Supporting Information

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SI Results and Discussion

From Fig. 2*B*, we found that there is no significant interaction force (neither adhesive nor repulsive) between cartilage against cartilage. Using the Hertz theory (1), the contact radius a can be calculated by $a^3 = RL/K$, where R and K are radius of the curvature (1–2 cm) and stiffness of the cartilage (4–10 MPa) (2), respectively. Moreover, average pressure P_{av} can be calculated by $P_{av} = L/\pi a^2$, leading to

$$P_{av} = \frac{L^{1/3}K^{2/3}}{\pi R^{2/3}}, \quad \text{[S1]}$$

which was around 0.02–0.2 MPa for the performed experiments.

1. Israelachvili JN (2010) *Intermolecular and Surface Forces* (Academic and Elsevier, Amsterdam), 3rd Ed.
2. Swann AC, Seedhom BB (1993) The stiffness of normal articular cartilage and the predominant acting stress levels: Implications for the aetiology of osteoarthrosis. *Br J Rheumatol* 32(1):16–25.

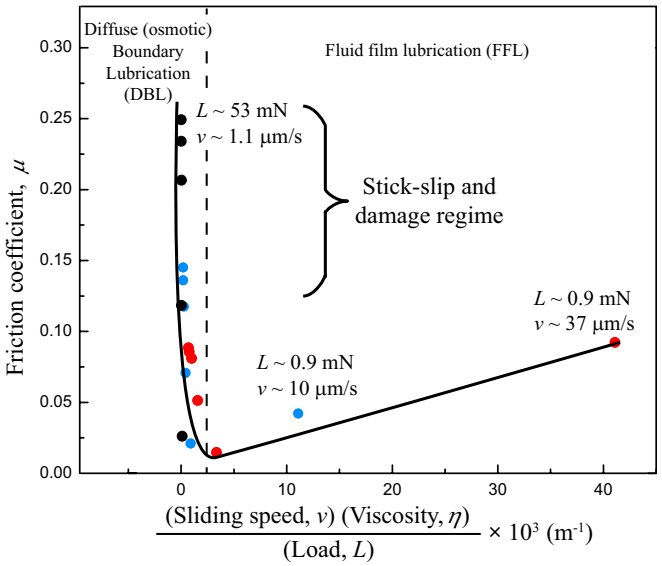

Fig. S1. Conventional Stribeck curve plotted with the data from Fig. 2*B*. Viscosity is assumed as constant (η = 0.1 pa·s, 100 times bulk water).

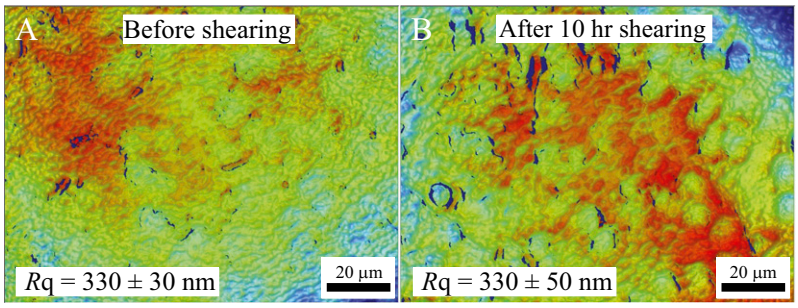

Fig. S2. Topographic images (top view) of the contact zone of normal (nondigested) cartilage (*A*) before and (*B*) after 10 h shearing in nonstick-slip regime. Red and blue colors indicate higher and lower heights, respectively.