

Physiotherapy,
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Vojta Self-training: Experiences of six neurologically impaired people

A qualitative study

Summary Six neurologically impaired people invoked reflex locomotion described by the Czechoslovakian neurologist Vaclav Vojta daily for four months. The purpose of the study was to find:

- How the trainees experienced a period of autonomous training based on reflex locomotion as described by Vojta.
- If the trainees attained results they ascribed to the training.
- If they considered the time and effort spent worth while.

After a training period of four months, interviews with the trainees were recorded on tape. The interviews were transcribed word for word, interpreted, coded and categorised according to the grounded theory method. The following categories were established:

1. Fascination with the body.
2. Functional results.
3. Independence.
4. Hard to explain.

Conclusions The daily training sessions were considered interesting and rewarding, and the training period was well worth the time and effort spent. The trainees experienced improvements in relaxation, breathing, strength, mobility, balance, walking ability and fine motor function. They found it important to be able to train on their own. They found it hard to explain to others what they were actually doing, and what happened in their bodies during training sessions.

Introduction

Autonomous training for adults based on what Czechoslovakian child neurologist Vaclav Vojta has identified as inborn reflex locomotion was first developed at the Rome Vojta centre. The first author (Bäckström), a Vojta-trained paediatric physiotherapist, learned about it there in 1989.

Vojta self-training was then tried in northern Sweden in two single-case studies with cerebral palsied subjects (Bäckström and Swanberg, 1991). Two diplegic young women had subjectively and objectively

improved motor function after regularly having practised reflex creeping and reflex turning according to Vojta principles.

Intrigued by those results we were curious to learn how other neurologically disabled adults might be affected by reflex locomotion.

The Vojta Concept

Inborn Programmes of Locomotion

The potential for treating cerebral palsied children by activating complex locomotor activity provoked by external stimulation was discovered by the child neurologist Vaclav Vojta and his associates in Czechoslovakia in the late 1960s. Working with cerebral palsied children, they detected two movement sequences, one in prone, the other starting in supine. It was possible to identify nine trigger points where stimulation sets off spontaneous but co-ordinated muscle work. The starting position for one movement sequence is the end position of the preceding movement: the movement patterns are reciprocal. Vojta called these motor complexes 'reflex creeping' and 'reflex turning'. He explained them as the awakening or activation of inborn programmes of locomotion in the central nervous system (Vojta, 1984, 1988; von Aufschneiter, 1989; Swanberg, 1992; von Aufschneiter and Vojta, 1992; Forsberg, 1992).

In this context, locomotion is defined as movements involving automatic posture adaptation/shift in the centre of gravity, rising against gravity (on an elbow or a knee) and dynamic movement, all as one unity.

Kinesiological Analysis, Postural Development

The Vojta treatment principle is based on a careful kinesiological analysis of the developing infant. Vojta sees the unco-ordinated muscle work of cerebral palsied

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children as compensatory motor functions due to blocked postural development. It is possible to invoke ideal movements. Vojta sees them as inborn possibilities and calls them 'reflex locomotion'. Such 'automatic' creeping and turning are used in treatment. In Vojta therapy the weakest link in motor development is addressed. The idea is to decrease the impact of compensatory substitute movements.

The movements provoked in such treatment involve the entire body, including breathing and eye movement. They can be invoked to the full in newborn babies and to some extent remain available in everyone, regardless of age and health status. The kinesiological content of the movements has been described in detail (Vojta and Peters, 1992).

Stimulation at Trigger Points, Provoked Ideal Movements

At nine defined trigger points on the body and extremities, stimulation is given in three directions:

1. Towards a point of support against the surface on which the patient is lying.
2. Towards the nearest proximal joint.
2. Resisting the movement triggered.

It is proposed that the reflex locomotion pattern offers an opportunity to reach the central nervous system (CNS) to activate dormant motor functions. CNS is required to invoke another programme of muscle activity.

The described programmes cannot be invoked by training specific movements. Vojta's theory is that the movement patterns are already stored in the CNS and can be called forth when properly stimulated. When activated therapeutically, these movements should not compete with the usual substitute movements, ie the person treated should neither help nor hamper, but just let things happen. Sometimes this is difficult, eg when short spastic muscles are being actively stretched. Children are diverted by stories, songs and so on during treatment.

The purpose of Vojta treatment is to establish prerequisites for movements, ie fundamentals of postural development. By means of inborn movement co-ordination ('reflex locomotion' or 'ideal movements' in Vojta terminology), a neurologically impaired body might also work more 'as intended'. When using will/consciousness,

as in most other motor endeavour, the usual compensatory, 'pathological' or substitute movements are activated instead.

