

## Current Clinical Practice in Asperger Disorder

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Dr McPartland reports that he is one of the authors of *A Parent's Guide to Asperger Syndrome and High-Functioning Autism: How to Meet the Challenges and Help Your Child Thrive*; he has also received honoraria for lectures on Asperger syndrome from Universities and at conferences. Dr Volkmar reports no conflicts of interest concerning the subject matter of this article.

In 1944, Hans Asperger published a description of 4 boys who had major social problems despite adequate cognitive and verbal skills.<sup>1</sup> His original term for the condition was *Autistischen Psychopathen im Kindesalter*, usually translated as autistic psychopathy or autistic personality disorder in childhood. His use of the term "autistic" occurred a year after Leo Kanner's classic description of the syndrome of early infantile autism but, because of the war, Asperger was likely unaware of Kanner's paper.<sup>2</sup>

Asperger considered the disorder a personality factor rather than a developmental issue. He emphasized the centrality of social deficits in the face of relatively intact intellectual and linguistic abilities along with unusual circumscribed interests, motor difficulties, and a history of similar problems in fathers.<sup>3,4</sup> The condition received scant attention in North America until Lorna Wing's influential review and case series appeared nearly 40 years later.<sup>5</sup> In her review, Wing termed the condition "Asperger syndrome," which shaped the current term "Asperger disorder" (AD). She suggested some modifications to Asperger's original description, such as the inclusion of females. Contrary to Asperger's belief that diagnosis would be unlikely until children were of preschool age, Wing observed that some features, such as lack of pleasure in socialization and play, might emerge earlier. Wing suggested that the disorder might best be regarded as a variant of autism.

### Distinguishing features of AD

Once introduced into English-speaking psychia-

try, multiple conceptualizations and diagnostic approaches arose. Differences in diagnostic approaches, predominantly small sample sizes, and confusion with other disorders complicate the interpretation of clinical and research reports from this era. As part of the field trial for *DSM-IV* and *ICD-10* criteria for pervasive developmental disorders, international clinical reports of persons with AD were used to evaluate potential differences from other pervasive developmental disorders.<sup>6</sup> Findings from the field trial suggested that children with a clinical diagnosis of AD:

- Are more likely to exhibit strength in verbal IQ than are those with autism
- Are more likely to show more severe social deficits than those with pervasive developmental disorder—not otherwise specified
- Tend to exhibit circumscribed interests

As a result of the trial, AD was incorporated into both *DSM-IV* and *ICD-10* as an official diagnostic category. The diagnostic criteria reflect these observed distinctions. *DSM-IV-TR* criteria for AD are provided in the **Table**. This Table also displays diagnostic criteria for the other autism spectrum disorders (ASDs) to facilitate differential diagnostic comparison. Although the diagnostic criteria for AD in *DSM-IV-TR* are identical to those published in *DSM-IV*, the *DSM-IV-TR* includes detailed accompanying text that is particularly useful for illustrating the differences between AD and other high-functioning (ie, intact cognitive ability) ASDs.

In AD, restricted repetitive and stereotyped interests tend to manifest as the consuming and intrusive pursuit of a particular body of knowledge, also known as a "circumscribed interest," rather than other behaviors that are more common in autism (atypical motor mannerisms or inappropriate object use). Individuals with AD are also more likely to be socially motivated despite poor social agility (ie "active but odd") rather than being frankly disinterested in social interactions.<sup>7</sup>

AD is commonly detected in children 4 years or older, although the diagnosis often may not be made until the child is 10 or 11. As such, a diagnosis of AD is typically made later than a diagnosis of autism.<sup>8-10</sup> This delay probably reflects the relative subtlety of developmental effects and the absence of language-based red flags rather than a different pattern of onset. Indeed, retrospective reports indicate social and behavioral anomalies as early as 20 months of age.<sup>11</sup> Despite efforts to better operationalize the distinction between AD and other ASDs—especially high-functioning

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### EDUCATIONAL OBJECTIVES

After reading this article, you should be familiar with:

- How Asperger disorder (AD) differs from other autism spectrum disorders
- Clinical features and assessment of AD
- Pathophysiology associated with AD
- Treatment modalities appropriate for AD

Who will benefit from reading this article?

