

Changes in arm-hand function and arm-hand skill performance in patients after stroke during and after rehabilitation: reference data on 'therapy as usual'

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Introduction

From clinical experience it is known that performance in general and arm-hand skill performance (AHSP) specifically may deteriorate once a stroke patient has left the training program [1]. However, it is neither well understood at what rate such deterioration (or improvement) occurs, nor in which patient subcategories this is most prominent. Especially stroke patients with a low-functional arm-hand receive (too) little attention in many research programs. Furthermore, the rapid expansion in AHSP research in stroke rehabilitation leads to the increasing risk of losing the opportunity of clearly defining 'therapy-as-usual' (TAU). Patients stratified into three subgroups according the Utrechtse Arm-hand Test [2], followed the Concise Arm and hand Rehabilitation Approach in Stroke (CARAS)[3].

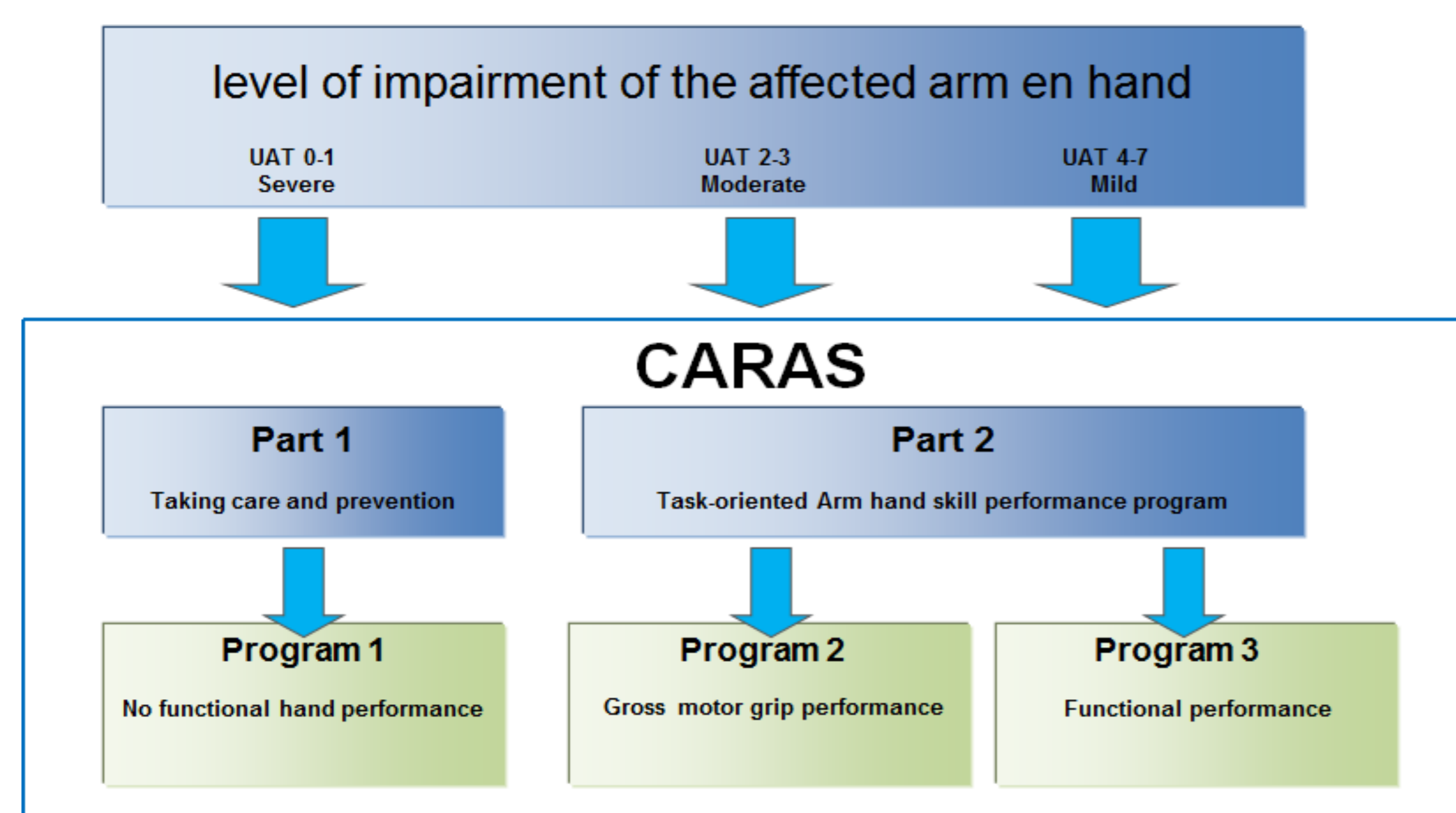


Figure 1. Schematic representation of the CARAS and its constituting programs. UAT = Utrecht Arm/Hand Test [2]

Aim of this study: to monitor the development of arm-hand use in a broad range of stroke patients over time both during and after clinical rehabilitation.

Research questions

- To what extent do arm-hand function and arm-hand skill performance change during and after their clinical rehabilitation involving CARAS?
- To what extent does the rate of improvement or deterioration (over time) of arm-hand function (AHF) and arm-hand skill performance (AHSP) differ between three subgroups of stroke patients with either a low, intermediate or high functional arm-hand, during and after their clinical rehabilitation involving (CARAS)?

