Objective ADHD Test

Success to me is...

"...fitting in and staying out of trouble."

— Danny, age 9

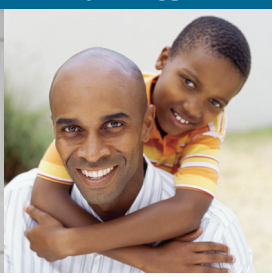
Quotient® ADHD test

Success to me is...

"...seeing my child be the best he can be. The graphics are easy to understand on the Quotient® report. I can *see* Danny's progress with hyperactivity and inattention on paper as well as better behavior at home."

— Danny's Mom

Children	Adults	Families



Attention Deficit Hyperactivity Disorder (ADHD)

is a neurobehavioral disorder that affects the way an individual functions in different settings. According to the CDC, ADHD affects 9.5% of children[1] and 4.5% of adults. A person with ADHD may face life-long challenges in school, work and personal relationships. Identifying the disorder early and optimizing treatment is critical. With proper treatment, many people with ADHD can and do lead successful lives.

ADHD has Three Core Symptom Areas:

- Inattention (cannot focus)
- Hyperactivity (cannot sit still)
- Impulsivity (acts without thinking)

Diagnosis and Management

For an individual to be diagnosed with ADHD, symptoms must be present at levels that are not in line with his or her stage of development and interfere with normal daily activities. Doctors may use parent and teacher rating scales, interviews and the Quotient ADHD Test along with a clinical exam to make a diagnosis and implement a treatment plan.

ADHD Has Three Sub-Types

Inattentive Type

- Difficulty paying close attention to details
- Hard to organize activities or finish a task
- Difficulty following instructions or conversations
- Is forgetful in daily activities, frequently loses things

Hyperactive-Impulsive Type

- Extreme restlessness and fidgetiness
- Talks excessively and/or interrupts others

Combined Type

- Symptoms of both types are equally strong

ADHD affects 9.5% of children. Approximately 60% have symptoms through adolescence into adulthood.[2]

ADHD in Children[3]

ADHD is usually first diagnosed in grade school. Children with ADHD have trouble paying attention, controlling impulsive behaviors (may act without thinking about what the result will be), and, in some cases, are overly active. It is normal for children to have trouble focusing and behaving. However, in children with ADHD, the symptoms continue instead of getting better, and they can make learning very difficult.

A Child with ADHD Might:

- have a hard time paying attention and daydream a lot
- not seem to listen
- be easily distracted from schoolwork or play
- forget things
- be in constant motion or unable to stay seated
- squirm or fidget
- talk too much
- not be able to play quietly
- act and speak without thinking
- have trouble taking turns
- interrupt others

ADHD in Adolescents[4]

A teenager may notice greater challenges with staying on top of schoolwork and other responsibilities. There are more time demands and higher expectations to function independently.

Difficulty with "executive functioning" emerges in teenagers. This term refers to brain functions that activate, organize, integrate, and manage other functions. Executive function allows people to think about goals and consequences for their actions, plan, evaluate progress, and shift plans as necessary.

Inattention and impulsivity can lead to difficulties with driving. Drivers with ADHD have more tickets, are involved in more accidents, make more impulsive errors, and have slower and more variable reaction times.

Comorbid Conditions May Emerge in Adolescence

Up to 60% of teens with ADHD have been found to have at least one other comorbid (co-existing) condition. Many of the symptoms overlap, so it is important to get help from an experienced clinician.

- Mood disorders including depression and dysthymia.
- Anxiety disorders may be present in 10-40% of teens with ADHD. Anxiety disorders are characterized by excessive worry and may have physical symptoms such as headaches or upset stomach.
- Substance abuse risk among children with ADHD ranges from 12-24%.
- Oppositional Defiant Disorder (ODD) is characterized by difficulty following the rules and limits set by authority figures. Conduct Disorder (CD) is more severe than ODD and adds difficulty following rules and laws set by society.

ADHD in Adults[5]

ADHD is often inherited. It affects both males and females, and people of all races and cultural backgrounds. It is a common misconception that kids outgrow ADHD, but 60% of kids with ADHD have symptoms into adulthood. ADHD can go undiagnosed, so many adults do not seek out a full assessment for themselves until after their child is diagnosed!

