

Prognosis and Course of Bell's Palsy

I. Clinical Study

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Summary. The clinical picture of ischemic palsy of the facial nerve was analyzed by symptoms in 87 patients. The level of the lesion of the facial nerve in the channel was determined by topeesthesia. Mutagenic disorder usually causes incomplete or defective recovery. The speed of development of palsy does not affect its course. Retroaural pain has little significance in the prognosis of palsy. Recovery may be defective even in cases where no pain is present. If the nasopalpebral reflex is absent and Bell's phenomenon is positive in the 3rd week the prognosis is unfavourable. In half the patients no precipitating or etiological factor was found.

Clinical appraisal was made in five muscles (*M. frontalis*, *M. orbicularis oculi* et *oris*, *M. zygomaticus*, *M. depressor labii inferioris*). The patients were divided into three groups according to the degree of their recovery: complete, incomplete and defective recovery. Recovery was defective in elderly patients with vascular hypertension. Voluntary activity in Group 1 (complete recovery) is symmetrical by the 1st—2nd month and in Group 2 (incomplete recovery) by the 5th—7th month; in Group 3 it is permanently insufficient.

Key words: Facial Paralysis — Physical Examination — Prognosis.

Zusammenfassung. Das klinische Erscheinungsbild der ischämischen Facialisparese wurde bei 87 Patienten nach den einzelnen Symptomen analysiert. Die Höhe der Facialisläsion im Fallopiischen Kanal wurde topognostisch festgelegt. Eine transgeniculäre Läsion hinterläßt gewöhnlich unvollständige Besserung bis schwerwiegende Folgen. Akuität des Paressebeginns hat keinen Einfluß auf ihren Verlauf. Retroauriculäre Schmerzen sind für die Prognose unwichtig. Auch Paresen ohne Schmerzáußerungen können schwere Folgeerscheinungen hinterlassen. Fehlt in der dritten Woche der nasopalpebrale Reflex und ist das Bellsche Phänomen positiv, erscheint die Prognose ungünstig. In der Hälfte der Patienten konnte kein provozierender oder kausalgenetischer Faktor für die Parese eruiert werden.

Die klinische Wertung wurde an *fünf Muskeln* (*M. frontalis*, *orbicularis oculi*, *zygomaticus*, *orbicularis oris*, *depressor labii inferioris*) vorgenommen. Die Probanden wurden *nach den Defektsymptomen in drei Gruppen* aufgeschlüsselt: Heilung ohne Folgen, Heilung mit leichten Residuen und Defektheilung mit schweren Folgeerscheinungen. Ältere Patienten mit Bluthochdruck hatten häufiger schwere Defektzustände. Die Willküraktivität war in der 1. Gruppe symmetrisch im 1. bis 2. Monat, in der 2. Gruppe im 5. bis 7. Monat und in der 3. Gruppe blieb sie dauernd insuffizient.

Schlüsselwörter: Facialisparese — Neurologische Untersuchung — Prognose.

In spite of the simplicity of clinical symptomatology, ischemic palsy of the facial nerve presents many problems [3,16]. Etiopathogenesis of the disease is still unknown. Opinions as to the treatment of palsy vary as well and no evaluation of the results of conservative and surgical treatment has been made because we lack a sufficiently high number of comparable patients in both groups [6,18]. An accurate statement of prognosis and a perfect knowledge of the course of the palsy can contribute to the solution of these problems. Therefore, in this paper we would like to deal with the problem of establishing a likely prognosis at the beginning of the disease and try to determine precisely the course of the disease.

In the first part of the paper we analysed the results of the clinical picture, topognosis and the evaluation of voluntary activity. In the second part of our paper we presented the results of electromyographic and conduction time examinations.

Material and Method

87 cases of ischemic palsy of the facial nerve were analysed. The examinations took place in the EMG laboratory of the Neurological Clinic in 1966—1970. We did not include patients suffering from malignant hypertension, diabetes, head trauma, infection symptoms, disease of the ear, repeated palsies of Melkersson-Rosenthal's syndrome, and patients in whom palsy developed during pregnancy and labour. All patients were repeatedly examined; those with mild forms of palsy were checked for at least half a year and those with serious forms for at least one year, in irregular intervals of one to three months. All of them underwent neurological and electromyographic examinations and topognosis of the facial nerve was stated in all of them. Most patients underwent otological, internal, rtg pyramide after Stenverse and Schüller and common biochemical examinations (BP, ESR, BWR, urine).