Empirically Based Treatment of Children

The treatment technique has an empirical and clinical basis. It was originally used on babies at risk and cerebral palsied children (Brandt *et al*, 1980; Wassermayer and Vojta, 1989; Immamura *et al*, 1983; Kanda *et al*, 1984). The Vojta method was developed with and for infants and children. The treatment is carried out by parents under regular instruction by a physiotherapist. Every day, the body is stimulated to perform the automatic movements invoked by parental hands or, in the case of adults working on their own, by active eye deviation.

The method is used in several continental European countries as well as in Japan, India, Chile and Australia. Very little has been published about it in English, most documentation being in German, Czech or Italian.

The Vojta Concept – Summary

To sum up, the Vojta concept theory is characterised by the following criteria:

- The theory was derived from clinical experience.
- It is based on phylogenetic kinesiology.
- Locomotion programmes, supposedly inborn, in prone, supine and lateral lying are invoked.
- The central nervous system is aroused and activated, 'asked for another programme'.
- The ideal movements involving reflex creeping and turning influence substitute movements of the impaired person.

Based on these principles, the practical treatment is characterised by the following steps:

1. The starting positions are well defined in prone, supine and lateral.
2. Aimed pressure stimulates natural support points on which the body rests on the surface.
3. The reciprocal locomotor activity is started by stimulation of nine trigger points in various combinations (in adults also by active eye movement).
4. The whole body becomes engaged in active automatic muscle work.

Vojta Autonomous Training for Adults Defined Starting Position, Fixed Support Point and Active Eye Deviation

The basic movements of reflex creeping and turning can also be provoked in adults by stimulation, involving distinctly aimed pressure at trigger points. In autonomous training to invoke the muscle activity described by Vojta as inborn locomotion, the trainees lie in a defined starting position looking sideways. They concentrate on a fixed point against the supporting surface, eg an elbow against the floor, and keep looking to the side waiting for an automatic response by the body: turning from supine to prone or 'creeping' in prone (see figs). The eye movement to the side replaces the physiotherapist's hands provoking the locomotion pattern by aimed pressure.

A Different Approach to Neurological Physiotherapy

Modern neurological physiotherapy literature often insists that functions should be trained, goal-directed and exercised in a functional setting. However, the first two Vojta self-training cases in Sweden indicated that after a period of triggering locomotion programmes in lying positions, letting the body do work in creeping and turning co-ordination automatically, such self-training seemed to carry over into experience and achievement of functional motor gains. The purpose of this study was to find out what other neurologically impaired people might experience after a period of autonomous training in this unusual way.

Objective

The objective of the study was to find out:

- How a self-training period triggering reflex locomotion as described by Vojta was experienced by six people with neurological impairment.
- If the trainees experienced effects that they ascribed to the routine.
- If they considered it worth while, considering the time and effort that were required.

Material and Subjects

A strategic sample of neurologically impaired subjects was selected to contain six trainees who were as different from each other as possible. They are described in the table overleaf.



Fig 1: Punctum stabile is left elbow. Trainee turns his eyes to right side in order to invoke locomotion

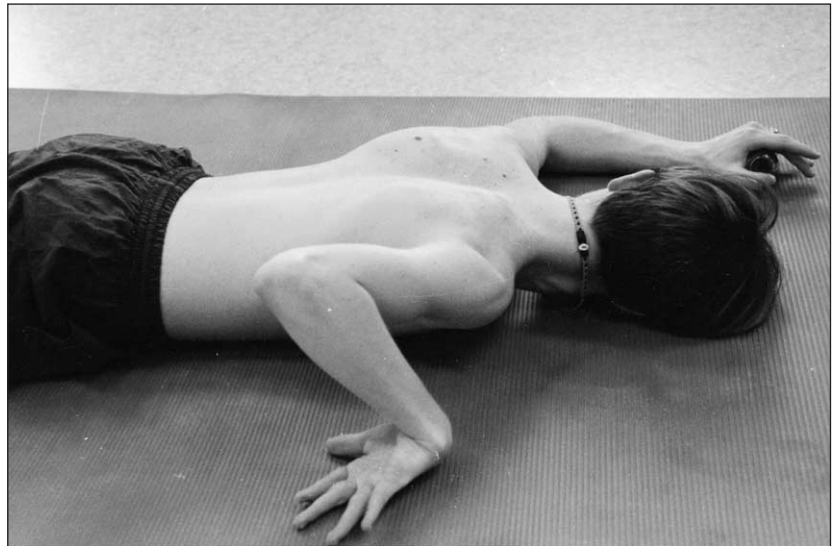


Fig 2: Trainee in activation of his inborn ideal movement, 'reflex creeping'



