

Sustaining Both Amount and Intensity of Practice is Necessary to Maintain Outcomes During Poststroke Rehabilitation

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Background

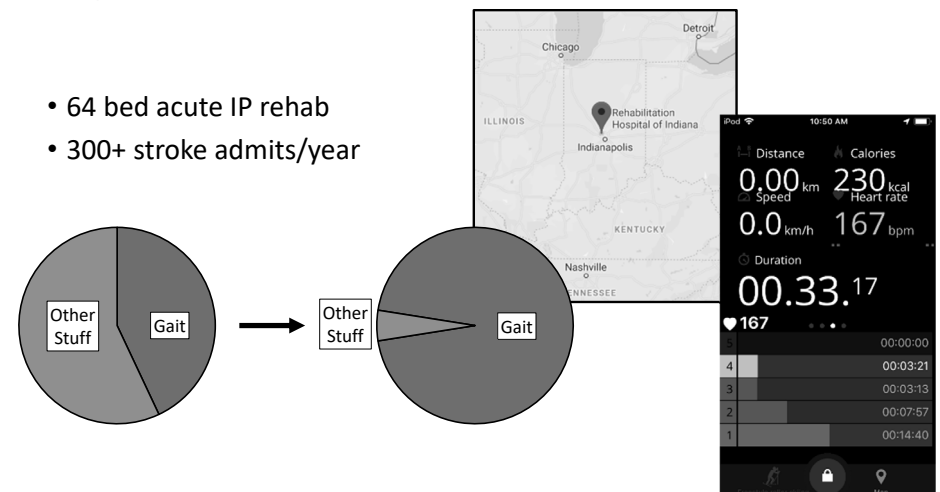
- 78% of individuals with subacute stroke have limitations in walking function (Alguren, 2010)
- Recovery of independent walking is a key predictor of discharge location following inpatient rehabilitation (Hornby, 2015)

Background

- Controlled efficacy trials indicate HIT results in ↑ gains in walking function vs alternative strategies following acute-onset neurologic injuries
 - Conventional PT (Hornby, 2016; Plaweki, 2024)
 - Low-intensity walking (Hornby, 2019; Brazg, 2017; Holleran, 2015)
 - High-intensity impairment-based (Lotter, 2020)
- Effectiveness studies during routine IP stroke rehabilitation indicate HIT:
 - Is feasible and safe (FIRST-Chicago: Hornby, 2015)
 - Results in ↑ walking & non-walking outcomes (FIRST-Oslo: Moore, 2020)

Background – FIRST Indiana (Henderson, 2022)

- 64 bed acute IP rehab
- 300+ stroke admits/year



Background – FIRST Indiana (Henderson, 2022)

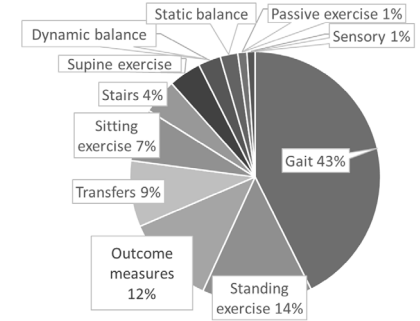


Phase 0:
Implement OM &
HIT equipment



Month 0

Background – FIRST Indiana (Henderson, 2022)



Phase 0: Implement OM &
HIT equipment



Month 0 Month 9

Background – FIRST Indiana (Henderson, 2022)

Implementation strategies

- 9 hours of in-person training + 8 recorded lectures
- Training PT aides
- MD orderset for HIT
- Mentoring / co-treating with research staff

Phase 0: Implement OM &
HIT equipment

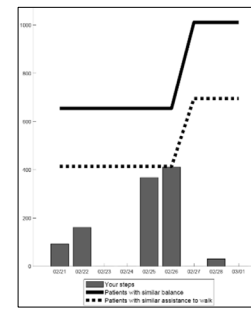


Month 0 Month 9 Month 27

Phase 1:
Usual Care

Phase 2:
Transition

Background – FIRST Indiana (Henderson, 2022)



