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K. OBRDA — J. PFEIFFER

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C. IRÁNYI, M. TARNÓCZY

DIAGNOSTIC CONTRIBUTIONS OF THE EMG IN NERVE ROOT COMPRESSION SYNDROMES

Although there are many reports concerning the electromyographic findings in acute disc syndromes, a review of the literature reveals little on the subject of electromyographic changes observed in chronic radicular syndromes associated with degenerative joint disease of the spine. In chronic cases the EMG changes observed in acute nerve compression syndromes are not seen or are present to a much lesser degree than would be expected on the basis of the neurologic symptoms.

We selected 164 cases from patients referred to our department having chronic and acute radicular syndromes. On 102 patients the chronic radicular symptoms were associated with degenerative joint disease of the spine. The observations were contrasted with the findings of 62 patients, whose acute radicular lesion was connected partly also with spondylosis, partly with symptoms remaining after laminectomy performed 1-4 month earlier because of herniated disc, tumor and traumatic injury of the spine.

On 2/3 part of the patients we observed the radicular pains, reflex and sensibility symptoms associated with severe or moderate motor weakness.. In 1/3 part of the cases the root pain developed without reflex and motor sings. At least three of the characteristic radiological sings of spondylosis were present. We examined the muscles innervated of C 5 to D 1 and L 4 to S 1 roots. We made EMG records from the deltoid, extensor communis, flexor ra-

Table 1. Comparison of neurologic findings and elektromyographic changes in to patients having chronic cervical radicular syndromes.

Group	Symptoms	Number of cases	Fibrilation potentials	Polyphasicity	Reduction
			In % of muscles examined		
I.	Motor weakness of 4—5 strength degree	22	6,5	50	25
II.	Radicular pain syndromes	48	3,5 (5 %)	25 (40 %)	13

Table 2. Comparison of neurologic findings and elektromyographic changes in 37 patients having acute cervical radicular syndromes

Group	Symptoms	Number of cases	Fibrilation potentials	Polyphasicity	Reduction
			In % of muscles examined		
I.	Motor weakness of 0—3 strength degree	13	50	50	50
II.	Motor weakness of 0—4 strength degree and mild spinal cord sy. (St. p. lamin.)	24	50 (50 %)	63 (60 %)	76

Table 3. Evaluation of regeneration by comparing the controll neurologic sings and emg changes in 70 patients having chronic cervical radicular syndromes

Group	Symptoms	Number of cases	Clinical symptoms	Emg findings	Clinical symptoms	Emg findings
			Refered to improvement		Were unchanged	
			in % of muscles examined			
I.	Motor weakness of 4—5 strength degree	22	60	65	30	25
II.	Radicular pain syndrome	48	50	40	40	50

Note: Deterioration was 10 %

dialis, abductor pollicis, abductor digiti minimi, quadriceps, tibialis anterior and gastrocnemius muscles. We analysed the correlations of root lesion and EMG changes. In the cervical cases we studied the correlation of root involvement and the symptoms of restitution after the physical therapy and the changes of regeneration of EMG on the basis of controll investigations after 2-4 month.

We summarized our results on following tables.

As it is demonstrated on table 1. in the casses of 70 chronic cervical radicular syndromes we found
in 5 % fibrillation potentials and
in 40 % polyphasicity.

On table 2. we demonstrated that in 37 cases of acute cervical radicular syndromes we found
in 50 % fibrillation potentials and
in 60 % polyphasic potentials.

Table 4. Evaluation of regeneration by comparing the control neurologic sings and EMG changes in 37 patients having acute cervical radicular syndromes

Group	Symptoms	Number of cases	Clinical symptoms	EMG findings	Clinical symptoms	EMG findings
			Refered to improvement		Were unchanged	
			In % of muscles examined			
I.	Motor weakness of 0—3 strength degree	13	90	80	10	20
II.	Motor weakness of 0—4 strenght degree and mild spinal cord sy. (St. p. lamin)	24	75	70	25	30

Note: There were no sings of progression

Table 5. The distribution of EMG changes in 32 patients having chronic lumbar radicular syndromes

Clinical symptoms	Number of cases	Without EMG changes	EMG changes	
			Fibrilation potentials	Polyphasicity reducation
1. Motor symptoms	20	1	1	18
2. Alteration of reflexes an sensibility	5	2	1	2
3. Radicular pain syndrome	7	3	1	3
Total	32	6	3 (10 %)	23 (75 %)

On table 3. is demonstrated the evaluation of regeneration by comparing the controll neurologic sings and EMG changes of 70 patients having chronic cervical radicular syndromes. On table 4. are demonstrated the same changes on 37 patients having acute cervical radicular syndromes. The clinical symptoms and the EMG findings of fibrillation and polyphasticity and reduction varied parallel with the improvement or were unchanged.

As it is established on table 5. we observed in 32 patients having chronic lumbar root involvement syndromes
in 10 % fibrillation potentials and
in 75 % polyphasicity.

On table 6. we demonstrated that in the cases of 25 acute lumbar root

Table 6. The distribution of EMG changes in 25 patients having acute lumbar radicular syndromes

Clinical symptoms	Number of cases	Without EMG changes	EMG changes	
			Fibrilation potentials	Polyphasicity reduction
1. Motor symptoms	16	1	3	12
2. Alterations of reflexes and sensibilty	6	1	3	2
3. Radicular pain syndrome	3	1	0	2
Total	25	3	6 (25 %)	16 (60 %)

compression syndromes we observed in 25 % fibrillation potentials and in 60 % polyphasicity.

In acute root lesion fibrillation is the principle EMG finding. Polyphasic potentials and reduction without fibrillation suggest that a milder neurogenic lesion is present. On the basis of the frequency of the latter EMG changes in chronic nerve root compression syndromes, it is reasonable to assume, that the relative chronicity of the compressive or irritative process may allow the nerve opportunity for adaptatinon so that Wallerian degeneration fails to occur or, when it is present, involves fewer axons than would be ordinarily expected on the basis of the clinical picture of pain, weakness and sensory deficite. — Previous reliance on the demonstration of fibrilation potentials should be replaced with an appreciation of the significance of minimal EMG changes, that is increased proportion of polyphasic motor unit action potentials and reduction when present in a segmental distributation innervated by a cervical or lumbar root.

On the basis of the mentioned EMG criteria we employed the EMG as an aid in diagnosis in different groups of cases, when the clinical symptoms were not clearcut and definite. We summarize our observations as follows:.

1. EMG helps to detect in cases of radicular pain syndromes subclinical neurogenic lesion in the neuromuscular pathaway of the affected nerve root.
2. In the nerve root compression syndromes connected with motor weakness it aids in the determination of the topologic diagnosis and probable prognosis.
3. In cases with motor weakness of 0-3 strenght degree the satisfactory EMG changes of regeneration may help to decide to apply conservative therapy instaed of operation.
4. EMG helps by detecting subclinical denervation in cases chracterized with motor weakness considered functional to clarify the organic radicular respectively origin.
5. Following laminectomy EMG reveals in early stage the signs of regeneration of the axons.
6. In cases of severe motor deficit EMG can be used as prognostic indicator and helps in determining the program of reeducation.

ORHAN SENGIR

COMPARATIVE STUDY OF IDIOPATHIC LOW BACK PAIN AND SCIATICA IN ADOLESCENTS, YOUNG ADULTS AND OLDER ADULTS

Indiopathic low back pain and sciatica is a frequent disease of adults but it can be encoutred among adolescents, young men and women. The clinical picture of the idiopathic low back pain and sciatica in younger ages differs from that usually seen in older ages. This study is undertaken in order to expose the characteristic features of the disease in these two age groups.

Material and Method

Two groups of two hundred fifteen patients between the ages 15 to 26 and 40 to 51 years with idiopathic low back pain and sciatica observed over afive years period are analysed and their characteristic features compared. In these patients the diagnosis of idiopathic low back pain and sciatica was made taking in consideration the type, onset and localization of the pain tenderness and limitation of the columna vertebralis, straight-leg raising and Lasegue tests, reflex and sensory changes, motor weakness and atrophy of the muscles of the affected leg. Laboratory examinations such as blood count, erythrocytes sedimentation rate and routine urinanalysis were carried out and found to be normal. Although myelograms were not made,

Figure 1.

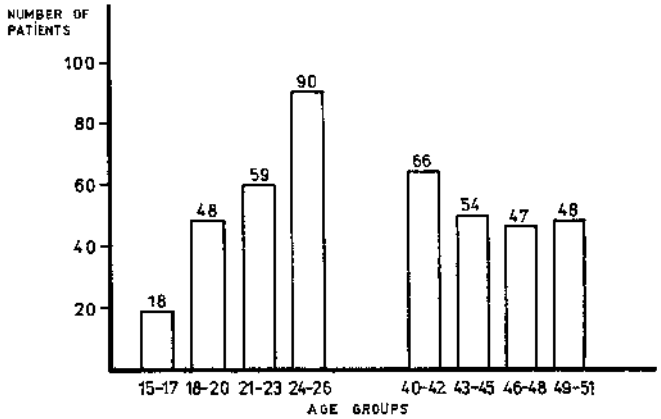


FIG 1: AGE DISTRIBUTION OF ADOLESCENTS, YOUNG ADULTS AND OLDER ADULTS

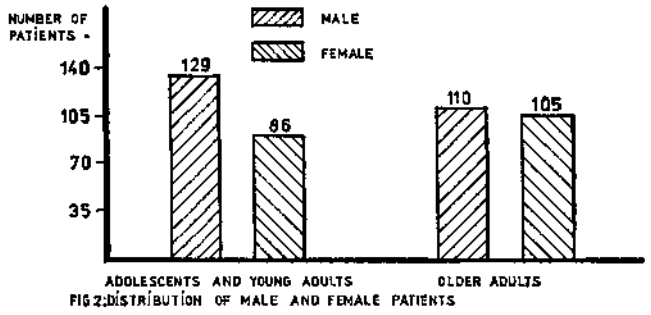


FIG 2: DISTRIBUTION OF MALE AND FEMALE PATIENTS

Figure 2.

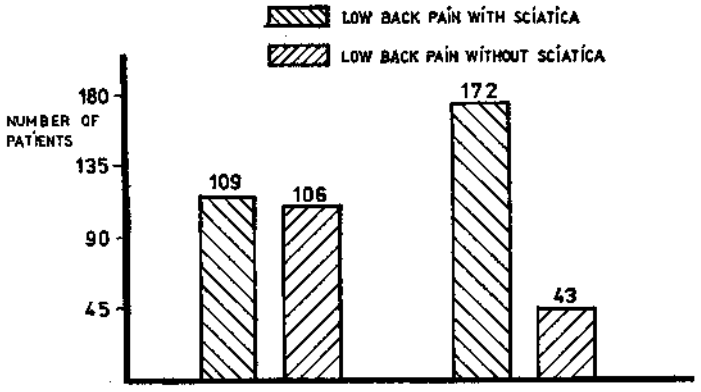


FIG 3 : PATIENTS WHO ARE COMPLAINING OF LOW BACK PAIN WITH OR WITHOUT SCIATICA

Figure 3.

roentgenograms were taken routinely through the following exposures: anteroposterior, lateral. The results are presented below.

Results

1. The incidence of low back pain and sciatica: A previous study over six hundred eighty cases of idiopathic low back pain and sciatica showed that eight per cent of patients were between the ages fifteen to twenty six and thirty per cent of patients were fourty to fifty one years old.

2. Age distribution: In the group of young adults and adolescents it was noticed that the number of patients gradually increased with advancing years. The distribution of patients was more uniform in older adults between 40 to 51 years. [Figure 1]

3. Sex of patients: Male adolescents and young adults were found to be much more affected by the disease. In the group of older adults, men and women were about equally affected by the disease. [Figure 2]

4. Low back pain with or without sciatica: In the two hundred fifteen adolescents and young adults analysed, the number of patients who were complaining of low back pain with sciatica and the others who were suffering

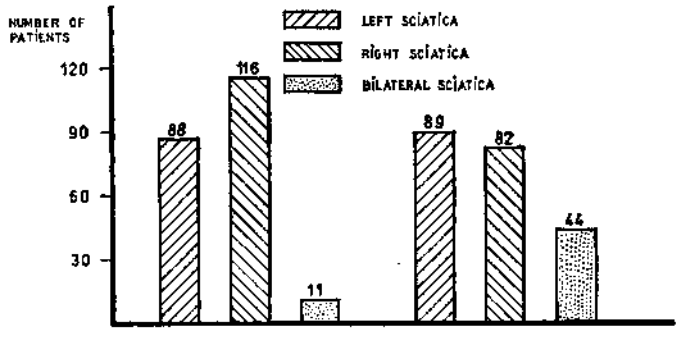


FIG 4: DISTRIBUTION OF LEFT, RIGHT AND BILATERAL SCIATICA IN TWO GROUPS

Figure 4.

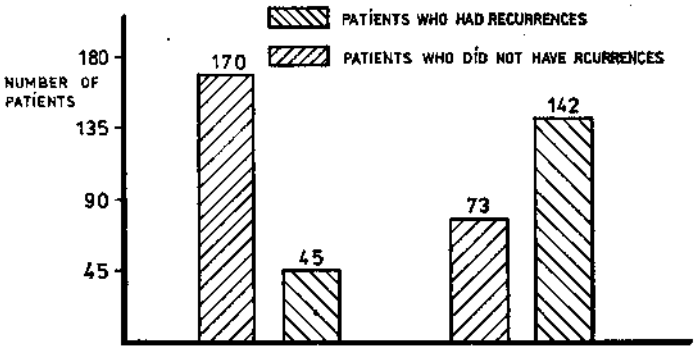


FIG: 5: PATIENTS WHO HAD AND WHO DID NOT HAVE RECURRENCES

Figure 5.

of low back pain without sciatica was practically equal. In the group of older adults the incidence of low pain without sciatica was remarquably low. [Figure 3]

5. Site of pain: Right sciatica was slightly more common in adolescents and young adults and left sciatica in older adults. Bilateral sciatica was seen rarely in adolescents and young adults [Figure 4]. Only in 3 % of patients.

6. Factors predisposing to low back pain and sciatica: More than fifty per cent of adolescents and young adults did not know the cause of their complaints. In twenty eight per cent of patients the disease appeared following traumas during sport activities, lifting of heavy objects and falls. The rest of patients gave a history of exposure to cold, long hours of hard work.

A preceding pregnancy and difficult labor seemed to be the cause of the disease in many young women.

Many years of occupational traumas, strains and heavy daily housework among women were, in addition to lifting of heavy objects and exposure to cold factors, predisposing older adults to low back pain and sciatica.

7. Recurrences: More than sixty per cent of patients in the age group fourty to fifty one gave history of previous mild backache of acute sciatalgie

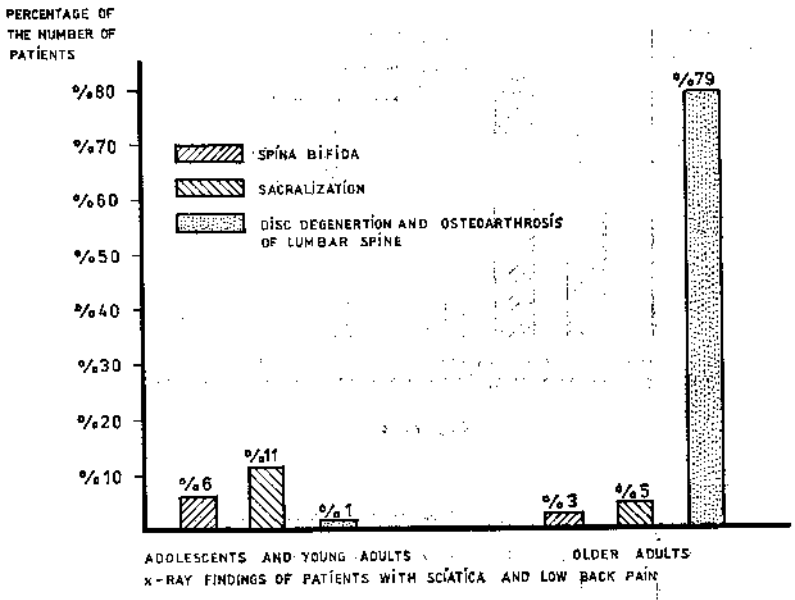


Figure 6.

from which they had been completely recovered. Striking differences were obtained on comparison with other group: Eighty four per cent of adolescents and young adults were complaining of low back pain and sciatica for the first time. (Figure 5)

8. Physical examination: Physical examination of patients in the group of fourty to fifty one revealed often changes in deep tendon reflexes, some atrophy and weakness of muscles innervated by L 5 and S 1 spinal nerves, numbness and paresthesias over lateral border and sole of the foot or mediodorsal aspect of the foot and in the lateral leg. Adolescents and young adults seldome did have these sings of a compressed spinal nerve.

9. Radiologic examination: Roentgenograms usually had signs of disc degeneration and osteoarthrosis of lumbar spine in older adults. X-ray examination of adolescents and young women and men revelaed that big number of patients did have unilateral sacralization, spina bifida but not signs of degenerative diseases of the spine. (Figure 6)

10. Treatment and rehabilitation: The conservative treatments and rehabilitation of patients over fourty years were usually difficult and required many weeks of bed rest, physical therapy followed by exercises, use of a lumbo-sacral corset and even psychotherapy for emotionally instable patients. In contrast adolescents, young men and women most of the time, after a few days of bed rest and some restriction of their activities were completely cured of their low back pain and sciatica.

Discussion

Indopathic low back pain and sciatica occurs most often in the third and fourth decades of life but young adults, adolescents and even children may have the disease. Love mentioned that of 1217 patients with low back pain

and sciatica, 25 were between the ages of ten and mineteen years. Key, Wahren, Pernström, Webb, Svien and Kennedy reported children with low back pain and sciatica due to herniated intervertebral disc. [8, 9, 11, 16] Our previous study over six hundred eighty cases of indiopathic low back pain and sciatica showed that eight per cent of patients were under twenty five.

The characteristic features of idiopathic low back pain and sciatica in adolescents and young men and women were found to be different from these usually seen in older adults: Male adolescents and young men were often affected by the disease. Young men who were frequently angaged in competitive athletics, games and heavy works were more prone to low back pain and sciatica, than young women. Among the others conditions predisposing to low back pain and sciatica there were exposure to cold, unilateral sacralization of the fith lumbar vertebra, spina bifida, pregnancy and difficult labour in young womn. [2, 3, 17]

In the group of patients between the ages of 40 to 51 years, like the men who were exposed to occupational trauma, women because of their bad social and economic condition were obliged to do strenuous housework and as a result they were found to be affected about equally by the disease.[15] The roentgenograms of patients over fourty years usually showed sign of disc degenration and osteoarthrosis. [5, 6, 13] Low back pain without sciatica was a common complaint and bilateral sciatica was seen in three per cent of adolescents and young adults. In the group of our older patient bilateral sciatica was encountred in sixteen per cent of patient. Epstein reported the incidence of bilateral sciatica as fifteen per cent. [8] In our previous study over 517 patients with sciatica this incidence was found to be thirteen per cent. [15]

The history of patients revealed that only a small number of young adults with low back pain and sciatica had return of their symptoms after a period of quiescence, while more than sixty per cent of patient in the older age group had one or two recurrences: In the majority of these old patients the symptomes were gradual and progressive. [8, 12, 17]

Physical examination of adolescents and young adults disclosed loss of the usual lumbar lordotic curve, tenderness and spasm of paravertebral muscles, scoliosis, pain and limitation of the spinal movements, positive. Lasségue or straight leg raising tests but, unlike the patients of older adults group they did not showed often sings of a compressed spinal nerve such as diminished or absent ankle jerk reflexe, muscular weakness and atrophy of the affected limb, hypesthesia or parasthesia of the fifth lumbar or first sacral dermatome.

The results of treatments and rehabilitation of patients in the two groups studied were also quite differents: As the symptoms of many young adults and adolescents were usually mild, they recovered completely in a short time, after a conservative treatment. The group of older patients required many weeks of bed rest, physical therapy, traction, exercises, lumbo-sacral corset in order to keep their symptoms under control. [12, 14]

It is generally accepted that in nearly all of the patients with idiopathic low back pain and sciatica the symptoms are caused by lesions of intervertebral disc, but completely different clinical features of the disease in adolescents and young adults make us believe that the symptoms of these young patients were usually caused by lumbosacral sprains and sometimes by minor lesions of intervertebral discs in lumbo-sacral region.

JACQUES CHENEAU

A PSYCHO-THERAPEUTIC APPROACH TO BENIGN VERTEBRAL PAIN

Any valuation of the results of vertebral pain treatment is weak since it relies practically on a subjective element: pain. The clinical data are variable therefore not reliable, and as for radiology, its major and almost exclusive role is to detect the inflammatory aetiologies, either infectious or malignant which would put such vertebral pains outside the limits of this research.

Therefore it is mainly on the patient's satisfecit that we have founded our opinion of the results of the treatment which we have been applying for 8 years in a relatively homogenous way. This opinion is based on the approach of the patient taken as a whole, somatic and psychic.

We have retained 500 observations which are characterised as follows:

I Every patient has been through a radiological, biological and clinical examination as complete as possible, registered on 5 pages of diagrams which ensure the inclusion of all elements.

II Given the usual co-existence of conflicting and anxiogenous situations with vertebral pains, we have tried to evaluate the patien's behaviour which could be either totally depressive or, to a lesser degree agressive, warped or anxious but which was more often perfectly normal.

III Once we have well established the vertebral pain's benign nature and have evaluated the result of the possible radicular eventration, we have administered a treatment involving: a psychological impact, physiotherapy and re-education. We shall now define more explicitely these three elements.

A The psychological impact includes demystification, relaxation and direct psychotherapy.

1. Demystification is sometimes necessary with a patient scared by some previous diagnosis, often disproportionate, worn out by a pain which seems to him incurable and which has driven him from doctor to kinesist often passing trough the hands of charlatans in the process. It consists in explaining very precisely to the patient the nature of his pain and telling him the prognostic, almost always benign

2. The techniques of relaxation which we use are inspired by Caycedo and Schultz. The readers interested should see their regional societes of Sophrology where these methods are taught.

Relaxation has considerable psycho-sedative and antalgic affects and moreover it facilitates the acces to direct psychotherapy.

3. Direct psychotherapy, when necessary, consists in making the patient aware of his faults of behaviour. From this moment he is better prepared to resolve his own problems, from which we want to stay totally divorced, or

if they are insoluble, to bear with them. Such an awakening of consciousness is relatively easy as long as the doctor uses diplomacy, patience and kindness and thanks to the previous techniques of relaxation.

B Physiotherapy is based on vertebral manipulations made much easier and more confortable by previous relaxation. In case of part failure or in rare cases where the treatment, because of the particular characteristics of the disease, extends over six sessions, we appeal to accessory therapetics which are:

1. Immobilisation realized by the use of plaster is recommanded when the seances are wholly adequate but followed each time by a relapse.
2. Tractions always cervical, always performed in a vertical position either standing or sitting and almost always associated with electrotherapy of faradaic type, help in some obstinate cases.

We do not think that a medical treatment should be very useful. Aspirin and its substitutes help a little. Local infiltrations may soothe temporarily and the fact of resting in bed and the resulting antalgic or relaxed positions taken more or less accidentally often bring complete sedations but without any re-educative efects.

We have but little experience of radiotherapy which is supposed to realize a deep mediate revulsion and in the long run a sclerosis, but we think that at a time of radio-active dissemination one should keep ionizing radations for malignant tumours.

Many fellow doctors and ourselves have given up tractions on a board because of the highly painful reactions provoked, when effective, in spite of all the care taken when the patient sets on his feet again.

In the course of time we have given up short waves, ultrasonic waves and rectified high frequency which seemed to us inefficatious.

As for tractions and re-education in water their effects are so much poorer to that of the treatment we apply daily that we have given them up two years ago.

C Re-education is in an integral part of our usual 3 to 6 sessions. A score of years ago we were educated along the lines of the official teaching in Williams' dogma which we may resume as follows:

1. Theorem:
   a) Lumbar hyperlordosis is very frequent
   b) Lumbalgies are very frequent
2. Corollary: Lumbar hyperlordosis creates most lumbalgies
3. Therapeutic conclusions: To ameliorate lumbalgy lumbarlordosis must be inverted.

This method of provoking a low lumbar cyphosis was put into practise in gymnastic or re-education rooms. It was compulsorily practised on patients in a sitting position because of the special form of the seat called „design" and the backward orientation of the horizontal surface of the chairs. It was taught in factories and work-rooms where, in order to cyphose their lumbar region, the workers were asked to joint their legs in all the movements they carried out.

In fact already at that time, simple commonsense told us to reject too unnatural and exaggerated cyphosian postures such as the „Mahometan prayer".

Through the years we have noticed that patients most likely to suffer pain were the lumbar cyphotics not the hyperlordosics; that the cyphosian gestures, above all joined legs, were algesiogenic (opinion verified on Ducroc-

quet's sketches]; that contrary to an interdict heard often it is necessary to combine in reasonable measure flexion and rotations of the rachis in order to obtain a movement together efficacious, aesthetic and sure, this with the following three conditions:

1. That the centre of gravity of the body stay as near as possible to the centre of the polygon of sustentation, without overhang.
2. That in standing, sitting or lying position the physiological curves of the rachis be respected as far as possible.
3. That in the course of movement these curves change harmoniously without „breaks", without any disharmony of curves.

From the practical point of view we study positions, movements, gymnastics.

Positions are either those of current life either positions chosen because of their antalgic, softening, relaxing effectes. In current life, in standing position, there exists a certain tendency to lumbar hyperlordosis that has to be actively fought against. In sitting position the tendency is on the contrary to lumbar cyphosis which the patient has to redress firmly with the help of a rubber wedge at the base of the chair in order to re-orientate its upper surface towards the front, according to the idea of Troisier. The patient puts his feet under the seat and can thus stay for hours in a sitting position, the lumbar region normally lordosed, without any fatigue. The so called „design" seats require a cushion behind the low back of the patients. In lying position we prescrible antalgic and relaxing positions: the usual rest on a hard board is often useful but sometimes not tolerated. Certain postures in rotation extend the beneficial effect of the manipulations. In some cases we sometimes prescribe cyphosis but always in a position of relief or even better with a light traction.

Current life movements should be executed in the following position: „lunging" one leg forward, the opposed arm forward. They should never be executed in an ambling position: leg and arm of the same side forward at the same time, as this creates an overhang and out of balance position. In most cases we prescribe a rotation of the trunk.

The limit of this education of movements lies in some workshops where the worker must bend often and for long periods close to floor level. The only solution would be the amelioration of these conditions and that is the role of mechanical elevators.

The gymnastics our patients have to practise is extremely classical, and they are asked to repeat regularly the principal exercises at home.

IV Our results

We have catalogued about 40 variables for each observation, and for the being we have concentrated our attention on those related to the kernel of our work.

A With regard to the usual overweight of rachialgie by a psycho-affective problem we have selected patients presenting an aggresive or unnatural comportment which corresponds approximatively to their absence of consensus, to their scepticism towards our therapy. They were relatively few, 23 %, and the results of the treatment were a little less favourable than the average of total cases.

B With regard to lumbar lordosis we haven't found any significant difference as to the results of the treatment whatever may be the degree of lordosis. Hyperlordosis furthermore is quite exceptional nowadays.

C Concerning typical neuralgia we haven't here either [to our great sur-

prise) had our attention called to any difference in the percentage between good results of pure lumbalgia and those of neuralgia L 5 and S 1. This doesn't fit in with the reputation of tenacity of these radiculalgia. Without being able to work out the percentage and the rapidity of the retrogression of the objective symptoms of these neuralgia, because they are not frequent, it has seemed that cutaneous hypo-aesthesia and paresies disappear in a few weeks and that suppressed reflexes only reappear partially and only after about *a year*.

D Total results of all categories of our 99 last patients seen from January 1st up to May 30th 1975 were good in less than 6 sessions in 86 cases.

E The good durable results have been of 60 % in 8 years. Out of 40 % left, many have been lost of sight and a certain number possibly never had a relapse.

F Twenty five patients, i. e. 5 %, which are out failures, never gave their satisfecit at the end of the treatment.

G We have noted 3 errors of diagnosis: a tumour, a urinary lithiasis, a maltese fever.

To resume, we have re-examined and noted 500 observations of patients suffering of vertebral pain. We have treated them with a rapid method, (nearly always less than a week) which comprises a psychological approach, physiotherapy and re-education especially of current life movement. The results are favourable for 86 % in our last cases, lasting in 60 % and scarcely less good in patients presenting troubles of comportment and practically identical whatever the degree of radicular deterioration.

K. SCHIMRIGK AND W. GRÜNINGER

THE EFFECT OF ELECTRICAL STIMULATION ON EXPERIMENTAL DENERVATED MUSCLE

The study was designed to yield a better understanding of the effect of electrotherapy on muscle after nerve section or crush.

The m. quadriceps of white rats was electrically stimulated after nerve crush and after nerve section.

Electrically stimulated muscles showed fewer central nuclei and a greater number of necrotic single fibres. The demonstration of motor endplates could not give a reliable indication of the onset of reinnervation. The various results show the importance of the trophic influence of the nerve and raise the suspicion that electrical stimulation has a slowing effect on the atrophy, but also on reinnervation and on regeneration of the fibres: After 7 weeks the unstimulated muscles show a greater degree of regeneration than the stimulated ones.

Electrical stimulation is a standard treatment of denervated muscle. The results of this study must be applied to therapy with the conventional reservations regarding animal experiments, but the electrical stimulation of denervated muscle nevertheless seems to be indicated only secondarily, if at all.

A. VRBOVÁ

EXPERIENCE WITH THE REHABILITATION AND SPA-TREATMENT OF THE PROXIMAL PARESIS N. ULNARIS AT GLASS-BLOWERS

More and more often it happens that patients with paresis n. ulnaris of professional origin, which means glass-blowers are coming to our spa-sanatoriums for neurologic rehabilitation. Mostly it concerns glassball-blowers, glass-cutters and engravers, workers with long but also with a short anamnesis. Already in very young glass-blowers we can find now symptomes of the beginning of these affections.

These always show up there, where the worker leaning on his elbow puts his full weight on it and therefore the n. ulnaris is pressed in its sulcus. A stronger affectation is found at glass-blowers, working with lead-glass, even if the influence of lead hat not been proved by the medical research.

In some cases especially where it concerns younger workers the fault can be put to a more shallow sulcus n. ulnaris.

From the working point of wiev we can eliminate a direct leaning against the elbow at glass-blowers and at cutters, but it can't be eliminated at the engravers.

From pathologic-anatomic view there are found fibrious changes in the surroundigs of the nerve, but also degenerative changes directly in the nerve itself, In the progressive development of the trophic syndrome, the mm. interossei and the mm. lumbricales digiti III et IV, the m. flexor digitorum profundus digiti IV. et V. are most often affected.

The sensoric component is very often affected too. The ill worker mostly complains of paresthesis of the fourth and fifth finger, in most cases the contact feeling in the corresponding segment is reduced, very often away from the middle of the forearm, at the back side of the fourth and fifth finger further at the front side of the fifth finger and also at the contiguous part of the palm and back of the hand. The patients complain of a sense of weakness in the fourth and fifth finger, of being unable to use the fingers in everyday functions and after some time the position of the fingers becomes semiflected. The flection, abduction and also oppostion of the thumb, later of all the fingers stagnates. The Fremont sign (test) is positive. The heavy trophic changes of the thenar and antithenar, described in all the previous older works, are not to be found today.

In the original working method of the glass-blowers the right hand — in the right — handed persons was more affected. Recently we find a mild frustration of both hands with a slight prevalence of one of them.

Even though the ambulat and the spa-rehabilitation is started early the worker must reconceile himself with a shorter prognosis of his profession and of being put into a different phase of glass-work. Often there is an aggravating painful radicular component of the cervicobrachial syndrome of the vertebrogenious origin, which is manifested more in the affected limb.

In the last five years we treated in our neurologic spa-sanatorium an ever increasing number of patients, from whom we have selected a group of 35 patients treated in our sanatorium recurently at one year intervals. It concerned glassball-blowers, glass-cutters, mostly masters in their profession.

From the 35 patients, 14 were found to have a paresis n. ulnaris bilateralis, without a notable prevalence of one hand mostly being a fruste one. Six were found to have a paresis bilateralis more expressive on the right hand side 9 patients more on the left hand side and 5 patients had only a one-sided paresis n. ulnaris of the right-handed persons. Only in a single case it was a question of the affection of the sensitive component. In two patients we noticed a slow shift of the syndrome from the right hand to the left one during the lapse of one year and this, when the patient changed his working method. or in another case of fruste paresis n. ulnaris bilateralis we saw the paresis more expressed on the right hand side.

Twelve patients at the same time suffered from a radicular syndrome on the basis of the neck spine's spondylarthrosis, which is iradiating pain more to the side of the peripeheric laseis n. ulnaris. Seven glass-blowers were suffering also from a syndrome radicularis lumbosacralis.

The shifting of the paresis from one hand to the other, respectively its accentation can be attributed not only to a change of working method and to working's stereotyp of right-handed or left-handed persons and this by changing the weight from the elbow to the whole fore-arm.

The disorder of the sensibility, persisting more or less, hypaesthesy in a corresponding segment showed no change during the cure, even when it concerned patients, who had taken the cure treatment several times.

