The Response of the Lacrimal Gland to Parasympathicomimetic Agents after Parasympathetic Denervation

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The reaction of certain denervated structures to pharmacological agents has frequently been studied. On the contrary, practically nothing is known of the reaction of the lacrimal gland after parasympathetic denervation.

An investigation of the reaction of the lacrimal gland to parasympathicomimetic agents after parasympathetic denervation was made in man. For this purpose, three patients were selected with facial paralysis resulting from operations for tumor of the cere-bello-pontine angle. The site of interruption of the facial nerve—far above the geniculate ganglion—is known with certainty in this category of patients. Therefore, we can be sure that the parasympathetic nervous pathway of the lacrimal gland which leaves the facial nerve at the level of the ganglion is discontinued. In two of the patients the trigeminal nerve was also interrupted.

Lacrimal secretion was determined by means of the Schirmer test, before and after subcutaneous administration of various parasympathicomimetic agents, it appeared that the denervated lacrimal glands reacted abundantly to the administration of pilocarpine and mecholyl. The differences in secretion, evoked by the pharmacological stimuli, between the denervated lacrimal glands and the contralateral normal glands proved to be such as to justify the conclusion that in all probability the denervated glands were sensitized to direct parasympathicomimetic agents. Prostigmine, administered in a dosage which, in two patients, produced a marked increase in secretion in the normal eye failed to elicit secretion from the denervated glands.

The response pattern found in the three patients investigated—sensitization to direct parasympathicomimetic agents together with absence of response to prostigmine—raises doubts as to the validity of current opinion

according to which the parasympathetic nervous pathway of the lacrimal gland synapses in the sphenopalatine ganglion.