

THE NASOPALPEBRAL REFLEX: ITS APPLICATION TO NEURO-  
PSYCHIATRY, PARTICULARLY TO INSULIN SHOCK  
TREATMENT.

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THE subject of this contribution to the knowledge of reflexes is not the discovery of a new reflex or a new modification of an old one. On the contrary, the reflex at issue was described for the first time as far back as 1896 in the *Lancet* by W. Overend, who called it the "frontal reflex." As has often happened with many other reflexes, it was overlooked and rediscovered many times after, and each of the authors gave to it another name. However, in spite of all these numerous contributions its practical clinical value remained of no importance, and it is scarcely mentioned in text-books dealing with nervous disorders.

Stimulated by our investigations of the behaviour of reflexes in electrical shock procedure (1943), and by trying to compare and utilize these experiences in insulin coma, we came to realize that this apparently rather valueless phenomenon can be of great use not only in insulin treatment, but also in the investigations of other states of unconsciousness.

Overend, in his short preliminary note on a new cranial reflex, has given a correct description of the phenomenon. He said that a slight tap in the middle line of the forehead is followed by twitchings of the eyelids of both sides. Several years later the same reflex was rediscovered independently by McCarty (1901) as the "supraorbital reflex," and by Bechterew (1901) as the "eye reflex." Again, years later Guillain (1920) described the same reflex and called it the "nasopalpebral reflex." Shortly afterwards Simchowicz (1922), using the tip of the nose as the reflexogenous zone, added the name "nose-eye reflex." Wartenberg (1930) suggested first the name "glabella reflex," and later (1945) "orbicularis oculi reflex." He has rightly recognized that all these various names cover one and the same reflex phenomenon, consisting of a brisk contraction of both orbicularis oculi muscles in response to a short tap on a wide frontal area. This reflexogenous area is, in fact, spread from the tip of the nose to the hair borderline of the forehead, and laterally to a vertical line approximately through the external eye canthus. But there is no denying that the responsive *centre* of this vast field is the root of the nose.

The best method of elicitation is a quick tap with a small percussion hammer or even with the tip of a half-bent middle finger on the root of the nose or between the eyebrows. The easily discernible brisk contraction of the eyelids on both sides is an unfailing response in every healthy person even when the eyelids are closed. By a voluntary exertion a small percentage of persons can suppress the reaction, but this rare faculty, as we shall see, cannot influence

the clinical application of the reflex. The elicitation of the reflex in persons with eyelids closed and its invariable presence in blind persons eliminates the possibility that we are dealing here with an optico-palpebral blink reflex—a protective response caused by objects manipulated near the eye.

The nasopalpebral reflex has found only a very limited application in neuropsychiatry up to now. It is diminished or even abolished on the side of a peripheral facial palsy, and exaggerated in postencephalitic Parkinsonism. Only Simchowicz has mentioned in few words its abolition in three out of five cases of genuine epilepsy immediately after a seizure.

We can notice the particular susceptibility of the reflex in the E.C.T. procedure. It disappears regularly after the convulsive fit for a variable length of time related to the depth of the comatose state. But even a subconvulsive shock can suppress it for a short time.

One of the generally admitted difficulties in insulin coma treatment is the lack of an objective and reliable sign for the assessment of the progressive degrees of unconsciousness. Murray *et al.* (1938) defined as a moderate coma that stage in which the superficial reflexes are lost and a positive Babinski appears, although they have to admit that a positive Babinski occurs in most cases during the unconscious state, and its appearance in relation to a definite time or depth of the coma could not be confirmed. On the grounds of our own investigations we arrived at the same conclusion. The susceptibility to an extensor toe response is highly individual; in some persons it appears already in a superficial comatose condition; in others it is not evident even in a deep coma. In the popular table of Himwich *et al.* (1939), illustrating the sequence of events during hypoglycaemia, the depression of pyramidal functions is mentioned in the 4th hour and the loss of the corneal reflexes at the end of the 5th. Frostig (1940) makes the statement that "lid and corneal reflexes are the last of the reflex signs to disappear," and in his table it is noted that "lid and corneal reflexes are sluggish" in the 5th hour. What this author meant by "lid reflexes" is not evident, but from their obvious similarity in behaviour with the corneal reflex one can infer that they have nothing in common with the nasopalpebral reflex. He rightly remarks that "loss of consciousness is recorded when there is no reasonable response to touch and call," and adds, "This is certainly an inaccurate method." This unsatisfactory state is discussed and expressed in the well-known book by Kalinowsky and Hoch (1946), and they write, "There is unfortunately no agreement among insulin therapists as to the definition of coma."

Our observations relative to the nasopalpebral reflex, seem to show that there is no necessity for such a pessimistic opinion. With a sufficient dose of insulin a stage of unconsciousness can be achieved in the 3rd hour in which the nasopalpebral reflex invariably disappears. Parallel to this disappearance the patient becomes quieter, although myoclonisms and twitchings may still be present. Shortly before its total abolition in some persons a sluggishness of the response can be observed; in others, on the contrary, the reflex is exaggerated and the response extends over a much wider area than the eyelids, but eventually the reflex disappears abruptly and cannot again be elicited till the coma is terminated. From this so easily defined moment, which seems to

indicate the start of a deeper stage of coma, the unconsciousness grows deeper and deeper till the corneal reflex disappears. It is in the hands of the therapist to terminate the coma according to the requirements of the given case, reckoning from the moment of the disappearance of the naso-palpebral reflex. The assessment of the exact time at which the reflex disappears is at the same time a valuable guide for the direction of the required dose of insulin, which can be so manipulated that this reliable sign is achieved in the second half of the third hour. A great advantage is the simplicity of its elicitation, and the ease with which its presence or absence can be noticed.