Patients were divided into three groups according to the degree of recovery. Group 1, 36 patients: complete recovery, Group 2, 17 patients: incomplete recovery, light muscular weakness, which can be revealed only by detailed examination after a muscular test. Muscular strength corresponds to the third of higher degree of muscular test. The face is at rest, during laughter or whistling it is symmetric or only very slightly asymmetric. Synkinesis are always present and noticeable, though to a very small degree in one or more muscles. Group 3, 34 patients: defective recovery. Muscular strength is defective, below the third degree of the muscular test. There is marked synkinesis and contractures. The face is asymmetric when in motion and sometimes when at rest. We have used the modified M.R.C. scale [12] and define single degrees so: 0 degree—no contraction, 1st degree—faint contraction without gross motion, 2nd degree—definite motion, 3rd degree—full range of motion, 4th degree—full range of motion plus moderate resistance, 5th degree—full range of motion against normal resistance. Five muscles were examined and evaluated: M. frontalis (F), M. orbicularis oculi (C), M. zygomaticus (Z), M. orbicularis oris (R), m. depressor labii inferioris (Q). This group of patients does not represent a real cross-section of patients because only patients with serious palsies showing no improvement were sent for an examination.

Results

Personal data of the group are presented in Table 1. The term of the first examination is stated in Table 2. More than one half of the patients are in the 10—40 age group. The greatest incidence of palsy in males is between their 30tieth and 40tieth year, in females between 10—30 and 50—60 years. Most cases with serious disorders fall into the 6th decade of life. If we divide the patients into those below 40 and those above 40, we find that during the summer months the incidence is the same in both groups. The course is more serious in older patients, of course. In winter months, palsy develops mostly in the younger persons but its course is benignant. These differences could not be confirmed by statistical analysis since the number of patients was small. Cases with a serious course were examined relatively late; after the onset of the disease, mostly in the second month.

Statement of Topognosis

The taste disorder was examined by means of anode current (electrogustometry). The threshold to anodal galvanic stimulation of the tongue was established by method of electrogustometry with chronaximeter. The results of normal and lesion sites were compared, differences over 1 V (one section of the scale) were considered as pathological after the experience from the examination of 30 normal persons. For the other details of this method see Jepsen [5].

We made checked the function of M. stapedius by anamnestic investigation for phonophobia and we examined the stapedius reflex, or, rather, the physiological synkinesis of M. stapedius in an intense closure of eye lids when the patient heard a noise in his ears. The test was termed positive in the case when the patient could hear the noise on the functioning side only. The test results could not be appraised when the noise was not heard in the both ears. When the noise was heard in either ear, the lesion was in N. facialis below the branching off of N. stapedius [16].

Tear secretion was provoked by ammoniacal vapours and examined by Schirmer's test. In Table 3 we give the results of topognostic examination. Disturbance of facial nerve was found in each section of the channel. For ischemic palsy a disorder in the distal section is typical. In a severe disturbance in the ganglion geniculi area, we must take into consideration the possibility of inflammatory, esp. herpetic, etiology. In two patients with transgeniculate lesion, we were able to make a histological examination of the nerve sheath during decompression and we discovered that it was a case of a swollen nerve without inflammatory infiltration. Transgeniculate disorder refers rather to the

Table 3. Topognosis of N. facialis

Group	infrachordal level	suprachordal	supra-stapedial	trans-geniculate	total
1st	15	19	1	1	36
2nd	7	3	1	6	17
3rd	13	11	4	6	34
Total	35 (40%)	33 (38%)	6 (6%)	13 (15%)	87

Table 4. Rate of origin of palsy

Group	origin of palsy sudden	slow: from this the first affected branch			
			upper	lower	both
1st	15 (43%)	20 (57%)	12	4	4
2nd	10 (59%)	7 (41%)	3	0	4
3rd	15 (48%)	16 (52%)	2	6	8
Total	40 (48%)	43 (52%)	17	10	16

extent of the edema in the channel than to the kind of lesion. The greater the extent, the more serious the disturbance of the nerve can be. Therefore Groups 2 and 3 contain a greater number of cases with transgeniculate localisation. It is very likely to find incomplete or defective recovery in this kind of lesion.

Analysis of Clinical Picture

We studied the speed of palsy origin, the presence or absence of retroaural pain, the presence or absence of Bell's phenomenon, provoking factors, voluntary activity of five muscles examined.