Psychiatrists, child and adolescent psychiatrists, psychologists, primary care physicians, nurse practitioners, and other health care professionals. To determine whether this article meets the continuing education requirements of your specialty, please contact your state licensing and certification boards.

autism—the distinction remains controversial.

### Clinical features

Significant social disability is the primary feature of AD. This disability extends from basic elements of social behavior—such as eye contact, gesture, and facial expression—to more sophisticated as-

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pects, such as empathy and perspective taking.<sup>12</sup> The social deficits may be more subtle than in persons with autism; this may reflect intact cognition better enabling individuals with AD to compensate through analysis of social situations and distillation of guiding rules for behavior.<sup>13</sup> This analytical, rather than intuitive, approach to social interaction frequently results in a rigid social style or awkward patterns of eye contact and gesture.<sup>14</sup> Intense areas of preoccupation are a second salient clinical feature. In contrast to typical topi-

cal infatuations of childhood, the circumscribed interests in children with AD tend to be obsessive, intrusive, exclusive of other activities, and factually driven—often without comprehension of broader relevant contexts. These often stand out during psychiatric evaluations as intrusive conversation topics foisted on the interviewer. Despite the absence of diagnostic criteria specifying language impairment, individuals with AD tend to display difficulties with the social use of language. Children with AD may develop a pre-

cocious vocabulary and pedantic speech patterns, orating at length on their preferred topics with insufficient regard for the contributions or interest level of a conversational partner. Speech volume may be poorly modulated, with nasal tone, limited prosody, and dysfluent rhythm or pace.<sup>15</sup> Individuals with AD generally experience difficulty in using and comprehending figurative language.<sup>16</sup> Loose associations may be evident but usually reflect poor perspective of the listener’s need (eg, in-

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Table	DSM-IV-TR diagnostic criteria for different autism spectrum disorders		
	Autism	AD	PDD-NOS
	No. of symptoms from the list below		
Qualitative impairment in social interaction	≥ 2	≥ 2	≥ 1
<ul style="list-style-type: none"><li>• Use of multiple nonverbal behaviors, such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction</li><li>• Failure to develop peer relationships appropriate to developmental level</li><li>• A lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (eg, by a lack of showing, bringing, or pointing out objects of interest to other people)</li><li>• Lack of social or emotional reciprocity</li></ul>			
Qualitative impairments in communication: no. of symptoms	≥ 1		?
<ul style="list-style-type: none"><li>• Delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)</li><li>• In individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others</li><li>• Stereotyped and repetitive use of language or idiosyncratic language</li><li>• Lack of varied spontaneous make-believe play or social imitative play appropriate to developmental level</li></ul>			
Restricted, repetitive, and stereotyped patterns of behavior, interests, and activities	≥ 1	≥ 1	?
<ul style="list-style-type: none"><li>• Encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus</li><li>• Apparently inflexible adherence to specific, nonfunctional routines or rituals</li><li>• Stereotyped and repetitive motor mannerisms (eg, hand or finger flapping or twisting, or complex whole-body movements)</li><li>• Persistent preoccupation with parts of objects</li></ul>			
Delays or abnormal functioning in at least 1 of the following areas, with onset before age 3 years: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play	Check		
Clinically significant impairment in social, occupational, or other important areas of functioning		Check	
No clinically significant general delay in language (eg, single words used by age 2 years, communicative phrases used by age 3 years)		Check	
No clinically significant delay in cognitive development or age-appropriate self-help skills, adaptive behavior (other than in social interaction), and curiosity about the environment in childhood		Check	
Criteria are not met for another specific PDD		Check	
AD, Asperger disorder; PDD-NOS, pervasive developmental disorder—not otherwise specified; Check, criteria only for this diagnosis.			

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adequate expository information, inclusion of extraneous details) rather than disorganized thought processes.