We have chosen the same rehabilitation treatment as in the peripheric paresis but the balneologic treatment in regard to frequent vertebrogenic inconveniences. As a basic rehabilitation method we used with all patients the individual training according to the muscle test. These were exercises of conscious movement with a rough propioceptice stimulation even againts a resistance, beginning with isometric movements and then continuing with the coordination of all muscles. Before the exercises the patients took a Sollux-bath. After repeating the muscle test in four weeks we fount above all an improvement of the flection and ulnaric duction of the wrist, further an improvement of the fingers' mobility, the flection of the mm. interossei, of the opposition and flection of the m. opponens dig. V as well as the improvement of the flection and extension mm. policis longus et brevis and of its mm. adductores, Besides preheating by the Sollux-lamp we also prescribed mud-compresses. As a vasodilatans can be considered mainly the therapy of carbon dioxide baths.

Up to the year 1975 we prescribed carbon dioxide baths with radon or radon baths, all in all 10 to 12 baths every other day, of indifferent temperature up to 36 degrees for 20 minutes. At these indications we can recommend radon baths because of their analgetic influence at the associated vertebrogenic syndromes. We can attribute this analgetic result also to the physical effects of the bath's temperature and also the effect on the vegetative nervous systeme, where on the peripheric area arises a sympathotonic reaction. From our 35 patients 23 had had also radon baths and in these we found an expressive improvement of their paresis. Another balneologic method in weak paresis of the type of prefessional paresis n. ulnaris is the treatment therapy by gas injections, where in all amyotrophic syndromes of the hand we applied every other day suboutaneous injections of 50 ccm spa-gas to the back side of the fore-arm and of the hand. It is a question of specific gas effect, its component carbon dioxide, strengthed by the addition of H_2S on the algic component, and of the reflexive effect too. The favourable effect to the lymphostasis and to the trophic changes are due to the vasodilatation. As a positive factor we can mention the contact between the gas and the fine dispersed ends of the centripetal nerve fibres and the possible direct influence on the afferent nervous system.

From the other physical procedures we can also mention the effect of the classical massages for stimulation of the skin and also a more intensive influence of the underwater massages. In 28 cases from our 35 patients we could note a notable improvement of the muscles' strenght according to the muscle test, a permanent improvement in 11 patients, recurrently treted and from this four glass-blowers, beginners in their profession. The coming--down of the cervicobrachial syndrome in 12 patients could be added to the total result of the treatment. In the eleven repeatedly treated patients, from this six have repeated the spa-treatment three times it was the matter of a longtime chronic paresis, where the mobility, the subtile movements notably improved, so that the patients could continue in their profession. Two of these patients were successfully transferred to another branch of their profession. Lately many young workers coming to us with the diagnosis of a fruste affection can by an early rehabilitation be completely cured and the young glass-blowers can continue in their profession. The transfer to another branch

of work has certainly a favourable effect on the paresis, but with older workers with a chronic form of this disorder the results are not so considerable.

Even considering the great development in the working conditions in our glass-industry, especially the glass-blowers, the glas-cutters and the engravers we must continue to consider the working methods which expose their hands to a forced mechanic exertion. A systematic rehabilitation cure and spa-treatment for workers of this profession seems to be extremely indiciated.

K. FASSHAUER AND G. HUFFMANN

PROGNOSIS AND REHABILITATION IN PATIENTS SUFFERING FROM TRAUMATIC BRACHIAL PLEXUS LESIONS

Traumatic brachial plexus lesions often lead to permanent defects which can fundamentally alter the fate of the injured (9). The question of the prognosis and rehabilitation possibilities arises early in the course of treatment. Therefore one must try to gain extensive knowledge of the extent of damage as soon as possible (2, 5).

The patients

Since 1967, patients with traumatic brachial plexus lesions were examined electrodiagnostically in our clinic. Almost two thirds of the injuries were due to traffic accidents, most of these were motorcycle or moped accidents. Domestic accidents were fairly frequent, quite often the patients had fallen down stairs. Accidents at work were less frequent, these were mostly due to conveyor belts and machines. Sporting accidents with brachial plexus injuries occured during skiing, sledding, when playing soccer, bicycling, riding and at other sports (Table 1).

The age of the patients was of great importance concerning the reason of injury (Table 2). Traffic accidents — with the exception of motorcycle accidens — were distributed fairly evenly among the various age groups. The incidence of domestic accidents increased with higher age and sporting accidents decreased. The motorocycle accidents occured in the lowest age group in 85 % of the cases and therefore at a time, when many of the injured had not yet finished their occupational training. We were able to register an increase of motorcycle accidents since about 1971.

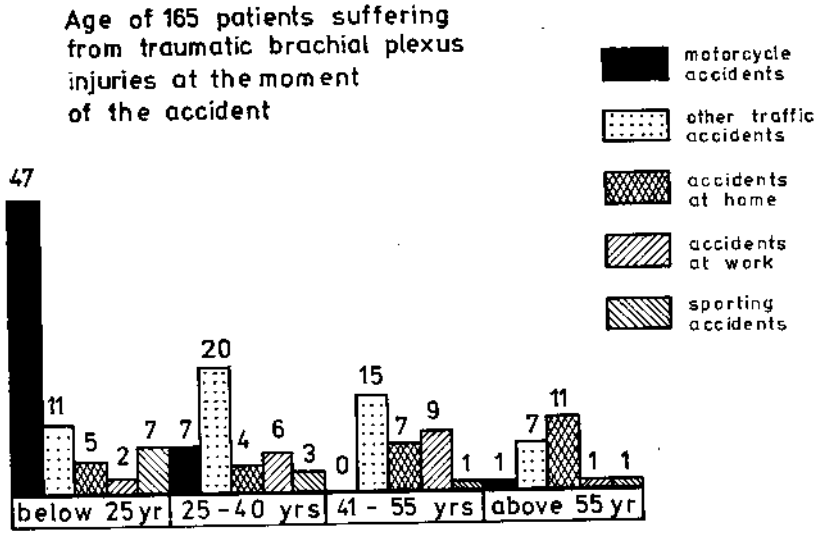
Clinical findings

Atrophic paralysis of the complete arm musculature, often with edema of the hand, trophic changes of the finger, and anaesthesia was found in many patients. We found a total brachial plexus palsy with involvement of the nerve roots at least from C_5 to C_8 in 78 patients, a predominantly upper plexus lesion in 21 cases. The right arm was affected slightly more frequently (86 times) than the left (79 times).

Table 1.

Cause of damage in 165 patients suffering from traumatic brachial plexus injuries

Table 2.



The severity of the brachial plexus injury was quite variable and was usually correlated to the violence of trauma [1]. The mildest injuries were registered in domestic, the most severe in traffic accidents — here especially in the case of motorcycle accidents.

A classification of the extent of damage according to the degree of permanent paresis is best suited to determine the type of neccessary rehabilitation efforts, since only the permanent defect is decisive for the handicap and occupational possibilities [Table 3].

In contrast the clinical examination alone during the early stage does not render a clear indication as to the anticipated permanent defect; therefore, one must try to gain further information by further invetigations [10].

Table 3.

Grade of traumatic brachial plexus injuries

I	transient palsy with complete recovery
II	pernament palsy without paralysis
III	permanent palsy with paralysis in some part of the arm
IV	permanent paralysis of the whole arm

Prognostical indications

Electromyographic investigations can determine the extent of denervation and the occurence of reinnervation, as well as the extent of neurogenic alterations in later defect (2). Spontaneous activity or its absence after the first 3 or 4 weks indicates that only neuropraxia is present and that rapid recovery from paresis is to be expected, or that neural degeneration is present which indicates that the prognosis in much poopper (7).

Sanguineous cerebrospinal liquor (2) and elogation of root pouches on myelography (5, 9) indicated root avulsion in some patients. In 10 of 21 patients it was possible to register a normal sensory nerve potential of the median nerve at the wrist after stimulation of the third finger. Therefore the lesion leading to anaesthesia had to be thought to be proximal of the spinal ganglion (5). Also in 5 of 8 patients the Ninhydrin-test was able to show intact per spiration in spite of anaesthesia of the hand (5). A Horner's syndrome was considered to be a sign of poor prognosis (1, 8). Of 8 patients who were re--examined, only 2 showed partial recovery.

However, the full extent of the expected defect could not be determined with any of the cited examinations. If signs of nerve root avulsion are present one must always anticipate a severe defect.

If complete paralysis persisted after one year and no certain signs o reinnervation were found in electromyography the chances of recovery seemed poor. We have, however, seen partial recoveries even in the second and third year after the accident. Even restitution of partial functions of an arm are of great importance (8). Artisan's work is probably only possible if the paresis recedes completely (Grade I); not however in patient with paresis grade II to IV.

Treatment and rehabilitation (Catamnesis)

We reexamined 20 patients with arm plexus lesions following motorcycle accidents and interviewed them as to their occupational history (Table 4) (3). Of the 11 patients who had completed their occupational training at the time of the accident, none were still working at their old job. Half of the injured were occupied in a new profession , some had been retrained for new jobs and four had not worked at all after the accident. Retraining had begun only 2 $^1/_2$ years after the accident, and many patients had resigned during the time they were ill or out of work. In addition to the disability due to the grade

Table 4.

	professional training completed before accident	professional training not completed before accident	sum
working in original profession	0	3	3
working in a new profession	5	5	10
training for a new profession	3	0	3
unemployed	3	1	4
sum	11	9	20

of paresis further handicaps arose from for instance contractures and severe pain [8, 10] which showed a negative influence on rehabilitation measures. *Treatment* must therefore begin early especially in view of these complications, and must be patiently continued over years. It should not be abandoned too early because of presumptive hopelessness. Beside operative procedures [6] which may be considered in some patients during the acute stage, physical therapy is of great importance [4, 10]. In regard to vegetative disorders [6] and for psychological reasons electrical stimulation seems to show positive effects.

The personality structure is very important for the *emotional reaction* to the accident results. Personal initiative and willpower are decisive for rehabilitation. Often, a passive, expectant attitude was found; pain — which was present constantly — led to alcohol and drug abuse. Positive influence of the persons involved in the care of the patients at home and at work is expecially important in such cases. We saw good rehabilitation results for example in such patients who could be reintegrated into new jobs in their old firms.

Measures concerning the occupational *rehabilitation* should begin immediately after recovery from the direct injuries. Training of the skill of the healthy arm can begin immediately during hospitalisation. Only the early coordination of all therepeutical and occupational measures in consideration of the anticipated pernament defect can lead to successfull rehabilitation in patients with severe brachial plexus lesions.

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L. V. LAITINEN

PLACEMENT OF ELECTRODES IN TRANSCUTANEOUS NERVE STIMULATION A THEORY OF PAIN

Introduction

As shown by increasing numbers of clinical studies, transcutaneous nerve stimulation (TNS) is an effective palliative therapy in chronic pain due to various causes. In the majority of the reported series, 13 — 75 % of the patients have benefited from stimulation.

Although TNS includes many electronic parameters, such as pulse shape, width, frequency, etc., the roles of which have not been sufficiently documented, correct placement of the stimulation electrodes is of great importance. Most clinicians have stimulated the painful area, but some have noticed that stimulation of this area is not a conditio sine qua for relief of pain. Melzack's recent study seemed to show that the most effective stimulation sites were near and distant acupuncture points and the innervation area peripheral to the pain site. Electrodes placed at pain trigger points did not seem to give such good results.

In many patients with local or widespread sensory loss, stimulation of the painful area seems to me repugnant, although the maximal pain is often felt in the anesthetic or hypesthetic area. Even strong electrical stimulation in this area will seldom give the patient any subjective sensation, and in some patients stimulation of this region may even aggravate the pain. In such cases I have therefore purposely placed the electrodes far from the pain, area, and even on the completely healthy side of the body. Since the clinical results of this technique seem promising, I shall describe my method and results here. Finally I shall present my concept of the psychological mechanisms of chronic pain.

Patients and Methods

The present series consisto of 46 consecutive patients referred for surgieal treatment to the Department of Neurosurgery, University Central Hospital, Helsinki. All were suffering from long-term chronic pain of various etiologies, and many had already undergone neurosurgical or orthopedic operations with little permanent benefit. Acupuncture and hypnosis had also been tried.

The patients' clinical pain condition was first assessed in quantitative terms, with a special pain index card (Fig. 1). The total severity of the pain was assessed in points from 0 to 16 from four subscores, which consisted of 1) subjetive intensity of pain, 2) frequency of pain, 3) consuption of analgesics

No

Name Sex Born Age

Occupation Nationality

Address Phone

Diagnosis

Etiology

Duration of pain Quality of pain

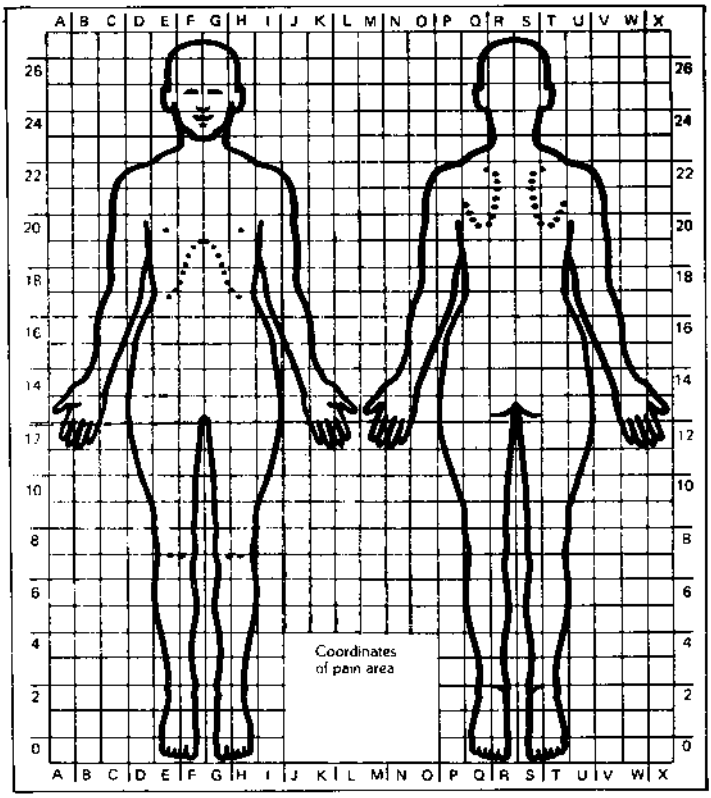
Psyche Intelligence Social condition

Previous therapy

Drugs

Hatch the pain area(s) ////
Cross-hatch the most painful area XXX
Mark all areas of sensory loss or defects with o

Assessment of severity of pain as follows
A Subjective intensity: no pain, 0; mild, 1; annoying, 2; intense, 3; unbearable, 4
B Frequency: never, 0; seldom, 1; often, 2; very often, 3; continuous, 4
C Consumption of analgesics: none, 0; occasional, 1; minor, regular, 2; major, regular, 3; maximal, 4
D Incapacitation: none, 0; slight, 1; unemployable, 2; needs help, 3; completely helpless, 4
E Duration of later periods of relief of pain
F TNS session number
G Induction time of relief of pain
H Duration of immediate effect
I Immediate effect of TNS: worse, 0; not known, 1; unchanged, 2; fair, 3; good, 4



TNS

Date	A	B	C	D	A-D	E	F	coordinates	parameters	G	H	I

Fig. 1. Pain index card (available from the author).

and 4) degree of incapacitation. The subjective intensity of pain was evaluated as follows: no pain 0, mild 1, annoying 2, intense 3 and unbearable 4 points. The frequency of pain as follows: never 0, seldom 1, often 2, very often 3 and continuous 4 points. Consumption of analgesics was evaluated as follows: none 0, occasional 1, minor but regular 2, major, regular 3 and maximal 4 points. Incapacitation was assessed as follows: none 0, slight 1, unemployable 2, needs help 3 and completely helpless 4 points.

Attention was also directed to the patients' psychological features, intelligence and social condition.

The body map of the pain index card allowed digital definition of the coordinates of the pain site and electrode placement.

Stimulation technique

A portable transcutaneous nerve stimulator was used [Em-set^{TM}, Em-set Oy, Katajaharjunt. 6 B 18, Helsinki 20]. The device produced biphasic pulses of 0,4 or 0,8 msec in duration. The first negative phase was four times as long as the second positive phase; the surface areas of the phases were equal. The frequency ranged from 10 to 100 Hz, and the intensity of the constant current type pulses could be adjusted from 0 to 50 mA. The electrodes were silver plates, 2 cm by 3 cm in diameter. Electrode paste was used to improve their contact with the skin. They were attached to the skin with adhesive tape or an elastic bandage.

The stimulation frequency was usually 60 to 100 Hz and the intensity was so adjusted that the patient had a strong but still not unpleasant sensation of electricity. Muscle jerks were avoided.

Placement of electrodes

The painful area was stimulated, provided it showed no signs of sensory deficit. Where local or widespread hypesthesias or anesthesias were found, the electrodes were placed on the upper arm or thigh of the healthy side.

Stimulation time

Stimulation was normally given for 15 to 30 minutes, and the session was repeated as soon as the pain recurred. After 2 — 4 successful treatments in the outpatient department 34 patients purchased a portable stimulator and continued their treatment at home.

Results

Nineteen patients (41 %) reported that TNS was repeatedly effective in abolishing the pain more or less completely, 17 (37 %) stated that the effect was fair, while 10 patients (22 %) obtained no relief or the effect was only of short duration.

Some patients stated that the pain disappeared within 10 to 15 minutes of stimulation. Others did not notice any relief during the first sessions, but the pain disappeared later, even two days after the session and did not recur for several days.

The duration of the relief varied from a few minutes to two weeks. The shortest durations were noticed in cancer patients, who often needed TNS

Table I. Mean pain scores and percentage improvements in different categories (N, number of patients; A, subjective intensity of pain; B, frequency of pain; C, need for analgesics; D, incapacitation; Z, sum A to D; % percentage improvement).

	before treatment						after treatment					
	N	A	B	C	D	Z	A	B	C	D	SI	%
Thalamic pain	8	3,4	3,4	2,6	3,3	12,8	1,6	1,4	1,0	3,0	7,0	45
Traumatic neuralgia	6	3,3	3,5	3,0	2,5	12,3	2,0	2,0	1,5	2,0	7,5	39
Phantom limb pain	5	3,6	3,8	2,6	2,0	12,0	0,8	0,8	1,0	1,6	4,2	65
Zoster neuralgia	5	3,6	3,6	2,0	1,8	11,0	1,2	1,4	0,6	1,6	4,8	56
Cancer pain	4	3,5	3,8	3,3	3,5	14,0	1,8	2,3	2,0	3,5	9,5	32
Brachialgia	4	3,0	2,5	2,0	1,3	8,8	2,3	2,0	2,0	1,3	7,5	15
Avulsion neuralgia	3	4,0	3,3	3,0	2,3	12,7	3,0	2,7	2,3	2,3	10,3	19
Low back pain	3	2,7	2,3	2,0	2,3	9,3	1,3	1,7	1,0	2,3	6,3	32
Whip-lash pain	2	3,0	3,5	3,0	2,0	11,5	2,0	2,0	1,0	1,5	6,5	44
Cluster headache	2	3,0	1,5	2,5	0,5	7,5	1,5	1,0	1,0	0,5	4,0	47
Parkinsonian leg pain	2	4,0	3,0	2,5	3,5	13,0	4,0	3,0	2,5	3,5	13,0	0
Intercostal neuralgia	1	3,0	3,0	3,0	2,0	11,0	1,0	1,0	0	1,0	3,0	73
Atypical glossoph. neuralg.	1	3,0	2,0	3,0	2,0	11,0	4,0	2,0	3,0	2,0	11,0	0
Total	46	3,4	3,2	2,6	2,4	11,6	1,8	1,7	1,4	2,2	7,1	39
Average improvement							47%	47%	46%	8%		

frequently. A single session had long-lasting effects in patients with thalamic pain, traumatic neuralgia and zoster neuralgia.

The good effect of TNS had a tendency to disappear, particularly if the patient lived far from Helsinki, was depressive or had low intelligence. One depressed patient always obtained good relief when treated by the author, but at home she began to dislike the stimulator even though it abolished her pain. Two other depressed patients felt that TNS repeatedly increased their pain. The one suffered from brachial avulsion neuralgia and the other from spondylotic brachialgia.

The over-all results of TNS were assessed after an average of 9 months of treatment (Table I). The subjective intensity and frequency of the pain improved by 47 % and the consumption of analgesics diminished by 46 %. Incapacitation was lessened by only 8 %, which is understandable because, owing to their underlying diseases, many of the patients were in poor general condition. The total mean improvement of all diagnostic categories was 39 %. Those conditions in which the improvement exceeded the mean level were

phantom limb pain (65 %), zoster neuralgia (56 %), cluster headache (47 %), thalamic pain (45 %) and nuchal pain after whip-lash injury (44 %). Post-traumatic neuralgia reached the mean level of improvement, and cancer pain (32 %), low back pain (32 %), avulsion neuralgia (19 %) and brachialgia of spondylotic origin (15 %) were below the mean.

Apart from the two patients in whom TNS evidently worsened the pain, there were no complications. So far, there have been no signs of skin irritation from electrode paste.

Discussion

The present study confirms the previous findings that TNS is effective in many kinds of chronic pain. The over-all beneficial effect of 39 % on different aspects to the pain complex was slightly lower than that reported by Melzack, who used a different questionnaire for assessing pain. The average pain decrease during his TNS sessions was 75 % for pain due to peripheral nerve injury, 66 % for phantom limb pain, 62 % for brachialgia, and 60 % for low back paine. The difference between his results and mine may be related to the duration of the effect: he studied the patients soon after a single TNS session, whereas my patients were evaluated after 9 months of treatment.

In his study, Melzack correlated the percentage decreasse of pain with the site of the electrodes. In peripheral nerve damage, low back pain and brachialgia the results were best in those patients, in whom stiumlation was applied at near and remote acupuncture points. Ebersold et al. have also found that the site at which stimulation produced the greatest pain relief varied from remote nerve trunks to the painful area itself; the latter usually gave the best response. Lazorthes et al. demonstrated that stimulation of acupuncture points gave the best results, particularly when these points correspoded to the dermatome of the painful. nerve. But they could also show that stimulation of the healthy side was able to relieve the pain. Shealy stated that among his 2000 patients who had received TNS he had not had a single patient who achieved complete permanent control of pain with remote stimulation. My present findings are clearly at variance with his statement: the best results were obtained in those three major diagnostic categories in which the healthy side of the body had been stimulated, viz., in thalamic pain, zoster neuralgia and phantom limb pain. In all these conditions the quantitative improvement was clearly above the mean, whereas in those three categories in which the painful area had been stimulated, viz., cancer pain, low back pain and brachialgia, the improvement did not reach the mean of the whole series. The difference may partly depend on the basic nature of the diseases involved, but the results suggest that improvement is greater when the healthy side of the body is stimulated. To document this finding we are collecting a series for a controlled trial.

In their studies on the placebo effect of TNS, Long and Melzack found that the improvement produced by this therapy does not depend wholly on suggestion, although this does have an additional benefical influence on pain relief. Nevertheless, further information is still needed on the role of suggestion, and this should be remembered in designs of new controlled trials.

Little is known about the action mechanism of sucessful TNS. Even though the peripheral, spinal, reticular and thalamic structures are essential for transmission of nociceptive signals, the final mechanism for pain relief must be sought on the cerebral level, among those psychological processes which also underlie the development of chronic pain. There is ample evidence that

chronic pain states tend to develop after a lesion or total interruption of cutaneous sensory pathways (e. g., causalgia, thalamic pain, zoster neuralgia, avulsion neuralgia, phantom limb pain, postcordotomy dysesthesia etc.). To understand the psychological mechanism of pain, we have first to define the meaning of pain experience. From an evolutional point of view, any external or internal stimulus may be painful if the brain interprets it as dangerous. The temporal cortical areas, which are also rich in limbic and emotional connections, continuously classify and interpret certain signals as dangerous (painful), others as harmless (neutral), and still others as harmless but meaningful (pleasant, soft, cold, etc.). When, after a lesion of the pathways, the arriving signal is changed, i .e., completely novel or even lacking, interpretation presents a problem. Some neurons specialized for the task of interpretation are unable to understand the new „language" and, as their primitive function serves for security and protection, they switch on the signal for danger, pain. It should then be the brain's holistic intengrative task to check the situation and inform those interpretative neurons that the sensory change or loss is not dangerous.

The plasticity of the brain, its ability for physiological and psychological reorganization, is reduced in old age. Therefore, old age increases the risk of chronic pain after nerve lesions. Zoster neuralgia is extremely uncommon in people under 60, and the risk of phantom limb pain after amputation also seems to increase with age. Psychic stress, poor social conditions, loneliness, low intelligence, depression and fear of death diminish the brain's capacity to interpret the changed sensory input and worsen the pain.

Melzack and Wall have drawn attention to the role of the substantia gelatinosa of the posterior horn in the peripheral primitive selection of sensory signals. But, as I have pointed out her, the cortical level is more important for the final intepretative treatment of complex sensory data. To make a proper judgement, the brain cannot base its assessment solely on signals from A delta and C fibers and their cortical connections. Successful interpretation requires, in addition, the input coming simultaneously from tactile and pressure receptors. In this connection it is relevant to recall the fairly recent remarkable finding of Comings and Amronin, who demonstrated by electron microscopy that, in a family with autosomal dominant insensivity to pain, the unmyelinated C fibers were intact, while the medium- and large-sized myelinated fibers were affected. This shows that the C fibers, although they undoubtedly mediate nociceptive signals, are not by themselves able to tell the brain whether a stimulus is painful or not. The stimulus remains neutral, as was beautifully demonstrated by Comings and Amromin. Their patients had never, owing to the inherited defect in the tactile fibers, been able to learn what „pain" was.

Another recent surgical finding may support my present concept of chronic pain. Small stereotactic lesions in the anterior pulvinar may effectively abolish chronic pain without simultaneously producing sensory loss or emotional blunting. Electrical stimulation of the target area gives rise to evoked potentials in the temporal cortex. On the other hand, the anterior pulvinar receives spinal afferent fibers mainly along the dorsal column, fibers which are very fast and presumably of a mechanoreceptor origin. Only very few of the fibers to the anterior pulvinar ascend along the anterolateral segment of the cord. Pulvinotomy may disturb the already perplexed interperative processes of the temporal cortex. Its effect is often of short duration, as is so common when chronic pain is treated with destructive lessions.

The action mechanism of TNS might be as follows: any novel continuous cutaneous stimulation atracts the brain's attention. When new sensory receptors and fibers are stimulated, new cortical neurons become involved in classification tasks, the previously agitated neurons become inhibited, and so the pain is abolished. Analysis of the new TNS data will continue long after stimulation has ceased, and so the inhibition will continue. With repeated TNS session, always supported by active psychotherapy, pain is often inhibited for longer and longer periods. However, as the previously learned model of behavior, chronic pain, has a tendency to recur, repeated TNS sessions are needed.

Acknowledgement

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J. C. ASCHOFF, D. WEINERT

SULPIRIDE IN THE TREATMENT OF MIGRAINE

There is little doubt that in women migraine attacks are often related to hormonal changes. Sommerville (1972) demonstrated that migraine attacks correlated with falling plasma estradiol levels. Sulpiride, a benzamid-derivative with neuroleptic and thymoleptic properties is known to act at the hypothalamic level and in particular to inhibit releasing factors responsible for FSH and LH secretion. In this way Sulpiride keeps estradiol levels low and prevents major fluctuations. Sulpiride, therefore, should improve migraine.

34 women with recurrent attacks of migraine were treated with Sulpiride (300 mg/day). Of these 60 % became completely free of migraine, 20 % improved and only 20 % had no benefit of this treatment. In the latter group an organic cause (head trauma, lesions of the cervical vertebral column) was usually responsible for the migraine attacks. When Sulpiride was withdrawn, migraine frequently reoccured. Side effects were related to the above mentioned hormonal changes, i. e. amenorrhoe or delayed menstruation in 60 %, and breast tension (40 %) or galactorrhoe in 15 %, due to an increased luteotropic hormon (LT) secretion.

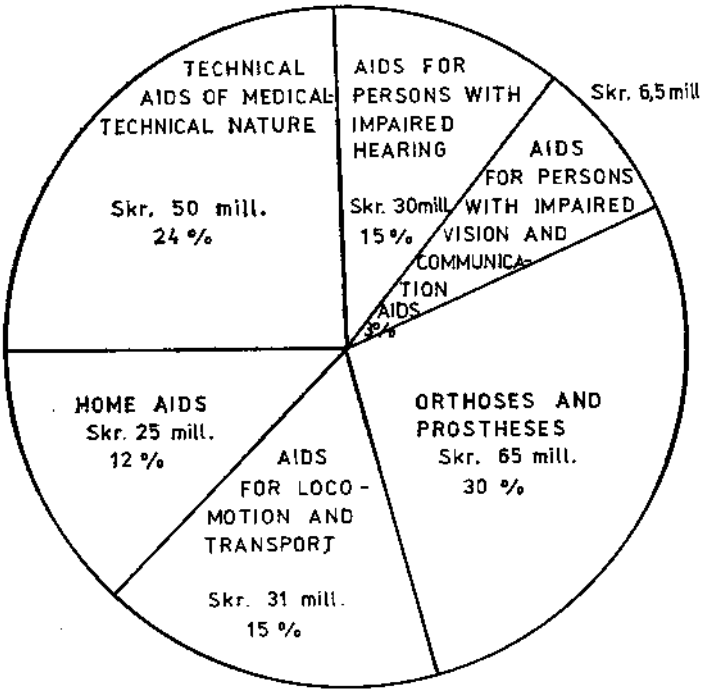
ANDERS GOGSTAD

PRESCRIPTION OF TECHNICAL AIDS IN SWEDEN. PRACTICAL ORGANIZATION AND SOME THEORETICAL VIEWPOINTS

Service with technical aids is an important part of the rehabilitation programme for the handicapped in the Scandinavian countries. In Sweden are from 1962 considerable costs for technical aids covered by the state — but the public investment in dwelling improvements and technical aids has increased significantly already since early in the 1950ies. During the 1950/51 fiscal year the total appropriation for such purposes in the national budget amounted to Skr. 3.5 million (one Skr. = $ 0,24), in 1960/61 to Skr. 10 million, in 1970/71 to Skr. 160 million and in 1974/75 to Skr. 260 million. (The population of Sweden is approx. 8 million). The inflation has during the period 1950 to 1975 grown in prices proportion 1 to 3,5.

Table 1.

GOVERNMENT GRANTS FOR TECHNICAL AIDS FOR THE DISABLED BROKEN DOWN BY DIFFERENT GROUPS OF AIDS. FISCAL YEAR 1974/75



Totally: Skr. 210 mill. approx.

The division of different groups of aids is shown in diagram 1:

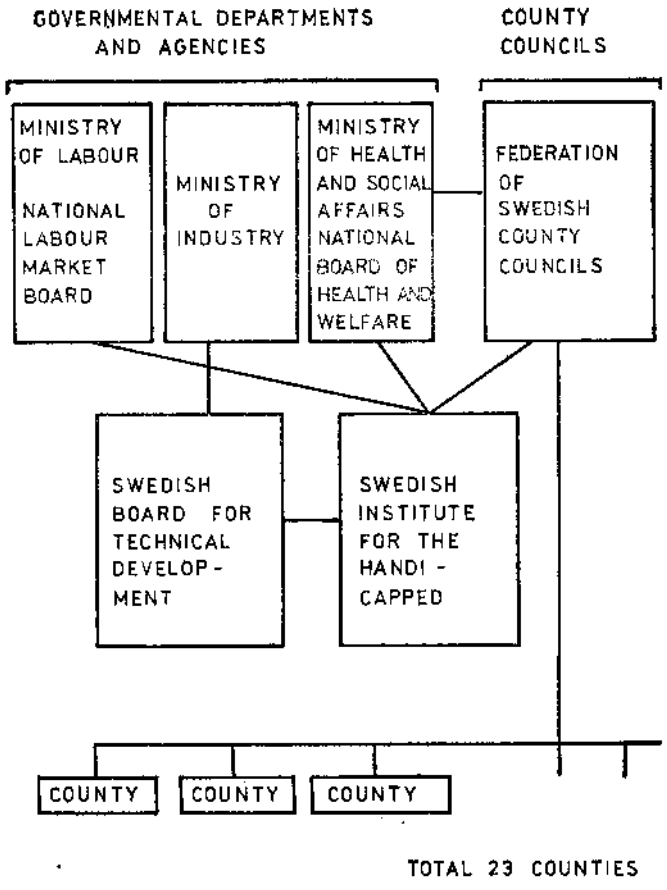
The handling of technical aids on local level is the responsibility of the country councils. These activities include prescription and distribution of aids, training, information, follow-up etc. From January 1st 1976 the country councils have also taken over the economical responsibility of all technical aids. The governement is, however, paying the counties after a yearly lump sum according to the number of inhabitants in the county concerned.

The Association common to the county councils has in this structure a vital role to play in policy desicions, to make a list of recommendations of aids free of cost etc. It also has to make arrangements for central purchase to bring down the prices. „Technical aids" are in this connection divided into the following groups:

Medical technical aids for improved function in daily living. Aids for locomotion and transport (wheel-chairs, autocars).

Table 2.

CENTRAL ORGANIZATION OF THE SERVICES OF TECHNICAL AIDS FOR HANDICAPPED IN SWEDEN



Home aids such as washing machines, alectrical kitchen appliances etc.
Visual, hearing and speech aids.
Technical communication aids.
Occupational aids.
Building and community planning questions such as dwelling improvements.
Orthopedic aids such as orthoses/prostheses and shoes.

