# TACTILE PERCEPTION OF TEXTURED SURFACES: A TRIBOLOGICAL INTERPRETATION

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In recent years, industrials paid a growing attention in qualifying and even predicting the tactile perception of their products. Surface texturing is an exciting option to control surfaces tactile perception. Nevertheless, relations between textured surface parameters and tactile perception remains unclear. Hence, a better understanding of the finger / surface contact is necessary. This study aims at investigating the relationships between the tactile perception of textured surfaces and the tribological behaviour of the finger / surface contact. Ten textured surfaces characterized by equally distributed 100 μm tall cylindrical dots were studied. Dots diameter D varies from 0.2 to 4 mm and dots interspacing is equal to 2D. The perceived roughness of the textured surfaces were evaluated by 26 young subjects (23±3 years old). They had to score on a scale ranging from 0 to 20 the roughness of each textured surfaces which were presented to them six times in a pseudo-random order. Subjects were not able to see the textured surfaces and were asked to touch them with their dominant hand forefinger. In parallel, in vivo friction tests of the finger / surface contact were performed. The textured surfaces were placed on a tribometer allowing to measure the normal force, the tangential force, and the finger displacement. Moreover, the friction induced vibrations were measured thanks to an accelerometer fixed on the subject fingernail. Finally, in vivo indentation tests were also performed between the subject finger pad and the textured surfaces in order to characterize the adhesion force. Psychophysic results shows that the mean perceived roughness draws an inverted U-shape curve versus D. The analysis of friction coefficient, adhesion force and power spectral density of the acceleration signal highlights a modification of the tribological behaviour between fine and coarse textures. A physical explanation of the tactile perception of the studied surfaces related to texturing parameters can thus be given.