

Develop a treatment plan to help Jake with his motion dyscontrol and inattention

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- This case shows data from serial assessments to help inform treatment planning.
- Motion control improved with the first dose of medication to the level expected for a boy Jake's age. Sustained attention improved but performance continued to indicate some deficit.
- His parents and teachers noticed Jake's improvement in motion control but missed the continuing inattention and over-rated his overall improvement with the first dose of medication.
- Attentive performance further improved on the Quotient Attention Scaled Score and now showed the level of attention expectable for a boy Jake's age.

History: Jake is almost 10 years old and in the 4th grade.

Referral Complaint: Jake came to the practice for an ADHD evaluation due to poor academic performance, difficulty with concentration and excessive fidgety behavior. His parents reported that he was also extremely disorganized and impatient.

Plan of Action: Our standard protocol for patients presenting with behavioral complaints includes a baseline Quotient ADHD Test because symptoms of multiple behavioral problems overlap and many children present with comorbid conditions. The baseline test quantifies the severity of deficits in each symptom domain and serves as a benchmark to inform patient management decisions. Jake's baseline test revealed significant motion dyscontrol and inability to sustain attention. We started him on medication.

We generally re-test in one to three weeks after starting medication to help titrate the medication to an optimal dose quickly. On medication, his teacher reported that he needed much less direction and that he could work independently. His mother reported similar improvement in symptoms at home. However, Quotient attention metrics indicated that Jake's performance had room for improvement. We concluded that the medication might be sub-therapeutic, so we increased the dose and tested again. Results of the third test indicated that this was the right medication and dose for Jake.

Conclusions: This case illustrates the value of using data from serial, objective assessments using the Quotient ADHD Test to inform medical management of the patient and help to achieve better clinical efficacy. Jake had severe motion and attention control dysfunction at baseline, which improved with medication. Parent and teacher reports over-rated improvement, whereas the Quotient ADHD Test suggested that there might be room for improvement on the attention metrics. Since there were no side effects, we increased the dose. Jake is doing well at home and at school.



The Right Equation to Help Optimize ADHD Management

See the Problem
Gain alignment.



See the Progress
Are we there yet?



Get on Track
Sooner

Quotient
ADHD test

QUANTITATIVE DATA

MOTION ANALYSIS

	Day 1		Day 8		Day 29	
	Results	%ile	Results	%ile	Results	%ile
Time Immobile	85 ms	27	348 ms	96	358 ms	95
# Movements	3840	20	863	95	851	96
Displacement	6.38 m	20	0.95 m	98	0.94 m	98
Area	246 cm ²	11	15 cm ²	98	14 cm ²	99
Spatial Complexity	1.054	10	1.374	94	1.418	96
Temporal Scaling	0.842	29	0.343	94	0.317	95

ATTENTION STATE ANALYSIS

	Day 1		Day 8		Day 29	
	Results	%ile	Results	%ile	Results	%ile
# Shifts	20	6	12	64	9	78
Attentive	23.3%	31	50.0%	55	76.7%	77
Impulsive	33.3%	52	33.3%	52	23.3%	65
Distracted	13.3%	22	16.7%	15	0.0%	99
Disengaged						
Random	16.7%	26	0.0%	99	0.0%	99
Minimal	10.0%	7	0.0%	99	0.0%	99
Contrary	3.3%	13	0.0%	99	0.0%	99

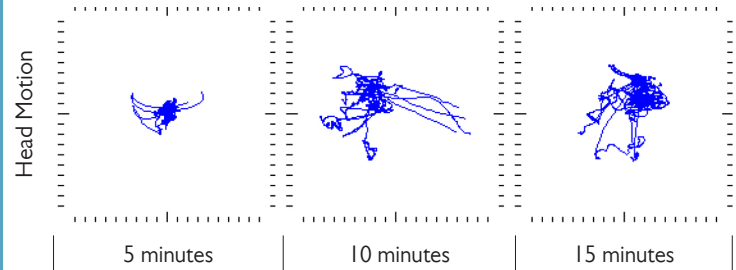
ATTENTION RESPONSES

	Day 1		Day 8		Day 29	
	Results	%ile	Results	%ile	Results	%ile
Accuracy	73.8%	24	86.9%	55	93.8%	78
Omission Errors	16.1%	12	6.3%	30	0.0%	99
Commission Errors	36.3%	31	20.2%	56	12.3%	74
Response Time	490 ms	54	470 ms	46	464 ms	47
Variability	179 ms	24	109 ms	80	112 ms	74
COV	36	26	23	79	24	75

