A6
Hydrostatically coupled dielectric elastomer actuators: new opportunities for hand rehabilitation

Federico Carpi
University of Pisa, Italy

Dielectric elastomer actuators (DEAs) have been demonstrated to represent today a high-performance technology for electromechanical transducers based on electroactive polymers. As a means to improve versatility and safety of DEAs for several fields of application, so-called 'hydrostatically coupled' DEAs (HC-DEAs) have recently been described by our group. HC-DEAs are based on an incompressible fluid that mechanically couples a DE-based active part to a passive part interfaced to the load, so as to enable hydrostatic transmission. This talk will present ongoing developments of HC-DEAs and their promising potential application in the field of hand rehabilitation. A hand-held system with electrically controllable mechanical compliance is being developed using an HC-DEA based patented technology. The system is designed so as to allow the user to squeeze a viscoelastic part which reacts with variable compliance according to a driving signal, so as to enable controllable rehabilitation exercises.

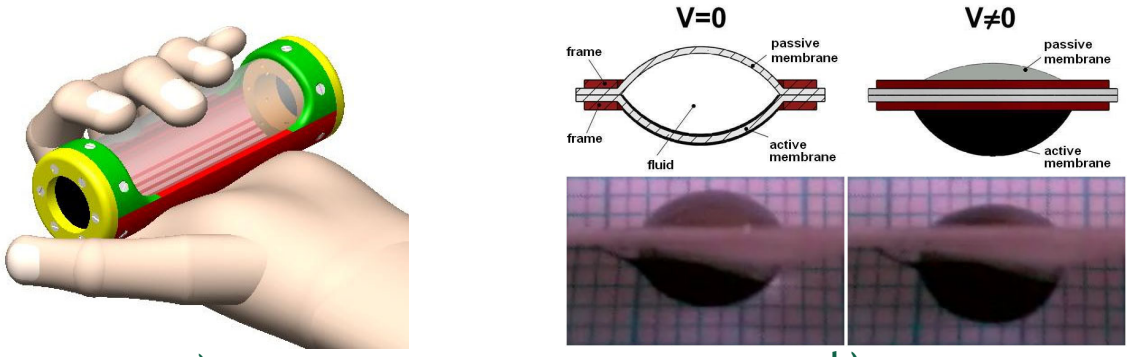

Figure - a) drawing of the rehabilitation system, b) concept (above) and pictures (below) of an HC-DEA.