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# Carbonation as a novel taste-free thickener increases swallowing time

**Jeyam Emmanuel** (*Salivary Research, Mucosal and Salivary Biology Division, King's College London Dental Institute.*), **Guy Carpenter** (*Salivary Research, Mucosal and Salivary Biology Division, King's College London Dental Institute*)

**INTRODUCTION:** Dysphagia remains a common problem which is difficult to manage. Food/liquid physical characteristics can be altered by thickeners which aid swallowing by recruiting the tongue into the swallowing process. One drawback of thickeners is that they often impart a taste and mouthfeel. Here, we compare a thickened liquid using a conventional food thickener with carbonated water and then in combination. When combined the thickener retains the carbon dioxide bubbles into the matrix forming an even thicker liquid which still flows.

**METHODS:** Healthy volunteers aged 18 or older (n=10) were studied on a single occasion. Using a partially inflated balloon attached to a manometer, tongue pressure was measured before being asked to drink 100ml of 4 different solutions in a random order – still and carbonated water with and without thickening powder. All 4 were prepared with orange concentrate to standardise the taste. Time and number of swallows was recorded as well as asking participants to complete a VAS for each drink on ease of swallowing.

**RESULTS:** We found a strong link between adding thickening powder and increasing both swallowing time and number of swallows. Carbonation, without thickener, had no statistically significant difference from still water. However, interestingly, carbonation with thickening powder took significantly more time and number of swallows to drink than when thickening powder was mixed with still water. Tongue pressure showed a weak positive correlation with increased time to swallow. Similarly, the VAS reflected the swallowing times of thickened fluids.

**DISCUSSION:** All subjects found thickened fluids more difficult to swallow. Thickness was increased by the incorporation of bubbles which provide an easier way to thicken liquids than thickeners. This has implications for dysphagia management in the acute phase and could also guide future research into improving long-term adherence to treatments by altering the physical characteristics of a substance.