

Viscometry study on residual saliva using ultra micro-volume viscometer: a preliminary study on the method for collection of residual saliva

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Background

The rheological properties of the residual saliva may affect its coating as well as lubrication capacities¹⁾(Fig.1). However, its viscosity has never been documented so far, because the quantity of collectable sample of residual saliva is so less that its viscometry is unavailable using conventional viscometers. Recently, an ultra micro-volume viscometer (RSM-MV1, Fig.3), which measures the liquid viscosity even with a smallest volume of 5 μ L, was developed by Kurihara et al.. This device paved the way for the viscosity measurement of the residual saliva.

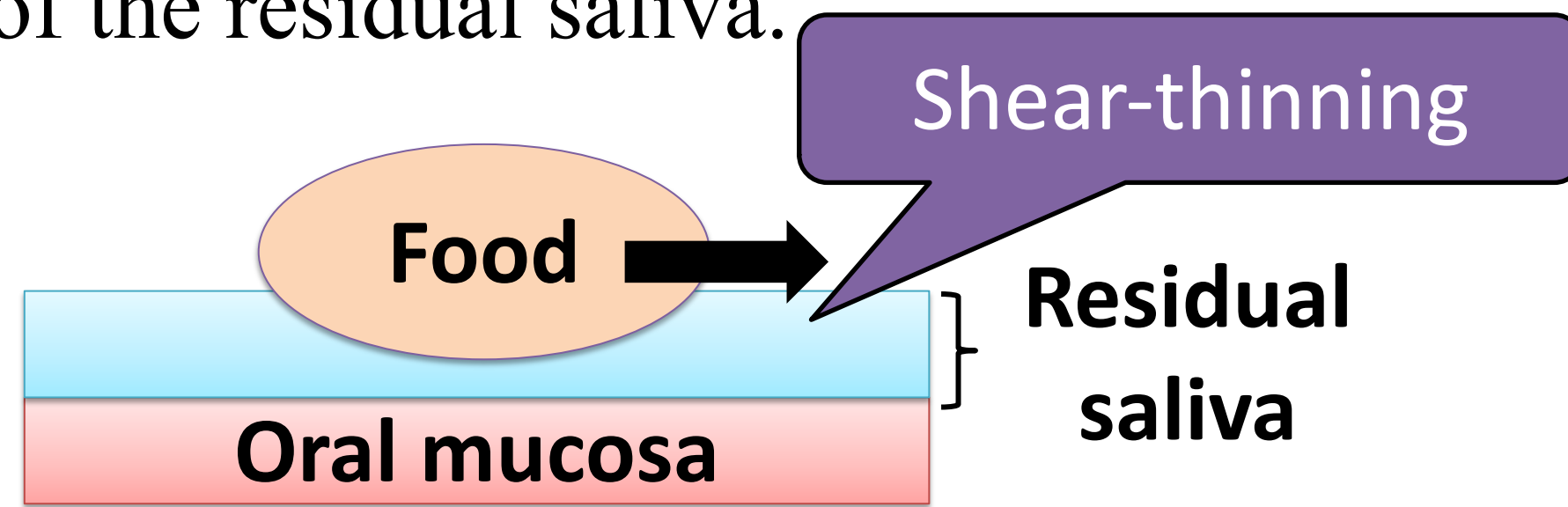


Fig.1 Residual saliva plays an important role in lubrication.