Rate of development of palsy. This could be investigated in 83 patients. In a sudden development of the disease, the patients became paralysed overnight, in a slow progress of the disease patients became paralysed in 2 to 4 days. From Table 4 it is obvious that the rate of palsy development has no essential influence upon prognosis or the course of the disease because both types are represented in each group by approx. the same number of cases.

The importance of retroaural pain was examined in 84 patients. Pain lasted for several days and sometimes for as long as weeks. Pain radiated into lower mandible, forehead, occiput and face. At the beginning the pain was constant, later it appeared in intervals. In Group 3, the patients with pain clearly predominate, but 19% of the patients without pain have defective recovery. We also systematically

Table 5. Number of patients with various provoking factors in the origin of palsy

	1st group	2nd group	3rd group	total
Cooling in summer	4	5	5	
in winter	3	0	1	18
Infection in summer	6	4	4	
in winter	1	0	1	16
Uncertain cause	16	6	16	38
Dental and eye affection	3	8	2	13
Slight trauma of head	2	0	1	3
Migraine	3	1	3	7
Hypertension	0	1	5	6

examined perception on the back side of the auditory passage and the adjacent part of the external ear, Hunt's zone, during the acute phase of the disease. The disturbances occurred in 12% in each of the three groups. Hypesthesia in this area does not relate to the disorder in the geniculate area. Evaluation of retroaural pain with regard to the course and prognosis of palsy is of little value. In cases with defective recovery presence of pain is four times more frequent and in other cases twice more frequent than its absence. Disorder in Hunt's dermatome zone was recorded in a small number of cases in all three groups.

Evaluation of nasopalpebral reflex was made in 76 patients. If it is present in the first three weeks, then prognosis of the palsy is favourable. Possibility of a wrong prognosis is in approx. 15–20% of cases.

Bell's phenomenon was examined in 77 patients. It is an unfavourable symptom if it survives in the third week the duration of palsy. If it is not present, then prognosis of palsy is absolutely favourable. Table 5 shows the provoking factors. The analysis of presumably provoking factors does not give us any definite answer to the question of prognosis and the course of palsy because of limited numbers. Patients with hypertension likely to suffer from a more serious course of disease already because we deal with older patients.

Evaluation of voluntary activity was made in certain intervals and is recorded in Figs. 1–3. The number of examinations undertaken in a particular period is also obvious.

29 patients were analysed in the Group 1 (Fig. 1). More than 50% of muscles preserve their voluntary activity. The smallest lesion is in M. orbicularis oculi (C) and M. orbicularis oris (R) and the most in M. zygomaticus (Z) and depressor labii inferioris (Q) in the initial stage of the disease. Voluntary activity is restored in all muscles in the 3rd week of the disease. Muscular strength is restored at first in M. frontalis (F) and in M. orbicularis oculi (C). These muscles reach the

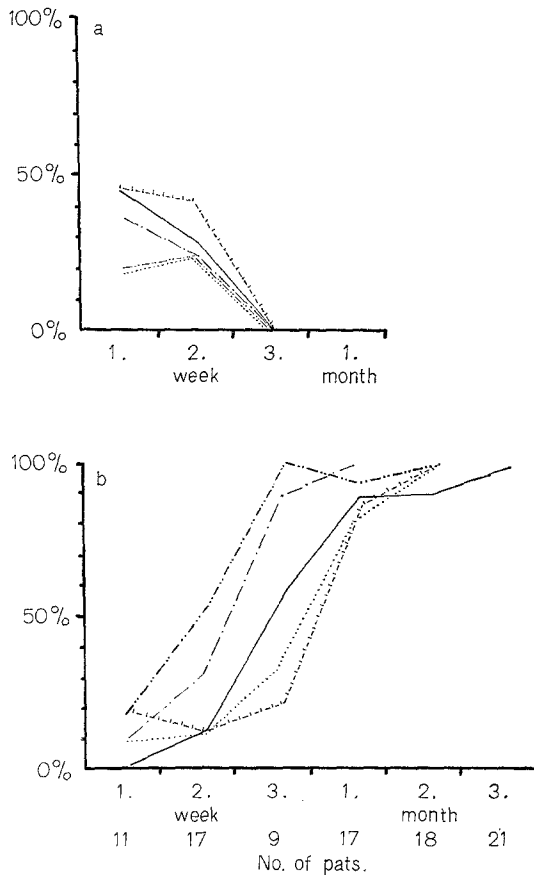


Fig.1. a 1st group. Afunction of single muscles in the course of palsy. Ordinate: percentage of muscles without function. Abscissa: time of examination. M. frontalis — · · · ·, M. orbicularis oculi — — — —, M. zygomaticus — — —, M. orbicularis oris · · · · ·, M. depressor labii inferioris — · — · —. b 1st group. Return of muscular strength. Ordinate: percentage of muscles with power of 3rd or higher degree on M.R.C. scale. Abscissa: time of examination. Under the time number of examined patients is given (valid also for Fig.1a and b). These abbreviations were used also in Figs.2 and 3

third or higher degrees of muscular test in the 3rd or 4th week, other muscles in the course of the 2nd or 3rd month.

