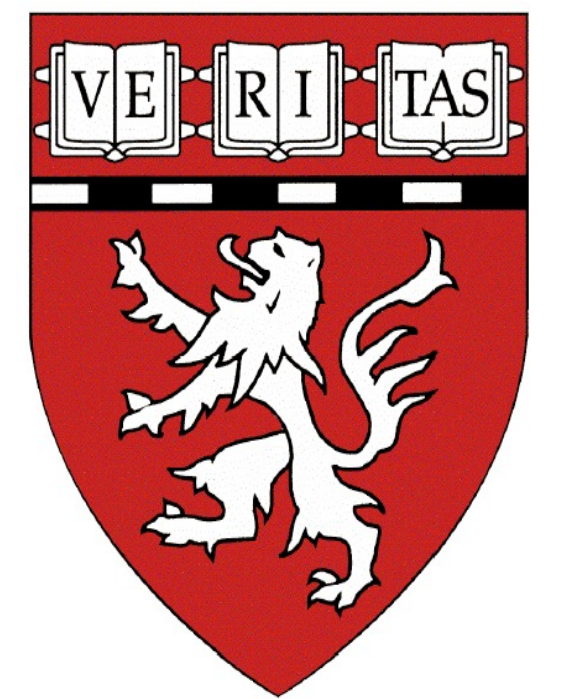




Intraindividual variability in response to repetitive transcranial magnetic stimulation (rTMS) treatment protocols

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INTRODUCTION

- Transcranial magnetic stimulation (TMS) is safe, non-invasive tool widely used for research and treatment that acts by modulating activity within and between neural circuits.
- TMS is FDA approved for the treatment of unipolar depression.
- TMS consists of 36 treatment sessions, delivered 5 days per week for the first 30 sessions and then 6 taper sessions over 2-3 weeks.
- The left dorsolateral prefrontal cortex (LDLPFC) is a target stimulation site for TMS treatment.
- TMS was initially approved to treat MDD at the LDLPFC target with the 10 Hz repetitive TMS (rTMS) protocol, but intermittent theta-burst stimulation (iTBS) is a more rapid protocol that has been found to be equally as effective within a population.
- It is not yet known whether an individual patient might find one protocol more therapeutic than the other.

METHODS

- We conducted a retrospective chart review to analyze the relationship between treatment response to rTMS and the protocol used.
- **Population:** 11 patients diagnosed with treatment-resistant MDD who received at least 20 consecutive treatments of both treatment protocols in a naturalistic clinical setting.
- **Assessment measure:** Depressive symptoms were assessed at baseline, after every ten sessions and at end point (sessions 1, 10, 20, 30, 36) using the Hamilton Depression Scale (HAMD-17).
- **Analysis:** Response criteria was determined to be a 50% decrease in HAMD-17 scores from the initial score to the final score collected. A final HAMD-17 score of ≤ 7 was necessary to categorize as a full remission.

