

THE TREATMENT OF POLIOMYELITIS DURING THE FIRST TWO YEARS OF DISEASE¹

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Through the wording of the title of the main theme, "The treatment of poliomyelitis during the first two years of disease", a connection has been established with the traditional division of the course of poliomyelitis into three stages: the acute, the reparative and the final stage. In this system, the two-year limit usually represents the end of the reparative stage and the transition to the final stage. Earlier, physical orthopaedic treatment was given almost exclusively during the reparative stage, whilst during the acute stage the patient was given only a common medical treatment, adapted to his condition; all operative treatment was postponed until the final stage had set in. In some quarters, this two-year limit is still being maintained as a magical demarcation line between two ranges widely differing from the therapeutic point of view. During recent years, a change of opinion in this respect has manifested itself to an increasing extent. Nowadays, it is almost generally considered that the orthopaedic treatment should commence when the patient is admitted into the epidemic hospital, and that the patient should be subjected to a continued check-up as long as may be regarded suitable in each particular case. As early as 1930, *Silfverskiöld* had advocated this opinion.

An organization working along these lines has been available for nearly five years in the County of Östergötland (Sweden), a district of about 270,000 inhabitants. The epidemiologist and the orthopaedist work side by side in the hospital and in the out-patient department. The latter department functions by means of follow-up examinations at regular intervals. When required, the patient can be re-admitted

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into the epidemic hospital for continuous physical treatment in case this cannot suitably be given in the home district. Thanks to a close contact with different social institutions and private enterprises, the patient can gradually be introduced into working life. Through the rehabilitation center, which has functioned for a few years, a good idea can be obtained of the patient's working capacity.

Various therapeutic measures have been taken when these have been thought to be indicated and consideration has been given not so much to the duration of the period of sickness as to the patient's medical and social status.

I shall give below a summary of the *general* principles of the physical orthopaedic treatment without entering upon details which are too well-known to require a more detailed presentation.

As a whole, we have two main principles for the *early* therapy: a passive and an active principle. The *passive* treatment is intended to give the patient a suitable posture from the very first day of sickness in order to prevent deformities and contractures arising, and to prevent overstretching in paretic muscles. For most paretic cases, these measures are necessary as soon as the patient is admitted into the epidemic hospital. The *active* treatment begins with the physical therapy. A careful start with light massage and passive movements can be made when the patient has been free from fever for a few days, provided that his general condition so permits. *A main rule for every early treatment must be that the patient must not under any circumstances be overtired*, and that the intensification of the treatment must be supervised by the doctor.—According to the degree of seriousness of the pareses, active movements can be commenced fairly soon, and the bath treatment can also begin after the patient has been free from fever for 1–2 weeks, if there are no counterindications.—As far as the upper extremities are concerned, supporting bandages can be applied as soon as required. I wish to emphasize particularly the importance of a careful control of the positions of the hand and the fingers, since otherwise deformities which are very difficult to treat may result. Provisional bandages of plaster of Paris or any other material suitable for the lower extremities will be necessary, when the patient is allowed up. In this connection, I should like to point out the importance of frequent check-ups, as soon as the patient has been permitted weight-bearing, since it is practically impossible to avoid an impairment, mostly insignificant, which usually appears when the patient has been out of bed for some time. This is probably a consequence partly of overstretching, which it may be difficult to avoid even with immobilizing bandages and partly of a certain degree of overfatigue. If the im-

pairment does not disappear within a rather short time, or if it should increase, the patient should rest in bed again. An important detail is the continuous examination of the back. If a patient shows even a minor deformity, examination should be carried out rather frequently, since, of course, a paralytic scoliosis may develop surprisingly rapidly.

