

blue cloth

Patt

ms.

2 vols

M.D. 1913

61492: 616842

Splints in the Treatment  
of  
Flaccid Paralysis.

Clinical Notes of three Cases.

Drummond

M.B. M.R.C.P.E.

Addington Hospital

Dublin.

S.A.



Introductory Remarks.

Reasons for Adoption of  
this method of Treatment.

The treatment of Diseases which affect the Nervous System as a practical entity is still in its infancy and however much the objects of our attention in this particular branch of our profession may excite our sympathy & commiseration we have to confess that in many ways that is as far as we can get.

Inured as we all become sooner or later to the spectacle of disease & distress yet none of us can view with quietude the subject of paralysis in any one of its many forms. none of us but feels somewhat rebellious when he realises his impotence when faced with the problem of alleviation or cure.

We are constantly on the watch for knowledge of any new line of treatment which promises anything of success and anything calculated to strengthen our hands in this direction is received with open arms.

In working our object is always to cure where possible and failing that to benefit, and we desire to do either of these in the shortest possible time.

Recently I had become acquainted with a new method of treatment adopted in cases of "Infantile Paralysis" (so-called) and certain analogies between this disease and the commoner condition "Peripheral Neuritis" induced me to follow the same idea in the latter.

I have now tried the method, to be described later, in 3 cases - two of Peripheral Neuritis and one of Infantile Paralysis and my results have been so astoundingly encouraging and convincing as to cause me to publish them for consideration.

Before entering into a description of the cases and the results to be deduced therefrom it might be well to devote space to a brief consideration of the facts which suggest the line of treatment and what that treatment is.

We know that in cases of Peripheral Neuritis recovery occurs even though the duration of treatment, necessitated by the severity of the case, be long.

We are cognizant of the fact that a great deal of recovery takes place in cases of Infantile Paralysis even after years.

Naturally we wish this recovery to be as speedy and as complete as possible and a closer investigation of pathological involvement and physical changes in these two conditions has helped us considerably.

In the condition of Peripheral Neuritis we know that there is a toxic influence exerted on the nerve fibres and on the associated connective tissue; that fibres degenerate and are replaced by connective tissue; that as the result of this there is degeneration of muscular tissue and impairment of muscular activity amounting in certain cases to total inerga.

But we are also taught by our success in treatment that the amount of muscular disability produced is no criterion of the amount of total nerve destruction, no guide as to the amount of mobile recovery that will occur as the result of careful and accurate treatment.

In the absence of the phenomenon known as the "Reaction of Degeneration" we are accustomed to give a very hopeful prognosis.

In the condition colloquially known as "Infantile Paralysis" we are guided by the same factors, but our prognosis knowing as we do the respective pathological changes is necessarily more guarded.

I do not in this paper propose to discuss pathology. Such is well known and I am going to deal only with the clinical results of treatment.

Knowing therefore that the nervous destruction cannot be nearly so complete as physical disability would seem to suggest we must perforce seek an explanation for the tardiness of recovery in so many cases.

When this is found we established a firm position from which to attack the problem of successful treatment and rapid recovery.

We find what we seek when we study more closely certain mechanical changes which occur in the affected parts.

For consideration of what these changes are we will keep before our minds a typical case in which there is marked "drop foot."

For this to occur we know that there is primary damage to the nerve cells or their axons supplying the extensor muscles of the leg.

The associated structures suffer in various ways:-

I The trophic influence of the nerve cell is interfered with or destroyed and the muscles and their tendons waste from want of what we might term "nutritive effect".

II The beneficial and tonic influence of active use is lost and muscles atrophy considerably from want of this alone.

III. The weight of the foot influenced by gravity and by the pressure of bed-clothes etc. produces stretching of weakened structures.

IV Injured and active muscles still exercise a pull on the affected member and the flexor muscles in the particular instance under consideration, thus unconsciously increase the amount of "drop foot".

