

Fracture of soft matter during needle insertion

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Soft matter is extensively used in the biomedical field due to its biocompatibility and tunability of tissue-mimicking properties. This talk is mainly about the in-situ fracture characteristics of soft matter (hydrogel) during needle insertion and the role of water content, and identify the stresses cause various cracks. In the process of needle insertion into the PAA hydrogel, a complex stress field is generated and causes various cracks due to contact between the needle and hydrogel. The results facilitate in better understanding of friction, fracture and damages of tissues, particularly liver, brain during needle insertion; opens a promising perspective in control of tissue damages during surgical operations.

Keywords: Cone crack, fracture, friction, soft matter, needle insertion, tissue damage