

# What Does the Cerebellar Virtual Reality Centre Mean for Chiropractors?

BY FRANK PEDERICK DC

**Tony Lockett, on a goals per match basis is the most effective major goal-kicker ever in the AFL, but he sometimes misses easy shots, and what is the matter with Sav Rocca, so full of promise but unable to deliver? Perhaps this important phenomena could be explained in terms of the cerebellar reality centre!**

The cerebellum although occupying 1/10th of skull volume contains half of the neurons in the CNS. Recent studies have led to the conclusion that it contains a dynamic, adapting and evolving neural model of the body; an in-built virtual reality centre. This virtual reality centre is needed because reliance solely on the feedback pathways to the sensory and motor cortex would result in too-slow reaction times for many activities. The cerebellar virtual reality centre produces a predictive model of the body based on its current position and cortical command signals, resulting in activity. The centre is in the sensory feed back pathway monitoring the activity ahead of the cortex that modifies the centre to reflect the new information and adjust the activity if necessary, well before a cortical response is available.

An essential component of this arrangement is that self-generated information is perceived as less intense than the same externally produced stimuli. When you tickle yourself the effect is not the same as when someone else does it. Who says research can't be fun? Another example can be found

in studying gait. The inferior olive has a neural pathway which enables it to gate out sensory input from the grounded foot but increases sensitivity to inputs from the foot on the swing phase which could encounter a condition which could lead to a slip, trip or fall. Thus the virtual reality centre is primed to react in conditions which could require urgent action.

Even with our virtual reality centre we cannot achieve perfect control. As discussed in a previous article on a model for brain activity (AC, Apr 98), the brain is always evolving a different solution based on "noisy" input signals and many feedback pathways. The same applies to the virtual reality centre. Therefore, we can't precisely control any action. If you don't believe me, try a little more personal research with a pool table, darts board or a football. Anything, including reducing subluxations, which reduces interfering signals in the nervous system will potentially improve control.

The cerebellum is not hard wired at birth, most hand/eye skills are learned. The virtual reality centre comprises modules which are programmed by experience with various activities. Because there are many unprogrammed modules, it is easier to learn complex motor skills when young, early learning leads to enduring skills. There are no other activities quite like cycling or skiing, therefore they are protected. A lady patient who woke from an iatrogenic coma unable to remember anything of her past life, (including her husband and children), still retained the ability to crochet. Squash and tennis

share many modules so that playing one may interfere with performance in the other. This would be unlikely to happen with squash and lawn bowls for example.

These studies lead to the conclusion that there is no such thing as an independent sensory system. The outcome of detection of sensation, perception, is always influenced by experience, thought and movement, confirming that action is at the heart of being alive.

Some implications for chiropractors from this work are:

1. The benefits of the chiropractor being subluxation free are further supported .
2. There may be benefits in evaluating palpation methods especially in developing better methods of training chiropractors to use their sensory systems which are perhaps their best primary diagnostic equipment. The ability to divert or still the conscious mind when palpating for example may be a key to enhanced performance.
3. The virtual reality centre is probably programmable using tai chi, Alexander technique, yoga, Feldenkrais technique, PFN, somatic recall, stretching exercises, isometric exercises and relaxation techniques. I have no recommendation as to which may be best, but I suggest none will work well unless every effort has first been made to reduce subluxations.
4. The palpation of the cranial rhythmic impulse has been criticised by some as solely or in part detecting vascular or other pulsations from the examiners

## Master of Chiropractic Science (Paediatrics) Course RMIT University

The postgraduate course in Chiropractic Paediatrics at RMIT University has reached its 5th birthday. Up to this time some 22 students have completed various levels of the course with 12 chiropractors expected to complete their masters, graduate diploma or graduate certificate this year alone and even more over the next few years as international numbers increase. It has also been a time of substantial academic growth and development with the course remaining the only university based programme in Chiropractic Paediatrics in the world.

Currently the course is offered as a three year part-time self-directed learning package with one residential school per year. Students

may graduate after 1, 2 or 3 years with a Graduate Certificate in Chiropractic Paediatrics, Graduate Diploma in Chiropractic Paediatrics or Master of Chiropractic Science (Paediatrics). Thus it not only caters for the busy Australian Chiropractor but also those chiropractors overseas who account for over 50% of enrolments.

The course work aims to enhance clinical skills in the field of paediatrics as well as fostering an appreciation for research issues relevant to the chiropractic treatment of infants and children. Clinical subjects focus on case history taking, examination and management protocols, including appropriate application of chiropractic adjustments, for com-

mon and less common childhood complaints that may present in chiropractic practice. The overall emphasis being that children cannot be treated as 'little adults'

During the 3rd year of the course students may further clinical skills through additional course work or contribute to chiropractic research by conducting a research project. Examples of completed theses include Chiropractic Treatment of Primary Nocturnal Enuresis (Hall B.), A Retrospective Case series of an Adolescent Patient Group Reporting for Chiropractic Management of Their Condition (Gilmore R.) and Literature Review to Evaluate the Parameters of Subluxations and Nervoscope Measurement