

LEARNING DISABILITIES IN CHILDREN-AN AYURVEDIC PERSPECTIVE

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ABSTRACT

Learning disabilities or learning disorders are umbrella terms for a wide variety of learning problems of childhood. It is not always easy to identify it and hence remains a very misdiagnosed condition in out-patient department. It has a prevalence rate ranging from 3-10 % among students of India. Children with learning disability are usually below average achievers in academics and hence it's a very tormenting problem for the families especially in a country like India where failure is considered derogatory. Child has an appreciable intellectual disability and affects many parts of his/her life like school, daily routine, work, family life and social life and friendships. If not

managed timely, it awfully impacts their life and they tend to become a burden over the society. Hence a keen attention should be paid over the child's academic problems so as to identify and manage it as early as possible. This paper basically deals with the different types of learning disabilities found in children, their types and probable causes. *Ayurveda* has come a long way in terms of its benefits to the society in physical as well as mental health. So, in support of the above said statement, a sincere attempt has been made in unfolding the best possible *ayurvedic* modalities for management of learning disorders.

KEYWORDS: Learning Disorders, intellectual, derogatory, *Ayurveda*.

INTRODUCTION

Representatives of organizations committed to the education and welfare of individuals with learning disabilities are known as National Joint Committee on Learning Disabilities (NJCLD). In 1980s, NJCLD, therefore, defined the term learning disability as: A heterogeneous

group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning or mathematical abilities. Basically, this affects the brain's ability to receive, process, analyze, or store information. These disorders are intrinsic to the individual and presumed to be due to Central Nervous System Dysfunction. While learning disability and learning disorder are often used interchangeably, they differ in many ways. Disorder refers to significant learning problems in an academic area. These problems, however, are not enough to warrant an official diagnosis. Learning disability, on the other hand, is an official clinical diagnosis, whereby the individual meets certain criteria, as determined by a professional (such as a psychologist, psychiatrist, speech language pathologist, or pediatrician). The core tenet of LDs juxtaposes the disparity between a child's poor academic achievement and his expected intellectual potential.

Etiology

🌈 Learning disabilities are caused by something affecting the growth of the brain. This may occur in prenatally stage, during birth, or in early childhood.

🌈 Possible causes include the following:

- An inherited condition, meaning that certain genes delivered from the parents affected the brain development.
- Chromosome abnormalities such as Down's syndrome or Turner syndrome.
- Complications through birth resulting in a lack of oxygen to the brain.
- A very premature birth.
- Mother's illness during pregnancy.
- The mother taking alcohol during pregnancy, for example Fetal Alcohol Syndrome.
- First degree relatives with learning disability, prenatal cigarette exposure, lead exposure are risk factors
- A dyslexic parent may pass on the disorder up to half of the children.
- Half of the siblings of a dyslexic child are likely to suffer from dyslexia.
- Association with attention deficit hyperactivity disorder (ADHD) is well known, the two conditions co-existing in around one-third of cases.
- Contact with damaging material (like radiation).
- Neglect, and/or a lack of mental stimulation early in life.
- Some people with learning disability have additional physical disability and/or sensory weakening.

- An enervating illness or injury in early childhood affecting brain development, for example a road traffic accident or child abuse.

Pathology

- ✚ There is no organic brain lesion in most of the cases.
- ✚ Different regions of the brain communicate with one another through the neural networks-the electric wiring of the brain.
- ✚ According to the National Center for Learning Disabilities, in children with LD, it is the wiring that experience difficulties.
- ✚ The regions of the brain aren't effectively communicating with one another.
- ✚ A range of neurobiological investigations using primarily functional brain imaging suggest that there are differences in the left temporo-parieto-occipital brain region between dyslexic and non-impaired readers.
- ✚ Functional brain imaging in both children and adult dyslexic readers demonstrate a failure of the left hemisphere posterior brain systems to function properly during reading with increased activation in the frontal regions, a pattern referred to as the neural signature of dyslexia.

