Příloha č. 1:

Willisův tepenný okruh

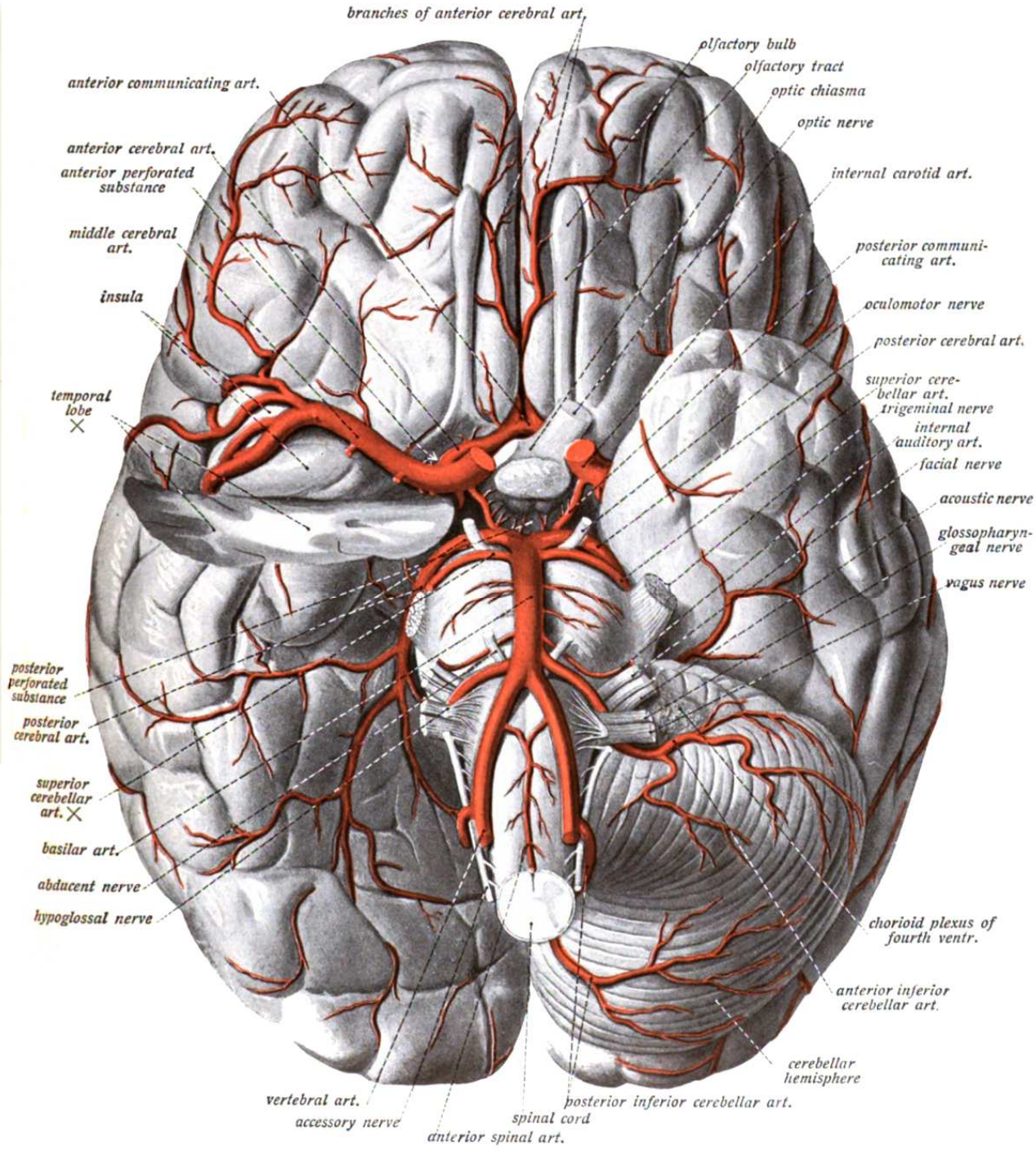
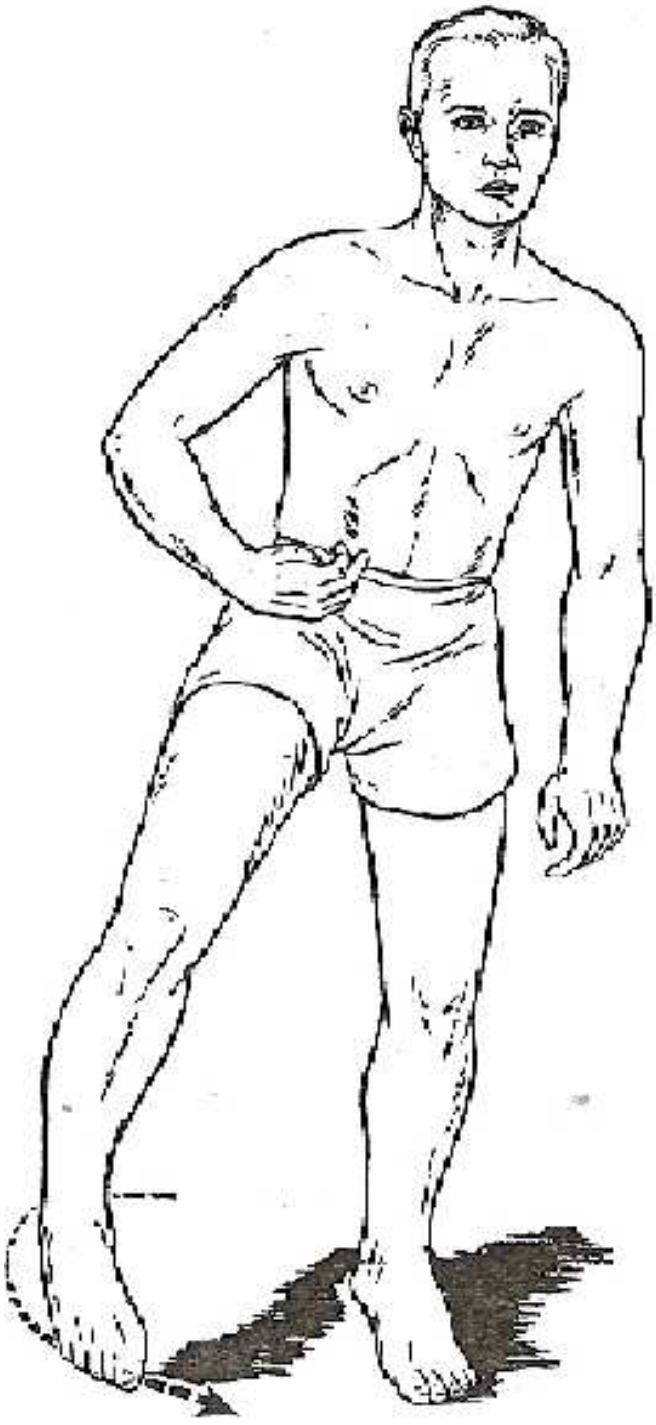


Fig. 548.

Obrázek dostupný z: http://commons.wikimedia.org/wiki/File:Sobo_1909_3_548.png

Příloha č. 2:

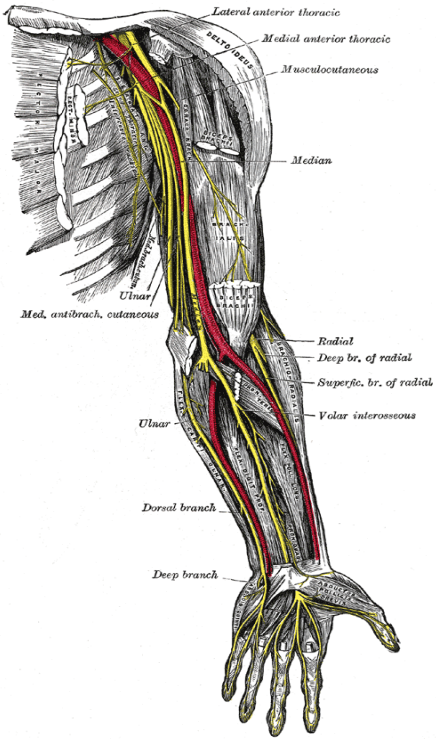
Wernickeovo-Mannovo držení – vadné držení těla vlivem patologického rozložení svalového tonu (charakteristické pro CMP při uzávěru a.cerebri media) (Pfeiffer, 2007)



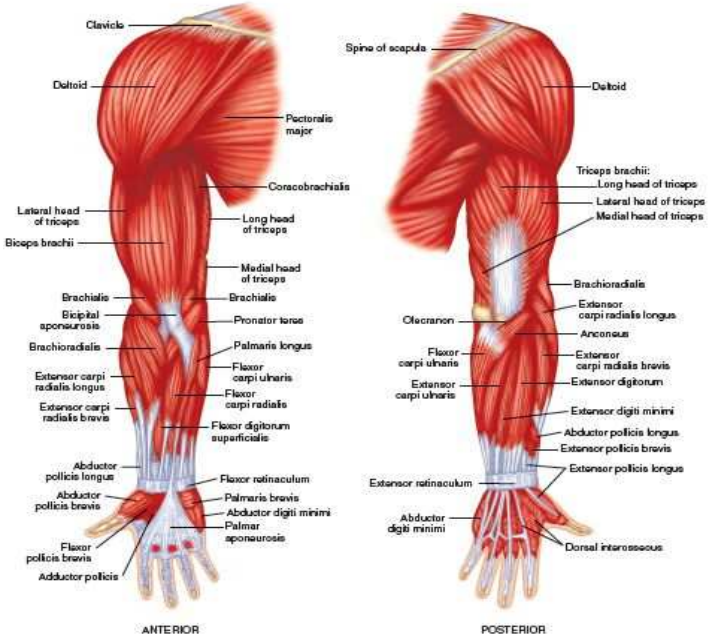
Příloha č. 3:

Anatomie horní končetiny

Obr. 1: cévní a nervové zásobení horní končetiny, Obr. 2: svaly horní končetiny



Obr. 1 dostupný z: http://www.bartleby.com/107/illus816.html

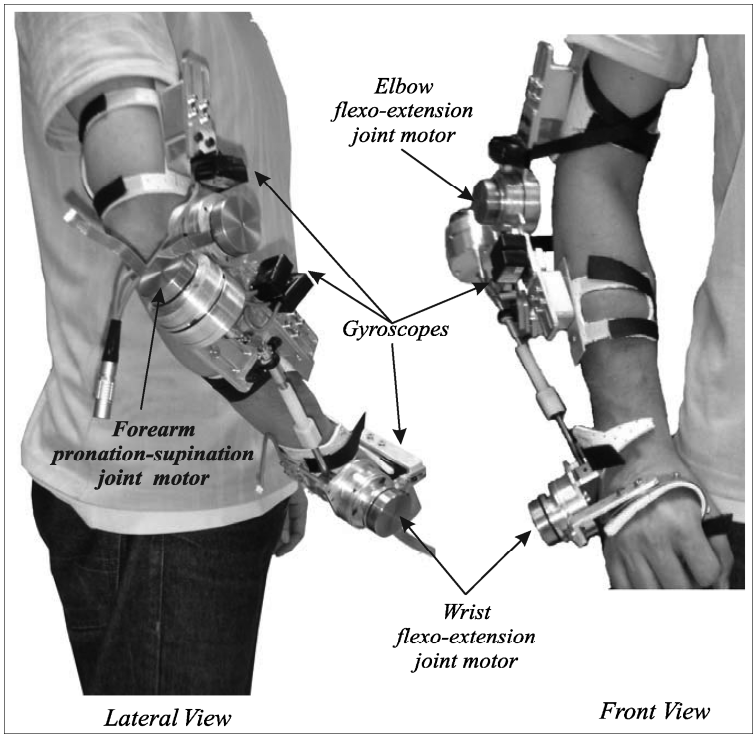


Obr. 2 dostupný z: http://medicine.academic.ru/5376/Muscle

Příloha č. 4:

Mechanika robotického systému

Obr. 1: exoskeleton, Obr. 2: end-effector



Obr. 1 dostupný z:

http://www.tremorjournal.org/index.php/tremor/article/view/77/html

Obr. 2 dostupný z: http://www.jneuroengrehab.com/content/5/1/15/figure/F1?hiG

Příloha č. 5:

Přehled elektromechanických a roboticky-asistujících systémů zaměřených na HK podle Patrizia Poli (2013).

Devices	Characteristics
InMotion robot	3 active degrees of freedom (DOFs) wrist robot mounted at the tip of a companion planar robot (MIT-MANUS), allowing 5 active DOFs at the shoulder, the elbow, and the wrist.
Mirror Image Movement Enhancer	6 DOFs robot manipulator; the treatment focused on shoulder and elbow function; unilateral or bilateral upper limb training.
Bi-Manu-Track	1 DOF system to train forearm pronation/supination and wrist flexion/extension; bilateral training in passive or active mode; no feedback to the patient.
Gentle/S	3 DOFs robot manipulator (HapticMaster, FCS Robotics,The Netherlands) with an extra 3DOF passive gimbal mechanism (allows for pronation/supination of the elbow as well as flexion and extension of the wrist), an exercise table, computer screen, overhead frame and chair.
Arm robot ARMin	Semiexoskeleton for movement of the shoulder (3DOFs), the elbow (1DOF), the forearm (1DOF), and the wrist (1DOF); matched with an audio-visual display used to illustrate the movement task to the patient.
Assisted Rehabilitation and Measurement Guide	4 DOFs robotic device provides arm reaching therapy for patients with chronic hemiparesis; it gives patient a real time visual feedback of the location of the arm.
REHAROBTherapeutic System	Firstly for rehabilitation robotics, uses standard industrial robots, not modified, but equipped with extra safety systems and a special instrumented orthotic, developed for fixing the patient's limb it provides passive shoulder and elbow physiotherapy. limb; it provides passive shoulder and elbow physiotherapy.
NeuroRehabilitation Robot	3 DOFs robot, based on direct-drive wire actuation; it gives patient visual and auditory feedbacks; easily transportable

Příloha č. 6:

Přehled robotických systémů zaměřených na HK dle Pawela Maciejasze (Maciejasz, 2014)