Disabled persons can obtain a wide variety of aids free of cost, provided it can be documented that they really are in need of it — i. e. that the aids considerably contribute to improved functional status, physical independence or are necessary for keeping the disabled in productive work. It should also be proved that they really are able to handle the device prescribed. The testing, evaluation and training of the patient is mainly the responsibility

of ocuppational therapists or physiotherapists in hospital departments for medical rehabilitation, long-term diseases, orthopedics or neurology — in co--operation with the community health staff, particularly the district nurses who also have and extended right is, however, for more expensive and technically complicated aids limited to certain cathegories of medical specialists. The all- over coordinating technical and administrative control has in all counties been taken over by a special county board for the technical aids where are seated representatives for elected members of the county council, representatives for the handicapped's own organizations and certain experts.

Unless very simple, all new technical aids must be tested by the Swedish Institute for the Handicapped. This is a governmental organization situated in Stockholm which carries out a certain amount of research and development work. It is also responsible for initiating and co-ordinating such research and development work carried out by other organizations. Another task is to spread information both to the professional staff involved in prescription of technical aids and to the public — particularly the consumer group: the disabled. The Institute also participates in advanced training of staff by arranging courses and conferences and by preparing study material.

An international information centre, „International Centre on Technical Aids, Housing and Transportation" (ICTA), is attached to the Institute's information department. ICTA forms a part of Rehabilitation International. The Institute is also housing the new board and central organization for handicap questions established by the Nordic countries. Each year a survey of research and development projects in the Nordic countries is published.

As a part of the welfare policy of the country it is also important to evaluate the results of these great investments. It is of course always important to weigh the inputs to the outputs and to other projects in order to get a correct order of priority. It is, however, rather difficult to perform such evaluations — objective and subjective criterias on „effects" are difficult to define, construct and operationalized. Some investigations have, however, been carried out by experts groups in administration through continous folow--up by the field workers and also by some research workers such as Helander and Allander. Time does not allow me to go into detail.

The principal idea behind the service with technical aids is to diminish the distance between the disabled and the notdisabled in the society.
The technical aid is, isolated seen, no solution of the problems of the disabled but may increase the total effects of comprehensive rehabilitation programme. As a part of such a programme must also be considered the attempts to improve housing conditions, make an easier access for the handicapped to public transportation, public buildings etc., in other words: „make society friendly to the handicapped". It will, however soon be seen that such a general policy programme has its narrow limits as the many individual needs easily are lost in such generalized programes. Different cathegories of handicapped may thus have quite different needs. A carpet-covered floor may be a great help to a paralyzed when walking but a threat to an allergic. A pave ment edge along a street with heavy traffic might mean a great inhibition to a wheel-chair patient but is an important mean of orientation to a blind. A bath-tub in a flat is a great help for a psoriasis patient but is useless to a locomotor-handicapped etc., etc. A number of individual psychologically and sociologically induced preferences are also decisive for the attidues to and consenquently to the effects of such measures and aids. Age, sex, level of

education, intellectual resources, cultural patterns and traditions are beside the type of disease and disability contributing to the ittitude to, the need for and the effect of technical aids, dwelling improvement and changes in public facilities.

Patients considered by an expert team to be in need of technical aids may easily be divided in two cathegories: Those with positive attitude to aids and those with negative attitude to aids.

By evaluation of the effects of prescribed aids one of the most important indicators of positive effects is the registration of the frequency of the usage of the aid. Is the aid put into a corner and not used at all — or is it frequently in use? The next indicator is observations of the facts around the use: Time-saving and strenght-saving procedures in work, mobilization and daily activities at home. The third indicator is the patient's own attitude to the aid but this may often be the least reliable. Frequently patients that objectively are observed to benefit from using the aid and in fact continually uses it express a negative attitude to the aid. E. G. it is denied that it really is strength — or time-saving, a number of unpleasant side-effects are frequently mentioned etc. In this attitude may be hidden certain unexpressed desires that are not fulfilled or directly countracted by the presence of the aid. We have thus observed that technical aids for elederly, efficiently contributing to a state of indepedence, compesate for the need of a person, a home-aassistant, that probably for other reasons were highly desired. Thus the technic aid only contributes more to the loneliness and isolation of the elderly. In the working ages we may notice similar ambivalence as regards rehabilitation as an alternative to pension or other passive support when communication or working aids may contribute desicively to maintaining the occupation. We are here touching the complicated fields of motivation problems of rehabilitation but these are beyond the theme of this short lecture — they should, however, not be forgotten within this important field of rehabilitation.

If we sum up some of the experiences from different Swedish investigations we find the needs for technical aids among the handicapped — seen with the expert's eyes — are considerably high and are only satisfied to 50 %
— in spite of the existing liberal Swedish rules. But the need varies markedly between different cathegories of handicapped. Renewal of many types of technical aids is necessary at least every other year — a service for repair and renovation is therefore also important to build up. The need increases with the age. A Swedish sample of patients used their technical aids up to 80 % but the aids not used were chiefly the cheapest and simplest. But even if it is difficult to get the elderly to accept an aid than the younger groups of disabled. It seems further more difficult to get hand — and arm-disabled to accept aids than other disablities are more unwilling to accept an aid or device than persons with later ecquired disablities. Men are more negative that women, patients with a fluctuating or progressive handicap are more negative than those with a stable handicap. A too complicated device is more easily refused than a simple one, in particular if the intellectual resources of the patient are limited. Certain cultural traditions, standard of living, patterns of consumption preferences, esthetic values etc., may be highly individual and contribute to different attitudes and motivation for use. This is well know from e. g. prosthesis prescription throug many years.

The attitude to the own handicap and the way of adaptation to the situation of disability may reflect on the attitude to the technical aid. A resistance

towards a technical aid may indicate a maladaptation to the disability state in general. It should thus be regarded as a serious sign and treated as such within the comprehensive rehabilitation programme for the patient. The insecurity-feeling, the need for personal prestige, the loss of self-respect etc. may lead to overcompensation in desires and claims: the aid or the device should be of a certain quality and design — usually far above general standards — to be accepted. This may also be taken for what it is — namely a serious sign of maladaptation and psychological need for personal support and firm correction.

These are examples of the roles the technical aids within a rehabilitation programme. A role that never may be considered isolated and apart from the patient's total need in a difficult situation.

E. ROCHA, M. PEREZ, J. PLAJA, F. ANGLES, C. RECIO

THE AVERAGE MYOELECTRICAL ACTIVITY OF SKELETAL MUSCLE IN HEALTHY AND PARETIC INDIVIDUALS IN ELEMENTARY MOVEMENTS OF THE LIMBS

Introduction

The purpose of this study is to show the results obtained by using surgical techniques to correct the pathomechanics of gait in spastic hemiplegic patients. All the patients had previously followed a rehabilitation program using normal conservative techniques and all cases were considered to be clinically stabilized, although serious deficits of gait still persisted. Our purpose was to achieve a gait which at the same time would involve the least energy expenditure and provide the best psychological and aesthetic acceptance on the part of the patient and society in general.

Analysis of normal gait

Normal gait is a complex activity, which is highly integrated and has low energy expenditure. Biomechanically, it implies the interaction of movemental hip level on the three planes and of the knee, ankle joint and metarsophalangeal joints on the saggital plane. These are the so-called „determinants of gait", movements carried out with the participation of the muscles of the lower limbs and some of the trunk and upper limbs, which are necessary for momentum, balance and postural adjustment. Also, normal gait implies the correct functioning of the structures necessary to supply, transport and maintain an adequate energy balance all of which is regulated and controlled by the central nervous system.

Normal gait involves three fundamental elements:

1. Forward progress of the body through push-off in one lower limb while body weight rests on the other.
2. Balance and support of body weight on one lower limb, while the other swings forward.
3. Adaptation of length of swinging limb in order to avoid the obstacle of the ground and finally to come into contact with it.

The first two tasks are essential for walking. The third is necessary to achieve smooth gait.

Analysis of hemiplegic gait

Leaving aside the complex mecehanismus involved in motor execution, their regulating centres and interdependence, we can classify the hemiplegic's gait disorders from a practical point of view in three groups.

1. Gait disorders principally caused by defects in motor control and execution,
2. Gait disorders principally caused by defective information from central

nervous system, such as proprioceptive sensory disorders, spatial perception or visual field disturbances.

3. Gait disorders principally caused by defects in integration and programming, such as organic dementia, apraxias or impaired body image.

This classification is practical in order to program a series of therapeutic rehabilitation measures, but we must bear in mind that in clinical practice all patients suffer from the defects in the three groups mentioned to a greater or lesser degree simultaneously, because the central nervous system functions as a whole, even though hierarchic levels exist.

The spastic hemiplegic with movement capacity such as synergies achieves ground contact in the stance phase with the forefoot or external edge, instead of with the heel. In the mid-stance period the spastic triceps causes failure of foot dorsiflexion, provoking hyperextension of the knee; also, the varus component causes instability and push-off is slow and weak due to paresis. In the swing phase, the mechanical lenthening, due to equinus, causes foot drag. As well as an insecure and slow gait, all this causes in increase in energy expenditure, which can become from 20 to 60 per cent higher than that of normal gait, in patients whose cardio-respiratory functional reserves often are already critical.

In 1972 we began to apply a series of techniques with the purpose of improving the mechanical conditions of gait in this type of patient, using surgical methods at foot and hip level.

Criteria for selection of patients:

1. Hemiplegics with gait disorders caused mainly by control deficit in motor execution, with minimum disturbance of information and programming of the central nervous system. In our opinion, patients with disorders principally of information and programming require other treatment techniques, which we do not analyse here.
2. Patients who have followed a course of functional treatment of the lower limb and gait re-education over a period of not less than six months awaiting stabilization of the brain damage, but who continue to have difficulties with stance and walking.
3. In general, long life expentancy in relation to etiology and youth of the patients.
4. Long-term failure of other techniques such as medication, alcoholizations, etc.
5. Rejection of orthesis by patient due to intolerance or aesthetic reasons.
6. Patient's desire to increase his independence and to achieve gait on all types of surfaces.

Material and methods

In acordance with these criteria we selected 17 patients of which 5 were females and 12 were males. Their ages ranged from 18 to 60, with a mean of 32.5 (Table 1).

Brain damage was caused by traumatism in 5 cases and by thrombosis in 4 cases. Arteritis was diagnosed in 3 cases and cerebral tumour in 2 cases (Meningioma). There were 2 cases of vascular malformation (such as arterio--venous fistula) and 1 case of post-anesthesia cerebral anoxia.

The paralysed side was in 9 cases the left and in 7 cases the right, and there was 1 case of post-traumatic diplegia.

Table 2. Correlative clinical aspects of functional levels before & after operation

Type of movement		Proprioception		Clonus		Functional level of gait	
Before	After	Before	After	Before	After	Before	After
Synergies	Synergies	Normal	Normal	Limited	No clonus	III	IV
Synergies	Synergies	Normal	Normal	Persistent	Limited	II	VI
Synergy + Selective	Synergy + Selective	Normal	Normal	Persistent	Limited	II	VI
Synergy	Synergy	Normal	Normal	Persistent	Persistent	I	IV
Synergy	Synergy	Normal	Normal	Persistent	Persistent	IV	V
Synergy	Synergy	Normal	Normal	Persistent	Persistent	I	III
Synergy + Selective	Synergy + Selective	Normal	Normal	No clonus	No clonus	VI	VI
Synergy	Synergy	Normal	Normal	Persistent	Persistent	III	IV
Synergy	Selective	Normal	Normal	Persistent	Persistent	V	VI
Synergy + Selective	Synergy + Selective	Normal	Normal	Persistent	Limited	II	VI
Synergy + Selective	Synergy + Selective	Normal	Normal	Limited	No clonus	II	VI
Synergy	Synergy	Abnormal	Abnormal	Limited	No clonus	III	IV
Synergy	Synergy	Normal	Normal	Limited	No clonus	III	IV
Selective	Selective	Normal	Normal	Limited	Limited	V	VI
Synergy	Synergy	Abnormal	Abnormal	Limited	No clonus	III	VI
Synergy	Synergy	Normal	Normal	Persistent	Limited	II	VI
Synergy	Synergy	Normal	Normal	Persistent	Persistent	IV	VI

Disturbance of proprioception was minimal. We considered it to be clinically normal in 15 cases and with notable deficit in 2 cases.

Clinical evaluation of clonus was divided into 3 categories:

1. Duration of response of more than ten seconds = persistent.
2. Duration of response of less than ten seconds = limited.
3. No clonus.

Table 3. Changes in differed phases of gait before and after operation. Characteristics of gait studied

	Before	After
	№ Cases	№ Cases
A) Weight bearing phase		
1. Period of ground contact:		
A) Heel	0	5
B) External edge of foot	2	0
C) External edge — forefoot	13	0
D) Whole foot	2	0
	0	12
2. Period of Mid-stance:		
A) Foot flat	1	17
B) External edge support	15	2
C) Forefoot support	1	0
D) Knee hyperextension	12	5
3. Period of foot push-off:		
A) Big toe	1	1
B) Little toe	16	3
C) Forefoot	0	5
D) Whole foot	0	8
B) Swing phase		
1. Foot drag	14	6
2. Varus	17	4

Ten of our patients showed persistent Achilles clonus, six limited and in one case there was no clonus.

The analytical study of gait with the patients barefoot showed disturbances of greater or lesser degree in all cases. Disorders observed were as follows (Table 3):

1. *Ground contact:* None of our patients achieved contact with the heel, but instead with the forefoot and external edge (13 cases), with the external edge only (2 cases) and with the forefoot (2 cases).
2. *Mid-Stance:* Complete flat foot support was achieved only in 1 case. In 15 cases mid-stance was obtained using the external edge of the foot and in 1 case the forefoot. During this period, hyperextension of the knee was recorded in 12 of the 17 patients under study.
3. *Push-off:* Only 1 patient achieved push-off with the big toe. The remaining 16 patients did this using the external edge of the foot and little toe.
4. *Swing Phase:* During the whole of this phase we observed foot drag in 14

Table 4.

— Classification of different levels of gait— Levels before and after operation

	Functional levels of gait			
	Incapable of walking . . . . . 0 Level ground with braces and cane . . . . I Unlevel ground with braces and cane . . . . II Level ground without braces and with cane III Unlevel ground without braces and with cane IV Level ground without braces or cane . . . V Unlevel ground without braces or cane . . VI			
Level	No. of cases:		No. of levels improved:	No. of patients
	Before	After		
0	0	0	0	1
I	2	0	1	7
II	5	0	2	2
III	5	1	3	2
IV	2	5	4	5
V	2	1	5	0
VI	1	10	6	0

cases and hindfoot varus in all 17 cases, although in 1 case the varus was insignificant.

Functional level of gait (Table 4) was classified from 0 to VI, with 0 being incapable of walking and VI walking on all types of surfaces without help.

Before the operation, the majority of our patients, ten, were within Groups II and III, while the rest were evenly distributed within the remaining Groups, except for Group 0, where there were none.

Ten of the cases were also controlled by accelerometric and goniometric analysis of gait before and after surgical procedures. The basic method is described elsewhere.

Surgical procedures

In this study we have followed the techniques advocated by Treanor, Perry, Banks, White and Mooney:

1. Lengthening of Achilles tendon (Figure 1) with partial tenotomies ad different levels of the tendon, normally three, (2 on the medial aspect and 1 on the lateral aspect). In the case of intensive equinovarus, section of the posterior tibialis muscle tendon is also carried out.
2. Transfer of the external longitudinal half the anterior tibialis muscle tendon to the third cuneiform bone. The internal half remains at its original point of insertion.

Table 5.

Different surgical techniques for Correction of pathomechanics of hemiplegic gait.

Surgical techniques	No. of cases:
1. Sliding heel-cord-lengthening	17
2. Split anterior tibials transfer	16
3. Toe flexor release	4
4. Posterior tibialis release	2
5. Obturator nerve neurotomy	2
6. Hip adductor release	2

3. In the case of feel with metatarsus varus and claw toes, an incision is made on the short plantar muscles, on the big toe adductus and a tenotomy on the toe flexors.
4. The skin suture is carried out with catgut, in order to avoid any change of plaster cast during the immobilization period.
5. Immobilization is achieved with a plaster boot which holds the foot in a neutral position and this is maintained for six weeks.
6. The patients start walking in parallel bars with plaster cast and canvas boot at the end of the first week, recommencing their normal preoperative activities.
7. After removal of cast approximately 6 weeks, special attention is paid to avoidance of edema by means of elastic stocking, periods of orthostatic unloading, active-assisted exercises of ankle and use of static bicycle and pedal.

In our series (Table 5) heel-cord-legthhening was carried out on all 17 patients, hemitransfer of the anterior tibialis in 16 cases, toe flexor release in 2 cases.

Results

Motor control and sensory deficits did not change in any of our patients (Table 2).

Achilles clonus showed a positive change. Four patients changed from persistent to limited and five from limited to no clonus. The rest remained at the same preoperative level (Table 2).

Using the same criteria for analytic study of gait mentioned before, we carried out a second clinical evaluation 8 weeks after operation. The results were as follows (Table 3):

1. *Period of ground contact:*
   With the heel in 5 cases and with the whole foot in 12 cases, compared to the 13 cases with external edge and forefoot before surgery.
2. *Period of mid-stance:*
   With the foot flat in all 17 cases, although in 2 there was predominance of support on the external edge support before surgery. Hyperextension

of the knee persisted in 5 cases of the 12, but in 3 of these it was very slight.

3. *Foot push-off:*
   This was achieved in 1 case with the big toe, in 3 cases with the little toe. in 5 cases with all the toes and in 8 cases with the whole foot,compared to 16 cases with little toe push-off before surgery.
4. *Swing phase:*
   Foot drag was observed in only 6 of the 14 preoperative cases and in 5 of these it was slight. Varus continued only in 4 of the 17 cases and in 5 of to a lesser degree than before surgery.
5. *Functional level of gait:*
   This improved postoperatively in all cases (Table 4). 7 patients improved by 1 level and 9 patients improved by 2 or more levels.
6. *The goniometric analysis,* including the instant angle values in hip, knee and ankle joints, and its graphical composition in x-y axes, showed a clear increase in the range of active movements in the ankle and a decrease and better performance in knee movement, indicating less need to compensate for the foot drop and triceps tightness during mid-stance (Figure 2).
7. *The tri-axial accelerомtric trace findings* were more inconstant, but mainly showed a decrease in intensity of accelerations and decelararions, which can be interpreted as a reduction in energy wasted and not directly used in gait progression.

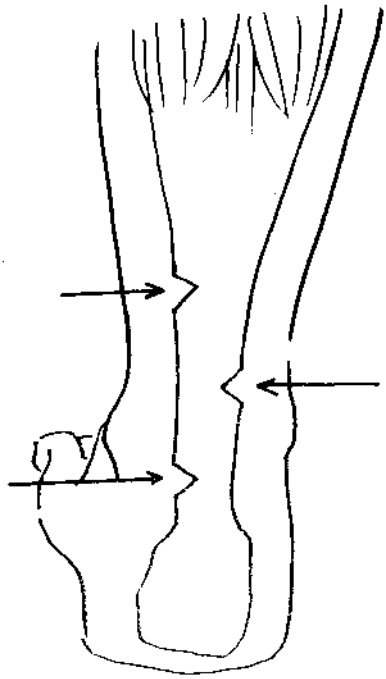


Figure 1. Heel-cord-lengthening for equinus deformity.

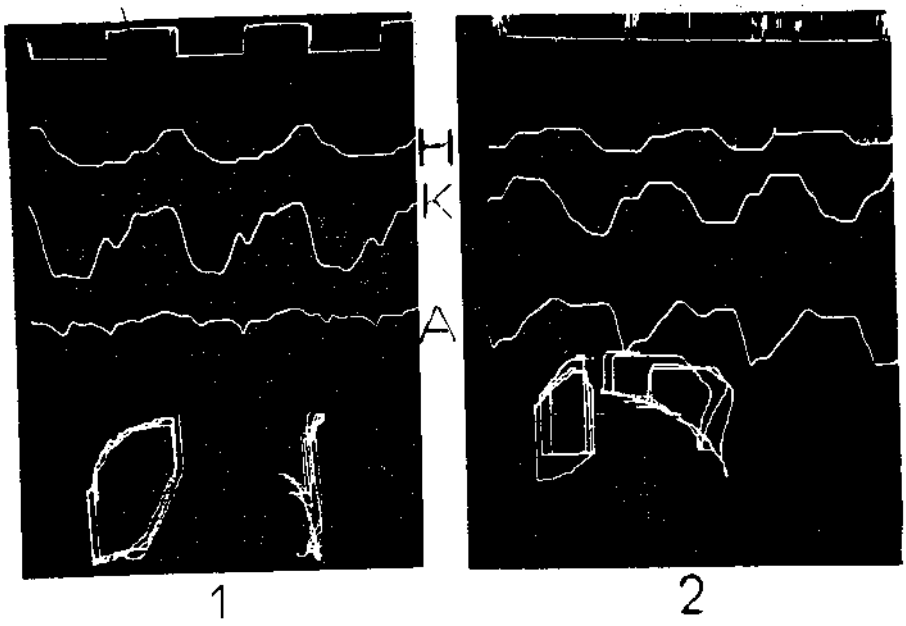


Figure 2: Electrogoniometric tracings of hip (H), knee (K) and ankle (A) joints and combined plotting in x-y axis, before (1) and after (2) operation. The ankle's range of movement increases and the knee and hip decreases and improves performance.

In our series we have no surgical complications; neither have we observed infections, dehiscences or tendon ruptures.

Orthostatic edema was seen to be present in 4 cases on removal of plaster boot, but this was reduced by physiotherapy.

Slight valgus was observed in one case.

Spatic claw toes were seen in 4 cases.

Discussion

From these results we can underline the following facts:

1. This was a selection of patients who had previously been following a rehabilitation program using normal techniques over a period long enough to consider them as clinically stabilized at motor execution level, and in whom there remained serious limitations in the mechanism of gait with only slight sensory deficits.
   The fact that no change was noted in motor control and sensory deficits is logical, because our intention was to correct pathomechanical effects of gait at peripheric level.
2. Achilles clonus decreased on the whole in our patients, probably due to the tendinous lengthening of the triceps during the first phase of surgery.
3. We attribute the improvement in ground contact, to the reduction in equinus (Figure 3, 4, 5, 6), due to triceps lengthening and also to the reduction of varus trough the hemitransfer of the anterior tibialis.

Figure 3

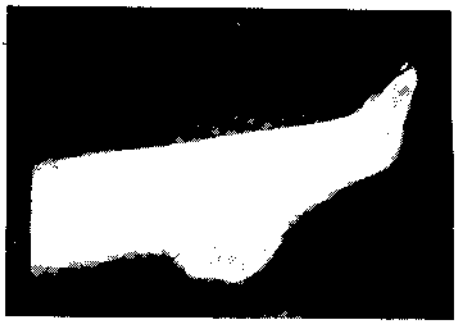


Figure 4

Figure 5

Figure 6

Figures 3, 4, 5, 6:
Onservations: Gain in active articular movement at ankle level and correction of foot varus before and after heel-cord-lengthening and split anterior tibialis transfer.

4. Mid-stance progressed to flat foot support with resulting improvement in stability and security of gait. We attributed this to varus correction through hemitransfer of anterior tibialis to third cuneiform bone and the lengthening of the figures of the medial aspect of the Achilles tendon. Likewise, in our series, knee hyperextension during this period of gait decreased. Therefore momentum was not so reduced and this probably had a positive effect on its energy expenditure. The reduction in equinus and better presention of the foot for ground contact would be the cause of this improvement in knee hyperextension.
5. Push-off became weaker, probably due to lengthening of the triceps. However, in the period of push-off, althoug a normal rolling action was not achieved, this was carried out with all the forefoot or the entire foot.
6. The periods of acceleration and deceleration of the swing phase did not change, as being under motor control of the central nervous system, they were not modified with this technique. However, there was a marked improvement in the period of mid-swing and during all the swing phase, as there was a considerable decrease in frequency and intensity of foot drag.

7. Apart from the changes observed in some periods of gait, there was an evident improvement in the patient's functional walking capacity (Table 4) as all gained 1 or more functional levels. An outstanding point is that none of them used a brace after the operation, with resulting psychological and aesthetic benefit.
We asked the opinion of our patients on the results obtained and all considered them to be positive.

In our experience, the use of muscle-relaxing pharmaceutical products, in doses necessary to obtain a therapeutic effect, is complicated by adverse collateral elements, such as decrease in alterness and reactional capacity, which these patients greatly need, as well as dependence upon such products for the rest of their lives.

As regards alcoholizations and phenolization of neuromuscular points, in our experience, the effects are in time limited, with relapses; phenolization is very painful and above all at triceps level our results have been very poor.

With regard to neurotomies of the lower limb, we have only used that of the obturator nerve in cases of serious spasticity of hip adductors. In our series, this was carried out in 2 cases. We did not consider it appropriate in nerves with important sensitive and vegetative components.

We decided that in this type of patient, articulation fixing was not indicated as we consider an elastic foot to be less invalidating than a rigid foot.

The total transfer of the anterior tibialis involves the risk of hypercorrection, creating pes valgus. Heel-cordlengthening by normal techniques is difficult to graduate, causing incorrected talus or equinus. We also believe that by respecting the natural insertion of the muscle in whole or in part, its neurophysiological control and dynamism is less disturbed.

We have no experience of the use of implated peripheral nerve stimulators.

In all our cases we carried out heel-cord-lengthening and hemitransfer of the anterior tibialis to the third cuneiform bone, except in one case — a 12 year old child with cranial traumatiism caused by a firearm 11 months previously. In this case there was slight valgus of the foot before operation and therefore incisions were made on the lateral aspect and one on the medial aspect of the Achilles tendon and hemitransfer of the anterior tibialis was not made.

Plantar musculature tenotomy was only practised in 4 cases to remedy claw toe intensity, with good postoperative results. However, there were 4 cases of postoperative claw toes in which toe flexor tenotomy was not carried out, and for this reason we agree with the authors of this technique that it is advisable to practise this operation in all cases whether or not they have claw toes before surgery.

Although 4 patients had orthostatic edema, this was slight and decreased rapidly with periods of postural treatment and active exercises.

A paramedial menigioma, with residual left-side hemiparesis of 18 month's evolution, had been removed from one of our patients, a 40 year old woman. After foot surgery, she showed a slight valgus. However, from walking on flat surfaces without braces but with cane she progressed to walking on unlevel surfaces without help.

Conclusions

1. Neither motor control and execution nor proprioception are altered.
2. Pathomechanism of gait improves at heel strike, flat foot support and in

the reduction of foot drag and varus during swing. Claw toes either improve or disappear with toe flexor tenotomy.

3. All patients benefit from a marked improvement in functional level of gait.
4. No type of orthesis is required.
5. Of all the treatment techniques we have studied to date these have given the best results.
6. In our experience, we have hardly had any complications.

All together, the gait of these patients became more stable, safer and more comfortable with improved psychological and aesthetic acceptance.

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JAN PFEIFFER

Polyelectromyography has become a widely used method, but there are sobe doubt about the evaluation of these records.

We eleborated our system for evaluation of polyelectromyographic records. Under standardised condition we examined polyelectromyographicaly a group of healthy people from 18 to 50 years of age. Each record are transformed into a curve analogically as in digital averaging and the significant deviation enumerated. The aim of our work is to estabilish the norms of movements, which serve to the research of lesion of the central motoneuron in comparing the polyelectromyographic activity of the paretic muscles and the norms.

In the evaluation we concentrated upon the relationship between agonist and antagonist of the limb which is making the movement and the iradiating muscular activity into the limbs of the oposite side. In each person we also examined tendon reflexes, afferent stimuli from the zone where pyramidal iritation symptoms arise, stretching reflexes and elementary postural reflexes.

The tendom reflexes stretching reflexes and elementary postural reflexes are very difficult for evaluation and we use them very seldom.

In 25 % of patients with lesion of central motoneuron, the polyelectromyographic findings were within the norm. In 75 % of the patients the findings differed from the norm.

This can be put to good use in the evaluation of therapeutic methods especially the therapeutic exercise in rehabilitation.

■

M. DOZEVA, M. DIMITRIJEVIČ-ALEKSOVSKA, Lj. JORDANOVSKA

REHABILITATION OF HEMIPLEGIAS CAUSED BY HEAD INJURIES IN CHILDREN

Hemiplegia is one of the most frequent and most severe neurologic sequels in head injury. It is often incomplete with appearance of obvious spasticity, which predominates in upper extremities.

Though the head injury presents one of the primary causes in mortality of children, this number is not yet so great as in adults, because fractures

on the base crane are rather rare, as well as extra and subdural heamatomas (1). Yet, in children there are other problems. These are numerous and severe sequels which impede long-term and difficult rehabilitation, where in the end dominante psycho-social problems. For these youngsters who are at the beginning of the life, psycho-affectional sequels took place in the medical rehabilitation and latter, in their social and professional rehabilitation.

Material and methodology

On the table below there is presentation of 25 observed child's hemiplegias after cranio-cerebral trauma, which have been treated in the period of 1971 — 1973 in the Rehabilitation Centre in Skopje. We want to emphasize that the majority of cases, 22, are after traffic accidents and only 3 children were victims of fall head or shot wound. Unfortunately, the number of those traffic accidents victims increases each year.

Table I. Age and sex of children treated in rehabilitation

Year		1971		1972		1973		Total	
		M	F	M	F	M	F	M	F
Age	0 — 6	1	0	0	0	1	0	2	0
	7 — 10	2	0	3	2	3	0	8	2
	11 — 15	3	0	2	1	5	2	10	3
	Total	6	0	5	3	9	2	20	5

Most often, such children are reffered to us by neurosurgery clinic after coma has disappeared, children who are incooperative, with impeted talking, sphincteric incontinence and difficulties in feeding. Then, balance is made of their neurologic and orthopedic disturbances, their psycho-affectinal state, as well as language disturbances. Their rehabilitation requires cooperation of more specialists in different disciplines-physiater, kinezitherapist, occupational therapist, teacher, social worker and psychologist. In case of disturbed langage-aphasie and dysarthrie, logopedist's aid is inevitable.

After initial episode, kinezitherapist treats the little patient by mobilisation of his extremities, expecially his plegic side, by passive movements. Later, he uses active assiested exercises, but always very carefully, because each forced movement can cause pain and increase the spasticity. We emphasizes that in our treatment we primary use Bobath method.

The occupational therapist on his side intimately relates with the patient, teaching him in self-management that is feeding and dressing himself by means of combinated and symetrical movements. There should be limitation of compensation with healthy hand, because the child forgets rapidly to use itself with his handicapped hand. Starting from the point of view that even the play is child's work, we can easily understand what is the aim of the occupational therapist in reeducation of those children. Psychoaffectional sequels are very frequent, but in our series we did not have so severe cases with mental ant emotional disturbances and the contact with the patient

was possible: In any case, during their rehabilitation they have been stimulated and helped in their further education and, trained even after their discharge.

Clinical picture in head injuries shows as well language disturbances, motor aphasie, aphasie and dysarthrie, because of bulbar centres involvement. We had one case where after 3 month's total aphasie, later developed dysarthrie and feeding was quite normal.

We can conclude that, the motor deficit in children is rather moderate, than in adults. As our second table shows, extrapyramidal syndrom is rather less, without rigidity. The level lesion depends upon the severeness of motor deficit and not the spasticity itself, which can in much impede the rehabilitation, but cannot exclude it.

From neurological point of view, it is emhasized the presence of senso-motor disturbances; astereognosie can make worse the prognosis in functional sense. Epilepsy, which appear later on the other hand, inpede the rehabilitation and poses problems in kinezitherapeutic treatment. Joint mobilisation should be slow, not forced and the little patient should not get fatigue and respond with more frequent onsets (6).

In five patient we observed general crises and in four astereognosie. Children with apraxie have difficulties in self-management. Urinary incontinence is always present in the first 2 — 3 months rehabilitation in severe cases with sequels. We did not observed algodystrophic syndrom in upper extremities of our hemiplegic.

In our treatment we did not use alcohol infitration or final electrostimulation

Table II. Neurologic sequels

Syndrom pyramidal		25
Syndrom extrapyramidal		3
Paralyses faciales		5
Senso-motor disturbances	asteregnosie apraxie	4 2
Language disturbances	aphasie dysarthrie	4 6
Epilepsy		5

Table III. Results of rehabilitation and sequels

Year	1971	1972	1973	Total
Complete re-education	0	1	1	2
Motor sequels	2	2	4	8
Motor sequels and psycho-affectionel sequels	3	5	7	15
Total	5	8	12	25

Results of rehabilitation

Treatment of children with cerebral trauma lasts long and satisfactory results can be obtained even after 2 — 3 years of rehabilitation. Children with psycho-affectional disturbances should be absolutely managed in special schools. Their rehabilitation is very influenced by the surroundings. After discharge, the children should continue their rehabilitation in the family and contact other children.

As our table shows, out of total 25 children, only two had excellend results. 8 children with orthopedic sequels needed orthotic aids and later surgical intervention. 15 children with noted psycho-affectional sequels with changed memory impeded their further education.

Social and professional rehabilitation arises from all the combinated deficits, but the results in functional sense are considered.

Table IV. Social and professional rehabilitation

Year	1971	1972	1973	Total
Normal education	4	3	3	10
Special education	1	4	5	10
Education impossible	1	1	3	5

Only 10 children could continue normal education, yet other 10 had problems in education. 2 of them did not pass the class and other 8 nad go to special classes. The rest 5 children could not be educated at all.