Different forms of LD

Type	Definition	Features
Dyslexia	“Dys” means difficulty with and “lexia” means words – thus “difficulty with words”.	<ul style="list-style-type: none"> ▪ Most common LD, affecting 80% of children ▪ Mispronunciations ▪ Labored, effortful approach to decoding, word recognition and text reading ▪ Handwriting is often affected ▪ Speech that lacks fluency with many pauses or hesitations.
Dysgraphia	“Dys” means difficulty with and “graphia” means writing – thus “trouble with writing”.	<ul style="list-style-type: none"> ▪ Poor legibility and excessive erasures ▪ Misuse of lines and margins ▪ Irregular letter sizes and shapes ▪ Handwriting abilities that interfere with spelling and written composition ▪ Synchronization difficulties like writing and thinking at the same time
Dyscalculia	“Dys” means difficulty with and “calculia” means calculations and mathematics – thus “difficulty in learning or	<ul style="list-style-type: none"> ▪ Problems with mental math ▪ Trouble analyzing time and reading an analog clock ▪ Struggle with motor sequencing that involves numbers, often they count on

	comprehending arithmetic problems	their fingers <ul style="list-style-type: none"> ▪ Inconsistent results in addition, subtraction, multiplication and division ▪ Poor memory of math concepts
Audio processing disorder	This is a problem with the way the brain processes the sounds a person takes in. It is not caused by hearing impairment.	<ul style="list-style-type: none"> ▪ Difficulty to follow conversations know where a sound came from ▪ Listen to music remember spoken instructions, particularly if there are multiple steps ▪ Understand what people say, especially in a loud place or if more than one person is talking
Video processing disorder	There is difficulty in interpreting the visual information.	<ul style="list-style-type: none"> ▪ The child may have trouble seeing the difference between similar letters, shapes, or objects. ▪ Trouble using what they see to coordinate with the way they move, may struggle to write within lines or bump into objects while walking ▪ Switch numbers or letters when writing, or may mistake “b” for “d” or “w” for “m”

Ayurvedic perspective

न हि सर्वविकाराणामतोअस्ति ध्रुवास्थितिः ।।

स एवकुपितोदोषः समुत्थानविशेषतः ।

स्थानान्तरगतश्चैवजनयत्यामयान् ।। (च. सू. 18 / 44–45)

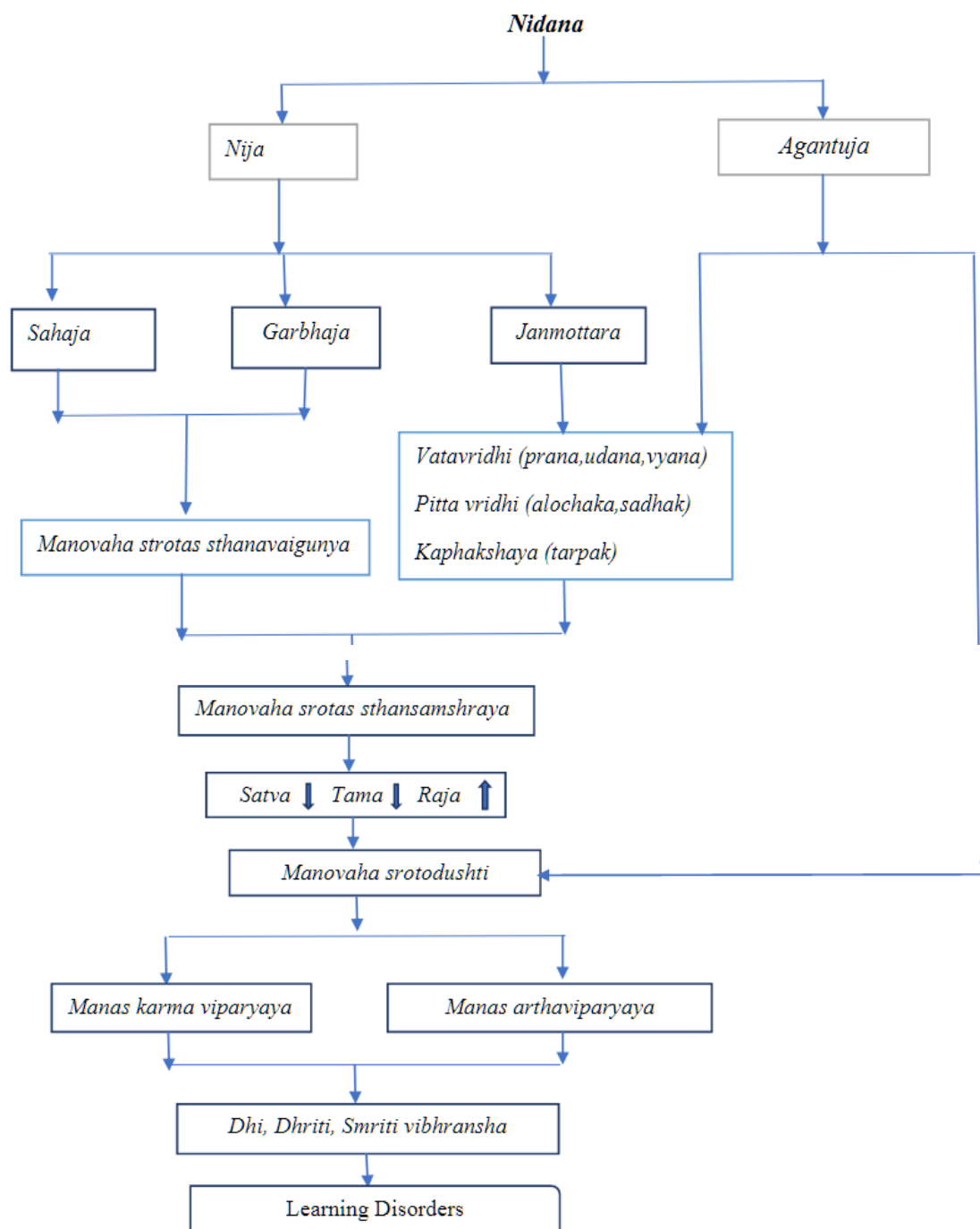
- According to *Acharya Charaka*, it is not possible to name every disease. The same *Tridoshas* after getting exposed to different causative factors (*Nidanas*), produces different types of diseases (*Rogas*) at different places (*Sthanas*). Keeping this in consideration, there is no direct description of learning disorders in classical texts.