Phase 0: Implement OM &
HIT equipment



Month 0 Month 9 Month 27

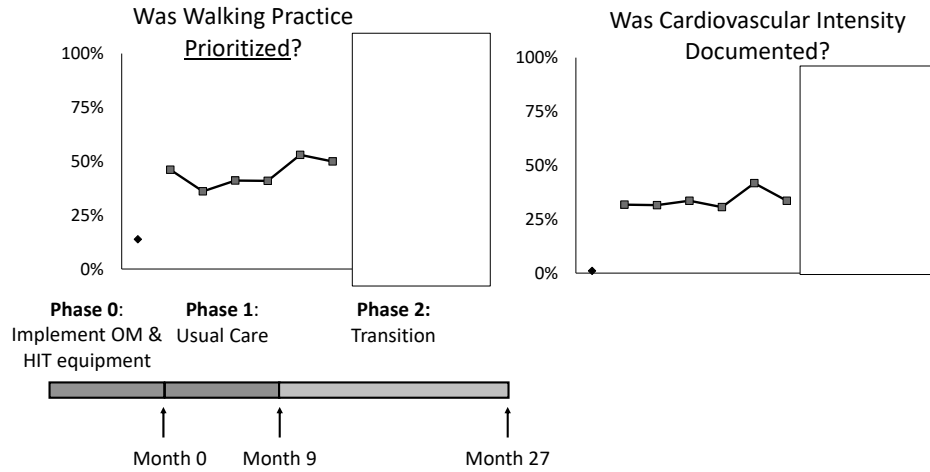
Phase 1:
Usual Care

Phase 2:
Transition

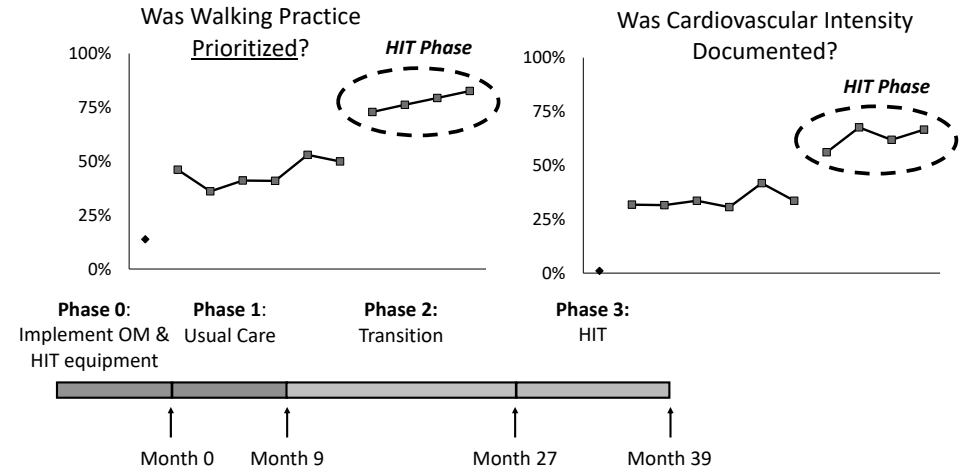
Percent with Walking

	MaxA / TotalA	MinA / ModA	≥ Contact Guard
PT 1	46%	69%	83%
	67%	93%	78%
	100%	89%	100%
	73%	100%	100%
PT 2	28%	53%	51%
	37%	67%	59%
	64%	79%	88%
	55%	76%	95%
PT 3	17%	100%	0%
	44%	75%	63%
	91%	100%	100%
	72%	100%	100%
PT 4	30%	69%	83%
	60%	82%	89%
	100%	82%	100%
	70%	100%	100%
	21%	80%	0%