Additional clinical characteristics focus on motor control and learning profile. Clumsiness and motor difficulties were observed in Asperger's initial report, and unusual gait patterns, odd posture, poor handwriting, problems with visuo-motor integration, and difficulties with activities that require motor dexterity have been noted in subsequent accounts.<sup>17,18</sup> Individuals with AD may also display proprioceptive difficulties, such as problems with apraxia, balance, tandem gait, and finger-thumb apposition.<sup>19</sup> Some research suggests that individuals with AD possess a distinct neuropsychological profile, featuring deficits in fine and gross motor skills, visuomotor integration, visuospatial perception, nonverbal concept formation, and visual memory with preserved articulation, verbal output, auditory perception, vocabulary, and verbal memory.<sup>20,21</sup> This pattern of

Data on the epidemiology of AD are more limited than those for autism, which reflects the continuing disagreement about best diagnostic approaches and the fact that official recognition of AD is relatively recent. Fombonne<sup>31</sup> estimated that prevalence of AD is approximately 2.6 per 10,000, about one-fifth as common as autism. The disorder occurs at a much higher rate in boys than in girls. In Asperger's original report, all cases were male<sup>1</sup>; in reanalysis of his subsequent cases, approximately 5% were girls.<sup>4</sup>

As with autism, more research is needed on cultural and ethnic factors. Cases have been reported from many different countries, although most are from the developed regions of the world.<sup>32</sup>

### Etiology and pathophysiology

Initially considered a consequence of psychosocial phenomena, ASDs are now understood to be brain-based biological disorders, although no clear universal cause has been revealed. Medical conditions, such as aminoaciduria and ligamentous laxity, and perinatal difficulties have

aging has revealed abnormalities in brain activity associated with social information processing and social cognition as well as problems with functional connectivity among separate brain regions.<sup>41-44</sup> Research has not yet identified the brain regions implicated in AD or in the broader autism spectrum.

Genetic factors have been considered since Asperger's original account.<sup>45</sup> Case series have reported AD, ASD, or autistic-like traits in family members, particularly among fathers. Also, the rate of autistic-like traits in siblings of children with an ASD is considerably higher than that in the general population.<sup>10,46-48</sup> Some family history studies also indicate associations with other psychiatric disorders, including depression, schizophrenia, and schizoid personality disorders.<sup>49</sup>

Although AD may have stronger heritability than autism, most evidence indicates shared genetic mechanisms common to all ASDs.<sup>50,51</sup> No consistent genetic etiology has been established for AD, and the ASDs probably feature a polygenetic etiology with as-yet-unspecified epigenetic gene-environment interactions.<sup>52</sup> Individual studies have reported specific genetic abnormalities, including balanced translocations, and de novo translocations—chromosomes 1, 5, 11, 13, 14, 15, 17, autosomal fragile site, fragile X syndrome, fragile Y, and 21p+.<sup>35,53-57</sup>

### Clinical assessment

Diagnostic assessment of AD entails a comprehensive developmental history, including early social development. The individual's social and communicative characteristics should be assessed by direct observation in multiple contexts; social difficulties are often most pronounced during unstructured periods without clear social expectations or adult-directed interactions. Psychiatric interviewers should observe social behaviors, such as use of eye contact, gesture, and social reciprocity. Social communicative competency can be assessed by making leading conversational bids, asking open-ended questions, and forcing the interviewee to sustain the burden of maintaining the conversation. The interview should elicit details about social relationships, circumscribed interests, self-awareness, and insight into others. Input from teachers and parents about the child's behavior with peers is also important. The assessment should address obsessions and compulsions, ritualized behaviors, depression and panic attacks, and integrity of thought processes and should include reality testing.