Conclusion

In our expose we presented our moderate experience in rehabilitation of hemiplegic children, after cranio-cerebral trauma, underlying medico-pedagogic and social problems. We conclude that motor sequels are less in children than in adults. Unfortunately, they are present in this youngesters who are in the begining of the life and more or less will have dificulties in education, learning and life.

E. BERKER

THE RESULTS OF REHABILITATION IN PARAPLEGIA AND QUADRUPLEGIA CASES IN PHYSICAL MEDICINE AND REHABILITATION CLINIC

All of us may acknowledge that rehabilitation in the general sense became a very important part of medical care after the 2nd World war and was greatly used in the treatment of war casualities. The notion of rehabilitation was first brought to Turkey around 1950 ties and our clinic which was a physical therapy clinic was changed to a Physical Medicine and Rehabilitation Clinic in 1964.

Here I would like to present the results of rehabilitation of 26 paraplegia and quadriplegia cases which is a small selected group of those cases who have completed their rehabilitation program with us during the last five years.

Methods: The cases were evaluated as to sex, age, nature of the lesion, complications and the socio-economic status after rehabilitation.

Results: We had 17 paraplegia and 9 quadriplegia cases.

The etiological factors were divided into four main groups. Table III shows the distribution.

As we see from the above tables, a higher percentage of our cases were females (57,7), and trauma and infections were the leading etiological factors. 69,2 % of our cases were in the second or third decades of life.

The complications of these disorders are variable. Since they are important causes of unsuccessful treatment in these patients, we selected the most important complications and evaluated our patients accordingly.

Table I.

Paraplegia	Quadriplegia
17 (65,3 %)	9 (34,7 %)

Table II.

Females	Males
15 (57,7 %)	11 (42,3 %)

Table III. Etiologal factors

	Trauma	Infections	Tumors	Intoxications
Females	7	4	—	4
Males	3	5	2	5
Total	10	9	2	5

Table IV. The age distrubution of our cases ispresented in Table IV.

	10 — 20	21 — 30	31 — 40	41 — 50
Females	7	4	—	4
Males	2	5	2	2
Total	9	9	2	6

Urinary tract infections and decubitus ulcers were seen with the highest percentage. 57,7 % of our cases had urinary tract infections (UTI) and 50 % of them had decubitus ulcers (DU). The rest of the complications like spasticity, etopic calcification and pain were seen to a lesser degree. Table V shows the distribution.

The duration of the patient's stay in the clinic varied with special features, complications, psychological factors and social status of each case. The mean duration was 50 days.

The results of the rehabilitation program was recorded by us using a different approach which be cited here:

Each patient was evaluated at the first admission and muscular strength, performance of the activities of daily living (ADL), urinary and bowel functions, psychological status and any changes that would hinder rehabilitation were recording, a goal of rehabilitation program was set for each patient. This is the maximum functional capacity to be expected from each patient at the end of the rehabilitation program.

This maximum functional capacity was divided into four main groups in order to simplify evaluation:

a) In this group the patient will be dependent on braces and devices but he will be able to perform ADL and his former profession at the end of the treatment.

b) In this group the patient will be dependent on braces and devices and he will not be able to perform most ADL and his former profession without assistance from others.,

c) In this group the patient will be a wheel-chair patient, he may or may not go on with his job depending on the special features of his profession.

d) In this group the patient may be functionally in one of the above groups but he will still have to change his profession.

Table V. Complications

UTI	DU	ES	EC	P
15	13	3	6	3
57,7 %	50 %	11,5 %	23,1 %	11,5 %

Table VI.

Patient dependent on devices independent ADL, profession	21,1 %
Patient dependent on devices dependent ADL, profession	70,1 %
Patient wheel-chair bound may or may not change profession	9,8 %
Patient in one of the above groups, has to change profession	69,5 %

Table VI below shows the results in our cases.

In discussing and summarising our results briefly here, we noted that our patients were of the younger age groups. Trauma mostly due to traffic accidents, sports accidents and sometimes suicide attemps with infecitions of viral or bacterial origin were the commoner etiological factors of their dissability.

In evaluating the patient's socio-economic status after the treatment, we recorded that 69,5 % of our cases thought rehabilitated functionally, could not go on with their former jobs. This was interesting in that although this is a small group and it may not be correct to make a general statement, such a large percentage of cases in need of new jobs suitable for their disability stresses the importance of vocational councelling and vocational rehabilitation as well as vacancy in such jobs and government's reinforcement of new laws and regulations for employement of disabled personell at a higher percentage.

H. H. JANZIK, H. RAUCHFUSS AND H. BILOW

TREATMENT AND REHABILITATION OF PERSONS PARALYSED BY CERVICAL SPINAL CORD INJURIES

I. Kind of accident and level of localisation

The treatment of persons paralysed by transverse lesion of the spinal cord is intended to enable the patients to take part in social life as indepedently as possible, and should integrate patients into society again by employing them in normal or new occupations.

The 54 transverse lesions of the spinal cord with tetraplegia, treated in the „Berufsgenossenschaftliche Unfallklinik" Tübingen from 1969 to 1976, were exclusively caused by occupational accidents, approximately 48 % due to falling down and 46 % due to street accidents. Internal causes, e. g. circulatory malfunction, involved 4 % of the accidents; 2 % were not clarified. The patients were 14 to 74 years old; the 21 to 40 year-olds being involved most frequently, 42 % of cases. The relation male — female was 80 — 20 %. The patients chiefly suffered cervical transverse lesions caused by fracutre-dislocations of the cervical vertebral column, which were diagnosed in most cases. A more exact distribution of the quality of injury and to the concomitant central myokinetic lesions is to be seen in table 1.

Quality and distribution of neurological signs do not absolutely coincide with the level of the X-ray findings. Table 2 compares levels of neurological signs with levels of X-ray findings.

Table 1. Surgical and neurological findings

Surgical findings		Neurological findings	
Luxation fractures of the C. V. C.[1]	12 %	Tetraplegia	78 %
Fractures of C. V. C.	22 %	Paraplegia	14 %
Injuries of th. V. C.[2]	11 %		
Luxation of C. V. C.	6 %	Centr. cord-syndrom	4 %
Normal	13 %	Hemiplegia	4 %

1 = Cervical vertebral column
2 = Thoraic vertebral column

N = 54

Table 2. Comparison of X-ray and neurological localisations

Segment	X—ray	Motoric	Sensory disturbances	
			Central	Segmental
Normal findings	13 %	—	13 %	91 %
Not determined	—	3 %	—	—
C 1	6 %			
C 2	11 %			
C 3	2 %			
C 4	7 %	17 %	9 %	
C 5	21 %	17 %	20 %	2 %
C 6	20 %	28 %	19 %	2 %
C 7	20 %	21 %	7 %	3 %
C 8		4 %	4 %	2 %
D 1				
D 2			2 %	
D 3			2 %	
D 4			4 %	
D 5			9 %	
D 6				
D 7			4 %	
D 8			7 %	

During the initial examination not all patients were able to walk, to stand or to sit. 76 % of these patients were unable to grip and to hold anything. 83 % showed rectovesical malfunctions. Most of the patients were taken into a special ward during the first week after the accident (59 %) and stayed in clinical treatment for more than five months (51 %).

II. Complications by accident and injury

The most frequent complications were naturally found in urine sediments (76 %). A little decubitus appeared in 11 %, a large or multiple decubitus in 9 % of the cases. In most cases, the neurologist was consulted once or several times. Table 3 shows the consultation of the different specialists.

The surgical complications were caused by injuries of several organ systems during the accident: extremities 11 %, thorax 9 %, facial fractures 2 %.

Table 3. Medical consulations

Appointments	Neurologist	Internist	Urologist	Neurosurgeon	Other
1 — 2 times	63 %	15 %	5 %	6 %	15 %
3 — 5 times	19 %	—	4 %	—	—
More than 5 times	2 %	—	—	—	—

Table 4. Comparison of findings to that of the published literature

Author (year)	N	Neurological symptoms	Treatment aim	Professional rehabilitation	Mortality rate
Cook (1967)[1]	O. A.	Para-and tetraplegic	N. A.	N. A.	15 — 30 %
Conradi (1974)	36	Tetraplegic	N. A.	N. A.	30 %
Marcusson et al. (1974)[2]	224	C. V. C. injuries with med. lesions	N. A.	N. A.	15 %
Roche (1975)	41	Tetraplegic	67 %	N. A.	10 %
Our patients	54	Tetraplegic (45) Paraplegic (9)	90 %	38 %	10 %

1 = Literature revien
2 = Statistics of the G. D. R.
N. A. = Not available

As is shown in table 4, the most frequent complications in the neurological departement were concussions of the brain (24 %) directly caused by the accident. As mediate sequences, pain syndromes were the most frequent complications during the treatment (13 %). Internal complications most frequently appeared during the first weeks after the accident (37 %). Convulsive seizures and mental changes both developed to 6 %. These complications are caused by initial cerebral malfunction, and we tend to relate them to cardiovascular factors like embolism, hypotensive malfunction and cardiac arrhytmias.

III. Treatment

Our main efforts in the treatment are guided by:
1. treatment of the spinal edema,
2. respiratory failure,
3. gastro-intestinal atonia during the initial time,
4. disturbed micturition,
5. prevention of thrombosis,
6. associated injury of the (mostly cervical) vertebral column,

7. physiotherapy,
8. professional and social rehabilitation.

The order of these listed complications is arbitrary, since any of them may constitute the main aspect.

1. Treatment of the spinal edema
   To reduce secondary lesions of the spinal cord we immediately treat all patients paralysed by transverse lesion with high doses of sortisone (Fortecortin) and osmolar solutions. Our intention is to prevent the spinal cord edema and to stimulate the blood flow through the lesion level.
2. Respiratory failure
   Respiratory failures in tetraplegia are treated by intermittent inhalation therapy three times a day. The inhalation air is enriched with 20 % oxygenium and secretolytica in mikroneulisation. Positive pressure respiration with this mixture gives sufficient respiration, including the periphere alveoli. Intubation or even tracheotomy of patients with spinal cord injury lower than C 4 is no longer necessary when using this treatment, except for old patients with considerably restricted respiratory function. At the same time, breathing exercises are done in order to attain abdominal breathing. The auxiliary musculature can only be trained by making patients sit up. Since we started treatment in this manner, the incidence of pneumonia has decreased.
3. Gastro-intestinal atonia
   The initially appearing gastro-intestinal atonia requires alimentary abstinence. We try to overcome the atonia by alternating treatment with prostigmine and bepanthene. Aftewards, light diet may be given cautiously. Rectal evacuation is achieved by lubricants or laxatives, which prevent excessive thickening of faeces in the rectum.
4. Disturbed micturition
   The micturition is done by catheterising several times a day. By using sterile sets of disposable catheters once only, the incidence of bladder infections has decreased. After the spinal shock has disappeared, we try to achieve bladder automatism by training the patients in tapping the anterior abdominal wall. It is only successfull, however, if the injury is above the sacral spinal level. In case of a lower bladder paralysis, micturition is done mechanically by manual or abdominal wall pressure. Because of residual urine, catheterising may be continued three or four times a week. Tests by electrostimulation to achieve a good micturition were not satisfactory.
5. Prevention of thrombosis
   We tried to prevent thrombosis in the lower extremities and particularly in the pelvis by passive movement of the extremities on and after the first day. Again and again, we unfortunately found para-articular calcifications, particularly in the area of the hip joints. For the last year, each patient has been given anticoagulants immediately, followed two or three weeks later by less extensive passive movements. Since then, we have not seen any further thrombosis or calcification. On the other hand, a longer period of observation will be necessary to confirm our previous results. Paralytic joint conctracutres may be prevented by reduced movement exercises. This is achieved by regular changing of the patient's position.
6. Injury of vertebral column
   We treat all injuries of the cervical vertebral column by means of Crutch-

field's tongs and traction of 4 to 5 kg. The replacing of dislocations is achieved by increasing traction to 15 kg. The Crutchfield's traction remians for 6 to 10 weeks. Degree of the injury and X-ray findings determine the treatment period.

7. Physiotherapy
   We start training the cardiovascular system using lifting exercises in bed, after the acute phase and healing of the cervical vertebral column injury. About ten days later, the patient with tetraplegia is able to sit in a wheel--chair and is consequently treated with ergotherapy according to his physical disability. Additionally, physiotherapy and sports are used to invigorate the remaining musculature functions.
8. Rehabilitation
   According to the severity of the injury, there is a relatively high percentage of persons who remain unable to work (62 %). Nevertheless, we have succeeded in training 38 % for occupational employment. We cooperate with social workers in our clinic and government offices. Contact are already made during clinic treatment. As soon as possible, in cooperation with their social workers and psychologists, the patients begin tests for occupational abilities. 11 % were able to continue their own profession again; most of these were brain-workers. 7 % were or are still been trained for a new profession. 15 % were bound a new occupation. 5 % were able to work only part-time.

IV: Discussion

In cases of increasing deterioration, the complications were mainly caused by internal malfunction [19 %], only 7 % by injury progression. 6 patients died on circulatory or respiratory break-down [10 %]. Even though 13 % of cases showed a partial remision of neurological signs, restoration of re examination, no patient was able to walk, to stand or to sit; 29 % of the discharged patients were able to walk short distances without mechanical aid or assistance.

48 % of patients were able move exclusively by themselves in wheelchair, in addition a further 5 % were also able to walk without assistance using a supporting aparatus, a further 2 % by aid of a walking cart and finally a further 7 % using crutches. In summary, after discharge, 62 % of the admitted patients had the ability to move independently by wheelchair and by other means, and to eat by themselves. It must be emphasized that 38 % of the injured with cervical transverse spinal lesion were again able to work full or part time after rehabilitation.

As far as it is possible to compare these result with other published scientific results, a high degree of conformity in the results of modern treatment is seen. A trend to decreasing mortality is apparent comparing recent publications with those of COOK's synopsis from 1967 (table 6). Our examinations show the conditions for best social and occupational rehabilitation of the patients with cervical transverse lesions. These conditions are immediate physical rehabilitation due to consistent and combined cooperation of all disciplines.

E. C. FUCHS, H. GUTZMANN, W. RIMPAU

REPORT ON OBSERVATION OF 30 PATIENTS WITH COMPLETE TRANSVERE SPINAL INJURY

Composition of material under study

We are reporting on 30 patients who suffered from complete transverse spinal cord injury in West Berlin between 1970 and 1975. They were selected from the records of the three large neurosurgical departments and two rehabilitation centres in West Berlin. Criteria for selection were time, location and extent of injury as well as the possibility of visiting the patient in his home and accustomed surroundlings. Our patients were relatively similar in extent of injury and quality of rehabilitation facilities, but were in significantly different stays of rehabilitation after leaving the hospital.

We introuced ourselves as "benevently intrested experts" (König) and tried to conduct structured interviews with us rigid frameworks and fixed roles in order to offer the patient — and his relatives, whenever possible — the oportunity for nondirected dialogue.

Since we were dealing strictly with transverse spinal cord injuries and were aware of the special problems involved in investigating this condition, we had to forget to use of an accepted system of evaluation (Wahle). We developed an index system in order to reduce the danger of equating significantly different conditions. A more exhaustive discussion of evaluation techniques is beyond the scope of this paper.

The distribution according to age and sex reveals a significant predominan-

	male		female		total	
	cases	%	cases	%	cases	%
up to 20 years	2	7	—	—	2	7
21 — 30 years	11	36	3	10	14	46
31 — 40 years	8	26	2		10	33
41 — 60 years	2	7	—	—	2	7
61 years and over	2	7	—	—	2	7
	25	83	5	17	30	100

ce of male patients, which corresponds to similar results of Wahle and Seiberth's studies of transverse spinal injury.

Distribution acording to sex and level of injury is also similar to that in other studies, with the exception of a clear accentuation of injuries to the cervical spine.

	conservative cases	%	operative cases	%	total cases	%
C_4 — C_8	3	10	4	13	7	23
D_1 — D_5	1	4	4	13	5	17
D_6 — D_{12}	8	27	4	13	12	40
L_1 — L_2	3	10	3	10	6	20
	15	50	15	50	30	100

Evaluation according to therapy and level of injury reveals approximately equal distribution between conservative and operative therapy. This constellation appeared in the course of the study and was not influnced by selection.

It should be noted that relatively broad criteria for operation were applied, in any case, broader than those established by Guttman, Braakmann and others (e. g. dislocation, radiologic evidence of cord compression etc.). It appears that there was a relatively large number of operations in the group of lesions in the upper thorax. However, two of the patients had suffered fracutres of the cervical spine which were treated with anterior fusion, but the postoperative level of paralysis stabilized in the upper thoracic cord.

	C_4—C_8	D_1—D_5	D_6—D_{12}	L_1—L_2	total cases	%
occupational, industrial accidents automobile	2	2	4	2	10	33
traffic accidents	—	2	1	—	3	10
domestic accidents	—	—	5	2	7	23
swimming accidents	4	1	—	—	5	17
attempted suicide/ acts of violence	1	—	2	2	5	17
					30	100

Evaluation according to cause and level of paralysis indicates that conventional industrial accidents predominate with 33 % of the total.

The proportion climbs to 43 % if one includs two traffic accidents, which

occured in the course of work and one accident involving swimming at work (policeman). Domestic accidents occupy second place with 23 %, followed by swimming accidents, attempted suicide and traffic accidents.

It is understandable that a majority of the swimming accidents caused lesions which were evenly distributed over all levels.

Explanation of our concept of rehabilitation

We define rehabilitation as the sum of all measures necessary to allow handicapped patients the greatest possible development of physical and mental well-being, a desirable social position and a satisfying occupation. In this regard, we share definitions developed by Guttman, Wahle, Rossier and others. We make basic distinctions among three types of rehabilitation which overlap and which run parallel in the course of rehabilitation, but which can also be evaluated specifially at ony point in the course of the rehabilitation of an individual patient.

1. medical-neurological rehabilitation
2. social rehabilitation / social surroundings
3. occupational rehabilitation.

Heiperts suggests that rehabilitation begins at the side of the accident, meaning that the patients first contact with medical personnel can have consequences for the entire course of rehabilitation. Meny physicians are not conscious of this point which was — and often still is — regarded as secondary as Polikoff and others have repeatedly emphasized.

1. Medical-neurological rehabilitation includes:
   surgical treatment
   complications
   stay in hospital
   ambulatory medical care
   physical therapy
   psychological management.

Neurological and medical rehabilitation is not limited to actual hospital care, but incomparses the whole period of time up to the point at which the study was made.

It should be noted that all patients which we examined had been treated in special paraplegic units, and that half of them treated in special paraplegic units, and that half of them had previously been treated surgically. In addition, a selection in the positive sense has been made, also this is a result of the state of clincal care in West Berlin in not related criteria which we had set.

We evaluated various parameters in order to judge hospital care. Among these were the medical diagnosis and therapy, physical and occupational therapy and the number and gravity of complications such as decubital ulcas, urinary tract infections and contractures. We used standard times for therapy and rehabilitation developed by Guttmann as criteria for judging lenght of hospital stay. Since medical rehabilitation does not end at the hospital door, as has often been emphasized, the question of ambulatory medi- aspect to treatment concerns a process of adaption of the patient to his new situation which can not be overstimated. This includes a through explanation of the nature and prognosis of the patient's condition as well as constant attention to problems of the individual patient.

2. Social rehabilitation includes:
family situation
marital relations
sexuality
physical living conditions
social contact
social activities.

When the patient leaves the hospital he encounters problems for which he is rather unprepared, even after most thorough care by the therapeutic team, acting from the perspective of the rehabilitation center. He sees himself as a member of a minority whose special needs ar only very rarely seen and met. Architectural hindrances, difficulties with public transportation, lack of consideration or excessive pity (which is often percived as even more discriminatory) are a few of the problems which confront the patient. Return to the family is no less difficult, assuming that the family exist at all as a viable social unit. Social and sexual roles must be modified or newly defined by marital partners, expecially where a male patient is concerned. The relations between patients and children are often involved in this process.

In this sense social rehabilitation concerns all those in contact with the patient, all those who influence his surroundings.

3. Occupational rehabilitations includes:
occupational activity
disability pension
re-education
temporary on the job evaluation.

Acording to Guttmann's dictum, a tax-paying patient is the best example of successfull occupational rehabilitation. The same principle is expressed in the proposition that rehabilitation takes precedence over pension. Wa are of the opinion that overemphasis on the socio-economic aspekt, though important in dealing with public health institutions, is not always adequate to the needs of the patient. Contact with fellow workers, recognition by superior and self-satisfaction derive-from work in a chosen field are more important to him.

The degree to which job satisfaction — on the basis of creative and freely chosen activity — is at all possible under current conditions of production cannot be further discused. Nor can we discuss the extent to which the term "job satisfaction" is often used to describe a form of substitute satisfaction derived from fullfillment of desires for consumer goods.

Occupational rehabilitation cannot be fully regarded as successfull if the professional activity does not correspond to the interests of the rehabilited patient. Occupational satifaction is an indispensible criterion. It is certain that occupational activity raises the level of condition and increases life expectancy. This must be made clear to patients, to public institutions concerned with occupational rehabilitation and expecially to employers.

Results and discussion

1. Results of medical neurological rehabilitation

The standard of medical and neurological rehabilitation in both forms of therapy is good. A number of indicators have been considered in this evalu-

results	operative cases	%	conservative cases	%
good	6	40	6	40
fair	9	60	7	46
poor	—	—	2	14
	15	100	15	100

ation. Among these are length of stay in the hospital, complications — both in the hospital and after release from the hospital, success in training bladder subjective evaluation by the patient. The large number of complications, which is most often related to insufficient nursing care in primary care institutions — not in the rehabilitation centers — seems to be the least satisfactory aspect of this part of the rehabilitation process. Continuing care after release from the hospital is inadequate in many cases, especially when measured against the standard set by Sutton and others. We consider an interdisciplinary clinic to be the best solution.

2. Results of social rehabilitation

results	operative cases	%	conservative cases	%
good	5	33	4	27
fair	8	53	7	46
poor		14	4	27
	15	100	15	100

There is considerable contrast between medical and social rehabilitation. Significant problems encontered in public life — architectural barriers as well as difficulties in dealing with institutions — and in personal relations where disappointments in relations between marital partners assume major importance. Many patients experienced deep shock on leaving the rehabilitation-center.

Although it is possible to develop social contacts and to be accepted in the company of others bound to wheelchairs, everything changes abruptly once the patient is "outside". Cooperative effors on the part of the therapeutic team, family and friends are necessary in order to releave this shock.

Patients without a preformed, receptive group "outside" are unfortunately sometimes committed to sanatoriums, even to psychiatric institutions. Even when this is not concieved as a permanent solution, but a rather as a "transitional" stage, it often happens that the success of the total rehabilitation effort is jeopardized.

3. Results of occupational rehabilitation

We often encounter poor results where occupational success is concerned. The equal distribution among good, fair and poor results, independent of therapy,, indicates significant defects in this area of rehabilitation.

results	operative cases	%	conservative cases	%
good	5	33	6	40
fair	6	40	4	27
poor	4	27	5	33
	15	100	15	100

A limited job supply an insufficient number of re-education centers play a significant part, as do state employements offices, where patients are often advised to apply for a disability pension.

We believe that too little attention is payed to the fact that many patients develop the motivation to take a job only after they leave the hospital.

A remark by Kennedy which was discussed by Pampus, suggests that a laminectomy can also be considered a "psychological operation" in the same sense we asked patients the questions: „Do you believe that there will be further change in your condition?"

	operative impromentno change		conservative impromentno change	
C_4 — C_8	—	4	2	1
D_1 — D_5	2	2	—	1
D_6 — D_{12}	1	3	4	4
L_1 — L_2	—	3	—	3
	3	12	6	9
	% 20	80	40	60

The result was surprisingly clear: 80 % of the surgically treated patients did not expect a change in their condition, while 60 % of the patients, treated conservatively expressed the same opinion. 20 % and 40 % respectively expected improvement. Not one patient deterioration in his condition.

We evaluate this result as an expression of an "operation superstition", which is still be found in a large portion of the population, and not at all as a substantiation of the "psychological operation". In this regard we would remind the reader of the disturbing response to sensational reports of successfull anastomosis of the spinal cord. The same publications carried news of the fact, that Marray's "sucesses" were not available to scientific scrutiny

on the last page, if at all. Everyone who discusses prognosis with paraplegics ought to take this social psychological phenomenon into account, in order in arm the patient against false hopes.

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V. PAESLACK

CLINICAL REHABILITATION IN TRAUMATIC TETRAPLEGICA

Rehabilitation of victims of accidents with complete tetraplegia is a novel challenge in Medicine. Its many facets, possibilities and difficulties cannot, as yet, be fully assessed.

Up to about 20 years ago 100 % of patients with complete tetraplegia died within 2 years. Improvements in treatment and systematic application of the principles of rehabilitation developed by L. Guttman reduced this mortality rate to 10 %. This means that 90 % of complete tetraplegies survive for many years or decenia.

This result, encouraging at first sight, presents us with many problems of all-round re-integration of these patients.

Most traumatic tetraplegics are young. This demands a system of therapy and rehabilitation which looks far ahead and is constantly carried out from the day of the accident on-wards.

Tetraplegics, indeed now represent a model of modern rehabilitation. "Model" here does mean "ideal". Our efforts to achieve all-round re-integration of these severely injured and severely disabled people will have to overcome a great number of obstacles which all too often interfere with or hinder the achievement of the goals of rehabilitation.

The extent of disability and its consequences nowadays cannot be sufficiently understood by isolated description of anatomical or physiologic defects or abnormalities found in individuals. For the development of a program of rehabilitation it is necessary to understand disability as an all-embracing anthropologic and sociologic entity and to define it as such.

Seen in this light complete interruption of conduction of the middle and lower cervical cord will produce the well-known picture of motor, sensory and vegetative paralysis.

But motor paralysis also leads to the collapse of the psychomotor body image of the patient and produces farreaching or complete dependence on outside help together with renunciation of most of the customary independent activities.

Sensory paralysis destroys essential chances of receiving physical information and loss of decisive parts of human interaction. It induces farreaching loss of the ability to enjoy pleasure and great dangers from the environment.

The interference with vegetative function — the loss of voluntary control of bladder and bowels and the disturbances of sexual function — causes very heavy burdens for social integration. At the same time they constitute permanent and serious threats to life via infection of the urinary tract: even

today urinary infection and renal failure carry the greatest dangers for the tetraplegic.

Road accidents are the most common cause of trauma to the cervical spinal cord. Lately motorcycle — and moped accidents are rapidly increasing. Diving into shallow water remains one of the most common causes.

In a special department the number of patients with permanently complete tetraplegia is relatively large: 50 % or more of all patients. Partial recovery of initially complete teraplegia and farreeaching recovery in initially incomplete teraplegia are relatively rare. They amount to less than 25 % of the total.

This experience has to become the basis of the program of therapy and rehabilitation. It cannot be stressed too much that in these circumstances rehabilitation is, in fact, a matter of the first hour after admission, i. e. sonsiderations of future rehabilitation will have to dominate all measures of immediate treatment, intensive care and the early period of treatment.

Here it will not be possible to give anything like a complete description of the systematic therapy of the newly injured tetraplegic or of the systematic therapy of the newly injured tetraplegic or of the entire program of therapy and rehabilitation. The methods used today are to a large extent standardized — they are used with minor variations all over the world or, at least, they ought to be. We shall have to assume that they are generally known.

Immediate measures and acute management of the early period follow the established principles of intensive therapy. Taking account of possible additional injuries the newly injured is positioned and turned on a special bed e. g. the well-known Stryker frame for a period of 10 weeks. Where there are fractures or dislocations of the cervical spine, skulltraction, also for about 10 weeks, is applied.

During the phase of spinal shock the bladder is emptied with the technique of intermittent catherisation. As soon as the first signs of reflex activity arisse, the so-called bladdertraining, based on stimulation of trigger zones for the development of a reflex bladder, is started.

Physiotherapy begins during the first hour after admission of the newly injured. In the tetraplegic this involves systematic breathing therapy night and day, extensive preventive measures against thrombosis and embolism, passive movements of all paralysed and active training of normal or only partially paralysed limbs.

Occupational therapy, social and psychologic care also normally start within the first 24 hours.

When X-ray controls show sufficient stabilisation of the injury of the spine, the patient will be transfered to a normal bed, gradually raised to a sitting position over about 10 days and eventually transferred to a wheelchair. This is followed by 4 — 5 months of intensive training with the help of physio-and ocupational therapy, therapeutic sport, and, at times, therapeutic work-techniques.

At the end of a period lasting all together 7 to 8 months younger patients with a lesion below C 6 will bee partially independent in the activities of daily living; they will be able to dress or undress the upper part of their body and to look after their own hygiene.

They will be able to eat and drink without outside help, possibly using minor technical aids. They can, if only with an effort, write, both by hand and typewriter. They can propel the wheelchair by hand on an even surface with sufficient speed. Suplying them with an electric wheelchair will be

needed in exceptional cases only. An increasing number of these patients will be able to pass a driving test and can drive a car.

The percentage of those who at the end of clinical treatment can return to work either immediately or after retraining in a professional training-centre lies by, at best, 40 — 50 %, is, therefore, still relatively small.

Tetraplegics with higher lesions — below C 4 and C 5 — will, of course, be much les independent.

Regular medical check-ups, at first at 6 months, later at yearly intervals, serve to supervise and, where needed, adjust physical, psychological and work--re-integration.

The clinical program of treatment provides the outer frame for the rehabilitation of the patient with an injury to the cervical spinal cord. But it will not achieve permanent succes and satisfactory results, if the techniques of treatment are not from the start designed to achieve all-round rehabilitation. This statement which represents a demand appears to be self-evident, but experience teaches us that this is as yet by no means the case.

For example, there still persists among those undertaking the primary treatment, usually accident surgeons, general or neurosurgeons, the tendency to use surgery. This practice, arising from the understadable impulse to "do something" in that dreadful situation, cannot be condemned too strongly. Experience has shown there is NO chance of exercising a beneficial influence on the neurological status by any operative procedure, be it the socalled decompression laminectomy with or without stabilising techniques of the spine. Unfortunately we see not too rarely a rise in the level of paralysis by one half and up to two segments following such operations.

Furthermore laminectomy often produces secondary instability of the spine which causes massive further disability.

When surveying the total material of the Spinal Injuries Centre at Stoke Mandeville (England) and at Heidelberg (Germany)*), we, together with L. MICHAELIS and H. FRANKEL, have been able to prove that the number of those whose paralysis recovers partially or to a great extent is far greater in those who were treated conservatively than in those submitted to early surgery.

Early operation in traumatic tetraplegia as a rule counteracts rehabilitation and, therefore, has to be clearly condemned.

It is vital during the early phase that all concerned with treatment, i. e. the whole clinical team, have a clear picture of the purposes of early treatment:

Correct positions and turning will decide whether the goal outlined above of partial independence and re-integration into family and Society and, where possible, work, can be achieved.

If e. g. one does not succeed in preventing pressure sores this will, as a rule, mean delay of discharge from the centre by many weeks, if not months.

If correct positioning and systematic physiotherapeutic training does not succeed in preventing contractures, the chances of future indepedence are reduced to a minimum.

If the paralysed hand does not develop into a socalled functional hand by correct positioning, if it does not become a passively useful bodily tool, then the tetraplegic will lose even a small chance of future independence.

If systematic aseptic catherisation does not succeed in preventing primary infection of the urogenital tract, if early shrinkage of the bladder is caused by the socalled staycatheter which, unfortunatly, is still in use, then the future chance of a well functioning reflex bladder is very small indeed.

In the tetraplegic physio- and occupational therapy are not part of a so-called "after-treatment" They occupy a decisive place both in the early and in the later treatment. During the first few days the tetraplegic has physiotherapeutic treatment 6 — 8 times during the 24 hours. Training of function is started during these first days in order to reduce to a minimum the loss of cerebral experience of functioning upper limbs.

Later the disabled patient will undergo traíning for 7 to 8 hours a day which will enable him to achieve a certain degree of independence and activity in spite of the extremely severe disability.

The newly injured who is fully conscious, will be informed about his state and prognosis at once i. e. on the first day. In this way we can enrol his active participation which is the essence of successful rehabilitation.

In the process of rehabilitation the family and other personal environment have to be involved early. This is of very great importance. Early leave over weekends to go home, extensive information on the disability of the patient and his family, weeks of training for the closest members of the family in the centre, will create the conditions for a return into the accustomed circle, where he should stay free from complications or almost so.

Driving lincence and a car with the necessary adjustments must also be acquired during this first stay at the centre. Preparation of suitable accomodation at home and assessment of the chances of re-integration into work will also have to proceed during the second half of the patient's first stay in the centre. All this has to be done by the clinical team and with the continuous and direct cooperation of the patient himself.

Ladies and gentlemen, I have tried to give you a very general outline of the clinical phase of rehabilitation of the tetraplegic as it has now to be attained. Allround and consistent achievement of all steps outlined here is an urgent duty of the present and a heavy challenge for the future.

FRANCIS KATONA

THE IMPORTANCE OF AFFERENT SYSTEMS IN THE REHABILITATION OF EARLY INFANTILE BRAIN LESIONS

In the last 7 years owing to a program of regular longitudinal neurological screening of problematic risk neonates and infants 115 of them were submitted to early neurorehabilitation.

The diagnostical procedures included eeg. emg. stimulus-polygraphic analysis of the responses, pneumoencephalography, subdurography, angiography and repeated neurological studies of brain function.

Early treatment was introduced from the 6 th. postnatal week up to the 8 th. postnatal months.