DEMOGRAPHICS

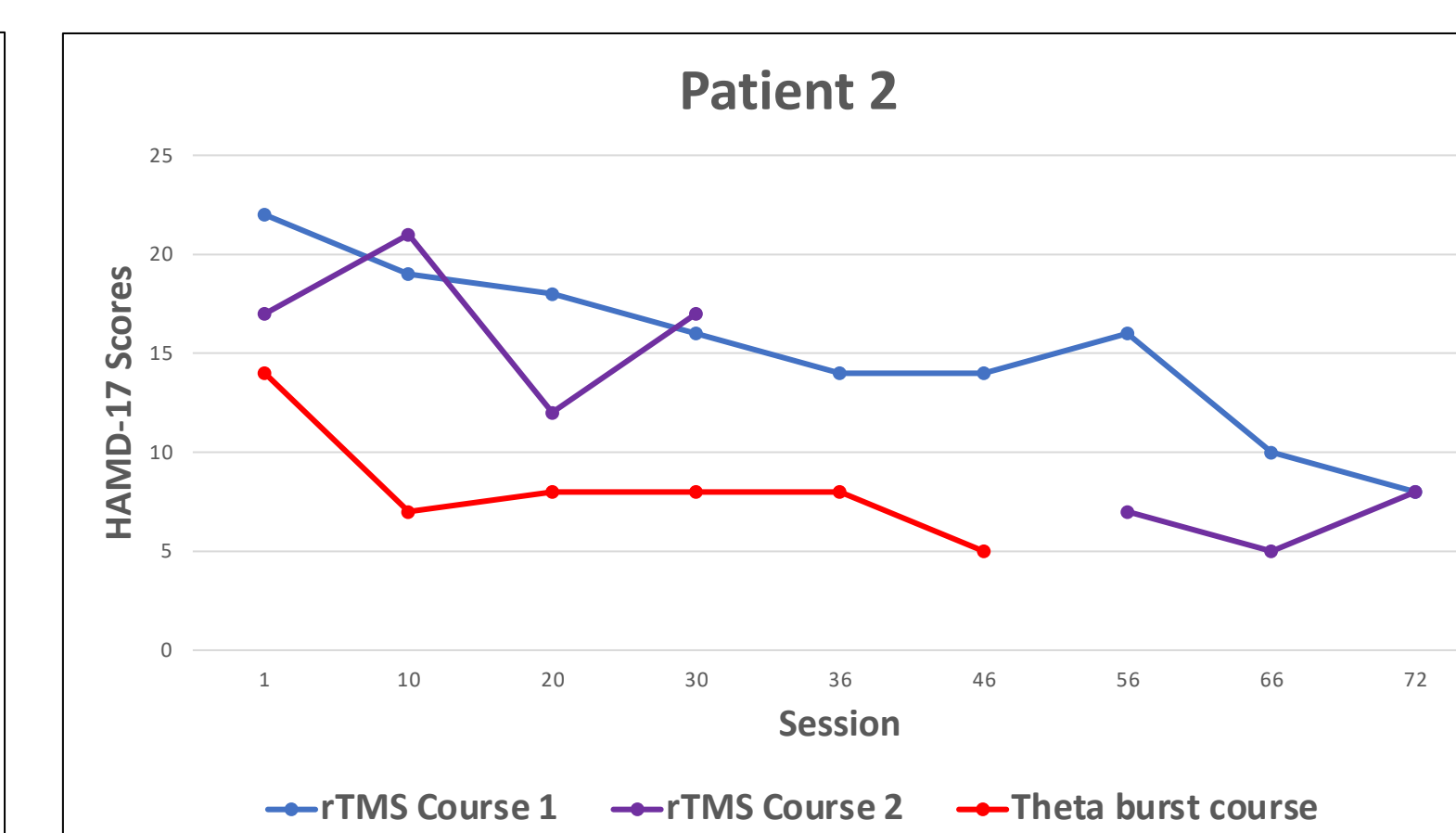
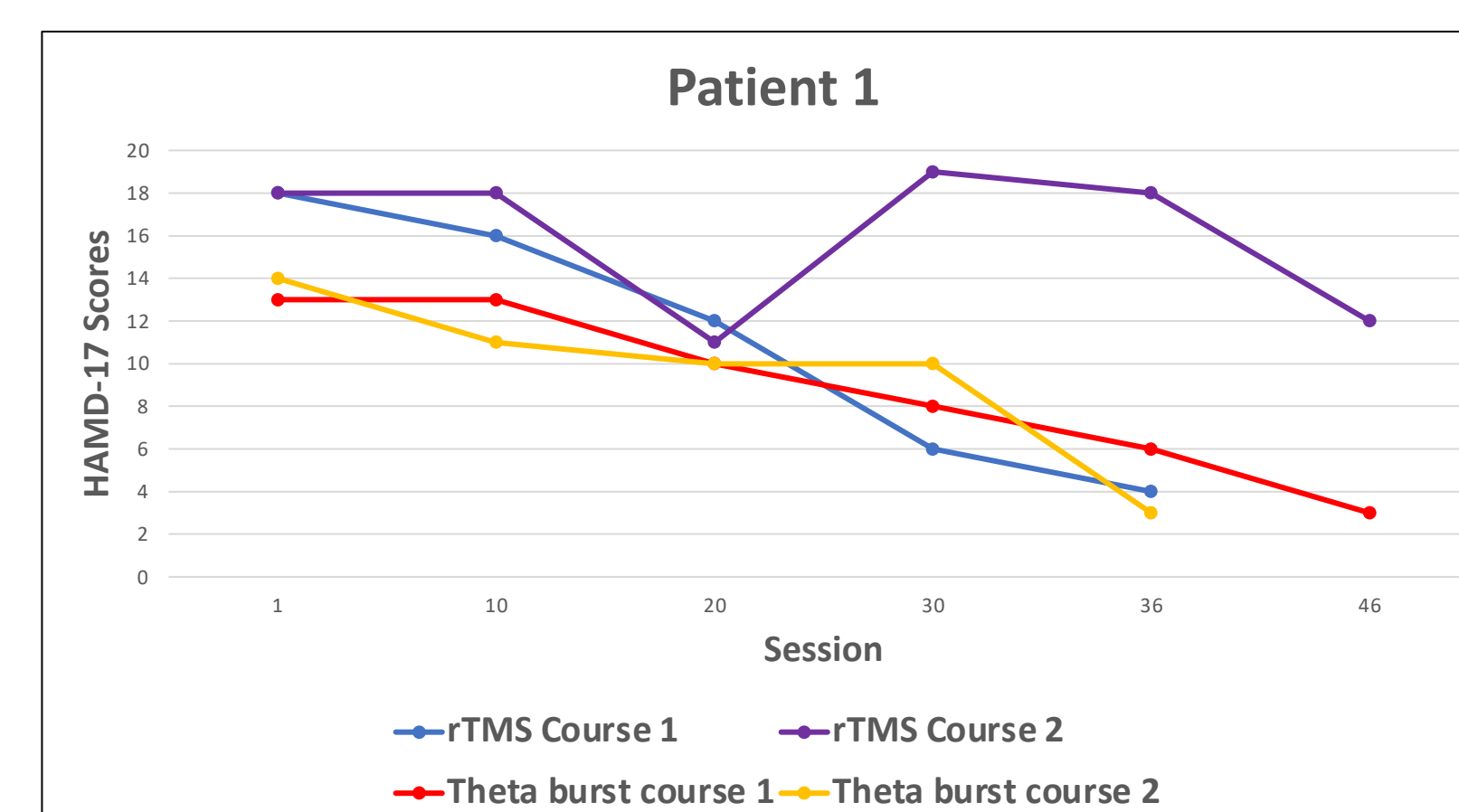
- Gender: 64% female (n=7), 36% male (n=4)
- Age: 23 - 72 years old (mean= 43.9 years, SD = 12.8 years)
- HAMD17 Baseline Score Average = 16.52 ; SD = 5.00
- Range of total number of treatment sessions: 20 – 108 sessions (mean= 47 sessions, SD = 20 sessions)