Objectives

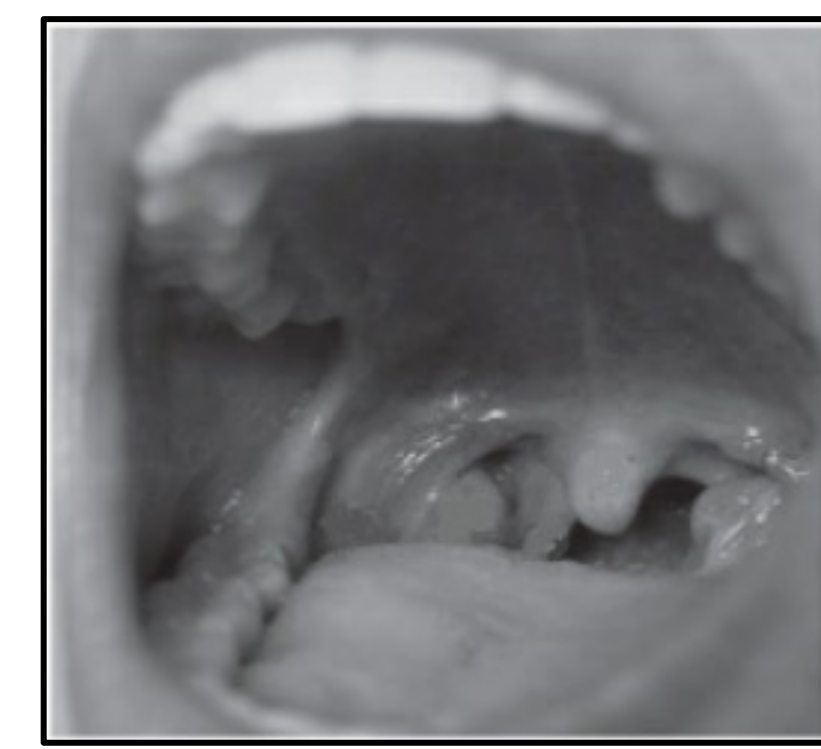
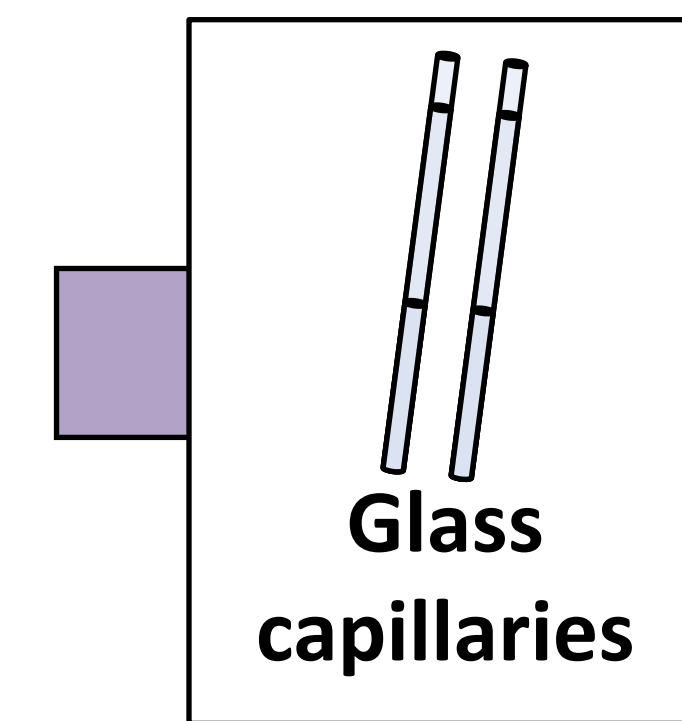


