



Cerebra

Positively Different

Vojta (Reflex Locomotion) Therapy/Dynamic Neuromuscular Stabilisation

Introduction

Vojta therapy or Reflex Locomotion, (RL), was developed by Professor Hellbruegge (University of Munich), and based on the research conducted by the Czech Paediatric Neurologist, Professor Vojta at the beginning of the 1950s. Professor Vojta closely studied the natural mobility and innate muscle control progression in babies, and observed that movement caused motor reactions throughout the body as a result of specific stimulation via the central nervous system.

Babies have an innate ability to develop movements to grasp, reach, roll, sit up, crawl, and eventually stand up and walk; these abilities are not taught but appear to be 'stored movement patterns', which control the muscles of the body in a co-ordinated sequence. Vojta established that components of these movements provoked 'global' dynamic muscle activity and central nervous system regulation, which is found in all forms of human movement or locomotion.^{1,2,3}

'Global patterns' form the basis of Reflex Locomotion, a term that refers to the motor responses resulting from the application of Vojta therapy, or pressure applied to specific areas of the body which cause the reflexes.^{1,2,3}

To illustrate stored movement muscle activity, one can imagine standing on one leg and concentrating on the muscles in the leg; however, innate sequences of involuntary movements of muscles in the back, neck, head, arms, the other leg and all around the body, make fine adjustments to maintain this balance. This shows that it is not just the muscles in the leg that are required to maintain this posture. Vojta therapy involves pressure or massage on one part of the body, which stimulates related motor patterns, of stored movement muscle activity, as in creeping, crawling or walking, giving the 'global patterns' described.⁴

Anthea Wright

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Whilst studying the inborn programmes of locomotion, kinesiology, (movement, posture and balance), and natural development of movements, Vojta observed that there were trigger points, which provoked complimentary movements to co-ordinate the body in the natural way.

Professor Vojta's research

It was found that gentle pressure on certain points of the muscles used by babies during locomotion, reproduced the reflex locomotion, in the form of stabilising dynamic muscle activity, which are the fine involuntary muscle movements or reflexes, discussed earlier. The research was divided into two main streams:

- a) Neurological evaluation, leading to the development of a methodology of evaluating child development, its dynamics and major disorders.
- b) The concept of the nervous system as an open system endowed with a basic, phylogenetic make-up, yet capable of receiving various stimulations, which may affect the functioning of the nervous system, and have an effect on its anatomical maturation. The reflex locomotion is the physical representation of the meeting of these two complimentary aspects.³ Vojta suggests that his therapy exercises, which induce the primitive reflexes of a baby, may be imprinted or 're-learned' by the central nervous system later in life.

A clinical assessment of the child's development

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Automatic postural reactivity - seven to eleven tests are carried out to identify any abnormalities in reaction to sudden postural change, which would also highlight any problems associated with the automatic responses from the central nervous system, (CNS). The sequential CNS changes in these reactions are well established by the end of the first

year of life, therefore, any central or peripheral anomalies, and the stage of development may be identified at this examination.

Kinesiological analysis –during normal development, spontaneous motor function accompanies specific movements, such as adjustments to orientation, balance during locomotion, or posture whilst sitting or standing. The components of locomotion become synchronised during the first year of growth and therefore, comparisons can be made to identify any possible pathological conditions.

Reflexology – pressure or taps on specific areas of the body elicit reflexes, and an evaluation of such responses will give an indication of any anomaly within the central nervous system.³

The physiotherapeutic approach

Where a child has brain lesions, developmental delay, or other cerebral dysfunctions causing disturbances in movement or posture, the therapy is designed to enhance the development of movement sequences and treat the motor developments.⁴

Vojta therapy aims to⁴:

- modify the reflex activity by introducing a different neurological activity to give a new physical awareness, or muscular proprioception (balance)
- modify spinal reflexes involved in co-ordinating a movement
- improve breathing to increase efficiency of functions
- promote growth of innate anatomical locomotor systems
- encourage development of movement-associated neural pathways
- prevent orthopaedic degradation in severe pathological conditions
- delay degenerative neurological function.

In the practical application, there are two basic co-ordination complexes:

- reflex creeping
- reflex rolling.

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The therapeutic goals of Reflex Locomotion are: to facilitate the automatic regulation or control of the body's position, to facilitate the active maintenance of the support function of the extremities, and to stimulate co-ordinated muscle activity.



Figure 1: Reflex creeping/crawling



Figure 2: Second phase reflex rolling

Reproducing global patterns forms the basis of motor rehabilitation in babies, children, adolescents, and adults, and it is possible to stimulate these important patterns from early movement, like the 'building blocks' of the normal development in children, for those with movement disorders. In babyhood, Reflex Locomotion is utilised within the framework of early intervention, and the best results are gained at this time. At this age, the central nervous system's malleability or 'plasticity' is at its greatest.¹ Plasticity, or neuroplasticity, is the lifelong ability of the brain to reorganise neural pathways based on new experiences and sensory stimulation.