In the Group 2 we analysed 16 patients (Fig.2). 25—50% of voluntary activity has been preserved. In initial stages the most affected are R and Q, the least Z and C. F and C recovered the soonest. The latter has 20% cases of preserved muscular strength (3rd degree) in the acute stage and this muscle is affected the least as against the other muscles.

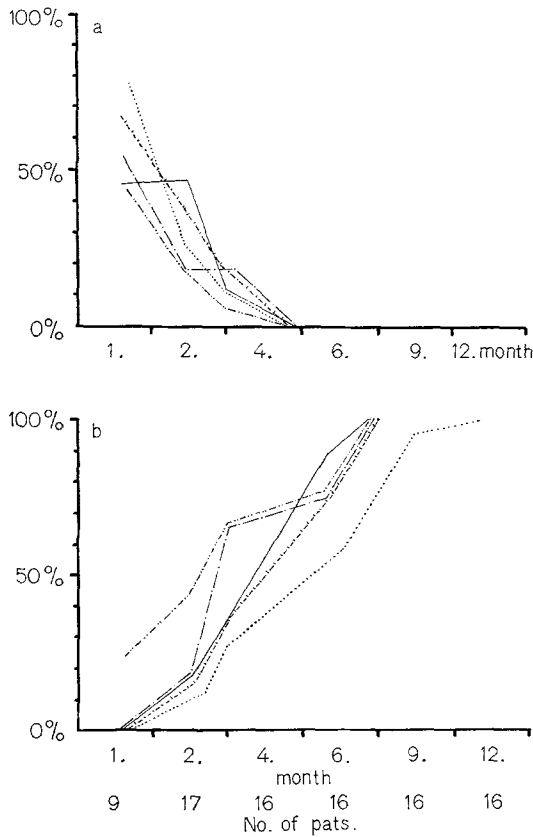


Fig. 2. a 2nd group. A function of single muscles in the course of palsy. Abbreviations see Fig. 1a and b. b 2nd group. Return of muscular strength during the palsy improvement. Abbreviations see Fig. 1a and b

Between the 3rd and 6th month, function in all muscles becomes restored. After the 6th month muscular strength on both sides of the face is practically symmetric. Muscles of the lower branch of the facial nerve are affected most at the beginning of the disease and that is why they improve more slowly than muscles of the upper branch.

In the Group 3 we had 30 patients (Fig. 3). 80—100% muscles were without any function in the first two months. Z and Q are affected the most. Relatively unaffected is R, which may be caused by a wrong interpretation of the active motion because the healthy side of the face can draw over the paralysed corner in the action. This can imitate voluntary activity, which is not real. This we demonstrated by an EMG examination. Between 6th and 9th month activity appears in

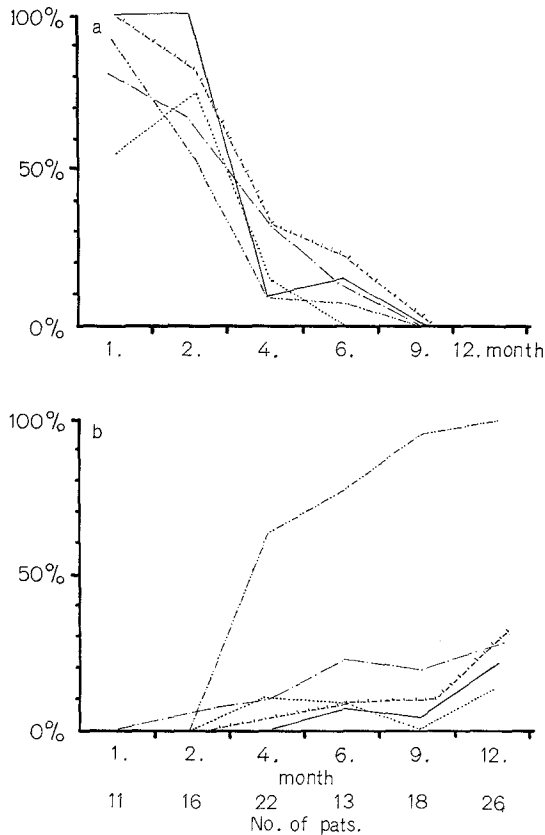


Fig. 3. a 3rd group. Complete loss of function of single muscles in the course of palsy. Legend is the same as in Fig. 1a and b. b 3rd group. Return of muscular strength during the improvement of the palsy. Legend is the same as in Fig. 1a and b

