

PAROTID GLAND FUNCTION AFTER PARTIAL EXTIRPATION

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The problem of the effect on secretion of partial removal of the parotid glands from dogs has been insufficiently studied. V. M. Koropov [2] came to the conclusion that after an initial and a repeated resection of $1/4$ or $1/3$ of the gland functional recovery occurred not through regeneration of the glandular epithelium but by compensatory increase in the functional activity of the remaining secretory portions. However, after partial resection repeated three or four times, in most dogs there was no recovery of function and secretion remained impaired. From these observations we concluded that the compensatory power of the salivary gland is restricted to certain limits.

However it is still not clear what influence on secretory function is caused by removal of a large portion of the parotid gland; also it is not known what is the influence of partial extirpation of one parotid gland on the work of the symmetrically opposite member. An experimental attack on these problems is all the more necessary since the proposal by V. P. Filatov and V. E. Shevaley [3] in 1951 for the transplantation of Stensen's duct into the orbit. This operation is an effective preventive measure against cicatricial xerosis and the blindness caused thereby. After the operation saliva from the parotid gland keeps the eye sufficiently moist and so replaces the glandular action of the conjunctiva which has atrophied as a result of parenchymatous xerosis.

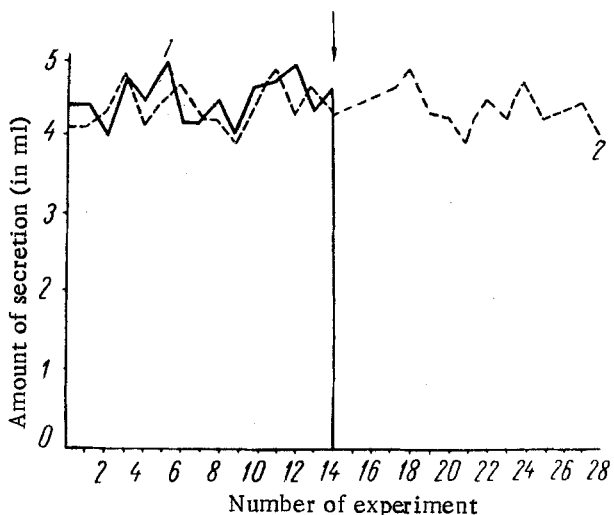
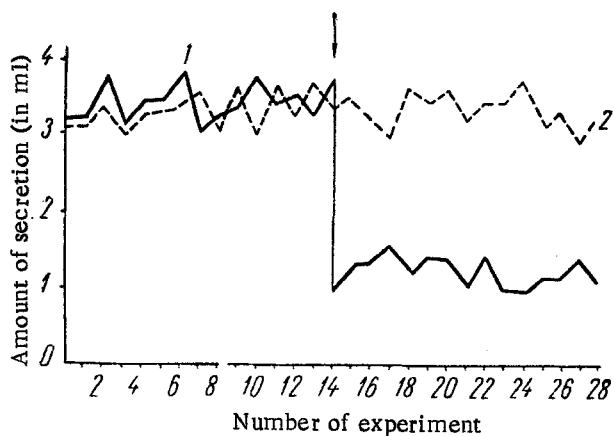
However, as the authors themselves point out, this operation has many shortcomings which greatly reduce its usefulness, and which cause the patient very unpleasant sensations on account of the excessive amount of salivary secretion into the eye at meals and at other times. To reduce the secretion of saliva from the eye, x-irradiation of the parotid region has been used (doses of 100-200 r are given amounting to a total of 1000 r). The irradiation is performed at intervals of 2-4 days. V. E. Shevaley [4] has pointed out that in some patients, as a result of the x-irradiation, a reduction of salivary secretion to the required level was produced. However, after a few months the secretion again increased and further x-irradiation sessions were required. Therefore x-ray treatment is not an effective or reliable method of counteracting the excessive secretion. Here we must note that in the opinion of radiologists such large x-ray doses might seriously affect health. There is a danger of damage to such important structures as the ear, facial nerve, or base of the brain.