The treatment consisted of programed regular trainings to assist the failing or rudimental function of the developing pathway systems. The essentials of the training program in general may be summarised in the followings:

1. Activation of the developing motor patterns may be possible trough the adequate receptor and afferent pathway systems. The importance of the vestibular rceptors the vestibular nuclei, the vestibulospinal tracts, the reticoluspinal tract, the rubro and the olivospinal tracts is outstanding in this respect.

2. Specific motor patterns may be evoked from the motor pattern pool of the infant. These patterns vary according to the development of the affected infant. The motor patterns may be evoked by sensory stimulation, and can be imprinted in the CNS during the developmentaly adequate periods.

3. Each stimulation program activates a well defined chain of sensory-motor reactions with a circumscribed morphological and functional background, according to the developmental grade of synaptic connections in the pathways. (For example motor reactions in the neck muscles evoke movements in the upper arm, and the eye muscles, owing to a chain of reactions in the nucleus of Cahal, the nuclei of the III. IV. VI. nerves, the vestibulospinal tract, the medial longitudinal fascicle, and the reticulospinal tract). Activation programs usually work in such chain reactions involving sensory, and motor function.

4. Our method is derived from neurophysiological studies on neonates prematures and infants. Up to now 120 training procedures were aplyed. All training procedures follow definite gradients of the developing human nervous system. These gradients build up the human specific trends of erect posture, standing, gait, upper arm function, finger manipulation, visual control, hearing and vocalisation, adaptation, sensory-motor behaviour, elementary learning, and intelligence. The accompanying development of individual character and its psychological factors play an essential role in the program of assisted development.

5. The program aplies electrotherapy on a broad level. In this respect however we adept special training to influence afferent pathways with special multiple chanel stimulators.

6. The training program of the infants was perfected individualy by the physicians and physiotherapists. Each infant had its special course of treatment. The patient was studied, tested and the mothers instructed how to aply the various maneuvres. Each baby was controlled bimonthly or weekly if it became necessary. At these occasions the parents were instructed to the application of the next program.

The training program lasted 2 — 3 hours daily in infants below 2 months and 3 — 5 hours later. The daily rhytmicity of the program was essential in order to reach reliable results.

The dual effect of each program must be emphasized. The programed stimulation of particular receptors and pathway systems affects usually specific channels. This stimulation is however transfered to aspecific pathways as well. Thus a general arousal effect is activated and maintained during the treatment. This was experienced not only during the stimulation of the visual analysers or the acustic analysers but also during postural training through the proprioceptiv system. The general effect of this arousal mechanism was an increased activity and sensory motor behaviour of the babies. This was especially important in adynamic inactive infants. Elementary learning utilises specific and non specific pathways simultaneuosly. Habituation, dyshabituation, stimulus-response characteristics, the emerging special motor reaction in space and time from general motor patterns, were observed and specified during the therapy of the infants. While activating and establishing special functions in the mechanisms controlling vision, hearing, production of sound, various motor reactions generaly increased the activity level of formerly inactive infants.

The possible precise diagnosis of the early damage of brain development is very important. Only the involvement of all possible measures in the diagnostic procedure can lead to a sound statement about the condition of the brain. On the basis of this diagnosis the programing of a complex therapy seems to be worth while. Owing to the energy required to such a treatment by the team of physicians, physiotherapists and the parents above all, we concentrated the first effort in order the stabilisation of the differential diagnosis. Early screening and diagnosis as the first phase, and early habilitiation of neurodevelopment as the second phase may lead to the prevention of the consequences of early brain damage.

L. ČESNEK, J. PECHAN, M. ŠTELCLOVÁ, M. DĚDKOVÁ

EXPERIENCES WITH CONSERVATIVE ELECTROSTIMULATION OF THE PARALYSED („NEUROGENIC") BLADDER

According to Wagner and Bucy (1972), the mean cost of medical and other care for only one paraplegic during his life reaches cca 900 000 dollars. The whole number of paraplegics in USA was estimated to 200 000 persons (Stenberg et al., 1967). These two data illustrate well the importance of the problem of paraplesics. Above all, it is the condition of the urinary tract which representents the most important factor determinating the life expectancy of the paraplegic. Despite the immense effort devoted to resolve this problem, perfect emptying of the urinary bladder cannot be achieved, in most cases: The indwelling catheter is harmful, intermittent catheterisation time consuming and implanted stimulators are not very efficient. Under the influence of a few promising reports dealing with conservative electro-stimulation of the bladder (like those of Katona, 1973, Vishnevsky et al., 1973 or Jegorov and Šlégr, 1975) we decided to study this method by means of cystometry on our own patients.

Tab. 1. Material (patients, N = 30)

Lesion	Male	Female	Total
Cystoplegia centralis (UMNL)	12	13	25
Cystoplegia peripherica (LMNL)	2	3	5

Tab. 2. Curent used

Form:	rectangular
Duration of pulse:	2 or 5 ms
Amplitude:	40 — 80 mA
Duration of stimulation:	40 or 15 Hz
Frequency:	30 sec — 5 min

Tab. 3. The results of bladder elctrostimulation

Lesion	Contractions of the bladder	
	Spontaneous	Electrically provoqued
Cystoplegia centralis (UMNL)	present: 23 absent: 2	8*) = 35 % 0
Cystoplegia peripherica (LMNL)	absent: 5	0

*) Mean rise of the intravesical pressure: from 9,4 to 65,6 cm of water

Tab. 4. What elicited electrically Induced bladder contraction

Current on		1 case
Current off		3 cases
Current on and off		4 cases
	total	8 cases

Material and method

The urinary bladder electrostimulation was performed on 30 patients suffering from transverse lesion of the spinal cord or cauda equina (Tab. 1). The upper motor neuron lesion was present in 25 cases and the lower motor neuron lesion in 5. The numbers of men and women were approximately the same. The electrostimulation was done during cystometry, the bladder was filled to a mean of 250 ml (range 100 — 550 ml). In men, a rectal electrode and in women, a vaginal electrode was used. The second, indifferent electrode — anode — was fixed to the hypogastrium. Rectangular pulses (Tab. 2) were applied for 30 seconds to 5 minutes. Only a rise of the intravesical pressure not lower than than 10 cm of water occuring during the stimulation nor less than 10 seconds thereafter was considered as a positive result.

Results

are shown in the table 3. In cases of bladders without uninhibited contractions, no contractions provoqued by electric stimulation could be obtained, no matter whether the lesion was an upper or a lower motor neuron one. In cases of bladders exhibiting uninhibited contractions (N = 23), electrically elicited contractions were encountered in 8 cases only, i. e. in 35 %. This contraction could be elicited either by switching the current on or off or both (Tab. 4). The shape of the provoqued contraction was the same as that of the uninhibited one.

Side effectes (Tab. 5): Tetanic contraction of striated muscles (of the abdominal wall and pelvic floor and of adductors) was observed in all persons examined, with the exception of cases of denervation of the muscles concerned. In cases of high cord lesions, autonomic hyperreflexia was evoked (like piloerection and arterial hypertension, e. g. 180/110 from previous 145/80).

Tab. 5. Side effect of bladder Electrostimulation (N = 30)

Contraction of striated muscles*)	nearly all cases
Autonomic hyperreflexia	high lesion (C)
Pain	low lesion (L)
Defecation	3×
Transitory worsening of spasticity	1×
Menstruation	1×

*) viz addutors and those of the abdominal wall and pelvic floor

On the contrary, patients with low cord lesion complained of serious pain even if current amouting 40 mA was used. Several times, defecation defecation occured during stimulation. In one case, worsening of spasticity was observed and in another case, provocation of menstruation.

In our group, electrically induced bladder contraction could only be elicited in several but not all patients having uninhibited bladder contractions. It was not possible to evoke bladder contraction by means of electrostimulation in patients with damaged reflex bladder innervation. This leads to the suspicion that the bladder contraction was elicited by irritation of afferent nerve fibres and not by direct stimulation of the smooth detrusor muscle. It may be assumed that the irritation of afferent nerve fibres caused the activation of the intact bladder reflex arc including the vesicospinal centre in the cone. Direct stimulation of the smooth muscle may be probably accomplished only by electrodes laying immediatelly on it. Otherwise, in our opinion, electrical stimulation may not be sufficiently strong to cause smooth muscle contraction. Another problem is presented by the contraction of the pelvic floor muscles closing off bladder output during stimulation and autonomic hyperreflexia or pain which were also mentioned already. The application of a rectal electrode in paraplegics may be dangerous because of the risk of its perforation (Frankel, 1974). Fortunately, this complication was not encountered in our group of patients. Of course, all men examined were carefully observed after rectal electrostimulation. From this point of view, the vaginal electrode is quite safe and, therefore, it was preferred in women.

According to Bors and Comarr (1971), rectal electrostimulation of the bladder was tried earlier by Comarr (1961) and Dees (1965) but without success. Our observation done on a larger group of patients demonstrated that conservative electrostimulation of the bladder was successful in several cases, in accordance with the report of Jegorov and Šlégr (1975).

Another form of bladder electrostimulation was performed by Vishnevsky et al. (1973), Katona (1973) and others. This was done in order to ameliorate reflex bladder evacuation after repeated long lasting stimulation (facilitating spontaneous bladder activity) and not to elicit immediate bladder contraction during the application of the current. This form of electrostimulation seems to be promising. On the other hand, the method of conservative bladder electrostimulation proposed to elicit immediate voiding is not fit to be used routinely, presently.

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E. BERARD, R. GIRARD, P. MINAIRE, A. LERICHE, J. BOURRET

E. M. G. STUDY OF SPHINTERS IN SPINAL CORD INJURIES AT T12 — L1 (Vertebral level)

After a spinal cord injury by a fracture of the thoracolumbar spine at T12 L1, vertebral level, 3 clinical syndroms are to be found at the vesical level, as well as at the level of the lower limbs: (diag. 1)

1 — complete flaccidity with disparition of the bulbocavernous and anal reflexes,
2 — vesical and sphincterial reflectivity with anal, bulbocavernous and bulboanal reflexes present,
3 — mixed syndrom, with, for instance, hypotonia of detrusor and reflectivity of sphincters.

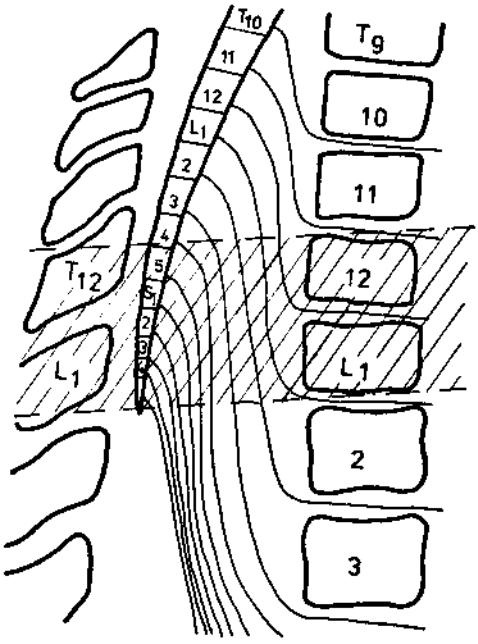
It is most important to make an accurate diagnosis of these different syndroms, for the vesical rehabilitation is different in each case:

— either by using elevation of abdominal pressure (about 100 cm of water in case of complete flaccidity,
— or by eliciting a reflex voiding in case of upper-motorneuron-type of bladder.

A good rehabilitation prevents patients from renal failure and positively influences survival of spinal cord injured people.

Voiding through Crede's Manoeuver is well indicated for lower motor neuron bladders, but dangerous in case of upper motor neuron type of bladder, even poorly symptomatic, for the obstruction of the sphincters (still increased by pressure) may lead to a vesico ureteral reflux and also a struggling bladder up-side.

Difficulty arises from the fact that entirely flaccid bladders at the beginning may gradually turn into spastic ones, sometimes much later (2 or 3 years at most).



Diagr. 1.

The diagnosis of such a neurologic change must be made just in time, so that more adapted voiding technics may be started.

In such cases, an electromyographic study of the sphincters is helpful. There are 2 examples:

a) Dr G. had a car accident on 24.09.74. He got an immediate flaccid L1 pjaraplegia with L1 fracture that was osteosynthesed 2 months later.

After 4 monts, his paraplegia remained flaccid, complete below L1.

A very weak reactivity of the intravesical pressure after a percussion during a cystomanometry raised a doubt: E. M. G. of the anal sphincter did not show any electrical activity, but no sign of electrical denervation. A regular clinical watching enabled us to witness the reapparition of the cremasterial reflex some days later.

Micturition using reflex voiding was initiated in January, i. e. during the fourth month, without any urological complication.

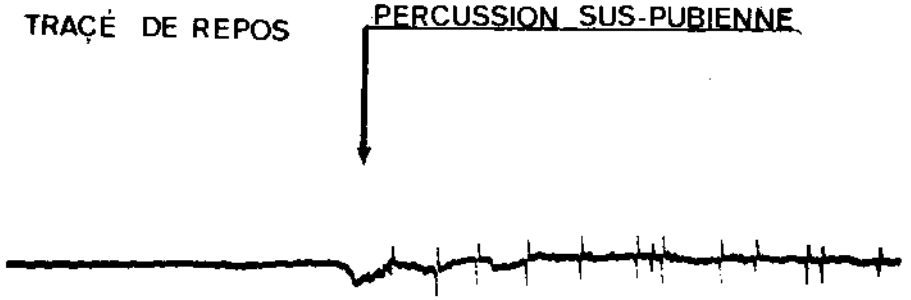
The anal reflex only reappeared during the seventh month (post-injury), then the bulbocavernosus one. Paraplegia is still complete.

b) Mr P., compression — fracture of vertebral body of T12 after an occupational injury on June 12, 1973; osthesynthesis with 2 Roy-Camille plates was performed 24 hours later. Uncomplete flaccid paraplegia between T12 and L4, and complete under L4.

In the vesical sphere:

His non reflectivity made us try to get micturition trough Crédé's Manoeuver. He always had leakings, even with a catheter. The use of a Davol R system was locally illtolerated...

He came back to us 17months later :there was still a jerk areflexia, but



Diagr. 2.

the patient often suffered from urinary infections, which led us to perform an E. M. G. of the anal and urethral sphincters on 03. 12. 74.

(Diag. 2) It showed a low amplitude baseline tonus with definite changes especially by reflex stimulation of the perianal region.

The E. M. G. confirmed the absence of any voluntary contraction.

A cystography was therefore performed, that showed a very tonic struggling bladder, with vesico-ureteral reflux, and a sclerous external sphincter.

8 days later, a sphincterotomy was carried out. Micturition used reflex stimulation through supra pubic percussion.

Discussions

We have already gathered 10 identical cases in which we could, thanks to electromyography, modify the type of micturition and so avoid irreversible urinary tract damage.

However, several electromyograms have to be done, and each must include:
— recording of the baseline tonus,
— reflex stimulation,
— stimulation while coughing,
— attempt of a voluntary contraction,
— and recording during micturition, if possible.

Let us also emphasize that an electromyographic study of the anal sphincter alone is not sufficient, for, especially at that neurological level, the discrepancies between recording of the anal sphincter and the external sphincter of the bladder are frequent.

The recording of the external sphincter must be systematically done.

Conclusion

The spinal cord injury by a lesion at T12 — L1 vertebral level, requires a particular care because of the possible torpied and long evolution of a lower motor neuron type of bladder into an upper motor neuron type. The therapeutical incidence of such an alternation is greatly important.

Electromyography is here very helpful as a method for a precise diagnosic that will conduct the rehabilitation of the bladder.

G. E. MÜLLER

SOME SPECIFIC PROBLEMS OF REHABILITATION AFTER HEAD INJURY

1. Introduction

This is hardly a scientific paper. It could even be considered as belonging to the realm of utopia as it deals with the project of a Center for Diagnosis and Rehabilitation of head injuries yet to be built.

However, as a group of people concerned by the problem of head injuries, coming from five countries, have elaborated this project for the past three years, as numerous publications in this field have been considered, as centers in France, Belgium, Switzerland, Great-Britain, Germany and Norway have been visited, we feel that to discuss our conclusions in front of an international gathering of specialits might be worth while, if not for you, at least for us.

In a very summarized way, I shall present our analysis of the problems and the choices we made.

2. Statistics

Statistics about head injuries vary from one country to another. If in the Federal Republic of Germany the estimation of severely head injured *hospitalized* patients is about 2,000 (milion) year, if an overall french estimation including also the *light* cases, proposed the figure of 10 000 cases (milion) year, we have also encountered an evaluation from the United States of 40 000 cases (million) year.

Our own figures in Luxembourg are closer to 8 000 (milion) year, with about 1 400 severe cases, which corresponds to Schmieders estimate that for one person killed we can expect about four severe head injuries.

As one bed can serve to rehabilitate about 4 to 8 patients a year this would mean, for the severe cases, up to 400 beds for a milion inhabitants.

All this is only to show that our basic project of 270 beds for a european region of about 20 million inhabitants should be largely insufficient and certainly not exaggerated.

3. Scales of gravity in time

For the same patient scales of gravity do differ in time. There is an immediate and early *vital scale* applied by emergency wards, intensive care units and neurosurgery. The criteria are danger for life, danger for important body functions, associated lesions, risk of complications.

There is a *neurological* and *neuropsychological scale* which can be established when patient is out of danger and which tends to assess site and size of brain

lesions, nature and intensity of neuropsychological difficulties, sensory status, including disturbances of balance, and the patients reactions to the disabilities.

There is a *psychosocial scale* which becomes evident when the patient has to face his family, his work and his social situation. His succes of failure will result from a complex field of forces where his previous personality, his residual skills, the help and hostility of his environment, the legal and administrative network, the economic realities and the possibilities of reinsertion with the help might receive, shall all contribute to strenghten or weaken his "coping strategy" (Crosholm 1972).

Severity in one scale does not necessarily mean severity in the next one and vice versa.

These cosiderations tend to demonstrate *the need for coherence* in our efforts to understand head injured patients.

4. Specific diagnostic procedures

Rehabilitation centers should be able to gather and coordinate all previous information available.

This calls for a *computerized codifying unit* which does not only collect informations but can also provide them at any given moment to whoever needs them.

Apart from the classical diagnostic departments of neurology. neurophysiology, E. N. T., ophalmology, psychiatry, physical medicine etc. the center shall need a neuroradiological unit with a *brain scanner* permitting to localize and observe brain damage also in the neurologically silent zones, most often damaged in head injury, the temporal and the frontal lobes.

Then, apart from a classical department of psychology, an efficient *unit of neuropsychology* is needed, as these new techniques elaborated by Luria, Teubner, Lhermitte etc. permit to evaluate the disturbances of function.

Finally, in a multinational and bilingual center, the *administration* has to be able to cope with patients from very different national, social, legal and administrative backgrounds.

5. Specific rehabilitation procedures

Most centers of acute traumatology tend nowadays to include early rehabilitation so that they might intervene, as Behrend from Hamburg puts it, "spätestens sofort".

On discharge however many injured patients are, if at all, rehabilited in general institutions alongside with amputated patients, cardiovascular cases, sometimes even in psychiatric departments with mentally disturbed people.

Some centers are apprehensive about admitting head injured patients alongside with socalled "normal" people and tend to limit their proportion to 10 or 20 percent.

Head injuries demand specific rehabilitation programmes.

Difuse lesions lead to the "post-traumatic-syndrome" and the discussion about its objectivity or subjectivity is far from closed.

The capacity to make an effort has to be reeducated, memory must be retrained, selfconfidence must be rediscovered, pleasure in individual and group activity should emerge.

Thus there is a need for general, individual and group physiotherapy which brings the patient from his bed to the playgrounds. Patients are numerous, physiotherapist are scarce, and salaries tend to increase. A judicial combi-

nation of individual therapy and audiovisual means, as proposed by Behrend, makes this reducation possible and not to expensive.

Localized lesions tend to create specific problems of which aphasia, apraxia, posttraumatic epilepsy and visual disturbances are only the better known ones.

Specialized teams working in close cooperation with the neuropsychological department are indispensable.

6. The selection of patients

In a nightmarish vision any specialized center could slowly become crowded by *severely disabled patients* needing numerous personel expensive installations, and having most of the time, no real success to show for.

Choices shall have to be made.

Bryan Jennett from Glasgow (1972), disturbed by the "increasing number of disabled survivors" has tried to redefine recovery and to establish prognostic criteria which would permit a reasonable "strategy of management".

Gerstenbrand from Vienna (1969) has shown the remarquable results of concentrated rehabilitation on some, especially young, severely injured patients.

These considerations have let us to the conclusion that a rehabilitation center has to control the admission of *severely injured patients* and limit their number to about one in nine in a specially equiped unit (30 beds), until the therapeutic experience permits to better define the admission criteria.

By systematically admitting *light head injuries early* after their accident to a rehabilitation center Francois Cohadon from Bordeaux (1975) has reduced the duration of incapacity for work, from about 144 days to 80 days and the average permanent disability was reduced from about 14 % to 10 %. These results tend to show the importance of psychosocial factors, and the value of early rehabilitational attidudes even in light injury.

Who should *not* be admitted?

— Patients below 18 or above 50
— Severe psychotic and psychopathic cases
— Drug addicts and alcooholics
— Acute risks of suicide.

To all these rules there shall be exceptions which have to be carefully considered.

7. Possibilities for research

I shall only mention four research projects which could be realized by routine work:

1. To discuss, establish and introduce an *international codification* for head injuries permitting prospective studies. Most papers so far have been based on retrospectively selected material.
2. To *coordinate all diagnostic procedures*, expecially brain scanning and neuropsychology, and correlate them with previous clinical informations and the social and economic outcome.
3. To *compare psychosocial factors*, in different national, economic, social, administrative and legal settings.
4. To establish *well defined rehabilitational programmes* and to verify their efficiency.

8. Where should such a Center be situated

What are the arguments for a City?

— the proximity of a University

— the close connection with a Center of Traumatology and early rehabilitation
— the more "normal" living conditions for most patients who come from cities anyway
— the closeness to their family (if they happen to be living in that particular city).

What are the arguments for a village?

— the easy avaliabilty of big and healthy spaces for sporting and social activities
— the possibilities to create a "non-clinical atmosphere"
— the possibilities for a gradual transition from the activities of the center to the village life
— the „holiday" atamosphere, free from daily wories and outside interference.

Finally Hochfelden in Alsace in France seems a fair compromise.

It is a village of about 3000 inhabitants a less than half an hour transport from the University and the Center of Traumatology in Strasbourg. The motorway passing at about one kms distance provides good connections with Germany, Belgium, Luxembourg and Switzerland.

9. Rehabilitation towards what?

Nowadays rehabilitational philosophies tend to be allenbracing and there is no doubt that the rehabilitation of an injured brain is a global affair. The aim of all rehabilitation is selfreliance and it is important that the transition from passive to active methods is achieved as rapidly as possible.

The right to happiness is an important factor in creating a powerful motivation. Gratifying individual and group activity, in rehabilitation and leisure, shall play an important part.

Much effort and time has been spent in many places to teach patients skills which nobody wishes them to have.

There is a danger of rehabilitating people towards jobs that don't exist.

The global philosophy applied in the "Stiftung Rehabilitation" in Heidelberg is impressive in that it prepares people by prolonged training and schooling for fully independent jobs of the most modern kind with a guarantee of employment at discharge.

10. Conclusions

These are only a few of the problems we met when establishing the plan for a "Cité Européenne du Cerveau".

I shall spare you the acount of all the difficulties we encountered when we tried to interest and mobilize the various national agencies because this is another story where tears and smiles might mingle freely and which would illustrate some of the most formidable obstacles to any kind of an optimistic view on rehabilitation.

We had to make a certain number of choices. We shall have to go on and make choices until1980, when hope the Center of Hochfelden shall open its doors.

As we are still in the learning process I would be most grateful for any comments, criticisms and suggestions from the audience.

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J. B. BARON, M. J. TANGAPREGASSOM, A. M. TANGAPREGASSOM, N. USHIO, P. M. GAGEY, H. GOUMOT, V. LAMIT, J. LEFEBVRE, C. MASSONET, C. VENDRENNE, Y. ROUQUET, R. GENTAZ

PERTURBATIONS OF ORTHOSTATIC TONIC POSTURAL ACTIVITY FROM MIDBRAIN ORIGIN IN CASE OF POST-CONCUSSIONAL SYNDROMA

The purpose of this paper is to emphasize the incidence of oculomotor system on postural activity and specially the relationship after head injuries.

In France during the First World War a lot of works have been done on the topic of post-consussional syndroma. Mainly two directions are found in the description of this syndroma.

Mairet and Pieron describe a pernament postural trouble in relationship with a permanent false vertigo-like sensation.

Pierre — Marie describes a transitory one with a temporary false sensation of dizziness appearing during head rotation or position changing.

Our purpose is to study this syndroma, its aetiology in regard of traffic injuries or work accidents, summarizing a part of our work and of the team of our fellow-workers who are studying this problem from different points of view.

Amphoux and Sevin considering the biomechanical data following head injuries demonstrate that the maximum of energy of a direct stroke is found in the region of the brainstem. Vendrenne and Chodkiewicz, in pathology, describe that the midbrain is specially involved in head injury pointing out the importance of the unilaterality of the lesion in this part of nervous system.

In 1905 Thiele demonstrates on rats the relationship existing between the tonic postural activity, locomotor behaviour and brainstem reticular formation. The unilateral electrical stimulation of this structure inducing an incurvation of spinal cord homolateral to the stimulation and circling motions of the animal in the same direction; the unilateral destruction o f the midbrain at the level of the III nucleus provokes stable and heterolateral reactions. There is a desequilibrium between the tonus of the paravertebral muscles, abductor, adductor, flexor, extensor, muscles of the limbs between the left and right sides. In 1975. Yamamoto and Yamada, Tangapregassom and all. stereotaxically reproduce this phenomenon. It seems that the equilibrium muscles tonus is depending in part on the midbrain structures and specially that the oculomotor nuclei are playing a predominant part in these mechanismus.

As a matter of fact Tangapregassom and al.. show a perturbation of functioning of the oculomotr muscles homolaterally to the electrical stimulation and controlateraly to the destruction characterized by a ptosis, an exophthalmia and an exophoria. These disturbances have been described by Baron in 1955

in fishes and mice. A tonic change between the abductor adductor oculomotor muscles of both eyes provokes when the deviation of the eyeball is less than 4° sciolitic attitude and peculiar locomotr behavior characterized by crawling motion.

The oculomotor structures seem to have a special action in the body equilibrium keeping. The III, IV and VI nuclei are formed by a mixed cells population: large ones having a motor activity and small neurons having a sensory function. Palkovits and Jacobowitz in 1974 demonstrate their cholinergic property.

The contiguity of the oculomotor nuclei and the mesencephalic reticular formation brings us to look after the underlying reasons about motor unskillfulness following alternations of structures other than the specific involved in the control of equilibrium e. g. VIIIth nerve or cerebellum.

In this scope it is possible to study the changes of biogenic amines or their precursors, as it has been shown by Friedman and Everett inducing homolaterally to the disturbance. a drop of acetylcholine, Michaelis, Arango and Gerard modifying the level of Dopa and Ungerstedt, Butcher and all., Cools and Von Rossum, Barbeau, Costall, Naylor and Olley inducing changes in the levels of both of neurotransmitters. Corroborating partially such an hypothesis, Lantin, Tangapregassom and all. and Poletto, Lantin, and all., on centrally lesionned mice and rats, have observed stable variations of Dopa in the the telencephalon and diencephalon.

Clinical features

The tonic orthostatic postural activity is a functional entity. This function is an archaic one and specifically human, characterized by the positioning and maintening of the body gravity center in the basis. In standing up body is never immobile, it swings continuously, following, peculiar and complexe rhythms, the amplitude and the frequnce of which detecting the functioning of the different sensorimotor systems, who control and maintain the body gravity center in the basis. This motion can be recorded by a statokinesimeter, and their amplitudes and frequencies mesured.

These systems are more commonly related to the extrapyramidal system than to the pyramidal one, and are in close relationship with the reticular formation.

The functioning of the tonic postural activity can be explorated:

a) *standing up statically:*
With a statokinesimeter the sponteneous displacements of the body gravity center are recorded, the patient standing in a dark room, looking straight away at a vertical bar situated in the median plan of the basis, the head free, fixated, or rotated, the eyeball straight away or deviated homolaterally or contrallaterally to the head position. The associated displacements of the body axis to the galvanic labyrinthic stimulations are also recorded;

b) *standing up dynamically:*
The differencies of tension existing between the right and left, superior and inferior limbs can be objectivated by dynamising them. This is the aim of Fukuda trampling on the inferior limbs reported by Ushio, Matsuura and all., and the Gagey koy test on the superior one.

Excepting neurological testings who are classifically normal, opthalmological examination should be performed very carefully on the functioning of the oculomotor system beside a classical one.

a) *standing up:*
This examination must be done the head free, or after fixation by a neck collar correcting the vicious attitude of the head. This inspection allow to expose a small unilateral paralysis affecting specially some motor units of the III or IV nucleus, provocating a displacement of one eye of a few degrees inferior to 4°. This paralysis can be shown by a convergent manoeuvre, on the side of the paralysis there is an hypoconvergence (Baron, Filliozat, Soulairac). This phenomenon is different from the phoria or fusion perturbations as it was described by Vidal.
A compression of the eyeballs is also performed as a mesure of the diameter of the pupil;

b) *sitting down;*
The deviation of the eyeballs on the right or the left sides provokes a difference of tonus between the flexor-extensor, abductor-adductor system of the inferior right and left limbs (Baron). This postural reaction is perturbated after head injury (Gagey, Baron and all.).

Some others examinations must be associated:

— O. R. L. interrogating the vestibular apparatus;
— rheoencephalographic (Rouquet, Babic and all., Boismare, Boquet and Courtin) reporting simultaneously and aspect of the right and left deep brain vascularisation;
— radiographic interrogating the functioning of atlas-axis articulation by tomographia and the neck vertebrae (Gentaz, Gagey and all.) as the entire vertebral column with and without correction of the oculomotr paralysis;
— psychiatric personnality and performing tests (Filiozat, Goumot and all., Boquet-Masiee), reporting the psychiatric aspect, are also applied.

Results

From all these examinations relating to 150 patients most of them suffering of pseudo vertigo but working over again after head injuries who have provocated on most of them a coma of more than half an hour, recent less than one month or ancient more than two years, it can be assumed that three types of postural tonic activity troubles can be isolated on our population (Baron, Goumot and all.):

— 75 % show a double spontaneous increase of the amplitude of the body oscillations. This phenomenon find again with electrical vestibular stimulation and motion of the eyeballs. Statically and dynamically these perturbations are always associated with partial unilateral paralysis of the III or the IV showing an alteration of the midbrain. When the compression of the eyeballs decrease the amplitude of the statokinesigramme, it can be assumed that an orthopaedic therapy by prismatic lenses will ameliorated the patient. The O. R. L., rheographic and psychiatric examination are then normal;
— 10 % show a provocated increasing of the amplitude of the body oscillations when the head and the neck are rotated on one side, the rheographic, examination is perturbated after the same maneouvre. Spontaneously all the others examinations are normal. It can be assumed that a unilatoral mechanical or reflex perturbations of the vascular system of the brain is provocated by the rotation of the head looking as an Vertebro Basillar Insufficiency (VBI) (Boquet, Boismare and all.);
— 15 % of the population show an anarchic and gigantic, more than ten time the normal amplitude motion, perturbations. All the psychiatric tests are

disturbed. The O. R. L., the rheographic, radiographic examinations are very difficult to practice [Soulairac, Noto and all.].

Therapy

From all these results some therapy can be suggested depending from the aetiology of the troubles of the tonic body activity.

In case of brainstem lesions a therapy changing the level of the neurotransmitter amines concentration, precursor of adrenaline or acetylcholine, associated with energy increasing drugs as Vitamine B can be utilisated or an orthopaedic one using prismatic lenses. This therapy who relieve by correcting the oculomotor disturbance the conflict existing between afferencies from the II, III, IV, VIII, XI nerves and motor orthostatic reactions, allowing, can be used as a therapy or as a test.

In case of VBI syndroma a therapy with DHE only or associated with robasine or vitamine C can be used.

In case of psychiatric syndroma a psychoanalytic, psychomotric, psychosociologic therapy can be prescribed.

Since we have now more than 10 years of experimentations about this subject we can assume that post-concussional syndroma is not a subjectif one mainly and the pseudo vertigo can be ameliorated by a suitable therapy when the diagnosis is done.

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E. SCHERZER AND TH. KIRSCHBICHLER

EEG AND SPASTICITY IN HEAD INJURIES

Spastic neurological signs of cerebral origin and EEG abnormalities following major brain injuries are compared in this study. For this purpose we examined 100 patients who had suffered a cerebral injury many months or even a few years previously so that an irreversible permanent psychic and neurological defect had occurred.

Reports on longitudinal control examinations during the early posttraumatic stage were rarely available since the patients had been treated primarily in various other hospitals where EEG had been registered sporadically only.

Among the 100 patients of this study 48 showed unilateral neurological deficits with slight to marked spastic signs (hemispasticity) and 10 showed bilateral neurological deficits with spastic signs (tetra — or quadrispasticity).