Finally, a few words regarding treatment by means of apparatus. In our cases, such a treatment has not been carried out to any large extent, since we are of the opinion that a correctly directed physical therapy performed in the right way by a well-trained masseuse has very great advantages, from the psychological point of view also. Such a therapy comprises not only the manual treatment, but, furthermore, instruction of the patient by the masseuse. She should teach the patient to use the non-paretic part of the muscles in the most practical manner and also, like any other teacher, inspire the pupil to do his best to apply the instructions received, as well as to train to acquire new accomplishments by means of self-activity.—Sometimes, it may be difficult for a patient to “find out” a muscular function, and in these cases the apparatus treatment can be valuable.

The series I am going to describe briefly in the following, dates from the year 1946 up to, and including, 1950. During these years, a total of 217 cases with extremity or trunk pareses were registered. 31 of these patients died. Of the remaining 196 patients, some have moved or otherwise disappeared. After this reduction, there are 135 *patients* left who have been treated in accordance with the principles described above.

When judging one's own results and comparing these with results from other series, comparison must always be made carefully. It is necessary to make a division, the mild cases must be separated from the serious ones. There are also semi-serious cases which, from the prognostic point of view, may differ as much from the mild cases as from the serious ones. It is needless to point out that such a division must necessarily be subjective, and that the limits must be fluid. This is also true of all other authors occupying themselves with similar questions; therefore the comparisons with other and similar series, to which I shall revert later in this lecture, must be understood with the above-mentioned reservation.—I have divided the material into three groups. Group I comprises mild pareses, group II semi-serious pareses and group III the serious pareses and paralysis. However, I have not only judged the pareses from the qualitative viewpoint, but have also taken the quantitative extension of the pareses into consideration. The distribution within the different groups can be seen in table 1.

The bandage treatment too is an important part of the therapy

TABLE 1

Year	Number of surviving cases of pareses	Grouping according to the status when falling ill			Total
		I	II	III	
1946	8	1	1	—	2
1947	41	1	4	7	12
1948	27	6	6	3	15
1949	80	34	24	12	70
1950	40	20	13	3	36
Total	196	62	48	25	135

during the first two years of the disease. Besides some provisional bandages, permanent ones of different kinds have also been given to a total of 37 patients. Further, in twelve cases operative treatment has been carried out within the two-year period (Table 2). For comparison, I have also included the cases operated on after the period mentioned. The two cases of spinal fusion refer to quickly increasing scolioses which we have not succeeded in stopping by any other means. Both of the two sympathectomia cases had serious circulation disturbances with considerable subjective trouble. The muscle transplantation and the shoulder-joint arthrodesis refer to the same patient, a man of 47 years when he fell ill, with total paralyse of the shoulder joint muscles and, almost complete paralyse of the elbow flexors of the same side. He is now at work. The tenoplasty for opposition motion, which has been carried out in each instance according to *Bunnell's* method, has been made at the site of increasing and isolated strong pareses or at the site of opponens paralyse, with good functional results throughout.—One case may perhaps require a closer description, namely arthrodesis of the hip. While other arthrodesis operations are not uncommon in post-paralytic conditions, the hip arthrodesis is more or less a rarity. *Hallock* described in 1950 no less than 13 cases, collected since 1929. In addition to this, only a few cases have been published.

Our case is a woman who fell ill with poliomyelitis in 1949 at the age of 21 years. When arriving at the hospital, she had mild pareses in the flexors and the outward rotators of the left hip, and possibly also a slightly reduced contractibility in the quadriceps and the flexors of the left knee. After one month's stay in the hospital, she was discharged without any observable pareses. At a follow-up two months later, she had a positive Trendelenburg on the left side and pain in the hip when walking. At this time, there were no other pareses. The positive Trendelenburg developed more and more with a resulting increase in difficulty of walking at

TABLE 2
Operative treatment.