V The longer the disability lasts the more likely are we to get the formation of adhesions which fix

the joint in its new position of deformity and prevent its more or less forcible replacement into the normal position.

VI. Bony changes occur which further increase the deformity and tend to make it permanent.

---

Now we know that the healthiest nerve cell is that which leads an active existence and that the surest way of benefiting a damaged one is to give it carefully regulated work to do.

We realize that for the nerves more or less damaged to produce a mobile effect on the muscles as affected above, they have undertaken a difficult task to perform. And this is the point where we step in and by a mechanical device render their task as easy as it is possible to make it.

The motor element of the nerve has to gather in a long slack of stretched muscle and tendon in the first place.

Damaged as it is it may still exercise some trophic influence.

It has - acting through the muscles - to attack the problem of the adhesions which form in a long-persisting case.

We wish therefore to adopt a device which will keep the foot in a normal position until the stretched structures recover their tone. We wish to act early in order to prevent adhesive & bony changes in a false position.

We wish above all to promote trophic influence which is a great factor in rapid recovery and which I find is a direct result of early & continuous correction of abnormal position.

With these facts before us we are in short in a position to consider and that, practically, the best means of assisting the damaged structures and of counteracting any and all pernicious influence at work.

We succeed by a simple device:

In the case under consideration we apply a back splint to the leg. To this we have a foot piece set at an angle of about  $100^{\circ}$ . This keeps the foot up at about the normal angle, takes the strain off the weakened structures, counteracts the pull of active opposing structures and from the point of view of rapid & complete recovery becomes an ideal agent in treatment.

Once applied the splint is kept on until recovery is complete. No fixed time can be given for any stated case.

Robert Jones discussing the treatment of Polomyelitis Anterior Acuta in the British Medical Journal of Dec. 9<sup>th</sup> 1911, a discussion which first suggested to me the idea of adopting the treatment in cases of Peripheral Neuritis, says:-

"The first stage of treatment is to correct existing deformity and when this is corrected the limb should be kept immovable until the ligaments, muscles and even bone have become of normal shape and length. To break the continuity of treatment is to invite disaster and bring about relapse.

The slightest stretching of a muscle on the point of recovery disables it again."

He advocates the keeping on of the splints for six or even twelve months, and though he is famous for his orthopaedic surgery he says:-

"No case should be operated on before twelve months have been spent in endeavouring to restore the function of the paralysed muscle."

Clinical Notes of  
Three Cases.

Summary and Deductions.

In Conclusion.

I have now had the opportunity of applying these ideas in 3 cases as mentioned above. All were of severe type and thus serve as a true test of the efficacy of this method. Two were cases of Peripheral Neuritis in which I am not aware of the idea having been adopted hitherto. The third was a case of "Infantile Paralysis".

A brief description of these three cases & their progress I will now set before you:-

### Case No. I

Mrs Summer      Housewife      Oct. 30.

Admitted to Addington Hospital, Durban  
10<sup>th</sup> Feb. 1912.

Complaint. Paralysis of both hands, both legs and feet. Gradual onset. Pains in the calves. Total inability to stand or walk.

Her husband is a brewer's traveller and the important factor in her history was chronic alcoholism lasting several years.

History was difficult to elicit and facts as to the special forms of alcohol taken were not forthcoming.

I did not see her on admission and in fact not until 16 weeks later when I took up duties at this Institution.

During that period she underwent the usual treatment by means of Treadmill, massage, strychnine hypodermically.

My predecessor was able to inform me that he had not been able to see the slightest degree of benefit from this treatment and was inclined to believe there was some permanent spinal myelitis.

Her condition was then as follows:-

# Nervous System only

## Sensory Functions.

Tingling in both hands and feet and shooting pains in the calves of the legs. Sensibility to touch active everywhere.

Appreciation of sensations of heat, cold & pain was impaired on the dorsum of both feet as far up as the lower end of the tibia.

Tickling of the soles produced a sensation of extreme discomfort.

Deep pressure of the calves of both legs produced excruciating pain.

