

## **WALKING AID COMPLIANCE IN CHILDREN WITH SPASTIC DIPLEGIA**

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### *ABSTRACT*

*A three month prospective self report study of 50 children using different types of walkers or elbow crutches was done to determine compliance with use of the prescribed device. Data were collected by means of log entries made by the child's care givers throughout the day. The data collected consisted of number of times and the distance the child walked each time. Overall mean compliance was 49.1%. Children using the reciprocal walker showed the greatest compliance while those using walkers with gutter attachments and elbow crutches showed the least. Compliance was greatest for distances of 50-100m while it was the least for distances over 150m.*

### **INTRODUCTION**

Gait is the ultimate goal of physiotherapists and their disabled clients. This is especially so in the case of a child where the child as well as the parents yearn for ambulation for psycho social reasons. In the Indian scenario in particular, with a barrier free environment remaining a distant dream, the ability to ambulate becomes an urgent and insistent necessity. A non-ambulant child is often refused admission in school or is unable to cope at school. Recreational activities for the wheelchair bound child are all but non existent. Because of this, physiotherapists dealing with children with cerebral palsy balk at prescribing a wheelchair except in the most extreme of circumstances.

With the push for gait even with assistance being so important, most children who come to our hospital for management are trained for ambulation if they have the potential. However, it has been noticed and documented that the attrition rate for use of assistive devices is high. Initial use of the walking aids is noticed. Later on children and their parents prefer to use hand holding assistance or assistance of furniture/ walls and other immovable articles instead of the prescribed devices. Reasons cited for this are cosmesis and the fact that walking aids are cumbersome and difficult to carry around in public transportation and so on.

Literature makes a case for rear walkers as against front walkers in children with cerebral palsy (1). Rear walkers are not readily available in our part of the country and have to be specially ordered and hence their prescription is at a minimum. The most common walking aids prescribed in our hospitals for children with cerebral palsy are walkers- standard, reciprocal, with gutter attachments and rollators; and elbow crutches.

This study looked at compliance of walking aids in children with cerebral palsy. The compliance rate is important for clinical decision making as well as for economic reasons.

### **METHODOLOGY**

The study design was prospective self-report (2). Data were collected by means of log entries.

Patients who come to at regular intervals (3 months) were recruited for the study. Fifty children who were habitual users of walking aids prescribed at least 6 months before the start of the study, were selected.

The parents of the children who consented for the study were instructed to keep a log in which they entered each time the child used the assistive device to ambulate and each time he/she ambulated without the device, whatever the reason might be. The parents were also instructed to send a log to the school where the child's attendant was required to keep the log. All of these children had attendants as they were not independent for activities of daily living (ADL) and ambulation. These children ambulated only for ADL purposes within the school. They were asked to also note the approximate distance ambulated. The parents were instructed not to use coercion, encouragement or other methods to ascertain use of the walking aid other than what they would normally employ. They were told that the purpose of the study was to obtain data so that we could reassess our interventions and that the results would have no effects on their ongoing care. They were encouraged to be regular and honest. Most of these children were clients of the hospital for several years and were motivated and committed. They were also used to being part of research studies. The period of the study was for three months.

### **RESULTS**

The characteristics of the children taken for the study are described below. Children were between 6 and 16 years of age. They were of at least average intelligence attending normal school. None of them had any co-morbidities that would interfere with function including

diagnosed behavioural abnormalities. All children had functional range of movement in hip, knee and ankle bilaterally. All children had at least a grade of 3- in the knee extensors, hip extensors and hip abductors. Walking aids were prescribed in most cases due to dynamic tonal abnormalities which interfered with muscle control. In addition, they were prescribed based on upper limb function, balance, age, and ability to use the aid competently and lower limb mobility and strength. Thirty seven children had components of the crouch pattern of gait. Three children had an extensor snap with equinus, seven had crouch with equinus and the remaining three had atypical gait patterns. All children except two had adequate upper limb function to manage a walking aid for at least 150 meters. The two children who did not have the requisite motor function in the upper limb, were given gutter attachments.