Musculature throughout the body is activated in a co-ordinated manner and the nervous system is addressed at all regulatory levels. Besides the skeletal musculature, muscles involved in facial expression, eye movements, the swallowing process, bladder and bowel function, and breathing are also activated. This flow of automatic motor reactions is provoked by graded pressure applied on certain body parts, with the patient placed in specific positions, (lying on the back, side-lying, and lying on the tummy). They are part of human movement processes such as grasping, rolling, creeping, crawling, and walking.¹

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Reflex Locomotion can play an important role in the domain of rehabilitation to improve the quality of life in children and adults with motor disorders. A Vojta-trained physiotherapist should be responsible for the implementation of the therapy. The developed 'therapy programme' should be regularly supervised and

matched to the patient's movement development.¹

Vojta therapy has a positive influence on the entire co-ordination of a child in his/her spontaneous movement, resulting in improved up-righting against gravity, balance, gait, grasp, speech and other functions. The improved co-ordination of movements as a result of the therapeutic 'activation' can often be sustained over the duration of the whole day, and will slowly build to become automatic.⁵

Movement-impaired patients also appeared to gain a better ability to initiate contact and communicate, therefore, a child has better ways to meet the confrontations within his/her environment. Vojta therapy can be used as the basis for other therapies and help a child meet the tasks set by the psychologist, early educationalist, speech and language therapist, occupational therapist, and teacher.

For Vojta therapy to be successful, it must be carried out several times a day. A treatment lasts between 5-20 minutes, and parents/carers are required to carry out the treatment daily; they play a very important role in the implementation of Vojta therapy.

For the entire duration of the therapy – which can last for weeks to months, or years – the Vojta therapist educates the parents in how to implement the therapy and is a support person for the parents. The Vojta therapist should monitor and review the progress of the patient and make adjustments, where necessary, throughout the duration of the treatment.⁵

Advances on Vojta's Reflex Locomotion (RL) to Dynamic Neuromuscular Stabilisation (DNS)

Kolar was a student, under the supervision of Vojta whilst he studied patients with cerebral palsy, and he noticed that predicted movement patterns were sometimes compromised, not only in patients with musculoskeletal pathologies, but also in healthy volunteers. This may have indicated that the guiding role of CNS in motor development ceases its control later in life, after the motor patterns become fully learned and automatic,⁶ (by the age of about 4 years, when gross motor function is fully formed).

Motor development during infancy is automatic, but also requires correct development of vision and hearing, which contribute to balance and orientation, for stability. Skeletal and muscular development are genetic, but joint positions, posture and muscle development depend on motor programmes received from the CNS.

Kolar's approach is to optimise distribution of internal forces of the muscles acting on each segment of the spine and other joints. This enables a good posture for balance and stability, as well as dynamic movement. DNS therapy also enhances the performance of all the organs in the body.

Kolar further developed Vojta's pressure point therapy to enable older patients' muscle systems to re-learn the processes which occur during the development of babies. He addressed the problems of balance and stability by looking at all the muscles involved, including the deeper, internal muscles within the abdomen. His therapy is called Dynamic Neuromuscular Stabilisation, (DNS).

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The inborn motor programmes can be evoked automatically through stimulation of global reflex postural-locomotion zones, (fine motor adjustments throughout the body, to maintain balance and posture), which correspond to those observed in babies. The brain must be stimulated and conditioned to automatically activate optimal movement patterns that are necessary for stable activity. To re-learn the motor programmes from the CNS, the patients are placed in the primal positions that a baby would adopt. This feeds forward simultaneous activation of the diaphragm, pelvic floor, deep neck flexors, and all the sections of the abdominal wall. For example, the position of the pelvis will affect the quality of breathing, because the muscles of the spine are involved in chest movements.

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Examples of studies on Vojta's Reflex Locomotion (RL)

Dvorak and Valouchova employed Vojta therapy for peripheral facial palsy in seven patients. Reflex Locomotion assists where it is difficult for patients to exercise voluntary control of muscles. Palsy areas involved were, eye brow/lid and mouth movements, as well as swallowing and articulation. The treatment lasted for 15-20 minutes and the results were recorded by electromyograph, (EMG)⁷.

All seven patients reported improvements in swallowing and six had improved articulation; five out of the seven confirmed better control of voluntary movements, such as closing eye lids, puckering and smiling. The EMG recordings confirmed these results, but also showed less than 50% improvement, possibly due to muscle fatigue after approximately 15 minutes. Further treatments could resolve facial symmetry, to enable patients to perform voluntary exercises for strengthening and mobility⁷.

Bokarius AV and Bokarius V employed DNS to treat patients with chronic pain due to musculoskeletal disorders, caused by neuromuscular diseases, neurological lesions, genetic factors, congenital anomalies, muscle atrophy, post polio syndrome, spasticity, and some bone conditions. Their study looked at the number of patients who returned after DNS treatment, as an indication of success, because they had noticed that there was a decline in the numbers experiencing recurring pain.