Special Senses were all active.

There was no mental involvement.

Kossikoff's sign was not then in evidence though I was told things that suggested it had been there on admission.

Pupils equal, reacted readily to light and accommodation.

There was slight lateral nystagmus.

## Motor Functions.

Organic reflexes. Active.

Plantar reflex. Absent on both feet but the attempt to elicit it produced marked discomfort.

Abdominal reflex. Absent on both sides.

Deep Reflexes { Ankle jerks. Absent  
Knee " Absent.  
Biceps, triceps, supinator jerks.  
all absent.

Both feet were markedly dropped and there was complete inability to move them on the toes.

The legs could be drawn up but the movement was weak & together with extension at the knees easily overcome.

There was double wrist drop but there was slight response when an attempt was made to raise the hands.

There was hyperextension of all the first phalanges of both hands which seemed to indicate that the lumbricals and interossei were not involved. This was corroborated on instituting movements which required the use of these muscles.

Both calves were flabby and the extensor muscles were greatly atrophied.

Involved muscles all reacted slightly to Faradism and there was no R.D.

A certain continued rapidity of pulse suggested basal involvement.

There was nothing else abnormal.

N.B.

As mentioned before she had had 16 weeks of treatment previously on orthodox lines and the benefit had been pronounced nil.

Further treatment & progress:—

May 30<sup>th</sup> 1912.

Back splints were applied to the legs with foot piece as previously described. Hands were similarly treated with splints on the flexor aspect.

There was a little force required to get the feet into the required position and during the ensuing two days there was great discomfort and aching in the calves from stretching of the muscles. This later wore off.

June 14<sup>th</sup> 1912.

A fortnight later.

There is slight movement of the toes of both feet. The movement of the fingers is free.

June 20<sup>th</sup> 1912.

All the toes now move freely.

July 3<sup>rd</sup> 1912.

A month later. Six weeks treatment.

There is slight dorsiflexion of

the left foot. Both hands  
can be readily dorsiflexed.

July 8<sup>th</sup> 1912

The left foot can be well  
dorsiflexed. There is a slight  
movement of dorsiflexion of the  
right foot. There is free  
movement at both wrists &  
the splints have now been  
taken off these.

July 30<sup>th</sup> 1912.

There is fairly free movement  
of both ankles.

August 21<sup>st</sup> 1912.

All the splints are now off.  
Patient was up for the first  
time and walked with assistance.  
Ankles ached as the result of the  
unwonted exercise.

September 25<sup>th</sup> 1912.

Patient walked out of  
Hospital 16 weeks after the

Splints were first applied and after a previous 16 weeks of absolutely abortive treatment.

She has since returned several times to report progress and her cure is now complete provided always that she does not revert to her previous bad habits.

It may be advanced that the 16 weeks early treatment in this case prepared the way for the beneficial action of the Splints in the second 16 weeks.

Certain it is that in the latter period improvement was early, progressive & led up to final cure.

Case No II

Mrs Mary Jane Palmer. Widow at 39.

Admitted November 13<sup>th</sup> 1912.

Complaint: Tremor and weakness of both hands. Inability to walk. Pains and cramps in the calves of both legs.

Her husband died about a year ago and since then patient has had frequent recourse to alcoholic solace.

She drank chiefly stout and beer but admitted occasionally taking spirits. She was frequently intoxicated.

### History.

About six weeks before admission patient began to notice an unsteadiness in her gait and that her hands were becoming tremulous. At the same time she first felt what she describes as "cramps" in the legs. She tried to brace herself up with increased amounts

of alcohol but instead of improving became progressively worse until she was quite unable to walk or even to stand.

She suffered from pins & needles in feet & hands and excruciating pains in the calves.

She gradually lost the power of her legs until she became quite unable to move her feet at all and noticed that these were markedly "dropped".

Her hands similarly drooped at the wrist & she could not raise them.