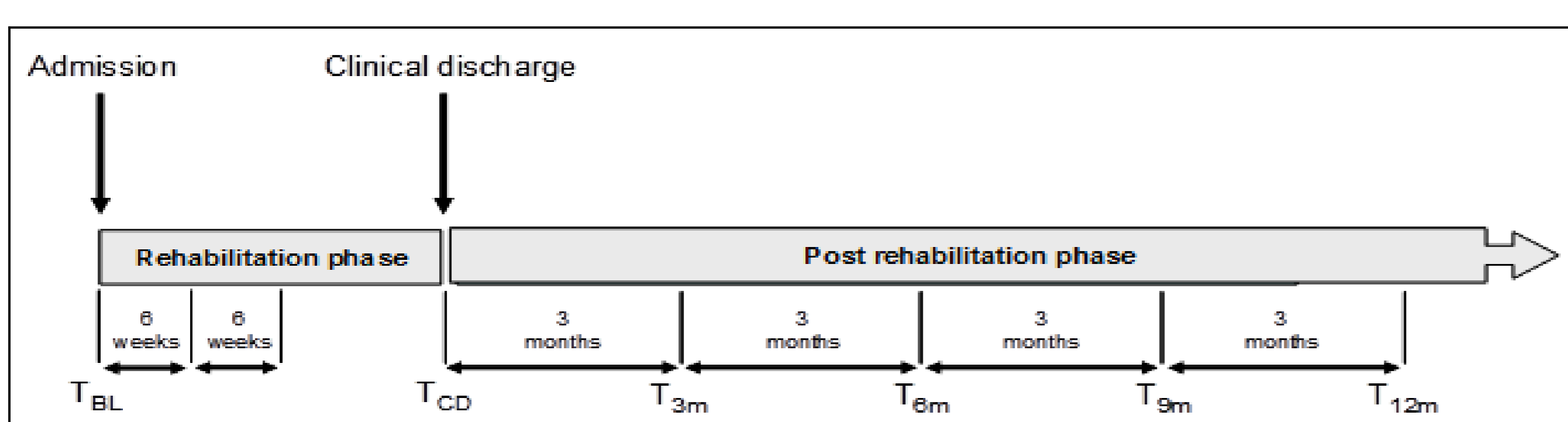


Figure 2. schematic representation of the measurement dates

Methods

Study design

Prospective cohort study.

Results

Participant characteristics

89 first-ever stroke patients (M/F = 62/27; mean age = 58yr (+/-10.6); post-stroke time = 29 days (+/-20.1).

Test	Time phase	Subgroups									P-value			
		Gr1			Gr2			Gr3			overall	Gr1 - Gr2	Gr1 - Gr3	Gr2 - Gr3
FM	$T_{bl} - T_{cd}$	6.7	13.3	2.0	22.5	12.5	24.0	7.1	7.3	7.0	0.000	0.000	0.064	0.000
	$T_{cd} - T_{12m}$	4.7	9.7	2.0	8.1	11.4	7.0	3.2	5.9	1.0	0.177	-	-	-
Grip Strength	$T_{bl} - T_{cd}$	1.3	5.1	0.0	11.9	7.1	12.0	6.9	8.0	7.0	0.000	0.000	0.000	0.029
	$T_{cd} - T_{12m}$	4.6	6.7	2.0	11.4	8.6	10.0	7.6	7.8	5.0	0.009	0.005	0.050	0.078
ARAT	$T_{bl} - T_{cd}$	3.0	8.1	0.0	27.7	12.1	28	13.1	11.5	11.0	0.000	0.000	0.000	0.000
	$T_{cd} - T_{12m}$	4.6	12.6	0.0	7.6	8.0	6.0	1.3	3.7	1.0	0.004	0.008	0.684	0.001
ABILHAND	$T_{bl} - T_{cd}$	0.94	2.09	0.85	1.97	1.63	2.49	2.38	1.95	2.13	0.056	-	-	-
	$T_{cd} - T_{12m}$	1.23	1.52	0.61	0.82	1.56	0.66	0.68	1.57	0.90	0.567	-	-	-

Table 1. Rate of improvement over time (mean, sd, median) of patients regarding FM, ARAT, grip strength and ABILHAND

Test	Time phase	Subgroups		
		Gr1	Gr2	Gr3
FM	deterioration	16.0%	8.7%	0%
	equal or improvement	84.0%	91.3%	100%
Grip Strength	deterioration	0%	4.3%	3.3%
	equal or improvement	100%	95.7%	96.7%
ARAT	deterioration	0%	4.3%	3.3%
	equal or improvement	100%	95.7%	96.7%
ABILHAND	deterioration	52.0%	21.7%	30.0%
	equal or improvement	48.0%	78.3%	70.0%

Table 2. Deterioration of arm-hand performance in post-rehabilitation phase of patients regarding FM, ARAT, grip strength and ABILHAND.

Discussion

- Improvement on arm-hand capacity was observed in all 3 subgroups both during and after rehabilitation, except for grip strength in the severely impaired group.
- Perceived performance improved in all 3 subgroups over time during rehabilitation and was maintained in a majority of patients in the post-rehabilitation phase.
- Largest gains in AHF and AHSP are seen in patients with a moderately impaired arm-hand function.
- A comprehensive clinimetric data set is available. CARAS may serve as a 'therapy-as-usual' condition in future therapy development studies.

References

- [1] Hayward K, Barker R, Brauer S. 2010;32(24):1973-86
- [2] Kruitwagen - van Reenen et al, Disabil Rehabil 2009;31(16):1338-43
- [3] Franck J, Halfens J, Smeets R, Seelen H. OJOT 2015;3(4), Art. 10



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