Ayurveda describe three aspects of mental ability

- **Dhi** (The power of acquirement or learning),
- **Dhriti** (The power of holding), and
- **Smriti** (The ability to memorize, recollection of past experiences).
- **Dhi** and **Smriti** work in association with the **Dhriti** and leads to normal process of *Gyanotpatti*. When the three mental functions are not in balance, either individually or in their coordination with one another mentioned as the state of (*Vibhransha*) in our texts, then learning problems can emerge.

Samprapti (Etiopathogenesis)

Keeping in mind the *Manovyaparyaya* and *Gyanotpatti karma* probable mode of origin of the disease can be postulated.

Schematic representation of *samprapti****Samprapti ghataka***• ***Dosha – Sharirika***

Vata – Prana, Udana, Vyana

Pitta – Buddhi vaisheshika Alochaka, Sadhaka

Kapha – Tarpaka

- **Manasika** - *Rajas and Tamas*
- **Dushya**- *Rasa, Majja*
- **Srotas** - *ManovahaSrotas*
- **Dushti**- *Atipravritti*
- **Agni**- *Vishama*
- **Udbhavasthana** - *Mastishka, Hridaya*
- **Vyaktisthana** – *Sarva Sharira*

The *Nijanidanas* mainly the *sahaja* and *garbhajanidana* lead to *sthanvaigunya* at the site of *manovahasrotas*. As these factors act at the level of *manas* e.g inheritance of *manas prakriti* and *satva* of the parents or antenatal factors like *dauhridavimanana*, so the child is prone to develop *manas vyadhi* since birth. These factors also affect the development of *Gyanendriya* and *Karmendriya* of the child making them more susceptible to abnormalities of their functions. The *janmottaranidana* primarily causes the vitiation of *vatadosha*, as *vatadosha* has been called as “नियन्ता प्रणेता च मनसः and “सर्वेन्द्रियाणामुद्योजकः”. Amongst the five functional types of *VataDosha*, *Prana Vayu* is related with control of the functions of *Buddhi* and *Mana*, while *Udana Vayu* governs enthusiasm, speech and helps in recalling the past experiences i.e *Smriti*. *Vyana Vayu* governs the motor activities of the body. These are vitiated leading to abnormalities of their functions. There is also *vridhhi* of *pittadosha* and chiefly there is vitiation of functions of *Buddhi vaisheshika*, *Alochak* and *Sadhak Pitta*. Vitiation of *Tarpaka Kapha* is also seen. As *Tarpakakapha* is responsible for *Indriyatarpana*, so its vitiation will lead to abnormalities in the functioning of various *Indriyas*.