In this condition she came to hospital and on examination the state of affairs was as follows:—

### Nervous System.

Sensory Functions. Her feet and hands felt cold and numb. She experienced at intervals an acute sensation of pins & needles in these members.

Her appreciation of touch was dulled over the dorsum of both feet.

She readily distinguished everywhere between hot & cold objects.

Licking of the soles of the feet produced great discomfort.

The sense of pain was superficially dulled all over both feet and hands but not above the wrists or ankles.

Slight deep pressure produced extreme agony in the calves.

She readily distinguished between weights of moderate difference.

Sight. Pupils equal. Reacted to light and accommodation readily.  
No nystagmus.

Hearing. Quite acute.

Taste. Unimpaired.

Smell. Formally active.

## Motor functions:-

Organic Reflexes. Active.

Plantar response faintly flexor.

Abdominal reflex. Faint.

Ankle jerk absent

Knee " "

Biceps "

Triceps "

Supinator "

Jaw "

There was a marked tremor of the hands and muscles of the face & tongue. The tremor was a coarse one intermediate between that of Paralysis Agitans & Exophthalmic Goitre.

## Voluntary Movements.

There was marked double wrist drop which could not be corrected by any effort of the patient.

Both feet were dropped and movement of the toes or at the ankle was quite in abeyance.

The patient was quite unable to stand even with support.

She could flex both legs at the knees and extend them but the movement was easily counteracted by resistance.

Co-ordination in hands & legs was markedly impaired.

There was no R.D. though the extensor muscles of both legs were greatly wasted.

Gasomotor Function. Both feet were inclined to be puffy especially on admission when they had been hanging for some time.

Cerebral & Mental.

Patient seemed a little stupid on admission but after a day or two this wore off and she then

took an active interest in her treatment.

Her memory was quite good and Rositoff's was not in evidence.

She slept badly for the first few nights.

### Locomotor System.

There were no bony changes. Muscles were impaired as mentioned above the condition being one of flaccid paralysis of the extensor muscles of the arms & legs with cramps and rather coarse tremor.

### Treatment & Progress.

Nov. 14<sup>th</sup> 1912.

Backsplints as before applied. Associated treatment by massage and Faradism was carried out.

The splints were applied when the condition was one of complete inability to move feet or toes.

Nov. 21<sup>st</sup> 1912.

Patient can now move all the toes of both feet and slightly dorsiflex both feet at the ankles.

Pain in the calves which was aggravated by the application of the spirits has now greatly diminished.

Nov. 27<sup>th</sup> 1912.

All the movements of the affected parts are better performed though requiring great concentration on the part of the patient.

Dec. 2<sup>nd</sup> 1912.

Improvement is maintained.

Movements are now very free & the "wrist drop" is nearly corrected.

The feet have not been allowed to extend yet but the dorsiflexion is much stronger.

Dec. 10<sup>th</sup> 1912.

The wrists are now quite able to support the hands with the "drop" corrected. Both feet are apparently normal. Splints were removed but as there was a slight tendency for the left foot to 'drop' they were re-applied.

Dec. 14<sup>th</sup> 1912.

Splints were removed to-day. Both wrist & foot. drop is corrected. The ankles were bandaged and the patient allowed to get out of bed. She walked a few steps with assistance.

Dec. 24<sup>th</sup> 1912.

Cure

Patient walked out of Hospital cured. The "Splint Treatment" was carried on for only 5 1/2 weeks. The case was secured early & though a bad one it amply testified to the extreme worth of the method adopted.

Notes.

In this particular case there was no preliminary trial of treatment with medicinal agents nor indeed were these employed at all.

The splints were regarded as the "tour de force" and the resting of weakened structures obtained through their application combined with massage and faradism, produced rapid & complete restoration of function.

In exactly one month's time after admission to hospital all deformity was corrected and the normal tone of the muscles restored and after a further ten days devoted to walking exercise cure was pronounced complete.

This case differs from the previous one and the one to follow in that the treatment was adopted from the commencement, and what this means is evinced when one considers the perfection of recovery in all ways.