Table 1 Robotic devices for upper limb rehabilitation

System name,references	DOF	Supported movements	Main control inputs	Actuators	Type; field of application	Stage of development; additional information
Systems assisting shoulder movements						
Kiguchi [114]	2	Shoulder – FE, AA	sEMG	DC motors (x2)	Stationary system (exoskeleton-based); power assistance	C0 study: 1 hs
Systems assisting elbow movements						
Cheng [9]	1	Elbow – FE	sEMG	DC motor	Stationary system; physical therapy	CI study: 5 stroke + 5 hs
Cozens [10]	1	Elbow – FE	Joint angle	Electric servo-motor	Stationary system; physical therapy	CI study: 10 stroke + MS
Kiguchi [170]	1	Elbow – FE	sEMG	DC motor	Stationary system (exoskeleton-based); physical therapy	C0 study: 2 hs
MARIONET, Sulzer [142]	1	Elbow – FE	Joint angle	AC servomotor (SEA)	Stationary system (end-effector-based); physical therapy	C0 study: 6 hs
Mavroidis [11]	1	Elbow – FE	Force/torque	DC motor	Portable orthosis (continuous passive motion device); physical therapy	Prototype
MEM-MRB, Oda [104]	[1]	[Elbow – flexion]	Joint angular velocity, torque	MRF brake	Stationary system; physical therapy	C0 study: 1 hs
Myomo e100, Myomo, Inc.; Stein [172]	1	Elbow – FE	sEMG	DC motor (x1)	Portable orthosis; physical therapy	Commercial system (FDA clearance); CI study: 8 cS
Ögce [171]	1	Elbow – FE	sEMG	DC step motor	Wearable shoulder-elbow orthosis; physical therapy	CI study: 2 traumatic brachial plexus injury
Pylatiuk [153]	1	Elbow – FE	sEMG	Hydraulic	Wearable orthosis; physical therapy	First prototype
Rosen [169]	1	Elbow – FE	sEMG	DC motor (x1)	Stationary system (exoskeleton-based); power assistance	C0 study: 1 hs; predecessor of *CADEN-7*
Song [12]	1	Elbow – FE	sEMG	AC servo motor	Stationary system (end-effector-based); physical therapy	CI studies: 8 cS [12], 7 cS [13], 3 cS [14]
Vanderniepen [143]	1	Elbow – FE	Joint angle	Electric motors (x2) (SEA)	Wearable orthosis; orthopedic physical therapy	Prototype
Systems assisting forearm movements						
Kung [15]	1	Forearm – PS	Joint angle, torque	AC servomotor (1)	Stationary system; physical therapy	CI study: 7 cS + 8 hs [16]
Systems assisting wrist movements						
ASSIST, Sasaki [146]	1	Wrist – flexion	Joint angle	Rotary-type pneumatic actuators (x2)	Wearable orthosis; power assistance	C0 study: 5 hs
Colombo [17]	1	Wrist – FE	Torque	Not specified	Stationary system; physical therapy	CII study: 20(8) cS
Hu [18]	1	Wrist – FE	sEMG	Electric motor	Stationary system (end-effector-based); physical therapy	CI study: 15 cS
Loureiro [100]	[1]	[Wrist – FE]	Hand motion (tremor)	MRF brake	Wearable orthosis; tremor suppression	CI study: 1 ET
PolyJbot, Song [175]	1	Wrist – FE	sEMG, joint angle and torque	DC servomotor (x1)	Stationary system; physical therapy	CII study: 27(15) cS [19]
Systems assisting finger(s) movements						
Amadeo, tyromotion GmbH	5	Fingers (each) – FE	End-point position and force	Electric motors	Stationary system (end-effector-based); physical therapy	Commercial system; CI study: 7 aS [20]

Table 1 Robotic devices for upper limb rehabilitation *(Continued)*

Chen [21]	5	Independent linear movement of each finger	Fingers positions and forces, sEMG	DC linear motors (x5)	Stationary system (end-effector-based); physical therapy	C0 study: 1 hs
CyberGrasp, CyberGlove Systems LLC; Turner [22]	[5]	[Resistive force to each finger]	Joint angles (*CyberGlove*)	DC motors (x5)	Force-feedback glove; interactions with virtual environment	Commercial system for other applications, used in some clinical studies e.g. [191,192]
Ertas [23]	1	Concurrent FE of 3 joints of a single finger	Joint angles	DC motor (x1)	Finger exoskeleton (underactuated mechanism); tendon physical therapy	C0 study: 4 hs
Fuxiang [24]	4	Index finger– FE (x3), AA	Joint positions and toques	Linear stepping motors	Modular-finger exoskeleton (continuous passive motion device); physical therapy	C0 study: 3 hs
Gloreha, Idrogenet srl	5	Independent passive movement of each finger	Fingers positions	Electric motors (x5)	Portable (Gloreha Lite)/Movable (Gloreha Professional) (end-effector-based, cable-driven); physical therapy	Commercial system (CE mark); CII study: 10(5) sS [25], CI studies: 9 stroke + 3 other diseases [26], 4 cS [27]
Hand of Hope, Rehab-Robotics Comp. Ltd., Ho [28]	5	Each finger separately - FE	sEMG	DC linear motors (x5)	Portable system (orthosis); physical therapy	Commercial system (CE Mark), CI study: 8 cS
HandCARE, Dovat [113]	5	Independent linear movement of each finger (1 at a time)	Fingers positions and forces	DC motor (x1!)	Stationary system (end-effector-based, cable-driven); physical therapy	CI study: 5 cS + 8 hs
HEXORR, Schabowsky [29]	2	Thumb – FE, other fingers together – FE	Fingers positions and forces	DC motor (x1), AC motor (x1)	Stationary system (end-effector-based, cable-driven); physical therapy	CI study: 5 cS + 9 hs
HIFE, Mali [183]	2	1 finger – FE	End-point position	DC motors	Haptic interface (end-effector-based); physical therapy	Prototype
InMotion HAND, previous name *InMotion 5.0*, Interactive Motion Tech., Inc.; Masia [165]	1	All fingers together – GR	Not specified	DC brushless motor	Add-on module for *InMotion ARM*; physical therapy	Commercial system
Kline [30]	1	All fingers together – extension	Joint angles, sEMG	Pneumatic	Wearable glove; physical therapy	CI study: 1 stroke + hs (np)
Lucas [147]	1	Index finger – flexion (passive extension)	sEMG	Pneumatic (x2)	Wearable orthosis; grasp assistance	CI study: 1 SCI
MR_CHIROD v.2, Khanicheh [158]	[1]	[All fingers together – GR]	Finger position and torque	ERF brake	Exercising device (handle-like); physical therapy	C0 study: hs (np); fMRI compatible
MRAGES, Winter [157]	[5]	[Fingers (each) – FE]	Finger positions and torques	MRF brakes (5)	Force-feedback glove; physical therapy	Prototype
Mulas [31]	2	Thumb – FE, other fingers together – FE	sEMG, pulleys position	DC servo motors (x2)	Wearable orthosis; physical therapy	CI study: 1 sS
Nathan [167]	1	All fingers together – grasp (passive release)	Hand-held trigger, index and thumb fingers joint angles	FES	Wearable orthosis (glove); physical therapy	CI study: 2 stroke + 1 hs
PowerGrip, Broaden Horizons, Inc.	1	Thumb, index and middle finger together – GR	Switches or sEMG	DC motor (1)	Wearable orthosis; grasp assistance	Commercial system

Table 1 Robotic devices for upper limb rehabilitation *(Continued)*

Reha-Digit, Reha-Stim; Hesse [32]	1	4 fingers (except the thumb) together – FE	None	DC motor	Portable system (rotating handle); physical therapy	Commercial system (CE mark); CII study: 8(4) sS, CI study: 1 cS
Rosati [144]	1	4 fingers (except the thumb) together – FE	Not selected yet	DC motor (SEA)	Wearable orthosis; physical therapy	Design
Rotella [33]	4	Index finger flexion (x2) (passive extension), thumb – flexion, other fingers together – flexion	Not specified	Electric motors	Wearable orthosis; grasp assistance	Design
Rutgers Master II-ND, Bouzit [184]	4	Thumb, index, middle, and ring finger – FE	Actuator translation and inclination	Pneumatic (x4)	Force-feedback glove; interactions with virtual environment	Research device; often used for hand therapy (e.g. [185-187])
Salford Hand Exoskeleton, Sarakoglou [34]	7	Index, middle, and ring finger – FE (x2), thumb – FE	Joint angles and end-point force	DC motors	Wearable orthosis (exoskeleton); physical therapy	C0 study: hs (np)
Tong [35]	10	Each finger – FE (x2)	sEMG	Electric linear motors (x10)	Portable system (wearable orthosis); physical therapy	CI study: 2 cS
TU Berlin Finger Exoskeleton, Wege [36]	4	1 finger – FE (x3), AA	Joint angles	DC motors (x4)	Finger exoskeleton; physical therapy	C0 study: 1 hs
TU Berlin Hand Exoskeleton, Fleischer [117]	20	FE and AA of all major joints of each finger	Joint angles, end-point force, sEMG	DC motors	Wearable orthosis (exoskeleton); physical therapy	Prototype
Worsnopp [37]	3	Index finger – FE (x3)	Joint angles and torques	DC brushless servomotors (x6)	Finger exoskeleton; physical therapy	Prototype
Xing [38]	2	Thumb – FE, other fingers together – FE	Position, force	Pneumatic (PAMs) (x2)	Wearable orthosis; physical therapy	C0 study: 3 hs
Systems assisting shoulder and elbow movements						
ACRE, Schoone [108]	5	Shoulder * elbow	Joint angles	Electrical motors (x5)	Stationary system (end-effector-based); physical therapy	CI: 10 sS
ACT^{3D}, Ellis [39]	3	Shoulder * elbow	End-point torque, position and velocity (*HapticMaster*)	DC brushed motors (*HapticMaster*)	Stationary system (end-effector-based); physical therapy and assessment of therapy results	CI study: 6 stroke
ARC-MIME, Lum [137]	1 + [2]	Shoulder * elbow (longitudinal movements of the forearm) [forearm's elevation and yaw]	Forearm position and torque	DC motor (x1), magnetic particle brakes (x2)	Stationary system (end-effector-based); physical therapy	An attempt to commercialize; CI study: 4 cS; merges concepts from *MIME* and *ARM Guide*
ARM Guide, Reinkensmeyer [136]	1 + [2]	Shoulder * elbow (longitudinal movements of the forearm) [forearm's elevation and yaw]	Forearm position and torque	DC motor (x1), magnetic particle brakes (x2)	Stationary system (end-effector-based); physical therapy	CII study: 19(10) cS [40]; see also: *ARC-MIME*
BFIAMT, Chang [41]	2	Shoulder * elbow (bilateral longitudinal movements of the forearms)	End point position and torque	DC servomotor (x2), magnetic particle brakes (x2)	Stationary system (end-effector-based); physical therapy	CI study: 20 cS [41]
BONES, Klein [118]	4	Shoulder – FE, AA, RT, elbow – FE	Joint angles, cylinder pressure	Pneumatic (x5)	Stationary system (parallel robot + exoskeleton-based distal part); physical therapy	Prototype; see also: *Supinator extender (SUE)*

Table 1 Robotic devices for upper limb rehabilitation *(Continued)*

Dampace, Stienen [154]	[4]	[Shoulder – FE, AA, RT, elbow – FE]	Joint angles and torques	Hydraulic brake actuators (SEA)	Stationary system (exoskeleton-based); physical therapy	CI study: stroke (np); see also *Limpact*
Freeman [163]	2	Shoulder * elbow (in the plane)	Handle torque and position	DC brusheless servomotors (x2), FES	Stationary system (end-effector-based); physical therapy	C0 study: 18 hs
InMotion ARM, previous name *InMotion 2.0*, Interactive Motion Tech., Inc.; based on: *MIT Manus*, Krebs [107]	2+[1]	Shoulder * elbow (in the plane + gravity compensation)	Joint positions, angular velocity and torque	DC brushless motors	Stationary system (end-effector-based); physical therapy	Commercial system, CIII/CIV studies: 127(49) cS [203], CII studies: 56(30) aS [42], 30(10) aS [43] and others
Ju [44]	2	Shoulder * elbow (in the plane)	Handle torque and position	AC motors (x2)	Stationary system (end-effector-based; physical therapy	CI study: stroke (np)
Kiguchi [45]	3	Shoulder – FE, AA, elbow – FE	sEMG	DC motors	Wheelchair mounted system (exoskeleton-based); power assistance	C0 study: hs (np); see also: shoulder, elbow and shoulder-elbow-forearm orthoses developed by Kiguchi and *SUEFUL-7*
Kobayashi [149]	4	Shoulder – FE, AA, RT, elbow – FE	Joint angle	Pneumatic (PAMs) (x10)	Wearable (but not portable) orthosis ("muscle suit"); power assistance	C0 study: 5 hs
Limpact, Stienen [155]	4	Shoulder – FE, AA, RT, elbow – FE	Joint angles and torques	Rotational hydroelastic actuator (SEA)	Stationary system (exoskeleton-based); physical therapy	Design; based on *Dampace*
MariBot, Rosati [46]	5	Shoulder * elbow	Motor positions	DC frameless brushless motors	Stationary system (end-effector-based, cable-driven robot); physical therapy	Prototype; successor of *NeReBot*
MEMOS, Micera [132]	2	Shoulder * elbow (in the plane)	Torque and handle position	DC motors (x2)	Stationary system (end-effector-based); physical therapy	CII study: 20(12) cS [17], CI study: 18 cS [47]
MIME, Burgar [120]	6	Shoulder * elbow	Forearm position, orientation, torque	DC brushed servomotors (*PUMA 560* robot)	Stationary system (end-effector-based); physical therapy	CII studies: 27(13) cS [48] and 30(24) sS [49], CI study: 13 cS [50]; see also *ARC-MIME*
Moubarak [51]	4	Shoulder – FE, AA, RT, elbow – FE	Joint position, velocity and torques	DC brushless motors (x4)	Wheelchair-mounted system (exoskeleton-based); physical therapy	Prototype
NeReBot, Rosati [111]	3	Shoulder * elbow	Motor positions	DC motors (x3)	Stationary system (end-effector-based, cable-driven robot); physical therapy	CII studies: 24(12) sS [111], 35 (17) aS [52], 21(11) sS [53]; predecessor of *MariBot*
REHAROB, Toth [125]	12	Shoulder * elbow	End-point torques	Electrical motors (*ABB IRB 140* and *IRB 1400H* robots)	Stationary system (2 modified industrial robots); physical therapy	CII study: 22 (13) stroke + 8(2) TBI [54], CI study: 6 cS + 2 sS + 4 hs [125]
			Systems assisting forearm and wrist movements			
Bi-Manu-Track, Reha-Stim; Hesse [55]	1	Forearm – PS * wrist – FE	Not specified	Not specified	Stationary system (end-effector-based); physical therapy	Commercial system, CII study: 44 (22) sA [56], CI study: 12 cS [55]
CRAMER, Spencer [109]	3	Forearm – PS, wrist – FE, AA	Hand accelerations (Nintendo Wii console)	Digital servomotors (x4)	Stationary system (parallel robot); physical therapy	Prototype
InMotion WRIST, previous name *InMotion 3.0*, Interactive Motion Tech., Inc.; Krebs [138]	3	Forearm – PS, wrist – FE * AA	Joint angles	DC brushless motors (x3)	Stationary system, may be used as an add-on for *InMotion ARM*; physical therapy	Commercial system