The *Agantuja Nidanas* exerts their influence in two ways, either they can cause the *Doshadushti* primarily leading to *Manovaha srotodushti*, or they can directly affect the *Manovaha srotas* as in *Bhutavesha* and *Shiroabhighata* etc.

Diagnosis

- Discrepancy between potential (ability, IQ) and achievement, resulting in underachievement, especially in reading, is the most important clue. Unexpected difficulties in reading should arouse suspicion.

- **History-** Inquiry into prenatal, perinatal or postnatal factors contributing to learning disability. Information with respect to marital disharmony, unrealistic expectations from the child, sibling rivalry, discrimination and emotional trauma should be sought.
- **Physical examination-** It should exclude any neurological deficit, hearing and visual loss.
- **Investigations-** These include screening for hearing, vision, speech and psychoeducational status.

DSM-5 Diagnostic criteria for LD

- Persistent difficulty in learning academic skills for at least 6 months with at least one of the symptoms despite intervention targeting the areas of difficulty. These areas of difficulty include:
 - ✓ Inaccurate or slow and effortful word reading
 - ✓ Difficulty understanding the meaning of what is read
 - ✓ Spelling
 - ✓ Writing difficulties such as grammar, punctuations, organization and clarity
 - ✓ Number sense, fact and calculation
 - ✓ Mathematical reasoning

Management of learning disabilities

Multidisciplinary approach

- Involving the class teacher, remedial teacher, parents, social worker, pediatrician, psychologist and, if warranted, even a psychiatrist, is important in managing the learning disability.
 - The teaching curriculum is adjusted and specific teaching materials employed to help the child in exploring his optimal learning potential.
 - For reading disability, the child should be taught;
 - To break the spoken words into smaller units of sound
 - That letters on the page represent these sounds
 - That written words have the same number and sequence of sounds as heard in spoken words,
 - Phonemic awareness
- Additional measures include:
- Practice in reading stories is useful

- Computers with spelling checker
- Tape-recorders
- Recorded books
- Oral rather than written examination
- Drug therapy for comorbidities such as emotional problems, hyperactivity and enuresis

Role of ayurveda

Ayurveda adopts a holistic approach towards the disease management. It believes in treating the individual as a whole and not mere the disease. Basically, the *Chikitsa* is classified into 3 types i.e. *Daivavyapashraya Chikitsa* (Divine therapy), *Yuktivyapashraya Chikitsa* (Rational therapy) and *Satvavajaya Chikitsa* (Psychotherapy). *Ayurvedic* management has given positive results in improving intellectual power, concentration, learning capacity and enhancing academic performance in neurobehavioral disorders.

Daivavyapashraya chikitsa

The word *Daiva* refers to sinful acts committed in past life. It is a treatment based on pleasing the god. Its mode of action can't be ascertained through a general logic, but gives immediate results. It acts on the basis of *Prabhava*. This revives normal functioning of *Satva guna* and removes obstacles of *Raja* and *Tama*. *Mantra* (Hymns), *Aushadha* (Amulets, Talisman), *Mani* (Wearing of Gems), *Mangala* (Auspicious ceremony), *Bali* (Offering to god), *Upahara* (Gift), *Homa* (Oblations), *Niyama* (Observance of auspicious scriptural rules), *Prayaschitta* (Atonement), *Upavasa* (Fasting), *Svastyayana* (Chanting of auspicious hymns), *Pranipata* (Observance to the god), *Gamana* (Going to pilgrimage) are different means of this discipline. In *manidharana karma*, wearing a ***Rudraksha*** amulet can be opted.

Yuktivyapashraya chikitsa

It is aimed at rational use of herbal drugs and therapies. It is a treatment in which the medicine, lifestyle, and diet are skillfully planned and administered. It is divided in two types – *Shodhan* & *Shaman*. Since learning disabilities involve a neurological deficit in the functioning and coordination of brain, a great deal of nootropic drugs (*medhya rasayanas*) which enhance memory and cognition and boost overall brain performance are mentioned in *Ayurveda* that can be of great benefit.

