

The importance of static and dynamic signs of non-verbal communication with central nervous system of impaired children during the kinesitherapy treatment

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ABSTRACT

Aim To investigate the importance of physiotherapist's static and dynamic signs of nonverbal communication in order to influence such protocol in the quality of interaction between a physiotherapist and a central nervous system of an impaired child, which can ultimately improve outcomes of kinesitherapy treatment.

Methods During a three-month period, an internally created protocol was implemented. The group consisted of six patients aged 11 months to 4 years of age, with multiple congenital sensory-motor deficiency of central nervous system. The Protocol included the implementation of eight precisely defined non-verbal physical therapist behaviors in kinesitherapy treatment. The evaluation was made by a questionnaire.

Results Subsequent to the application of internal protocol, parameters such as occurrence of crying at the beginning of the treatment, occurrence of crying during the treatment and mean value of three treatments in the last week taken after three months from the beginning of the Protocol application, show significant improvements.

Conclusion The influence of nonverbal communication on the interaction between a physiotherapist and a child and the outcomes of kinesitherapy treatment, can be a base for further research in a multidisciplinary team.

Key words: physiotherapy, motor and sensory disorders, interaction, internal protocol.

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INTRODUCTION

In neuro-rehabilitation of children with congenital sensory motor impairments, it is important to recognize the importance of rehabilitation of perceptual, sensory, and emotional components of a child, where a subtle application of certain nonverbal behavior can have a profound significance. From the point of view of these components physiotherapist rehabilitation does not seem easy, so physiotherapist must make a personal evaluation, and use that assessment in selecting most appropriate instruction and behavior (1).

The access to children at the age of four years cannot be based exclusively on the motor learning, but on the modeling of behavior as primary emotions and feelings. In the relationship between motivation and learning, it has been acknowledged that human performance is optimal at intermediate levels of arousal (2). Four components make wakefulness in humans: feelings, emotions, thoughts and movement (3). In doing so, the static and dynamic signs can be one of the tools. The time characteristics of social behavior and its nonverbal manifestation can exert a positive influence on communicative activity (4).

The research was done by an internally developed protocol that included eight specific nonverbal behaviors. Perception and sensory impairment, if any, further hamper the functioning of a child in the environment and make it difficult to interact. Therefore, it is primarily necessary to motivate and create environment in which the child feels safe and successful.

An influence of sensory and perceptual damage to the ability to perform normal movement is deep (5).

The protocol is based on previous experience in working with children through the application of Feldenkrais' methods. Not only the motor, sensory (including proprioception, vision and vestibular systems) and cognitive systems of the body are involved, but the ability to dynamically interact with the environment must also be included (6). Bobath concept is called neurodevelopment concept. It uses scientifically based facts as well as applied neurophysiology as the base for the treatment (7). A good therapeutic plan cannot be made through a one-time patient assessment and focused solely on physical dysfunction. In addition to the analysis of motor control, another useful approach is psychological (8).

During the treatment, the therapist should observe through clinical reasoning, set a working hypothesis, and focus on determining the specific obstacles that stand in the way to the treatment goals through problem solving. Rehabilitation is a problem solving and educational approach with available resources and the underlying disease (9).

The protocol is aimed at establishing just above ambient conditions.

For a complete modern physiotherapy of sensor damaged child better knowledge of the symptomatology and pathology is necessarily. Certainly, apart from the usual team of processing the pedagogical approach is also required during the kinesitherapy (10).

Eliminating fear and anger and resentment of the child, is also an important communicative task. Recent findings about fear, anger and disgust lead to findings that these emotions are significantly different from each other in the distribution of neural activity. Fear is associated with activation of amygdala (11,12), disgust with insults and globus pallidus (13), and anger with lateral frontal cortex (14).

PATIENTS AND METHODS

Implementation of the protocol is made on the group of six patients. Inclusion criteria were the below five years, clinical signs of a senso-motor disorder that was functional impairment of movement and/or sensors and/or behavior. Child had to be independently powered, at least to the crawling function.

At least two rounds of any form of rehabilitation in the field of physiotherapy were required for child, during the application of the protocol. Treatments were carried out in four cases in the patient's home and in two cases at the hippodrome center for therapeutic riding.

Excluding criteria were the existence of contraindications of physiotherapy enforcement in general and/or of the Protocol, such as uncontrolled epilepsy, other drugs that markedly affect cognitive abilities, phase changes or the introduction of new drugs/medications.