Table 1 Robotic devices for upper limb rehabilitation *(Continued)*

RiceWrist, Gupta [119]	4	Forearm – PS, wrist – FE * AA	Joint angles and forces	Frameless DC brushless motors	Wearable orthosis; physical therapy	Prototype; extension for *MIME*, see also: *MAHI*
Supinator extender (SUE), Allington [57]	2	Forearm – PS, wrist – FE	Joint angles and forces	Pneumatic	Wearable orthosis; physical therapy	CI study: 8 cS; extension for *BONES* and *ArmeoSpring*
Takaiwa [110]	3	Forearm – PS, wrist – FE, AA	Torque	Pneumatic (x6)	Stationary system (parallel robot); physical therapy	Prototype
W-EXOS, Gopura [174]	3	Forearm – PS, wrist – FE, AA	sEMG, hand force, forearm torque	DC motors (x3)	Stationary system (exoskeleton-based); power assistance	C0 study: 2hs; see also: SUEFUL-7
Systems assisting wrist and fingers movements						
AMES, Cordo [58]	1	wrist and MCP joints of 4 fingers (coupled together)	Flexion/Extension torque, sEMG (optional)	Electric motor + 2 vibrators (for flexor and extensor tendons)	Stationary system (with desktop mounted orthosis), physical therapy (at home)	FDA clearance; CI study: 20(11) cS; a modified version of the system is used for ankle rehabilitation
Hand Mentor™, Kinematic Muscles, Inc.; Koeneman [59]	1	Wrist and 4 fingers (except the thumb) extension	Wrist angle, flexion torque	Pneumatic (PAM) (x1)	Wearable orthosis; physical therapy	Commercial system (FDA Class I Device); CII study: 21(11) sS [60], CI studies: 1 cS [61], 1 cS [62]
HWARD, Takahashi [130]	3	Wrist – FE, thumb – FE, other fingers together – FE	Joint angles and torques	Pneumatic (x3)	Stationary system (with desktop mounted orthosis); physical therapy	CII study: 13(13) cS
My Scrivener, Obslap Reseach, LLC; Palsbo [190]	3	Wrist * fingers	End-point position and torque (*Novint Falcon*)	Electric motors (*Novint Falcon*)	Stationary system (end-effector-based, using haptic device); fine motor hand therapy	CI study: 18 children with weak handwriting skills
Systems assisting shoulder, elbow and forearm movements						
ADLER, Johnson [63]	3+{3}	Shoulder * elbow * forearm	End-point torque, position and velocity (*HapticMaster*)	DC brushed motors (*HapticMaster*)	Stationary system (end-effector-based); physical therapy	C0 study: 8 hs [64]
ARAMIS, Pignolo [65]	6x2	Shoulder – FE, AA, RT, elbow – FE, forearm – PS	Joint angles and torques	DC brushed motors (x6 per exoskeleton)	Stationary system (2 exoskeletons); physical therapy	CI study: 14 sS
Gentle/S, Amirabdollahian [121]	3+{3}	Shoulder * elbow * forearm	End-point torque, position and velocity (*HapticMaster*)	DC brushed motors (*HapticMaster*)	Stationary system (end-effector-based); physical therapy	CII study: 31(31) sS + cS [66]; predecessor of *Gentle/G*
iPAM, Culmer [67]	6	Shoulder * elbow * forearm	Joint torques	Pneumatic	Stationary system (2 robotic arms); physical therapy	CI study: 16 cS
Kiguchi [68]	4	Shoulder – FE, AA, elbow – FE, forearm – AA	sEMG	DC motors	Wheelchair mounted system (exoskeleton-based); power assistance	C0 study: 1 hs; see also: shoulder, elbow and shoulder-elbow orthoses developed by Kiguchi and *SUEFUL-7*
L-Exos, Frisoli [197]	4	Shoulder – FE, AA, RT, elbow – FE {forearm – PS}	Joint angles	Electric motors (x4)	Stationary system (exoskeleton-based); physical therapy	CI study: 9 cS [69]
MGA, Carignan [70]	5	Shoulder – FE, AA, RT, VD, elbow – FE, {forearm – PS}	Joint torques	DC brushless motors (x5)	Stationary system (exoskeleton-based); physical therapy	Prototype
MULOS, Johnson [168]	5	Shoulder – FE, AA, RT, elbow – FE, forearm – PS	Joystick (4 DOF)	Electric motors (x5)	Wheelchair-mounted system (exoskeleton-based); power assistance and physical therapy	C0 study: 1 hs

Table 1 Robotic devices for upper limb rehabilitation *(Continued)*

NJIT-RAVR, Fluet [71]	3+{3}	Shoulder * elbow * forearm	End-point torque, position and velocity (*HapticMaster*)	DC brushed motors (*HapticMaster*)	Stationary system (end-effector-based); physical therapy of children	CI study: 8 CP
RehabExos, Vertechy [131]	4	Shoulder – FE, AA, RT, elbow – FE {forearm – PS}	Joint torques	Custom-made frameless brushless motor (x3), DC motor (x1)	Stationary system (exoskeleton-based); physical therapy	First prototype
Systems assisting shoulder, elbow and fingers movements						
Pneu-WREX, Wolbrecht [145]	4+{1}	Shoulder – FE, AA, HD, elbow – FE, {fingers – GR}	Joint angles, grasp force, cylinder pressure	Pneumatic (x4)	Stationary system (exoskeleton-based); physical therapy	CI study: 11 cS [72]; see also: *T-WREX* and *ArmeoSpring*
T-WREX, Sanchez [106]	{5}	{Shoulder – FE, AA, RT, elbow – FE, fingers – GR}	Joint angles, grasp force	None	Wheelchair mounted gravity balancing orthosis; physical therapy	CII studies: 23(11) cS [73], 28(14) cS [74], CI studies: 9cS + 5cS (2 studies) [75]; see also: *Pneu-WREX* and *ArmeoSpring*
Systems assisting elbow, forearm and wrist movements						
Ding [179]	4	Elbow – FE, forearm – PS, wrist – FE, AA	Joint angles (a Motion Capture System is used)	Pneumatic (x8)	Wearable (but not portable) orthosis; power assistance for explicitly specified muscles	C0 study: 6 hs
MAHI, Gupta [76]	5	Elbow – FE, forearm – PS, wrist – FE * AA	Joint angles	Frameless DC brushless motors	Wearable orthosis (force-feedback exoskeleton); physical therapy	Prototype; extension for *MIME*; see also: *RiceWrist*
WOTAS, Rocon [99]	[3]	[Elbow – FE, forearm – PS, wrist – FE]	Angular velocity, torques	DC motors (x3)	Wearable orthosis; tremor suppression	CI study: 10 mainly ET
Systems assisting forearm, wrist and fingers movements						
Haptic Knob, Lambercy [77]	2	Forearm – PS * wrist – FE, fingers – GR	Position, torque	DC brushed motors (x2)	Stationary system (2 parallelograms); physical therapy	CI study: 3 cS
Hasegawa [98]	11	Forearm – PS, wrist – FE, AA, thumb – FE (x2), index finger – FE (x3), other fingers together – FE (x3)	sEMG	DC motors (x11)	Wearable orthosis; grasp assistance	C0 study: 1 hs
Kawasaki [178]	18	Forearm – PS, wrist – FE, thumb – FE (x3), AA, other fingers – FE (x2), AA	Joint angles of healthy hand	Servo motors (x22)	Stationary system (exoskeleton-based); physical therapy	C0 study: 1 hs
Scherer [156]	[1]	[Forearm and fingers twisting movements * wrist – FE]	Position, torque	Magnetic particle brake	Stationary system (end-effector-based, rotating handle); physical therapy	CI study: 2 stroke + 1 MS
Systems assisting shoulder, elbow, forearm and wrist movements						
Braccio di Ferro, Casadio [134]	2	Shoulder * elbow * (forearm) * wrist (in the horizonatal or vertical plane)	Device joint angles, end-point force	AC brushless servomotors (x2)	Stationary system (end-effector-based); physical therapy	CI studies: 10 cS + 4 hs [78], 7 MS + 9 hs [79], 11 MS + 11 hs [80], 8 MS [81]
CADEN-7, Perry [97]	2x7	Shoulder – FE, AA, RT, elbow – FE, forearm – PS, wrist – FE, AA	sEMG, joint angles, angular velocities and forces/torques	DC brushed motors (2x7)	Stationary system (exoskeleton-based), 2 robotic arms; power assistance	C0 study: 1 hs

Table 1 Robotic devices for upper limb rehabilitation *(Continued)*

Denève [82]	3	Shoulder * elbow * (forearm) * wrist	Device joint angles, end-point force	AC brushless motors (x3)	Stationary system (end-effector-based); physical therapy	Prototype
EMUL, Furusho [159]	3	Shoulder * elbow * (forearm) * wrist	End-point position	Electric motors + ERF clutches	Stationary system (end-effector-based); physical therapy	CI study: 6 stroke; predecessor of *PLEMO*, see also: *Robotherapist*
ESTEC exoskeleton, Schiele [115]	9	Shoulder – FE, AA, RT, VD, HD, elbow – FE, forearm – PS, wrist – FE, AA	Joint angles	Not selected yet	Wearable system (exoskeleton-based); physical therapy	First prototype
Furuhashi [83]	3	Shoulder * elbow * (forearm) * wrist	End-point torque	DC motors (x3)	Stationary system (end-effector-based); physical therapy	Prototype
Hybrid-PLEMO, Kikuchi [135]	2	Shoulder * elbow * (forearm) * wrist (in the adjustable plane)	Device joint angles, end-point force	DC servomotors (x2) + ERF clutches/brakes (x4)	Stationary system (end-effector-based); physical therapy	Prototype; based on *PLEMO*
Lam [180]	2	Shoulder * elbow * (forearm) * wrist (in the plane)	End-point position, abnormal trunk position detection	Not specified	Stationary system (end-effector-based); physical therapy	C0 study: 8 hs
Li [176]	5	Shoulder – FE, AA, elbow – FE, forearm – PS, wrist – FE	sEMG signals from not affected arm	AC (x3) and DC (x2) servo motors	Wearable system (exoskeleton-based); physical therapy	Prototype
MACARM, Beer [112]	6	Shoulder * elbow * forearm * wrist	End-point position and force	Electric motors (x8)	Stationary system (end-effector-based, cable-driven robot); physical therapy	CI study: 5 cS
Mathai [84]	3	Shoulder * elbow * forearm * wrist	End-point torque, position and velocity (*HapticMaster*)	DC brushed motors (*HapticMaster*)	Stationary system (end-effector-based); physical therapy	CI study: 4 cS
MIME-RiceWrist, Gupta [119]	10	Shoulder * elbow * forearm * wrist	See separate information for MIME and RiceWrist system	See separate information for MIME and RiceWrist system	Stationary system (robotic arm + orthosis); physical therapy	CI study: stroke (np)
PLEMO, Kikuchi [105]	[2]	[Shoulder * elbow * (forearm) * wrist] (in the adjustable plane)	Device joint angles, end-point force	ERF brakes	Stationary system (end-effector-based); physical therapy	CI study: 6 stroke + 27 hs [85]; successor of *EMUL*, predecessor of Hybrid-PLEMO
Robotherapist, Furusho [160]	6	Shoulder * elbow * forearm * wrist	End-point position	Electric motors + ERF clutches	Stationary system (end-effector-based); physical therapy	Prototype; see also: *EMUL*
RUPERT IV, Balasubrama- nian [151]	5	Shoulder – AA, RT, elbow – FE, forearm – PS, wrist – FE	Joint torques and actuators pressure	Pneumatic (PAMs)	Wearable system (exoskeleton-based); physical therapy	CI study: 6 cS [86]
Salford Arm Rehabilitation Exoskeleton, Tsagarakis [148]	7	Shoulder – FE, AA, RT, elbow – FE, forearm – PS, wrist – FE, AA	Joint positions and torques	Linear pneumatic actuators (PAMs) (x14)	Stationary system (exoskeleton-based); physical therapy	Prototype
Sophia-3, Rosati [87]	2	Shoulder * elbow * (forearm) * wrist (in the plane)	End-point position and force	AC motors	Stationary system (end-effector-based, planar cable-driven robot); physical therapy	First prototype; see also: *Sophia-4*
Sophia-4, Rosati [87]	2	Shoulder * elbow * (forearm) * wrist (in the plane)	End-point position and force	DC motors	Stationary system (end-effector-based, planar cable-driven robot); physical therapy	Prototype; see also: *Sophia-3*

Table 1 Robotic devices for upper limb rehabilitation *(Continued)*

SUEFUL-7, Gopura [166]	7	Shoulder – FE, AA, RT, elbow – FE, forearm – PS, wrist – FE, AA	sEMG/joint forces/torques	DC servo motors (x7)	Stationary system (exoskeleton-based); power assistance	C0 study: 2 hs; shoulder-elbow orthosis integrated with *W-EXOS* system
Takahashi [182]	2	Shoulder * elbow * (forearm) * wrist (in the plane)	End point position	Electric servomotors (x2)	Stationary system (end-effector-based); physical therapy	CI study: 5 stroke + 2 Guillain-Bare syndrome
Tanaka [88]	2	Shoulder * elbow * (forearm) * wrist (in the plane)	End-point force and position	AC linear motor (x2)	Stationary system (end-effector-based); physical therapy	C0 study: 6 hs
UHD, Oblak [139]	2	3 configurations possible: 1) shoulder * elbow, 2) forearm – PS, wrist – FE, 3) forearm – PS, wrist – AA	Torque and handle position	DC motors (x2), (SEA)	Stationary system (end-effector-based); physical therapy	CI study: 1 cS; reconfigurable robot
Umemura [152]	7	Shoulder – FE, AA, RT, elbow – FE, forearm – PS, wrist – FE, AA	Actuators pressure	Hydraulic	Stationary system (end-effector-based); physical therapy	Prototype
UMH, Morales [127]	6	Shoulder * elbow * forearm * wrist	Joint torques	Pneumatic	Stationary system (two robotic arms); physical therapy	C0 study: hs (np)
Xiu-Feng [89]	2	Shoulder * elbow * (forearm) * wrist (in the plane)	Device joint angles, end-point force	AC servomotors (x2)	Stationary system (end-effector-based); physical therapy	CI study: 30 stroke
Systems assisting shoulder, elbow, forearm, wrist and finger movements (whole arm)						
ArmeoPower, Hocoma AG; based on: *ARMin III*, Nef [90]	6{+1}	Shoulder – FE, AA, RT, elbow – FE, forearm – PS, wrist – FE, {fingers – GR}	Joint angles, grasp force	DC motors (x6)	Stationary system (exoskeleton-based); physical therapy	Commercial system; CI studies: 3 cS (ARMin I) [91], 4 cS (ARMin II) [92]
ArmeoSpring, Hocoma AG; based on: *T-WREX*, Sanchez [106]	{7}	{Shoulder – FE, AA, RT, elbow – FE, forearm – PS, wrist – FE, fingers – GR}	Joint angles, grasp force	None	Stationary system (exoskeleton-based); physical therapy	Commercial system (CE Mark, FDA clearance); CI study: 10 MS [93]; see also: *T-WREX*
ARMOR, Mayr [177]	8	Shoulder – FE, AA, RT, elbow – FE, forearm – PS, wrist – FE, thumb – FE, other fingers together – FE	Joint angles of the master hand	Electric motor	Stationary master-slave system (exoskeleton-based); physical therapy	CII study: 8(8) sS
Gentle/G, Loureiro [123]	6{+3}	Shoulder * elbow (3 DOF, *HapticMaster*), {forearm – PS, wrist – FE, AA}, thumb – FE, other fingers together – FE (x2) (grasp robot)	End-point torque, position and velocity (*HapticMaster*) joint angels and end-point force (grasp robot)	DC brushed motors (*HapticMaster* and grasp robot)	Stationary system (robotic arm + orthosis); physical therapy	CII study: 4(4) sS [94]; based on *Gentle/S*
HEnRiE, Mihelj [124]	4{+2}	Shoulder * elbow (3 DOF, *HapticMaster*), {wrist – FE, AA}, thumb, middle and index finger together – GR	End-point torque, position and velocity (*HapticMaster*) joint angels and end-point force	DC brushed motors (*HapticMaster*) electric motors (grasping device)	Stationary system (robotic arm + orthosis); physical therapy	Prototype (with spring instead of an actuator in the hand part); C0 study: 1 hs; based on *Gentle/S*

Table 1 Robotic devices for upper limb rehabilitation *(Continued)*

IntelliArm, Ren [116]	8{+2}	Shoulder – FE, AA, RT, VD, {HD (x2)}, elbow – FE, forearm – PS, wrist – FE, all fingers together – GR	Joint angles and torques	Not specified	Stationary system (exoskeleton-based); physical therapy	CI study: stroke (np)
MUNDUS, Pedrocchi [101]	[3]+{2}+1	[Shoulder – FE, AA, elbow – FE], optional: forearm – PS, wrist – FE (shoulder-elbow-wrist exoskeleton), optional: all fingers together – GR (hand orthosis)	sEMG, button, eye-movement or Bran Computer Interface; object labels – radio frequency identification	elastic elements or DC brakes (shoulder-elbow-wrist exoskeleton), FES (optional), DC motor (optional hand orthosis)	Modular wheelchair-mounted system (exoskeleton-based); movement assistance	CI study: 3 SCI + 2 MS
ReoGo, Motorica Medical Inc.	2+{1}	Shoulder * elbow; also {* wrist} or {fingers - FE} if special handle used	End-point position	Electric motors (x4)	Portable system (end-effector-based) with various handles; physical therapy	Commercial system; CIII/CIV study: 60(np) sS [198], CI studies: 14 cS [95], 10 sS [96]

All the systems in the following table are grouped according to the joint movement they support. For the sake of convenience, we consider the shoulder complex, the forearm and the hand (fingers) as single joints. Thus, we distinguish the following "joints": shoulder, elbow, forearm, wrist and fingers. Devices assisting movements of only one "joint" (starting from shoulder and ending with fingers) are described first followed by devices assisting movement of two, three and four joints (in that order). The end of the table presents systems assisting movement of the whole arm.