- Mandukaparni (Centella asiatica Linn.)***: Is a prostrate. Fresh whole plant juice is used for therapeutic purposes as *Medhya* (cognitive enhancer). Major constituents are saponin (medacoside, asiaticoside, medacassoside, asiatic acid, a new triterpenic acid). They act

on behaviour and inhibits the memory impairment induced by scopolamine through the inhibition of AChE. Syrup Mentat, a formulation containing *Centella asiatica* proved for its antistress effects. Its Methanol extract showed highest free radical scavenging activity that can be attributed to the presence of polyphenols and flavonoids as this fraction contains maximum amount of these secondary metabolites.

- ii. ***Yastimadhu (Glycyrrhiza glabra Linn.)***: Is a hardy herb or under shrub belonging to Fabaceae family. Fine powder of dried root is used internally with milk for therapeutic purpose as *Medhya*. The roots and rhizomes of *Glycyrrhiza glabra* is an efficient brain tonic; it increases the circulation into the CNS system and balance the sugar levels in the blood. Liquorice has significant action on memory enhancing activity in dementia. According to studies, it significantly improved learning and memory on scopolamine induced dementia.
- iii. ***Shankhapushpi (Convolvulus pleuricaulis chois)***: Is a perennial, prostrate or sub erect spreading hairy herb found throughout India. Recommended therapeutic form is fine paste of whole plant. Highly regarded as *Medhya* (intellect promoter).
- iv. ***Brahmi (Bacopa monniera)***: Is a well-known nootropic plant reported for its tranquilizing, sedative action, cognitive enhancer, hepatoprotective, memory enhancer and antioxidant actions. Neuroprotective activity may be ascribed to having its reactive oxygen species scavenging property.
- v. ***Kushmanda (white gourd/ Benincasa hispida)***: Is useful in treatment of *pitta vikara*, bleeding disorders, epilepsy, and insanity. The juice of the fruit is prescribed by *Sushruta* for mental disorders and insanity.
- vi. ***Ashwagandha***: Is a much renowned adaptogenic herb that helps body to deal with stress. It may serve as a natural tranquilizer to reduce excessive activity in the brain when stimulated.
- vii. ***Saraswatarishta***: Is another classical ayurvedic formulation widely used in mental disorders. It consists of 18 *medhyarasayan* drugs rich in *vata* balancing property which aid in managing anxiety related problems and improve overall cognitive function. Also helps in treating acute anxiety, fatigue, insomnia, partial loss of memory, low grasping power and slurred speech.
- viii. ***Kapikachurchurna (Mucuna pruriens)***: It has an active component called levodopa, a direct precursor of the neurotransmitter dopamine, which is a potent neurotransmitter. It gives stimulus by acting upon certain areas of CNS and hence, will increase the learning, cognitive and intellectual abilities of the child.

Panchakarma therapy

Sarvanga abhyanga-A gentle soothing massage over the body with medicated oils works on both physical and psychological levels.

Physical- Rubbing the body produces heat and increases blood circulation, it affects the lymphatic system and supplies more nourishment to the blood. It also relaxes the muscles and pacifies aggravated *Vata dosha*.

Psychological-Through touch, massage works on the nervous system and affects the circulation of growth hormones.

Shiro-dhara- Medicated oils like *Jatamansi oil*, *Brahmi oil*, *Bala oil*, milk and *Ghritas*, *vata shamak* decoctions can be used that directly nurtures the control station (*Uttamanga*) i.e head and alleviates psycho-somatic disorders balancing the *doshas*. Continuous pressure by dripping of fluid on the forehead produces a vibration which generates electromagnetic waves and it reaches the brain cortex producing a tranquilizing effect. There are studies that supports its efficacy in various neurodevelopmental disorders like ADHD and various Cognitive impairments.

Shiro-basti- It involves pooling of the liquid medicines, especially herbal oils and *ghritas* in a chamber kept overhead that are allowed to stay there for a certain period of time. It enhances and nourishes the brain cells, alleviates insomnia, stress, tension and different kind of neurobehavioral disorders. *Ghrita* such as *Kalyan ghrita*, *Goghrita* and oils such as *Jyotishmati oil*, *Brahmi oil*, *Tila oil* are beneficial.

Shiro-abhyanga- *Shirodhara* and *Shirobasti* followed by *Shiroabhyanga* reduces the levels of stress-related hormones and also triggers rapid cerebral blood flow further enhancing the efficacy of the procedure.