Fig 3: One sequence of creeping is completed. Trainee turns his eyes to left side to continue reciprocal movement sequence

Characteristics of the six subjects

Trainee no	Sex	Age (years)	Condition
1	F	28	Cerebral palsy, moderate spastic diplegia. Wheelchair user able to walk short distances with crutches.
2	M	21	Cerebral palsy, minor spastic hemiplegia right side.
3	F	20	Cerebral palsy, tetraplegia mixed form. Wheelchair user able to walk short distances with help.
4	F	40	Cerebral palsy dyskinetic form. Wheelchair user able to walk outdoors with one crutch, indoors without any.
5	F	38	Sequelae after meningitis in her teens, extensor spasticity of legs, weak trunk. Wheelchair user able to walk very short distances with crutches.
6 (extra)	M	20	Cerebral palsy, moderate spastic diplegia. Wheelchair user able to walk short distances with a Rollator. Unknown to authors before interviewed. Has worked with Vojta self-training for four years.

Self-training Procedure

The trainees were to provoke the locomotion for at least four months, every day for 15-30 minutes, and then participate in recorded interviews. The first five subjects were instructed and followed-up in Vojta self-training by the chief author (Bäckström). I had a couple of initial meetings with each trainee, at which I used my hands to trigger what Vojta has explained as their dormant ideal movements and to give them a feeling of the muscle work in reflex locomotion. After that they were to contact me if they wanted further instruction.

Exercise Technique

The trainees lay in the instructed position in supine, lateral or prone. They concentrated on the fixed support point, often an elbow against the surface, turned their eyes and waited. They had not been told what to expect.

After a while their bodies started to move in the inborn movement predisposition described by Vojta. In supine, for instance, the legs would bend and the body slowly turn to the side. In this way, the movements were activated for 15-30 minutes each time. The first few times nothing much happened, but as they persevered more and more would occur in their bodies. In a single training session, trainee 2 could finally come all the way from supine to prone to kneeling in both directions and all that, as he said, 'without actually doing it himself'.

Taped Interviews

After their self-training period, the patients took part in taped interviews, being asked the following questions, which had previously been tried out in a pilot study:

- What happens during training?
- What does it feel like?
- You have tried other training methods, what is the difference?
- Have you noticed any motoric changes that you think might be due to this training?
- Was it worth the time and effort spent?
- Will you continue?
- What qualities, if any, do you consider necessary for a person to do self-training according to Vojta?

Each interview took between 45 and 60 minutes.

Extra Trainee

After coding, interpretation and categorisation of the interviews with five trainees I realised that there were striking similarities in their experiences and viewpoints. They all seemed to take a very positive view on this type of self-training. But how did the fact that I was the instructing physiotherapist influence them? I decided to find one more trainee to interview, whom I had never met before. However, the experiences of trainee 6 did not differ from those of the others.

Naturalistic Inquiry, Grounded Theory

Following Lincoln and Guba (1985), the data collection was performed in a home environment with semi-structured interviews (Kvale, 1996). The interviews were transcribed word for word and interpreted according to the grounded theory method (Glaser, 1978; Starrin *et al*, 1997). This is a method used to generate ideas, hypotheses or theories from empirical data. When each interview had been transcribed, it was read and reread and subjected to open coding, a technique used to identify pertinent information categories in an unstructured collection of material. Associations were written down in the margin of the transcript. The codes were then narrowed down to categories describing the essence of the interview.

As an example, the following quotation generated six open codes:

It was so intense, I thought, compared with other forms of physical therapy.... In those exercises, I had always been supposed to do a lot of things actively, and the physiotherapist was supposed to do a lot of things to me. And here I had been told: Do nothing (*surprise*). Just lie in those positions, and the only thing I was to think about was this with my eyes. OK, so I lay there and felt a whole lot of things starting to happen in my body (*body takes charge*). Every session became something exciting to look forward to (*excitement*). I wondered, what will happen today? (*expectation*). And something new always happened (*satisfaction*). Also a sort of wonder about my body (*miracle*). Imagine that it is so made that a lot of things just happen (trainee 1).