When the child used the assistive device the entry was considered as a positive entry and when the child walked without the assistive device, the entry was noted as negative. Results were tabulated as the number of times entries were made, number of positive and negative entries. The distance walked during positive and negative entries were tabulated and the entries were categorised as 50 meters or less, 51-100 meters, 101-150 meters and greater than 150 meters. If the distance was not noted, the entry was considered only for the overall compliance and not for individual distances. Children were grouped according to the walking aids used. The positive entries for each child was analysed as a percentage for that child based on the total number of entries. The mean compliance rate of children using a particular device was calculated. The percentage compliance was arbitrarily categorised as >75% (excellent); 51-75% (good); 25-50% (fair) and <25% (poor) for each of the distances described. Overall mean compliance was 49.1%. Individual parameters are described below.

**Table 1: Compliance with respect to device**

Type of device	Compliance (%)
Reciprocal walker	60.2
Standard walker	50
Gutter walker	14.8
Rollator	52.8
Elbow crutches	34.9

As Table I illustrates, the compliance was greatest for reciprocal walker while the lowest rate of use was for gutter walker.

**Table 2: Compliance with respect to distance**

Distance (m)	Compliance (%)
<50	52
50-100	57.5
101-150	41.3
>150	25.9

Children tended to use the assistive device more consistently at distances of 50-100m. The usage was lowest at distances over 150m.

**Table 3: Compliance with respect to distance and device**

Type of device	<50m	50-100m	101-150m	>150m
Reciprocal walker	63.7	66.1	50.3	31.4
Standard walker	57.7	50.1	39.8	10.8
Gutter walker	13	15.8	12.4	2.2
Rollator	60.7	62.8	42.1	33.5
Elbow crutches	25.9	52.9	35.7	27.5

The highest rate of compliance was for children who used reciprocal walkers at distances of 50-100m. The lowest usage was noted for children who used gutter walker at distances over 150m.

**Table 4: Overall compliance based on type of device**

Type of device	>75%-excellent		51-75%-good		25-50%-fair		<25%-poor	
	No.	%	No.	%	No.	%	No.	%
Rollator (n=15)	2	13.3	7	46.7	4	26.7	2	13.3
Standard walker (n=10)	0	0	6	60	4	40%	0	0
Gutter walker (n=2)	0	0	0	0	0	0	2	100
Reciprocal walker (n=13)	2	15.4	9	69.2	2	15.4	0	0
Elbow crutches (n=10)	0	0	01	10	3	30	6	60

Fifteen percent of children using reciprocal walkers and thirteen percent of those using rollators used their devices over 75% of the time. Sixty nine percent of children who were given reciprocal walker, used the device consistently over 50% of the time. One hundred

percent of children who were given the gutter walker and sixty percent of children who were prescribed elbow crutches used the device less than 25% of the time.

**Table 5: Compliance for <50 m**

Type of device	>75%-excellent		51-75%-good		25-50%-fair		<25%-poor	
	No.	%	No.	%	No.	%	No.	%
Rollator (n=15)	04	26.7	04	26.7	06	40	01	6.7
Gutter (n=02)	0	0	0	0	0	0	2	100
Standard (n=10)	02	20	05	50	02	20	01	10
Reciprocal (n=13)	03	23.1	08	61.5	01	7.7	01	7.7
Elbow crutches (n=10)	0	0	01	10	03	30	06	60

At distances of less than 50m, children who were given rollators were the most consistent. Children who were given gutter walkers and elbow crutches were the least compliant at this distance.

**Table 6: Compliance for 50-100 m**

Type of device	>75%-excellent		51-75%-good		25-50%-fair		<25%-poor	
	No.	%	No.	%	No.	%	No.	%
Rollator (n=15)	4	26.7	09	60	02	13.3	0	0
Gutter (n=02)	0	0	0	0	01	50	01	50
Standard (n=10)	01	10	04	40	05	50	0	0
Reciprocal (n=13)	4	30.8	06	46.2	03	23.1	0	0
Elbow crutches (n=10)	02	20	05	50	02	20	01	10

At distances of 50-100 m, the majority of children used the device less than 75% of the time. The highest number of children who used their device with reasonably high consistency were those with reciprocal walkers.

