




Innovazioni Tecnologiche in Riabilitazione.[†]

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Neurorobotics refers to the branch of science combining neuroscience, robotics, and artificial intelligence. It hence refers to all robots developed for interacting with or for emulating the nervous system of humans or other animals. A neurorobot can be developed for clinical purposes, for example neurorehabilitation or neurosurgery, or for studying the nervous system by emulating its properties, as it occurs for example in the walking robots based on central pattern generators. Many neurorehabilitation approaches and techniques have been developed to restore neuromotor function, aiming at the recovery of physiological movement patterns in patients with neurological pathologies. Robotic rehabilitation is a young science that is rapidly infiltrating the clinical environment. In 1994 with development of MIT-MaNUS5, robotic device for the upper limb rehabilitation, started the robotic era of neurorehabilitation. In the same year the introduction of Lokomat, a Body Weight Supported Treadmill Training (BWSTT) assisted by a gait orthosis, represented the first pioneering grounded exoskeleton.

Neurorobots have the potential for accurate assessment of motor function in order to assess the patient status, to measure therapy progress, or to give the patient and therapist real-time feedback on movement performance. Ekso is a mobile exoskeleton that is intended for rehabilitation and mobility of individuals with neurological motor diseases. The device is designed to adjust easily to fit users ranging in height between 157 – 195 cm. The individualized fit is made using measurements at the thigh and shank to adjust length, and at the hips to adjust frontal plane width. The device is attached to the user's torso with backpack style shoulder harnessing and a torso brace. A new Exoskeleton called Indego has been working in our Hospital too. Indego mirroring natural human movement, lean forward to initiate standing or walking and lean backward to stop and sit. An Indego app on the mobile device allows to control operation, change settings, and capture data without the need for tethered controls. Indego allows over ground training or personal mobility on a variety of surfaces both indoors and outdoors and we're studying the utility of an exoskeleton used as home device.

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[†] presentato a @ITIM 2019 - 19° Congresso Nazionale Associazione Italiana di Telematica ed Informatica Medica 11-12 Novembre 2019, Matera/Potenza.