

Development of a tool to imitate the fork method described by the International Dysphagia Diet Standardisation Initiative

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Dysphagia is a condition defined by the difficulty in chewing and swallowing foods, which can be associated with malnutrition, dehydration, chest infection, and potential risk of death. The International Dysphagia Diet Standardisation Initiative (IDDSI) developed standard methods intended to be simple to classify foods and beverages into different levels, which are related with the different needs of patients. Although interesting, those methods lack scientific data and reproducibility. This work develops a probe to be coupled in a texturometer to perform the IDDSI fork test. The probe was designed to hold and press on the fork, imitating the thumb in the original test. The probe was designed in CAD and cut in aluminum sheets by a CNC machine, being then assembled. The fork was fixed to the probe, and the force required to make the thumbnail white was measured using a scale (490 gf = 4.8 N), being used for compressions. Four kinds of foods with different textures were analyzed: boiled potato (25 min cooking), carrot (30 min cooking), banana, and corn starch gel, cut into cubes of 1.5 cm side. With the maximum force set, the fork could entirely penetrate only the starch gel sample, penetrating only 2.69 mm of potato, 2.63 mm of carrot, and 4.8 mm of banana. The energy required for the fork penetrating those depth into the samples was 28 mJ for potato, 27 mJ for carrot, 32 mJ for banana, and 45 mJ for starch gel. Only the starch gel could be classified as soft and bite-sized according to the IDDSI, once the other foods could not be compressed using this force. The results using the developed probe agreed with the standard IDDSI method. The developed instrument proved to be efficient in imitating the fork test proposed by the IDDSI, turning the current qualitative analysis as quantitative. Moreover, the food can be compressed with the same force pattern, which guarantees greater precision in the analysis and study of data since the test conditions can be controlled instrumentally.

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