

# Poliomyelitis—A Study on 500 Cases

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Poliomyelitis though practically wiped out from some parts of the world, still continues to be a common affection in developing countries like India. The disease can be witnessed from acute stage, convalescent stage to residual paralytic stage with crippling deformities in any moderately attended Rehabilitation practice (2 per cent of Orthopaedics O. P. D. at B. H. U.) in our country. The present study was undertaken in 500 cases of poliomyelitis during convalescent and residual paralytic stages to study pattern of muscle involvement in poliomyelitis. All these patients were examined clinically and the group of muscles involved were assessed as per M. R. C. grading of muscle power.

It was observed that most patients belonged to less than 5 years of age. Adult polio was

rarely seen and number of patients in the 11-15 years were very small.

**Table II. Regional Distribution**

Single Upper limb	22(4.4%)	All Four limbs Both upper and one lower limb	4 3 Bil.
Single lower limb	273(54.6%)	Ipsilateral	10
Both lower limbs	174(34.8%)	Contralateral Trunk and Head	2 2

We observed that lower limb was involved more frequently than the upper limb. Similarly ipsilateral involvement was more common than the contralateral.

**Table I. Age in Years at onset of Disease**

	Less than 2 years	2-5	6-10	11-15	Un- known
No. of cases	173	225	12	9	51
Per- cent	34.6	51	2.4	1.8	10.2
Most of patients presented during convalescent stage					
Distributed equally on both sides and in both sexes					

**Table III. Distribution Pattern of Hip Muscles Involvement**

Total number of cases		447		
	M.R.C. 0	M.R.C. 1-4	M.R.C. 5 (Normal)	
	No.	No.	No.	
Flexors	21	372	54	
Extensors	75(17%)	347	25	
Abductors	46(10%)	378	23	
Adductors	93(20%)	332	22	
Ext. Rotators	10	381	47	

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Distribution pattern of muscle involved in lower limbs around hip revealed involvement of extensors, adductors and internal rotators, more common than others.

**Table IV. Pattern of Knee Muscles Involvement**

Total number of cases—447

	M.R.C. 0	M.R.C. 1-4	M.R.C. 5 (Normal)
	No.	No.	No.
Flexors	50(11.1%)	373	24
Extensors	103(22%)	312	32

Similarly knee extensors were more commonly involved than flexors.

**Table V. Pattern of ankle, foot and toe muscles involvement**

Total number of cases—447

	M.R.C. 0	M.R.C. 1-4	M.R.C. 5 (Normal)
	No.	No.	No.
Dorsiflexors	114(23%)	227	46
Planterflexors	30	348	69
Evertors	93(20%)	298	56
Invertors	102(22%)	310	35
Toes	32	350	65

Around ankle and foot, dorsiflexors and invertors were affected in large number of cases than planter-flexors and evertors.

In the upper limb, paralysis of abductors of the shoulder showed a particular affinity (Table VI).

Around elbow, extensors were more involved. Muscles acting on wrist and fingers showed rarely any gross involvement, except thumb (Table VII).

**Table VI. Pattern of Shoulder Muscles Involvement**

Total number of cases—34

	M.R.C. 0	M.R.C. 1-4	M.R.C. 5 (Normal)
	No.	No.	No.
Flexors	4(12%)	27	3
Extensors	4	27	3
Abductors	14(41%)	20	0
Adductors	4	29	1
External Rotators	4	29	2
Int. Rotators	3	29	2

**Table VII. Pattern of Elbow and Forearm Muscles Involvement**

Total number of cases—34

	M.R.C. 0	M.R.C. 1-4	M.R.C. 5 (Normal)
	No.	No.	No.
Flexors	2	24	8
Extensors	5(14%)	28	1
Pronators	1	29	4
Supinators	2	29	3

**Table VIII. Pattern of wrist Muscles Involvement**

Total Number of cases—34

	M.R.C. 0	M.R.C. 1-4	M.R.C. 5 (Normal)
Dorsiflexors	0	19	15
Palmerflexors	0	17	17
Radial deviators	0	24	10
Ulnar deviators	0	25	9
	0	85	51

No case was seen in paralytic group, and in partial paralytic group also number of cases are much lower than the shoulder and elbow.



Abductors and extensor were commonly involved (Table VIII).

**Table IX. Pattern of Fingers Muscles Involvement**

Total number of cases—34

	M.R.C. 0	M.R.C. 1-4	M.R.C. 5(Normal)
	No.	No.	No.
Flexors	0	16	18
Extensors	0	24	10
Abductors	1	20	13
Adductors	1	16	17

No. of cases in paralytic group were very small & extensors were more frequently involved than the other groups.

**Table X. Pattern of Thumb Muscles Involvement**

Total number of cases—34

	M.R.C. 0	M.R.C. 1-4	M.R.C. 5(Normal)
Flexors	1	18	15
Extensors	5(14%)	27	2
Abductors	5(14%)	27	2
Adductors	1	23	10
Opponens	1	23	10
	13	118	39

Extensors and abductors were commonly involved.

## DISCUSSION

The distribution pattern of muscle paralysis as observed can not be explained by the qualities of muscle such as size, function or position in the limb. The specific tendency of a muscle for paresis or paralysis is explained by the relative length of their spinal nuclei such as—Tibialis anterior muscle which has a short col-

umn and tensor fascia femoris and hamstrings have a long column. Further, if a focus of destruction by polio virus affects one particular level, the muscles innervated by the short motor cell columns are more often paralysed, than being paretic, because all the motor cells to that particular muscle are likely to be destroyed. The muscles innervated by long motor cell columns are affected more frequently owing to the long length of their nuclei but seldom get paralysed totally and remain only paretic.

**Table XI. In order of more frequent involvement: Lower Limb**

	Muscles	Root Value
HIP	: Internal Rotator	L4—S1
	Adductors	L2—S2
	Extensors	L5—S2
	Abductors	L4—S1
KNEE	: Extensors	L2—L4
ANKLE	: Dorsiflexors	L3—S1
	Invertors	L5—S1

**Table XII. In Order of more frequent involvement: Upper limb**

	Muscles	Root Value
Shoulders	: Abductors	C5—C6
Elbow	: Extensors	C7—C8
Wrist	: Only Partially affected	
Fingers & Thumb	: mostly thumb abductors and extensors affected	

Punatar and Patel (1977) in their study observed involvement of L<sub>2/3</sub> spinal segment most frequently, while L<sub>4</sub> spinal segment was more often completely paralysed. Kumar and Kapahtia (1988) observed more often involvement of L<sub>5</sub> & S<sub>1</sub> segment and association of L<sub>5</sub> segment with paralysis of muscles while S<sub>1</sub> segment with paresis of muscles. For upper limb

involvement, Kumar and Kapahtia (1986) observed involvement of shoulder and elbow as most common.

In the present study it was observed that lumbar spinal segment for L<sub>2</sub> to S<sub>1</sub> and cervical spinal segment from C<sub>5</sub> to C<sub>7</sub> are the vulnerable

site for polio-virus affection. Thoracic spinal segment and upper cervical segment are not commonly involved.

It was also felt that the disease most often involved only a part of the spinal column since contralateral affection is uncommon.

#### REFERENCES

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