

## The role of occupational therapy within the complex functional rehabilitation program of the paraplegic patient

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**Abstract.** Improving the quality of life of paraplegic patients is a common concern of all health care professionals. Physical therapy has a variety of methods which can be used to prevent physical decompensation of paraplegic patients and to improve their quality of life. A complex functional rehabilitation program through physical therapy and occupational therapy will help the paraplegic patient to achieve the highest level of independence.

**Key words:** *paraplegia, interdisciplinarity, occupational therapy, physical therapy.*

### Introduction

The technological explosion of the last decades has generated a directly proportional transformation of society, and the entry of the modern techniques in our life has inevitably led to the increase of the number of accidents, to the enhancement of the vertebro-medullary traumatism, especially. Road accidents occupy a first place in the genesis of the traumatic vertebral and medullary impairments.

The complex interdisciplinary approach, with regard to the neuro-motor rehabilitation of the paraplegic patient is especially delicate and demands specialized units which are capable to solve the problems (1). The therapeutic program must be individualized according to the particularities of every particular case, taking into account the specific data of every patient, the associated impairments and personality, and imposes the permanent reevaluation of the functional level of the patient in order to complete it according to the newly determined data.

The months in hospital after a spinal cord injury are an extremely difficult period for patients as they gradually adjust to what may be a lifetime of disability (2). The purpose of physiotherapy and of occupational therapy is to teach the patient to be independent, which means to make him benefit from the maximum usage of the functional residual to compensate the paralyzed part and to accept his disability, stimulating the patient with regard to the fact that he still has a lot of resources for being useful to himself and to those around

him and that life can offer him a lot of satisfactions even in these conditions in which his manner of movement is modified (3).

In the rehabilitation program of paraplegic patients the neuromotor reeducation represents only one aspect, the medical problems of these patients being extremely complex, belonging to various neuro-surgical, neurological and urological specialties, to physiotherapy, occupational therapy and psychology.

So the action of functional rehabilitation presumes a team activity in which every specialist must bring his contribution for the achievement of the proposed objectives (4). The purpose is to create a lifestyle for the patient and the family so that the disability may interfere as little as possible with the daily normal activities. The rehabilitation program focuses on abilities rather than disabilities and facilitates the recuperation of the individual's independence by exploiting the functional residual (5).

At the moment there are no medical solutions for the recovery of the area of injured medulla, although there are medical teams who study the possibility of nerve graft, stem cell implant, and implant of electrostimulating devices at the level of the medulla. There are premises that such therapies will be possible in the following years. The rehabilitation of a paraplegic person is a long process which demands the adjustment of almost all aspects of life (6). So, the kinetic rehabilitation program of the paraplegic develops over a long

period, changing together with the patient's evolution.

The level of the injury dictates the limits of neuromotor rehabilitation, but functional rehabilitation is also dependent on the age of the patient, his physical condition and the impact of the disability on the psychological balance of the patient.

Out of the multiple forms of disabilities which affect humankind, a severe traumatism or a disease of the medulla indubitably constitute one of the most devastating calamities of the human being (7). The severity of the paraplegic's invalidity makes it a major objective of the great rehabilitation services everywhere because this impairment demands considerable costs, both medical-social and personal.

### Material and Method

The selection of the subjects participating in this research was made according to their own free will.

The basic criterion in selecting the 10 subjects who participated in this study was paraplegia.

All subjects suffered a vertebro-medular traumatism, and half of them had an associated diagnostic. None of the subjects was at the first stage of rehabilitation treatment.

During the entire period of this study, the subjects of both lots followed a common functional rehabilitation treatment which was based on a physical therapy program comprising 30 exercises differently applied during the 4 weeks of study, lasting 50 minutes, three times a week.

In the case of the experimental lot the common physical therapy program was supplemented by a program of occupational therapy made on the basis of the problems identified with regard to performance in daily occupational activities, centered especially on exercising different occupational activities with or without the help of some adapted instruments.