SEE THE PROBLEM

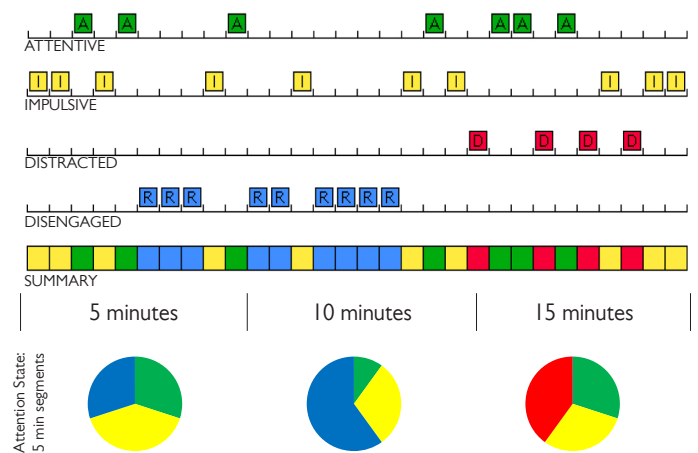
Day 1
BASELINE

MOTION ANALYSIS



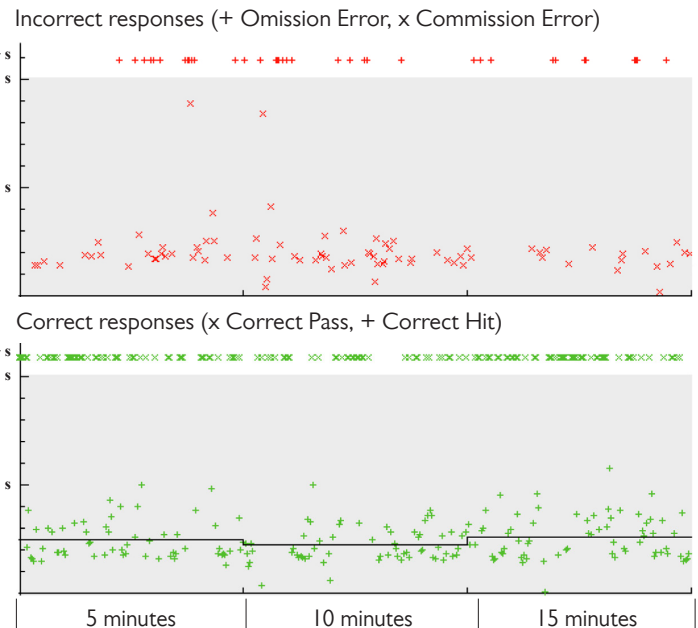
Jake demonstrated good motion control for the first 5 minutes, but area increased over time as he fatigued. This motion pattern and the low percentile scores are consistent with motion dyscontrol.

ATTENTION STATE ANALYSIS



20 attention shifts (6th percentile) and low % time attentive (23.3%, 31st percentile) is a pattern consistent with attention problems.