For some systems it was difficult to classify them into a particular group. One of such cases includes the end-effector-based systems with a splint. A specific classification to particular group may depend on the joints constrained in particular case by the splint. Furthermore, some devices allow for movements in some joints only in a limited range.

In some cases the same system may appear multiple times in the table on various stages of development. We have accepted such occurrences only if, in our opinion, the difference between two versions of the system justified considering them as two various systems. Otherwise, information included in the table includes only the most recent version of the system available at the time of this publication.

System names are provided in italics. Whenever possible, the first column of the table provides the system name and reference (including the name of the first author) to the publication in which the system is described. We only provide the appropriate reference for systems without a name. The names of commercial systems are followed by their producer names. Appropriate information is provided following a semicolon for commercial systems based on systems being described in scientific publication before commercialization. Except one case, i.e. *ArmeoSpring* based on *T-WREX* system, the description of the predecessors is not provided elsewhere in the table because we found no significant differences between the predecessors and their commercial versions.

The last column contains information about the current stage of system development, clinical trials performed using the system and some additional information are provided. If the system has undergone clinical evaluation, information about the category of the trial, number of participants enrolled and their condition, as well as reference to the paper presenting results of the study is also provided. We distinguish four categories of the studies marked as C0, CI, CII, CIII/CIV. For a description, see Table 7. Categories CII and CIII/CIV provide two numbers of subjects. The first number indicates the total number of participants enrolled in the study. The number in parenthesis indicates number of participants undergoing therapy using the particular system. We made this distinction because there is often a control group undergoing other form of therapy in the CII and CIII/CIV studies. If both numbers are equal, all participants underwent therapy using the specified system but other parameter of the study varied between the groups (e.g. training intensity, device control strategy, or order in which various forms of therapy were applied). No reference after the number and condition of participants indicates that the reference is the same as the one provided in the first column. Information about predecessors or successors is also provided, if available. We use the following symbols and abbreviations:

- for degrees of freedom of the device (DOF) and supported movements (second and third column of the table respectively): [ ] - indicates passive (i.e. exerting only resistive force) and { } - indicates not-actuated degrees of freedom or movements, otherwise active.
- for supported movements (third column): (joint name) - indicates that range of movements for that joint is limited to a very small range, AA – adduction/abduction, FE – flexion/extension, GR – grasp and release, PS – pronation/supination, RT – internal/external rotation, HD - horizonatal displacement, VD - vertical displacement (both in the shoulder girdle), MCP – metacarpophalangeal joint, * - indicates that the direction of the movement of the device does not correspond to the direction of any of basic anatomical movements (e.g. pronation/supination, flexion/extension, rotation) but is a combination of many, (x number) - indicates that a few particular movements are possible (e.g. flexion in a few joints of one finger), (in the plane) - indicates that the end effector of the device moves only in a specified plane; for the explanation of anatomical terms of motion see Figure 2.
- for main control inputs and actuators (fourth and fifth column respectively): (*commercial system name*) - indicates that the particular commercial device (usually robot or haptic interface) is incorporated in the described system and that the particular sensors or actuators are part of that commercial system.
- for main control (forth column): sEMG - surface electromyography.
- for actuators (fifth column): AC - alternating current, DC - direct current, ERF - electrorheological fluid based, FES - functional electrical stimulation, MRF - magnetorheological fluid based, PAM - pneumatic artificial muscle, SEA - series elastic actuator, (x number) - number of particular actuators being used (provided only if such an information was available).
- for clinical studies (last column): C0, CI, CII, CIII/CIV - category of the study: 0, I, II and III/IV, respectively (for category descriptions see the subsection *Clinical studies* of the survey); subject condition: aS - acute stroke, CP - cerebral palsy, cS - chronic stroke, ET - essential tremor, hs - healthy subject(s), MS - multiple sclerosis, SCI - spinal cord injury, sS - subacute stroke, TBI - traumatic brain injury; np - number of subjects is not provided.

Příloha č. 7:

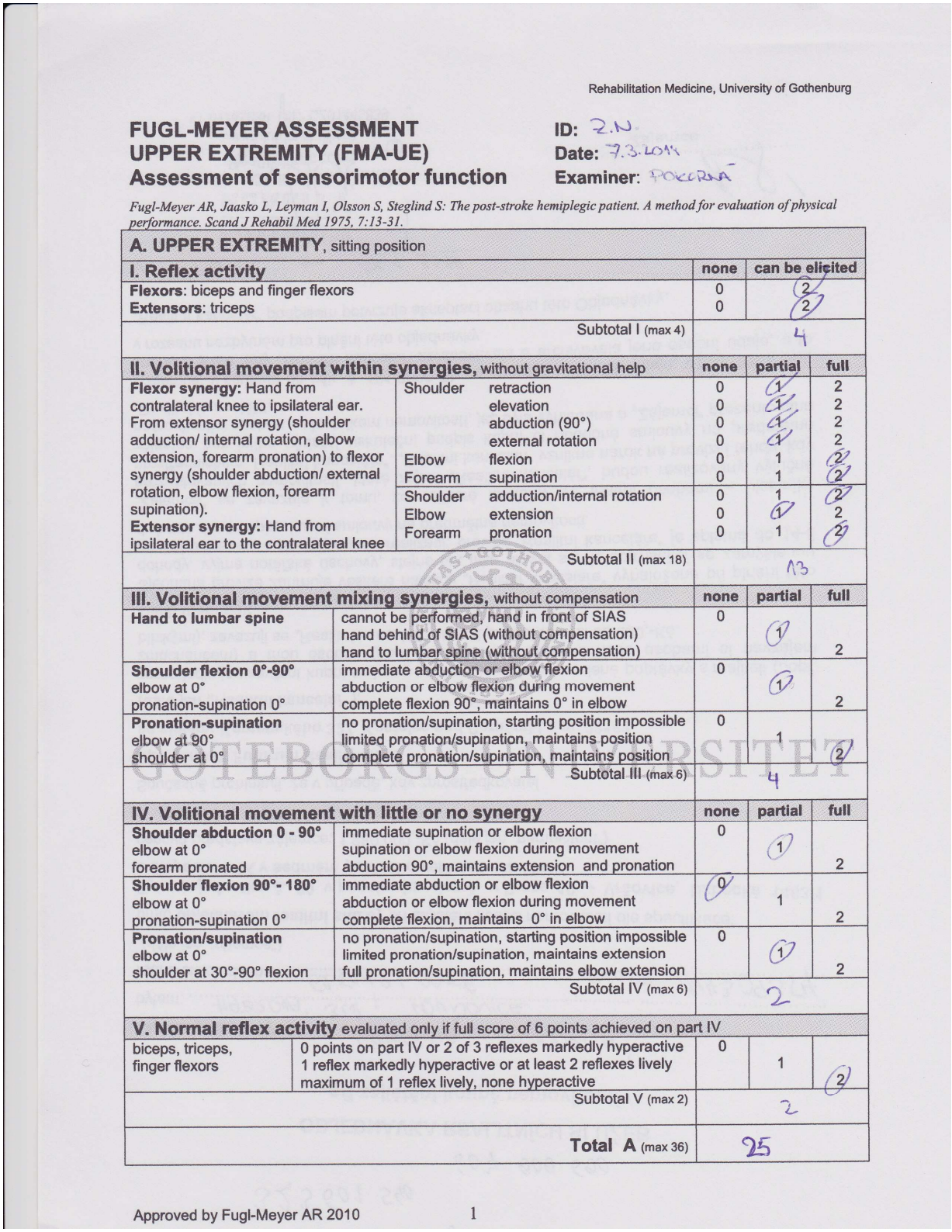
Kritéria pro výběr pacientů po CMP do výzkumu pod vedením DR. Vereny Klamroth-Margansky (Marganska, 2014)

Panel 1. Final eligibility criteria

- Diagnosis of one, first ever cerebrovascular accident verified by brain imaging (MRI or CT)
- Chronic impairment after stroke (minimum 6 months)
- Moderate to severe arm paresis, as indicated by a score of 8–38 on arm section of Fugl-Meyer assessment (which has a maximum of 66 points)
- Aged ≥18 years
- Stable recovery stage
- Able to sit in a chair without any additional support and without leaning on the back rest
- Passive range of motion in the shoulder as assessed with the neutral zero method: anteversion/retroversion 80°/0°/20°, abduction/adduction 60°/0°/10°, inner and outer rotation 20°/0°/20°
- Passive range of motion in the elbow as assessed with the neutral zero method: flexion/extension 100°/40°/40°
- No excessive spasticity of the aff ected arm (modifi ed Ashworth Scale ≤3)
- No serious medical or psychiatric disorder as assessed by their physician
- No participation in any clinical investigation within previous 4 weeks
- No participation in any therapeutic treatment (apart from assigned therapy) done with the paretic arm during the therapy phase of the study
- No anticipated need for any major surgery during the study
- No pregnancy or breastfeeding in women
- No orthopaedic, rheumatological, or other disease restricting movements of the paretic arm
- No shoulder subluxation (palpation < 2 fingers)
- No skin ulcerations at the paretic arm
- Ability to communicate effectively with the examiner such that the validity of the patient's data could not be compromised
- No cybersickness (eg, nausea when looking at a screen or playing computer games)
- No pacemaker or other implanted electric devices
- Bodyweight <120 kg
- No serious cognitive defects or aphasia preventing effective use of ARMin

Příloha č. 8:

Fugl-Meyerův test u pacientky Z. N. prováděný pří vstupním vyšetření 7.3.2014



Rehabilitation Medicine, University of Gothenburg

FUGL-MEYER ASSESSMENT
UPPER EXTREMITY (FMA-UE)
Assessment of sensorimotor function

ID: Z.N.
Date: 7.3.2014
Examiner: POKORNÁ

Fugl-Meyer AR, Jaasko L, Leyman I, Olsson S, Steglind S: The post-stroke hemiplegic patient. A method for evaluation of physical performance. Scand J Rehabil Med 1975, 7:13-31.

A. UPPER EXTREMITY, sitting position					
I. Reflex activity				**none**	**can be elicited**
Flexors: biceps and finger flexors **Extensors**: triceps				0 0	2 2
			Subtotal I (max 4)		4
II. Volitional movement within synergies, without gravitational help				**none**	**partial** / **full**
Flexor synergy: Hand from contralateral knee to ipsilateral ear. From extensor synergy (shoulder adduction/ internal rotation, elbow extension, forearm pronation) to flexor synergy (shoulder abduction/ external rotation, elbow flexion, forearm supination). **Extensor synergy:** Hand from ipsilateral ear to the contralateral knee	Shoulder	retraction		0	1 / 2
		elevation		0	1 / 2
		abduction (90°)		0	1 / 2
		external rotation		0	1 / 2
	Elbow	flexion		0	1 / 2
	Forearm	supination		0	1 / 2
	Shoulder	adduction/internal rotation		0	1 / 2
	Elbow	extension		0	1 / 2
	Forearm	pronation		0	1 / 2
			Subtotal II (max 18)		13
III. Volitional movement mixing synergies, without compensation				**none**	**partial** / **full**
Hand to lumbar spine	cannot be performed, hand in front of SIAS hand behind of SIAS (without compensation) hand to lumbar spine (without compensation)			0	1 / 2
Shoulder flexion 0°-90° elbow at 0° pronation-supination 0°	immediate abduction or elbow flexion abduction or elbow flexion during movement complete flexion 90°, maintains 0° in elbow			0	1 / 2
Pronation-supination elbow at 90° shoulder at 0°	no pronation/supination, starting position impossible limited pronation/supination, maintains position complete pronation/supination, maintains position			0	1 / 2
			Subtotal III (max 6)		4
IV. Volitional movement with little or no synergy				**none**	**partial** / **full**
Shoulder abduction 0 - 90° elbow at 0° forearm pronated	immediate supination or elbow flexion supination or elbow flexion during movement abduction 90°, maintains extension and pronation			0	1 / 2
Shoulder flexion 90°- 180° elbow at 0° pronation-supination 0°	immediate abduction or elbow flexion abduction or elbow flexion during movement complete flexion, maintains 0° in elbow			0	1 / 2
Pronation/supination elbow at 0° shoulder at 30°-90° flexion	no pronation/supination, starting position impossible limited pronation/supination, maintains extension full pronation/supination, maintains elbow extension			0	1 / 2
			Subtotal IV (max 6)		2
V. Normal reflex activity evaluated only if full score of 6 points achieved on part IV					
biceps, triceps, finger flexors	0 points on part IV or 2 of 3 reflexes markedly hyperactive 1 reflex markedly hyperactive or at least 2 reflexes lively maximum of 1 reflex lively, none hyperactive			0	1 / 2
			Subtotal V (max 2)		2
			Total A (max 36)		25

Approved by Fugl-Meyer AR 2010 1

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2 N.
7.3.2014

B. WRIST support may be provided at the elbow to take or hold the position, no support at wrist, check the passive range of motion prior testing		none	partial	full
Stability at 15° dorsiflexion elbow at 90°, forearm pronated shoulder at 0°	less than 15° active dorsiflexion dorsiflexion 15°, no resistance is taken maintains position against resistance	0	(1)	2
Repeated dorsifexion / volar flexion elbow at 90°, forearm pronated shoulder at 0°, slight finger flexion	cannot perform volitionally limited active range of motion full active range of motion, smoothly	0	(1)	2
Stability at 15° dorsiflexion elbow at 0°, forearm pronated slight shoulder flexion/abduction	less than 15° active dorsiflexion dorsiflexion 15°, no resistance is taken maintains position against resistance	(0)	1	2
Repeated dorsifexion / volar flexion elbow at 0°, forearm pronated slight shoulder flexion/abduction	cannot perform volitionally limited active range of motion full active range of motion, smoothly	0	(1)	2
Circumduction	cannot perform volitionally jerky movement or incomplete complete and smooth circumduction	0	(1)	2
	Total B (max 10)		4	

C. HAND support may be provided at the elbow to keep 90° flexion, no support at the wrist, compare with unaffected hand, the objects are interposed, active grasp		none	partial	full
Mass flexion from full active or passive extension		0	1	(2)
Mass extension from full active or passive flexion		0	1	(2)
GRASP				
A – flexion in PIP and DIP (digits II-V) **extension in MCP II-V**	cannot be performed can hold position but weak maintains position against resistance	0	1	(2)
B – thumb adduction 1-st CMC, MCP, IP at 0°, scrap of paper between thumb and 2-nd MCP joint	cannot be performed can hold paper but not against tug can hold paper against a tug	0	1	(2)
C - opposition pulpa of the thumb against the pulpa of 2-nd finger, pencil, tug upward	cannot be performed can hold pencil but not against tug can hold pencil against a tug	0	(1)	2
D – cylinder grip cylinder shaped object (small can) tug upward, opposition in digits I and II	cannot be performed can hold cylinder but not against tug can hold cylinder against a tug	0	1	(2)
E – spherical grip fingers in abduction/flexion, thumb opposed, tennis ball	cannot be performed can hold ball but not against tug can hold ball against a tug	0	(1)	2
	Total C (max 14)		12	