	1-2 years after falling ill	2-3 years after falling ill	More than 3 years after falling ill
Spinal fusion	2	1	1
Lumbar sympathectomy	2	3	3
Arthrodesis of the Shoulder joint ...	1	1	
Transplantation of muscles from med. epicond. to the shaft of the humerus	1		
Tenoplasty for Opposition	5	1	1
Arthrodesis of the Hip joint	1		
Arthrodesis of the Knee joint			2
Epiphyseodesis			3
Arthrodesis of the Ankle joint			2
Arthrodesis of the Subastragalus ...			1
Lengthening of the Tendo Achilles			1
Total	12	6	14

TABLE 3
*Age and group division when falling ill during the years 1946-1950.
135 cases of pareses.*

Age	I Mild pareses	II Semi-serious pareses	Serious pareses and paralyses	Total
0- 5	6+(9)	9	6	21+(9)
6-10	1+(6)	3	1	5+(6)
11-20	5+(10)	12	6	23+(10)
21-30	3+(7)	7	4	14+(7)
31-40	4+(3)	10+(1)	3	17+(4)
41-50	1+(6)	5	4	10+(6)
51-55	+(2)		1	1+(2)
	20+(43)	46+(1)	25	91+(44)

The figures within brackets indicate the number of cases which during treatment became clinically free from pareses.

the same time as the patient felt increased pain when she was allowed weight-bearing. At the last, she could walk only with the support of a crutch. Eight months after she had fallen ill, an intra- and extra-articular hip arthrodesis was carried out with an excellent functional result.

When judging the results in this series, it should be borne in mind that here it is a question of short-period results. Of all the 135 cases of pareses, 44 cases corresponding to 33 % have become entirely free

TABLE 4

	I Mild pareses	II Semi- serious pareses	III Serious pareses and paralyses	Summa
When falling ill	63	47	25	135
At the latest examination	51	22	18	91

from pareses, all of which have had mild pareses excepting one case belonging to group II. It is of some interest to note that the higher ages do not have lesser opportunities for recovery than the patients in the younger ages. In the remaining cases of pareses also, considerable improvement can be registered (Table 3). Group I, which originally consisted of 63 cases, has, after a reduction of 43 cases, received an addition from the other two groups of no less than 31 cases, the main part of which comes from group II. Group III has been reduced from 25 cases originally to 18 cases (Table 4). In figures, the improvement in group I is 68 %, in group II 53 %, and in group III 28 %. In other words, a patient falling ill with mild pareses has, during the 2 years after he has fallen ill, somewhat more than 2 chances out of 3 to become entirely free from pareses, whilst a patient with a semi-serious or serious pareses, and with a paralyses, has chances of improvement of two and one out of three respectively. The number of high-grade disablements is at present 9, i.e. nearly 7 %, all belonging to group III. Of these, three patients had fallen ill in 1947, one in 1948 and five in 1949. In our series, about 30 patients have so far received social assistance in the form of means of living, retraining, occupational training, schoolhome or temporary sickness contribution.

In recent years two great poliomyelitis series have been published in Sweden. In 1944, *Birger Jönsson* published a study of 210 cases of pareses with an average observation time of 6 years, and in 1945 *Rolf Bergman* described 233 cases of pareses with an observation time of between 6 and 12 years. Even with regard to the duration of the observations, these two series can hardly be compared with ours which, on an average, has been followed-up over 3 years. To this should be added the reservations previously made regarding the difficulties in dividing the groups. A comparison between our series and these two may still be of interest, since, as far as can be judged, the nature and intensity of the treatment has not been identical in ours and in *Jönsson's* and *Bergman's* series. In our series, after an average observation time of 3 years with a mean value of observation time of nearly 2 years, 33 % were entirely free from pareses, 37 % had mild pareses (group I), 17 % had semi-serious pareses (group II), and 13 % had

