SCRIPTA MEDICA (BRNO) – 580 (5): 219–224, *November 2007*

CHILDREN WITH CEREBRAL PALSY AFTER 6-MONTH PHYSIOTHERAPY

DRLÍKOVÁ L.[1], HASHIM M. K. A.[2],
AL FADHLIA. K. [2], ANBAIS F. H. [2], ERAJHI A. A.[2], POSPÍŠIL P.[2], KONEČNÝ L.[2],
DUNKLEROVÁ L.[2], ZEMANOVÁ H.[1], SIEGELOVÁ J.[2]

[1] Kociánka Home for Handicapped Children and Young Adults, Brno, Czech Republic
[2]Department of Functional Diagnostics and Rehabilitation, Faculty of Medicine, Masaryk University, St. Anne's Faculty Hospital, Brno, Czech Republic

Received after revision November 2007

A b s t r a c t

Cerebral palsy is a syndrome connected with immature brain damage. This disease means a serious social and economic problem. There are lots of studies concerned with the treatment of cerebral palsied individuals, but their results are dissimilar.

The aim of this study is to compare functional changes using two different methods – Gross Motor Function Measure (GMFM) and Barthel Index (BI). GMFM consists of 88 tasks divided into 5 sections. BI evaluates everyday activities of the patient.

We examined 15 children 5–16 years old (average age was 11.94 4.12 years). The percentages of groups of different CP forms were as follows: spastic 93 %, non-spastic 7 %; diplegia 47 %, hemiplegia 13 %, quadruplegia 33 %, ataxia 7 %. The children were treated according to principles of comprehensive rehabilitation treatment (5 of them using Bobath concept, 10 of them with analytic approach). The group was tested before the treatment and after 6 months of the treatment. The correlation between both measurements was high.

Our results showed improvements in both tests, GMFM and ADL, after 6 months of rehabilitation treatment.

K e y w o r d s

Cerebral palsy, Rehabilitation, Functional evaluation, Gross Motor Function Measure, Barthel index

INTRODUCTION

Cerebral palsy is a syndrome characterised by disorder of postural tonus, coordination of movements and senses. It is therefore a sensory motor disease originating on the basis of non-progressive immature brain damage (*1*). The syndrome has been existing for many years already in both more and less advanced communities with a relatively constant incidence of 2–5 per mil. The reason of fluctuation in this range has not been reliably demonstrated yet (*2*). With regard to the fact that this disease does not reduce substantially the lifespan, cerebral palsy is

an important social problem. It requires lifelong assistance that is often necessary, costs of repeated orthopaedic operations and compensatory aids, rehabilitation treatment, brings about problems with professional engagement and, last but not least, it affects the quality of life of the patients (*2,3*).

There are many studies monitoring the changes connected with different kinds of both intervening and non-intervening therapies. The most frequently evaluated criteria include changes in the base (*4,5*), range of movements (*4*), and changes in balance (*6*). The studies monitoring different approaches in the therapy of these patients have controversial results. (*7,8,9*)

PURPOSE

The aim of the study is to compare possibilities of evaluation of changes of the functional state of children with cerebral palsy by means of the following tests: "Gross Motor Function Measure" (GMFM) test (10) and 100-point "Barthel Index" (ADL) test evaluating the 10 most important self-attendance activities (11,12). We monitor the functional state change after 6 months and we evaluate the changes for individual groups of patients. The results of the study are preliminary ones.

METHODS

We examined 15 children with cerebral palsy at the age of 5–16 years; the average age was 11.94 ± 4.12 years. The individual CP form percentages were as follows: spastic 93 %, non-spastic 7 %, diplegia 47 %, hemiplegia 13 %, quadruplegia 33 %, ataxia 7 %. We used the Gross Motor Function Measure – GMFM test and the Barthel index test of daily activities.

The children were treated by methods of comprehensive rehabilitation using the Bobath concept (33.3 %); in some cases exercises on an analytical basis (66.6 %) prescribed by their doctor were used.

After 6 months of the prescribed therapy the same examination was repeated.

The GMFM test includes evaluation of 88 items divided into 5 sections: 1, lying and rolling; 2, sitting; 3, crawling and kneeling; 4, standing; 5, walking, running and jumping. It evaluates the skills of the child in the individual items by using a 4-point scale on the quantitative basis. A healthy child at the age of five years should comply with all items. The protocol of the study was approved by the local ethical commission.

The Barthel index ADL test evaluates 10 most important self-attendance activities. It is used for assessment of the patient's independence. The need of supervising means a certain degree of dependence. We record what the patient is really doing, not what their potential is.

We expressed the results as average values (± SD). We also evaluated the correlation between the first and second examinations. We used a Wilcoxon test for paired values for the evaluation of our results.

