

Nicolaus A. Friedreich's description of peripheral facial nerve paralysis in 1798

T. D. BIRD

From the Division of Neurology, University of Washington School of Medicine and Veterans Administration Hospital, Seattle, Washington, USA

SUMMARY In 1798, Nicolaus A. Friedreich of Wurzburg published a detailed clinical account of three patients with idiopathic peripheral facial nerve paralysis. His astute observations of onset, physical findings, natural course, treatment, and recovery preceded those of Charles Bell by 23 years.

I have recently found a summary and review written in 1800 concerning what may have been the earliest published detailed description of idiopathic peripheral facial nerve paralysis. The astute clinical observations were made by Nicolaus A. Friedreich in 1797, and published in the German medical literature in 1798 under the title "De paralysis musculorum faciei rheumatica." The English review of this paper appeared in 1800 in the *Annals of Medicine* published in Edinburgh. The historical and clinical interest of these reports warrant their documentation here for the future reference of students of the history of medicine and neurology.

Friedreich's observations and conclusions

Nicolaus A. Friedreich was a professor in the faculty of medicine at Wurzburg in the eighteenth century and was presumably the grandfather of the famous Nicolaus Friedreich of Heidelberg who described a classic form of familial ataxia in the 1860s and 1870s (Richter, 1970). In 1798 Friedreich reported three middle-aged adults with a similar history of acute or subacute onset of unilateral facial paralysis that slowly improved over a period of weeks to months. The English summary of his first case is shown in the Figure. He noted that all three patients had recent exposure to cold damp air followed by a restless night's sleep and subsequent flaccid paralysis of one side of the face. The paralysed side was relaxed and pendulous, and the face was drawn toward the unaffected side.

The weakness involved the eyebrow as well as the eyelid and cheek. In one patient he noted that hearing and salivation were intact. Facial sensation was normal, as were sensation throughout the rest of the body and muscle strength other than that of the face.

These cases proved to Friedreich that paralysis of the muscles of the face could arise from local causes acting on the "portio dura of the auditory nerve" (the contemporary term for the facial nerve). He differentiated this syndrome clearly from apoplexy or stroke because there was no association with headache, vertigo, sensory loss, loss of sight, impaired memory, paralysis of limbs, or paralysis of tongue. For contrast he mentioned another 55 year old man who developed right sided facial weakness in whom the diagnosis was in doubt until apoplexy became apparent with the onset of vertigo, blindness, right sided paralysis, and subsequent coma. Friedreich felt the cause of the facial paralysis in his three patients was "rheumatic" because of the prodrome of exposure to cold often followed by fever, chills, and local pain and swelling in and around the neck, ear, and mastoid. A Professor Brunninghausen added a comment to Friedreich's paper speculating that the paralysis arose from the nerve sheath becoming thickened and compressed in the stylomastoid foramen.

Friedreich's three patients all eventually regained normal function of facial muscles. In the first case, after the patient had shown no improvement in seven weeks, Friedreich began applying electric shocks "to where the nerve comes through the stylomastoid foramen." At first the muscles were immovable, then they trembled and convulsed during the shocks, and after one month of stimu-

Address for correspondence and reprint requests: Dr T. D. Bird, Neurology, Veterans Administration Hospital, 4435 Beacon Avenue South, Seattle, Washington 98108, USA.

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CASE FIRST.

A man of forty-six years, subject to frequent cataracts and rheumatism, was confined some weeks to bed, on account of a surgical operation. The first time that he left his room, he exposed his left side to a stream of cold air from a window. In the evening, he was affected with shivering, heat, thirst, and headach. In the morning, after a very restless night, a very painful swelling, of the size of a hazel-nut, appeared in the neighbourhood of the left mastoid process, exactly where the auditory nerve passes out of the skull. The malady was recognised to be rheumatic. Diaphoretics were ordered, and under their employment the pain and swelling abated daily. But on visit-

ing the patient on the morning of the fifth day, our author found the muscles of the left side of the face paralyzed, and the mouth and nose drawn towards the right side. His fears were, however, soon dissipated, as, on considering the preceding occasional causes, the previous swelling and pain in the region of the mastoid process, and the integrity of all the senses, and of all the other muscles of the body, he could not view the evil as apoplectic, but as being local, and proceeding from the rheumatism affecting the place. Antimonials, aconite, infusion of guaiacum, &c. as being serviceable in rheumatism, were prescribed; a blister applied to the neck, and various stimulating and discutient ointments rubbed in behind the left ear. These remedies were persisted in for seven weeks without any amendment, and, therefore, Professor Friedreich determined to try electricity, the good effects of which in obstinate rheumatism cannot be denied. He at first employed weak and few electric shocks, but gradually stronger, and more numerous, twice a-day, and directed them variously through the left side of the face, from that place where the nerve comes through

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through the stylomastoid foramen. During the first days the muscles remained immovable, but gradually they began to tremble, and to be convulsed at the application of the shocks, which are favourable signs. At last, their voluntary action returned by degrees, and after the electricity had been used a month, volition had regained its full energy, and the face its natural appearance.