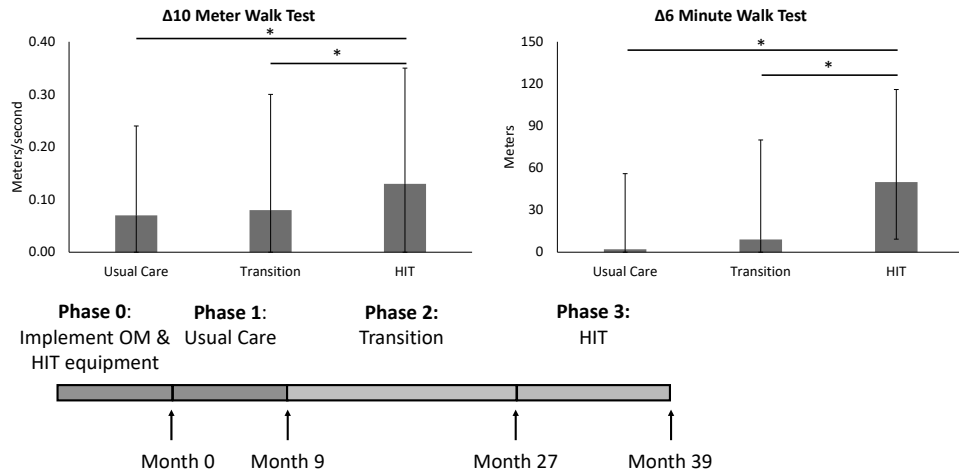
Background – FIRST Indiana (Henderson, 2022)



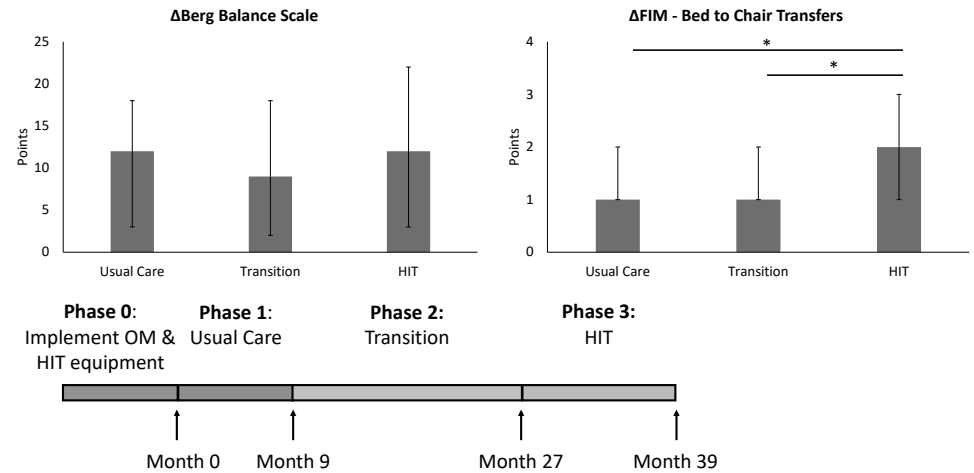
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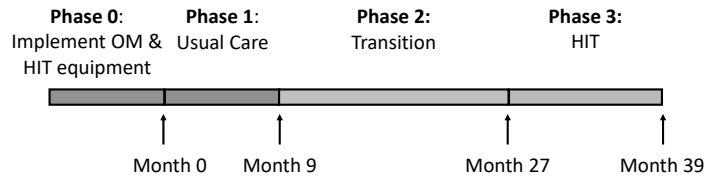


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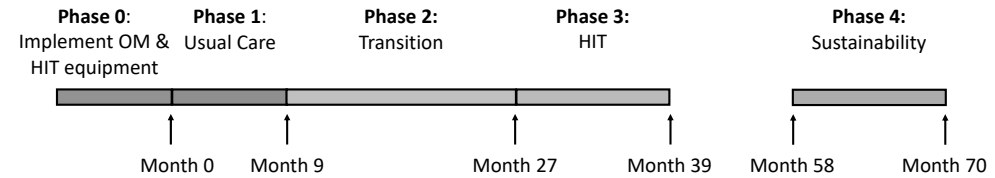
Adverse Events	Usual Care	Transition	HIT	Significance
All Significant	13	31	25	0.22
Death	1	0	0	0.13
New CVA	2	4	6	0.38
Rehospitalization	10	27	19	0.86
Falls (with injury)	12 (1)	70 (1)	38 (3)	0.11