Fig.2 Oral mucosa



Glass capillaries

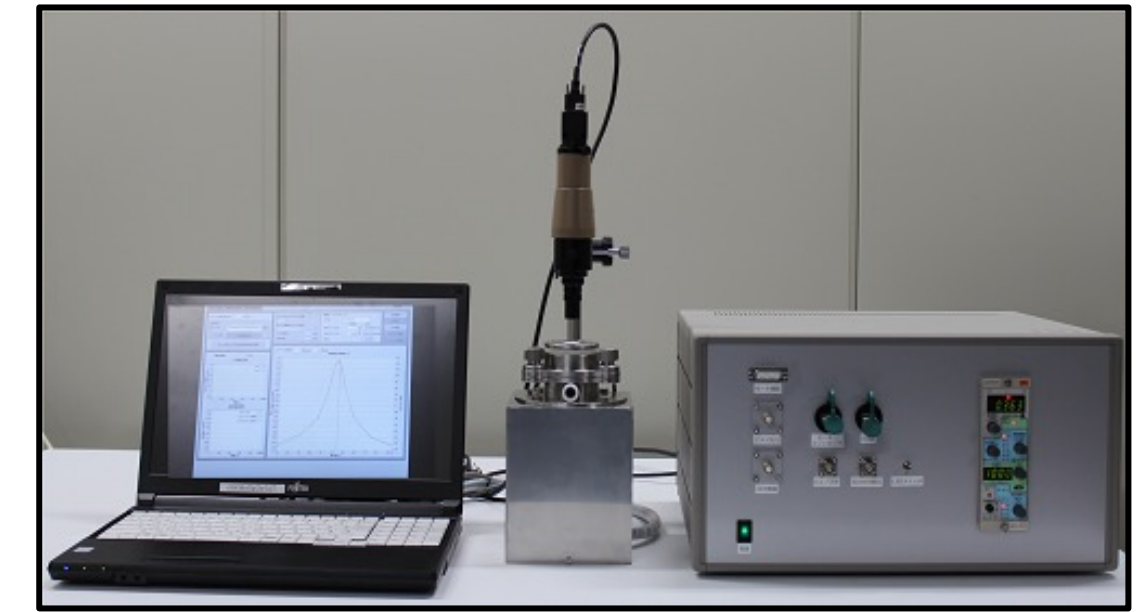


Fig.3 RSM-MV1

The aims of this preliminary study

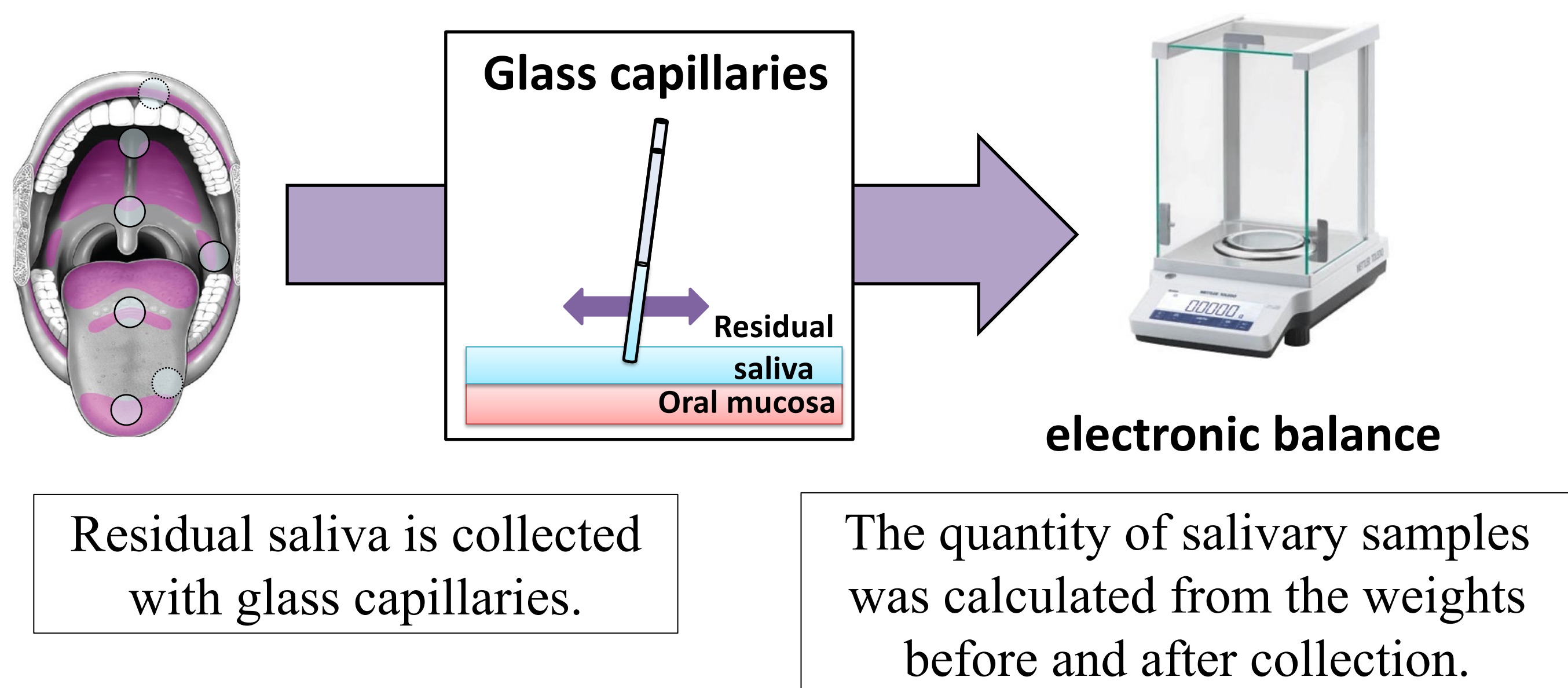
- To develop the collection method of residual saliva samples from various sites of the oral cavity in humans
- To evaluate that the collection itself has no effect on the viscosity of collected saliva sample

This study is one step in the research of the effect of residual saliva viscosity on moving and transporting food inside the oral cavity.