RESULTS

Effect of rTMS protocol used on TMS treatment response for depression

Population Response to Treatment Courses		
Protocol	No Response	Response
10 Hz rTMS	45.5% (n=5)	54.5% (n=6)
Theta Burst	81.8% (n=9)	27.3% (n=3)

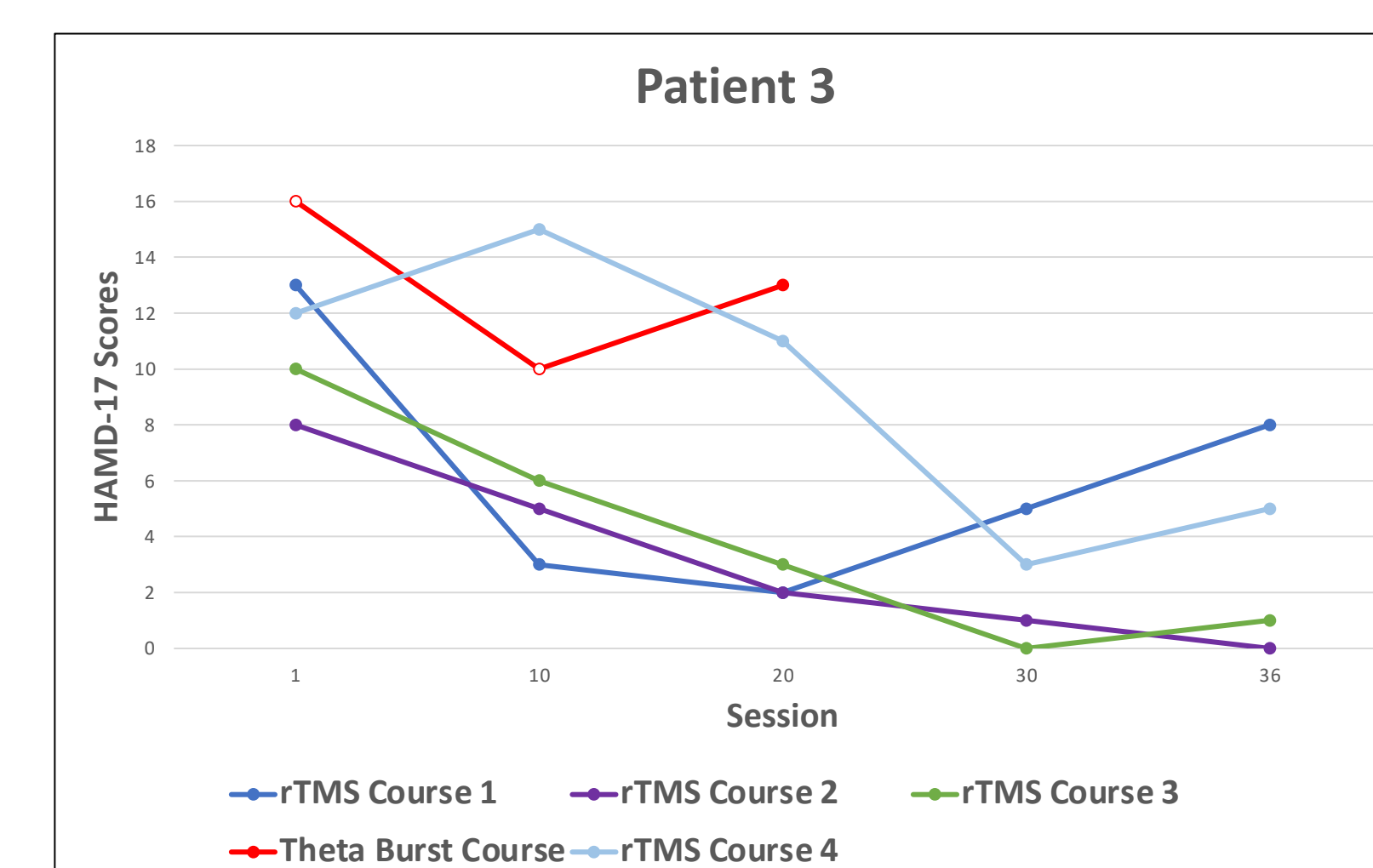
Similar Response to rTMS and iTBS



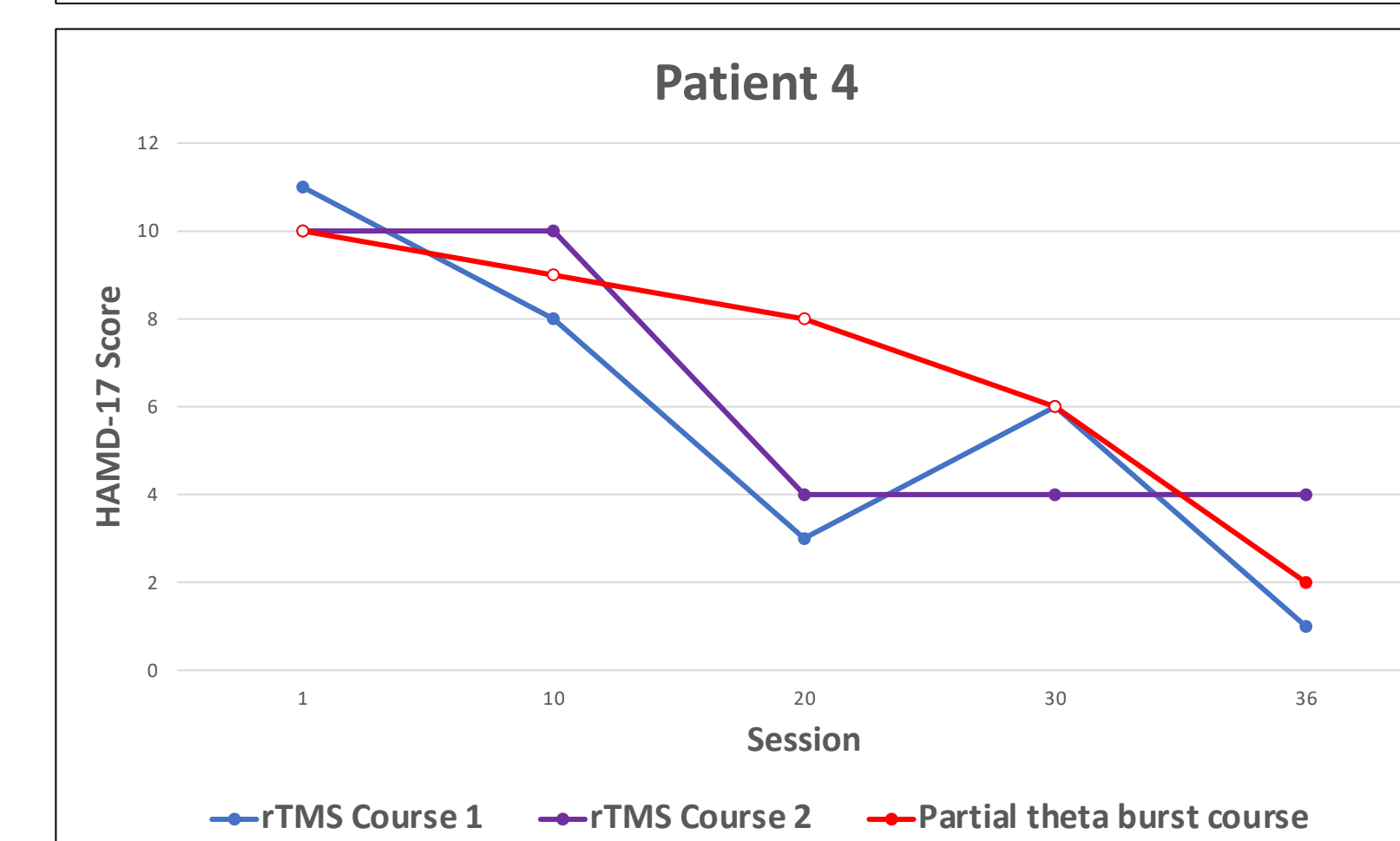
Protocol	1	10	20	30	36	46
rTMS Course 1	18	16	12	6	4	
		88.90%	75.00%	33.30%	22.20%	
rTMS Course 2	18	18	11	19	18	12
		100.00%	61.10%	105.60%	100%	66.70%
Theta burst course 1	13	13	10	8	6	3
		100%	76.90%	61.50%	46.20%	23.10%
Theta burst course 2	14	11	10	10	3	
		78.60%	71.40%	71.40%	21.40%	

Protocol	1	10	20	30	36	46	56	66	72
rTMS Course 1	22	19	18	16	14	14	16	10	8
		90.4%	81.8%	86.4%	63.6%	63.6%	86.4%	45.4%	42.1%
rTMS Course 2	17	21	12	17			7	5	8
		124.5%	70.6%	100.0%			41.2%	29.4%	47.1%
Theta burst course	14	7	8	8	5				
		50.0%	57.1%	57.1%	35.7%				

