

## At school

With a suitable treatment, global proprioceptive information is changed and body schema is fixed. Sensory information are now consistent and the brain can treat them efficiently. Rehabilitation, particularly speech language, is taken further and become more efficient.

At school, the teacher's role is crucial for the success of the proprioceptive treatment :

- ⇒ **Prism glasses** have to be worn in the classroom as well as during breaktime and sport. Proprioception is indeed reprogrammed within the movement.
- ⇒ **A 30° personal tilted board** has to be used for reading and writing. This will inhibit some extraocular muscles.
- ⇒ A 2nd row in front of the board is the best seat. This will avoid sweeping eye movement.
- ⇒ **Feet flat on the ground** or on a step if necessary. The student has to wear his feet soles. This will inform the brain on the body balance. Thus, he will be more available for learning.
- ⇒ Ear plugs or noise-cancelling headphones should be used when visual disorder is related to noise interference.
- ⇒ Each **sudden regression**, unusual restless behavior or attention disorder, following a period of progress must be noticed and relatives informed. Treatment might be revised.

**Besides those points, specific arrangements and other support measures for learning disabilities, such as french PAP or PPS, need to be considered.**

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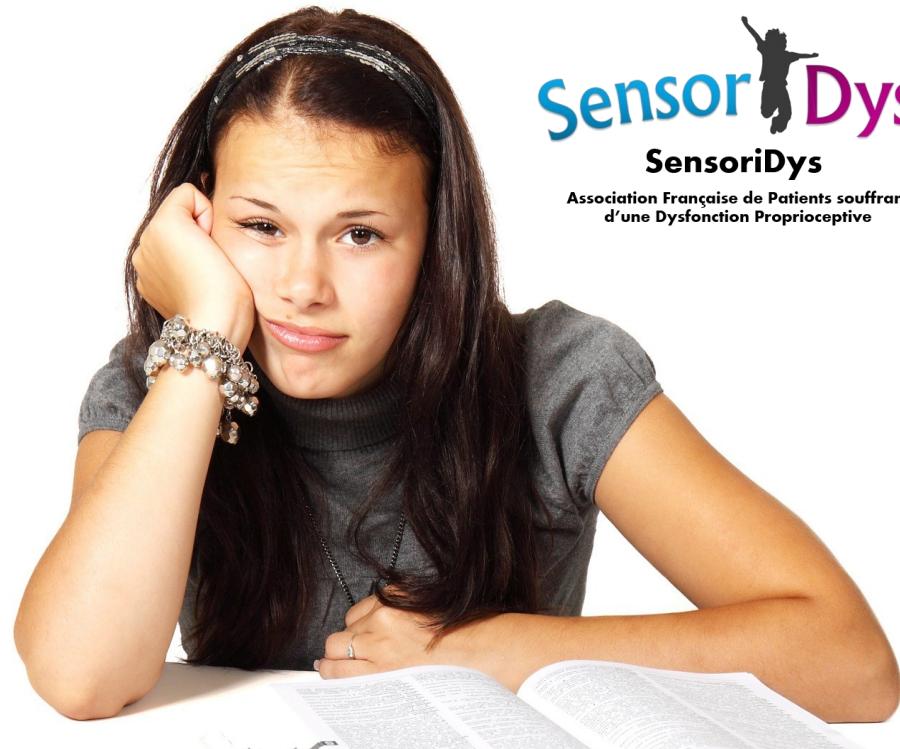
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## SCHOOLING & PROPRIOCEPTIVE DYSFUNCTION

### HELP DYSPROPRIOCEPTIVE CHILDREN AT SCHOOL



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### UNDERSTAND IN ORDER TO SUPPORT

« More than a "6th sense", proprioceptive sensitivity might be a primary sense which is necessary to the emergence of self-awareness as a being capable of action. »

**Pr JP. Roll (CNRS)**

## What is Proprioception ?

Proprioception is the sense which allows us to perceive ourselves without using eyes. It plays an essential role within the **body schema** development, which is the representation of one's own body, its shape, volume and the place it takes within space.