EEG data in the 48 cases of hemisyndromes were as follows:

	number of patients	
Generalized EEG abnormalities	4	
Unilateral EEG foci	30	
contralateral		22
ipsilateral		8
Bilateral frontal EEG abnormalities	5	
Normal EEGs	9	

EEG data in the above-said 10 cases of tetra — or quadrisyndromes were as follows:

	number of patients	
Generalized EEG abnormalities	3	
Unilateral EE foci	7	
contralateral		6
ipsilateral		1
Bilateral frontal EEG abnormalities	—	
Normal EEGs	—	

It appears worth mentioning that tetraspasticity was more or less accentuated on one side of the body in all of our observations. In 6 of these cases the EEG focus was contralateral, in one of these cases it was ipsilateral to the accentuation of tetraspasticity.

The rest of our patients, 42 cases, showed no spastic signs in the chronic stage of brain injury, but various different neurological and/or psychic disturbances. EEG abnormalities were seen in 37 of these cases.

From the data presented above it can be gathered that hemispasticity correlates strongly with a contralateral EEG focus. This holds also true for tetraspasticity insofar as an EEG focus is situated as a rule contralaterally to the side of the body where spasticity is accentuated.

Definitely normal EEGs were found in 14 out of 100 cases only. The very high percentage of abnormal EEGs including borderline cases may be explained by the fact our material is composed of severe brain injuries and rather frequent intracranial complications like haematomas, meningitis etc. that had necessitated craniotomy.

Regarding the clinical course, it was evident that spasticity and EMG abnormalities dont show much parallelism in amelioration. Nor was it possible to ascertain a significant correlation between the degree of severity of spasticity and EEG abnormalities. For instance, 18 patients with marked hemispasticity showed generalized EEG abnormalities in one case and contralateral delta foci in 3 cases. The remaining 14 patients had only slight EEG foci (alpha suppression, focal dysrhythmia), bilateral frontal EEG abnormalities or even normal EEG traces. The percentage of generalized EEG abnormalities was highest in patients with bilateral spasticity (3 cases out of 10 with tetra- or quadrispasticity), whereas it was strikingly lower in patients with unilateral spasticity (4 cases out of 48 with hemispasticity).

Suprising was also the high incidence of ipsilateral EEG foci in patients with hemispasticity (8 cases out of 48). This may be explained by the fact that most of our patients hand undergone severe brain injuries with protracted brain oedema causing secondary vascular brain-stem lesions, besides multiple primary traumatic lasions within the cerebral hemispheres. Among these many localized lesions there may be some that cause a clear-cut EEG focus without a corresponding contralateral neurological deficit.

As to prognosis the relationship of spasticity and EEG disturbance, a bad prognosis concerning spasticity may be assumed. In favorable cases spasticity resolves faster than the focal EEG abnormality. After cerebral injuries permanent EEG distrubances are, therefore, observed more frequently than permanent spastic signs.

Speaking about EEG recording, some aspects must be considered: bony following craniotomy, especially if disturbances of cerebrospinal fluid flow (as in low pressure hydrocephalus) or a prolapsus of brain tissue are present. Late complications like posttraumatic epilepsy, but also drugs may have a considerable influence on the EEG picture (re-occurence of foci, masking of an EEG focus by a generalized abnormality, etc.), but may have no influence on the neurological state of the patient.

In conclusion: We encountered pronounced EEG abnormalities mostly in patients with tetraspasticity. We want to underline that no congruent amelioration of EEG and spastic disturbances is to be expected. We could draw only few prognostic conclusions from the relationship of EEG and spasticity in the chronic phase of brain injury.

E. KLIMKOVÁ-DEUTSCHOVÁ

NEUROLOGICAL REHABILITATION IN GERIATRY

The hellenistic ideal of a young fighting hero alters gradually in the course of time into the image of an experienced and prudent man, who is victorious by his will and mental power. He expresses his esteem of the aged e. g. in the old testament. In our times the age limit being always higher, charges our whole society to sovle the position of ageing and aged persons, to care for their adaptability, maitaining their activity and their selfsustenance.

The rehabilitation of old persons adheres not only to the somatic state, the fitness of his functions, but a great deal to the ecologic and social factors in the sense of family and wider community association.

The problems associated with rehabilitation in neurology can be commonly considered in the areas of locomotion, manual skills, speech disorders and coordination defects, sensory disturbances and sometimes even psychiatric complications.

The elderly person knows himself and his possibilities often better and estimates life deeper than the young man. The psychological criteria in rehabilitation of old people differ from those of the young. Its aims are different too. It doesn't comprise the return to previous work and restitution of all functions like the e. g. injured young. Sometimes it is necessary to prepare the subject for another occupation or a new vocation measuring the somatic and psychic remaining capacity. Rarely it is necessary to preserve the selfreliance for the daily carrying out of his needs. Sometimes to prevent the worsening of the present condition. The rehabilitation of elederly people has therefore some specific aspects. It is well known that e. g. the tolerance of all procedures is not the same as in adults and young persons. One must consider the altered drug efficacy and safety, in the same way at the reactibility to enviromental factors. It is necessary to establish the importance of the starting state of the organism and to determine what kinds of disorders must be prevented. To solve the problem which are the systems and categories requiring our care in the process of rehabilitation of elderly, we studied large groups of patients to meet total needs of the individual.

In order to settle the needs of care in rehabiiltation we used a thorough statistical electronic analysis of three representative groups of elderly and old persons.

The first group represnts a 7 % sample of persons selected at random from 12000 surviving members of resistance living in Prague. They suffered in war time be well known catastrophic material and psychic life conditions with excessive overburdening by stress, hunger, infections and traumatisms. The results of this investigation concerns 146 parameters of social and medical

examinations of 708 persons. The present living conditions were investigated by means of quesionaires concerning also their habits, incomes, working possibilities, subjective estimations of social position, free time arragements etc. The careful medical examination by district doctors following the schemes elaborated at our Postgraduate institute in Prague comprises the whole status and gives a survey of the polymorbidity of persons under investigation. The average age of this group was in 3,2 % under 49, 75,6 % over 60 years.

The other two groups belong to the similar population well known from our previous work as groups with premature ageing. The control groups concern the non selected population of patients not suffering from war stress.

The results of the first group showed the following percentage of the most involved systems: The most frequent are disabilities in the nervous system with 85,6 % of occurence, the other symptomatology concerns cardiac and circulatory impairement in 82 %. The locomotor system was involved in 80 % and the respiratory functions in 78 % to mention only the main symptomatology. For the aims of rehabilitation and regulation of regime it is necessary to emphasize that 39,6 were owerweight. It is well known that people who have starwed at sometime in their lives are prone to overating.

Our second group of premature ageing was examined by myself and followed up dynamically for nearly 30 years. We give a survey of the detailed subjective and objective neurological examination in slides 1—4, where the computer analysis of 700 persons is evaluated in comparison to controls, all divided according to decades of life. The next diagrams show the frequency of osteoporoses and hyperostoses also as signs of altered metabolism after extreme living conditions. They testify the premature ageing too.

In the third group we include 10.251 persons from 15 districs of Czech countries, who were regularly checked up by their district doctors. The distribution of the main symptomatology is similar but the frequency is in our first group much higher. It may be explained by the temporal distance and by faster developing signs of ageing. The difference is also done by the strictly supervised examination plan in the first group.

From our investigations we can conclude that characteristic for the symptomatology is the involvement of several systems in the same individual i. e. the multimorbidity, which must be taken in consideration in the rehabilitation program.

In 1974 678 of persons checked up in the mentioned third group for premature ageing has undergone rehabilitation and treatment in our spas, specialized for lomocotor, cardiac and neurological rehabilitation.

The principle of rehabilitation to support the patient in his activity was completed by pharmacological means and a regime respecting minor possibilities of burdening the circulatory system. In all warm procedures must be taken in consideration the lowered termoregulation in old age. The use of peloids is also contraiindicated in osteoporosis. The prognosis of osteoporosis can be delayed by means of regular gymnastics and of course of medicaments, like natriumfluorid, anabolics vitamin D with calcium containing diet. We must not underestimate the care of the skin, not only as a cosmetic remedy, but as a fortification and stregthening the tonus. The altered motoric stereotypes and dysbalance of the muscle groups help to establish the right pathogenetic diagnosis, decide the correct reflex-therapeutic measures. The complete restoration of these functions is more difficult in the elderly. Even the manipulating therapy is not simply contraindicated for old age in vertebrogenic disorders, but the possible vertebrobasilar impairement has to be respected

to prevent rotation in retroflecting position of the head with compressive influence on the rigid arteries.

Not to be forgotten is the use of geriatrics stimulating the central nervous system, further psychopharmacological remedies diminishing the anxiety, depression and tension. If unrelieved, the depression will certainly render ineffective the traditional forms of rehabilitation. In that way the motor rehabilitation is easier, the organic symptoms are better influenced. Even persons of more than 70 years of age may be successfully treated by bath procedures. Conditioning, training, coordination exercises, the right regime of rest and food, active cooperation, determination and drive is the dominant theme. We remember Sherington's famous words: "The muscle is the cradle of recognisable mind."

A carefull supervising in living habits in accordance with psychotherapeutic measures have a preventive character. Motivation for recovery is most important in the outcome of any rehabilitation programme. The main aspect of the entire rehabilitation process is a good contact with the environment preventing social isolation.

P. WESSELY

PARAMETER OF APPEARANCE OF EARLY POSTTRAUMATIC FITS

Within the framework of posttraumatic cerebral fits, early have to be differentiated from posttraumatic epilepsy (= PTE), since the pathogenesis, prognosis and the therepeutical measures are distinctly different.

With respect to the limitation in regard to time several authors differentiate between immediate fits, i. e. fits following immediately upon the trauma, and early fits proper, with the borderline vis-a-vis PTE as regards time being variously assessed in literature.

Whereas formerly the time limit of early fits was extended up to half a year, later on numerous authors fixed the interval at approximately 4 weeks.

Jennet (1962) includes in the early fits only the crises of the first week. Many others have followed this classification, too.

However, it seems recommendable not to set up any rigid deadlines — though these may obviously be extremely well suited for statistical purposes — but to assign these fits to the acute illness, whose length depends upon the severity of the trauma. For this reason, for any assessment, a certain flexibility as regards time must be stipulated.

From the pathogenetic point of view the early fits have to be regarded as irritative symptoms within the framework of a dynamic process and, thus. do not fulfil the definition of an "epilepsy". PTE, on the other hand, is assumed to be caused by a brain scar (a process which haas, to a large degree, already been concluded), from which an autonomous afflication develops.

Comparing the relevant literature, the frequency of early fits lies between 3.4 and 10 per cent.

When a larger number of traumatological patients is observed, the following parameters concerning the appearance of early fits are arrived at: in a total group of 300 patients with traumatic fits, 99 suffered from early fits, (of which 72 developed, with or without latency, into PTE), and 201 patients from a primary late epilepsy. In this connection it becomes evident that individual clinical-anamnestial or traumatological load factors (i. e. concerning the heaviness of the cranio cerebral trauma) exercise variously high degrees of influence both on the manifestation of early fits and on the change--over from early fits to a late epilepsy.

If such clinical parameters are being made use of, 3 groups may be differentiated: 1. such traumatological factors which, whenever they occur, result in a comparatively low incidence of early fits: if the length of the coma lies between 0 and 3 hours, 27 per cent of the patients (with a total number of 89 patients fulfilling this characteristic) will show early fits. If, in spite

of a short period of unconsiousness, early fits manifest themselves, these will develop into late fits in as much as 83.3 per cent of the cases. It may be assumed that, particularly whenever such a comparatively low load factor leads to the appearance of early fits, a personal disposition (or also the simultaneous occurrence of other traumatological factors) will favour the development of PTE. When there are no central neurologic signs (n = 166) 28.3 per cent will show early fits which, in 74.5 per cent of the cases will develop into PTE. Finally, early fits will occur in only 26.5 per cent of the cases if, after the acute phase has worn off, no organic psychic syndrome or traumatic psychosis remains, with 77.5 per cent of these cases showing a development into PTE.

A second group of factors, however, represents heavier load with regard to the incidence of early fits, thus, with missile injuries (as opposed to the accident injuries much more frequent at the moment), 32 per cent of the cases (n = 50) will show early fits, all of which will develop into a late epilepsy.

In the case of accidents involving an opening of the dura the rate of early fits becomes high, viz. 32.1 per cent, the same being true of the change-over rate to PTE with 84 per cent (n = 78). It is somewhat surprising that, among 105 cases, depressed fractures lead to early fits in only 29.6 per cent of the cases, of which 81 per cent developed into PTE.

Finally, a third group even heavier load factors, may be described: first of all, 44,7 per cent of the cases with a traumatic intracranial haematoma (n = 47) will show early fits, which develop, however, into PTE in 76 per cent of the cases only, with the fits being typically caused by the lack of space as an irritative symptom, the prognosis to be expected with adequately quick care being obviously good.

In the case of an uncosciousness going beyond the period of 3 hours, early fits appear in 36 per cent of the cases (n = 211), 70 per cent showing a development to PTE.

In 42.4 per cent of the cases (n = 118) early fits can be stated with those patients who show central neurologic signs, with the percentage even rising with patients in whom, in the course of the subsequent observation, the paresis are not retrogressive. This finding is also largely in line with the cerebral contusions with regard to demonstrable focal signs, or to the presence of a diffused contusion, which manifests itself only in the length of the change of consciousness. Finally depending on the degree of severity, an organic psychic syndrome persisting after the acute condition (in the case of a severe form 42 per cent), will also result in a rise of early fits, the development to PTE with this degree of heaviness, however, aparently not being concurrent (74 per cent with milder cases, and only 64 per cent with severe cases).

In the table attached these conditions are described in a survey. In this connection it becomes evident that there exists a significant statistical difference between these three groups of load factors summarized above, and that the severity of the trauma, or its possible complications, respectively, (such as haematoma or central pareses) will favour the incidence of early fits, or their development into a chronic form of PTE, respectively.

In this connection, no consideration is given to additional, not primarily traumatological load factors, such as inflammatory or metabolic or vascular complications, respectively, particularly also a chronic alcoholism (with the early fits, in this case, having to be differentiated from withdrawal fits), as

well as to a hereditary load with early fits. In the development of early fits, Stöwsand, in 1971, was able to show a clear dependence on age: i. e. with children he was able to observe early fits more frequently than with older people. The patients covered by this examination include exclusively persons over 15 years of age, so that a similar differentiation was not possible here.

According to the point of view of Courjon (1959) as well, the appearance of early fits causes to an increased degree (with his patients being 4 times as numerous) the appearance of PTE, even if it has to be taken into consideration that with the early fits, in over 27 per cent of the cases, a final termination of the fits within the first weeks without subsequent development into a late epilepsy can be observed.

In long-term observation, 43,5 per cent of the patients with early fits and subsequent development into PTE show a stopping of the fits, while of the patients with primary PTE 56.5 per cent show a termination of the fits.

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MARIA IONESCU, ELENA SILAGHI

THE ACTION OF THE THERMORADIOACTIVE WATER AND OF A UNDERWATER KYNETOTHERAPY OVER THE CEREBRAL TROMBOSIS SEQUENCES

The necessity of the Balneological treatment to the patints with trombosis of before and mean cerebral arteries, arthrosis and neuro-vegetative troubles, the intention of including the underwater therapy in the treatment of recovering of the paralysis, as much as the observation of the relaxant effect on the muscles of the thermoreactive, little mineralised, water Felix (Baile Felix, jud. Bihor. România) urge us to study efficienty balneological treatment associated to massage and underwater kinotherapy over cerebrales thrombosis sequences.

Methode

It has been selected 30 patients between 50 — 70 years old (17 men and 13 women) with thrombosis of the before or the mean cerebral arteries lasting 1 — 13 years, with the normal tension or moderate tension, who had arthrosis and vegetative troubles at the paralysed members, but they had no contraindication for the Felix treatment.

Balneological treatment lasted 20' — 30' during 21 days, in tub or in swimming pool — the water having 37° — 37,5° with massage and active and passive underwater kynetotherapy.

The appreciation of the results has been obtained by blood pressure, pulse, the degree of palsy, the muscle spasticity, the aspects of arthrosis and vegetative troubles.

Results

Changes of pulse and blood pressure have been noticed only to 9 patients who had little tension oscillations and the paralysis has been improved very much, so that at 7 patients the tests of palsy became negative.

The spasticity has been improved in a great measure so that disappeared at the end of the treatment — at 13 patients who had a light pyramidal contraction. Both the trophical vegetative troubles and arthrosis had been improved and in fact they disappeared.

Discussions and conclusions

The small number of cases makes that from this study one can draw conclusions only with informative character, but the good results may be an urge to includ the balneological treatment Felix in tub or in swimming-pool, in the treatment of rehabilitation of cerebral thrombosis sequences.

One must select only the patients with the normal tension or the light pressure, because the hypertension, the heart and breathing insufficiency cerebral, hemoragies and the acute period of cerebral thrombosis are contraindicated. (9, 10, 13, 17).

One cannot say exactly which is the best moment for the beginning of the treatment but one can say the smaller is the age of sequences, the better is the efficiency of balneological treatment.

The action of the thermoradioactive water Felix is achieved by a complex of factors: heat, radioactivity, ions, movement, etc., that improved the periferic ciurculation and that of the nervous system, then also soften the chronic inflammations, relax the muscles, and lead to ergotrophyc reactions proper to the patients for easiness of the voluntary movement. (1, 2, 3, 6, 11, 12, 18).

The underwater kynetotherapy and massage carried out selected area, according to Danniels's and Wortingam's (5) indications increase the efficiency of balneological treatment and at the same time they obtain major properties associated to the relaxing effect of thermoradioactive water Felix.

Expecting the good results, one mus keep in mind the age of the patients, the asociated illnesses, and the extend of the cerebral lesions, which if they are not a sure contraindications, nevertheless they hinder the favourable action of the thermoradioactive water Felix and of the underwater kynetotherapy.

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H. J. HACHEN

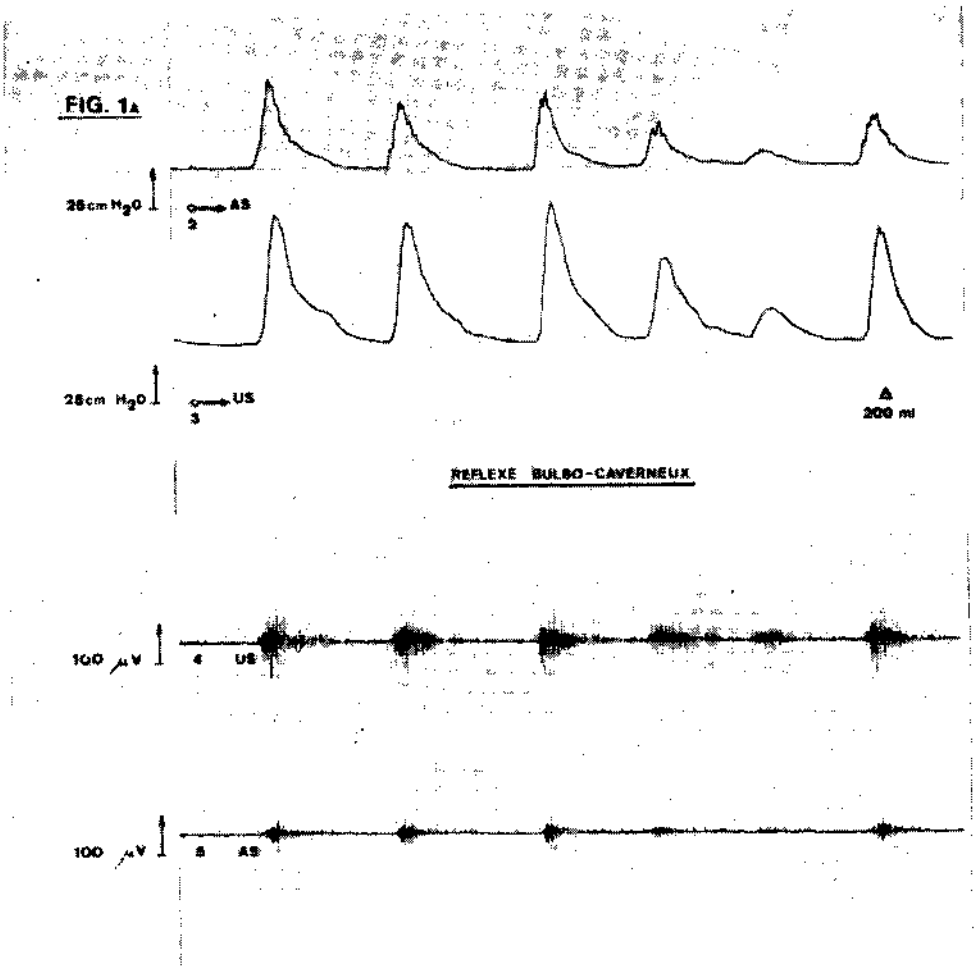
NEURO-UROLOGICAL ASSESSMENT OF BACLOFEN IN THE TREATMENT OF URETHRAL SPHINCTER SPASTICITY. A URODYNAMIC INVESTIGATION

In male paraplegics with upper motor neuron lesions, detrusorsphincter dyssynergia and urethral sphincter spasticity are the commonest causes responsible for inadequate bladder emptying. Hypoactivity of the detrusor and trigonal fibrosclerosis may further aggravate the situation. High postmicturition residuals expose the patient to chronic infection, stone formation, ureteral reflux and chronic pyelonephritis. Appropriate therapeutic measures must be taken during early bladder training in order preserve renal function. Our goal is to restore efficient voiding, maintain physiologic bladder capacity, eliminate catheter-drainage and minimize the incidence of urinary infection.

In the immediate post-traumatic stage, — when the patient is still in spinal shock, intermittent catherization at 8-hourly intervals has been shown to be the best available method to prevent detrusor dilation and chronic infection. With the gradual build-up of vesical reflex activity one may be tempted to try and overcome urethral sphincter resistance with cholinergic drugs, cholinesterase inhibitors or detrusor activation with an electronic device. In our experience, the resulting high-pressure system rapidly induces severe histo-morphological changes within the bladder wall and carries a considerable risk of reflux formation, with subsequent pyeloureteral dilation and pyelonephritis.

In chronic retention the primary concern should therefore be to alleviate any infravesical obstacle that prevents adequate outflow. Drug therapy with spasmolytic agents is of limited benefit, even in cases with purely functional stenosis. Pudendal nerve block allows for temporary relief of sphincter spasticity; however, one should consider that this method is counterindicated in the anticoagulated, actually injured patient. Bilateral neurotomy of the pudendal nerves would undoubtedly result in significant permanent reduction of sphincter spasticity. However, since these nerves supply both the urethral and anal striated sphincters, the surgical procedure carries a high risk of fecal incontience which is incompatible with normal social and professional activities.

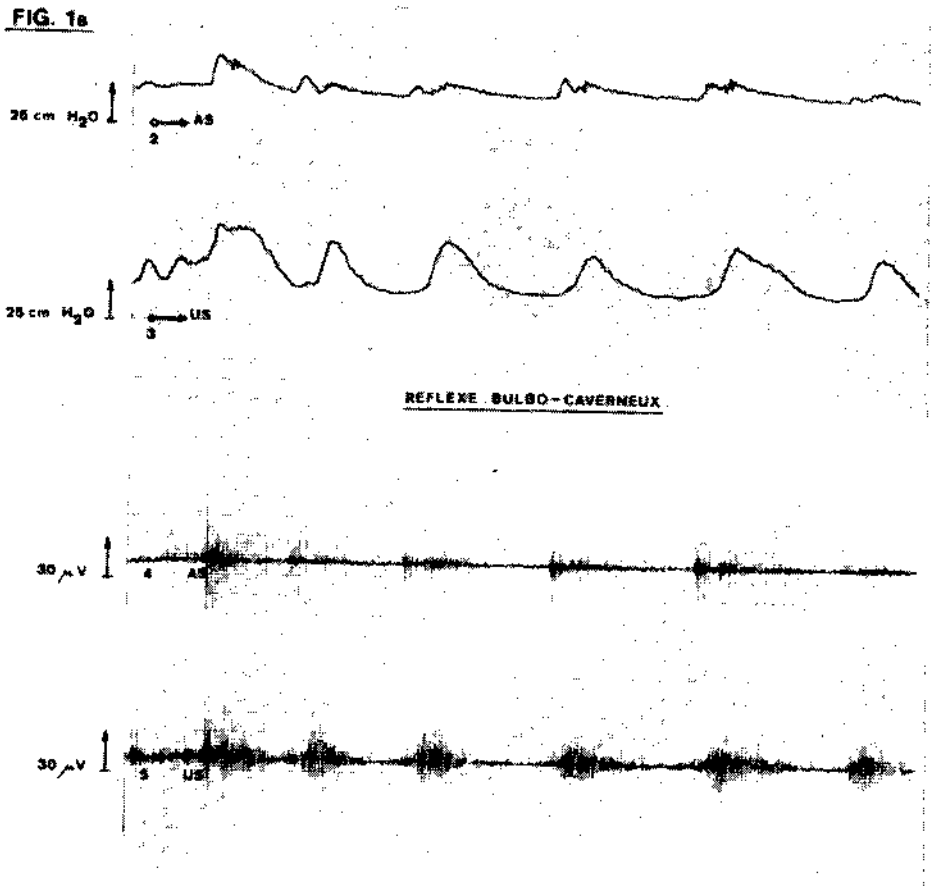
Four years ago we had the opportunity to be among the first investigators to assess the efficacy of baclofen in patients with neurogenic bladder dysfunction. As stated in a recent publication, the various micturition parameters showed no significant improvement in patients receiving oral baclofen at a dose of 75 mg daily for 10 consecutive days. On the other hand, preliminary findings with intravenously administered baclofen turned out to be very



encouraging. This observation prompted us to continue our neuro-urological investigation for two more years, in order to complete the data regarding clinical indications, patient selection, optimal dose-range and tolerance.

Material and methods.

99 male patients with recent spinal cord injuries of the upper motor neuron type (automatic neurogenic bladder function) had given their written consent for participation in the trial. 47 patients with post-micturition residuals between 50 and 100 ml were assigned to group A for oral treatment; the remaining 52 cases with residual volumes between 100 and 150 ml entered group B for intravenous treament. This pattern of distribution was chosen in view of the fact that oral baclofen had failed to improve voiding in all previously studied patients with major retention (> 100 ml). Oral dosage was 25 mg 8-hourly for 10 days (7 am., 3 and 11 pm.); intravenous dosage was 15 mg

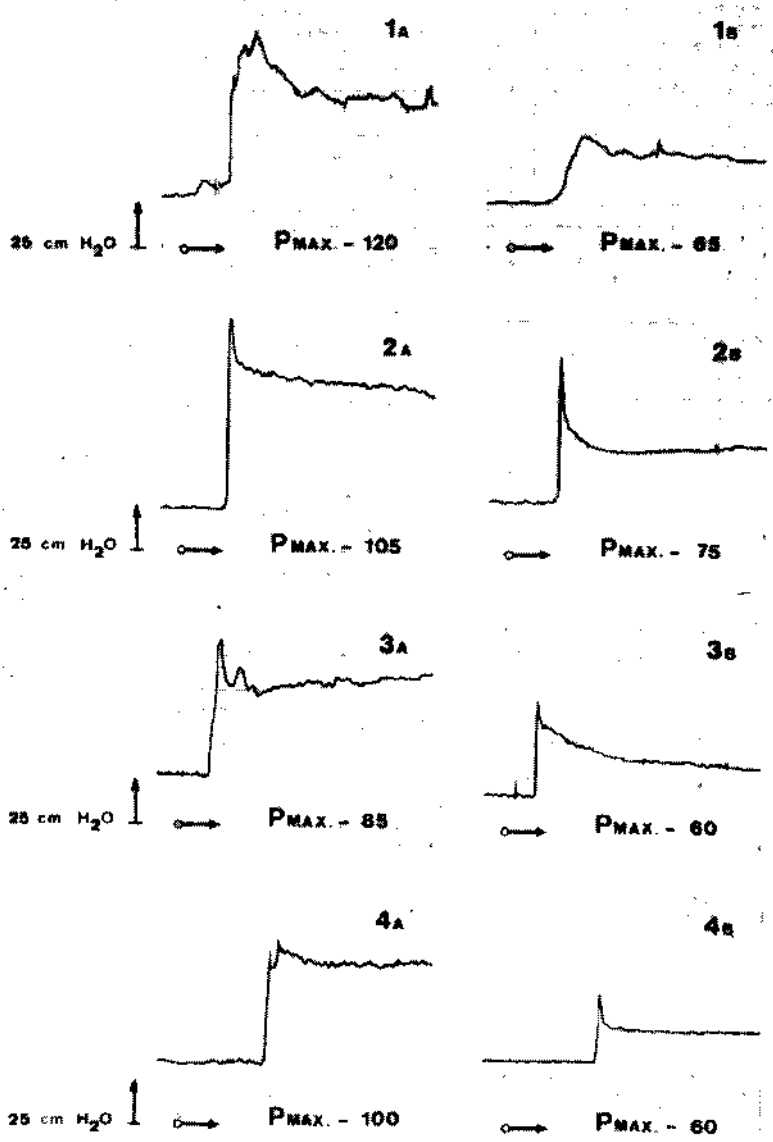


12-hourly for 7 days (8 am. and 8 pm.). A wash-out period of one week was observed before commencing the trial. In order to avoid possible drug interference no other medication was prescribed throughout the study.

The following urodynamic investigations were carried out before and after the course of treatment with baclofen: cysto-sphincterometry, micturition cystography, sphincter electromyography. Mean residual urine volumes were determined directly by catherization and indirectly with a radioisotope method using Hippuran -^{131}I. The purpose of this double assessment was to determine the degree of accuracy of the isotope method as compared to direct bladder catheterization. The results of this particular part of the study will be published elsewhere.

Our technique of cysto-sphinincterometry has been described previously. The set-up allows for concomitant assessment of pressure variations in the bladder and at both the anal and urethral sphincter. The exact position of the pressure-recording micro-balloons can be checked continuosly on a TV monitor. Pressure variations are trasmitted by Pb 23 Statham transducer-elements to a Hellige 6-channel polygraph. Continuous EMG-recordings are obtained from both the anal and urtheral sphincters with needle electrodes. Changes in bladder configuration during micturition and bladder capacity have been

FIG. 2 CHANGES OF URETHRAL SPHINCTER PROFILES DURING TREATMENT WITH BACLOFEN - LIORESAL®



analyzed afted constant-flow retrograde bladder filling with Ronpacon „370" (3 ml/min). Video-urethrograms were obtained from all patients at least twice before and after treatment.