Not every person with ADHD displays all of the symptoms, nor does every person with ADHD experience the symptoms of ADHD to the same level of severity or impairment. Some people have mild ADHD, while others have severe ADHD, resulting in significant impairments. ADHD can cause problems in school, in jobs and careers, at home, in family and other relationships, and with tasks of daily living.

Common Symptoms of Adult ADHD

- Difficulty getting started on tasks
- Difficulty completing tasks
- Physical restlessness or hyperactivity
- Excessive impulsivity; saying/doing things without thinking
- Excessive and chronic procrastination
- Frequently losing things
- Poor organization, planning, and time management skills
- Excessive forgetfulness

Objective Data Leads to Better ADHD Assessment

The Quotient® ADHD System accurately measures motion and analyzes shifts in attention state to give your clinician a report with objective data on hyperactivity, impulsivity and inattention. This information helps guide treatment planning.

First Visit

- The Quotient® ADHD Test may be administered at the initial visit to quantify the severity of deficits related to hyperactivity, impulsivity and inattention.
- Objective data from the Quotient® report supplements information gathered through rating scales from parents, teachers and self-reports.
- The baseline Quotient® ADHD Test provides objective information about hyperactivity, inattention and impulsivity to guide the conversation with your doctor about an individualized treatment plan if ADHD is the diagnosis.

Follow-up Visits

- Doctors may run a series of Quotient® assessments to help inform medication management and help achieve better clinical efficacy.
- The Quotient® ADHD Test is used to evaluate progress toward goals and to help guide treatment planning.

Med Check Visits

- Once dosing is stable, your doctor may test periodically at med check visits.

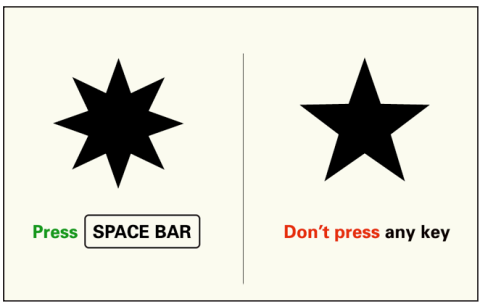
Professional Guidelines

- The American Academy of Pediatrics recommends systematic monitoring of dosage and side effects.[6]
- Medication Initiation: The American Academy of Child and Adolescent Psychiatrists (AACAP) recommends an office visit in the first 30 days to monitor medication tolerance, side effects and progress.[7]
- Continuation and Maintenance Phase: AACAP recommends office visits at least monthly until symptoms have been stabilized.
- Once the dosing is stable, schedule office visits every 2-4 months. "The patient with ADHD should have regular follow-up for medication adjustments to ensure that the medication is still effective, the dose is optimal and the side effects are clinically insignificant."

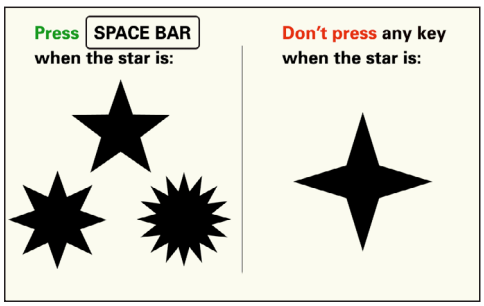
The Quotient® ADHD Test

The Quotient® ADHD Test takes 15 minutes for children 6 through 12 years old or 20 minutes for adolescents and adults. The test measures an individual's movement while he or she attempts to focus on changing visual stimuli. The information is uploaded via a secure internet connection and results are compared to a database of age and gender matched groups. The report is available right away to guide the discussion about next steps.