The protocol was implemented three times a week for three months. The protocol included the following nonverbal behavior of the therapists:

Item 1: Upon arrival, a therapist does not enter the personal zone of the child, but the local area and addresses the child from that distance, leaving the child time to adapt to the presen-

ce of a physical therapist. It aimed to develop initiatives and establishing of trust overcoming fear of the child. If certain situations were causing stress, there should be a way to change things to limit stress (15).

Item 2: With clapping, smiling, and playing with child's toys, trying to make the child come to him instead of being approached by a child therapist. It aimed to develop initiatives and establishing trust by overcoming fear of the child. Cognitive systems are intrinsically multi-modal. An important, open issue is how to combine cues from diverse sensors to achieve optimal performance (16).

Item 3: Physiotherapist spreads his hands, clapping and mime motivates and encourages the child to move. Each sensory data become part of the system aspiring to entirety. Verbotonal speech includes rhythm, tone, intonation, intensity, tense, tempo, as well as mime, gesture, posture and body position, proxemic, topography and mise-en-scene. The acoustic perception, either hearing or somatosensory system are not sufficient for processing these parts, entire spatioception is needed. The name spatioception appears in verbotonal method as a completely new name, but not a new concept (17).

Item 4: During the first 10 minutes of the treatment physiotherapist exclusively carried out movements and actions that the child normally performed with greater or lesser ease, and did not deal with the sensor-motor deficits of children with the aim of creating the motivation of the child and the environment in which the child is successful. Provision of feedback focusing on the outcome, task and environment rather than specific movement performance (18).

Item 5: In the course of the treatment, in appropriate moments, therapist abandoned initiative toward the child several times for a short time to encourage the child to interact with the environment. Provision of opportunities for the child to repetitively practice tasks in a range of contexts and environments (19).

Item 6: During the treatment, the therapist would allow at least two to three pauses lasting for two to three minutes, for drinking and feeding (fruit, chocolate). This effort was made to eliminate the fear of the child and establish further confidence addressing this behavior to reduce the release of cortisol, the stress hormone, which reduces the functioning of the hippocampus and is responsible for learning and

memory. In addition to eating and drinking as the primary functions to satisfy biological needs, it also has a strong social context. In primates, it develops trust, in the sense that the child's instinct indicates that the person feeding him will not hurt him. The effects of stress on memory include interference with one's capacity to encode and the ability to retrieve information (20). Metabolic stress may mediate in the relationship between rank and cortisol in other social mammals (21).

Item 7: Physiotherapist in the treatment reduced the vertical difference. This nonverbal behavior of the physiotherapists aims to respect the child. The use of lateral or horizontal communication in the workplace can also enhance morale and afford a means for resolving conflicts (22).

Item 8: During the treatment the physiotherapist let the child explore his head and face, such as physiotherapists' touching his head, pulling fingers through her hair, touching face with both hands to allow for tactile learning about environment, with the aim of introducing and developing trust, which is very important to a child and otherwise, healthy children. Typically, children become more motivated if they have been active and successful participants in the problem solving process (23).

For evaluation, internally set parameters (categories) were taken, such as frequency of crying (at the beginning and during the treatment). The categories used included always, very often, sometimes, rarely, never. Duration of treatment was expressed in minutes. An estimated incidence of crying at the beginning and during the treatment was based on the common judgment of parents and therapists. Length of the treatment was determined by child's crying. Crying for more than 5 minutes continuously determined the treatment interruption and this value was recorded as the length of the treatment.

RESULTS

The parameter considering occurrence of crying at the beginning of the treatment in the first week indicated one patient in "always" category, three patients in category "very often" and two patients in the category "sometimes" (Table 1).

The parameter considering occurrence of crying during the treatment showed three patients in the category "very often", and three

Table 1. Parameters taken during the first week of the Protocol application

Patients	Occurrence of crying at the beginning of treatment	Occurrence of crying during the treatment	Mean value of three treatments in first week (min.)
Patient 1	Very often	Very often	20
Patient 2	Very often	Very often	25
Patient 3	Sometimes	Sometimes	30
Patient 4	Very often	Sometimes	25
Patient 5	Sometimes	Sometimes	40
Patient 6	Always	Very often	15

patients in the category “sometimes”. Mean value of the treatments in first week was 25.8 minutes (Table 1).

Parameters taken in the last week of the Protocol application (after three months) showed one patient in the category “always”, two patients in the category “sometimes” and three patients in the category “rarely” (Table 2).

The parameter considering occurrence of crying during the treatment indicated one patient in the category “very often”, two patients in the category “sometimes”, three patients in the category “rarely”. Mean value of treatments in the first week was 38.3 minutes (Table 2).