In the subsequent analysis, these codes were all consolidated in the category 'fascination with the body'.

The categories developed out of many quotations from all trainees. The following example led to the category 'functional results experienced':

My body became more stable, I can move more securely. I used to walk like....well it looked like I would fall any second and I felt insecure. I did not dare let go of my crutch outside but now I can walk from the garage to the house, that is quite a distance, without my crutch. Sure, I am still swaying, but I do not feel as if I am falling (trainee 4).

After coding and categorisation, I contacted each trainee to check my interpretation and maybe gain additional information. After doing this with each subject, I brought them together to see if common categories could be identified. They emerged naturally and distinctly. In spite of the different ages and impairments of the trainees, there was a high degree of unanimity in their comments.

Findings and Discussion

Categories Identified

When the transcribed interviews were coded, four different categories emerged. They are presented below and illustrated with quotations.

1. Fascination with the body

The trainees found it interesting, 'intense' (trainee 1), 'fascinating' (trainee 2), 'confusing' (trainee 4), 'unbelievable' (trainee 5) that their bodies seemed to take over, that they did nothing and still they

became tired, because of muscle work. To all six, there was something appealing in the training itself. The training intrigued them, and in different ways they have expressed fascination for their bodies and what happens during training sessions. They are surprised and curious about their own bodies and the work they do. All were astonished that this could happen. For example, trainee 1 said her toes moved during training, although she could not move them by herself. Trainee 2 noted he worked a lot with his hemiplegic arm and trainee 5 did most work around her very weak abdomen/trunk – as if the body knew what it needed.

After a while my body just started to work for me.... I thought I must be doing this, I must be helping, it is quite impossible that it can be this way. And then I started from the beginning and the same thing, same pattern happened.... In time more and more happened (trainee 2).

I lay in different positions thinking about my support points and aimed my eyes in one direction. I don't know how to explain it, it started with my elbow, it was as if my body started to work by itself. It is really incredible that a person can start moving without actually doing anything (trainee 5).

It feels as if I am not doing anything even though afterwards I am dead tired. ...Those who do not know what this is about think one does nothing, but the whole body is at work, every muscle (trainee 6).

They were fascinated to discover that it was actually possible to lie down and 'get the body working by itself'. Trainee 6 did not mention that. But he had been triggering for four years, and in the beginning he might have been as fascinated as his schoolmates were when they first tried it.

More and more happened as time went on. Before trainee 4 noticed any spontaneous muscle work during the training, she had been doing the exercises for a full month. On trainee 3, external signs were not noticeable at first, even though she felt her body working.

2. Experienced Effects

Even though training is 'entertaining' in itself and thus willingly done, it is of no use and will not be done at length unless it has a noticeable effect. In that respect, the

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group was positive. All but trainee 3 claimed functional results of importance for day-to-day life. These effects developed gradually and imperceptibly. At first they did not notice a change, but all of a sudden they did something new without thinking about it. The improvement became so integrated in them that they did not notice the motoric/functional progress until after performing a task that had previously been impossible.

For example, trainee 2 took out a file from a bookshelf with his hemiplegic hand and then he realised he had not been able to do so earlier ('Wow, could I do this before?') and trainee 4 buttoned up her shirt without thinking about it, a task that had been impossible ('What did I just do?')

Three of them (trainees 4, 5 and 6) said friends and relations had pointed out progress to them:

Actually some friends have said that I talk more clearly (trainee 4).

It is easier to walk, my trunk is more stable.... Several people have told me I have become more erect (trainee 5).

These effects were concrete and functional: to tie shoes, be able to use knife and fork, walk without the crutch, peel potatoes, answer the phone with a complete phrase rather than a simple abbreviation, and so on. In addition to these concrete functional abilities, more general effects ascribed to the training were improved balance and walking ability, increased strength and co-ordination, physical and mental relaxation, improved breathing, even better speech (trainees 4 and 6) and the possibility of strength training without increasing spasticity (trainees 1 and 5).

I walk better on stairs. I lift my legs more easily, and the straight leg that takes the load is more steady. Before the training, my hip used to push out to the side, so almost all weight was on the crutch (trainee 1).

I manage to button up on my own, which was impossible before the training. And I can co-ordinate the use of knife and fork. I used to drop the knife, or it jerked so much when I tried to cut that I got angry....My speech is also more relaxed than it used to be. When I answer the phone at work, I now spell out the complete name, earlier I used a shorter version (trainee 4).