TABLE 5

	Free from pareses %	Mild pareses (Group I) %	Semi- serious pareses (Group II) %	Serious pareses and paralyses (Group III) %
Jönssons series (210 cases of pareses, 6 years average time of observa- tion)	33	44	13	10
Bergmans series (233 cases of pa- reses, 6-12 years average time of observation	35.2	44.6	12.4	7.8
Own series (135 cases of pareses, 3 years average time of observa- tion)	33	37	17	13

serious pareses and paralyses respectively (group III, Table 5). In *Jönsson's* series, 33 % were cured, 44 % mild pareses, 13 % semi-serious pareses, and 10 % serious pareses. In *Bergman's* series, 35.2 % were entirely free from pareses, in 25.3 % there was a muscular weakness, which did not limit the working capacity, 19.3 % had residual mild pareses, and 20.2 % had semi-serious or serious pareses. In 7.8 %, finally, the impairment was considerable or total. *Bergman's* division differs somewhat from the one used by *Jönsson* and by myself. When recalculating *Bergman's* results in accordance with our division, the distribution will be as shown in table 5. There is no statistically significant difference between the corresponding groups in the various series.

In 1949, *von Rosen* published 53 cases from the years 1941-1945. The patients had received an intensive physical-orthopaedic treatment. The cases, however, were a selection from a series comprising 130 cases of pareses, the main part of which had, consequently, not been considered to require orthopaedic care. Of the 53 cases, 16 (30 %) "practically recovered", thus about the same frequency as in the series described by me, which as distinct from *von Rosen's* cases, however, have not been selected. *Von Rosen's* results further emphasize the importance of thorough orthopaedic care in the case of poliomyelitis.

The results attained by us are, consequently, equivalent to those published from other quarters with considerably longer observation periods. Since in our series the results were reached within a short time and further improvements can be expected, it is probable that, with the intensive and carefully controlled treatment outlined above, better results can be obtained than has been previously possible.

SUMMARY

The orthopaedic treatment of poliomyelitis should begin when the patient is admitted into the epidemic hospital. Initially, the position of any paretic parts of the body should be checked and after the patient is free from fever, the masseuses' work should be supervised. Operative treatment does not always have to be postponed to the definitive stage. A brief description is given of a carefully treated and checked series comprising 135 cases, taken ill during the years 1946–1950. After an average observation time of 3 years, 33 % became free from pareses, all except one case with mild pareses. The total improvement among the mild pareses is 68 %, among the semi-serious pareses 53 % and among the serious pareses and the paralyses 28 %.

RESUME

Le traitement de la poliomyélite doit commencer au moment où le malade arrive à l'hôpital épidémique. En premier lieu la position des parties parétiques du corps doit être contrôlée et une fois que le malade n'a plus de fièvre, le travail de la masseuse doit être surveillé. Le traitement opératoire ne doit pas toujours être remis jusqu'à la phase définitive. Description sommaire d'un matériel d'observation minutieusement analysé et contrôlé comprenant 135 cas de maladie survenus entre 1946 et 1950. Après une durée moyenne d'observation de trois ans, 33 % sont exempts de parésies, à l'exception d'un seul cas ayant eu de légères parésies. Parmi les malades atteints de parésies légères 68 % ont été totalement guéris, parmi ceux atteints de parésies semi-graves 53 % et de parésies graves avec paralysies 28 %.

ZUSAMMENFASSUNG

Die orthopädische Behandlung der Poliomyelitis sollte begonnen werden, sobald der Patient in das Epidemiekrankenhaus aufgenommen worden ist. Im Anfang sollte die Lagerung der gelähmten Körperteile kontrolliert und nach dem Verschwinden des Fiebers die Tätigkeit der Heilgymnasten überwacht werden. Operative Behandlung muss nicht immer bis zum endgültigen Stadium verschoben werden. Kurze Beschreibung eines sorgfältig behandelten und kontrollierten Materiales von 135 Patienten, die in den Jahren 1946–1950 erkrankten. Nach dem Ablauf einer Beobachtungszeit von durchschnittlich 3 Jahren waren 33 % frei von Lähmungen. Diese Fälle hatten alle, mit einer Ausnahme,

leichte Lähmungen gehabt. Die gesamte Besserung der schwachen Lähmungen war 68 %, der ausgesprochenen Lähmungen 53 % und der schweren Lähmungen 28 %.

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