Materials and Methods

Residual saliva collection methods

With the approval of the study protocols by the Institutional Review Board at Tohoku University Graduate School of Dentistry, residual saliva samples were collected from various sites of the oral cavity in general volunteers (3 males, mean age: 27).



Residual saliva is collected with glass capillaries.

The quantity of salivary samples was calculated from the weights before and after collection.

Fig.4 The method for measuring the amount of residual saliva collected from various sites of the oral cavity

Evaluation of viscosity change before and after collection

Unstimulated whole saliva(UWS) was collected by the spitting method from 1 volunteer.

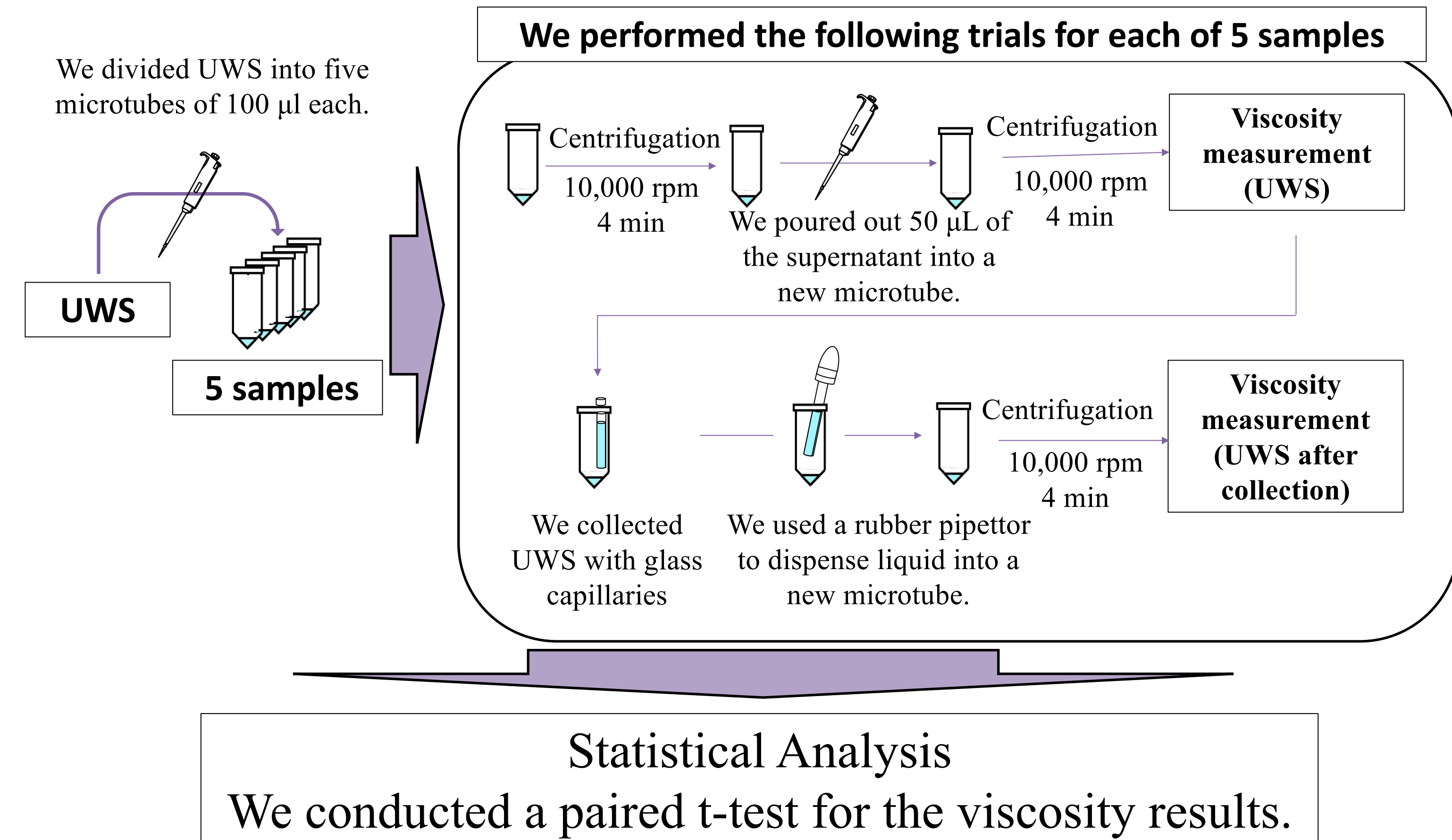


Fig.5 Evaluation of viscosity change before and after collection

Results and Discussion

Fig.6 shows the amount of residual saliva collected from each site in each volunteer. In every part other than the anterior part of tongue dorsum and the anterior hard palatal, the amount of collected residual saliva was larger than 5 μ L.