D. COORDINATION/SPEED after one trial with both arms, blind-folded, tip of the index finger from knee to nose, 5 times as fast as possible		marked	slight	none
Tremor		0	1	(2)
Dysmetria	pronounced or unsystematic slight and systematic no dysmetria	0	(1)	2
		> 5s	**2 - 5s**	**< 1s**
Time	more than 5 seconds slower than unaffected side 2-5 seconds slower than unaffected side maximum difference of1 second between sides	0	(1)	2
	Total D (max 6)		4	

TOTAL A-D (max 66)	45

2.N
7.5.2014

H. SENSATION, upper extremity blind-folded, compared with unaffected side		**anesthesia**	**hypoesthesia dysesthesia**	**normal**
Light touch	upper arm, forearm	0	1	2
	palmar surface of the hand	0	1	2
		absence less than 3/4 correct	**3/4 correct considerable difference**	**correct 100% little or no difference**
Position small alterations in the position	shoulder	0	1	2
	elbow	0	1	2
	wrist	0	1	2
	thumb (IP-joint)	0	1	2
			Total H (max12)	10

J. PASSIVE JOINT MOTION, upper extremity				**J. JOINT PAIN** during passive motion, upper extremity		
Sitting position, compare with unaffected side	only few degrees (less than 10° in shoulder)	decreased	normal	pronounced constant pain during or at the end of movement	some pain	no pain
Shoulder						
Flexion (0° - 180°)	0	1	2	0	1	2
Abduction (0°-90°)	0	1	2	0	1	2
External rotation	0	1	2	0	1	2
Internal rotation	0	1	2	0	1	2
Elbow						
Flexion	0	1	2	0	1	2
Extension	0	1	2	0	1	2
Forearm						
Pronation	0	1	2	0	1	2
Supination	0	1	2	0	1	2
Wrist						
Flexion	0	1	2	0	1	2
Extension	0	1	2	0	1	2
Fingers						
Flexion	0	1	2	0	1	2
Extension	0	1	2	0	1	2
Total (max 24)			24	**Total** (max 24)	20	

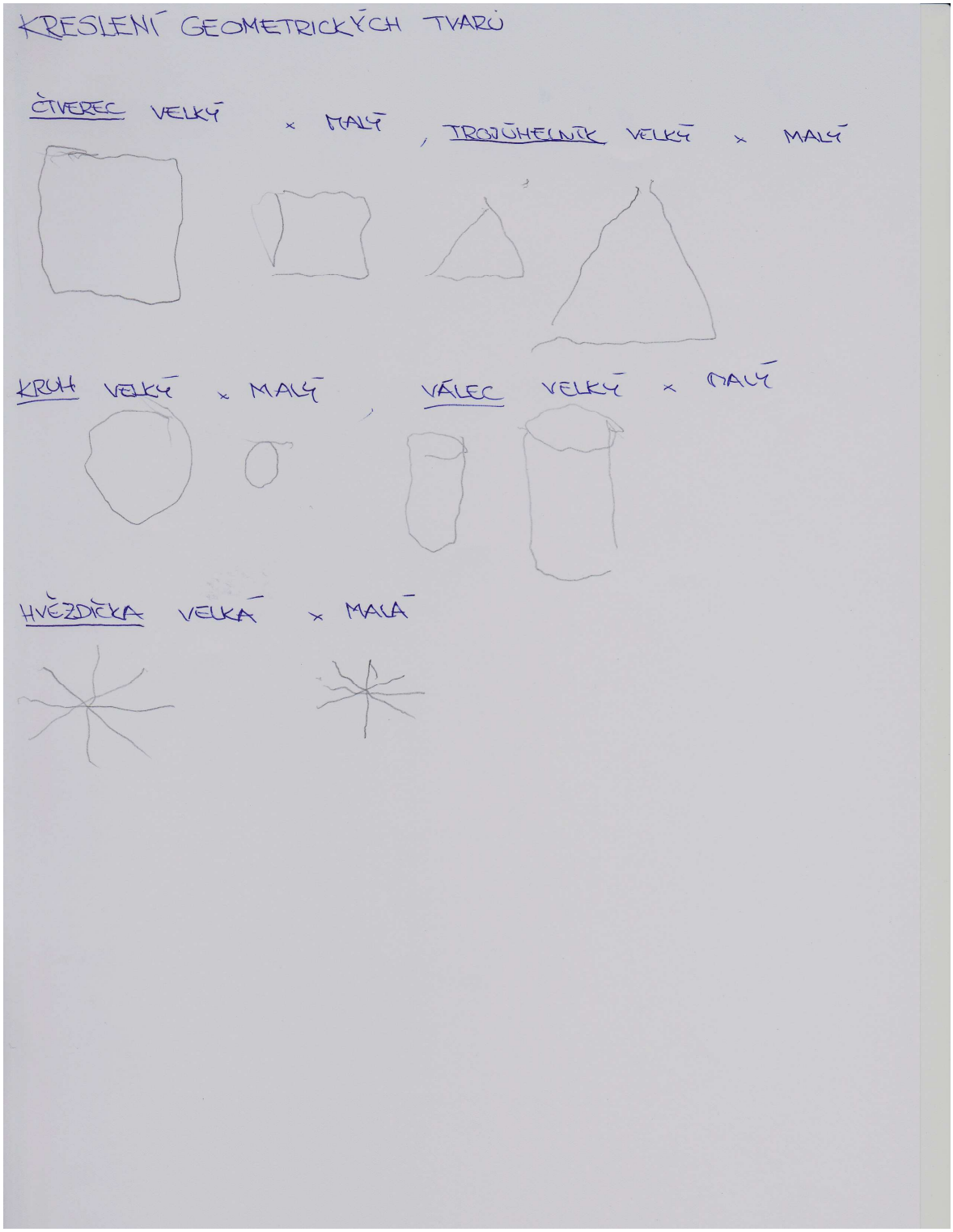
A. UPPER EXTREMITY	25 /36
B. WRIST	4 /10
C. HAND	12 /14
D. COORDINATION / SPEED	4 / 6
TOTAL A-D (motor function)	45 /66

H. SENSATION	10 /12
J. PASSIVE JOINT MOTION	24 /24
J. JOINT PAIN	20 /24

99 b.

Příloha č. 9:

Vyšetření jemné motoriky u pacientky Z. N. při vstupním vyšetření 7. 3. 2014 – kreslení geometrických tvarů



Příloha č. 10:

Fugl-Meyerův test u pacientky Z. N. Při kontrolním vyšetření 11. 4. 2014

Rehabilitation Medicine, University of Gothenburg

FUGL-MEYER ASSESSMENT
UPPER EXTREMITY (FMA-UE)
Assessment of sensorimotor function

ID: Z.N.
Date: 11.4.2014
Examiner: POKORNÁ

Fugl-Meyer AR, Jaasko L, Leyman I, Olsson S, Steglind S: The post-stroke hemiplegic patient. A method for evaluation of physical performance. Scand J Rehabil Med 1975, 7:13-31.

A. UPPER EXTREMITY, sitting position				
I. Reflex activity			**none**	**can be elicited**
Flexors: biceps and finger flexors			0	(2)
Extensors: triceps			0	(2)
		Subtotal I (max 4)		4
II. Volitional movement within synergies, without gravitational help			**none**	**partial** / **full**
Flexor synergy: Hand from contralateral knee to ipsilateral ear. From extensor synergy (shoulder adduction/ internal rotation, elbow extension, forearm pronation) to flexor synergy (shoulder abduction/ external rotation, elbow flexion, forearm supination). **Extensor synergy:** Hand from ipsilateral ear to the contralateral knee	Shoulder	retraction	0	1 / (2)
		elevation	0	1 / (2)
		abduction (90°)	0	1 / (2)
		external rotation	0	1 / (2)
	Elbow	flexion	0	1 / (2)
	Forearm	supination	0	1 / (2)
	Shoulder	adduction/internal rotation	0	1 / (2)
	Elbow	extension	0	1 / (2)
	Forearm	pronation	0	1 / (2)
		Subtotal II (max 18)		18
III. Volitional movement mixing synergies, without compensation			**none**	**partial** / **full**
Hand to lumbar spine	cannot be performed, hand in front of SIAS hand behind of SIAS (without compensation) hand to lumbar spine (without compensation)		0	1 / (2)
Shoulder flexion 0°-90° elbow at 0° pronation-supination 0°	immediate abduction or elbow flexion abduction or elbow flexion during movement complete flexion 90°, maintains 0° in elbow		0	1 / (2)
Pronation-supination elbow at 90° shoulder at 0°	no pronation/supination, starting position impossible limited pronation/supination, maintains position complete pronation/supination, maintains position		0	1 / (2)
		Subtotal III (max 6)		6
IV. Volitional movement with little or no synergy			**none**	**partial** / **full**
Shoulder abduction 0 - 90° elbow at 0° forearm pronated	immediate supination or elbow flexion supination or elbow flexion during movement abduction 90°, maintains extension and pronation		0	(1) / 2
Shoulder flexion 90°- 180° elbow at 0° pronation-supination 0°	immediate abduction or elbow flexion abduction or elbow flexion during movement complete flexion, maintains 0° in elbow		0	(1) / 2
Pronation/supination elbow at 0° shoulder at 30°-90° flexion	no pronation/supination, starting position impossible limited pronation/supination, maintains extension full pronation/supination, maintains elbow extension		0	1 / (2)
		Subtotal IV (max 6)		4
V. Normal reflex activity evaluated only if full score of 6 points achieved on part IV				
biceps, triceps, finger flexors	0 points on part IV or 2 of 3 reflexes markedly hyperactive 1 reflex markedly hyperactive or at least 2 reflexes lively maximum of 1 reflex lively, none hyperactive		0	1 / (2)
		Subtotal V (max 2)		2
		Total A (max 36)		34

Approved by Fugl-Meyer AR 2010 1

2.N.
11.5.2011

B. WRIST support may be provided at the elbow to take or hold the position, no support at wrist, check the passive range of motion prior testing		none	partial	full
Stability at 15° dorsiflexion elbow at 90°, forearm pronated shoulder at 0°	less than 15° active dorsiflexion dorsiflexion 15°, no resistance is taken maintains position against resistance	0	(1)	2
Repeated dorsifexion / volar flexion elbow at 90°, forearm pronated shoulder at 0°, slight finger flexion	cannot perform volitionally limited active range of motion full active range of motion, smoothly	0	1	(2)
Stability at 15° dorsiflexion elbow at 0°, forearm pronated slight shoulder flexion/abduction	less than 15° active dorsiflexion dorsiflexion 15°, no resistance is taken maintains position against resistance	0	(1)	2
Repeated dorsifexion / volar flexion elbow at 0°, forearm pronated slight shoulder flexion/abduction	cannot perform volitionally limited active range of motion full active range of motion, smoothly	0	(1)	2
Circumduction	cannot perform volitionally jerky movement or incomplete complete and smooth circumduction	0	1	(2)
Total B (max 10)			7	

C. HAND support may be provided at the elbow to keep 90° flexion, no support at the wrist, compare with unaffected hand, the objects are interposed, active grasp		none	partial	full
Mass flexion from full active or passive extension		0	1	(2)
Mass extension from full active or passive flexion		0	1	(2)
GRASP				
A – flexion in PIP and DIP (digits II-V) **extension in MCP II-V**	cannot be performed can hold position but weak maintains position against resistance	0	1	(2)
B – thumb adduction 1-st CMC, MCP, IP at 0°, scrap of paper between thumb and 2-nd MCP joint	cannot be performed can hold paper but not against tug can hold paper against a tug	0	1	(2)
C - opposition pulpa of the thumb against the pulpa of 2-nd finger, pencil, tug upward	cannot be performed can hold pencil but not against tug can hold pencil against a tug	0	(1)	2
D – cylinder grip cylinder shaped object (small can) tug upward, opposition in digits I and II	cannot be performed can hold cylinder but not against tug can hold cylinder against a tug	0	1	(2)
E – spherical grip fingers in abduction/flexion, thumb opposed, tennis ball	cannot be performed can hold ball but not against tug can hold ball against a tug	0	1	(2)
Total C (max 14)			13	

D. COORDINATION/SPEED after one trial with both arms, blind-folded, tip of the index finger from knee to nose, 5 times as fast as possible		marked	slight	none
Tremor		0	1	(2)
Dysmetria	pronounced or unsystematic slight and systematic no dysmetria	0	(1)	2
		> 5s	**2 - 5s**	**< 1s**
Time	more than 5 seconds slower than unaffected side 2-5 seconds slower than unaffected side maximum difference of1 second between sides	0	(1)	2
Total D (max 6)			4	

TOTAL A-D (max 66)	58

Approved by Fugl-Meyer AR 2010 2

Z.N.
11.4.2014

H. SENSATION, upper extremity blind-folded, compared with unaffected side		**anesthesia**	**hypoesthesia dysesthesia**	**normal**
Light touch	upper arm, forearm	0	1	(2)
	palmar surface of the hand	0	1	(2)
		absence less than 3/4 correct	**3/4 correct considerable difference**	**correct 100% little or no difference**
Position small alterations in the position	shoulder	0	1	(2)
	elbow	0	1	(2)
	wrist	0	1	(2)
	thumb (IP-joint)	0	1	(2)
			Total H (max12)	12

J. PASSIVE JOINT MOTION, upper extremity				**J. JOINT PAIN** during passive motion, upper extremity		
Sitting position, compare with unaffected side	only few degrees (less than 10° in shoulder)	decreased	normal	pronounced constant pain during or at the end of movement	some pain	no pain
Shoulder						
Flexion (0° - 180°)	0	1	(2)	0	1	(2)
Abduction (0°-90°)	0	1	(2)	0	1	(2)
External rotation	0	1	(2)	0	1	(2)
Internal rotation	0	1	(2)	0	1	(2)
Elbow						
Flexion	0	1	(2)	0	1	(2)
Extension	0	1	(2)	0	1	(2)
Forearm						
Pronation	0	1	(2)	0	1	(2)
Supination	0	1	(2)	0	1	(2)
Wrist						
Flexion	0	1	(2)	0	1	(2)
Extension	0	1	(2)	0	1	(2)
Fingers						
Flexion	0	1	(2)	0	1	(2)
Extension	0	1	(2)	0	1	(2)
Total (max 24)			24	**Total** (max 24)		24