**Table I.** The subjects of the experimental lot (data taken from their individual charts)

Name	Sex	Age	Diagnostic	Level of injury	Associated diagnostic	TVM Cause
P.E.	F	24	Spastic paraparesis, after TVM, non-operated;	T4-T5		Road accident
L.C.	M	31	Flaccid Paraplegia, after TVM, operated T11-T12	T11-T12		Fall from height
L.M.	F	27	Spastic paraplegia after TVM, operated T5-T7	T6-T7	2 <sup>nd</sup> degree Obesity	Road accident
B.C.	F	32	Spastic paraplegia after TVM, operated T9-T11	T10-T11		Fall from height
F.P.	M	24	Flaccid Paraplegia after TVM, operated T5-T8	T6-T7	Urinary Infection	Road accident

**Table II.** The subjects of the witness lot (data taken from their individual charts)

Name	Sex	Age	Diagnostic	Level of injury	Associated diagnostic	TVM Cause
D.M.	F	22	Spastic paraparesis after TVM, operated T11-L1	T11-T12	Urinary Infection	Fall from height
C.S.	F	32	Flaccid Paraplegia after TVM, operated T11-L1	T11-T12		Road accident
D.B.	M	38	Flaccid Paraplegia after TVM, operated T11-L1	T11-T12	Malformation gr. IV	Road accident
T.B.	M	32	Spastic Paraplegia after TVM, operated T6-T8	T6-T7	Neurogenic bladder	Road accident
M.A.	M	24	Spastic paraparesis after TVM, operated T6-T7	T6-T7		Dive

In order to make this study we resorted to the following research methods: the bibliographic study method, the interview method, the observation method, the experiment method, the functional evaluation method, the graphic and imagistic method, the statistic analysis method.

The first and the last act of the physiotherapist, necessary for the application of a functional rehabilitation program, is evaluation. The exactness of the evaluation depends on the quality of the measuring instruments (tests, questionnaires) and on the correctness of their usage, to which is added the observance of some compulsory conditions on which the exactness and the validity of the results depend. Evaluation is extremely important, initially for the assessment of the functional deficit and of the functional residual, and finally for the assessment of the results obtained after the implementation of the rehabilitation program. An important part of the rehabilitation process is the evaluation of the patient's functional deficit.

It is essential to evaluate the consequences of the infirmity in order to assist the patient in adapting to daily life and to reduce, if possible, both the disability – limitation of activity and the handicap – the restriction of participation.

For the functional evaluation of the subjects we used the Canadian Occupational Performance Measure (COPM) and the Functional Independence Measure (FIM).

The Canadian Occupational Performance Measure (COPM) is an individualized outcome measure designed for use by occupational therapists. The measure is designed to detect changes in a client's self-perception of occupational performance over time (8). COPM represents a questionnaire of individualized evaluation used for the assessment of changes with regard to the performance and satisfaction in problems of daily occupational activities.

The COPM has a semi-structured interview format and it is usually first completed as an initial assessment so that therapy objectives can be based upon problems selected by the client (9). During the research, this questionnaire was applied twice, before starting the rehabilitation program and at its end.

For the identification of the problems occupational performance, of the aspects and results of the intervention, the subject was interviewed about the daily activities of self-help, of work and during their spare time. The subject was asked to identify the daily activities which he

asking the subject to think about an ordinary day. Then the subject was asked to identify which of these activities are satisfied with difficulty now for him. The recording of these activities-problems was made at Step 1 - 1A, 1B or 1C. At Step 2 the subject was asked to give a value on a 1 to 10 scale for the importance of every activity-problem from Step 1. Steps 3 and 4 consist of the confirmation by the patient of the five most important problems which will be recorded by the evaluator. Using the scoring card, the subject is asked to record every problem under the aspects of performance and satisfaction. The total score is calculated summing the value for all the problems both for performance and for satisfaction and which is then divided by the number of confirmed problems. At the final evaluation the subject recorded again every problem both for performance and for satisfaction, then calculating the modified ion/change in performance.

The Functional Independence Measure (FIM) is the most widely accepted functional assessment measure in use in the rehabilitation community (10); can be used to assess the impact that the medullary injury has on the functionality of the paraplegic patient; that assessment was made twice during research, before beginning the rehabilitation program and at its end.

FIM verifies 18 functions, grouped in 6 subscales, every function being quantified from 1 to 7, and assess two dimensions: physical (eating, grooming, bathing, dressing, toiletry, bowel and bladder control, transferring, and ambulation) and cognitive (communication, social interaction, problem solving, and memory) (11). The highest possible functional level is 126 (18x7).

