SHORT COMMUNICATION

Quantitative age changes of the histological constituents of the human tongue

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Introduction

The histological structure of the tongue is comparatively simple in which a mass of striated skeletal type muscle is covered by stratified epithelium. Many researches which have been done are chiefly concerned with the epithelial changes in relation to disease. The mucous membrane of the tongue shows reactive changes for general trophic and metabolic disturbance1-4, and they appear to be the initial symptoms of internal disease5. Thus, it has been thought that the tongue is a mirror of generalized disease.

Histological studies concerning ageing of the tongue have also been made, and although most of these were concerned with epithelial changes, there is still little reliable information on the quantitative changes of other histological constituents of the tongue. Accordingly, the intent of this study was to assess the quantitative changes of all the histological constituents of the human tongue in relation to ageing.

Materials and Methods

Ninety-four tongues from cases (M 59, F 35) (Table 1) autopsied in the Department of Pathology I, School of Medicine, the Division of Pathology, Central Clinical Laboratory, and the Department of Oral Pathology, School of Dentistry, Iwate Medical University, were used in this study. Grossly obese and excessively thin cases (20 per cent above or below standard weight6) and cases having a therapeutic history of radiation to the head and neck region were excluded. The tongues, fixed in 20% neutral formalin, were cut transversely through the anterior, middle and posterior sites, and the tissue blocks were dehydrated, cleansed and embedded in paraffin. Sections, 5 µm thick, were taken.
from the three sites and stained with hematoxylin and eosin. The tissues on the left side of the tongue were examined using the light microscope, and the distribution of histological constituents such as muscle, fibrous connective, adipose, and other tissues (vessels and nervous tissue etc.) were analysed by means of a simple point-counting method, using an optical grid micrometer according to Mudd et al. The sums of the points of each constituent were respectively expressed as a percentage of the point total at each site of the tongue, plotted against age, and examined by regression analysis.

**Results**

The amount of muscular constituents in the anterior site of the tongue varied widely when compared with the middle and posterior sites (Fig. 1). The values obtained from the three sites decreased with increasing age. There are definite correlations between ageing and the amount of muscular constituent of the tongue, excluding the posterior site. With increasing age, the amount of fibrous connective tissue constituent in the three sites also decreased with a significant correlation (Fig. 2).
Conversely, the amount of adipose tissue constituent increased in relation to age in the three sites of tongue (Fig. 3). There was also a good correlation between ageing and the amount of adipose constituent in all sites of the tongue. Fig. 4 presents the rate of other tissue changes (vessels and nervous tissue etc.).

**Discussion**

Evidence of increasing body fat according to ageing was presented by Novak\textsuperscript{8)}, Brozek\textsuperscript{9)}, Garn and Harper\textsuperscript{10}). Studies on the volume of fat accumulation of the organs have also been made on the pancreas\textsuperscript{11)}, salivary gland\textsuperscript{12)}, and many other organs. In the present study, the authors found that there was a tendency of increasing adipose tissue in the human tongue with increasing age. Recently, Staudt et al.\textsuperscript{13)} have also observed the human tongue histologically and reported the strongest significant increase in the fat content in all observed sites in the male, and in the middle and posterior sites in the female.

It has been said that the collagenous fibrous tissue increases in the connective tissue and organs\textsuperscript{14)}, such as skin, uterus, medulla of kidney and heart muscle, with advancing age.
However, there are only a few persons who have denied that there was an increase of fibrous tissue with age. According to Tauchi et al. the proliferation of collagenous fibers and/or fibrosis may be a change caused by a pathological phenomena experienced during a long life rather than a true ageing process. Usually the connective tissue, particularly collagenous fibers, increases as a result of continued mechanical and chemical stimulation. In our present study it is shown that the amount of the fibrous constituent decreased with increasing age. The authors think however that this finding may only be an apparent change due to the progressive increase of adipose tissue. Moreover it would be rash to assume that all histological changes seen in autopsied cases are a true senile change, because the condition of inpatients might be modified by several factors, such as by drugs used for the treatment of diseases. Therefore, it is not easy to observe human material modified only by the ageing process. However, for the study of human tissue, it is necessary to make use of autopsy material. The authors postulate that further systematic studies, including the experimental research on animals, would be necessary to elucidate the physiological amount of the histological constituents of the tongue in relation to the natural age-

Fig. 3 Correlation between the rate of adipose tissue and ageing in the human tongue
Fig. 4 Correlation between the rate of other tissue and ageing in the human tongue

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References