Purpose + Hypothesis

Purpose: Investigate the sustainability of HIT implementation

Hypothesis: Fidelity and outcome measure gains will be significantly different from HIT phase



Methods

Inclusion Criteria

- All individuals admitted < 60 days post-stroke
- Age 18-89

Exclusion Criteria

- Unable to amb > 50 m prior to most recent stroke
- LE WBing restrictions / absent LE
- LOS < 7 days & d/c home

Methods

Sustainability Phase

- Reinitiated StepWatch throughout therapy day
- Hospital staff have access to recorded lectures
- No audit/feedback
- No mentoring from research staff



Extracted information

- Stepping activity during and outside therapy
- Demographics and comorbidities
- Outcome Measures – 10MWT, 6MWT + LoA, BBS
- PT treatment sessions
 - Gait practiced?
 - Gait prioritized?
 - Intensity documented?
 - Target intensity achieved?

Methods

Analyses

1. Were patients different at admission?
2. Were HIT fidelity metrics different?
3. Were OM changes different?

- Continuous data not normally distributed → Mann-Whitney U
- Nominal data → chi squared
- Alpha = 0.05

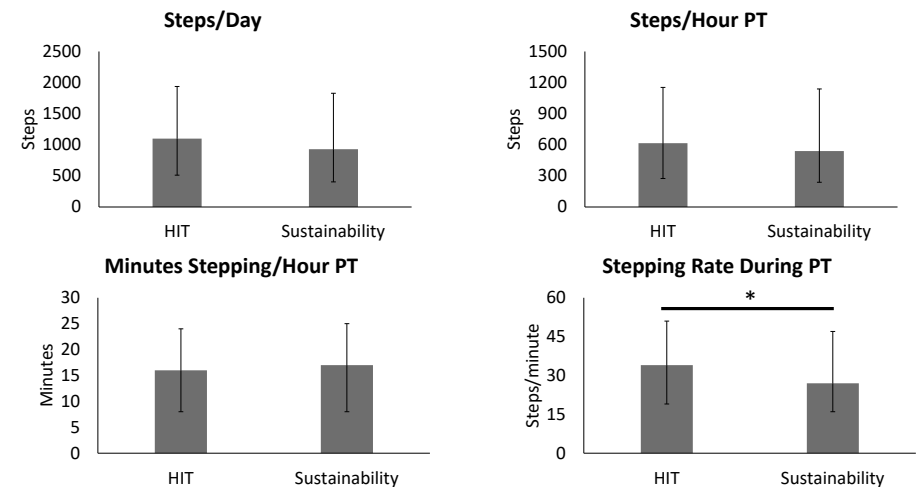
Results - Demographics

	HIT (n=208)	Sustainability (n=249)	Significance
age (y)	68.2 (57.4-76.3)	64.2 (55.7-73.4)	.04
gender: male (%)	113 (54%)	122 (49%)	
lesion location: right	96 (46%)	96 (39%)	
left	83 (40%)	118 (48%)	
bilateral	25 (12%)	35 (14%)	
lesion type: ischemic	151 (73%)	178 (72%)	
hemorrhagic/unknown	57 (27%)	67 (27%)	
beta-blockers, n (%)	120 (58%)	113 (45%)	P<0.001
duration poststroke (d)	9 (6-19)	12 (8-20)	P<0.001
Charlson Comorbidity Index	2 (0-3)	2 (0-3)	