Case No III.

Annie Oellermann

School-girl Oct. 13.

Admitted 29 - 9 - 12.

Complaint:- Complete inability to move either foot, to walk or even to stand. Weakness of both thighs.

Duration:- 6 weeks.

History:- Patient is a Dutch girl and the endeavour to elicit history was thus rather difficult.

Patient about seven weeks before admission had what is described as a fever lasting several days.

She was confined to bed and had pains in all her limbs, in her head & neck and down her spine.

There was no rash & she was always in full possession of her mental faculties.

When the pains subsided she experienced weakness of both arms from the shoulder downwards but not amounting to paralysis. It was more of the nature of a paresis.

At the same time both legs were found to be completely paralyzed as regards standing or movement of any nature.

She was treated for six weeks by her family doctor.

The treatment took the form of Iodine, massage & passive movement.

Latterly an endeavour was made to get her to walk but as she says this failed because she could not stand even with assistance.

Under this treatment the hands and arms improved until complete power returned to them.

No improvement could be elicited in the legs which

remained flaccid and helpless with 'dropped feet.'

The only change noted was that they became cold & blue and wasted considerably.

As a last resort having been pronounced incurable by her doctor her parents brought her to this hospital.

On admission her condition was as under:-

### Sensory Functions.

No abnormality of any description could be discovered despite careful test. Especially was there an absence of any tenderness in the calves.

### Motor Functions.

Organic reflexes all active.  
Plantar reflex. absent on both sides  
abnormal " " " " "

Knee joints.

left absent.

Right . Showed a faint response.

Ankle joints both absent.

All other deep reflexes were normal.

Both feet were "dropped" and completely inert. The toes could not be moved.

Calves were flabby and atrophied and the extensor muscles wasted.

Both legs could be drawn up at the hips and extended again but the movement was easily overcome by resistance.

**N.B.** With the exception of the peroneal group of muscles on the right side all muscles gave the normal reaction to Treadium.

This one group gave an indefinite Reaction of Degeneration.

Both legs and feet looked blue on hanging and became a little edematous.

There was a condition of scoliosis in the dorsal region and of lordosis in the mid-lumbar region and on admission patient was wearing a plaster case to if possible correct this.

Diagnosis.

Polio-myelitis anterior acuta.

Treatment and Progress.

Sept. 30<sup>th</sup> 1912.

Back splints applied as described and daily application of the Faradic battery & of massage.

Stychnine gr  $\frac{1}{60}$  hypod. daily.

Oct. 7<sup>th</sup> 1912.

The small toe of the left foot moved slightly.

Oct. 9<sup>th</sup> 1912.

The small toe and the one next to  
moved.

Oct. 12<sup>th</sup> 1912.

The four small toes of the left  
foot could be moved.

Oct. 16<sup>th</sup> 1912

All the toes of the left foot  
could be extended & flexed.

Oct. 26<sup>th</sup> 1912.

There was a slight attempt at  
dorsiflexion of the left foot in  
addition to movement of the toes.

Oct. 29<sup>th</sup> 1912.

All these movements were  
better performed.

Nov. 10<sup>th</sup> 1912.

Improvement of the left foot  
maintained but there was up  
to this time no change in the  
condition of the right foot & toes.

Nov 12<sup>th</sup> 1912.

Dorsiflexion of the left foot was well performed and there was slight dorsiflexion of the right foot but no movement of the right toes.

Nov. 16<sup>th</sup> 1912.

For the first time the second and third toes of the right foot were moved.

Nov. 19<sup>th</sup> 1912.

All the toes of the right foot were moved and dorsiflexion of both feet was well performed.

The right foot however tended to invert owing to peroneal weakness.

Nov. 28<sup>th</sup> 1912.

The patient was up for the first time and walked a little with support. The right foot dropped a little and was inverted.

The splints were still kept on during the resting period.

Nov. 29<sup>th</sup> 1912.

