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Patterns Observed in the First Chew of Foods with Various Textures

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Pressure distribution during the chewing of food with molars was measured using a multiple-point sheet sensor, and compared with results from an instrumental compression test. The sensor system detected the masticatory pressure with many sensing cells so that masticatory force and contact area between food materials and the lower teeth were directly measured. Masticatory pressure of five foods (white bread, raw carrot, cracker, rice cracker and Yokan) for fourteen healthy adults was measured, and the different pressure patterns related to the texture were discussed. Masticatory force *versus* time curves were characterized by each sample, although they varied largely by subject. Two peaks appeared in the masticatory curves of carrot and Yokan, more peaks were shown in cracker and rice cracker, but the first peak was missing for the bread mastication. The first peak corresponded to sample rupture, therefore the active pressure defined as the force divided by the contact area was found to reflect the breaking stress of the samples. Similar to the results of mechanical tests, brittle cracker and rice cracker showed a lower breaking force within a short time at the first peak. The last peak appearing just before teeth opening was similar to the maximum masticatory force for bread, cracker, rice cracker and Yokan, and did not correspond with the breaking force of samples. The order of the active pressure at the last peak was similar to that of stress values at very high strain measured in a compression test. The maximum force detected during one chew is not always measured in a normal instrumental test.

Keywords: [mastication](#), [intra-oral force](#), [food texture](#), [multiple-point sheet sensor](#),



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