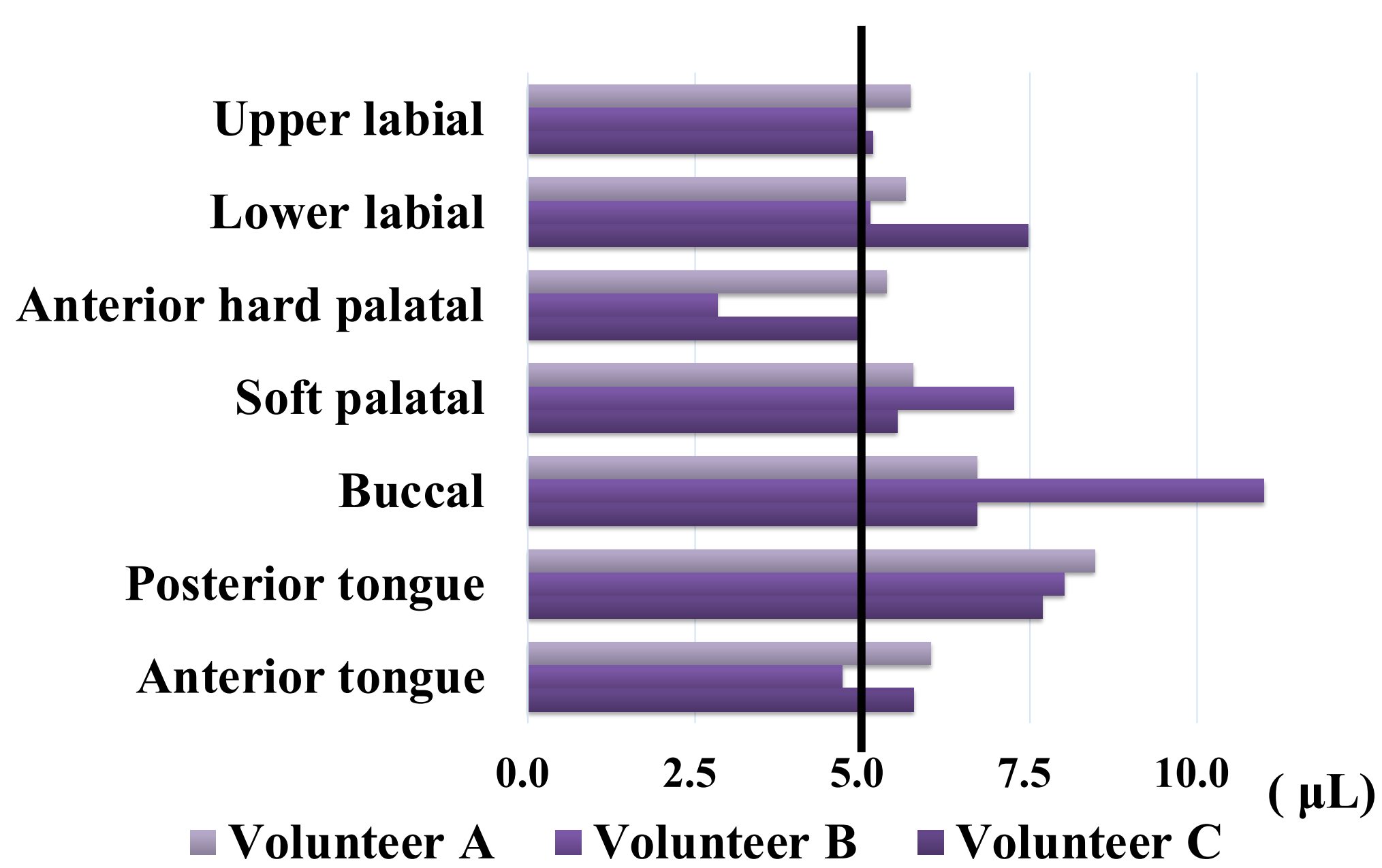


Fig.6 The amount of residual saliva collected from each site in each volunteer

Fig.7 shows comparison of the viscosity between before and after collection with glass capillary. The viscosity of UWS showed no significant change before and after collection using the glass capillaries($P= 0.45$).

