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*Frequency of infantile cerebral palsy in children  
with neurodevelopmental disorders*

The diagnosis of infantile cerebral palsy is impossible in the early period of life, but only when the central nervous system is mature enough, that is practically not earlier than when the child is one year old, and even better as late as at the age of 3–5 years (1). This, obviously, does not mean that until that moment the children whose psychomotor development causes concern, and those with the so-called perinatal risk cannot and should not start early rehabilitation. Psychomotor development disorders that occur before infantile cerebral palsy is diagnosed, are definitely an indication for starting rehabilitation (10).

Neurodevelopmental treatment applied early gives more chance of compensating developmental deficits, mainly through taking advantage of the brain's plastic possibilities and compensatory mechanisms. In the first year of a child's life their development is especially dynamic – this is the period when they acquire the most basic motor skills: maintaining erect body posture and alternate, bipedal walk, as well as manual skills, ability of sensual perception, communication, and various kinds of social behaviour. All these functions keep being mastered by continuous stimulating, repeating and taking advantage of the acquired experience (2,10).

The principles of early diagnostics and rehabilitation of children with ICP were worked out by the Rehabilitation Committee of the Polish Academy of Sciences under supervision of Prof. Dega in the year 1972. These principles are still valuable, binding and developed, especially in the field of early diagnostics and early psychomotor rehabilitation (3, 6, 8, 9). From among many methods of psychomotor rehabilitation of infants, the most often applied ones are NDT-Bobath and Vojta's method. The first of them is based on the idea of neurodevelopmental therapeutic approach, in which the most important fact is that learning to move depends on sensory experiences, which must be based on the correct muscle tone. This method is recommended from the moment any abnormality is noticed. Vojta's method is a method of neurophysiological diagnostics and therapy of children with central nervous coordination disorders. Its basic purpose is early detection of even small disorders on the basis of quantitative evaluation of the body reactivity in the space. It was prepared mainly for infants from the risk group (8, 9).

The objective of this paper was to present the frequency of infantile cerebral palsy occurrence in children who were referred to the Rehabilitation Polyclinic for the evaluation of their psychomotor development. These were the so-called "perinatal risk" children, or, according to the referring physician, or their parents, abnormally developing.

MATERIAL AND METHODS

In this paper we analyzed the medical documentation of the children born in the years 2000–2001, who had been referred to Rehabilitation Polyclinic for the evaluation of their development. Children with diagnosed cerebral palsy were not qualified for these studies.

Most frequently the children were referred to the polyclinic by neurologists and family doctors, less often by orthopedists, neonatologists, or other specialists. The terms most often used on the referral forms were: neurodevelopmental disorders, psychomotor development retardation, disorders in central nervous coordination, asymmetry of body position, spasticity of lower limbs, prematurity, perinatal risk child, axial hypotonia, muscle tone weakness, or just suspicion of infantile cerebral palsy.

As we know, early diagnosis of developmental disorders and early commencement of rehabilitation are very important, so the analysis included the age at which the child’s development was evaluated for the first time. The study included anamnesis from pregnancy and perinatal period in order to determine the influence of pathologies of that period on the frequency of developmental disorders. This period was analyzed on the basis of threats to the fetus, presented by Michałowicz, that may cause a perinatal lesion of the central nervous system (5). The action of one injuring factor is enough to create a pathology, so the normal pregnancy and perinatal anamnesis, i.e. not overburdening further development of the child was only such an anamnesis in which no irregularities were found. In the remaining cases it was decided that overburdening anamnesis might be related to the pathology of psychomotor development.

The most important was the final evaluation of the children’s psychomotor development. The final visit was the one during which the physician, specialist in rehabilitation defined the child’s psychomotor development as normal, or when infantile cerebral palsy was diagnosed. Three groups of examinees were distinguished, namely: group one, who developed ICP, group two, where children achieved normal motor development, and group three, where children, or rather their parents, did not turn up for the set check-up. (3).

RESULTS AND DISCUSSION

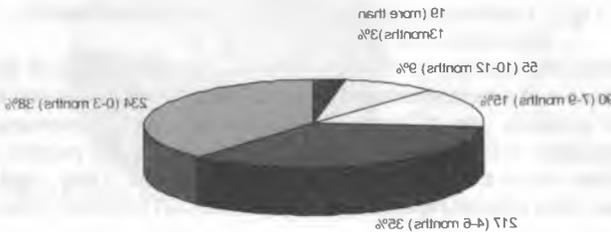


Fig. 1. Age of children during the first visit

Figure 1. presents the number of children (and per cent values) in particular age groups during the first visit. 615 children born in the years 2000–2001 were referred to the Rehabilitation Outpatient Clinic for the evaluation of their psychomotor development. Most often the first visit took place during the first 6 months of the child’s life. The number and frequency of subsequent visits were established by the physician, depending on the degree of the child’s developmental disorders. If the development was evaluated as normal, considering the pregnancy and perinatal risk, as well as the child’s age (usually more than 6 months, because of the degree of nervous

system maturity) one visit was enough to confirm normal development. Unfortunately, sometimes it was the parents, who “decided” to finish the treatment, by not turning up for the set check-up, because out of 229 children evaluated once 110 did not turn up for the set examination. It is very likely that the parents themselves evaluated their children’s development as normal

On the basis of the documentation it was calculated how many patients visits usually took place. The data are shown in Table 1. In the analysis of the data above there is a significant bit of information: after the first visit 229 children were evaluated as healthy.

