

FUNCTIONAL STUDIES OF THE MAJOR SALIVARY GLANDS USING  
<sup>99m</sup>Tc-PERTECHNETATE

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Dynamic studies of the major salivary glands with intravenous injection of <sup>99m</sup>Tc-pertechnetate were performed on 8 patients with Sjögren's syndrome. As controls, comparable studies were done on 20 patients with no history of salivary gland disease.

The method employed was sequential scintigraphy using a gamma scintillation camera. Simultaneously, the data were stored in computer at 12 second/frame and later replayed to obtain time-activity curves for the regions of interest over parotids, submandibular glands, and their intraoral orifices as well as background of the cervical region. These examinations were commenced immediately after injection of 5 mCi of <sup>99m</sup>Tc, and were continued up to 30 minutes. Stimulation of salivary glands with 25% tartaric acid was given orally at 20 minutes after injection. In addition, the measurements obtained were expressed as an activity index for each gland and its intraoral orifice, which were the ratio between the pre- and post-stimulation activity counts with corrected by the background activity.

There was a direct relationship between the scintigraphic findings and the results of the time-activity curves in each group. In control group, the glandular curves generally showed consistent shapes, in which the activities over parotids and submandibular glands continuously increased after injection, and subsequently decreased abruptly following stimulation. Reversely, the activities over their intraoral orifices increased following it.

On the other hand, the results in patients with Sjögren's syndrome differed markedly from those of control group. Two variations were observed. First, activities over the major salivary glands were to be less than those of control group or could not be distinguished from background activities, and second, no changes were observed in activities following stimulation.

The activity index between control group and Sjögren's syndrome is statistically significant.

From above results, it may be concluded that such measurements are an easy, safe, and objective means of evaluating the salivary gland function.

QUANTITATIVE ASSESSMENT OF FUNCTION OF  
 THE SALIVARY GLANDS

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A quantitative assessment of the salivary glands function was attempted by measurement of the fall down rate of the activity following oral intake of the citric acid. Method and Materials; Twenty normal volunteers, an obesity, a Sjögren's disease and an irradiated Wegener's granulomatosis were evaluated by this method.

Ten m Ci of Tc-99m pertechnetate was injected intravenously, and, 15 min. after, a piece of citric acid was ingested orally. The radioactivity was recorded for 20 min, and then time-activity curve was obtained in the ROI setted on the salivary glands. The fall down rate (FDR) was proposed as the following index.

$$FDR = (A-B)/(A-C)/t \text{ (\%/sec)}$$

where A is the activity just prior to intake of citrate, B is the background activity, C is the activity at equilibrium after intake of citrate and t is the time for fall down of the activity, following intake of citrate, to the level of C. Results; In normal persons, the average FDR was  $2.2 \pm 0.8$  %/sec in the parotid glands and  $1.6 \pm 0.9$  %/sec in the submandibular glands.

A case of obesity was 0.45 %/sec, at her weight of 98 kg. After her weight was controlled to 91 kg, the index increased to 1.0 %/sec.

In a patient with Sjögren's disease, the index was 0 %/sec before treatment and 0.3 %/sec after treatment.

In a case with irradiated parotid glands, the index was 0 %/sec for parotid glands and 1.5 %/sec in submandibular glands.

This result suggests that this method is useful to evaluate in a short time the salivary function quantitatively and to follow up the function in course of the treatment.