Figure English summary of Friedreich's description of his first patient with "Paralysis musculorum facie rheumatica" documenting the initial exposure of "his left side to a stream of cold air," the subsequent paralysis of the muscles of the left side of the face, "the integrity of all the senses and of all the other muscles of the body" such that he "could not view the evil as apoplectic, but as being local," and the gradual full recovery associated with electric shock therapy applied "where the nerve comes through the stylomastoid foramen." (*Annals of Medicine*, (1800) 216-218).

lation full voluntary action eventually returned. In the second patient Friedreich used electrical stimulation sooner, with full recovery in three weeks. In the third patient, electrical stimulation was not used because the patient had to "return to the country," but over a period of a year the patient regained normal muscle function. Friedreich treated this individual with great quantities of calomel to excite salivation.

The anonymous editor reviewing Friedreich's paper for the *Annals of Medicine* noted that this syndrome was different from tic douloureux and the painful face phenomenon described by Fothergill because the predominant symptom in Friedreich's patients was facial paralysis rather than excruciating pain.

Historical perspective

Facial paralysis is such a dramatic occurrence that it has been represented in works of art since antiquity (Goldman and Schechter, 1967). Thomas (1963) found that James Douglas briefly described the sudden onset of facial paralysis in a young

woman in 1704. However, Douglas's description was quite sketchy and only appeared in his unpublished handwritten letters. Nicolaus A. Friedreich's description of three similarly affected patients was quite detailed including the common prodromal phenomena, the pertinent positive and negative physical findings, and the subsequent gradual improvement. Friedreich correctly identified the paralysed cranial nerve as the "portio dura", and distinguished this syndrome clearly from apoplexy involving the central nervous system. He mentioned the presence of weeping on the affected side but did not comment on hyperacusis or taste. He did not mention upward deviation of the eyeball on attempted eye closure. His use of electrical stimulation of the facial nerve demonstrated considerable intellectual and practical curiosity as well as foresight, since similar studies are still performed today. Although *Garrison's History of Neurology* (McHenry, 1969) mentions Friedreich's observations in passing, most comprehensive reviews of idiopathic peripheral facial nerve paralysis fail to mention this report (Zulch, 1970).

The English review of Friedreich's paper was published in the *Annals of Medicine* in 1800 in Edinburgh. It is possible that this paper was read by Charles Bell who was studying medicine in Edinburgh at that time (Zimmerman, 1970). Bell later studied the function of the facial nerve in experimental animals, and also described several patients with facial nerve paralysis. Bell's first report of facial nerve paralysis in a patient was published in 1821. He mentioned briefly a man whose facial nerve was injured by a "suppuration which took place anterior to the ear and through which the nerve passed in its course to the face." Furthermore, he stated that partial paralysis of the face was frequent in young people and was "vulgarly called the blight." Bell's most famous and widely quoted report of partial paralysis of the face was published in 1828. A Mr Daniel Quick had been tossed by a bull 12 years previously, and the puncture wound of the horn produced a permanent paralysis of the facial nerve. Bell noted that although the patient's facial muscles were weak, facial sensation was intact, and this confirmed his experimental observations that the seventh and fifth cranial nerves had separate functions. Bell described upward deviation of the eye on attempted eye closure in this patient and demonstrated that it was a normal phenomenon. Bell also quoted the self-observation of Professor Roux of Paris who experienced both hyperacusis and decreased taste sensation associated with his own facial paralysis (Zulch, 1970).

Sir Charles Bell left his indelible mark on numerous aspects of descriptive and experimental neurology (Wilkins and Brody, 1969). He was one of the first to recognise the different functions of the anterior and posterior nerve roots, and argued extensively with Magendie over whose experiments were more definitive. Bell identified the long thoracic nerve and also emphasised the different functions of the trigeminal and facial nerves. He described "Bell's phenomenon" (upward deviation of the eye on attempted eyelid closure). Finally, the eponym "Bell's palsy" has become synonymous with idiopathic peripheral facial nerve paralysis. Bell certainly observed and described individuals with this syndrome, although his most famous patient was a man with irreversible traumatic paralysis. Nevertheless, 23 years before his report,

Nicolaus A. Friedreich of Wurzburg composed a detailed description of this syndrome that demonstrated careful clinical observations, accurate deductive reasoning about the nervous system, useful speculation about pathophysiology, practical attempts at treatment, and documentation of recovery of normal function.

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