In describing the evaluation manner for every function only specific aspects were highlighted. The seven degrees awarded for each function were:

*Degree 1* (complete help) – patient performs less than 25% of the respective activity, being completely dependent on another person due to physical or cognitive limits; needs the assistance of two persons; presents risk of injury during testing;

*Degree 2* (maximal help) – performs between 25% and 49% of the respective activity, being maximally dependent on another person;

*Degree 3* (moderate help) – performs between 50% and 74% of the respective activity, being moderately dependent on another person;

*Degree 4 (minimum help)* – performs more than 75% of the respective activity, needing only a minimal and occasional contact from another person;

*Degree 5* – needs only monitoring, verbal impulse, indications or the preparation of the ambient for the performance of activity, by that the patient having a modified dependence; (the examiner is always prepared to intervene);

*Degree 6 (modified independence)* – requires support devices or specialized equipment (modified instruments, orthosis, prostheses), activity is performed independently but in a longer than reasonable time or the activity presents risks of injury;

*Degree 7 (independent)* - activity is usually performed safely, without modifications, devices or support devices and in a reasonable interval of time.

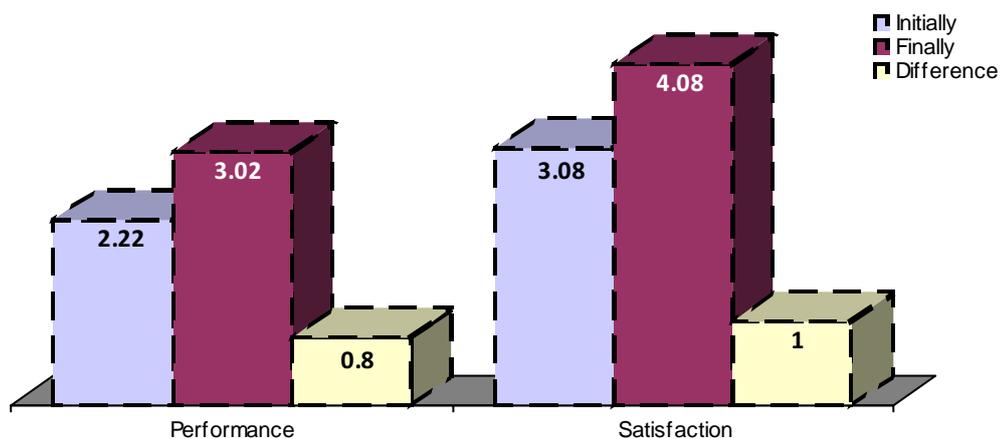
**Results and Discussion**

The recorded results after evaluation according to The Canadian Occupational Performance Measure (COPM) reflect the fact that with regard to occupational performance, the subjects of the experimental lot made, at the end of the study, an average progress of 0,8 points, starting from a initial value of 2,22 points and reaching at the final evaluation an average of 3,02 points.

The satisfaction felt by the subjects of the experimental lot in performing activities considered problematic recorded, between the two evaluations, an average increase of 1 point, from an initial average of 3,08 points to a final average of 4,08 points, which denotes a favorable modification in the sense of increased satisfaction in performing the activities.

**Table III.** The recorded results according to the Canadian Occupational Performance Measure (COPM) with the experimental lot

Experimental Lot		P.E.	L.C.	L.M.	B.C.	F.P.	Average	
C O P M	Performance	Initially	2	2,4	2,2	2,3	2,2	2,22
		Finally	2,6	3,2	3	3,3	3	3,02
		Difference	0,6	0,8	0,8	1	0,8	0,8
	Satisfaction	Initially	2,8	3,2	3,4	3	3	3,08
		Finally	3,6	4,2	4,4	4,2	4	4,08
		Difference	0,8	1	1	1,2	1	1