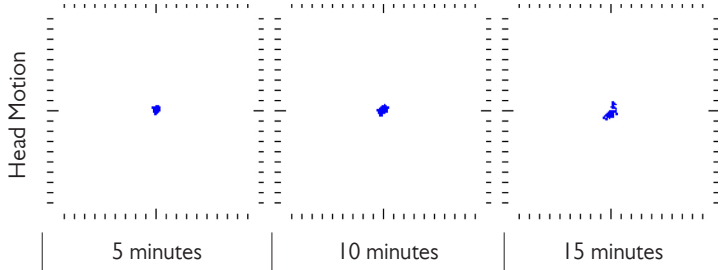
ATTENTION RESPONSES



SEE THE PROGRESS

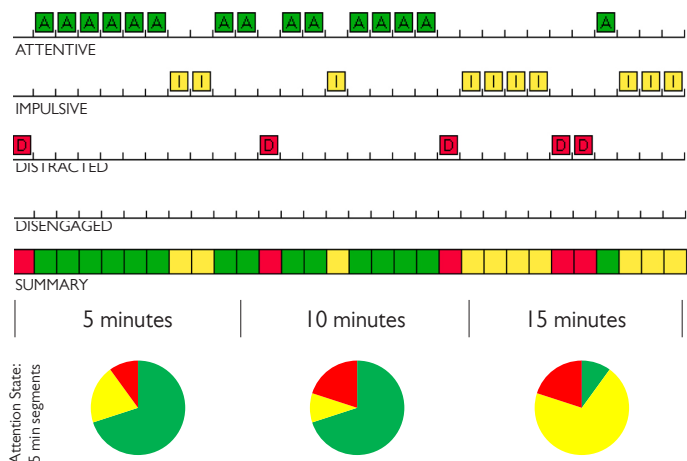
Day 8
Medication X

MOTION ANALYSIS



His teacher reported improvement. He was no longer disruptive in class. However, his attention is more difficult to assess without quantitative data. With rating scales alone, many clinicians would be satisfied. **Is this really “good enough?”**

ATTENTION STATE ANALYSIS



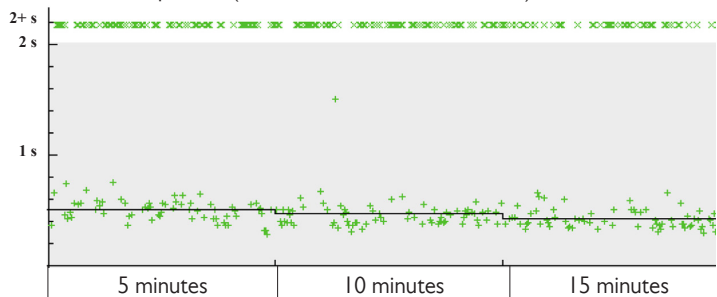
Jake's sustained attention improved compared to the baseline test. He still had 12 attention state shifts. The distracted state is in the 15th %ile. **We can do better!**

ATTENTION RESPONSES

Incorrect responses (+ Omission Error, x Commission Error)



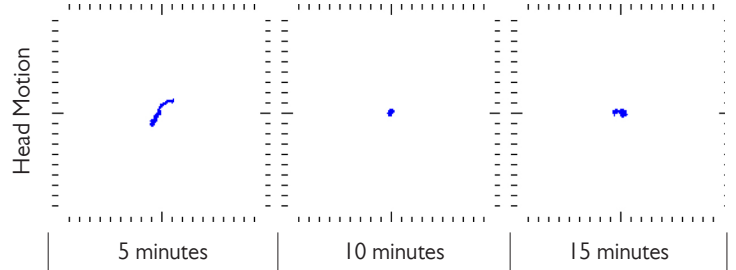
Correct responses (x Correct Pass, + Correct Hit)



GET ON TRACK SOONER

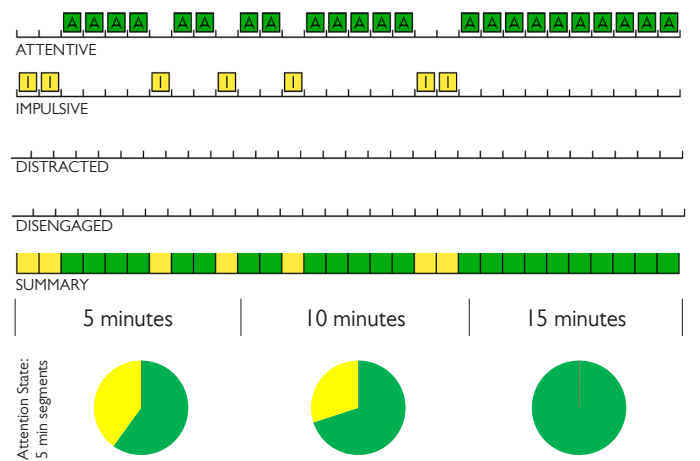
Day 29
Medication X, dose increase

MOTION ANALYSIS



Jake had excellent motion control on this test.