Numerous self-report, parent/teacher report, and direct observation measures have been developed to screen for and diagnose AD.<sup>58,59</sup> To date, these instruments have not been empirically demonstrated to reliably distinguish AD from other high-functioning ASDs.<sup>58,60</sup> Gold standard diagnostic procedures for ASDs include a parent interview; the Autism Diagnostic Interview-Revised; and a semi-structured conversation/play-based interview, the Autism Diagnostic Observation Schedule.<sup>61,62</sup> The last 2 instruments are publicly available but require training to administer and score. Neither instrument offers an algorithm to distinguish AD from other ASDs, although the information they provide is useful in this regard. Differential diagnosis, therefore, relies

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stronger verbal abilities relative to performance abilities, with a particular weakness in visuospatial organization and graphomotor skills, resembles, and may overlap with, nonverbal learning disability.<sup>22</sup>

AD is often comorbid with several other psychiatric disorders. The boundaries between symptoms and syndromes can be difficult to determine, and limited data (mainly from case reports and a few large, epidemiologically drawn studies) are available to inform such decisions.<sup>23,24</sup> Depression and anxiety frequently coexist with AD; estimates of comorbidity are as high as 65% and increased rates of anxiety and depression have been reported in family members.<sup>23,25,26</sup> Anxiety often stems from behavioral rigidity and divergence from predicted or routine events; it may resemble social anxiety. Depressive symptoms often emerge in adolescence secondary to social failings. Hyperactivity and inattention are common among children with AD, which has also been associated with Tourette syndrome, obsessive-compulsive disorder, and psychotic conditions—particularly schizophrenia.<sup>27-30</sup>

### Epidemiology

reported to co-occur with AD, but robust correlations have not been documented across studies.<sup>5,33,34</sup> Increased rates of epilepsy have been observed in persons with AD.<sup>35</sup> Neurochemical studies of ASDs have produced inconsistent results; the most common finding suggests elevated blood serotonin levels.<sup>36</sup>

The most consistent neuroanatomical findings in ASD reflect rapid brain growth in early childhood. This leads to increased brain volume that normalizes in mid-childhood and results in a relatively small corpus callosum.<sup>37</sup> Several studies that have focused specifically on AD have shown associated abnormalities, including left frontal macrogyria and bilateral opercular polymicrogyria, gray tissue anomalies, left temporal lobe damage, left occipital hypoperfusion, and dysmorphology superior to the ascending ramus of the Sylvian fissure proximal to the intersection of the mid frontal gyrus and the precentral sulcus.<sup>38,39</sup> Replication is required to determine whether distinct brain regions are implicated in AD.

Similar brain regions may be involved in ASDs, with quantitative differences in functioning that lead to the observed phenotypic heterogeneity and variation in severity.<sup>40</sup> Functional im-



primarily on clinical judgment.

Because ASDs, including AD, entail impairment across domains of function, it is advisable to refer children with suspected AD for a multidisciplinary assessment by a team with expertise in this area. Such an assessment should entail a developmental and health history, psychological assessment (cognitive ability, psychomotor control, adaptive function), communication assessment (receptive/expressive language, nonverbal communication, nonliteral language, pragmatics, prosody, and content), and a formal diagnostic evaluation using standardized diagnostic assessments. When necessary, consultation regarding behavioral management, motor disabilities, neurological concerns, psychopharmacology, college-readiness, or vocational training may be indicated. The aim of such an assessment is to determine a profile of strengths and weaknesses to inform intervention.

## Treatment

Psychosocial treatment of AD focuses on teaching appropriate social and communication behaviors. The guiding principle is the explicit inculcation of information that is not learned through natural, implicit methods. Treatment guidelines and strategies are akin to those for other ASDs and should take into account the verbal strengths that characterize AD.<sup>63</sup> Broadly speaking, recommended interventions use strengths (eg, cognitive or memory skills) to compensate for areas of weakness while establishing environmental supports to facilitate learning and socialization. Intervention programs must be developed according to the individualized needs of each person with AD, based on a nuanced assessment.<sup>64</sup> Intervention programs should address basic social and communication skills (with focus on pragmatic communication), adaptive functioning, and academic or vocational skills, while ensuring that learned skills generalize to naturalistic environments.<sup>65</sup>

Strong language skills and a concrete cognitive style make individuals with AD receptive to strategies aimed at establishing straightforward rules to guide behavior and memorization of verbal social scripts. These rules and scripts can be learned and practiced, first in therapeutic settings and then in more naturalistic settings. Social skills groups are a recommended treatment modality for children with AD because they provide a forum for both teaching and applying social lessons.