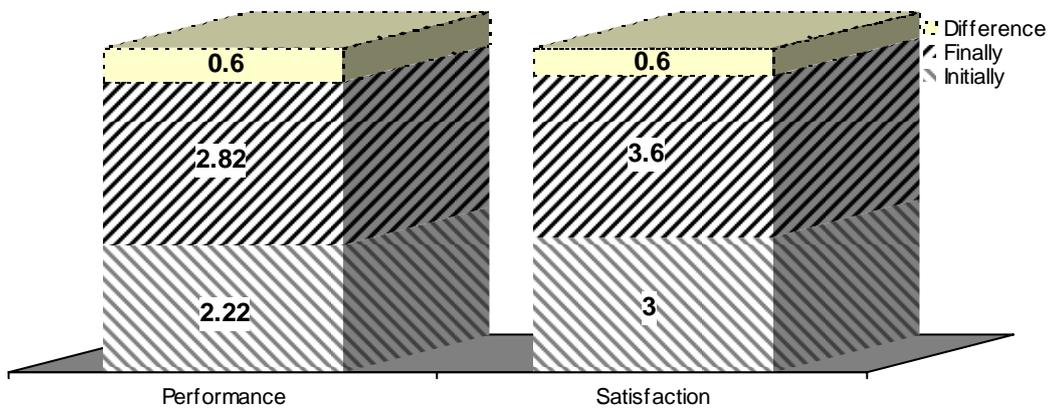
**Figure 1.** Recorded results according to the Canadian Occupational Performance Measure (COPM) by the subjects of the experimental lot

By analyzing the problems of occupational performance it stands out that the subjects of the witness lot started from an initial value of the average performance of 2,22 points and reached, at the final evaluation, an average of 2,82 points, that is an increase of 0,6 points after intervention by physiotherapy and occupational therapy.

With regard to the satisfaction felt by the subjects of the witness lot about performing the activities considered problematic, they recorded, between the two evaluations, an average increase of 0,6 points, from an initial average of 3 points to a final average of 3,6 points.

**Table IV.** Recorded results according to the Canadian Occupational Performance Measure (COPM) with the witness lot

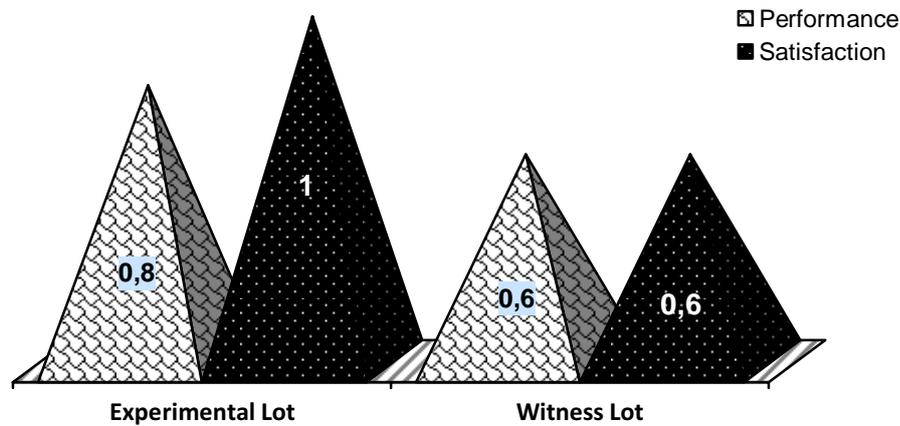
Witness Lot		D.M.	C.S.	D.B.	T.B.	M.A.	Average	
<b>COPM</b>	Performance	Initially	2	2,2	2,4	2,3	2,2	2,22
		Finally	2,5	3	3	3	2,8	2,82
		Difference	0,5	0,8	0,6	0,7	0,6	0,6
	Satisfaction	Initially	2,8	3	3,2	3	3	3
		Finally	3,4	3,6	3,8	3,8	3,6	3,6
		Difference	0,6	0,6	0,6	0,8	0,6	0,6



**Figure 2.** Recorded results according to the Canadian Occupational Performance Measure (COPM) by the subjects of the witness lot

If we analyze comparatively the results obtained by the subjects of both lots, after the evaluation of performance in daily activities (ADL) according to The Canadian Occupational Performance Measure (COPM), we notice a better evolution of the experimental lot, with an average of 0,8 points, with regard to performance, as compared to an average of 0,6 points, obtained by the

witness lot ; the same good evolution can also be noticed with regard to satisfaction, with an average of 1 point, with the experimental lot, compared to an average of 0,6 points with the witness lot, which denotes the fact that the improvement of the performance determines a more significant favorable modification of the satisfaction in the performance of activities.



