	Counseling	Specialized intervention	Others	CBT
LD	-	-	Yes	Yes	--	Yes
ADHD	Yes	-	Yes	-	-	-
Tics	Yes	Yes	-	-	-	-
Depression	Yes	Yes	-	-	-	-
Psychoses	-	Yes	Yes	-	Yes	-
Schizophrenia	-	Yes	-	-	-	-

Primary care pediatricians should be able to include simple counseling strategies in their therapeutic options for children as well as adolescent with mental health needs.

**Further reading :**

1. IAP Textbook of Pediatrics, 6th edition, volume two, pg no. 981-984.
2. Institute for psychotherapy and management sciences, paper IV- techniques and methods of counseling.

*Members are requested to submit original articles, review articles, case scenerios for*

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