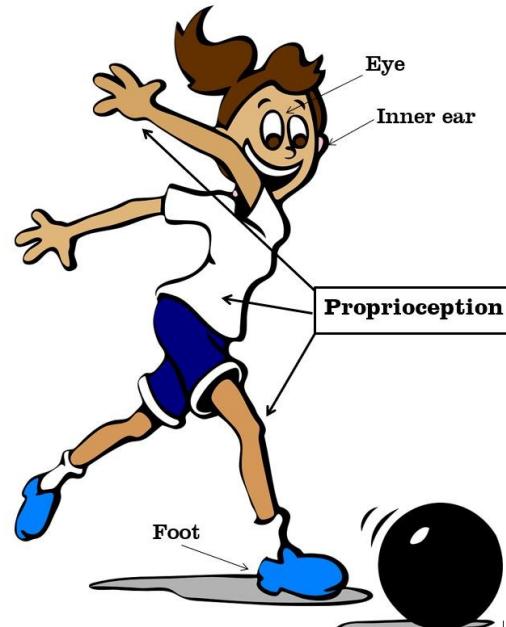
It works with millions of sensors situated, for most of them, in our muscles (specially in extraocular ones) and **sole of the foot**. This second retina informs the brain on pressure variations applied by the body on different parts of the foot (which is the expression of body inclination). **Eyes and mouth** are closely linked because trigeminal nerve is implied in both ocular and tongue plus oral mucosa feedback.

## Our body in its environment

Our eyes collect information about our environment. Inner ear contributes to sensation of movement and balance. Proprioceptive sensors and sense organs are both providing messages continuously through nervous fibers toward the brain which can analyze them. Thus, the brain knows the exact position of our body within space and reacts by relaxing or contracting muscles, which allow us to **make accurate and appropriate moves**.

Moreover, information from extraocular muscles about the position of eyeballs into their orbit allow the brain to **organize movement of our eyes more efficiently**.

Proprioception works in connection with all other sensory organs. Data about their respective position inside the body are consistently sent to the brain, which can properly direct them toward their stimuli. In that way, **the brain locates correctly visual and auditory information within space and can process efficiently**.



## Proprioceptive Dysfunction and Schooling

When proprioception provides wrong information, body schema construction is impaired : the child tilts whereas its proprioception make him believe he is straight. Information received to the brain from sensory organs are no longer consistent which causes sensory mismatch. **Various symptoms appear consequently. They are patient dependant and may impact education :**

- ⇒ unusual posture resulting in migratory pain and chronic fatigue,
- ⇒ clumsiness for fine movements, which can make writing and geometry drawing hard to process,
- ⇒ impaired ocular convergence and imprecise ocular saccades during reading and sometimes counting tasks,
- ⇒ unusual deglutition with reflexes alteration from oral point of departure, which can generate REM sleep disorder, resulting in attention deficit disorder with or without hyperactivity and memory disturbance
- ⇒ visual loss during listening of certain sound frequencies or irregular background noise, which can induce concentration difficulties when a noise is perceived.

A child demonstrating those difficulties may be diagnosed with **specific learning disability (dyslexia, dysorthographia, etc.)**. Clinical picture is sometimes less clear, but academic performances are not up to the many efforts made by the child **despite his normal intelligence and his real desire to succeed**.

## Proprioceptive treatment

The treatment aims at giving back a harmonious functioning of the proprioception via personalized utilisation of proprioceptive stimulation acting on various sensors (eye, foot, mouth). These stimulations must be monitored especially in the classroom. Among them :

- ⇒ **Prism into glasses** allowing to restore extraocular tension and edit global proprioception at the end.
- ⇒ **Proprioceptive foot sole**, by changing floor perception, help to rebalance the work of muscles involved in the regulation of postural tone.
- ⇒ **An ergonomic posture**, to maintain at work, will deeply change wrong proprioceptive information.