



## Cellfield

### **What occurs during reading – in brief:**

Reading is an acquired skill dependent on the neuro-physiological development and maturation of the central nervous system during the early developmental years. It is not a skill we are born with. Reading is the transfer between one individual's thoughts into the mind of another through the use of visual symbols. This complex process comprises a multitude of brain processes that are simultaneous, parallel and sequential, with high interconnectivity.

The process of reading involves the processing of visual, auditory, oral, and motor functions. These processes all occur in the sub cortical areas of the brain involved in automatic functions, functions we do not have to think about, but simply is available to us as we contemplate cognitive learning activities such as learning and reading in the classroom. Though we mention these processes separately, it is difficult to isolate them in brain function as they are so interrelated in their functions with rhythmicity and a timing that is precise and secure in a typically developing child.

If these processing components are disturbed in their interrelatedness, it causes the brain to have to contemplate cognitively what the sub cortical areas are not doing automatically, and it starts to overload the active working memory components of the brain, mostly reserved for reading comprehension. Active Working Memory is considered the "holding tank" of temporary information used to hold information for short periods of time as the brain contemplates the detail of the story, identifies main ideas, and forms a workable comprehension of the story, article or word math problem. This prevents the executive function from performing the highest level of processing tasks required for fluent, age appropriate reading speed.

### **Who can benefit from Cellfield intervention?**

Research on the Cellfield method has found a high applicability for school students ages 8 and up. Cellfield practitioners over the world has treated students as young as 7 years old and achieved good results. A qualifying marker for children this age would be having the ability to concentrate well enough. Cellfield has also shown good results with clients up to their early twenties and in some cases in mature adults.

Usually, students whose reading progress is consistently below their cognitive abilities can benefit from Cellfield intervention, and they do not have to have a diagnosis of dyslexia.

### **Visual Processing and Ocular Motility**

The strongest Cellfield treatment outcomes are phonological (the ability to decode unfamiliar words). However, printed text is speech converted into visual symbols. Reading is converting those visual

symbols into text. Normal reading requires high speed visual recognition of those symbols we know as letters, words and sentences. Problems in some aspects of ocular motility (binocular eye movement control) can materially impede the visual recognition of letters and words, and therefore affect a student's ability to read. These aspects of binocularity and eye movement control become of greater relevance in the transition to reading fluency stage.

A visit to a regular optometrist to check the visual acuity over far and near distance considers the lens of the eye and is not what is considered here. Converging research suggests that many of those with reading disabilities could well have problems with their transient vision system, which is a neural difficulty.

After seeing the visual symbol there are some pathways of processing this visual symbol to consider. Stationary vision involves the parvocellular (P) pathways. Reading words and sentences places a greater demand upon transient vision, which involves the magnocellular (M) pathways, which work in parallel with the P pathways. The M pathways have been shown in reading to be implicated in reading difficulties at several levels.

The Cellfield intervention activates and extends the M pathways, not only in their role with respect to eye movement control, but also with respect to contrast sensitivity and to peripheral vision. This occurs simultaneously with the auditory phonological exercises that are performed in every session.

## **Intervention Process: Phase 1**

The Cellfield intervention Phase 1 consists of one pre-assessment prior to the program, 10 one-hour sessions occurring Monday through Friday over two consecutive weeks and a post-assessment within a week thereafter. Phase 2 is described below.

The exercises are comprised of rhyming exercises, Pidgin English, homophones, embedded text, as well as mosaics. The rhyming exercises are necessary for a beginning of phonological awareness. Acoustic modification of target words occurs with strong orthographic to phonological emphasis on decoding of whole words.

The most demanding exercises of cognitive effort, attention and working memory, are the Pidgin English exercises. These are consisting of inductive learning exercises, high level phonological processing, visual closure, visual retention, and eye-hand-ocular motor work.

The homophone exercises activate cross communications between semantic, orthographic and phonological pathways, as well as direct the attention to the mid word.

The embedded text exercises reinforce phonological awareness while demanding high level of attention, eye movement control and working memory.

The mosaic exercises provides regular break during sessions to executive function in a "novelty" mode. It enhances spatial skills, pattern recognition, visual retention and rapid scanning.

There is a scoring system for each task, designed to enable the student to keep increasing their scores at every session against an increasing session-by-session difficulty. This is achieved by a system of

increasing bonus points and becomes a highly motivating factor for the students as they compete against themselves and not their peers. This also builds self esteem in knowing that the achievement is theirs and they can own their success.

### **Daily Practice Assignments**

The students are assigned one worksheet each day to complete before the next session. These assignments correspond with the current work in progress during the Cellfield intervention and also relates the visual image of the computer screen to paper and writing.

[See research on Phase 1](#)

### **Intervention Process: Phase 2**

The objective of the Cellfield intervention phase 1 is to break down the root causes of resistance to tuition, then to ensure that the child makes a sustainable transition into reading printed text streams with fluency and good comprehension.

Children frequently carry not only neurobiological impediments, but also psychological damage, which should not be underestimated. Success in lowering their resistance to tuition is necessary but not sufficient for achieving sustainable success in their transition into print text stream fluency.

The Cellfield intervention phase 1 breaks down impediments to children's response to tuition. Children develop embryonic new skills needed for processing language and text. There is much data to show that this has been achieved, including substantial average gains in high level processing skills, such as comprehension. [See research.](#)

Reading fluency phase 2 consists of 10 one-hour sessions conducted over 10 weeks and consolidates and develops those new skills, in a nurturing way which maintains elements of novelty and reward from phase 1, so that there is likely a sustainable transition into reading fluency.

Children resistant to tuition are usually slow processors of auditory, visual and language data. They take too much time in working memory to understand and memorize the tasks at hand. As a consequence, what is being taught is shifted out of working memory without being mastered, not as retrievable sub-routines, but as "uncoded" segments in a neural "too hard" basket. These children end up with not having mastered sub-routines in their behavioral pathways to draw upon higher level processing. Part of the efficacy of the Cellfield intervention phase 1 is the representation of critical core skills from "over-habituated material" in such novel and rewarding ways, the executive function re-engages the child so that learning takes place. The reading fluency phase 2 is intended to maintain the momentum of phase 1. New reading skills from phase 1 is nurtured, consolidated, and developed in phase 2. The student is guided into the world of reading, avoiding the negative "trigger points" of the "over-habituated" and "skill and drill" past.

When children come for Cellfield intervention they are likely to have received a certain amount of learning support, if not at school, then most certainly at home. Many of the reading skill building blocks resides in bits and pieces reside somewhere in their sub-conscious. Phase 2 focuses' on building the links between those pieces without having to first remove all prior learning and starting over again.

Cellfield intervention phase 1 contains much opportunity for novelty in the order, frequency, duration and timing of the presentation of the material. The material in phase 2 introduces multiple text types at multiple levels in an extraordinarily diverse selection of mainly contemporary topics and different categories of writing for students of all ages.

The neural rewiring which occurs after phase 1 is “brand new” and “fragile”. The psychological damage caused by the year prior influences the actual practice of the new skill. Phase 2 assist the children to come to the place where they achieved the success the first time and “practice in” their new skills to become their habits of regular use.

Phase 2 requires guided reading at home, supervised by the parents. Coming to the practice once a week to maintain the momentum of learning and assist the parents to continue building the momentum at home. A connection between home and practice is strengthened by the assignment book which is used as a growing record of progress at home and at the practice.