The aim of the study was to examine the long-term effect of DNS in the treatment of chronic pain, and they, therefore, looked at their records for 820 patients, who received 4 to 12 treatments of this therapy. The results showed that in the age group 18 to 35, only an average of 6% returned for further treatment, and in the age group 36 to 65 an average of 21% required further attention. The results were significant for the efficacy of DNS.

Pavlu et al., analysed the principles of Vojta therapy by SEMG (surface electromyography) monitoring the responses in healthy young adults whilst receiving two to five 30 minute sessions. The results demonstrated the following responses:

- responses recorded after 3 to 5 sessions, and more quickly in subsequent sessions
- responses preceded by changes in respiration and deeper breaths before activation of trunk muscles, with a tendency towards rotation
- legs tended to bend at hips and knees
- arms had a tendency to lift with elbows slightly bent and wrists dorsally flexed
- levels of responses varied in each individual, but the characteristic of tending to turn was the same.

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The trials confirmed that the pressure point method achieved adjustments in the muscles responsible for innate motor control.⁹


Husárová studied the Vojta approach as a treatment for the rehabilitation of 30 subjects, post stroke. The patients had partial paralysis which affected speech and walking, and the stroke caused spasticity and an inability to co-operate in their given psychological state. They were given Reflex Locomotion therapy two to three times a day for a period of 15 days. The results showed 83% had improved speech, 87% improved gait, 90% decrease in spasticity and 90% improvement in feeling of wellbeing or psychological state. This shows that the therapy evoked the global pattern of movement for walking, reaching, grasping and other physical daily activities, which returned. The results also demonstrate the plasticity of the brain and the return of 3-D and deep sensation.¹

Vojta/Reflex Locomotion/Dynamic Neuromuscular Stabilisation may benefit the following conditions:

- Cerebral Palsy (CP)
- Central Co-ordination Disorder (CCD)
- Peripheral paresis
- Spina Bifida (MMC)
- Myopathies
- Congenital malformations (pes equinovarus)
- Orthopaedic problems (scoliosis, hip dysplasia, congenital hip dislocation)
- Stroke
- Brain injuries
- Traumatic cross sections
- Multiple sclerosis
- Neuromuscular dysfunctions
- Back pain from nerve root involvement
- Function problems of breathing, swallowing and digestive tract.

Vojta therapy is not recognised by the National Health Service, nor are there any guidelines for the treatment from the National Institute of Clinical Excellence, (2010).

Vojta therapy has been available in many countries across Europe for some time, (Germany, Spain, Italy, Slovenia, Czech Republic, Poland, Norway, Austria, Romania), as well as, more recently, Syria, Japan, Chile, Argentina, Mexico, India and Korea.



Vojta therapy/Reflex Locomotion therapy came to London this year, (2010), and is available at the Kiki's Children's Clinic, 124 Thurleigh Road, London, SW12 8TU.
Tel: 020-7207-4234.

This paper has been written to provide an overview of a particular intervention/therapy and any associated research findings, not as a recommendation for the use of any therapy.

This information is not meant to replace the advice of any physician or qualified health professional. The information provided by Cerebra is for information purposes only and is not a substitute for medical advice or treatment for any medical condition. You should promptly seek professional medical assistance if you have concerns regarding any health issue.

Glossary (A-Z)

- **Automatic postural reactivity** – timed response to stimulation
- **Electromyograph** – a system for recording musculoskeletal activity
- **Global** - throughout the whole body
- **Kinesiology** – study of movement, posture and balance
- **Neuro-musculoskeletal** – nerve, muscle and skeleton relationship
- **Orthopaedic degradation** – worsening of a child's condition
- **Pathological conditions** – those having abnormal body structures or functions
- **Plasticity of the brain** – the brain's ability to change or make new connections
- **Phylogenetic** – genetic origin
- **Proprioception** – orientation and balance
- **Reflex locomotion** – all the body's muscles involved in moving an arm or leg
- **SEMG** – surface electromyography - measures electrical activity in contracting muscles
- **Stored movement patterns** – innate sequence of muscle movements to complete a physical task
- **Stabilising dynamic muscle activity** – energy stored in the muscles corrects balance.

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The Cerebra In-house Research Team carries out desk-based research into a number of areas, based upon parent and professional requests, new scientific evidence and issues raised by our staff. We aim to provide information that is relevant to parents and carers of children with disabilities as well as the professionals who come into contact with them.

By empowering parents and professionals with knowledge, we can help them to improve the lives of the children they care for and support.

If you require further information or would like to suggest avenues for further research, please get in touch.

These reports are made possible only by the kindness and generosity of Cerebra's supporters. Cerebra is a charity that works for a future where children living with neurological conditions enjoy lives filled with learning, opportunities and joy. We fund vital research that aims to improve children's lives and those of their families. We directly support more than 10,000 affected children and families around the UK.

With your help we can reach out to so many more. To find out how, visit www.cerebra.org.uk/fundraising or call 01267 244 221 and ask for Sadie Clark or Arthur Parkinson.

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