GRASP TRANSITION PROTOCOL

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Purpose	To assess the robot or human hand's capability and repeatability when transitioning an object from a precision to power grasp and vice-versa. The protocol assesses the hand by tracking sensorized object motion during grasp transition.
Task Description	A chosen sensorized object is periodically transitioned between the precision and power grasp in the assessed hand.
Setup Description	**List of objects and their descriptions:** The cylinder, cube, and sphere from the modular, sensorized object collection, equipped with appropriate motion capture markers/sensors, are used in the protocol.
	Initial and target poses of the objects: The objects are initially fixed in a precision grasp in the examined hand and are entirely supported by its fingers. The initial pose is hand-specific, but it must be the same for all trials and objects (position and orientation, with respect to the hand base frame). The target pose of the object is within a power grasp.
	Description of the manipulation environment: If using optical motion capture equipment, the space should be free of clutter and reflective surfaces. If using magnetic motion capture equipment, the environment should be free of large metallic objects or magnetic fields (excluding the hand).
Robot/Hardware/Software/Subject Description	**Targeted robots/hardware/software:** Any hand or gripper capable of precision to power grasp transition (and vice-versa) may be used in the protocol. There are no constraints on the control software - a package that maximizes performance should be used.
	Initial state of the robot/hardware/subject with respect to the setup: The assessed robot hand or gripper should be fixed on a rigid surface. If a human hand is examined, the forearm should rest on a rigid surface with the palm facing up.
	Prior information provided to the robot (if applicable): Prior to the manipulation operation, the robot hand should be programmed and tested with the object to ensure robust transitions. The robot does not need to know the object model or properties.
Procedure	Repeat following steps for each object: 1) Position the object into the assessed hand, so it remains grasped in the defined initial position (precision grasp). 2) Begin object motion data recording with the chosen motion capture system. 3) Run the system. The object should be transitioned between the precision and power grasp 10 times in a single run. 4) Stop the system and motion recording.
Execution Constraints	The same grasp configurations must be used for all objects.

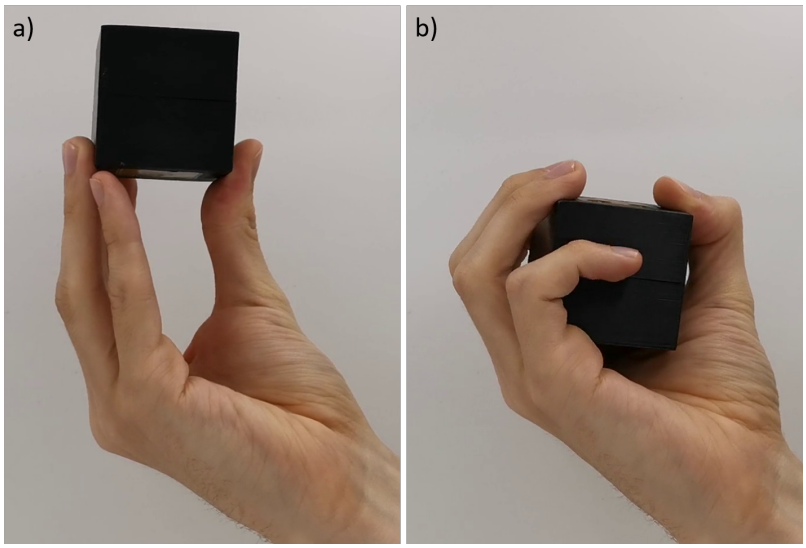

Fig. 1. Grasp transition assesses the hand's ability to change between a precision grasp (subfigure a), and a power grasp (subfigure b) repeatably.