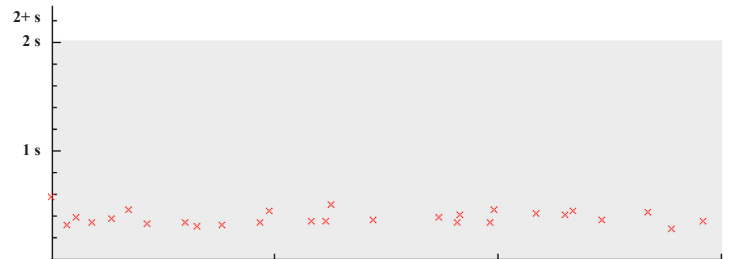
ATTENTION STATE ANALYSIS



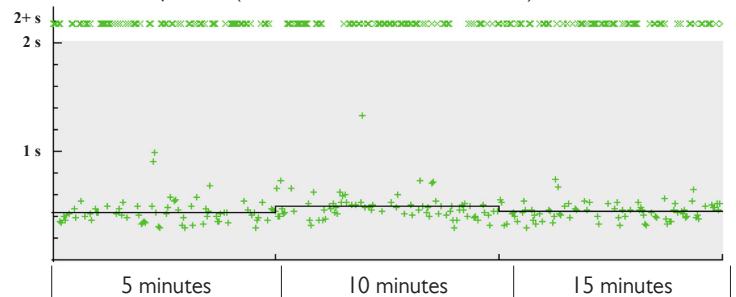
Jake's doctor used the attention state data from second test to help inform the decision to increase the dose. Jake had good sustained attention on this test. **We're there!**

ATTENTION RESPONSES

Incorrect responses (+ Omission Error, x Commission Error)



Correct responses (x Correct Pass, + Correct Hit)



From lack of follow-through to 'I'm so proud of you!'

Summary

Day 1: Scaled Scores show severe motion dyscontrol and attention deficit.

Day 8: Medication improved the Motion Scaled Score to 2.01, which is in the expectable range for a boy Jake's age. The Attention Scaled Score improved to 5.82, which suggests there may be room for improvement.

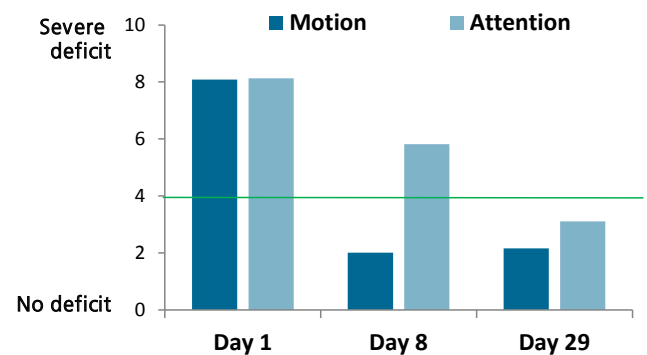
Day 29: A higher dose improved both Scaled Scores to be less than the mean scores for typically developing children.

Conclusions from the case

This case illustrates the value of using data from serial, quantitative assessments using the Quotient® ADHD Test to help inform treatment management. Without quantitative data to complement the parent and teacher reports, it is likely that it would have taken months to address Jake's inability to sustain attention.

Higher Scaled Scores indicate weaker performance on those domains than the average performance expected for age and gender. The mean Scaled Score for typically developing children across both Motion and Attention domains is ~4 for all ages and genders.

Test Date	Day 1	Day 8	Day 29
Age	9.83	9.85	9.90
Scaled Scores			
Motion	8.08	2.01	2.16
Attention	8.03	5.82	3.11



Raising the Bar: A New Performance Standard

The Quotient ADHD Test: A New Performance Standard

Adding micro-motion¹ and attention state analysis² improves performance characteristics relative to traditional CPTs.

Specificity	96.2% (True Negative)
Negative Predictive Value (NPV)	94.3% (Rule out)
Sensitivity	71.5% (True Positive)
Positive Predictive Value (PPV)	79.2% (Rule in)
Agreement	92.0%

Method: Post-hoc, pooled analysis of 851 children, age 6-14 (707 controls, 144 with ADHD)³

Possible Coding Choices

	CPT Codes	Example	2014 Medicare Physician Fee Schedule
Developmental Testing	96111	96111	\$ 130.04
Neuropsychological Testing	96118-96120	96118	\$ 99.23
Psychological Testing	96101-96103	96101	\$ 80.96