**Figure 3.** Recorded results obtained according to the Canadian Occupational Performance Measure (COPM) by both lots of subjects

We consider that the most important improvement of the performance and satisfaction of the identified problems was due to the intervention through occupational therapy, by providing instruments adapted for the achievement of independence in performing problematic activities identified by every subject (multifunctional instrument – rod with a handle for taking and putting clothes on the peg, on the hanger, for lifting objects/shoe from the floor, the possibility to reach items of clothing in higher or deeper sections of the closet).

With regard to the impact of the medullary injury

on the functionality of the paraplegic patient, through the evaluation of the 18 functions of the FIM scale, we can notice that at the initial evaluation the obtained score was of 90 points for the experimental lot, and 90,2 points for the witness lot, from a maximum total of 126 points. At the end of the study, the experimental lot, as a consequence of applying kinetic treatment and of the intervention of the occupational therapy obtained an increase of the score to 108,6 points, more important than in the case of the witness lot, who obtained at the final evaluation a score of 106 points.

**Table V.** The results obtained by the subjects of both lots according to the evaluation of the Functional Independence Measure (FIM)

Experimental Lot				Crt. Nr.	Witness Lot			
Subjects	Initially	Finally	Difference		Subjects	Initially	Finally	Difference
P.E.	80	105	25	1	D.M.	98	110	12
L.C.	98	111	13	2	C.S.	87	107	20
L.M.	90	110	20	3	D.B.	86	100	14
B.C.	82	105	23	4	T.B.	90	105	15
F.P.	100	112	12	5	M.A.	90	108	18
Average	90	108,6	18,6		Average	90,2	106	15,8
FIM	5	6,03	1,03	Average/18	FIM	5,01	5,88	0,87

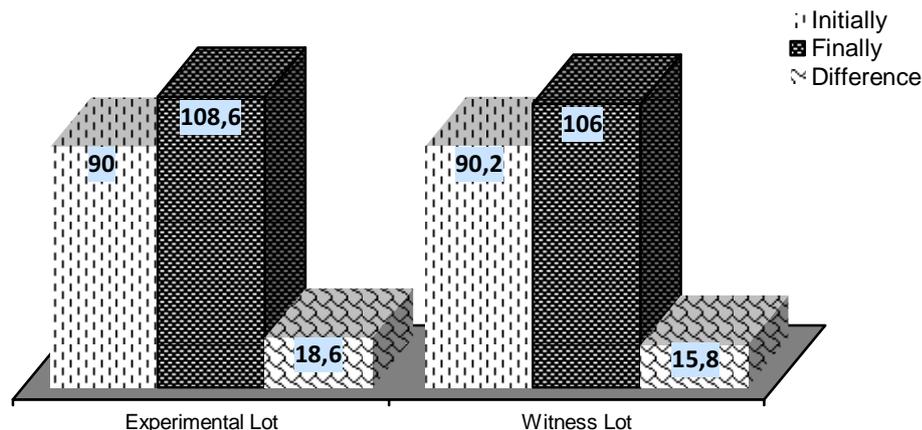


Figure 4. The results obtained according to FIM by both lots of subjects

## Conclusions

In the case of the paraplegic persons the occupational therapy has as a main objective their full integration, integration on all plans: personal, familial and socio-economic. A high degree of independence, as close as possible to normal is possible to reach especially for the paraplegic with a low injury, but only after he accepted the situation and took the decision to use all his resources for that purpose.

By combining programs of physiotherapy with the individualized ones of occupational therapy we can emphasize the progress of rehabilitation, by improving the functional level of the paraplegic, of the degree of functional independence and implicitly of the quality of his life.

The increase of the level of independence and a total social integration of the persons with motor disabilities still remain some desiderata. Unfortunately, in the absence of a completely accessible physical environment and of the efficient implementation of legislation adopted by the Romanian state, and also of the non-involvement of the civil society in supporting the causes of the persons with physical disabilities, there may appear the failure of social integration which attracts after it the emergence, in such persons, of the feelings of uselessness, frustration, powerlessness, marginalization.

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