**Table 7: Compliance for 101-150m**

Type of device	>75%-excellent		51-75%-good		25-50%-fair		<25%-poor	
	No.	%	No.	%	No.	%	No.	%
Rollator (n=15)	03	20	02	13.3	05	33.3	05	33.3
Gutter (n=02)	0	0	0	0	0	0	02	100
Standard (n=10)	01	10	01	10	07	70	01	10
Reciprocal (n=13)	4	30.8	02	15.38	05	38.5	02	15.4
Elbow crutches (n=10)	01	10	02	20	02	20	05	50

The number of children using the prescribed walking aid declined when the children were ambulating distances of 101-150m. The maximum number of children using their assistive device with maximum consistency were those who were given reciprocal walkers.

**Table 8: Compliance for >150m**

Type of device	>75%-excellent		51-75%-good		25-50%-fair		<25%-poor	
	No.	%	No.	%	No.	%	No.	%
Rollator (n=15)	01	6.67	01	6.67	08	53.3	05	33.3
Gutter (n=02)	0	0	0	0	0	0	02	100
Standard (n=10)	0	0	0	0	01	10	09	90
Reciprocal (n=13)	02	15.4	01	7.7	04	30.8	06	46.2
Elbow crutches (n=10)	01	10	01	10	03	30	05	50

At distances over 150 m, the use of assistive devices declined considerably. Most children used their devices less than 50% of the time.

## **DISCUSSION**

The overall compliance rate was less than 50% overall. However, as this included distances over 100m which are typically community ambulation distances, this finding should be further validated. It may be necessary to assess the efficiency of the prescribed walking aid on different surfaces and children may need to be prescribed different walking aids for different surfaces/ distances. Overall compliance was highest at the 50-100 m distance. The reasons for this may be efficiency and need. Less than 50 m is considered household ambulation and is usually indoor ambulation when the child has adequate opportunity to hold on to immovable objects. More than 100 meters is a considerable distance for most of these children and is usually community ambulation when they are more likely to use human contact for support, rather than a device. The 50-100m distance is often the distance that they require to ambulate in school and is most often the distance that they walk for exercise.

The distance of 101-150m and over 150m shows a decline in the assistive device usage and may be attributed to the following factors:

- a. increased energy consumption during use of an assistive device outdoors.
- b. fear factor.
- c. safety factor when attendants are likely to hold on to the child for fear of jostling in crowds/falls on uneven surfaces etc.
- d. social acceptance of assistive devices.

The least compliance was found in children using gutter walkers. As they were only two in number the findings cannot be commented upon. However, it is postulated that these children are likely to be less compliant due to the extent of involvement resulting in their need to use these restrictive and inefficient devices.

Contrary to expectations, children using elbow crutches were seen to be the second most non-compliant. As elbow crutches are the most socially acceptable as well as the least cumbersome it was expected to have the greatest compliance. But reasons for the low rate of use may be that the child did not perceive any added benefit in carrying elbow crutches and found it easier to ambulate holding onto objects in the environment. Another observation made by the children and the families, was that the elbow crutches tended to

require more attention during placement and would act as a hazard rather than an aid, if placed improperly.

The reciprocal walker and the rollator are easier to manipulate than the standard walker and hence may have accounted for the better compliance. The rate of compliance for the standard walker was very close to that for the rollator.

The age of the child may have been a factor in the compliance. The older children were less likely to be carried by their care givers and were more likely to be motivated towards independence. Contrarily, the older children often voiced cosmetic reasons for not using the device, preferring instead to not walk at all in public places, including school.

This study has certain limitations. As the design is one of self report, there may have been discrepancies in the report from the actual reality. As the subjects are children, the motivation provided by their parents and teachers as well as peer group, has a considerable role to play. Many of these children used public transportation or school buses to travel to school. The difficulty in transporting the devices may have contributed to decrease in usage. Only distances walked were considered. The type of surface was not considered and this is an important factor, both in prescription of walking aids, as well as efficiency of ambulation. These factors were not considered.

Considering the results of this study, a large scale study over a greater period of time, is warranted. Different surfaces, age of the subjects, type of cerebral palsy and socio economic factors will need to be considered.

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## REFERENCES

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