Journal of
Oral Health and Dentistry

ISSN: 2574-0792
J Oral Health Dent. 2017;1(S1):A0023
Conference Proceeding | Open Access

An *In Vitro* Experiment to Study the Oral Phase of Human Swallowing

Ramaioli M[1], Hayoun P[2], Mowlavi S[2], Lloyd R[1], Le Reverend B[2], Burbidge A[2] and Engmann J[2]

[1]CPE, FEPS, University of Surrey, Guildford, UK

[2]Nestle Research Center, Lausanne, Switzerland

Originally Presented in UKSRG-2016 Conference held at Institute of Child Health, London, UK during February 4-5, 2016.

Abstract

An *in vitro* model experiment was designed to study the flow and the mechanics of the oral phase of swallowing and was successfully compared with *in vivo* ultrasound measurements. The *in vitro* experiment was used to quantify the effect of the viscosity of a liquid, of the bolus volume and of the force imposed by the tongue on the oral transit time. The residual liquid mass was found to be independent of bolus volume and applied force. An excessively high viscosity resulted in higher residues, besides succeeding in slowing down the bolus flow. The flow of shear-thinning liquids, such as dysphagia thickeners, was compared with simple Newtonian liquids. A realistic theory was developed and used to interpret the experimental observations. The existence of an initial transient phase, dominated by inertia, was highlighted. This phase can be followed by a constant velocity regime dominated by viscous dissipation. The effect of the liquid viscosity on the oral transit time is lower when the transient inertial regime dominates bolus flow. Our theory suggests also that tongue inertia is the cause of the higher pressure observed at the back of the tongue in previous studies. The approach presented in this study is a first step toward a mechanical model of human swallowing that could facilitate the design of novel dysphagia treatments and their preliminary screening, before *in vivo* evaluations and clinical trials.

Citation: Ramaioli M, Hayoun P, Mowlavi S, Lloyd R, Le Reverend B, Burbidge A, et al. An *In Vitro* Experiment to Study the Oral Phase of Human Swallowing. Proceedings of UKSRG-2016; 2016 Feb 4-5; London, UK. J Oral Health Dent. 2017;1(S1):A0023.