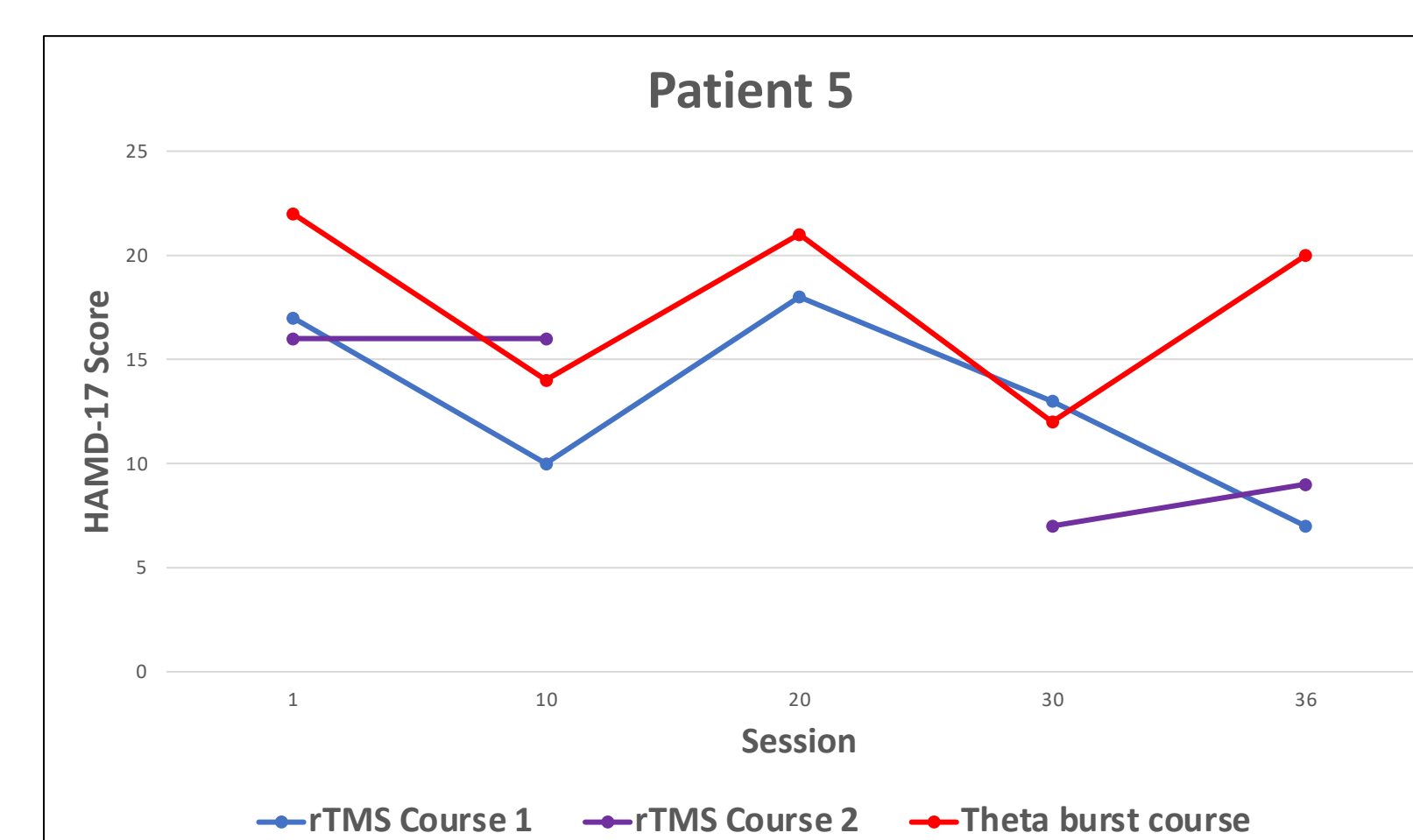
Different Response to rTMS and iTBS



Protocol	1	10	20	30	36
rTMS Course 1	13	3	2	5	8
		23.1%	15.4%	38.4%	61.5%
rTMS Course 2	8	5	2	1	0
		62.5%	25.0%	12.5%	0.0%
rTMS Course 3	10	6	3	0	1
		60.0%	30.0%	0.0%	10.0%
Theta Burst Course	16	10	13		
		64.5%	81.3%		
rTMS Course 4	12	15	11	3	5
		125.0%	91.7%	25.0%	41.7%

