

Abstract Submitted
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Stress fields in soft material induced by injection of highly-focused microjets¹ YUTA MIYAZAKI, NANAMI ENDO, SENNOSUKE KAWAMOTO, AKIHITO KIYAMA, YOSHIYUKI TAGAWA, Tokyo Univ of Agri & Tech — Needle-free drug injection systems using high-speed microjets are of great importance for medical innovations since they can solve problems of the conventional needle injection systems. However, the mechanical stress acting on the skin/muscle of patients during the penetration of liquid-drug microjets had not been clarified. In this study we investigate the stress caused by the penetration of microjets into soft materials, which is compared with the stress induced by the penetration of needles. In order to capture high-speed temporal evolution of the stress field inside the material, we utilized a high-speed polarized camera and gelatin that resembles human skin. Remarkably we find clear differences in the stress fields induced by microjets and needles. On one hand, high shear stress induced by the microjets is attenuated immediately after the injection, even though the liquid stays inside the soft material. On the other hand, high-shear stress induced by the needles stays and never decays unless the needles are entirely removed from the material.

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