Because of the shortcomings of the treatment described we have investigated experimentally the possibility of the partial removal of a large portion of the parotid salivary gland in order to produce the necessary reduction in its secretion.

EXPERIMENTAL METHOD

The work was carried out in the form of a chronic experiment on four dogs. In all of them the duct of the parotid gland was brought to the outside by Glinskii's method [1].

To establish normal unconditioned salivary secretion, in all the experiments a 2:1 mixture of 10 g of meat-and-rusk-powder with water was introduced into the mouth. The saliva was collected in graduated tubes separately on the two sides; three minutes were left between successive presentations of the powder; collection was continued for one minute, starting at the moment the food was given, and the procedure was repeated five times per day. A baseline value for the unconditioned secretion was established over a two-week period, and the dogs were then operated for



Change in the amount of salivary secretion from the left (1) and from the right parotid gland (2) after removal of 2/3 of the left parotid gland from the dog Sharik (upper graph). Change in the amount of salivary secretion from the left (1) and the right parotid gland (2) after removal of 5/6 of the left gland from the dog Start (lower graph). The arrow indicates the time of operation.

Figure we also give the results of 14 experiments conducted before and 14 after the operation. One day before the operation the left gland produced between 4 and 5 ml of saliva, but after it only 1-2 drops. Observations were continued for 1½ years. We found no recovery of function in the operated gland and no compensatory increase in the other. Frequently during a prolonged meal we counted the number of drops of saliva produced, and always the effect was the same; the intact gland produced about 50 drops of saliva, and the operated gland only 1-2 drops. The difference between the two glands was marked.

The results indicate that a single partial extirpation of a large amount of parotid gland may effect a reliable and prolonged reduction of secretion. The extent of the reduction depends upon the amount of gland removed.

These observations give reason to suppose that in patients with a transplanted Stensen's duct removal of a large amount of the parotid gland at operation would reduce the excessive overflow of saliva from the eye.

SUMMARY

A study was made of the effect on secretion of a single-stage partial removal of a large mass of parotid gland. Fistulae were established in both parotid glands by D. L. Glinskii's method. After removal of 2/3 of the gland from three dogs the secretion fell from 1/2 to 1/3 of the original value; after removal of 5/6 of the gland, secretion was reduced about 50 times. Although the dogs were observed for 1½ years there was no recovery of function from the

removal of part of the parotid gland. The operation was performed under ether anesthesia. Because of the liberal blood supply the extirpation was carried out particularly carefully, a small bit at a time. With such precautions hemorrhage was reduced to a minimum.

EXPERIMENTAL RESULTS

For the first two weeks after the operation, on account of edema at the wound there was no secretion of saliva from the operated gland. Experiments were therefore not started until after the edema had subsided completely. Similar results were obtained from all the dogs, and we report only those obtained from two animals. From three dogs we removed 2/3 of the gland, and from one, 5/6.

In the dog Sharik both parotid glands functioned normally before the operation. After removal of 2/3 of the gland on the left side there was a marked reduction of the secretion from it (see Figure, upper graph). For comparison, in the drawing we give the results of 14 experiments completed before and 14 after the operation. On the left side secretion was reduced to 1/3, and it remained reduced to this low level for the whole period of observation of 1½ years, whereas the secretion from the opposite gland underwent no appreciable change. One day before the operation the left gland secreted between 3 and 3.8 ml of saliva, but after the operation the amount varied from 1 to 1.3 ml. Therefore despite the long time which had elapsed we found no recovery of function in the operated gland nor any compensatory secretion from the opposite one. In the remaining two dogs, after removal of 2/3 of the gland secretion was reduced 2-2½ times.

From the dog Start we removed 5/6 of the left gland; by the side of the duct we left a very small portion of gland which continued to function. Such an extensive resection caused a diminution of secretion of approximately 50 times (see Figure, lower graph). In the

opposite side nor any compensatory increase of secretion from the symmetrical gland. The conclusion from these observations is that surgical removal of a considerable proportion of the parotid gland from patients in whom Stensen's gland has been transposed by the Filatov-Shevalev method would reduce the excessive overflow of saliva from the eye.

LITERATURE CITED

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