Table 1

Number of visits at the physician’s	1	2	3	4	5	6 and more
Number of children	229	158	105	49	32	42

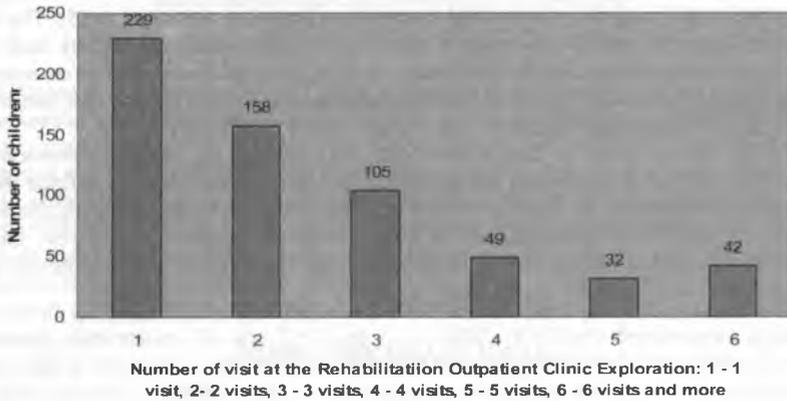


Fig. 2. Graphic presentation of the data contained in Table 1

Figure 3 presents the number of children normally developing and of those with ICP in proportion to the number of appointments at the doctor’s they had. From among 615 children, 272 were qualified for exercises, out of which 30 did not turn up for exercises or a check-up. Neurologists-pediatricians and family doctors most often referred the patients for development evaluation and, indeed, this is a very favourable kind of cooperation. Table 2 and Figure 4 present specialists who most often referred children to the Rehabilitation Outpatient Clinic.

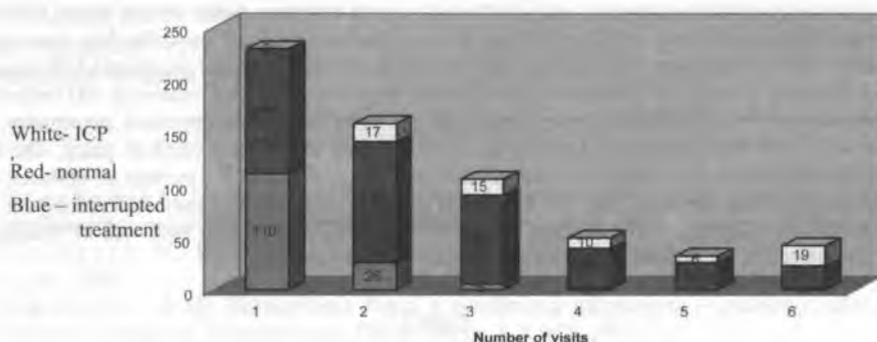


Fig.3. Number of visits and the final results

Table 2

Specialists	Neurologist	Family doctor	Orthopedist	After hospital treatment	Other specialist
Number of children	261	217	57	49	31



Fig. 4. Specialists referring children to the Rehabilitation Outpatient Clinic – a graphic presentation

One of the reasons for referring the child to the Rehabilitation Outpatient Clinic was an overburdened pregnancy and perinatal anamnesis. In 275 children there occurred pregnancy and perinatal irregularities, and from among these children in 74 rehabilitation was conducted effectively – normal development was achieved, whereas in 54 children ICP was diagnosed, in spite of the conducted rehabilitation.

Normal perinatal anamnesis was confirmed in 340 children. From among these 116 were referred for exercises, 18 children did not turn up for the appointed rehabilitation. Among the children without the so-called perinatal risk, that is with normal perinatal anamnesis ICP occurred in 13 children, whereas in 229 normal development was confirmed. The remaining 100 interrupted the treatment. In 150 children from among all the examinees developmental asymmetry was observed, 12 of them developed hemiparesis in the course of infantile cerebral palsy. The final analysis, being also the objective of the conducted studies, presents the number of children with diagnosed infantile cerebral palsy, the number of children who achieved normal development, and the remaining children, whose parents interrupted the treatment of their own will or because of being unaware of the problem. The results are contained in Table 3.