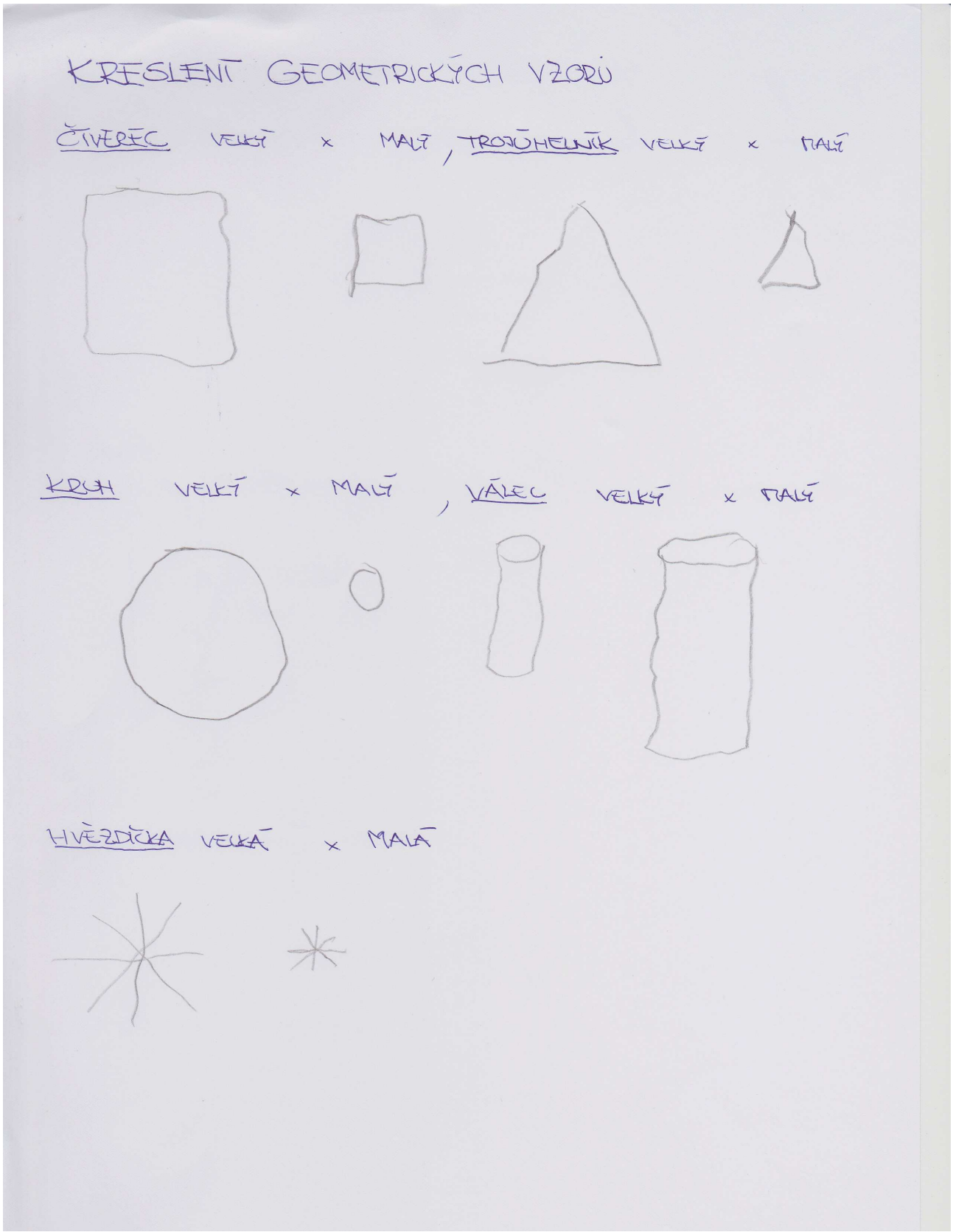
A. UPPER EXTREMITY	34 /36
B. WRIST	7 /10
C. HAND	13 /14
D. COORDINATION / SPEED	4 / 6
TOTAL A-D (motor function)	58 /66

H. SENSATION	12 /12
J. PASSIVE JOINT MOTION	24 /24
J. JOINT PAIN	24 /24

118 b.

Příloha č. 11:

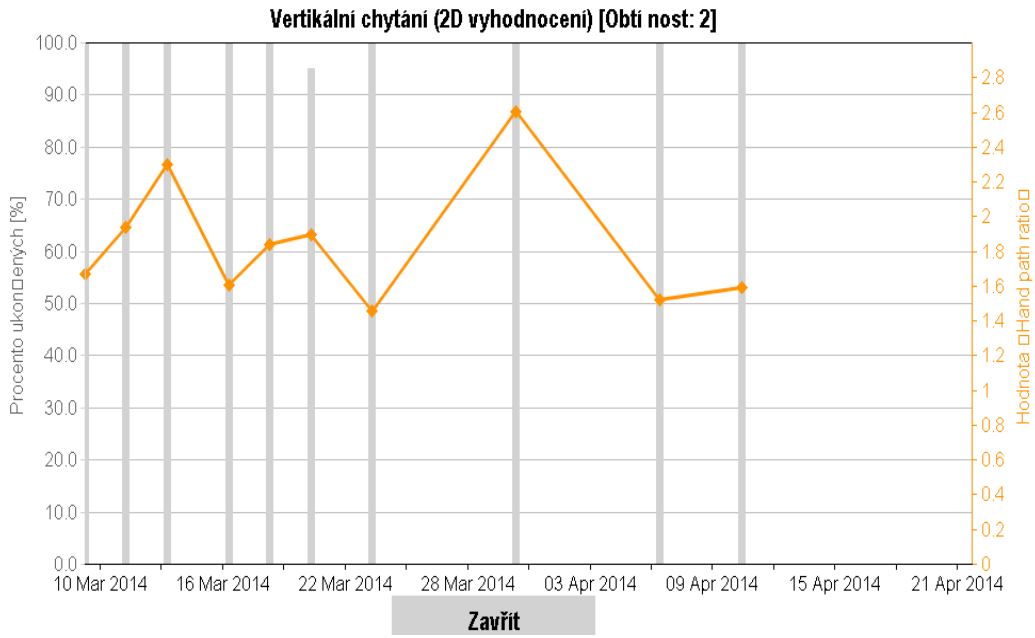
Vyšetření jemné motoriky u pacientky Z. N. při kontrolním vyšetření 11. 4. 2014



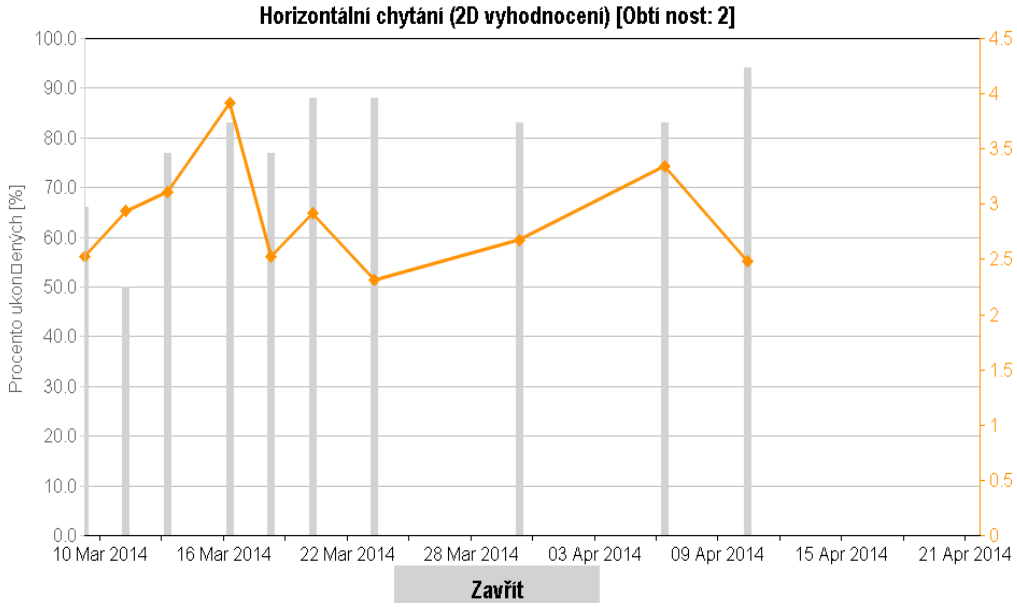
Příloha č. 12:

Výsledky 3 hodnotících cvičení ze softwaru systému Armeo®Spring (pacientka Z. N.)

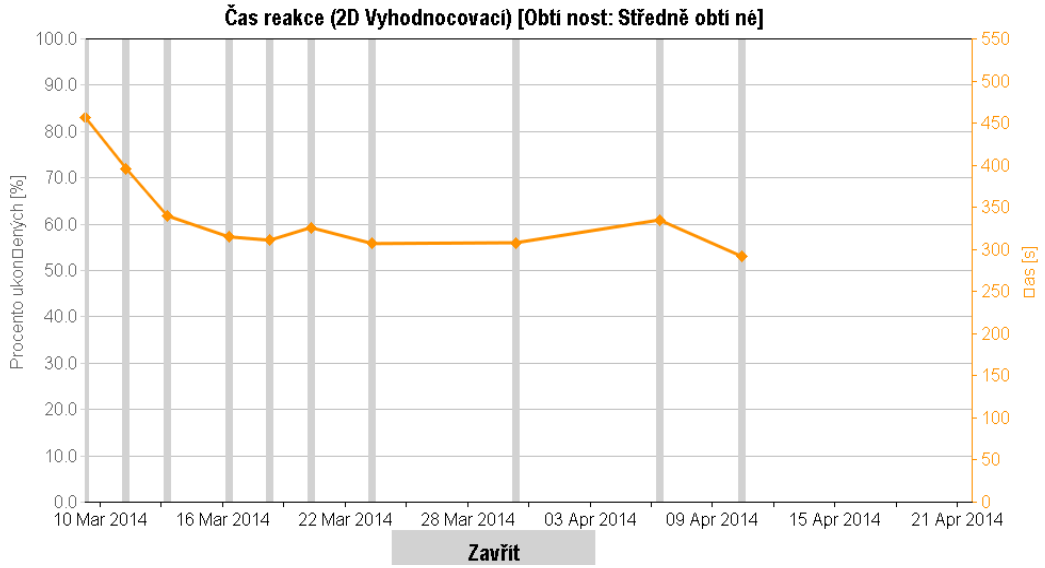
Obr. 1: vertikální chytání, obr. 2: horizontální chytání, obr. 3: čas reakce



Obr. 1



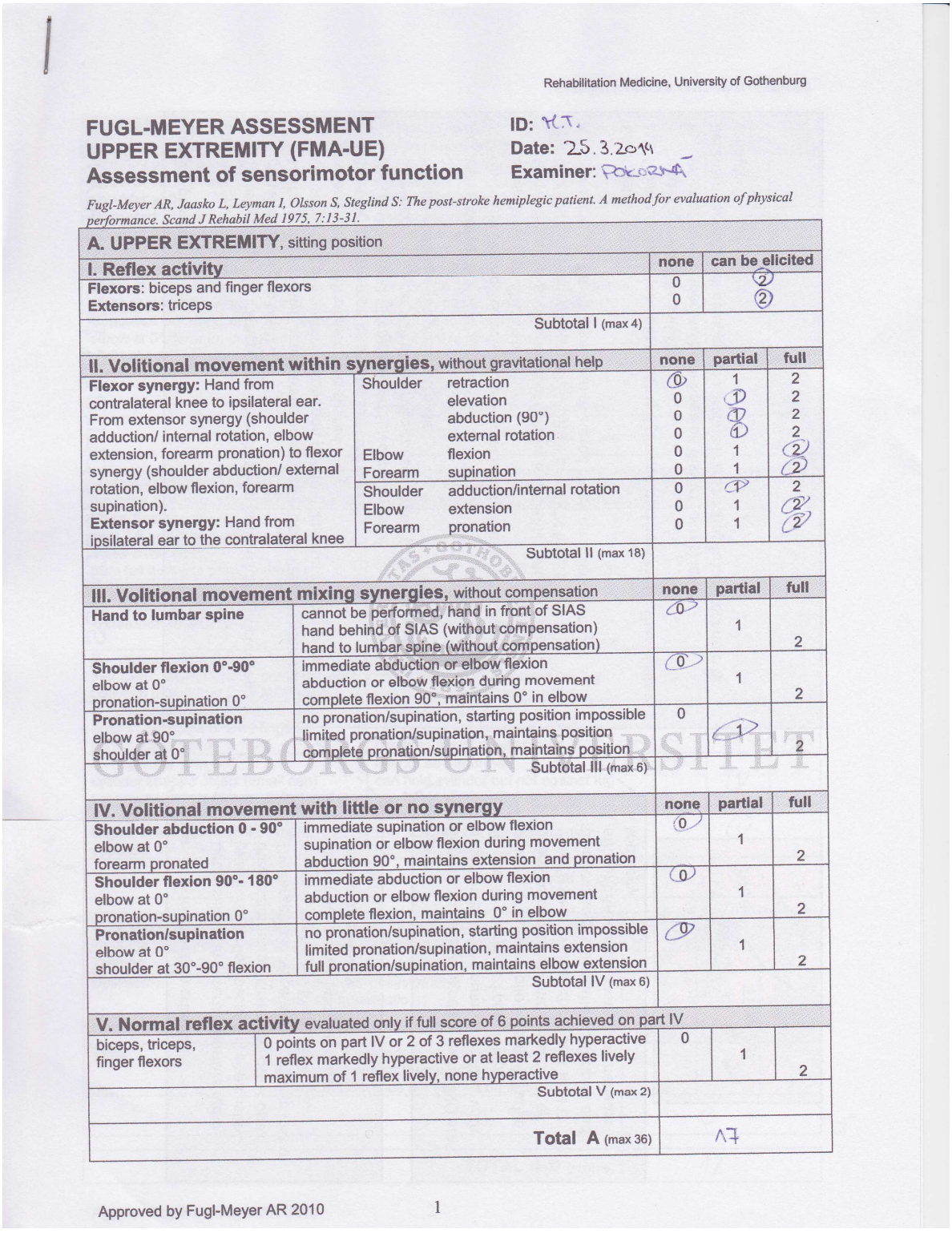
Obr. 2


Čas reakce (2D Vyhodnocovací) [Obtí nost: Středně obtí né]
Procento ukon□ených [%]
□as [s]
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
550
500
450
400
350
300
250
200
150
100
50
0
10 Mar 2014
16 Mar 2014
22 Mar 2014
28 Mar 2014
03 Apr 2014
09 Apr 2014
15 Apr 2014
21 Apr 2014
Zavřít

Obr. 3

Příloha č. 13:

Fugl-Meyerův test u pacientky M. T. prováděný pří vstupním vyšetření 25.3.2014



Rehabilitation Medicine, University of Gothenburg

FUGL-MEYER ASSESSMENT
UPPER EXTREMITY (FMA-UE)
Assessment of sensorimotor function

ID: M.T.
Date: 25.3.2014
Examiner: POKORNÁ

Fugl-Meyer AR, Jaasko L, Leyman I, Olsson S, Steglind S: The post-stroke hemiplegic patient. A method for evaluation of physical performance. Scand J Rehabil Med 1975, 7:13-31.