DISCUSSION

The results of this study have shown that an application of internal protocol reduced the frequency of crying at the beginning of the physiotherapist’s treatment, and also reduced the occurrence of crying during the treatment. Moreover, the communication efforts to improve interaction also increased the duration of physiotherapist’s treatment, the application of the internal protocol positively affected the quality and quantity of the treatment, and non-verbal communication was found to be an important factor in the physiotherapist’s work with children.

Also, research of nonverbal communication, in general, suggests importance of this part of communication such as research of nonverbal behavior as Argyle (24), and Sheflen (25) found worth considering. Thus, as Argyle points out, eye-to-eye contact (“mutual glance”) that takes too long (“piercing eye”) may be perceived as overly intrusive. At the same time Kleck (26) has found that people with open, friendly faces are perceived as being attractive and capable of inducing confidence and sympathy. Results from this work have shown a direct

Table 2. Parameters taken in the last week of the Protocol application (after three months)

Patients	Occurrence of crying at the beginning of treatment	Occurrence of crying during the treatment	Mean value of three treatments in last week (min.)
Patient 1	Sometimes	Sometimes	30
Patient 2	Sometimes	Rarely	40
Patient 3	Rarely	Sometimes	40
Patient 4	Rarely	Rarely	45
Patient 5	Rarely	Rarely	55
Patient 6	Always	Very often	20

link between the non-verbal behavior therapist and interactions between therapists and child. Specific nonverbal physiotherapist’s behavior from this Protocol, may have significant influence to positive outcome in physiotherapist’s treatment in order to create positive environment between child and physiotherapist. Treatment of child’s abilities was sidelined in favor of actions taken to support social aspects and participation of the children in their environment (27).

Without communication components, physiotherapist’s treatment often becomes an event in which the central figure is the therapist and not the patient. Optimum experience in any task is the one that is perfectly balanced so as to be neither too hard nor too easy (28). From these results, one may conclude that kinesitherapeutic treatment does not negatively affect the child’s discomfort but the lack of communication. More than a half of general practitioners determined the methods for supporting communication with the patient as useful such in studies of Bernieri and Rosental (29), which highlighted the importance of “interpersonal coordination, which includes rhythm, simultaneous movements, and smooth meshing interaction. The responses demonstrated the inability of the physicians to use basic communication techniques and strategies. (30).

Often it is important to encourage the patient’s functional potential, unleash the kinetic energy of the mind through the promotion of safety, respect, confidence, motivation, principles homing child and creating the environment in which the child feels safe and successful. Improvement in gross motor function has been indicated after periods of intensive physiotherapy for non-ambulatory children, and in children who have practiced functional tasks intensively in their everyday environments (31).

Although these results indicate the importance of non-verbal communication, the number of patients in this study is small to explain the link between nonverbal behavior and positive treatment outcomes. Also, no specific tests (measurements) were conducted. It is also important to point out that the subjective categories were measured. However, this study can

be a basis for further research in a multidisciplinary team.