Challenging behaviors, such as aggression, should be addressed through functional behavior analysis and positive behavior management. For older children and adults with AD, vocational training should teach appropriate etiquette for job interviews and workplace behavior. Assistive technology, such as organizational software and personal data assistants, is often appropriate for supporting organization and work and life management in persons with AD.<sup>66</sup>

The core social vulnerability of AD has not proved responsive to drug treatment. However, associated psychiatric problems are often responsive to pharmacological as well as behavioral and psychotherapeutic interventions. Medications can help with comorbid mood disorders, which are common during adolescence and young adulthood.<sup>67</sup> As noted, adolescents and adults with AD

are particularly prone to anxiety and depression; as such, SSRIs are frequently prescribed for this group. Children often exhibit attentional problems and sometimes receive a concurrent diagnosis of attention-deficit/hyperactivity disorder. Mental health professionals should be knowledgeable about the potential for comorbidity but must try to avoid the temptation to “chase symptoms” and to employ polypharmacy.

## Conclusion

Dr Asperger<sup>1</sup> was optimistic about outcome in the patients he identified, given the presence of similar problems in fathers and his conceptualization of the condition as a personality characteristic rather than a developmental disorder. His view tempered over time, although he maintained that the outcome was more favorable than in persons with autism, probably because at the time autism was conceptualized as primarily associated with intellectual deficiency.<sup>3,68</sup>

Considering the enduring debate about diagnostic conceptualization, discussion about differences in outcome of AD versus higher-functioning ASDs remains controversial. The limited data suggest that, in contrast to autism, more individuals with AD are self-sufficient and married, but this has not held true in all samples.<sup>69-72</sup> Extrication of symptom severity and adaptive capacity is needed to better understand differences in outcome among persons with ASDs.<sup>8</sup>

In the 65 years that have elapsed since the publication of Asperger's original manuscript, much progress has been made in understanding the disorder and, more important, in developing methods to detect and treat AD. Despite considerable research, however, psychiatry is yet to elucidate the genetic or brain bases of the disorder and parsimoniously and robustly distinguish AD from similar ASDs. This ongoing topic of debate promises to enter a new chapter with the publication of *DSM-V*.

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## Category 1 Posttest

- Which of the following characteristics is/are more likely to be exhibited by persons with Asperger disorder (AD) than by persons with autism?
  - Atypical motor mannerisms
  - Disinterest in social interactions
  - Strength in verbal IQ
  - All of the above
  - None of the above
- Which of the following social deficits is associated with AD?
  - Awkward pattern of eye contact
  - Rigid social style
  - Reduced empathy
  - All of the above
  - None of the above
- The neuropsychological profile of persons with AD tends to show stronger nonverbal relative to verbal abilities.
  - True
  - False
- AD is believed to have a unique genetic etiology relative to other autism spectrum disorders. (ASDs).
  - True
  - False
- Numerous self-report, parent/teacher report, and direct observation measures have been developed to effectively and reliably discriminate AD from other ASDs.
  - True
  - False
- Assessment for AD involves which of the following?
  - Direct observation of social behaviors
  - Input from parents and teachers
  - Developmental history
  - All of the above
  - None of the above
- The Autism Diagnostic Interview—Revised and the Autism Diagnostic Observation Schedule do not distinguish AD from other ASDs but do provide key information that may be useful in assessing for AD.
  - True
  - False
- The most common comorbidities associated with AD are
  - Bipolar disorder and depression
  - Schizophrenia and seizure disorder
  - Depression and anxiety
  - All of the above
  - None of the above
- Which of the following modalities have been found to be most effective in treating persons with AD?
  - SSRIs
  - Psychosocial interventions
  - Diet and exercise
  - All of the above
  - None of the above
- The pathophysiology that distinguishes AD from other ASDs is well known.
  - True
  - False