A. UPPER EXTREMITY, sitting position

I. Reflex activity	none	can be elicited
Flexors: biceps and finger flexors	0	(2)
Extensors: triceps	0	(2)
Subtotal I (max 4)		

II. Volitional movement within synergies, without gravitational help			none	partial	full
Flexor synergy: Hand from contralateral knee to ipsilateral ear. From extensor synergy (shoulder adduction/ internal rotation, elbow extension, forearm pronation) to flexor synergy (shoulder abduction/ external rotation, elbow flexion, forearm supination). **Extensor synergy:** Hand from ipsilateral ear to the contralateral knee	Shoulder	retraction	(0)	1	2
		elevation	0	(1)	2
		abduction (90°)	0	(1)	2
		external rotation	0	(1)	2
	Elbow	flexion	0	1	(2)
	Forearm	supination	0	1	(2)
	Shoulder	adduction/internal rotation	0	(1)	2
	Elbow	extension	0	1	(2)
	Forearm	pronation	0	1	(2)
Subtotal II (max 18)					

III. Volitional movement mixing synergies, without compensation		none	partial	full
Hand to lumbar spine	cannot be performed, hand in front of SIAS hand behind of SIAS (without compensation) hand to lumbar spine (without compensation)	(0)	1	2
Shoulder flexion 0°-90° elbow at 0° pronation-supination 0°	immediate abduction or elbow flexion abduction or elbow flexion during movement complete flexion 90°, maintains 0° in elbow	(0)	1	2
Pronation-supination elbow at 90° shoulder at 0°	no pronation/supination, starting position impossible limited pronation/supination, maintains position complete pronation/supination, maintains position	0	(1)	2
Subtotal III (max 6)				

IV. Volitional movement with little or no synergy		none	partial	full
Shoulder abduction 0 - 90° elbow at 0° forearm pronated	immediate supination or elbow flexion supination or elbow flexion during movement abduction 90°, maintains extension and pronation	(0)	1	2
Shoulder flexion 90°- 180° elbow at 0° pronation-supination 0°	immediate abduction or elbow flexion abduction or elbow flexion during movement complete flexion, maintains 0° in elbow	(0)	1	2
Pronation/supination elbow at 0° shoulder at 30°-90° flexion	no pronation/supination, starting position impossible limited pronation/supination, maintains extension full pronation/supination, maintains elbow extension	(0)	1	2
Subtotal IV (max 6)				

V. Normal reflex activity evaluated only if full score of 6 points achieved on part IV				
biceps, triceps, finger flexors	0 points on part IV or 2 of 3 reflexes markedly hyperactive 1 reflex markedly hyperactive or at least 2 reflexes lively maximum of 1 reflex lively, none hyperactive	0	1	2
Subtotal V (max 2)				
Total A (max 36)			17	

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1/3

B. WRIST support may be provided at the elbow to take or hold the position, no support at wrist, check the passive range of motion prior testing		none	partial	full
Stability at 15° dorsiflexion elbow at 90°, forearm pronated shoulder at 0°	less than 15° active dorsiflexion dorsiflexion 15°, no resistance is taken maintains position against resistance	0	(1)	2
Repeated dorsifexion / volar flexion elbow at 90°, forearm pronated shoulder at 0°, slight finger flexion	cannot perform volitionally limited active range of motion full active range of motion, smoothly	0	(1)	2
Stability at 15° dorsiflexion elbow at 0°, forearm pronated slight shoulder flexion/abduction	less than 15° active dorsiflexion dorsiflexion 15°, no resistance is taken maintains position against resistance	(0)	1	2
Repeated dorsifexion / volar flexion elbow at 0°, forearm pronated slight shoulder flexion/abduction	cannot perform volitionally limited active range of motion full active range of motion, smoothly	(0)	1	2
Circumduction	cannot perform volitionally jerky movement or incomplete complete and smooth circumduction	0	1	(2)
Total B (max 10)		4		

C. HAND support may be provided at the elbow to keep 90° flexion, no support at the wrist, compare with unaffected hand, the objects are interposed, active grasp		none	partial	full
Mass flexion from full active or passive extension		0	(1)	2
Mass extension from full active or passive flexion		0	1	(2)
GRASP				
A – flexion in PIP and DIP (digits II-V) **extension in MCP II-V**	cannot be performed can hold position but weak maintains position against resistance	0	(1)	2
B – thumb adduction 1-st CMC, MCP, IP at 0°, scrap of paper between thumb and 2-nd MCP joint	cannot be performed can hold paper but not against tug can hold paper against a tug	0	(1)	2
C - opposition pulpa of the thumb against the pulpa of 2-nd finger, pencil, tug upward	cannot be performed can hold pencil but not against tug can hold pencil against a tug	0	(1)	2
D – cylinder grip cylinder shaped object (small can) tug upward, opposition in digits I and II	cannot be performed can hold cylinder but not against tug can hold cylinder against a tug	0	(1)	2
E – spherical grip fingers in abduction/flexion, thumb opposed, tennis ball	cannot be performed can hold ball but not against tug can hold ball against a tug	0	(1)	2
Total C (max 14)		3		

D. COORDINATION/SPEED after one trial with both arms, blind-folded, tip of the index finger from knee to nose, 5 times as fast as possible		marked	slight	none
Tremor		(0)	1	2
Dysmetria	pronounced or unsystematic slight and systematic no dysmetria	(0)	1	2
		> 5s	2 - 5s	< 1s
Time	more than 5 seconds slower than unaffected side 2-5 seconds slower than unaffected side maximum difference of1 second between sides	(0)	1	2
Total D (max 6)		0		

TOTAL A-D (max 66)	12

H. SENSATION, upper extremity blind-folded, compared with unaffected side		**anesthesia**	**hypoesthesia dysesthesia**	**normal**
Light touch	upper arm, forearm	0	1	(2)
	palmar surface of the hand	0	1	(2)
		absence	**3/4 correct considerable difference**	**correct 100% little or no difference**
Position small alterations in the position	shoulder	0	(1)	2
	elbow	0	(1)	2
	wrist	0	(1)	2
	thumb (IP-joint)	0	1	(2)
			Total H (max12)	9

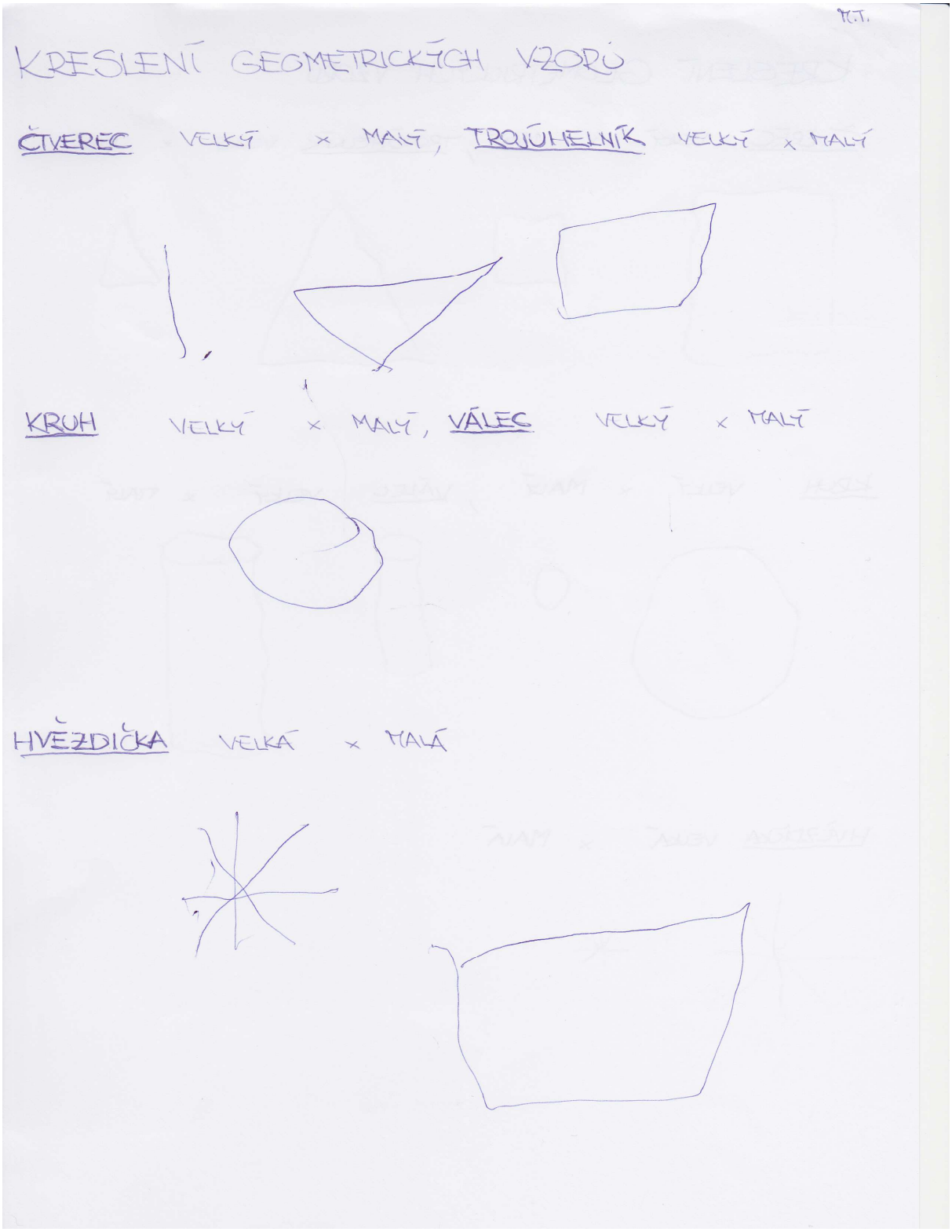
J. PASSIVE JOINT MOTION, upper extremity				**J. JOINT PAIN** during passive motion, upper extremity		
Sitting position, compare with unaffected side	only few degrees (less than 10° in shoulder)	decreased	normal	pronounced constant pain during or at the end of movement	some pain	no pain
Shoulder						
Flexion (0° - 180°)	0	1	(2)	0	(1)	2
Abduction (0°-90°)	0	1	(2)	0	(1)	2
External rotation	0	1	(2)	0	1	(2)
Internal rotation	0	1	(2)	0	1	(2)
Elbow						
Flexion	0	1	(2)	0	1	(2)
Extension	0	1	(2)	0	1	(2)
Forearm						
Pronation	0	1	(2)	0	1	(2)
Supination	0	1	(2)	0	1	(2)
Wrist						
Flexion	0	1	(2)	0	1	(2)
Extension	0	1	(2)	0	1	(2)
Fingers						
Flexion	0	1	(2)	0	1	(2)
Extension	0	1	(2)	0	1	(2)
Total (max 24)	24			**Total** (max 24)	22	

A. UPPER EXTREMITY	17 /36
B. WRIST	4 /10
C. HAND	8 /14
D. COORDINATION / SPEED	0 / 6
TOTAL A-D (motor function)	29 /66

H. SENSATION	9 /12
J. PASSIVE JOINT MOTION	24 /24
J. JOINT PAIN	22 /24

Příloha č. 14:

Vyšetření jemné motoriky u pacientky M. T. při vstupním vyšetření 25. 3. 2014 – kreslení geometrických tvarů



Příloha č. 15:

Fugl-Meyerův test u pacientky M. T. při kontrolním vyšetření 17. 4. 2014

Rehabilitation Medicine, University of Gothenburg

FUGL-MEYER ASSESSMENT
UPPER EXTREMITY (FMA-UE)
Assessment of sensorimotor function

ID: M.T.
Date: 17.4.2014
Examiner: POKORNÁ

Fugl-Meyer AR, Jaasko L, Leyman I, Olsson S, Steglind S: The post-stroke hemiplegic patient. A method for evaluation of physical performance. Scand J Rehabil Med 1975, 7:13-31.

A. UPPER EXTREMITY, sitting position

I. Reflex activity		none	can be elicited
Flexors: biceps and finger flexors		0	2
Extensors: triceps		0	2
	Subtotal I (max 4)		4

II. Volitional movement within synergies, without gravitational help			none	partial	full
Flexor synergy: Hand from contralateral knee to ipsilateral ear. From extensor synergy (shoulder adduction/ internal rotation, elbow extension, forearm pronation) to flexor synergy (shoulder abduction/ external rotation, elbow flexion, forearm supination). **Extensor synergy:** Hand from ipsilateral ear to the contralateral knee	Shoulder	retraction	0	1	2
		elevation	0	1	2
		abduction (90°)	0	1	2
		external rotation	0	1	2
	Elbow	flexion	0	1	2
	Forearm	supination	0	1	2
	Shoulder	adduction/internal rotation	0	1	2
	Elbow	extension	0	1	2
	Forearm	pronation	0	1	2
		Subtotal II (max 18)			15

III. Volitional movement mixing synergies, without compensation		none	partial	full
Hand to lumbar spine	cannot be performed, hand in front of SIAS hand behind of SIAS (without compensation) hand to lumbar spine (without compensation)	0	1	2
Shoulder flexion 0°-90° elbow at 0° pronation-supination 0°	immediate abduction or elbow flexion abduction or elbow flexion during movement complete flexion 90°, maintains 0° in elbow	0	1	2
Pronation-supination elbow at 90° shoulder at 0°	no pronation/supination, starting position impossible limited pronation/supination, maintains position complete pronation/supination, maintains position	0	1	2
	Subtotal III (max 6)			3

IV. Volitional movement with little or no synergy		none	partial	full
Shoulder abduction 0 - 90° elbow at 0° forearm pronated	immediate supination or elbow flexion supination or elbow flexion during movement abduction 90°, maintains extension and pronation	0	1	2
Shoulder flexion 90°- 180° elbow at 0° pronation-supination 0°	immediate abduction or elbow flexion abduction or elbow flexion during movement complete flexion, maintains 0° in elbow	0	1	2
Pronation/supination elbow at 0° shoulder at 30°-90° flexion	no pronation/supination, starting position impossible limited pronation/supination, maintains extension full pronation/supination, maintains elbow extension	0	1	2
	Subtotal IV (max 6)			2

V. Normal reflex activity evaluated only if full score of 6 points achieved on part IV				
biceps, triceps, finger flexors	0 points on part IV or 2 of 3 reflexes markedly hyperactive 1 reflex markedly hyperactive or at least 2 reflexes lively maximum of 1 reflex lively, none hyperactive	0	1	2
	Subtotal V (max 2)			
	Total A (max 36)			24

Approved by Fugl-Meyer AR 2010 1

1/3

K.T.