all muscles. The return of muscular strength of 3rd or higher degree is, however, very insufficient. Only C reaches the 3rd degree of muscle test in the 9th to 12th month. Other muscles acquire this value only in 20–30% of all examined muscles. The least improvement is in R, relatively the best improvement is in F after C, however.

Prognosis is favourable if voluntary activity has been preserved or if mobility has been restored in the paralysed portion of the face in the third week of the palsy. This rule does not concern several cases in Group 2 and 3 where it is necessary to apply other methods of examination to achieve a more accurate prognosis (EMG). In the third month we differentiate between patients with incomplete recovery, in whom muscular activity has been mostly restored and patients with

defective recovery, in whom most muscles are afunctional at this stage. Completely recovered patients have symmetric muscular activity within two or three months, incomplete recovery after six months. Function of muscles is insufficient in patients with defective recovery. *M. orbicularis oculi* recovers best.

Manifestations of the irritative lesion of the facial nerve at the beginning of palsy were revealed in six patients. Muscular spasm, reminding us of hemispasm, appeared several days before palsy in both branches, more, however, in the lower one. Four patients belonged in the Group 1, one was in the Group 2 and one in the 3. We cannot draw any prognostic conclusion from such a small number of cases. Irritation muscular symptoms appear more often in milder cases.

Returns of ischemic palsy appears in 10 cases (11%) from the total number of our patients. It was always the first return, after an interval of between a fortnight and 33 years since the first attack of palsy (Table 6).

Table 6. Repeated Bell's palsy

	homolateral	contralateral
1st group	2	4
2nd group	1	0
3rd group	3	0

Familiar incidence was found in 6 patients, though without any epidemiological relationship. They were always parents, children, brothers and sisters. In Group 1 it appeared in 4 patients, in Group 2 and 3 in one patient in each.

Discussion

Granger [4] attempted to make a prognosis already in the first three days of onset, which is, of course, possible only in cases with permanent partial palsy. Naumann *et al.* [13] recommends the operation therapy in the first three days, when the motions of muscles fail in this period, according clinical examination. He believes that they may be symptoms of total denervation. According to our experience this period it is very uncertain because partial palsy can return out into a complete one and vice versa. Much more reliable is prognosis in the second week of palsy, as attempted by Laumans [9], Etholm [2], Marinacci and von Hagen [10]. If voluntary activity is present at the end of the third week, muscular tonus is good and nasopalpebral reflex is preserved, the prognosis is favourable in approx. 85%. According to

our experience which agrees with that of Laumans [9] it is impossible to make the prognosis from clinical criteria earlier than in the third week. Peitersen and Andersen [14] found from their analysis of 181 idiopathic palsies that the risk of a complete recovery of palsy is the greater, the later the function appears. Etholm [2] found in his 46 patients with facial palsy of various etiology a better prognosis in a successive development of palsy than in a sudden development. This condition does not appear in ischemic palsy. Taverner *et al.* [15] made use of the electro-gustometric method for prognosis. Chorda tympani need not be necessarily damaged because it can lead beside the channel of the facial nerve where the lesion is localized. However, this possibility is very rare. Some authors ascribe considerable importance to this branch because infection can be carried over from the middle ear to the trunk of the facial nerve. McGovern [11], Blatt and Freeman [1] recommend neurectomy. Kocher [6] on the basis of an analysis of 108 cases reached the conclusion that the frontal branch had the greatest regeneration ability while the other branch towards M. orbicularis oris had the worst regeneration ability. The reason of this is probably the fact that nervous fibres in reinnervation must overcome a very difficult muscular plexus—modiolus—near the corner of the mouth so that most fibres fail to reach the original muscle [8]. In our patients most rapid improvement occurred in M. orbicularis oculi and M. frontalis. In a certain number of cases the clinical measurements for early determination of palsy fail and therefore a greater accuracy by means of an electromyographic examination is needed to shorten the time required for making a prognosis.

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