We have shown that neuronal discharge rates are correlated with 50-500 power in whisker vibrations. Furthermore, spikes in TG neurons commonly arise from high-frequency micromotions (slip events). To determine whether surface coarseness is translated into differential slips amplitude, we correlate texture power with slip amplitude and slip amplitude with firing rates. We find that the amplitude of slip events that resulted in spike discharge is not related to surface coarseness and neuronal discharge rate (Fig. S1A, C). Because responses of neurons in various stages of the whisker somatosensory system better reflects whisker deflection velocity than amplitude, we also calculate the velocity profile of slip events and find again that instantaneous slip velocity is not related to surface coarseness (Fig. S1B).

Previous studies (e.g. Shoykhet et al., 2000; Stuttgen et al., 2006) have studied the correlation between whisker velocity and TG firing rates or response probability. These studies employed ramp-and-hold stimuli and well separated velocity values. In the current study, we examine the reverse correlations between spikes and stimulus that generates them (STA). This association is done across all surfaces. We find that the velocity and amplitude of slip events that resulted in spike discharge are not related to surface coarseness. Moreover, the stimuli we employed are equivalent to filtered white noise with increasing power. The large degree of overlap in the velocity profiles between surfaces (Fig 2B, E) may degrade from the correlation between slip velocity and spiking.

To quantify the difference in trajectory and velocity signals we compared the peak to peak amplitude of slip trajectory and velocity signals in response to different sand papers. We show a high degree of correlation between the two signals (Fig. S1C).

**Figure Legends**

**Figure S1.** Slip events amplitude and velocity are not related to surface coarseness. (A-B) Correlation between power 50-500Hz in the distance profiles of different surfaces and Slip amplitude and velocity. (C) The relation between slip amplitude and neuronal discharge rates. (none of the relations show significant linear correlations). (D) Comparison of slip trajectory and velocity signals.
Supplementary material: Part 2

It has been suggested that difference between textures is expressed in differential NF amplitude. To determine these relations in the current study, we correlate surface coarseness with NF power (Fig. S2A) and NF power with neuronal discharge rates and found that the accumulative power in the NF frequencies range did not depend on surface coarseness and was not related to neuronal discharge rate.

Figure Legends

Figure S2. The amplitude of post-spike resonance is not related to surface coarseness. (A) Correlation between power 50-500Hz in the distance profiles of different surfaces and FRF power. (B) The relation between NF power and neuronal discharge rates (none of the relations show significant linear correlations).