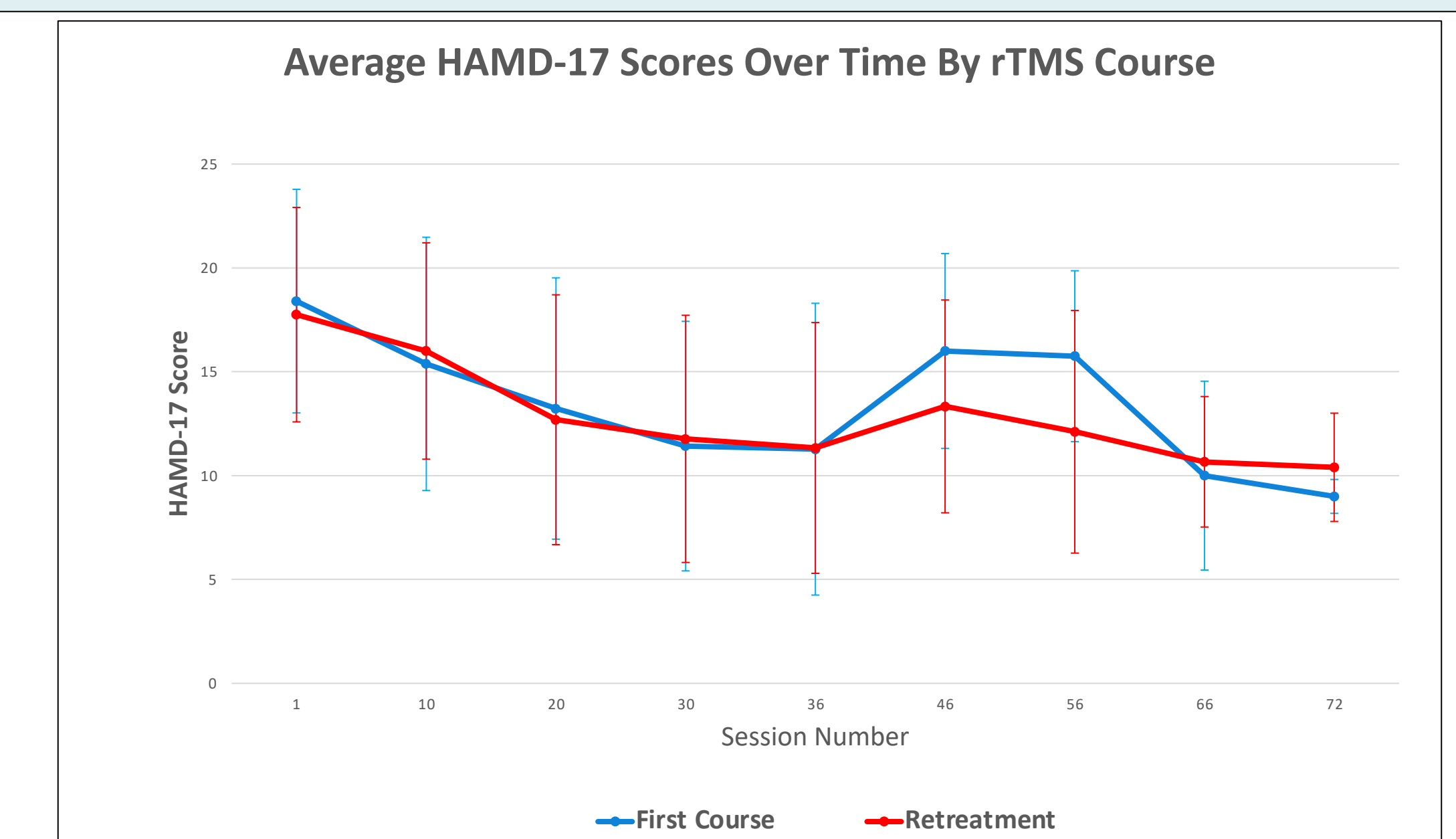


Protocol	1	10	20	30	36
rTMS Course 1	11	8	3	6	1
		72.7%	27.3%	54.5%	9.0%
rTMS Course 2	10	10	4	4	4
		100.0%	40.0%	40.0%	40.0%
Partial theta burst course	10	9	8	6	2
		90.0%	80.0%	60.0%	20.0%



Protocol	1	10	20	30	36
rTMS Course 1	17	10	18	13	36
		58.8%	105.9%	76.5%	41.2%
rTMS Course 2	16	16		7	9
		100.0%		43.8%	56.3%
Theta burst course	22	14	21	12	20
		63.6%	95.5%	54.5%	90.9%

Effect of TMS treatment response for depression



SUMMARY

- Previous explorations of naturalistic clinical data have indicated that therapeutic response to one 10 Hz rTMS treatment course should predict a similar response for a second course.
- However, we have observed that patients who have previously reliably responded to 10 Hz rTMS treatment courses do not necessarily respond to iTBS treatment courses.
- Some patients will only begin to improve from an iTBS treatment course once their protocol is switched to a 10 Hz rTMS one.

CONCLUSIONS & FUTURE DIRECTIONS

- Depressive symptoms improved with more rTMS treatments.
- Our findings indicate that there may be intraindividual variability in response to rTMS treatment courses dependent on the protocol used.
- This suggests that the capacity for therapeutic neuroplastic effects of specific TMS protocols may vary between individuals.

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