Basti- *Basti* is known to be the *ardhachikitsa* (half-treatment) in *Ayurveda*. It's a prime treatment modality for pacifying vitiated *vata dosha*. *Matrabasti* is safest and most effective for children because of its nil complications. *Dhanwantar oil* and *Sahcharadi oil* *matrabasti* are good options.

Nasya- *Acharya Vagbhatta* has said that “नासा हि शिरसो द्वार” (A.H Su 20/1) i.e. *nasa* is gateway of *shira*. This statement is strongly supported by anatomical fact that the olfactory nerve fibres run through the cribriform plate making it an excellent gateway into the brain for administering drugs. The drug administered through nostrils, reaches *shringataka* (*a shiramarma*) and spreads into the *murdha* (brain), *netra* (eye), *shrota* (ear), *kantha* (throat), *siramukhas* (opening of the vessels), etc. and seizes the morbid *dosha* from these areas and expels them from the *uttamanga*. After proper *snehan* and *swedan*, *Brimhana nasya* with *Anu*

tail, *Shadbindu taila*, *Brahmi oil*, *Kalyan ghrita*, *Palankasha oil* can be used that will alleviate *vata* and increase-memory and cognitive powers.

Dhupana karma- *Dhupana karma* with herbs such as *Jatamansi*, *Sarshapa* (mustard), *Vacha*, *Agaru*, *Palankasha* can be done.

Satvavjayachikitsa

Charaka defines it as a method of restraining or withdrawal of the mind from unwholesome objects (*Arthas*) “अहितेभ्यो अर्थेभ्यो मनो निग्रहः ॥” (*Ca. Su.* 11/54). It uplifts the *Satva* of the patient. This enhances *Prana vayu* circulation throughout the body resulting in removal of blockage of channels of circulation linked to mind. It prevents the impairment of intellect, patience and memory and bring them back to normal condition. This is secured best by restraining the mind from desire for unwholesome objects, directing it towards wholesome objects and the cultivation of *Gyana*, *Vigyana*, *Dhairya*, *Smrti* and *Samadhi*. So, the indulgence of the senses (*indriyas*) from their respective performance (bad habits) should be curtailed.

Sadvritta palan (Right Conducts/Ethical regimen)

It can be correlated to behavioral therapy in modern and demand a life-long commitment and efforts of both the parents and the affected children. It is assisted with the daily diet regulation and making sleep time-table of an affected child. Diet should be of nutritional balance (*Satvik Ahara*), on proper time, avoiding excess oil and spice, rich in antioxidants and immunity boosters. Cow's ghee, cod-liver oil, nuts and cashews, vitamin D3 are playing good role to develop brain activities. Sound sleep and a good amount of water intake is also a must. Scalp massage (*Shiro Abhyanga*), massage of soles of feet with sesame oil, *karnapurana* with *Shadbindutaila*, *Bilvataila* etc is also beneficial. Daily work should be listed and overcoming problems (e.g. during writing) should be handled one by one and slowly.

Yoga and Pranayama

Ideally it should be a part of lifestyle for lifetime and not just for therapeutic intention. Affected children should be encouraged with little warming up exercises like jogging, forward and backward bending in standing posture, strengthening *asanas* like *trikona asana*, *veerbhadra asana*, *parvathasana*, *sashanka asana* and relaxing *asanas* like *shavasana*, *makarasana*. Simple breathing exercises *anuloma-viloma*, *kapalbhati* and chanting of *Om* should be taught.

DISCUSSION

There are a large number of children with LDs, particularly in India and most of them go undetected. They face unique challenges in life that are often pervasive. Hence, the recognition and identification of the students with LDs become very difficult and awareness about LDs is also very low in India. Early and accurate identification of learning disability in schools can set struggling students on a path for success. Teachers, parents and schools can create plans together that tailor intervention and accommodations to aid the individuals in successfully becoming independent learners. School psychologists, special educators, speech and occupational therapists and literacy coaches should work as a team. Adopting an integrated approach towards management with the behavioral therapies and *Ayurvedic* herbs and procedures can really make a great difference to these children to blossom and excel in their lives.

“The celebrities Edison, Einstein and Leonardo da Vinci reportedly suffered from dyslexia and yet made it big in their fields”

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