Child Test: 1 target, 1 non-target



Adolescent/Adult Test: 3 targets, 1 non-target

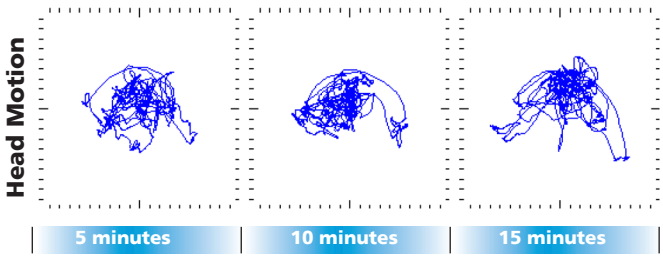


Baseline Assessment
Kate, age 12. No medication

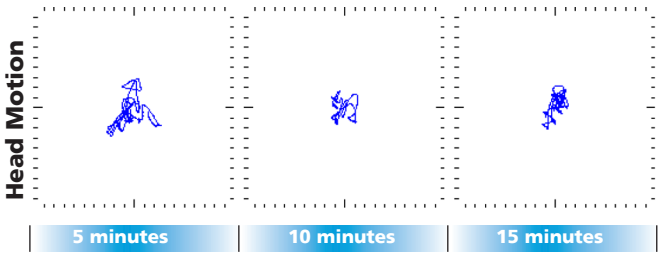
Post-Medication Assessment
20 mg methylphenidate

Motion Analysis

The graphical display reflects significant area. Quantitative data tables in the report match 6 motion metrics against and age- and gender-matched subjects.



The area of motion is reduced compared to the baseline test.



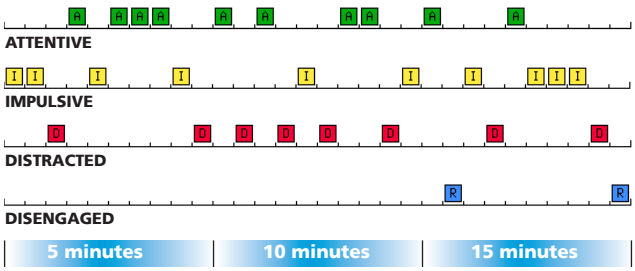
	Baseline		
	Ref. Range	Results	%ile
Immobility Duration	103-331 ms	68 ms	3[t]
Movements	916-2859	4445	3[t]
Displacement	1.21-4.13 m	8.7 m	3[t]
Area	24-104 cm^2	384 cm^2	1[t]
Spatial Complexity	1.099-1.320	1.042	1[t]
Temporal Scaling	0.345-0.771	0.825	12[t]

Test #2	
Results	%ile
357 ms	86
892	84
1.41 m	76
72 cm^2	31
1.160	41
0.117	98

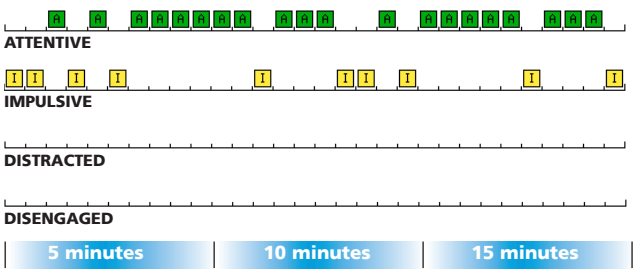
Download Kate's full case study and other case studies from BioBDx.com.

Attention State Summary

The chart shows 23 attention shifts and a pattern that is consistent with ADHD. For the first 60 seconds, Kate showed impulsive behavior, followed by 30 seconds of distraction, followed by 30 seconds on task, and so on.



Kate's attention improved compared to the baseline test. Distracted and disengaged states were eliminated. She improved from 23 attention shifts to 14. She improved on task performance, but impulsive behavior remained the same.



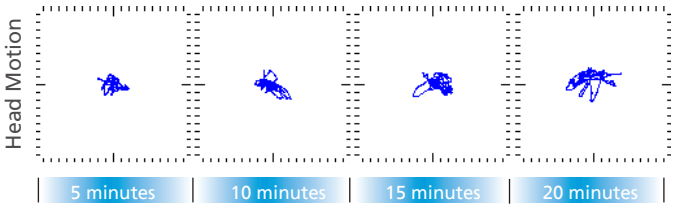
	Baseline		
	Ref. Range	Results	%ile
# Shifts	4-18	23	5[t]
Attentive	33.3-93.3%	33.3%	16[t]
Impulsive	5.0-46.7%	33.3%	34
Distracted	0-13.3%	26.7%s	5[t]
Disengaged			
Randon	0-3.3%	3.3%	25
Minimal	0-0%	3.3%	10[t]
Contrary	0-0%	0.0%	99