RESULTS

In the first evaluation by GMFM in children with cerebral palsy as a whole, the total score reached from 21 to 97 %, in the second evaluation after 6 months the group in the GMFM test reached the score in a range of 25–99 %. The results of the GMFM1 test (before the treatment) showed 58.8±23.1 points and after 6 months GMFM2 showed 63.6±22.8 points, which is a statistically significant improvement ($p < 0.01$).

In the ADL test the same group of children with cerebral palsy reached the total score of 20–100 %, on average 60±32 %. In an ADL test carried out after six months the total score was 25–100 %, on average 64±31 %; the second measurement was statistically significant ($p<0.05$). We evaluated several parts of the GMFM test; theindividual items of GMFM tests are listed in *Table 1*.

Table 1

A GMFM test of children with cerebral palsy in first examination and examination after 6 months in the individual items A to E of GMFM (A = lying and rolling, B = sitting, C = crawling and kneeling, D = standing, E = walking, running and jumping)

n = 15	A	B	C	D	E
1st examination	63.6±22.8	91.9±8.3	77±25.6	44±40.3	56.8±34.2
2nd examination	58.8±23.1	93.4±6	78.9±26.2	41.4±39.2	59.4±34.1

The differences in the individual items are not statistically significant.

We have not proved any improvement after 6 months in the individual items of the GMFM test.

Our results showed, after a therapy lasting for half a year in children with cerebral palsy, a statistically significant improvement both in the GMFM test and the ADL test. The individual items of GMFM were not substantially changed.

DISCUSSION

Our results in children with cerebral palsy of the scores achieved in individual tests being presented are in accordance with the results of our sample of 30 CP children already published (*13*), and also with other studies dealing with these problems (*10, 11, 12*). The GMFM test, compared to the Barthel index test, proves to be an identically sensitive test evaluating the results after 6-month rehabilitation.

Our study is limited by the fact that the syndrome is non-homogenous, and if we want to form homogenous groups, we are limited by the insufficient number of subjects. Obtaining more valid data means extension of the study to a longer period, which will also enable statistical evaluation of various forms of the disease and different therapeutic methods.

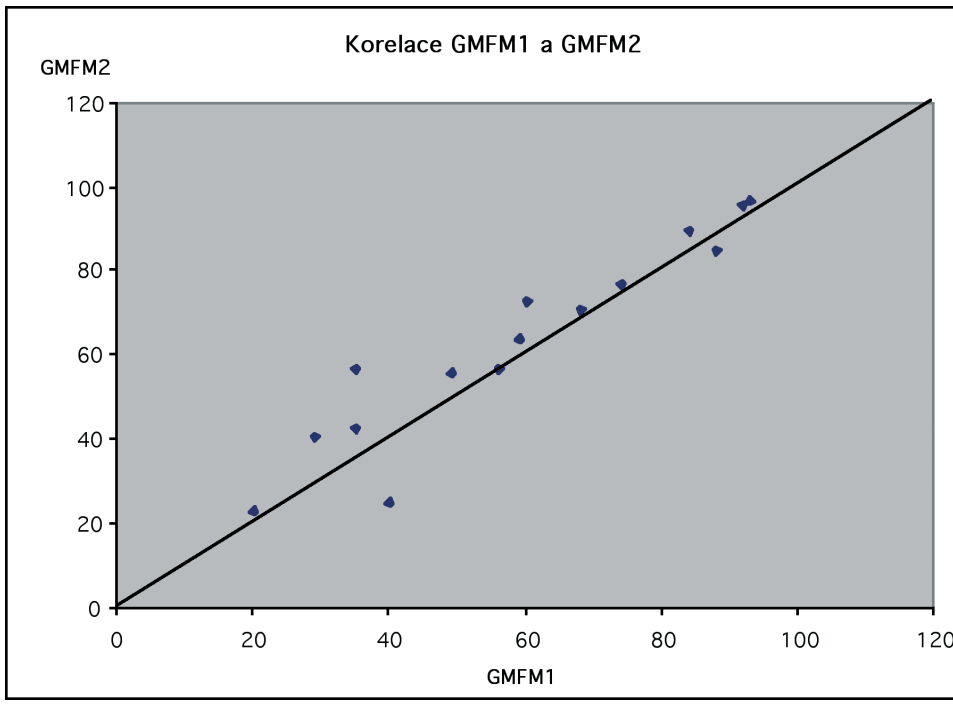

Fig.1
Correlation between first and second examination using "Gross Motor Function Measure" (GMFM) in the measurement made before and after six months of PT treatment

CONCLUSION

After the therapy of children with cerebral palsy lasting for half a year, a statistically significant improvement both in the GMFM test and the ADL test was achieved. The individual items of GMFM were not substantially changed.

A c k n o w l e d g e m e n t s

The research was supported by MSM 0021622402.

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