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REFERENCES

1. Everett T, Trew M. Human movement. London: Churchill Livingstone, 1997.
2. Yerkes RM, Dodson JD. The relation of strength of stimulus to rapidity of habit formation. *J Comp Neurol* 1908; 18:459-82.
3. Feldenkrais M. Awareness through movement. New York: Harper Collins Publishers, 1990.
4. Ila K. Psychology in Russia. *Bolotova Journal* 2012; 5:289-300.
5. Bobath B. Adult hemiplegia-evaluation and treatment. London: Elsevier Health Sciences, 1990.
6. Connors KA, Galea MP, Said CM. Feldenkrais method balance classes improve balance in older adults. *Evid Based Complement Alternat Med* 2011; 873672.
7. Shumway-Cook A. Motor control: translating research into clinical practice. Baltimore: Lippincott Williams&Wilkins, 2006.
8. Rosenbaum A. Human motor control. San Diego-California: Academic Press Inc, 2010.
9. Wade T. Measurement in neurological rehabilitation. London: Oxford University Press, 1993.
10. Majkić M. Klinička kineziterapija. Zagreb: Medicinski fakultet Sveučilišta u Zagrebu, 1997.
11. Calder AJ, Young AW, Rowland D, Perrett, DI., Etcoff, NL. Interactive neural systems governing emotion and social interaction. *Cogn Neurol* 1996; 13:699.
12. Calder AJ, Lawrence AD, Young AW. Neuropsychology of fear and loathing. *Nat Rev Neurosci* 2001; 2:352.
13. Calder AJ, Keane J, Manes F, Antoun N, Young AW. Impaired recognition and experience of disgust following brain injury. *Neurosci* 2000; 3:1077.
14. Blair JR, Cipolotti L. Impaired social response reversal. A case of "acquired sociopathy". *J Neurol* 2000; 6:1122-1141.
15. Kidshealth. Helping kids cope with stress. http://kidshealth.org/parent/emotions/feelings/stress_coping.html#cat145 (18 January 2013)
16. Anemuller J, Back J, Caputo B, Luo J, Ohl F, Orabona F, Vogels R, Weinshall D, Zweig A. Biologically motivated audio-visual cue integration for object. In: Abstract of International Conference of Cognitive Systems, Berlin, Germany, 2-4 April, 2008. Abstract No 5008, p. 539-48. University of Karlsruhe, Germany, 2008.
17. Runjić N. Spatioception, grammar of space and linguistics of speech. In: Zbornik referatov 2. Slovenskega posveta o rehabilitaciji oseb s polževim usadkom, Maribor, Slovenija, 8-9 November, 2002, p.135-138. Center za sluh in govor, Maribor 2002.
18. Meichenbaum D. Cognitive-behavior modification: An integrative approach. New York: Plenum Press, 1977.
19. Brian H, Christine I, Hyam B. Modified constraint-induced movement therapy or bimanual occupational therapy following injection of Botulinum toxin, *BMC Neurol* 2010; 10:58.
20. Kuhlmann S, Piel M, Wolf T. Impaired memory retrieval after psychosocial stress in healthy young men. *J Neurosci* 2005; 25:2977-82.
21. Martin NM., Richard WW. Dominance, cortisol and stress in wild chimpanzees. *Behav Ecol Sociobiol* 2004; 55:332-40.
22. Michael J. Papa, Tom D. Daniels, Barry K. Spiker. Organizational Communication Perspectives and Trends. Los Angeles: Sage Publ Inc, 2008.
23. Meichenbaum D. Cognitive-behavior modification: An integrative approach. New York: Plenum Press, 1977.
24. Argyle M, Henderson M, Furnham A. The rules of social relationship. *J Soc Psych* 1985; 24:125-39.
25. Shellen A. Body language and social order. New Jersey: Prentice Hall, 1972.
26. Kleck R. Case and eye-contact: a research review. *Psychology Bulletin* 1988; 100:78-100.
27. Odman P, Odberg B. Effectiveness of intensive training for children with cerebral palsy-a comparison between child and youth rehabilitation and conductive education *J Rehabil Med* 2005; 37:263-70.
28. Csikszentmihalyi M. The Classic Work on How to Achieve Happiness. London: Rider & Co, 2002.
29. Bernieri F, Rosenthal R. Interpersonal coordination: behavior matching and interactional synchrony. Cambridge: Cambridge University press, 1991.
30. Balashkova M, Valentinova T. Communication doctor-patient in general practice. In: Abstracts of the Scientific Conference Public Health in 21st century, Berlin, Germany, 17-18 September, 2010. Faculty of Public Health Plevin, Plevin, 2010. *J Biomed Clin Res* 13(Suppl.1):83.
31. Trahan J, Malouin F. Intermittent intensive physiotherapy in children with cerebral palsy. *Dev Med Child Neurol* 2002; 44:233-9.

Važnost statičkih i dinamičkih znakova neverbalne komunikacije u kineziterapijskom tretmanu djece s oštećenjima centralnog živčanog sustava

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SAŽETAK

Cilj Ukazati na važnost statičkih i dinamičkih znakova neverbalne komunikacije fizioterapeuta, kao i utjecaja interno izrađenog protokola neverbalne komunikacije, na kvalitetu interakcije između fizioterapeuta i djeteta, te posljedično i uspješnijeg ishoda fizioterapijskog tretmana.

Metode U periodu od tri mjeseca primjenjen je interno izrađen protokol; grupa se sastojala od šest pacijenata, u dobi od 11 mjeseci do četiri godine, s višestrukim prirođenim senzomotornim oštećenjima središnjeg živčanog sustava. Protokol je uključivao osam točno određenih neverbalnih ponašanja fizioterapeuta u kineziterapijskom tretmanu. Evaluacija je učinjena primjenom upitnika.

Rezultati Nakon aplikacije internog protokola, mjereni parametri (pojava plača na početku tretmana, pojava plača tijekom tretmana, kao i prosječno vrijeme trajanja tretmana), nakon tri mjeseca od početka primjene, pokazuju značajan napredak.

Zaključak Utjecaj neverbalne komunikacije na interakciju između fizioterapeuta i djeteta, kao i povoljniji ishod kineziterapijskog tretmana, može biti osnova za daljna istraživanja u multidisciplinarnom timu.

Ključne riječi: fizioterapija, motorički i senzorni poremećaji, interakcija, interni protokol.