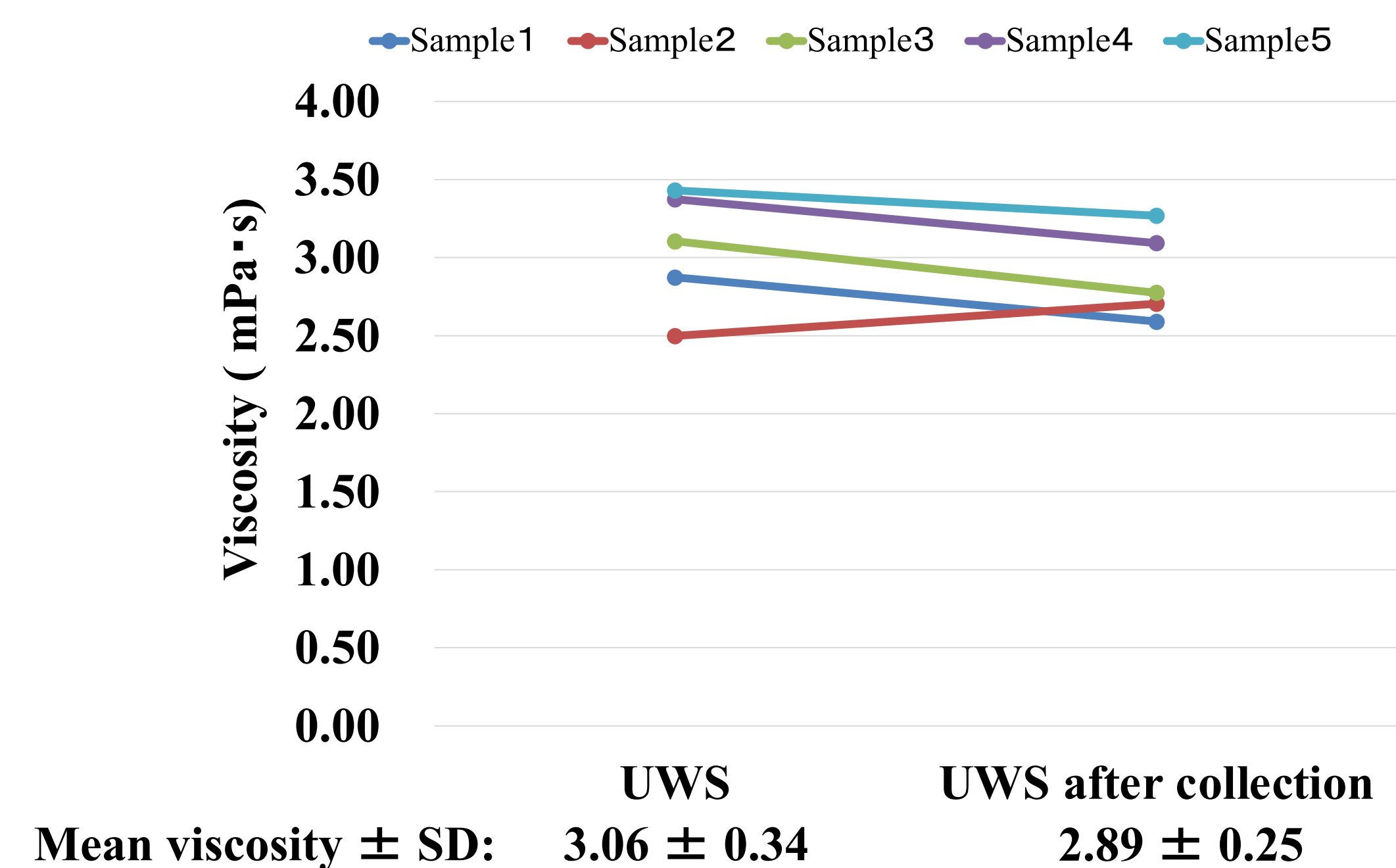


Fig.7 Comparison of the viscosity between before and after collection with the glass capillaries

Conclusion

The findings suggest that the method used in this study could be a promising way for the viscometry study of the residual saliva.

Reference

1) Mizunuma.H. *NAGARE* 2020; **39**: 14-19.