Compared in time with the appearance of the Babinski sign it can be said that the extensor response is established, as a rule, prior to the abolition of the nasopalpebral reflex, but the exact time relationship is impossible to define, since the Babinski sign is individually highly variable as to the time of its appearance and to the character of its features.

We did not extend our observations so long as to the disappearance of the corneal reflex, but found it occasionally still present, though sluggish, at the end of the 5th hour. Its disappearance is no doubt a warning signal for the termination of the coma, but useless as a sign for the therapeutically required demarcations.

The presence or absence of the nasopalpebral reflex is a good measure of the intensity of any spontaneously developed fainting or comatose state. We have observed in progressive comatose conditions all the stages of gradation in the same attack, starting with unresponsiveness to call, appearance of the Babinski sign, abolition of the nasopalpebral reflex, and finally the disappearance of the corneal reflex.

In spontaneous epileptic seizures the intensity of the fit can be gauged by the duration of the absence of the reflex after the attack.

In anaesthesia its presence is a good controlling sign for the relatively harmless degree of lost consciousness.

The behaviour of the nasopalpebral reflex in sleep is of particular physiological interest. In the majority of sleeping persons the reflex could be as readily observed as in waking persons, but in a small proportion, who have shown other signs of a deep physiological sleep, no response could be obtained.

In psychotic stuporose conditions it never disappears, and it can be presumed that psychogenic fainting or convulsive attack will not bring forth its abolition. Our case material is not suitable for such investigations, and it has still to be left open to proof.

#### DISCUSSION.

The position of the nasopalpebral reflex within the classification of reflexes has been widely discussed, but the authors, not being aware of its peculiar behaviour in states of disturbed consciousness, especially in such states as can be artificially produced and have therefore the advantage of an exact experiment, have not possessed sufficient data for a comparable study of this phenomenon in the same individual, at the same time and the same neuro-psychic condition.

The majority of workers were inclined to regard this reflex as an indirect response identical with skin reflexes, or at least with indirect periosteal, cartilaginous and osseous responses of isolated or combined character. Recently Wartenberg in his book on reflexes, after discussing this question elaborately, came to the conclusion that this phenomenon is a direct stretch reflex of the orbicularis oculi muscle, and consequently should be called the orbicularis oculi reflex. Our observations cannot bear out this opinion. The response can be obtained from a wide frontal field as far remote from the orbicularis muscle as the tip of the nose or the frontal hair border. On the other hand, a tap on the lateral sector of the orbicularis outside the external canthus is commonly without effect, although in the same person a good response from the root of the nose can be easily obtained. The reflex is highly susceptible to abnormal states of consciousness—a behaviour not observed in muscle stretch reflexes. In the electrically-produced shock condition, or in insulin coma, it behaves like a superficial or indirect reflex, whereas at the same time the muscle stretch reflexes are not only well preserved, but even exaggerated. And lastly Sommer (1938), in his exact experimental investigations, could not find action currents by brisk stretching of the orbicularis oculi muscle. He, too, points to the fact that muscle spindles—the receptive end-organs for the direct stretch reflex—are absent in all expressive muscles of the face. Although the similarity of its behaviour to that of the superficial indirect reflexes cannot be denied, it would be nevertheless incorrect to identify this phenomenon with a single skin reflex. It is true that with a quick stroke along the ridge of the nose with a match a similar reflex eye twinkle can be occasionally elicited, but this response is often absent in a person with a vivid nasopalpebral reflex.

It seems that the nasopalpebral reflex belongs to a special group of protective indirect reflexes in which the receptors are not exclusively in the skin, but in all tissues beneath the skin as well, situated in a wide area around the effector organ with a highly responsive central focus.

The abolition of the nasopalpebral reflex in deep sleep is probably the best indication of the importance of the cortex for its normal functioning. The resistance of the corneal reflex even to the electrical shock or deeper insulin coma points, on the contrary, to its subcortical midbrain character.

Consequent to our observations of the appearance of the Babinski sign prior to the disappearance of the nasopalpebral reflex, it seems logical to infer that in deep sleep, in which the nasopalpebral reflex disappears, the Babinski sign should be present, but unfortunately, the technical side of the investigations necessary to prove this inference is much more difficult than the examination of the nasopalpebral reflex.

#### SUMMARY.

The presence or absence of the nasopalpebral reflex is an excellent expedient for measuring the relative depth of a state of unconsciousness.

The abolition of the nasopalpebral reflex in insulin coma is an objective neurological sign indicating the beginning of a definite, not injurious, stage of the comatose condition, which can thus be sustained with exactness as long as it is therapeutically desired.

The nasopalpebral reflex is absent in other comatose conditions and after epileptic seizures, indicating the deeper level of unconsciousness. It is absent in deep physiological sleep.

The nasopalpebral reflex belongs to a special type of indirect exteroceptive responses.

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