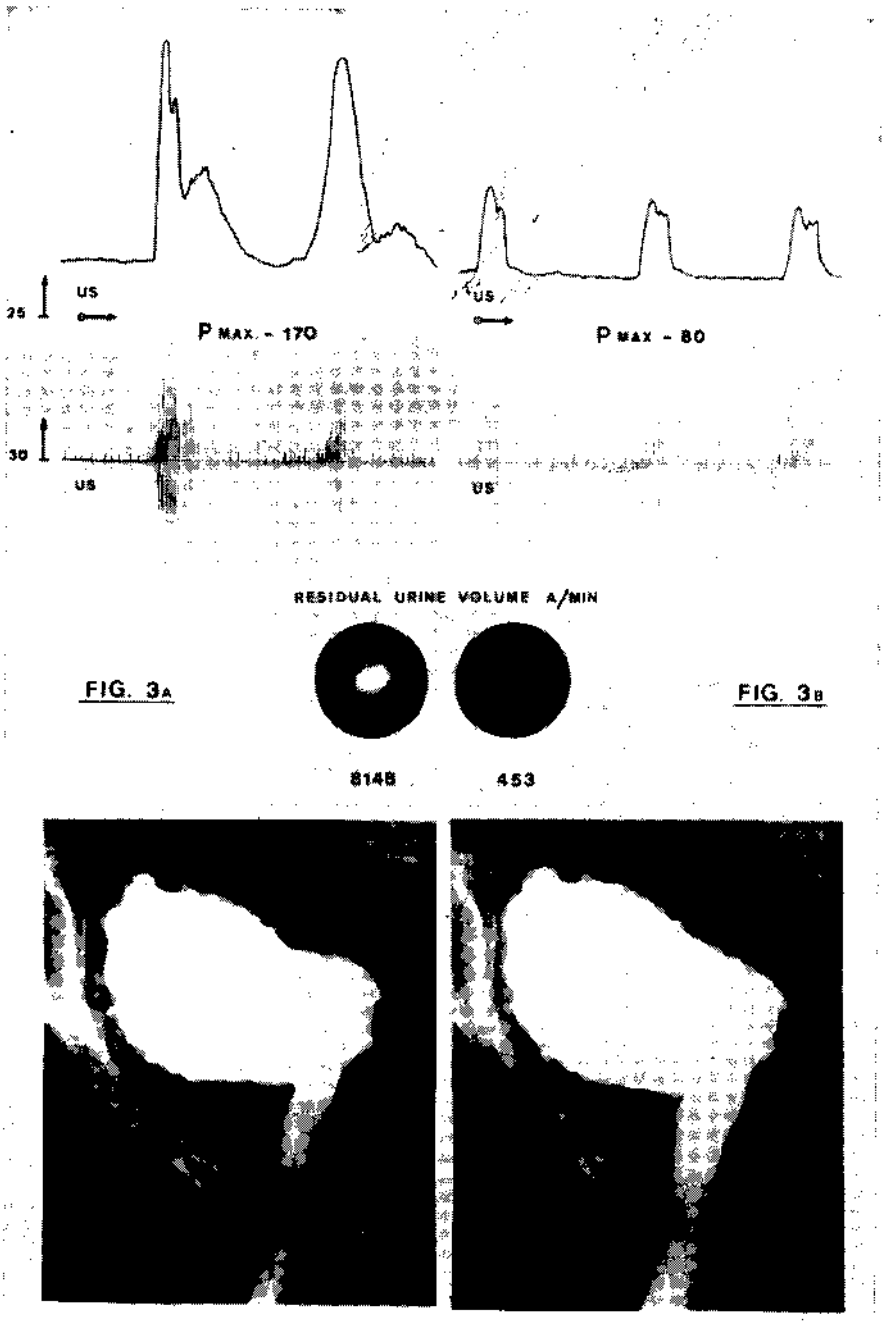


FIG. 3A

FIG. 3B

Results

Mean residual urine

In patients treated with oral baclofen no significant outflow-fascilitation was observed. Post-micturition residuals remained practically unchanged. On

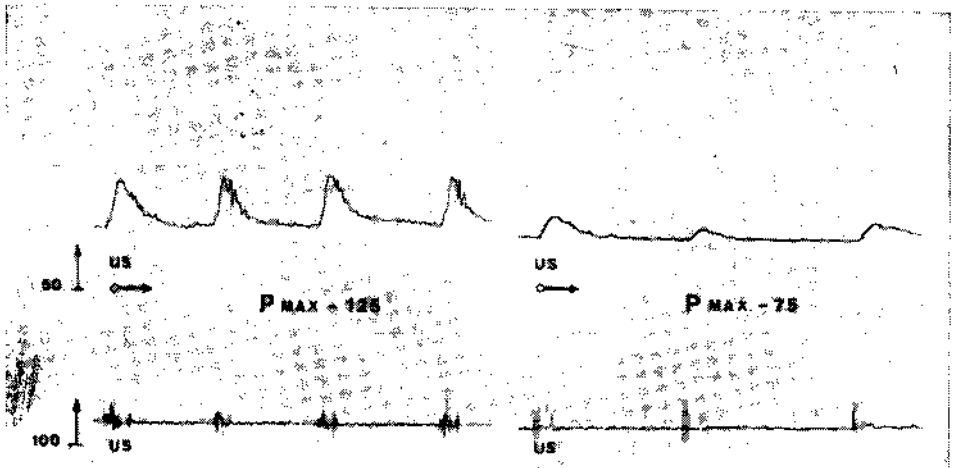


FIG. 4A

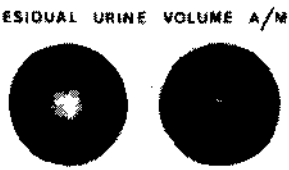
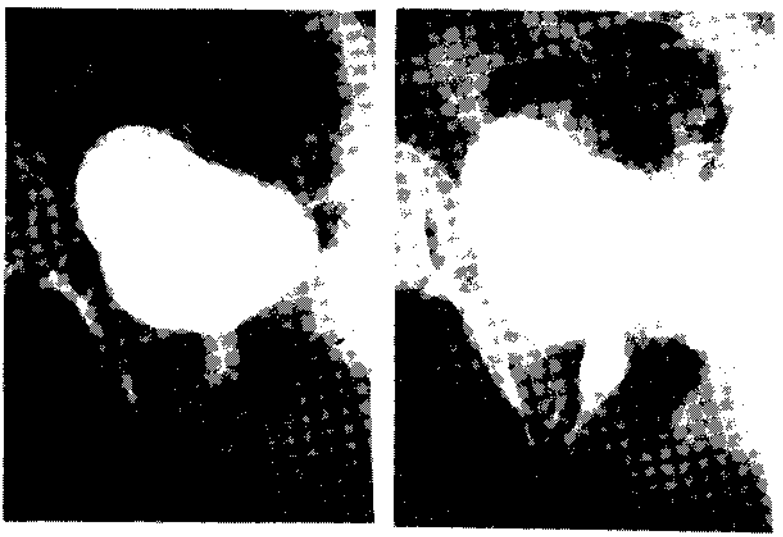
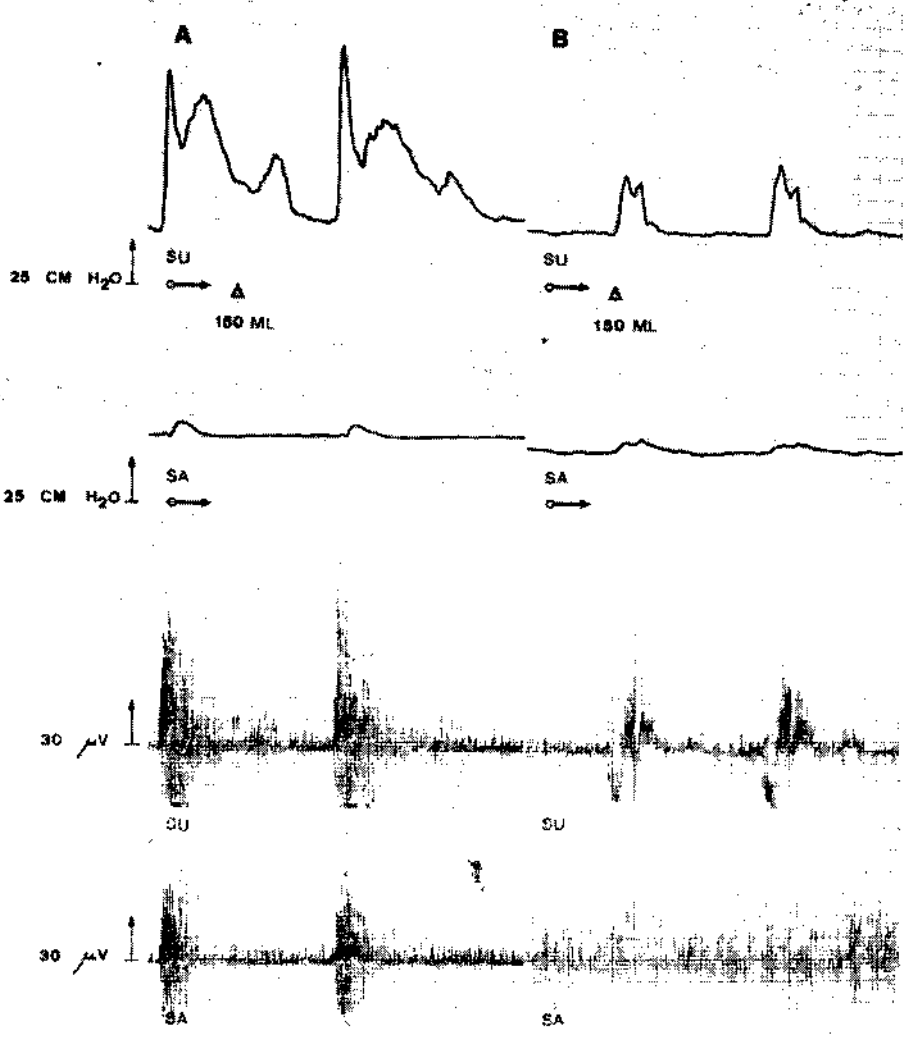


FIG. 4B



the contrary, in patients receiving the drug intravenously, we obtained a highly significant decrease in residual volume from 134,6 to 65,2 ml. Radioisotope estimation of residual urine resulted in similar findings: no significant changes

FIG. 5 BCG-REFLEX 10 MIN AFTER UNILATERAL ANESTHESIA OF PUDENDAL NERVE (SCANDICAIN 1%, 10 ML)



with oral medication; on the other hand significant reduction of radioactivity from 10452 to 3127 dots/minute in patients receiving intravenous baclofen.

Maximal sphincter resistance.

This parameter was significantly reduced in both groups, but the efficacy was considerably less with oral than with parenteral baclofen. In group A we registered a slight decrease from 114,8 to 103 cm H20/ in group B average maximal pressure dropped from 142 to 85,4 cm H20.

Table VI. Type and Frequency of secondary effect in:

— 47 patients treated orally (10 D)
— 52 patients treated I. V. (7 D)

Secondary effects	Baclofen-p. o.		Baclofen i. v.	
	N	%	N	%
Day sedation	18	38	14	27
Nausea	9	19	6	16
Poor balance	8	17	5	10
Vertigo	5	11	4	8
Depression	5	11	2	4
Muscular hypotonia	5	11	8	15
Headache	3	6	6	16
Diarhoea	3	6	1	2
Hallucinations	2	4	1	2
Dyspnoea	0	0	2	4
Dysreflexia	0	)	3	6

Reflex detrusor activity.

No significant changes were found regarding the critical threshold for reflex detrusor contractions and maximal amplitudes of non-inhibited bladder waves. During oral treatment, maximal detrusor contractions passed from 58 to 60 cm H20, during intravenous administration from 59,2 to 62,4 cm H20. In both groups the variations are statistically non-significant.

The therapeutic impact of baclofen on both striated sphinters can be demonstrated by comparing pressure-profiles and EMG-activity in treated and untreated patients during bulbo-cavernosus reflex activity elicitated by electrostimulation of the glans penis. Fig. 1A shows the recording made in a 22 years old paraplegic with a complete $Th_5 - Th_6$ lesion before he entered the trial. Fig. 1B reflects the situation after 1 week of treatment with intravenous baclofen; — both the sphincter-pressures and the EMG-activity are significantly reduced. Optimal therapeutic responses to iv. — baclofen were obtained in patients belonging to the age-group between 15 and 20. Fig. 2 shows the urethral-sphincter pressure-profiles in 4 such cases before and after treatment. Fig. 3 allows for side by side comparison of urethral sphincter pressures, EMG-activity, radionuclear estimation of residual urine volume

and voiding cysto-urethrograms in a 15 years old boy with a complete Th_5 — Th_6 lesion before and 15 minutes after an i. v. — drip of 50 ml isotonic saline + 30 mg of baclofen. (Infusion time 10 minutes). Note the disappearance of vesicoureteral reflux, the attenuation of sphincter pressure and the marked outflow-facilitation obtained with i. v. — baclofen. This was the most striking case in our whole series and one of the few patients who also respondent successfully to oral medication. Fig. 4_A and 4_B sum up the findings recorded in another highly positive case, a 17 years old paraplegic with a complete lesion at Th_9. Fig. 5 indicates the results obtained with unilateral pudendal nerve anaesthesia in the same boy whose micturition parametres were shown on Fig. 3. It was a common finding in our study that patients who responded well to i. v. baclofen also reacted positively to pudendal nerve block and vice-versa.

Tolerance

The adverse effects that may have been drug-related are indicated in Table VI. Signs of intolerance were usually of transient nature. No patient had to be withdrawn from the trial. At the dose adopted for our study, tolerance was found to be slightly better with intravenous than with oral baclofen.

MARTIN ŠTEFANČIČ

THE CHANGES OF CONDUCTION AN EXCITABILITY OF PERIPHERAL MOTOR NERVES IN HEMIPLEGIA

The atrophy of muscles in patients with hemiplegia or hemiparesis remain at present the object of a number of studies and discussions. Opinions regarding etiology strongly differ: inactivity and the compression of nerve roots and peripheral nerves are considered as being possible causes. Recently however has been mentioned the removing of the trophic influence of higher centres the main cause of the changes occurring in functional state of pheripheral motor neurones (Panin et. al. 1967, Goldkamp 1967, Bhala 1969, Štefančič 1975).

Our efforts have been focused on throwing light on two questions: whether the removing of inflow of impulses from higher levels induces changes on lower motor neurones and which mechanisms are responsible for the changes if they are present.

In accordance to these problems we undertook the measurements of the following electrophysiological parameters: conduction velocity of fast and slow motor fibres and rheobase and chronaxy of peroneal nerve. Measurement were applied in all examined subjects on both sides. There was applied a slightly modified test for motor functions of lower extremities after Ross (Gračanin 1968). The skin temperature on the below-knee above the peroneal nerve was also measured.

Table I. Conduction velocity of the peroneal nerve fast alpha motor fibres.

N. of patients		91
Mean value	aff. side	46,57 m/sec
	unaff. side	49,78 m/sec
MVD		—3,311
SDD		4,107
T-value		—7,457
P		<0,5 %

Table II. Statistical analysis of the Conduction velocity for fast and slow alpha fibres

		fast	slow
N. of patients		10	10
Mean value	aff. side	38,36 m/sec	47,19 m/sec
	unaff. side	40,50 m/sec	51,42 m/sec
MVD		—2,14	—4,23
SDD		2,302	3,489
T-value		—2,939	—3,834
P		0,5<P<1 %	<0,5 %

When measuring motor conduction velocity for fast fibres we have used the standard method applying skin electrodes for stimulation and needle electrodes for detection. These measurements were performed in 91 patients with hemiparesis mostly as a result of cerebrovascular disease. There existed a statistically significant difference between the affected and unaffected side at a level lower than 0,5 % together with positive correlation (Table I).

Conduction velocity of alpha motor fibres with slow conduction was measured in 10 patients. The metod applied was that of antidromic stimulation after Hopf (1962). Conduction velocity of these fibres was also lower on the affected side, still the difference between the affected and unaffected side was greater and mor significant in fibres with fast conduction than in those with slow conduction (Table II).

Rheobase and chronaxy were stated in 70 subjects (Tables III and IV); significant difference and positive correlation were obtained.

Skin temperature of the below-knee was measured in 84 patients (Table V). Between the two sides significant diference and positive correlation between motor conduction velocity and age of patients, duration of impairement, chronaxy and skin temperature.

Table III. Rreobase of the peroneal nerve

N. of patients		70
Mean value	aff. side	3,169 mA
	unaff. side	2,777 mA
MVD		0,391
SDD		0,581
T-value		5,634
P		<0,5 %

Table IV. Chronaxy of the peroneal nerve

N. of patients		70
Mean value	aff. side	0,258 m/sec
	unaff. side	0,231 m/sec
MVD		0,026
SDD		0,047
T-value		4,686
P		<0,5 %

Table V. Below-knee skin temperature

N. of patients		84
Mean value	aff. side	29,87 °C
	unaff. side	30,77 °C
MVD		—0,907
SDD		0,972
T-value		—8,551
P		<0,5 %

On the unaffected side correlation between motor conduction velocity, rheobase and age of patients was similarly obtained. Here like on the affected side correlation was not obtained between motor conduction velocity and the period of time extending from the moment when impairement occured, chronaxy and skin temperature.

It is to be underlinged that no examined patient presented either causes of peripheral neuropathy or clinical signs of it.

Our values of motor conduction velocity for fast fibres both on the affected side ($x_1 = 46,57$ m/sec) and on the unaffected side ($x_2 = 49,78$ m/sec) are within normal values according to the authors who had presented results obtained in sound subjects (Thomas et al. 1959, Johnson and Olsen 1960, Dimitrijević and Gračanin 1964). In spite of this motor conduction velocity obtained in our patients on affected side was statistically significantly slower as compared to the unaffected sice (mean value of differences: 3,21 m/sec, standard deviation of differences: 4,11 m/sec). It is to be mentioned that similar results were obtained by Gračanin (1973) in a population of 194 patients with hemiplegia. A significant difference between the affected und unaffected side was present also at other parameters: rheobase, chronaxy and skin temperature. The reason of these differences remains open for consideration.

Temperature is no doubt one of the essential external factors which have influence on the conduction velocity of peripheral nerves. According to the measurements of Henriksen (1956) and those of Johnson and Olsen (1960) the decrease of conduction velocity on the affected side in our patients could not be ascribed exclusively to the difference in temperature. Even more than the difference between mean values, it is the absence of correlation between motor conduction velocity and below-knee skin temperature, i. e. above the place where the nerve trunk is placed, which supports the above mentioned suggestion.

It has been found that in normal adult population over 30 or 40 years of age conduction velocity decreases as the subjects grow in age (Norris et al. 1953). Our results confirm this finding but are limited only to the unaffected side. On the affected side however there was no correlation between conduction velocity and age of patients. It is evident that deprivation of control from higher centers broke up the normal picture of depedence existing between conduction velocity and age.

Majority of authors having found electrophysiological changes in affected extremities in patients with hemiparesis are in favour of the concept that modified state of lower motor neurones and that of corresponding groups of muscles is due to the loss of trophic influence from higher centers or its decline.

Selective measurements of conduction velocity of fast and slow alpha motor fibres in our patients revealed that conduction velocity of fast fibres was more affected than that of slow ones. The difference between the two sides exists also in slow fibres and may be ascribed mostly to differences in temperature. Decrease in conduction velocity of fast fibres on the affected side may be due to some other mechanisms.

Mc Comas et al. (1973) found that patients with hemiparesis are subject to reduction in the number of active motor units in the affected muscles occuring from the 2nd to 6th month following the onset of the disease.

It was further found that remaining muscle fibres behaved mostly as tonic ones. By means of his, histo-chemical studies of bioptic samples of muscles Edström (1973) found that in muscles with strong tonic spasticity white muscle fibres become atrophied (phasic, fast units, type II), whereas red fibres (tonic, slow, units, type I) remain intact or even hypertrophic. It is also known that small alpha motor cells innervate tonic motor units and that on the other hand great alpha motor cells innervate mostly phasic muscle fibres (Eccles et al. 1958, Homma and Kano 1962).

Let us mention three mechanisms possibly affecting conduction velocity of nerve fibres in pathological conditions. One of them is demieliniziation i. e. when saltatory conducton is affected; the second is atrophy of axons as it the case in Charcot-Marie-Tooth disease; the third mechanism is selective deterioration of thick nerve fibres where only thinner ones continue conducting impulses.

The last mentioned mechanism would most probably be that of our particular case. It shows that removing of the inflow of impulses and trophic influence from higher centers affects mostly greater phasic motor neurones of the anterior horns of spinal cord which may be functionally dead, if there is present reduction of motor units. Smaller motor neurones innervating tonic motor units and receiving greater segmental inflow are evidently less affected.

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SOUHRN

GUY TARDIEU

PORUCHY TONUSU A SPASTICITA VYŽADUJÍ FAKTOROVOU ANALÝZU

Na 450 bibliografických údajích autor demonstruje, jak je pojem svalového tonu nejasný. Stejně tak je nepřesně definována spasticita: 1. jako zvýšený odpor při pasivním pohybu; 2. jako zvýšení všech proprioceptivních i exteroceptivních reflexů; 3. jako obtíže při pohybu a postoji, charakterizované abnormálními pohybovými vzory.

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F. GRAČANIN

MOTORICKÝ VÝKON A OVLÁDÁNÍ POHYBU POMOCÍ FUNKČNÍ ELEKTRICKÉ STIMULACE (FES) U PACIENTŮ S LESÍ CENTRÁLNÍHO MOTONEURONU

U více než 800 pacientů (dospělých hemiplegiků a dětí s DMO) byla aplikována metoda FES v oblasti n. peroneus či nervových vláken pro extensory na horní končetině. Výsledky byly analysovány klinicky, neurofysiologicky a kinesiologicky. Krom přímé excitace příslušného svalu bylo dosaženo facilitace v agonistech. Navíc byl obnoven mechanismus reciproční inervace. Zlepšila se chůze i postoj a bylo dosaženo volního pohybu. Autor se zabývá také neurofysiologickým mechanismem účinku FES.

SATHOSI UEDA, YASUKO FUKUYA, AKIRA SAKUMA, TOKUYKI HAZAVA, TSUNEO HASEGAWA

STANDARDISACE OBJEKTIVNÍCH TESTŮ PRO HODNOCENÍ NÁVRATU HYBNOSTI U HEMIPLEGIE

Autoři hodnotili 314 hemiparetiků v různém odstupu po cévní příhodě modifikovaným testem dle Brunnströmové, který se skládá ze 14 subtestů pro horní a z 18 pro dolní končetinu. Test má za cíl vyjádřit co nejpřesnější vývoj a mizení patologických hybných vzorců. Výsledky testu byly statisticky hodnoceny na základě hybnosti u hemiplegie. V něm je rozsah úpravy vyjádřen jedním z dvanácti stupňů. Spearmanův koeficient korelace mezi stupni pro dolní končetinu a úrovní stoje a lokomoce byl 0,770.

J. GATCHEVA

POKUS O APLIKACI ZPĚTNOVAZEBNÉHO OVLÁDÁNÍ PŘI REHABILITACI PACIENTŮ S HEMIPARESOU PO MOZKOVÉM KRVÁCENÍ

U 25 pacientů ve stadiu úpravy po mozkovém krvácení použila autorka audiovisuální EMG zpětné vazby k nácviku volní hybnosti a nácviku relaxace spastických svalů. Zvukový a světelný signál, odpovídající bioelektrické aktivitě v určité skupině svalů, napomáha pacientům v jejich aktivní účasti na rehabilitaci. Pomocí této metody bylo dosaženo úspěšného nácviku u 21 z 25 pacientů. Autorka doporučuje používat metodu před zahájením vlastní kinesiterapie.

S. VIOLA, R. MERLETTI, S. ANGELI, D. D.' EMANUELE

ZMĚNY SVALOVÉ SÍLY KRÁTKÉHO A STŘEDNÍHO TRVÁNÍ, VYVOLANÉ FUNKČNÍ ELEKTRICKOU STIMULACÍ U HEMIPARETIKŮ

Síla m. tibialis anterior byla měřena standardní metodou u pacientů s hemiparesou, dosud neléčených FES. Pacient sledoval během opakovaných měření hodnotu síly na monitoru. Při krátkodobém sledování byla síla srovnána před stimulací a po dvaceti minutové elektrické stimulaci. Hodnoty výrazně kolísaly a při srovnání nebyl rozdíl statisticky významný. Při střední době sledování byla hodnocena skupina pacientů, léčených metodou FES pravidelně po čtyři týdny. Zlepšování síly bylo ve srovnání se skupinou, léčenou tradičně, větší na hladině významnosti, vyšší než 0,01.

J. VOTAVA, J. PFEIFFER

KLONUS CHODIDLA — JEHO MECHANISMUS A MONŽOST OVLIVNĚNÍ

Klonus chodidla byl zaznamenáván elektromyograficky u dvaceti pacientů s centrální paresou různé etiologie. Aktivita byla snímána během klonu z několika svalů bérce. V EMG záznamu byly měřeny a hodnoceny tyto parametry: amplituda, trvání a interval mezi začátkem dvou následných potenciálů. U části vyšetřovaných provedli autoři obstřik nervových vláken procainem nebo ethanolem. Pravidelná rytmická EMG aktivita se vyskytovala jen v m. soleus, zatímco v mm. gastrochemii a v hlubokých flexorech je aktivita nepravidelná, podstatně nižší amplitudy. Při změně úhlu v koleni se zřetelně mění dráždivost m. soleus. Je nejmenší při maximální flexi, během extense se zvyšuje a při maximální extensi opět náhle klesne. To se projevuje prodlužováním trvání pseudoklonu a změnou pseudoklonu v klonus.

J. C. J. VAN HEMERT

BACLOFEN A PLACEBO PODÁVANÉ DVOJÍ SLEPOU ZKOUŠKOU U SPASTICITY MOZKOVÉHO PŮVODU

34 žen a 1 muž se spasticitou mozkového původu bylo léčeno za standardních podmínek baclofenem (18 pacientů baclofen, 17 pacientů placebo). Věk 3 — 61 r. Signifikantní zlepšení bylo zjištěno ve prospěch baclofenu v těchto ukazatelích: Spasticity, aktivní a pasívní fyzioterapie, zručnosti, abdukce dolních končetin, celkový poměr hodnot, závěrečné hodnocení lékařem, rehab. pracovnicí a sestrami.

Nebyly pozorovány zádné nepříznivé projevy.

M.-C. DOMS-LISSENS

ÚLOHA NEDOMINANTNÍ HEMISFÉRY PŘI ÚPRAVĚ AFASIE

Vedoucí úlohu v řečových funkcích má dominantní hemisféra. Avšak nedominantní hemisféra má různé schopnosti, kterých lze využit pro reedukaci řečových funkcí při těžkém poškození dominantní hemisféry. Významným prvkem pro reedukaci řeči je lokalisace center pro hudbu v nedominantní hemisféře. Pro sledování aktivity nedominantní hemisféry, která přebírá funkce dominantní hemisféry, by bylo cenné vyšetření krevního oběhu lbi pomocí Xe — 133. Zákrok je však pro pacienta náročný a riskantní.

M. D. ELVIN, F. M. HATFIELD

SEMANTICKÉ A SYNTAKTICKÉ SCHOPNOSTI VE VZTAHU K VÝKLADU A K LÉČBĚ AGRAMATISMU

Většina dřívějších metod jak rekonstruovat syntaxi v případech agramatismu se obracela k povrchové struktuře daného jazyka. Zde je popsán pokus o úpravu pomocí semantické složky. Nejdříve se pacient snaží posoudit semantickou úplnost gramatických a negramatických vět, které jsou mu předkládány. Poté se čerpá z pacientových kognitivních a linguistických reserv. Jsou uvedeny výhody i nevýhody obou přístupů.

YUKIO OTA, SHU-ICHI KOYABU

LÉČBA AMNESTICKO-APRAKTICKÉ AGRAFIE V JAPONŠTINĚ

V japonštině se užívá trojího písma. Z toho čínské písmo má mnohdy piktografický a ideografický základ, čehož lze využít pro nácvik čtení a psaní u japonských agrafických gramotných pacientů.

V. SMITKA, E. ŠADKOVÁ

PSYCHOLOGICKÁ HLEDISKA V REEDUKACI STARÝCH AFATICKÝCH PACIENTŮ

Autoři sledovali po dva roky 72 geriatrických multimorbidních pacientů, z nichž dvacet bylo léčeno skupinovou psychoterapií a dvacet individuální psychoterapií. Mimo to sledovali dvacet afatických hemiparetiků. Pokusili se vytvořit smíšené skupiny afatických nemocných s nemocnými bez obtíží v oblasti řeči. Pro nácvik řeči používali hlavně modifikované metody Vargha-Gereb. U některých pacientů se ukázalo jako psychologicky kladné využití nonverbálních archetypických fenoménů.

V. JANDA

SROVNÁNÍ SPASTICKÝCH SYNDROMŮ CEREBRÁLNÍHO PUVODU S DISTRIBUCÍ SVALOVÉHO NAPĚTÍ PŘI VADNÉM POSTOJI

Autor ukazuje na podobnost různých klinických syndromů z hlediska tendence svalových skupin ke zkrácení či ochabnutí. Při centrálních syndromech cerebrálního původu se projevuje typická spasticita a tendence ke kontraktuře jen v některých, vždy týchž svalech. Jsou to v souhrnu svaly antigravitační. Jiné svaly mají tendenci k útlumu. V menší míře se tyto dvě skupiny chovají podobně při neparetických stavech, jako je vadný postoj, vertebrogenní obtíže, dokonce i u „normálních" osob. Spastický syndrom tedy může být považován za vystupňovaní fyziologických vztahů různých svalových skupin.

G. GÖLLNITZ

NĚKTERÁ ZÁKLADNÍ REHABILITAČNÍ HLEDISKA U DĚTÍ TRPÍCÍCH NÁSLEDKY MOZKOVÉHO POSTIŽENÍ

Děti s mozkovou poruchou mají omezené adaptační možnosti vzhledem ke vnějšímu světu i k vnitřnímu prostředí své osoby. Různé zátěže organismu vedou snadno k dekompenzaci regulačních mechanismů. Ke správné rehabilitaci je nezbytná nejen neurologická diagnoza, ale též průběžné vyhodnocování dalších funkcí hybných, senzorických, fyziologických, řečových a duševních. Dobrých kompenzačních výsledků může být dosaženo jen v rámci celkového pojetí organického mozkového psychosyndromu.

S. POSER, G. RITTER

ROSTROUŠENÁ SKLERÓZA A ŘIDIČSKÝ PRŮKAZ

252 nemocných s roztroušenou sklerózou mozkomíšní (r. s.) bylo vyšetřeno z hlediska řízení dopravních prostředků a porovnáno s klinickým nálezem. 129 (51 %) mělo řidičský průkaz. Ze zdravotních důvodů spontánně ho odevzdalo 27 (22 %), dvěma byl odebrán. Po dopravním přestupku dočasně byl odebrán dvakrát. 4 nemocní měli průkaz na nákladní auta 2 k profesionální přepravě cestujících. 8 (6 %) bylo na dopravním úřadě vedeno jako provinilci. U zdravých je toto procento mnohem vyšší (15 — 20 %). R. s. často přejíždějí červenou (6 z 8) a bude se tím nutno blíže zabývat. Nemocní s r. s. celkem málo riskují. Obecný zákaz řídit vozidla pro r. s. není oprávněný. Mají dobrou disciplinu, vracejí průkaz sami, upravují si řízení přiměřeně svému stavu.

V. VLACH

NĚKTERÉ POHYBOVÉ VZORY VYVOLANÉ EXTEROCEPTIVNÍ STIMULACÍ VHODNÉ PRO REHABILITACI DĚTÍ

V rehabilitaci při poruše CNS užíváme základní pohyby, ze kterých se skládá normální hybnost. Tyto se mění během vývoje. Lidský mozek obsahuje značné množství vrozených a kodovaných pohybových vzorů, které se během evoluce objevují spontánně. Každý pohyb může být většinou vyvolán několika způsoby a lze tak dosáhnout přirozené hybnosti. Hlavní cíl rehabilitace postižených dětí je vertikalizace a lokomoce. Toho lze dosáhnout pomocí facilitace nejen proprioceptivní, ale též exteroceptivní. K aktivaci vzpřímování hlavové části těla užíváme v lehu na břiše krční reflexy a k vertikalizaci pánevní části těla vertebrální reflex, zvláště v torakální oblasti. Podle Bauera můžeme lokomoci aktivovat stimulací soleu nebo interskapulárně, což provokuje pohyby podobné plování.

E. BALOGH, SZ. HORVÁTH

MEDIKAMENTÓZNÍ VLIV NA SPASTICITU RŮZNÉHO PŮVODU A STUPNĚ V DĚTSTVÍ

Autoři podávají přehled některých léků, užívaných v rehabilitaci spasticity v dětském věku. Uvádí možnosti a vhodnost léčby podle různých věkových kategorií a podle různých topických i etiologických faktorů, charakteristických pro onemocnění.

LEHOVSKÝ M., TOŠNAROVÁ V.

POUŽITÍ MONOSYNAPTICKÉHO REFLEXU PŘI VYHODNOCOVÁNÍ SPASTICITY U DĚTÍ

Autoři vyšetřují poměr motorické odpovědi a Hoffmanova fenomenu M : H u 31 zdravých a 55 nemocných dětí, stižených spasticitou. M : H odpověď je u dětí se spasticitou vyšší. Dále hodnotí H 1 a H 2 technikou dvojích stimulů. Časné objevení H 2 a vyšší amplituda svědčí pro spasticitu při srovnání s normálními dětmi.

J. SÜSSOVÁ

PŘÍSPĚVEK KU STUDIU HEMIPARETICKÉ FORMY DĚTSKÉ MOZKOVÉ OBRNY

Práce se zabývá výskytem epilepsie u hemiparetických forem DMO. Všímá si psychického defektu a strany postižení. Vychází ze studia 28 pacientů. V daném souboru nalézá normální mentální úroveň častěji u levostranných hemipares, tam je snížena pouze při kombinaci s epilepsií. U pravostranných hemipares je mentální defekt častější a vyskytuje se i bez epilepsie.

O. HÖÖK

OTÁZKY MOTIVACE — NĚKTERÉ NEUROPSYCHOLOGICKÉ ASPEKTY

Chronicky nemocný se musí přizbůsobit svému stavu. Způsob, jak to učiní, závisí na druhu a rozsahu onemocnění nebo úrazu. Důležitou úlohu hraje premorbidní osobnost. I jiné faktory mají svoji nepopiratelnou váhu. Autor je rozebírá se zvláštním zřetelem k pracovní motivaci.

HABERFELLNER H., ROSSIWALL B.

FUNKČNÍ LÉČBA ORÁLNÍCH SENZOMOTORICKÝCH PORUCH

Pacienti se senzomotorickými disfunkcemi v oblasti ústní dutiny jsou léčeni různými funkčními aparátky. Vhodná je týmová spolupráce neuropediatra, ortodonta a logopeda. Kombinovanou léčbou lze dosíci lepší sociální adaptace nemocných, zlepšení žvýkacích a polykacích funkcí. Používané aparáty jsou v práci popsány.

J. MACH

NAŠE ZKUŠENOSTI S OPERATIVNÍ LÉČBOU SPASTICKÝCH OBRN NA DOLNÍCH KONČETINÁCH

Práce vychází z podrobného rozboru operačních postupů na dolních končetinách u 155 pacientů s dětskou mozkovou obrnou.

Popisuje výsledky jednotlivých zákroků a všímá si vhodnosti toho kterého zákroku a upozorňuje na jeho riziko. Práce zdůrazňuje, že chirurgické řešení u DMO je pouze součástí léčby a musí být správně indikováno. Doporučuje začít od proximálních kloubů a postupovat k akralním.

G. HUFFMANN

KATAMNESTICKÉ SLEDOVÁNÍ HODNOTY PRACOVNÍ PROGNOSY U LIDÍ S DMO

Podle testu, který zahrnuje neurologické, logopedické, psychologické, psychiatrické a pracovní vyšetření bylo sto nemocných zařazeno do pěti skupin pracovní schopnosti. Po osmi letech byla překontrolována jejich sociální situace a shledáno, že většinou odpovídala předpovědi podle testu. Případy, které neodpovídaly očekávání, se rovným dílem odchylovaly jak směrem kladným, tak záporným.