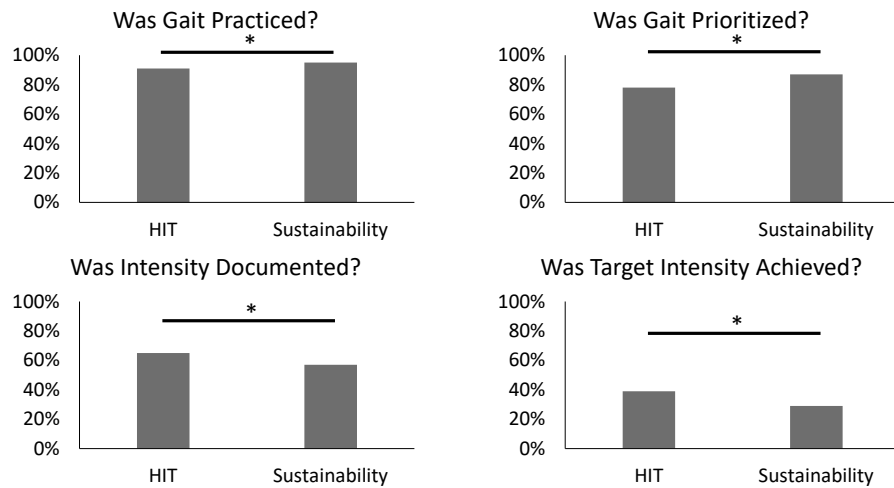
Results – Initial Function and IP Rehabilitation

	HIT (n=208)	Sustainability (n=249)	Significance
Baseline assessments			
paretic leg strength	2.8 (0.8-4.0)	3.0 (0.8-4.3)	
Berg Balance Scale	6 (4-25)	5 (3-27)	
10MWT (m/s)	0.08 (0.00-0.32)	0.06 (0.00-0.38)	
6MWT (m)	20 (0-92)	14 (0-91)	
6MWT LoA	2 (1-4)	3 (1-4)	
Training characteristics			
length of stay (d)	22 (15-29)	19 (13-24)	<0.001
PT sessions	18 (13-23)	14 (9-18)	<0.001
PT units/day	3.0 (2.8-3.3)	2.8 (2.6-3.1)	<0.001
Target Intensity: high	199 (96%)	245 (98%)	
moderate	9 (4%)	4 (2%)	

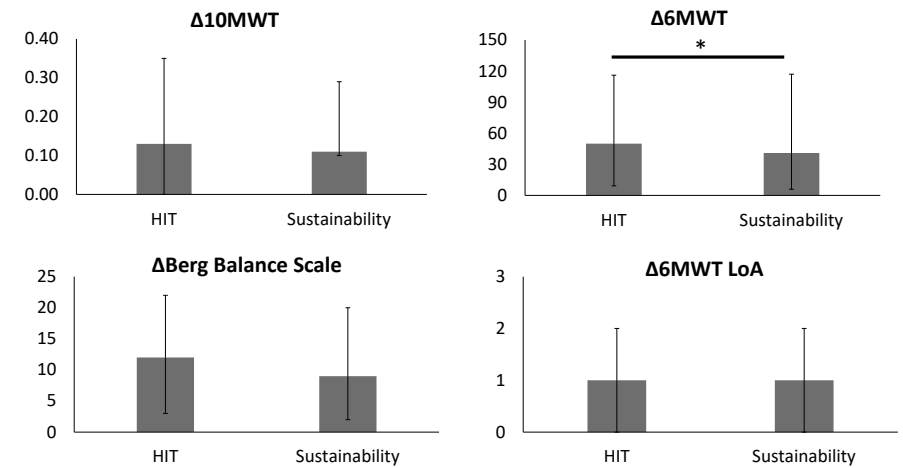
Results – Stepping Activity



Results – Chart Audits



Results – Discharge Outcomes



Summary + Conclusion

- 12 months of sustainability data collected 1.5 years after HIT implementation
 - Sustainability phase exhibited ↑ focus on gait activities, but at ↓ stepping rate resulting in no difference in amount of practice provided
 - Both intensity fidelity metrics ↓ during sustainability phase
 - Δ6MWT ↓ during sustainability phase
- Sustaining the amount, but not intensity of practice was not sufficient to maintain OM gains
- Next steps:
 - Account for baseline differences in statistical analyses
 - Documentation of intensity vs HR monitoring

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