I noticed it when I was doing my laundry....It was easier to stand up and hang the pieces, earlier I simply threw them into the dryer, but now I could stand up. I felt more secure standing on my legs (trainee 5).

As stated in the introduction, we assumed that it might be possible for a neurologically impaired person to experience functional improvement after a period of exercises intended to invoke programmes of 'automatic' muscle work. This assumption was fully borne out. Five out of six trainees experienced just that, even though no functions as such had been trained. The only new thing they had done was lying down and triggering predetermined movements. All trainees ascribed their functional motor improvements to the exercises.

Are these effects 'real'? They have not been objectively measured. It is well known that after taking part in a study one is likely to report favourable results. As regards the trainees in this study, they not only reported favourable effects in general terms like: 'I feel more steady' or 'I can use my hands better', but mentioned concrete and specific tasks: 'I can button my shirt now' or 'I can tie my shoelaces'.

We see this as an indication that the trainees really have improved. The people themselves and those around them have given many examples. Could peeling potatoes and walking without the crutch be placebo effects called forth by an enthusiastic physiotherapist?

Often a friend or neighbour made trainees aware of improvements, or they performed a task quite naturally and then realised that they had not been able to do it before self-training.

Another example of this is a person from a previous study (Bäckström and Swanberg, 1991) with spastic diplegia. In a filmed interview, she said she was going with some friends on a trip in a caravan. When she came into the caravan all of her friends were surprised:

You walked in!

Yes, so what?

Last year you crawled!

She had been self-training Vojta during the year and was convinced that was the reason for her motor functional improvement.

3. Independence

All trainees complied well. They worked every day for at least four months. The trainees had very different needs for physiotherapist help. One wanted to be followed-up weekly or biweekly, although new instructions were not necessary. One worked completely on her own for six months. All stressed the value of independence in training.

The opportunity to train without physiotherapist assistance was appreciated. This was especially stressed by trainee 1, who talked about 'critical physiotherapist hands, finding faults'.

The greatest asset with this type of training is that I manage to do this on my own. I get control over myself and my life and do not need to commit myself into the hands of somebody else (trainee 1).

I can do the training myself. I don't need anybody's hands to help me (trainee 2).

It is not laborious and I do not need any help (trainee 3).

This is a thing I myself can control and also I can do it completely on my own (trainee 4).

Independence was much stressed by the trainees. Over the years they had been subjected to much physiotherapeutic 'hands-on' treatment. They all found that when they could follow a programme at home without equipment or manual help, they saved time and developed a feeling of independence.

It also saves cost and time for the therapeutic institutions.

Other autonomous exercises or home programmes have the same independence aspect, but the trainees do not find them so interesting. The fact that they took part in a study and did something unusual may of course have influenced their attitude. However 'exercises in which the body works for me' (trainee 2) were found intriguing.

The traditional stretching and bending made me fed up, so they were simply not done....This is easier in a way, I can do it on my own, nobody needs to stretch my legs and it does not hurt (trainee 6).

Although independence in the training situation was highly valued, some of the trainees said that they wanted regular follow-

ups. Although instructions are not strictly necessary, the need for encouragement of a patient following a programme ought not to be neglected.

4. Hard to explain

It is difficult to describe what actually happens and how the body reacts – it sounds unbelievable. On this point, the trainees were unanimous. They all said that it was hard to explain to others what they were doing and what happened. They preferred to demonstrate, or let people try.

It is hard to tell but I have tried to explain that it is my body that works, they think it is strange, they don't believe....I say I do nothing....They think I am joking....If they want to know, the best way is to show them (trainee 4).

It is hard to explain but several times I have shown people, they think it is totally incredible that it works (trainee 5).

This category is closely related to the category 'Fascination with the body'. The trainees found it hard to believe what happened in their bodies while they were invoking reflex locomotion. In introducing the method to parents, potential trainees and colleagues, I now always show the technique in practice before explaining the theory.

It was in practice that automatic locomotor programmes were originally discovered. It is by experiencing the feeling in the body that they are most easily understood. This difficulty in explaining applies not only to the trainees. Even physiotherapists have difficulties comprehending the Vojta theory only by reading about it.

To be able to comprehend one has to try it, to practise letting the proposed 'dormant ideal movements' be invoked in the body as well as to watch how they are used as a tool in physiotherapeutic practice.

Worth Time and Effort

All trainees considered that it was worth the time and effort spent. They were pleased with their motor functional gains and appreciated having found a method to keep fit on their own.