Table 3

	Children with ICP	Normally developing children	Interrupted treatment
Number of children	67	402	146

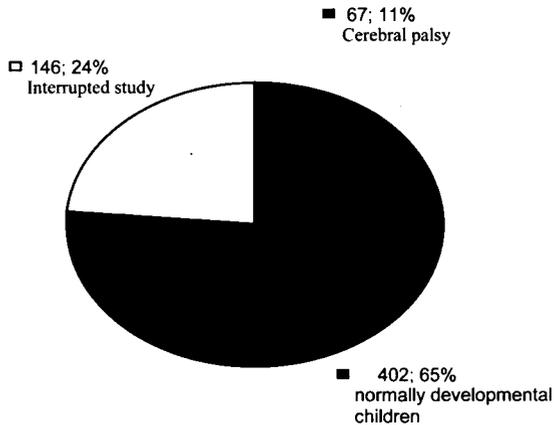


Fig.5. Final evaluation

Figure 5 presents the final analysis of the children's development evaluation

### CONCLUSIONS

1. Children with neurodevelopmental disorders are most often referred for evaluation in the first 6 months of their lives.
2. Most patients turned up for one visit.
3. After the first visit the psychomotor development of 119 patients was regarded as normal.
4. The parents of 110 children interrupted the treatment after the first visit.
5. Patients are referred for development evaluation first of all by neurologists-pediatricians and family doctors.

6. Among the children referred to the Rehabilitation Outpatient Clinic for development evaluation 11% developed infantile cerebral palsy, 65% achieved normal development, whereas 24% did not turn up for the appointed examinations.

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#### SUMMARY

The diagnosis of infantile cerebral palsy is not possible in the early period of life, but only when the central nervous system is mature enough. The abnormal psychomotor development observed earlier is defined as neurodevelopmental disorders and constitutes an indication for commencement of rehabilitation. An early diagnosis and rehabilitation of these disorders decrease the number of children with infantile cerebral palsy. The aim of the paper was to determine the frequency of infantile cerebral palsy in children examined in the Rehabilitation Outpatient Clinic because of disorders in the development of the nervous system. The study comprised children born in the years 2000–2001, treated by the Rehabilitation Outpatient Clinic because of neurodevelopmental disorders. The children were referred there by neurologists, family doctors, or other specialists, for the evaluation of their psychomotor development. The following factors were evaluated: child's age during the first visit, frequency of medical check-ups and the need for psychomotor rehabilitation. The final evaluation of treatment was very significant. In accordance to the final evaluation the children were divided into three groups: with normal development, with diagnosed cerebral palsy, and the remaining children, who discontinued the treatment. From among 615 children born in the years 2000–2001, referred to the Rehabilitation Outpatient Clinic because of abnormal psychomotor development, in 67 infantile cerebral palsy was found, in 402 motor development was defined as correct. A group of 146 children did not turn up for a check-up.

#### Częstość występowania mózgowego porażenia dziecięcego u dzieci z zaburzeniami neurorozwojowymi

Rozpoznanie mózgowego porażenia dziecięcego nie jest możliwe we wczesnym okresie życia, ale dopiero wtedy, gdy ośrodkowy układ nerwowy osiągnie dostateczny stopień dojrzałości. Obserwowany wcześniej nieprawidłowy rozwój psychoruchowy określany jest jako zaburzenia neurorozwojowe i jest wskazaniem do rozpoczęcia rehabilitacji. Wczesna diagnoza i rehabilitacja

zaburzeń neurorozwojowych zmniejsza liczbę dzieci z mózgowym porażeniem dziecięcym. Celem pracy było określenie częstości występowania mózgowego porażenia dziecięcego u dzieci badanych w Poradni Rehabilitacyjnej z powodu zaburzeń neurorozwojowych. Badaniem objęto dzieci urodzone w latach 2000–2001, leczone w Poradni Rehabilitacyjnej z powodu zaburzeń neurorozwojowych. Dzieci kierowane były przez neurologa, lekarza rodzinnego lub innego specjalistę celem oceny rozwoju psychoruchowego. Oceniano wiek dziecka podczas pierwszej wizyty, częstość kontroli lekarskich oraz potrzebę prowadzenia usprawniania neurorozwojowego. Bardzo istotna była ocena końcowa leczenia, według której dzieci zostały podzielone na trzy grupy: z normą rozwojową, z rozpoznaniem mózgowym porażeniem oraz pozostałe, które przerwały leczenie. Spośród 615 dzieci urodzonych w latach 2000–2001, skierowanych do Poradni Rehabilitacyjnej z powodu zaburzeń neurorozwojowych, u 67 wystąpiło mózgowe porażenie dziecięce, u 402 określono prawidłowy rozwój ruchowy. Grupa 146 dzieci nie zgłosiła się na wizytę kontrolną.