

## At school

With proper treatment, the global proprioceptive information is modified, and the body schema is corrected. The sensory information becomes consistent, and the brain can process it efficiently. Re-education, especially speech therapy, is continued and proves to be more effective.

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

- the child has to wear its **prism glasses** in class, during recess or when practicing a non-violent sport: proprioception is reprogrammed in movement;
- **a slant board angled at 30°** has to be used for reading (and writing, if possible), the use of certain eye muscles being thus avoided;
- the child should be seated facing the board, so as to limit eye movements: the second row in front of the board is the best seat;
- an arch support must be maintained by constantly wearing insoles calibrating the proprioception of the lower limbs: **feet placed flat** (with a footrest if necessary, depending on the size of the child) can inform the brain about the body balance, and the student affected by proprioceptive dysfunction is then more available for learning;
- if there are visual disorders due to noise, ear plugs or noise-cancelling headphones should be used during school tests;
- if, after a period of progress, the child shows **a sudden regression**, e.g. unrest, attention difficulties, the family should be informed, as the treatment may have to be revised.

In addition to these measures, there are of course specific arrangements for learning disabilities, which are covered by a French PAP (Plan d'Accompagnement Personnalisé), a Personalized Support Plan, or PPS (Projet Personnalisé de Scolarisation), a Personalized Education Project.

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International Society of  
PROPRIOCEPTIVE DISORDERS  
(ISPROD)

## EDUCATION AND PROPRIOCEPTIVE DYSFUNCTION

HELPING CHILDREN WITH PROPRIOCEPTIVE DISORDERS IN SCHOOL



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## UNDERSTANDING IN ORDER TO PROVIDE SUPPORT

« More than a "sixth sense", proprioceptive sensitivity might be a primary sense essential to the emergence of self-awareness as a being capable of action. »

*Pr. J.P. Roll (French National Center for Scientific Research, CNRS)*

## What is Proprioception ?

Proprioception is the sense that allows us to perceive ourselves without vision. It plays an essential role in the development of the **body schema**, which is the representation that each one makes of his own body - its shape, its volume, the place it occupies in space.

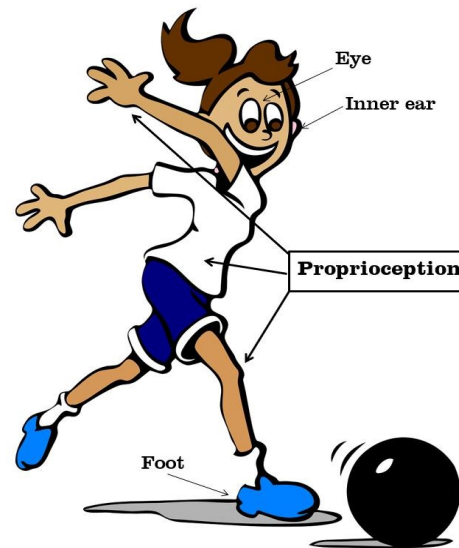
It works with millions of sensory receptors located mainly in all our muscles (with a predominance of those of the **eyes**), as well as in the skin on the **sole of the foot**. The skin on the sole of the foot is like a tactile retina and informs the brain about the variations in pressure exerted by the body on the different parts of the foot (reflecting the inclination of the body). The **eye** and the **mouth** are closely linked, because ocular proprioception is carried by the trigeminal nerve, which also carries information from the tongue and the mucous membranes of the mouth.

## Our body in its Environment

Our eyes collect information about our environment. The inner ear contributes to our sense of balance and movement. Proprioceptive sensors and other sense organs constantly send messages through nervous fibers toward the brain, which analyzes them. Thus, the brain knows exactly where our body is in space, and reacts by relaxing or contracting muscles, allowing us, in any given situation, to **make precise and appropriate movements**. The information given by the oculomotor muscles on the location of the eyeballs in their orbit also enables the brain to **efficiently organize the movements of our eyes**.

Proprioception combines with other sense organs: it constantly gives the brain an indication of the respective position of one another in the body, which enables it to direct them correctly in response to stimuli. In this way, **the brain locates visual and auditory information correctly in space and can process it efficiently**.

When the information given by the various sensory receptors is coherent, everything goes well. On the other hand, inappropriate or contradictory information, can lead to problems.



## Proprioceptive Dysfunction and Education

**When proprioception gives erroneous information**, it biases the construction of the body schema: the child does not stand straight while its proprioception make it believe it does. The information that the brain receives from the various sense organs is no longer consistent and sensory conflict appears. This results in **several kinds of symptoms, different from one patient to another, some of which have a direct impact on education**:

- an abnormal posture responsible for migrating pains and chronic fatigue;
- a clumsiness for fine movements, which can make writing and geometry tracing difficult;
- poor eye convergence and imprecise saccades when reading and sometimes during counting activities;
- swallowing problems with alterations in reflex with an oral point of departure, which can generate REM sleep disorders responsible for attention disorders (with or without hyperactivity), and memory disturbance;
- visual losses when listening to certain sound frequencies or irregular background noise, which can cause concentration difficulties as soon as there is noise.

These difficulties can be diagnosed as a **specific learning disability (e.g. dyslexia, dysorthography, dysgraphia)**. Sometimes, the picture is less clear, but the school results do not reflect the many efforts made by the child, **despite a normal intelligence and a real desire to succeed**.

## Proprioceptive Treatment

The treatment aims at restoring a harmonious functioning of proprioception thanks to the personalized use of proprioceptive stimulations acting on different sensors (eye, foot, mouth). Among these, some are to be monitored more particularly in class:

- **prisms added to eyeglasses** can restore the tension of eye muscles, and thus modify general proprioception;
- **proprioceptive insoles**, by changing the perception of the ground, help to re-balance the work of muscles involved in the regulation of postural tone;
- **an ergonomic posture**, to be adopted for work, modifies deeply the erroneous proprioceptive information.