Effectiveness of Vojta Treatment

It is hard to evaluate any therapy effects objectively, especially in children, since by definition they will develop no matter to what they are exposed. As yet, children have

Key Messages

- The Czech neurologist Vaclav Vojta began and developed therapy with and for cerebral palsied children.
- Vojta explains the invoked movements, turning and creeping, as the activation of inborn programmes of locomotion.
- Simply by moving their eyes, adults with or without impairment can also invoke the movement sequences described by Vojta.
- Neurologically impaired people who self-trained *ad modum* Vojta have reported functional improvement.
- The people in this study appreciated the independence of the training situation in addition to the results achieved.

been the largest group to have received Vojta treatment. This study was not an investigation of the effectiveness of Vojta therapy. For such purposes, a quantitative approach would have been more relevant. However, many of the statements of the trainees of this study refer to motor functional improvements that they themselves are convinced are the result of the autonomous training.

To investigate further this 'hands-off' version of Vojta, patients with other impairments, such as multiple sclerosis, spinal cord or whiplash lesions, could be studied, and the technique evaluated using a quantitative approach.

References

- Brandt, S, Lonstrup, H, Marner, T, Rump, K J, Selman, P, Schack, L K, d'Avignon, M, Noren, L and Årman, T (1980).** 'Prevention of cerebral palsy in motor risk infants by treatment *ad modum* Vojta', *Acta Paediatrica Scandinavica*, **69**, 383-286.
- Bäckström, B and Swanberg, K (1991).** 'Self training *ad modum* Vojta, adult cerebral palsy: Two case studies', *Proceedings of the World Confederation for Physical Therapy Conference in London*.
- Forsberg, H (1992).** 'Nervsystemets utveckling, struktur och function' in: Bille, O (ed) *Barnhabilitering*, Almqvist and Wicksell, Stockholm, chap 3 (in Swedish).
- Glaser, B (1978).** *Theoretical Sensitivity*, Sociology Press, San Francisco.
- Immamura, Sakuma and Takahashi (1983).** 'Follow-up study of children with cerebral co-ordination disturbance', *Brain and Development*, **5**, 311-314.
- Kanda, T, Inge, M, Yamori, Y, Suzuki, J and Sukase, H (1984).** 'Early physiotherapy in the treatment of spastic diplegia', *Developmental Medicine and Child Neurology*, **26**, 483.
- Kvale, S (1996).** *Interviews: An introduction to qualitative research interviewing*, Sage, London.
- Lincoln, Y and Guba, E (1985).** *Naturalistic Inquiry*, Sage, London.
- Starrin, B and Dahlgren, L (1997).** *Along the Path of Discovery*, Studentlitteratur, Lund.

Conclusions

- Vojta self training was interesting and rewarding for the trainees while doing it.
- Trainees considered the time and effort well spent.
- Five of the six persons studied experienced improved motor functions; the sixth experienced instant physical and mental relaxation.
- It was important to the trainees to be able to train without assistance.
- Trainees find it hard to explain Vojta self-training, what happens in their bodies during sessions.

Swanberg, K (1992). 'Sjukgymnastika behandlingsmetoder' in: Bille, O (ed) *Barnhabilitering*, Almqvist and Wicksell, Stockholm (in Swedish).

Vojta, V (1984). 'The basic elements of treatment according to Vojta: Management of the motor disorders of children with cerebral palsy' in: Scrutton, D (ed) *Clinics in Developmental Medicine*, **90**.

Vojta, V (1988). *Die Zerebralen Bewegungsstörungen im Suglingsalter: Frühdiagnose und Frühtherapie*, Ferdinand Enke Verlag, Stuttgart (in German).

Vojta, V and Peters, A (1992). *Das Vojta Prinzip*, Springer Verlag, Berlin.

Von Aufschneiter, D (1989). 'Die Reflexlokomotion: Eine Neurokinesiologische Behandlungsform nach Vaclav Vojta' in: Feldkamp, M and Danielcik, I (eds) *Krankengymnastische Behandlung der Infantile Zerebralparese*, Pflaum Verlag, Munich (in German).

Von Aufschneiter, D and Vojta, V (1992). 'A neurophysiological treatment' in: Forsberg, H and Hirschfeld, H (eds) *Movement Disorders in Children*, Karger, Basle.

Wassermeyer, D and Vojta, V (1989). 'Aufgaben des Therapeuten bei der Krankengymnastik des Symptomatischen Risikokindes nach Vojta', *Krankengymnastik*, **41**, 11, 1120-30 (in German).