MECH 493 Web Summary

Optimization and Application of an Experimental Setup for Fluid Injection into Tissue

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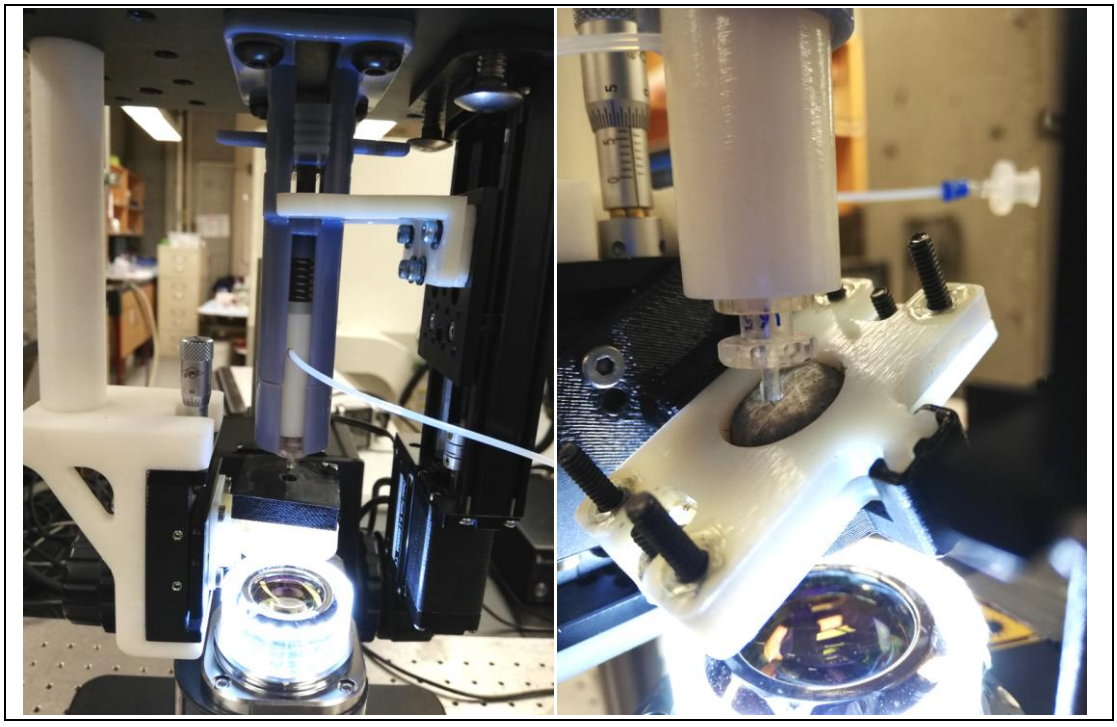

Hollow microneedles are an emerging minimally-invasive technology for delivering drug solutions into the skin. An experimental setup was developed at UBC to study the mechanics of these sub-millimeter devices and visualize skin deformation during fluid injections. This research project explored two modifications aimed at improving the setup's reliability and enabling testing of new experimental parameters. The first modification was a stopper system designed to easily set the microneedle's vertical position correctly at insertion. This method was found to be more user-friendly than the original method, but faced issues with accuracy due to compressibility of the skin. The second modification was a part redesign to enable a non-perpendicular angle of insertion between the microneedle and skin surface. Based on experiments conducted at a 30° insertion angle, the main challenges were found to be difficulty of controlling the insertion location, bending of the microneedle, and leakage during the transient injection phase.