Patient again walked with support + stood erect unassisted.

Nov. 30<sup>th</sup> 1912.

Walking was much better performed. The patient stood without support and also walked a few paces unassisted but was very unsteady.

She cannot yet rise from the sitting position.

The left knee jerk is faintly present and the right one more marked but sluggish.

Plantar reflexes are still bilaterally absent.

Dec. 11<sup>th</sup> 1912.

Patient now walks with the aid of a stick. Splints are dispensed with. The right foot still tends to invert.

Dec. 13<sup>th</sup> 1912.

The patient now walks very well without the aid of a stick.

The tendency of the right foot to invert is scarcely noticeable.

There is free movement of both feet in all directions now and complete recovery is only a question of a little time & continued exercise.

It is now ten weeks roughly since she was admitted to this Hospital and sixteen weeks since the onset of the paralysis.

Dec. 19<sup>th</sup> 1912.

Cure

Patient walked out of Hospital perfectly recovered and as it were viewing life through rose-coloured spectacles.

On admission she was a child doomed by medical opinion to the life of a paralytic.

She left with this verdict  
refuted and with the prospect  
of an active life before her  
instead of a mere existence.

In Summary one might draw  
attention to the following facts:-

I All three cases were of  
their kind bad cases and  
in none was there any movement  
of the affected feet or toes on  
admission.

II Two of them I and III prior  
to the application of splints  
underwent in other hands a  
course of treatment long  
considered appropriate.

In neither case could one  
perceive the slightest possible  
benefit from this treatment.

Both these cases informed by their previous medical advisers that cure was hopeless, benefit doubtful recovered completely the power of walking unsupported.

And there is in my opinion absolutely no doubt in affirming that in these two cases as in the third benefit was due to the resting of weakened structures and the immobilising of counteracting influences by the mechanical contrivance applied.

The splints once on were not removed until all possibility of relapse had vanished & recovery under their influence was rapid, progressive and complete.

III It might be worthy of mention that in all three cases the toes were the first to recover.

There are certain general facts to be deduced which might be worthy of mention:-

- (a) Damage to the nervous elements is not so severe as physical disability would seem to indicate.
- (b) Recovery from such damage as exists is rapid and the tonic influence of an active muscle on a damaged nerve is a factor to which we have perhaps attached too little importance in the past.
- (c) In no case of this description should an opinion based on a hopeless prognosis be advanced without thorough and patient examination and treatment.

(a) Pathological changes such as have been described have been often derived from investigation of cases which have been chronic for years and in which an initial destruction has been aggravated by the chronicity and consequent disuse of damaged structures.

This disuse has perhaps reacted on undamaged parts.

Thus we can conceive an atrophy of undamaged muscle fibres from want of use and similar changes in nerve cells and axons.

We can conceive that this may be aggravated by connective tissue replacement of damaged fibres involving healthy fibres just as a nerve may be injured by involvement in callus.

This connective tissue contracting as is its wont as time goes on, would constrict and destroy any healthy, involved fibres and a Post Mortem examination after years would

thus seem to reveal a primary condition of destruction quite compatible with what our opinion based on physical disability might have led us to believe.

This idea is put forward very tentatively and is suggested by the rapidity & completeness of recovery following early and correct treatment.

In conclusion I may say that as the result of the effect produced in these three cases by this form of treatment my faith in it is firmly established.

The neurologist or practitioner who can approach a case of this description with confidence sufficient to guarantee benefit gains greatly.

Perhaps I have been fortunate  
in my cases. Cases vary  
greatly in degree of course but  
I think I am right when I say  
that these three were stringent  
tests of the efficacy of the method.

and I am confident that  
others doubtless employing the same  
or similar methods now are  
meeting with equal success.

Undoubtedly the greatest  
amount of recovery is to be  
expected from a rational treatment  
based on anatomical & physiological  
and pathological factors and  
such a treatment is embodied  
in that which I have just  
discussed.