J. CLAYES

ATAXIE A HYPOTONIE U DĚTÍ S DĚTSKOU MOZKOVOU OBRNOU

Autor upozorňuje na význam EMG vyšetření análního a uretrálního sfinkteru při poranění na úrovni obratle Th 12 — L 1, neboť v těch případech může nastat jak chabá, tak i spastická nebo smíšená paresa těchto svalů. EMG bylo snímáno v klidu, při reflexech, volním stahu a mikci. Jsou uvedeny dvě kasuistiky, u nichž byl EMG výsledek podkladem pro úpravu terapie.

STARÁ V., RUSŇÁK Š., ROMÁNEK J., KOVÁŘOVÁ M.

MOŽNOSTI SOCIÁLNÍ ADAPTACE DĚTÍ S DĚTSKOU MOZKOVOU OBRNOU

Autoři vyšetřili sto dětí s dětskou mozkovou obrnou ve věku 3 — 15 roků. Hodnotili chůzi, stoj, schopnost transportu, denní činnost, řeč, psaní, interpersonální komunikace, tanec a reakce na rytmus. Cílem práce bylo zhodnotit schopností ke společenskému začlenění.

LAITER N., GAGNARD L., DOYON F.

STATISTICKÝ PŘÍSTUP K DĚTSKÉ MOZKOVÉ OBRNE Z ETIOLOGICKÉHO HLEDISKA

Autoři přesnými statistickými metodami hodnotí 19 ukazatelů u dětské mozkové obrny. Dále sledují 86 vztahů k porodní váze a etiologii.

K. LEWIT

BOLEST VZNIKAJÍCÍ NA ZADNÍM OBLOUKU ATLASU

Mechanismus u bolestí hlavy cervikálního původu je různý. Novou jednotkou je bolestivost zadního oblouku atlasu. Klinicky se může projevit typickou bolestí v zátylku nebo migrénou. Bolestivost vybavujeme pohmatem při maximální pasivní anteflexii hlavy vleže na zádech, současně hmatáme svalové spasmy. Často při tom bývá blokáda atlas-okciput. Při bolestech do retroflexe jde obvykle o islovanou retroflexní blokádu. Při blokádě je léčebnou metodou volba manipulace. Při přetrvávaní bolesti po manipulaci lze doporučit obšřik oblouku anestetikem nebo lépe opich suchou jehlou. Vhodná je i periostální masáž.

C. IRÁNYI, M. TARNOCZY

PŘÍSPĚVKY ELEKTROMYOGRAFIE K DIAGNOSE PŘI KOŘENOVÝCH SYNDROMECH

Autoři provedli EMG vyšetření u 107 případů krčních a 57 bederních kořenových syndromů. V akutních případech jsou změny výraznější, hlavním nálezem jsou fibrilační potenciály. V chronických případech jsou typickým segmentálním nálezem polyfasické potenciály bez fibrilací. Na základě získaných výsledků shrnují autoři do šesti bodů ty klinické situace, při nichž má EMG vyšetření diagnostický význam.

O. SENGIR

SROVNÁVACÍ STUDIE LUMBAGA A ISCHIASU U DOSPÍVAJÍCÍCH, MLADÝCH DOSPĚLÝCH A STARŠÍCH DOSPELÝCH

Autor srovnává dvě skupiny pacientů s lumbagem. První ve věku od 15 do 26 let, druhou od 40 do 51 roků, které sledoval po 5 let. Zjišťuje, že lumbago se vyskytuje ve skupině mladých pacientů častěji u mužů, během let se častot postupně zvyšuje. Vyžařování do dolních končetin a typické radikulární příznaky jsou u mladších vzácnější. V etiologii u maldých mužů jsou časté úrazy, u žen těhotenství. U mladších pacientů jde často o první výskyt obtíží a ústup při léčbě je rychlejší.

J. CHÊNEAU

PSYCHO-FYZIOTERAPEUTICKÝ PŘÍSTUP K BENIGNÍM BOLESTEM PÁTEŘE

Autor statisticky zpracovává výsledky léčby u 500 pacientů s bolestí páteře. Byli léčení krátkodobě (méně než 1 týden). Léčba zahrnovala: A) Psychologický přístup (odstranění obav, nácvik relaxační techniky, případně přímou psychoterapii). B) Fyzikální léčbu. Šlo především o manipulaci, dále v některých případech o imobilizaci nebo trakce současně s faradickým drážděním. C) Reedukaci cvičením, zaměřeným na pohyby běžného života. Léčení bylo úspěšné u 86 % případů. Trvalou úpravu zaznamenali u 60 % pacientů.

K. SCHIMRIGK, W. GRÜNINGER

ÚČINEK ELEKTRICKÉ STIMULACE NA EXPERIMENTÁLNE DENERVOVANÉ SVALY

M. quadriceps bílých krys byl elektricky drážděn po přerušení nebo stlačení n. femoralis. Histologické nálezy ukazují, že elektrická stimulace vede ke zpomalení denervační atrofie, ale také ke zpomalení reinervace a regenerace vláken při srovnání po sedmi týdnech. I když je tyto výsledky nutno přenášet do klinických podmínek s reservou, přesto se zdá, že elektrická stimulace denervovaných svalů nemá tak jednoznačně positivní klinický efekt, jak se předpokládalo.

A. VRBOVÁ

ZKUŠENOST S REHABILITACÍ A S LÁZEŇSKOU LÉČBOU PROXIMÁLNÍ PARÉZY N. ULNARIS U SKLÁŘŮ

U některých sklářských profesí se vyskytuje paréza n. ulnaris, poněvadž práce vyžaduje stálou oporu zatížené paže o loket. U některých oborů lze nahradit oporu o loket oporou o celé předloktí. U rytců skla nikoli. Často se vyskytuje i cervikobrachiální syndrom, který je třeba léčit současně. Léčba spočívá v aktivním cvičení, ve fyzikálních procedurách a v plynových injekcích. Zhoršují — li se obtíže přes opakovanou léčbu, doporučuje se, aby pacient přešel na jiný pracovní obor.

K. FASSHAUER, G. HUFFMAN

PROGNOSA A REHABILITACE PACIENTŮ, TRPÍCÍCH TRAUMATICKOU LESÍ BRACHIÁLNÍHO PLEXU

Za posledních devět let vyšetřili autoři elektrodiagnosticky 165 pacientů s poraněním brachiálního plexu. Hlavní příčinou byly dopravní nehody, najčastěji při jízdě na motocyklu. Neurologické, radiologické a elektrofysiologické vyšetření určilo lokalisaci lese a očekávaný rozsah postižení. Výrazná úprava však byla často pozorována ještě druhý a třetí rok po úrazu. Rehabilitace má začít ihned po zhojení vlastní rány. Longitudinální studie ukazují význam struktury osobnosti a sociálních podmínek pro perspektivu pracovní rehabilitace.

L. V. LAITINEN

UMÍSTĚNÍ ELEKTROD PŘI TRANSKUTANNÍ STIMULACI NERVU. TEORIE BOLESTI

46 pacientů s chronickou bolestí bylo léčeno transkutání nervovou stimulací (TNS). V případě poruch čití byly elektrody umístěny na zdravou část těla. Účinek byl kvantitativně hodnocen ve škále od 0 do 16 bodů. Po devíti měsících léčení se bolest zmírnila v průměru o 39 %. Výraznější efekt byl v těch případech, kdy byla drážděna zdravá část těla: při fantomové bolesti, neuralgii při zoosteru, thalamické bolesti. Autor předkládá theorii chronické bolesti a možný mechanismus jejího ovlivnění.

J. C. ASCHOFF, D. WEINERT

SUPIRIDIN V LÉČBĚ MIGRÉNY

Medikamentosní léčba migrény u žen, zaměřená na hormonální složku v etiologii.

A. GOGSTAD

PŘEDPISOVÁNÍ TECHNICKÝCH POMŮCEK VE ŠVÉDSKU. PRAKTICKÁ ORGANIZACE A NĚKTERÁ TEORETICKÁ HLEDISKA

Náklady na technické pomůcky pro tělesně postižené ve Švédsku v letech 1950 až 1975. Administrativní řízení přidělování pomůcek, jejich výroby a výzkumu. Postoj nemocných k technickým pomůckám. Vliv druhu, trvání a vzniku onemocnění. Praktické rozpory v potřebách různě postižených nemocných, např. nevidomých a vozíčkářů. Psychologické problémy při využívání technických pomůcek. Např. dokonalost pomůcky zbavuje nemocného nebo geronta společnosti živého pomocníka.

E. ROCHA, M. PEREZ, J. PLAJA, F. ANGLES, C. RECIO

ZACHÁZENÍ S PATOMECHANIKOU SPASTICKÉ NOHY U HEMIPARETICKÝCH NEMOCNÝCH

Popisovaná chirurgická léčba ekvinovarózního postavení nohy se doporučuje u nemocných 1. s motorickými poruchami bez poruch čití a intelektu, 2. kde byla prováděna reedukace pomocí všech prostředků po dobu nejméně šesti měsíců bez výsledku, 3. u nichž se očekává dosti dlouhé přežití. Na základě rozboru chůze je analyzována chůze sedmnácti operativně léčených nemocných.

J. PFEIFFER

PRŮMĚRNÁ MYOELEKRICKÁ AKTIVITA PŘÍČNĚ PRUHOVANÝCH SVALŮ U ZDRAVÝCH A PARETICKÝCH OSOB NA KONČETINÁCH

Povrchová elektromyografie přes všechny výhrady podáva při určité zkušenosti korelát svalové aktivity. Autor za standardních podmínek vyšetřením třiceti zdravých osob vypracoval pohybové normy, které převedl číselným zprůměrněním v křivky a uvedl směrodatné odchylky. Jde o jednoduché pohyby, při kterých srovnáva aktivitu agonistů a antagonistů na končetině, která se pohybuje a současně aktivitu druhostranné končetiny, která je v klidu. Hodnotí klid, volní pohyb proti odporu, nociceptivní podnět. Technika je vhodná zvláště pro posuzování léčebných efektů u hemiparéz, paraparéz centrálního původu a extrapyramidových pacientů. Při hodnocení vychází převážně z amplitudy akčních potenciálů, proto techniky nelze užít u lézí periferního neuronu. Každý záznam nemocného je rovněž převeden v křivku a porovnáván s normou.

M. DOŽEVA, M. DIMITRIJEVIČ-ALEKSOVSKA, LJ. JORDANOVSKA

REHABILITACE HEMIPLEGIÍ PO TRAUMATU V DĚTSTVÍ

Práce se zabývá výskytem hemiplegií po nitrolebních zraněních u dětí a poukazuje na rozdíl mezi touto a hemiplegií z téže příčiny u dospělých.

Všímá si lékařsko-pedagogických a sociálních problémů u 25 dětí s tímto onemocněním. Pouze 10 dětí bylo schopno zvládnout základní výuku, 5 dětí bylo zcela nevzdělavatelných. Autoři zdůrazňují, že situace u dětí je horší o to, že lze očekávat z důvodů onemocnění obtíže ve výchově, učení a i v životě.

E. BERKER

VÝSLEDKY REHABILITACE U PŘÍPADŮ PARAPLEGIE A KVADRUPLEGIE NA REHABILITAČNÍ KLINICE ISTAMBULSKÉ UNIVERSITY

V příspěvku jsou statisticky zpracovány výsledky za posledních 5 let, celkem u 26 případů paraplegiků či kvadruplegiků. 42,5 % případů byli muži, 57,7 %

tvořily ženy. 69,2 % bylo ve druhém a třetím deceniu. Hlavními etiologickými činiteli byly úrazy a infekce. 90,2 % pacientů záviselo na aparátech, 34,6 % bylo připoutáno k invalidnímu vozíku. 30,5 % mohlo pokračovat v původním zaměstnání. Nejčastějšími komplikacemi byly dekubity a močové infekce.

H. H. JANZIK, H. RAUCHFUSS, H. BILOW

LÉČEBNÁ PÉČE A REHABILITACE PACIENTŮ OCHRNUTÝCH PO TRAUMATECH KRČNÍ MÍCHY

Práce se velmi podrobně zabývá 54 pacienty s transverzální lézí krční míchy. Rozebírá mechanismy úrazu, komplikace, které úraz doprovázejí a podrobně se zabývá léčebnými metodami pojatými do péče po edému, přes interní komplikace až po sociální péči.

Mortalita při této soustředěné péči je stále nižší a výsledky této mnohodisciplinární péče jsou velmi dobré. V kooperaci disciplín vidí další zlepšení v péči o tyto pacienty.

E. C. FUCHS, H. GUTZMANN, W. RIMPAU

ZÁZNAM O POZOROVÁNÍ TŘICETI PACIENTŮ S ÚPLNÝM PŘERUŠENÍM MÍCHY

Po statistickém rozboru sledované skupiny pacientů uvádějí autoři své pojetí rehabilitace. Dělí ji na tři stadia, a to rehabilitaci medicínsko-neurologickou, sociální a pracovní. Závěrem probírají problematiku těchto tří stadií z hlediska praktického i z hlediska psychologie nemocných.

V. PAESLACK

KLINICKÁ REHABILITACE U TRAUMATICKÝCH TETRAPLEGIÍ

Práce upozorňuje na narůstání výskytu tetraplegií jako následku úrazů krční míchy a poukazuje na pokles mortality u těchto onemocnění. Diskutuje o vhodnosti časných neurochirurgických zákroků.

Autor podrobně rozebírá komplexní a časově návaznou péči o 450 pacientů s tímto postižením. Předkládá podrobné schéma této péče a zabývá se i reintegrací pacientů do společnosti. Všestrannou a trvalou péči na všech stupních považuje za nezbytný předpoklad úspěšné léčby nyní i v budoucnosti.

FRANCIS KATONA

DŮLEŽITOST AFERENTNÍCH SYSTÉMŮ PŘI REHABILITACI RANNÝCH DĚTSKÝCH MOZKOVÝCH PORUCH

V prvních pěti až šesti měsících poporodního života se mohou vytvořit různé pohybové vzorce pomocí programované stimulace vestibulárního, retikulospinálního, olivospinálního a jiných systémů. Programovaná stimulace navozuje u akinetických kojenců s těžkou svalovou dystrofií lokomotorické reakce. Tyto reakce se postupně stávají stabilními a nakonec se objevují spontánně. K stimulaci se používa pohybu elektrického proudu. V průběhu sedmi let bylo touto metodou léčeno 115 dětí.

L. ČESNEK, J. PECHAN, M. ŠTELCLOVÁ, M. DĚDKOVÁ

ZKUŠENOSTI S KONSERVATIVNÍ ELEKTROSTIMULACÍ NEROGENNÍHO MOČOVÉHO MĚCHÝŘE

Autoři prováděli elektrostimulaci močového měchýře u třiceti lidí s transverzální lézí míšní reaktální nebo vaginální cestou. Elektrostimulace byla prováděna během cystomerie.

U periferních postižení nebyla vyvolána žádná reakce. U neurogenního měchýře vyvolá stimulace kontrakci okamžitě. Vzorec této kontrakce je stejný jako u spontání nepotlačitelné kontrakce.

Autoři se domnívají, že kontrakce není vyvolána přímým podrážděním detrusorů močového měchýře, ale aferentními drahami, které podráždí spinální centrum.

V závěru autoři diskutují použití metody v praxi.

E. BERARD, R. GIRARD, P. MINAIRE, A. LERICHE, J. BOURRET

ELEKTROMYOGRAFICKÁ STUDIE SFINKTERŮ PŘI PORANĚNÍ MÍCHY NA ÚROVNI OBRATLE Th 12 — L 1

Autoři upozorňují na vzrůstající počet dětí s dětskou mozkovou obrnou, které trpí atakticko-hypotonickou formou. Ze 185 dětí 40 mělo tento syndrom. Při podrobné analýze shledávají diskretní athetosu 7,5 %, diskinézi u 3,5 %, dále mozečkovou a korovou ataxii, která se však těžko rozlišuje. Doporučují mnohostrannou terapii.

G. E. MŰLLER

NĚKTERÉ SPECIFICKÉ PROBLÉMY PO ÚRAZECH LBI

Skupina odborníků vypracovala plán na rehabilitační ústav, specializovaný na stavy po úrazu lbi. Měl by sloužit pěti evropským zemím a měl by být postaven do r. 1980. Ústav by byl vybaven pro diagnostiku, rehabilitaci, přeškolování v povolání a pro výzkum. Jsou uvedena různá hlediska na závažnost jednotlivých případů a probírá se otázka, jaké pacienty přijímat. Je zdůvodněno umístění ústavu v Hochfeldenu v Alsasku ve Francii.

J. B. BARON A SPOL.

PORUŠENÍ ORTOSTATICKÉ TONICKÉ POSTURÁLNÍ AKTIVITY U PŘÍPADŮ S POSTKOMOČNÍM SYNDROMEM

Cílem práce je zdůraznit vliv okulomotorického systému na posturální aktivitu, zvláště po úrazech hlavy.

Sledováno bylo 150 pacientů s pseudovertiginosními stavy po úrazech hlavy. Na základě podrobných vyšetření, včetně vyšetření oscilací těla kolem střední osy, bylo možno tyto pacienty rozdělit do několika skupin a pak cíleně léčit.

Závěrem zdůrazňuje, že postkomoční syndrom není jen subjektivní obtíží a zvláště pseudovertiginosní stavy je možno léčit, pokud je správná diagnosa.

E. SCHERZER A TH. KIRSCHBICHLER

EEG A SPASTICITA PŘI ÚRAZECH LBI

Studie pojednává o stu (100) nemocných, kteří ještě měsíce až roky po úrazu trpí psychickými nebo neurologickými obtížemi. Z těchto nemocných bylo vybráno 48 s hemisyndromem a 10 s tetrasyndromem. Všechny provázela spasticita. Je pro-

bírán vztah mezi EEG nálezem a klinickými projevy se zvláštním zřetelem ke spasticitě. V chronickém stádiu se dá vyvodit málo prognostických závěrů z poměru EEG a spasticity.

E. KLIMKOVÁ-DEUTSCHOVÁ

NEUROLOGICKÁ REHABILITACE V GERIATRII

Rehabilitace starých osob nezávisí jen na somatickém stavu, funkční výkonnosti ale velký vliv mají i ekologické a sociální faktory.

Autorka vytvořila tři skupiny pacientů, které pak podrobně statisticky zpracovala. Zdůrazňuje vliv předchozího strádání na současný zdravotní stav.

Dále podrobně rozebírá jednotlivé rehabilitační metody z hlediska vhodnosti užití u starých osob.

P. WESSELY

PARAMETRY PROJEVŮ ČASNÝCH POSTTRAUMATICKÝCH ZÁCHVATŮ

V úvodu autor uvádí klinické rozlišení časných záchvatů od posttraumatické epilepsie.

Vlastní práce vychází ze studia a klinického sledování 300 pacientů s posttraumatickými záchvaty. Všechny pacienty autor zařadil do jedné ze tří skupin podle mechanismu úrazu, výskytu časných záchvatů, výskytu posttraumatické epilepsie a vzájemného vztahu mezi těmito parametry.

U dětí je výskyt časných záchvatů častější než u dospělých.

M. IONESCU, E. SILAGHI

ÚČINEK TERMORADIOAKTIVNÍ VODY A PODVODNÍ KINETOTERAPIE PO TROMBOSÁCH V CEREBRÁLNÍM ŘEČIŠTI

Práce vychází z rozboru třiceti pacientů s trombosami v cerebrálním řečišti, rok až 13 let po akutní příhodě.

Popisuje lázeňské procedury, koupele a podvodní masáže a kinesiterapii v termoradioaktivní vodě Felix.

Výsledky byly velmi dobré. Hodnotícím kritériem byl krevní tlak, puls, stupeň bolesti, spasticita, vzhled arthrotických kloubů a vegetativní obtíže.

H. J. HACHEN

NEURO-UROLOGICKÉ HODNOCENÍ BACLOFENU PŘI LÉČBĚ SPASTICITY MOČOVÉHO MĚCHÝŘE

Dissinergie močového měchýře, detrusor — sfinkter a spasticita sfinkteru jsou nejčastější příčinou urologických obtíží u para a tetraplegických pacientů. Hojné užívání tranquilizerů zhoršuje hypoaktivitu měchýře. Dlouhodobá prognóza závisí na integraci horních partií močového traktu. Močový měchýř musí být od počátku cvičen. V akutní fázi spinálního šoku je interminentní katerizace nejvhodnější k vyprázdňování měchýře. Když se později objeví spasticita měchýře, je to jedna z největších obtíží, kterou se autor pokouší řešit i. v. aplikací baclofenu (Lioresal®). Reziduální moč se po této léčbě průměrně zmenšila ze 134 na 65 ml a odpor sfinkteru se zmenšil ze 142 na 85 cm H_2O.

M. ŠTEFANČIČ

ZMĚNY RYCHLOSTI A DRÁŽDIVOSTI PERIFERNÍCH MOTORICKÝCH NERVŮ U HEMIPLEGIKŮ

U skupiny 91 pacientů s hemiparesou byla měřena rychlost vedení rychlými motorickými vlákny na obou dolních končetinách v oblasti n. peroneus. Dále byla u části pacientů měřena rheobase, chronaxie, kožní teplota. U desíti pacientů i rychlost vedení pomalými vlákny. Všechny hodnoty byly signifikantně nižší na postižené než na nepostižené straně. Rychlost vedení rychlými vlákny byla více zpomalena než vlákny pomalými. Autor vysvětluje tyto změny výraznějším postižením motoneuronů fasických proti tonickým na straně paresy.

V. MEZINÁRODNÍ SYMPOSIUM O REHABILITACI V NEUROLOGII

Symposia se zúčastnilo 275 neurologů z celého světa, odborníků, kteří se zajímají o rehabilitaci. Bylo předneseno 72 prací. Hlavní tematika by zaměřena na rehabilitaci nemocných s poruchou centrálního motorického neuronu.

Symposium bylo rozděleno na deset tematických celků:

1. Teoretické podklady a nové názory na uspřádání centrálního motorického neuronu u zdravých a jeho poruchy.
2. Terapeutické problémy u hemiplegických pacientů.
3. Moderní medikamentosní léčba.
4. Diagnostické úkoly a terapie afatiků.
5. Dětská mozková obrna a celý komplex problémů týkajících se tohoto onemocnění.
6. Centrální obrny po úrazech a onemocněních míchy.
7. Úrazy hlavy a jejich složitá psychosociální problematika.
8. Psychosociální problémy moderní rehabilitace.
9. Vertebrogenní onemocnění.
10. Varia.

Na symposiu byla ukázána celá rozsáhlá problematika, kterou se zabývá neurologie v oblasti léčebné rehabilitace. Zmenšil sa počet postižení periferního motoneuronu mimo vertebrogenní onemocnění. Stále se zvětšuje počet nemocných žijících s různě těžkou poruchou centrálního motoneuronu, která je často spojena se složitým komplexem dalších nervově psychických poruch. Tyto kladou stále stoupající nároky na ekonomické a sociální zabezpečení při reintegraci těchto nemocných do společnosti.

Z teoretických prací vyplývá, že se děje velká přeměna a přehodnocování ustálených neurofysiologických pojmů, což vyžaduje spojení rehabilitace s moderně vybavenými laboratořemi. Tyto nové poznatky mají i praktický dosah v terapii.

Hemiparetiční pacienti jsou převážně osoby po náhlé mozkové příhodě. Jejich naděje na přežití je veliká, ale vyžaduje dlouhodobou rehabilitaci a důkladné testování jednotlivých funkcí. Fatické poruchy potřebují specialisovaného pracovníka, jsou náročné a řeší se mnoho teoretických úkolů. Moderní medikamentosní léčba zatím nepřináší zásadně nic nového a nutno ji považovat za terapii doplňující.

Dětská mozková obrna spojuje řadu oborů a léčebné úsilí se soustřeďuje na dětský věk. Není mnoho informací o této chorobě v dospělém věku. Léčba představuje dva hlavní proudy, neurologický a ortopedický. Z toho plynou některé diagnostické i terapeutické rozpory.

Vertebrogenní onemocnění. Léčení tohoto onemocnění se propracovalo k náročné diagnostické technice diferenciální a k topicky diagnostické technice. Je provázeno psychologickými problémy.

Paraplegie je oněmocnění převážně traumatického původu. Zde se více uplatňují elektrostimulační techniky.

Úrazů hlavy stále přibývá. Pozornost byla věnována převážně organickým příznakům, jejich důsledkům a terapii.

V. INTERNATIONALES SYMPOSIUM ÜBER REHABILITATION IN DER NEUROLOGIE

An dem Symposium nahmen 275 Neurologen aus der ganzen Welt teil, Fachleute, die für die Rehabilitation Interesse haben. Insgesamt wurden 72 Beiträge vorgetragen. Grundthema des Symposiums war die Rehabilitationsbehandlung von Patienten mit Störungen des zentralen motorischen Neurons.

Das Symposium verlief in zehn Gruppen, die sich mit folgenden spezifischen Themen beschäftigten:

1. Theoretische Grudlagen und neue Anschauungen hinsichtlich der Struktur des zentralen motorischen Neurons bei Gesunden und hinsichtlich seiner Störungen
2. Therapeutische Probleme bei Hemiplegie-Patienten
3. Moderne medikamentöse Therapie
4. Diagnostik-Probleme und Therapie bei Aphasie
5. Zerebrale Kinderlähmung und der mit dieser Erkkrankung verknüpfte Problemkomplex
6. Zentrale Lähmungen nach Unfällen und Rückenmarkerkrankungen
7. Kopfverletzungen und ihre komplizierte psychosoziale Problematik
8. Psychozociale Probleme der modernen Rehabilitationstherapie
9. Vertebrogene Erkrankungen
10. Varia

Auf dem Symposium wurde die gesamte umfangreiche Problematik, mit der sich die Neurologie im Bereich der kurativen Rehabilitation beschäftig, aufgezeigt. Die Anzahl der Schädigungen des peripheren Motoneurons — ausgenommen die vertebrogenen Erkrankungen — hat sich verringert. Eine immer größere Zahl von Patienten lebt mit Schädigungen des zentralen Motoneurons verschieden schweren Grades, die häufig mit einem komplizierten Komlex weiterer nerven-psychischer Störungen einhergehen. Diese stellen immer höhere Ansprüche bezüglich der wirtschaftlichen und sozialen Sicherstellung im Zuge der Reintegration diesser Patienten in die Gesellschaft.

Aus den theoretischen Arbeiten ergibt sich der Schluß, daß sich die bislang stabilen neurophysiologischen Begriffe in einem Prozeß intesiver Wandlung und Neubewertung befinden, was einen engen Zusammenschluß der Rehabilitationsbehandlung mit modern ausgestatten Laboratorien erfordert. Diese neuen Erkenntnisse wirken sich auch praktisch im Bereich der Therapie aus. Hemiparetische-Patienten sind überwiegend Personen, die einen plötzlichen Hirnschaden hinter sich haben. Ihre Überlebenschanzen sind groß, sie erforden jedoch langfristige Rehabilitationsbehandlung und gründliches Testen der einzelnen Funktionen. Phatische Störungen brauchen spezialisierte Fachtherapeuten, sind sehr anspruchsvoll und auf diesem Gebiet stehen viele theoretische Aufgaben vor ihrer Lösung. Die moderne medikamentöse Therapie bringt bislang für dieses Gebiet nichts Neues und sie muß als bloß ergänzende Therapie gewertet werden.

Bei der Behandlung der zerebralen Kinderlähmung sind mehrere medizinische Spezialbereiche hindbezogen und die kurativen Maßnahmen konzentrieren sich auf das Kindelsalter. Über das Bild dieser Erkrankung im Erwachsenalter gibt es nicht viele Informationen. Die Behandlung verläuft in zwei Richtungen: in der neurologischen und in der orthopädischen. Daraus ergeben sich manche diagnostischen und therapeutischen Widersprüche. Vertebrogene Erkrankungen. Die Behandlung dieser Krankheiten hat sich zu anspruchsvollen diagnostischen Techniken durchgerungen, und zwar zur differentialen und zur topischen Diagnostiktechnik. Sie ist mit psychologischen Problemen verknüpft.

Die Paraplegie ist eine Erkrankung mit überwiegend traumatischer Ursache. Hier kommen überwiegend Elektrostimulations-Techniken zur Geltung.

Kopfverletzungen werden immer häufiger. Das Haptaugenmerk galt den organischen Symptomen, ihren Folgeerscheinungen sowie der Therapie.

Vth INTERNATIONAL SYMPOSIUM ON REHABILITATION IN NEUROLOGY

The Symposium was attented by 275 neurologists from all over the world, by specialists who are interested in rehabilitation. Seventy two papers were presented. The main topic was rehabilitation in patients with disorders of the central motor neuron.

The Symposium was divided into ten parts:

1. Theoretic bases and new ideas for the classification of the central motor neuron in healthy subjects and their disorders
2. Therapeutic problems in hemiplegie patients
3. Modern medicamentous therapy
4. Diagnostic tasks and therapy in patients with aphasia
5. Cerebral palsy and the complex of problems concerned with this disease
6. Central paralysis after injury and diseases of the spinal cord
7. Head injuries and their complicated psychosocial problems
8. Psychosocial problems of modern rehabilitation
9. Vertebrogennic diseases
10. Free papers

The whole extensive problem dealing with neurology in the field of medical rehabilitation was being dealt with during the Symposium. There is a decrrease in the number of affections of the motor neuron beside vertebrogenic diseases. The number of patients living with severe disorders of the central motor neuron which is often connected with further complicated nervous disorders, is however increasing. These cause growing demands for social, economic provisions and reintegration of these patients into society. From the theoretical studies it is evident that there is a change and re-evaluation of the established neurophysiological concepts, requiring cooperation of rehabilitation with a modern equipped laboratory. New notions are also of practical importance in therapy.

Patients with hemiparesis are in the majority subjects with sudden cerebral strokes. Their perspectives for survival are great, but require long-term rehabilitation and thorough testing of functions. Aphasic disorders need specilised workers and are claiming great demands. Modern medicamentous therapy is at present not bringing anything new anad must be considered as supplementary therapy.

Cerebral palsy links a number of scientific fields and therapeutic methods and is concentrated on children. There are not many data available from cases in adult age. Therapy is represented by two main trends, the neurologic and the orthopaedic, which result in some diagnostic and therapeutic incosistencies.

Vertebrogenic diseases: the treatment of these diseases is connected with a demanding diagnostic differential technique and is accompanied by psychological problems.

Paraplegia is a disease of predominantly traumatic origin. The technique of electrostimulation is mostly applied.

Head injuries have an increasing tendency. Attention was being paid chiefly to organic symptoms their consequence and therapy.

5e SYMPOSIUM INTERNATIONAL SUR LA RÉÉDUCATION EN NEUROLOGIE

Résumé

275 neurologiciens du monde entier ont pris part au Symposium, spécialistes s'intéressant à la rééducation. 72 communications furent exposées. Le thème principal était orienté sur la réadaptation des malades affectés de troubles du neurone moteur central.

Le Symposium était divisé en dix parties thématiques:

1. Les bases théoriques et les nouveaux aspects sur l' organisation du neurone moteur central chez les bien-portants et leurs troubles.
2. Les problèmes thérapetiques chez les patients hémiplégiques
3. La thérapie médicamenteuse moderne
4. Les tâches diagnostiques et la thérapie des aphasiques
5. La infirmité motrice cérébrale et tout un ensemble de problèmes raportant à cette maladie.
6. La paralysie centrale après lésions et affections de la moelle épiniere
7. Lésions de la tête et leur problématique psychosociale complexe
8. Les problèmes psychosociaux de rééducation moderne
9. Les affections vertébrales
10. Varia.

Au Symposium fut présentée une étendue globale de la problématique dont la neurologie s' occupe dans le domaine de réhabilitation médicale. Le nombre d'affection du motorneurone périhpérique a diminué à part les affections vertébrales. Le nombre de malades vivant affectés différemment de troubles graves du motoneurone central augmente sans cesse. Celui-ci est souvent en relations étroite avec tout un complexe compliqué de troubles psychiques nerveux. Ceux-ci posent des prétentions sans cesse croissantes sur la sécurité économique et sociale pour obtenir la réintégration de ces maladies dans la société.

Les exposés théorétiques informent sur le grand changement et l' évaluation des notions neurophysiologiques stables, ce qui nécessite la jonction de la réhabilitation avec les équipements de laboratoires modernes. Ces connaissances nouvelles ont aussi une étendue practique dans la thérapie.

Les patients affectés d' hemiparèse sont, en principe, des personnes après affection cérebrale subite. Leur espoir de survie est grande, mais exige une longue réhabilitation et des tests approfondis des différentes fonctions. Les troubles aphasiques nécessitent un personnel spécialisé et sont exigeants, on cherche actuellement la solution à de nombreux problèmes théoriques. La thérapie médicamenteuse moderne n' apporte pas, en principe, jusqu' alors aucune nouveauté et il convient de la considérer comme une thérapie complémentaire.

La infirmité motrice cérébrale rattache tout un complexe de branches et l' effort thérapeutique se concentre sur l' âge enfantin. Il existe peu d' informations sur ce genre de maladie en âge adulte. La thérapie représente deux courants principaux, neurologique et orthopédique. Il en ressort certaines contradictions thérapeutiques et diagnostiques.

Les affections vertébrogènes. La thérapie de cette affection est passée à une technique diagnostique exigeante différentielle et une technique diagnostique topique. Elle est accompagnée de problèmes psychologiques.

La paraplégie est, pour la plupart, une affection d' origine traumatique. Là, on applique généralement, une technique électrostimulatrice.

Les lésions de la tête deviennent de plus en plus fréquentes. Pour la plupart, l' attention se porte sur les symptômes organiques, leurs conséquences et thérapies.