Test #2	
Results	%ile
14	41
66.7%	43
33.3%	34
0.0%	99
0.0%	99
0.0%	99
0.0%	99

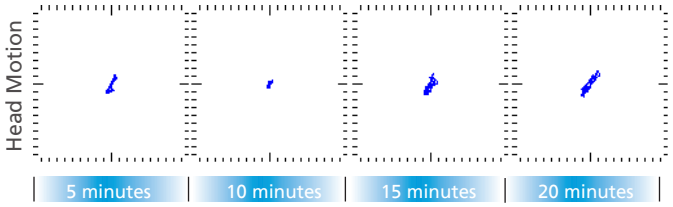
Baseline Assessment
Alex, age 21. No medication

Post-Medication Assessment
7.5 mg Focalin®

Motion Analysis



The graphs plot motion of the head. Head motion increases over the course of the test. The patient has motion control dysfunction.

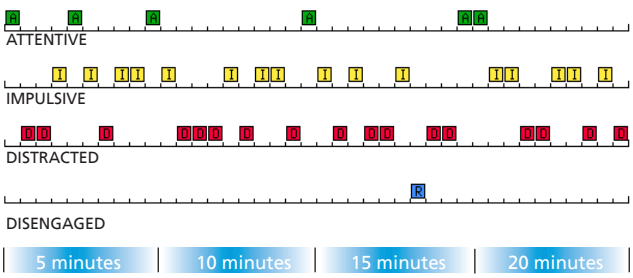


Motion control improved over the baseline assessment.

	Baseline			Test #2	
	Ref. Range	Results	%ile	Results	%ile
Immobility Duration	159-601 ms	210 ms	27	528 ms	79
Movements	449-1935	1464	31	638	73
Displacement	0.527-2.82	2.21 m	27	0.79 m	73
Area	11-107 cm^2	102 cm^2	17	25 cm^2	66
Spatial Complexity	1.1-1.431	1.098	15[t]	1.345	69
Temporal Scaling	0.116-0.63	0.390	41	0.065	85

Download Alex's full report aand other case studies from BioBDx.com.
Note: Some Adult Reports may also show graphics and quantitative data for leg motion.

Attention State Summary



The Quotient ADHD System analyzes 30-second blocks of data that is generated during the attention task. For the first 30 seconds, Alex was on task, followed by 60 seconds of distraction, followed by 30 seconds of impulsive behavior, and so on. The data suggests a problem with inattention.

Although he had 25 attention shifts, Alex's performance improved in his follow-up test. Alex demonstrated better focus, but still has 12 30-second blocks of impulsivity. He was attentive 62%, impulsive 30.0% and distracted 7.5% of the test.

	Baseline Results	Test #2 Results
# Shifts	23	25
Attentive	33.3%	62.0%
Impulsive	33.3%	30.0%
Distracted	26.7%s	7.5%
Disengaged		0.0%

Quotient®
ADHD test

For more information about ADHD:
Centers for Disease Control and Prevention (CDC)
www.cdc.gov

National Resource Center on ADHD
www.help4adhd.org • 800-233-4050

National Institute of Mental Health
www.nimh.nih.gov • 866-615-6464

To find a support group:
Children and Adults with Attention Deficit/Hyperactivity Disorder (CHADD)
www.chadd.org • 301-306-7070

Attention Deficit Disorder Association (ADDA)
www.add.org • 484-945-2101

References

1. MMWR Increasing Prevalence of Parent-Reported ADHD Among Children–US 2003 and 2007 November 12, 2010 59(44) 1439-1443
2. The Disorder Named ADHD. National Resource Center on ADHD, www.help4adhd.org
3. ADHD Fact Sheet, www.cdc.gov/ActEarly
4. ADHD in Teens, National Resource Center on ADHD, www.help4adhd.org
5. Diagnosis of ADHD in Adults, National Resource Center on ADHD, www.help4adhd.org
6. Clinical Practice Guideline: Treatment of a School-aged Child with Attention-Deficit/Hyperactivity Disorder. AAP Committee on Quality Improvement. Pediatrics. 2001 108(4) 1033-1043.
7. Practice Parameters for the Assessment and Treatment of Children and Adolescents With Attention-Deficit/Hyperactivity Disorder, J. AM. ACAD. CHILD ADOLESC. PSYCHIATRY, 2007;46(7):894-921.

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