B. WRIST support may be provided at the elbow to take or hold the position, no support at wrist, check the passive range of motion prior testing		none	partial	full
Stability at 15° dorsiflexion elbow at 90°, forearm pronated shoulder at 0°	less than 15° active dorsiflexion dorsiflexion 15°, no resistance is taken maintains position against resistance	0	1	2
Repeated dorsifexion / volar flexion elbow at 90°, forearm pronated shoulder at 0°, slight finger flexion	cannot perform volitionally limited active range of motion full active range of motion, smoothly	0	1	2
Stability at 15° dorsiflexion elbow at 0°, forearm pronated slight shoulder flexion/abduction	less than 15° active dorsiflexion dorsiflexion 15°, no resistance is taken maintains position against resistance	0	1	2
Repeated dorsifexion / volar flexion elbow at 0°, forearm pronated slight shoulder flexion/abduction	cannot perform volitionally limited active range of motion full active range of motion, smoothly	0	1	2
Circumduction	cannot perform volitionally jerky movement or incomplete complete and smooth circumduction	0	1	2
	Total B (max 10)		6	

C. HAND support may be provided at the elbow to keep 90° flexion, no support at the wrist, compare with unaffected hand, the objects are interposed, active grasp		none	partial	full
Mass flexion from full active or passive extension		0	1	2
Mass extension from full active or passive flexion		0	1	2
GRASP				
A – flexion in PIP and DIP (digits II-V) **extension in MCP II-V**	cannot be performed can hold position but weak maintains position against resistance	0	1	2
B – thumb adduction 1-st CMC, MCP, IP at 0°, scrap of paper between thumb and 2-nd MCP joint	cannot be performed can hold paper but not against tug can hold paper against a tug	0	1	2
C - opposition pulpa of the thumb against the pulpa of 2-nd finger, pencil, tug upward	cannot be performed can hold pencil but not against tug can hold pencil against a tug	0	1	2
D – cylinder grip cylinder shaped object (small can) tug upward, opposition in digits I and II	cannot be performed can hold cylinder but not against tug can hold cylinder against a tug	0	1	2
E – spherical grip fingers in abduction/flexion, thumb opposed, tennis ball	cannot be performed can hold ball but not against tug can hold ball against a tug	0	1	2
	Total C (max 14)		10	

D. COORDINATION/SPEED after one trial with both arms, blind-folded, tip of the index finger from knee to nose, 5 times as fast as possible		marked	slight	none
Tremor		0	1	2
Dysmetria	pronounced or unsystematic slight and systematic no dysmetria	0	1	2
		> 5s	2 - 5s	< 1s
Time	more than 5 seconds slower than unaffected side 2-5 seconds slower than unaffected side maximum difference of1 second between sides	0	1	2
	Total D (max 6)		1	

TOTAL A-D (max 66)	17

Approved by Fugl-Meyer AR 2010 2

H. SENSATION, upper extremity blind-folded, compared with unaffected side		**anesthesia**	**hypoesthesia dysesthesia**	**normal**
Light touch	upper arm, forearm	0	1	2
	palmar surface of the hand	0	1	2
		absence	**3/4 correct considerable difference**	**correct 100% little or no difference**
Position small alterations in the position	shoulder	0	1	2
	elbow	0	1	2
	wrist	0	1	2
	thumb (IP-joint)	0	1	2
			Total H (max12)	9

J. PASSIVE JOINT MOTION, upper extremity				**J. JOINT PAIN** during passive motion, upper extremity		
Sitting position, compare with unaffected side	only few degrees (less than 10° in shoulder)	decreased	normal	pronounced constant pain during or at the end of movement	some pain	no pain
Shoulder						
Flexion (0° - 180°)	0	1	2	0	1	2
Abduction (0°-90°)	0	1	2	0	1	2
External rotation	0	1	2	0	1	2
Internal rotation	0	1	2	0	1	2
Elbow						
Flexion	0	1	2	0	1	2
Extension	0	1	2	0	1	2
Forearm						
Pronation	0	1	2	0	1	2
Supination	0	1	2	0	1	2
Wrist						
Flexion	0	1	2	0	1	2
Extension	0	1	2	0	1	2
Fingers						
Flexion	0	1	2	0	1	2
Extension	0	1	2	0	1	2
Total (max 24)			24	**Total** (max 24)		24

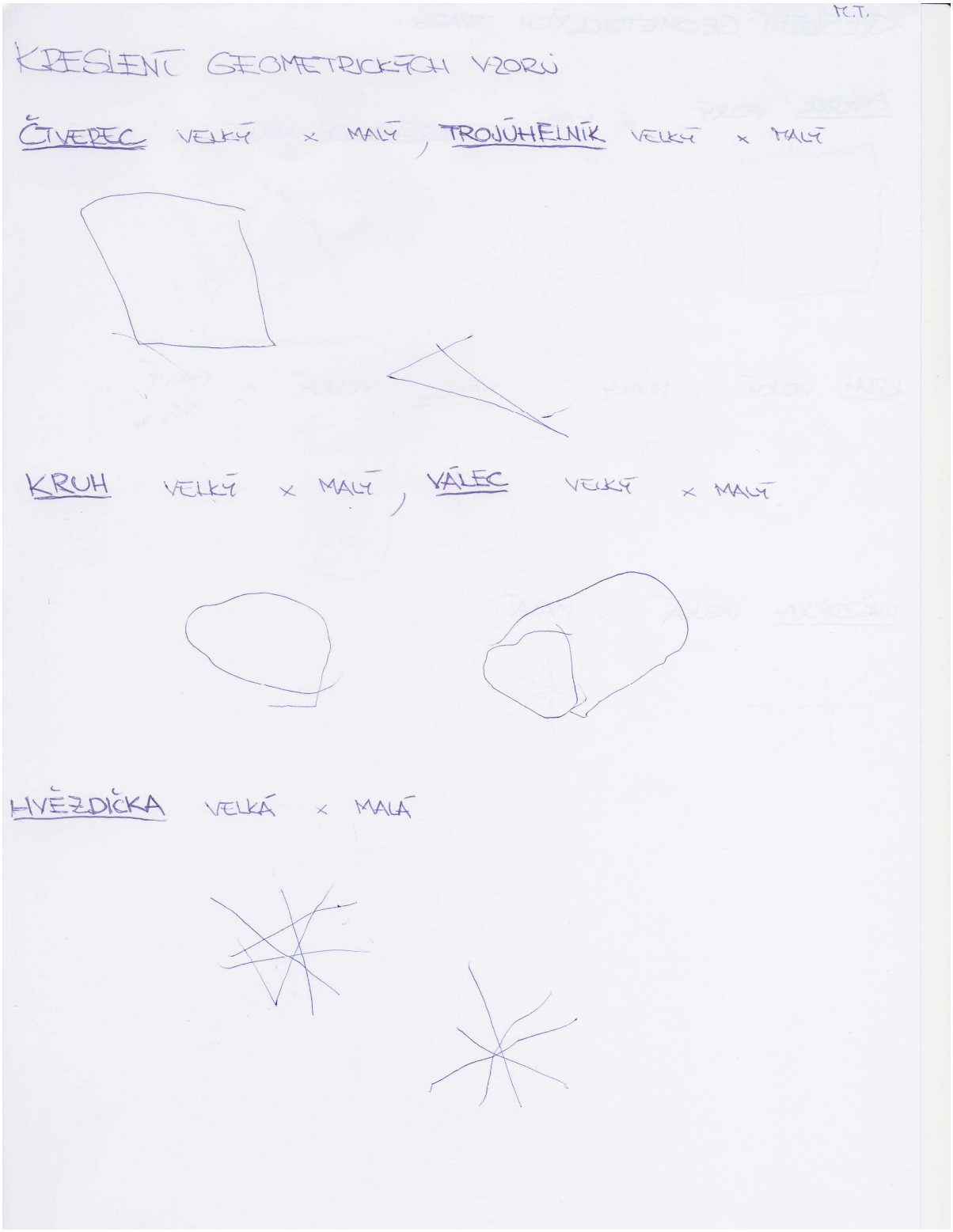
A. UPPER EXTREMITY	24	/36
B. WRIST	6	/10
C. HAND	10	/14
D. COORDINATION / SPEED	1	/ 6
TOTAL A-D (motor function)	41	/66

98b.

H. SENSATION	9	/12
J. PASSIVE JOINT MOTION	24	/24
J. JOINT PAIN	24	/24

Příloha č. 16:

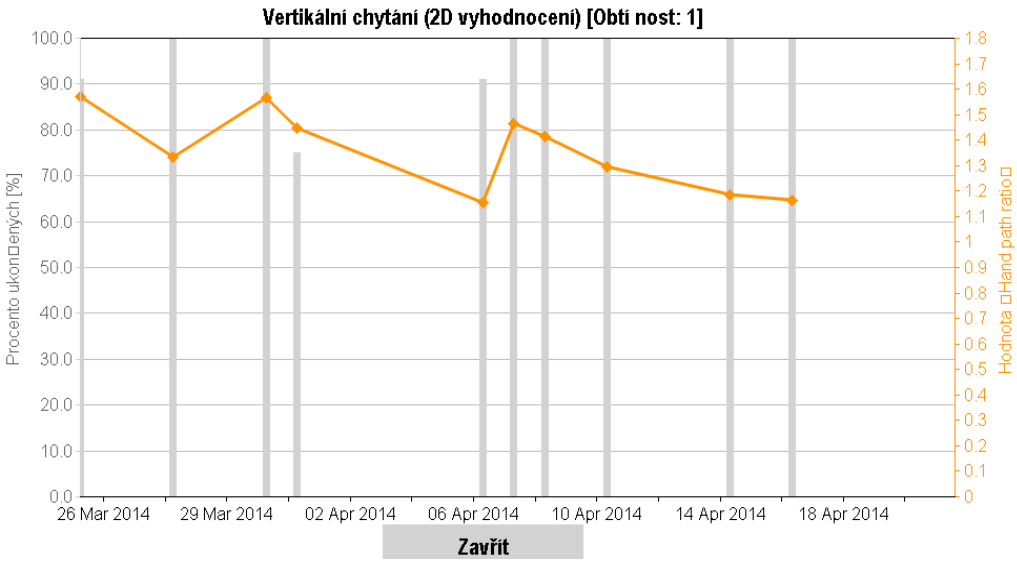
Vyšetření jemné motoriky u pacientky M. T. při kontrolním vyšetření 25. 4. 2014



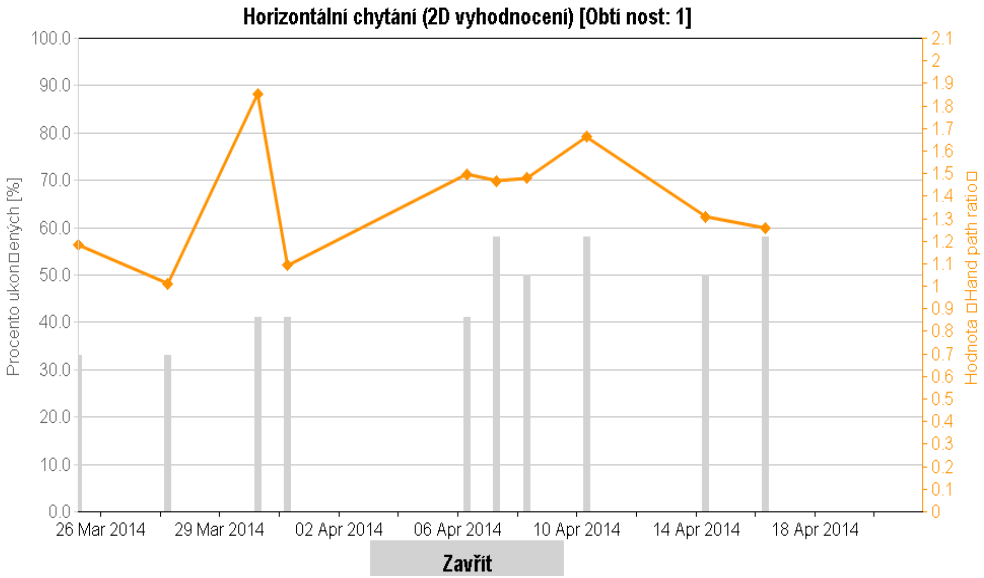
Příloha č. 17:

Výsledky 3 hodnotících cvičení ze softwaru systému Armeo®Spring

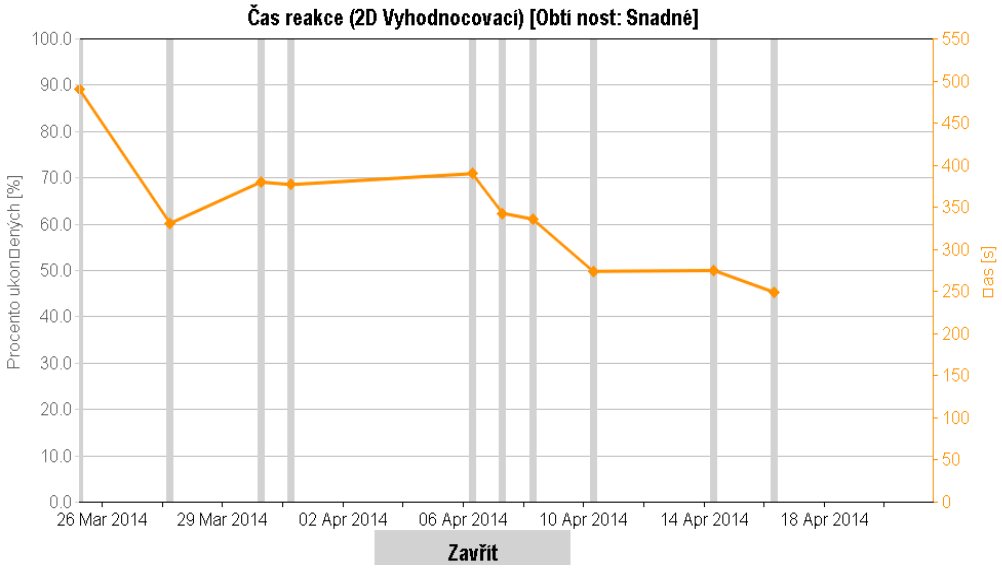
Obr. 1: vertikální chytání, obr. 2: horizontální chytání, obr. 3: čas reakce



Obr. 1



Obr. 2


Čas reakce (2D Vyhodnocovací) [Obtí nost: Snadné]
Procento ukon□ených [%]
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
550
500
450
400
350
300
250
200
150
100
50
0
□as [s]
26 Mar 2014
29 Mar 2014
02 Apr 2014
06 Apr 2014
10 Apr 2014
14 Apr 2014
18 Apr 2014
Zavřít

Obr. 3

Příloha č. 18:

Informovaný souhlas pacientky Z. N.

INFORMOVANÝ SOUHLAS

V souladu se Zákonem o péči o zdraví lidu (§ 23 odst. 2 zákona č. 20/1966 Sb.) s Úmluvou o lidských právech a biomedicíně č. 96/2001 Sb. m. s. Vás žádám o souhlas k vyšetření a následné terapii. Dále Vás žádám o souhlas k nahlížení do Vaší dokumentace osobou získávající způsobilost k výkonu zdravotnického povolání v rámci praktické výuky a s uveřejněním výsledků terapie v rámci bakalářské práce na FTVS UK. Osobní data v této studii nebudou uvedena.

Dnešního dne jsem byla odborným pracovníkem poučena o plánovaném vyšetření a následné terapii. Prohlašuji a svým dále uvedeným vlastnoručním podpisem potvrzuji, že odborný pracovník, který mi poskytl poučení, mi osobně vysvětlil vše, co je obsahem tohoto písemného informovaného souhlasu, a měla jsem možnost klást mu otázky, na které mi řádně odpověděl.

Prohlašuji, že jsem shora uvedenému poučení plně porozuměla a výslovně souhlasím s provedením vyšetření a následnou terapií.

Souhlasím s nahlížením níže jmenované osoby do mé dokumentace a s uveřejněním výsledků terapie v rámci studie.

Datum: 7.3.2014

Osoba, která provedla poučení: BARBORA POKORNÁ

Podpis osoby, která provedla poučení: .....

Vlastnoruční podpis pacienta: .....

Příloha č. 19:

Informovaný souhlas pacientky M. T.

INFORMOVANÝ SOUHLAS

V souladu se Zákonem o péči o zdraví lidu (§ 23 odst. 2 zákona č. 20/1966 Sb.) s Úmluvou o lidských právech a biomedicíně č. 96/2001 Sb. m. s. Vás žádám o souhlas k vyšetření a následné terapii. Dále Vás žádám o souhlas k nahlížení do Vaší dokumentace osobou získávající způsobilost k výkonu zdravotnického povolání v rámci praktické výuky a s uveřejněním výsledků terapie v rámci bakalářské práce na FTVS UK. Osobní data v této studii nebudou uvedena.

Dnešního dne jsem byla odborným pracovníkem poučena o plánovaném vyšetření a následné terapii. Prohlašuji a svým dále uvedeným vlastnoručním podpisem potvrzuji, že odborný pracovník, který mi poskytl poučení, mi osobně vysvětlil vše, co je obsahem tohoto písemného informovaného souhlasu, a měla jsem možnost klást mu otázky, na které mi řádně odpověděl.

Prohlašuji, že jsem shora uvedenému poučení plně porozuměla a výslovně souhlasím s provedením vyšetření a následnou terapií.

Souhlasím s nahlížením níže jmenované osoby do mé dokumentace a s uveřejněním výsledků terapie v rámci studie.

Datum: 25.3.2014

Osoba, která provedla poučení: BARBORA POKORNÁ

Podpis osoby, která provedla poučení: MARCELA TRLICOVÁ

Vlastnoruční podpis pacienta: