cme: Asperger's Syndrome – an Autism Spectrum Disorder

Helmut Remschmidt, Inge Kamp-Becker

SUMMARY

Introduction: Asperger’s syndrome is a pervasive developmental disorder, characterized by social and communication difficulties and stereotyped, repetitive behaviours. Methods: Review of the current knowledge including the guidelines of the German Association for Child and Adolescent Psychiatry in relation to diagnosis, aetiology and treatment of Asperger’s Syndrome. Results: The onset of the disorder is in early childhood with persistence into adulthood. Although it is beyond doubt that there is a biological basis, there is no coherent model for aetiology and genesis. Recent research provides evidence for genetic factors, brain damage or functional disorder, biochemical abnormalities, neuropsychological deficits and an interaction between these factors. Behavioural interventions have been shown to be effective in some studies. Discussion: Causal treatment of Asperger’s syndrome is at present impossible, and there remains a regrettable lack of evaluated treatment standards.

Key words: Asperger’s syndrome, autism-spectrum-disorder, autistic psychopathy, autism

Pervasive developmental disorders start in early childhood and are characterized by a delay and deviation in development. Further to the two conventional classification systems (ICD-10 and DSM-IV), three traits are characteristic for such disorders: qualitative impairments in mutual interaction (rapport), communication, and a limited, stereotypic, repetitive repertoire of interests and activities. These qualitative impairments are a fundamental feature in all those affected and manifest in all situations – however, they vary in regard to their extent.

The most important pervasive developmental disorders according to ICD-10 are listed in box 1. Autism spectrum disorders comprise especially early childhood autism (F84.0), Asperger’s syndrome (F84.5), and atypical autism (F84.1). In an additional definition, all pervasive developmental disorders are subsumed under this label. This concept is based on the idea that different autistic disorders cannot be distinguished categorically but can be assigned to one dimension. This means that they differ merely quantitatively, but not qualitatively. Table 1 lists the commonalities and differences of the diverse disorders in the autism spectrum.

Autism spectrum disorders manifest with a multitude of symptoms, a wide spectrum of clinical manifestations, and wide variations in their intensity. Autism spectrum disorders are seen as developmental disorders of the central nervous system (neurodevelopmental disorders) and are associated with impairments of basal cerebral functions that influence a patient’s ability for contact with others.

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Triad of qualitative impairments of pervasive developmental disorders
- Social interaction
- Communication
- Repetitive, stereotypical behavior
Epidemiology
In earlier times, autism spectrum disorders were generally assumed to be rare, but more recent studies show higher prevalence rates (1). Most epidemiological studies have researched early childhood autism, but there are not many data on atypical autism and Asperger's syndrome.

Recent data exist with regard to intelligence: whereas until just a few years ago, the rule was that three quarters of all autistic persons had a mental disability, recent studies have shown that this is not the case (2, 3) (table 2). The male:female sex ratio is about 3:1, and autistic disorders in girls are usually associated with clear mental retardation. For Asperger's syndrome, the sex ratio for boys and girls is about 8:1.

Symptoms
Asperger’s syndrome is characterized by a pervasive impairment regarding the ability to form contacts and communicate with others, and in addition it has some notable traits that distinguish it from early childhood autism. On the one hand, the child’s speech and intellectual development are not delayed. On the other hand, many Asperger’s patients display – perhaps because of their higher intelligence (compared with those with other autistic disorders), which they cannot utilize adequately – highly specialized and distinct special interests, which they pursue monomaniacally and which make them appear to their environment as extreme eccentrics – e.g., memorizing entire timetables, the melting points of all metals, or the paragraphs of the constitution. According to ICD-10, the following traits are required for a diagnosis of Asperger’s syndrome.
Qualitative impairments in social interaction

Affected children and adolescents stand out in their non-verbal behavior (notably reduced gestures, facial expressions, body language, eye contact), as well as in their inability to establish unforced contact with their peers or older people. This is not necessarily due to a wish on the part of affected persons to withdraw from social contact but to their inability to understand the unwritten rules of social interaction and to behave accordingly. They have a notable

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Main symptoms of Asperger's syndrome

- Qualitative impairments of mutual social interactions
- No delay in language development or cognitive development
- Unusual, very distinct, circumscribed interests and stereotypical behavior patterns

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**TABLE 1**

Comparison of characteristic features of pervasive developmental disorders

<table>
<thead>
<tr>
<th></th>
<th>Autism</th>
<th>Atypical autism</th>
<th>Asperger's syndrome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at initial manifestation</td>
<td>&lt; 3 years</td>
<td>&gt; 3 years</td>
<td>&gt; 3 years</td>
</tr>
<tr>
<td>Sex ratio (m/f)</td>
<td>3 : 1</td>
<td>3 : 1</td>
<td>8 : 1</td>
</tr>
</tbody>
</table>
| Symptoms                     | Qualitative impairment of social interaction  
                              | Qualitative impairment of communication  
                              | Repetitive/stereotyped behaviors  
                              | Delay in language development  
                              | No symbolic play             | No complete symptoms         | Impairment of social interaction  
                              | Stereotyped behaviors and interests  
                              | No delay in language development  
                              | No cognitive impairments       |
| Cognitive function           | Mostly impaired but stable           | Often mental disability | Not impaired but specific particularities |
| Epileptic fits               | In 25% up to adolescence                |                             | Ø                     |
| Etiology                     | In most cases genetically linked       |                             |                      |
| Course                       | Continuous, stable                      | No psychotic episodes       | Rare psychotic episodes |

**TABLE 2**

Epidemiology of pervasive developmental disorders*1

<table>
<thead>
<tr>
<th>Developmental disorder</th>
<th>Prevalence/distribution in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>All pervasive developmental disorders</td>
<td></td>
</tr>
<tr>
<td>— with mental disability</td>
<td>60–65/10 000</td>
</tr>
<tr>
<td>— mild to moderate intelligence</td>
<td>25–50 %</td>
</tr>
<tr>
<td>— average intelligence</td>
<td>30 %</td>
</tr>
<tr>
<td>— average intelligence</td>
<td>29–60 %</td>
</tr>
<tr>
<td>Early childhood autism</td>
<td>11–18/10 000</td>
</tr>
<tr>
<td>— with learning disability/mental disability</td>
<td>80 %</td>
</tr>
<tr>
<td>Atypical autism</td>
<td>1.9–10.9/10 000</td>
</tr>
<tr>
<td>Asperger's syndrome</td>
<td>2–3.3/10 000*2</td>
</tr>
<tr>
<td>Rett's syndrome</td>
<td>&lt; 1/10 000</td>
</tr>
<tr>
<td>Disintegrative disorder</td>
<td>0.2/10 000</td>
</tr>
</tbody>
</table>

*1 modified from 1,12

*2 The prevalence figures relate mainly to school children.

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inability to grasp others’ feelings and resonate emotionally. This difficulty is often referred to as “impairment of empathy” or a lacking “theory of mind.” It may also be described as extreme self-centeredness; the extreme isolation from the environment that is related to this in children with early childhood autism is much less prominent in Asperger’s syndrome. Children with Asperger’s syndrome establish contact to their environment in manifold ways, but inappropriately so. They enjoy talking to other people and do so a lot, and they talk in detail and elaborately about their interests, but they do not pay attention to whether their behavior is appropriate in the situation and how their opposite number reacts.

**Striking features of communication**
In Asperger’s syndrome, the delay in language/speech development that is typical for early childhood autism is absent. Other language features are typical for early childhood autism and rare in Asperger’s syndrome – e.g., echolalia (echo-like repetition of words and sounds) and reversal of pronouns (the children talk about themselves in the third person and learn only late to refer to themselves as “I”). Children with Asperger’s syndrome, however, often show particularities in their speaking voice. Their voices often sound monotonous and tinny, and show little modulation.

A diagnosis of Asperger’s syndrome according to ICD-10 stipulates that individual words are spoken in the second year of life or earlier and complete sentences in the third year of life or earlier. The child’s intelligence should be in the normal range or even above. But the milestones on the motor development may be reached with a delay: clumsy movements are a common feature but one that is not essential for a diagnosis of Asperger’s syndrome.

**Limited interests and stereotypical patterns of behavior**
Children with Asperger’s syndrome display a multitude of stereotypical movements, and their motor system pattern is characterized by clumsiness and a lack of coordination, and is situationally inappropriate, which makes these children appear clumsy in their environment. Their interests are often focused on certain topics and are unusual. Often, they have a seemingly obsessive interest in subjects such as mathematics, technology, scientific disciplines, or historical or geographical disciplines. Sometimes their special interests are only exaggerations of popular interests, such as Pokemon, dinosaurs, or computers. Special interests, however, exert a disruptive influence on other activities and impair such children’s participation in everyday life substantially. Further, distinct compulsive behavior (e.g., a compulsive adherence to certain rituals in everyday life, such as times or processes) and fear of change (e.g., a change in route) are common notable patterns of behavior.

**Etiology**
Thanks to intense research activities, the biological pathogenesis of autism spectrum disorders has been established beyond any doubt. The hypothesis that was valid up to the 1960s, that autism resulted from the mother’s emotional coldness (so-called “fridge mother”), is seen as refuted. In his first description in 1944, Hans Asperger (4) pointed out that the “autistic psychopathology” he had described had a genetic background. Social and psychological factors may influence the course of the disorder but are not regarded as etiologic. Although many data favor a biological pathogenesis, a conclusive model for the etiology and genesis of autistic disorders has thus far not been established. The results so far indicate the following contributing factors in the genesis of autism spectrum disorders: genetic factors, brain damage or functional damage, biochemical anomalies, associated physical pathologies, neuropsychological deficits, and interaction between these factors (5, 6, 7).

**Symptoms**
- The symptoms transcend situations and are fundamental functional features in affected children.
While numerous family studies and twin studies have been conducted into early childhood autism, this is not the case for Asperger’s syndrome. The data situation is equally uneven with regard to molecular-genetic studies. At least eight genomic scans have been performed in subjects with early childhood autism (10), but only one in Asperger’s subjects (11). The current assumption is that up to 20 genes are involved in the etiology of autism spectrum disorders. Several deviations in different cerebral regions have been shown to be responsible for the structural particularities of persons with Asperger’s syndrome (among others, abnormalities in the cerebrum and the limbic system, cerebellar abnormalities and abnormalities in the lower olivary body [12]). Currently, many researchers are discussing a model of insufficiently linked neuronal networks between diverse cerebral areas (6). This means that autistic disorders are regarded as cerebral functional disorders.

In the area of neuropsychological deficits, the following are investigated as psychological correlates of autism spectrum disorders:

- Deviating structure of intelligence
- Executive functions (meaning, the “higher” mental or cognitive processes that serve self-regulation and action control of the individual in his/her environment)
- “Theory of mind” (the ability to represent one’s own and others’ psychological states in one’s own cognitive system)
- Weak central coherence. This means that the context of and relations between things and objects are observed to a lesser degree, but the perception is instead directed at individual or even isolated details.

*Diagram 1* attempts to establish at least some relations, in the knowledge that currently, a consistent and comprehensive explanation is not yet possible.

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**Neurobiological dimension of etiology**
- Strong genetic factor
- Structural cerebral abnormalities
- Functional abnormalities of cerebral function
- Changes to dopaminergic and serotoninergic system

**Neuropsychological dimension of etiology**
- At the cognitive and emotional level, these are: executive functions, “theory of mind”, central coherence, language/speech, cognitive skills and attention.

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*Diagram 1* Models for etiopathogenesis of autism spectrum disorders

*Remschmidt H, Kamp-Becker I: Das Asperger Syndrom. Berlin: Springer Verlag 2006; 54; with kind permission from Springer (7).*
Diagnosis

The prior history and observation of the child in different situations are the basis for the diagnosis. This necessitates a differentiated examination by a child and adolescent psychiatrist, according to the guidelines of the Deutsche Gesellschaft für Kinder- und Jugendpsychiatrie (DGKJP, German society for child and adolescent psychiatry) (14).

It therefore seems advisable to refer children with suspected Asperger’s syndrome to a child and adolescent psychiatrist or a specialist hospital. In addition to the psychiatric diagnosis according to ICD-10, the following areas should be diagnostically clarified: comorbid psychopathologies, assessment of the general developmental status and cognitive abilities, adaptive behaviors, and neuropsychological functions. In any case, a physical/neurological exam should be conducted. In the history, the symptoms should be elicited in their entirety, for the child’s current as well as past behaviors, especially its early childhood, in order to be able to assess whether the symptoms may be indicative of a pervasive developmental disorder. This means that the conspicuous behavior is a fundamental functional feature of the entire development, which transcends situations and is not restricted to certain situations (e.g., only outside the family) or triggered by critical life events (e.g., separation of the parents). In all three areas of impairment, conspicuousities have to have been present consistently and stringently through the child’s entire development. Box 2 lists the symptom areas that have to be considered to make a diagnosis.

To assess the current impairment, an exploration and observation of the child’s or adolescent’s behavior should be undertaken. Private home videos from the family may be helpful in this context. The observations should cover varying situations (structured, unstructured, familiar, and new). Particular attention should be paid to the child’s ability to have a conversation, to non-verbal and verbal communication (pragmatic aspects, language

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**BOX 2**

**Symptom range of Asperger’s syndrome**

- **Qualitative impairment in reciprocal social interaction**
  - Non-verbal behavior (eye contact, facial expressions, gestures)
  - Contact behavior, social motivation
  - „Theory of mind“/empathy
  - Lack of shared pleasure/socioemotional interaction

- **Qualitative impairments in communication**
  - Intonation, manner of speech
  - Interactive communication
  - Language comprehension
  - Understanding of social rules of communication
  - Play behavior

- **Restricted, repetitive and stereotyped behavior, interests, and activities**
  - Fear of change/compulsions/rituals
  - Motor patterns
  - Special interests, peculiar activities

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**History**

- A detailed history and behavioral observation are required to diagnose autism spectrum disorders.

**Expanded history**

- An intelligence test and neuropsychological examinations are as necessary and advisable as a detailed history and behavioral observation.
comprehension, conspicuous linguistic traits, etc., the child’s behavior during play, and socio-emotional understanding. In spite of good verbal capabilities, persons with Asperger’s syndrome have a clear impairment in the prosody (metric-rhythmic aspects of speech) and pragmatic aspect of language (social use and understanding of language). The pragmatic aspect of language is responsible for the communicative use of grammar and semantics in different contexts.

Only if these rules are understood and used or broken within a culture is it possible to understand that someone is making a snide remark; has an ulterior motive; wants to be polite, humorous, sarcastic, and so on.

Among the standardized procedures are the following:

- The “Marburg scale” for Asperger’s syndrome as a screening questionnaire (14, 16),
- The Autism Diagnostic Observation Schedule – Generic (ADOS-G) (17), and the Autism Diagnostic Interview – Revised (ADI-R) (18).

**Differential diagnosis**

For the diagnosis, Asperger’s syndrome firstly has to be differentiated from other pervasive developmental disorders.

Children with early childhood autism usually stand out from birth, have multiple developmental disorders, and are usually much restricted in their cognitive functions. If spoken or received language or cognitive development are clearly delayed, this indicates the existence of early childhood autism.

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**Box 3**

**Assessment of effectiveness of intervention techniques in the treatment of autism spectrum disorders**

- Empirically confirmed and generally accepted procedures:
  - General behavior therapeutic measures and programs (for example, ABA approach, Lovaas, 1987; TEACCH, Mesibov, 1997)
- Empirically moderately confirmed but potentially effective procedures:
  - Training in social and communicative skills: „theory of mind“ training, support of social understanding
- Empirically not confirmed, but in certain cases helpful, procedures:
  - Ergotherapy, physiotherapy, sensory integration
- Methods of doubtful value
  - Facilitated communication, holding therapy, diets, vitamin and mineral therapies, secretin, therapy of audiovisual perception such as Auricula training, Tomatis therapy, auditory integration training
- Further procedures that are helpful, according to parents
  - Horse riding therapy, active (if needed, supported) leisure time activities (e.g., sports, music, chess club).

*1 Remschmidt H, Kamp-Becker I: Das Asperger Syndrom. Berlin: Springer-Verlag 2006; 172; with kind permission from Springer (7).
In schizoid personality disorder, the characteristic symptoms of Asperger’s syndrome are absent, namely the distinctive special interests, peculiarities of speech, and compulsively stereotypical behaviors. In schizophrenia, different symptoms occur (formal thought impairments, delusions, hallucinations) and take a different course: schizophrenic psychoses are often preceded by unspecific precursor symptoms; the prodromal symptoms manifest for weeks or months only. Reactive attachment disorder also takes a different course to Asperger’s syndrome, and different causes are assumed for this disorder. The distinction from obsessive-compulsive disorders is often difficult since Asperger’s syndrome is often accompanied by compulsive symptoms. These are, however, not at the core of the disorder. The same is true for the distinction from obsessive-compulsive personality disorder.

A common misdiagnosis is that of attention deficit hyperactivity disorder (ADHD), since this disorder is also associated with notable contact difficulties, albeit secondary ones. The primary symptoms of hyperkinetic disorder are impaired attention, hyperactivity, and impulsivity. Interaction problems are a result of these symptoms, but the criteria for Asperger’s syndrome are not fully met. Children with ADHD are usually capable of playing imaginatively and creatively; there are no fundamental deficits in empathy, non-verbal behavior is used communicatively, and such children do hardly or not fear change, show compulsions, or other rigid behaviors.

Comorbidities
In some cases, additional psychological disorders may develop, especially in life crises that may arise through external circumstances (moving house, separation of parents, births or deaths in the family) or internal circumstances, such as developmental tasks that will have to be mastered (starting school, changing schools, puberty, leaving the parental home). On the one hand, existing symptoms may aggravate – e.g., the hyperactivity, autoagression, or the ritualized behavior – or symptoms may develop that are pathologies in their own right – such as affective disorders and obsessive-compulsive disorders. Patients with Asperger’s syndrome have also been found to be at a slightly increased risk of schizophreniform psychotic episodes (19, 20), but also for psychotic depression and bipolar disorders. Obsessive-compulsive disorders and Tourette’s syndrome are common comorbidities in Asperger’s syndrome. Another common comorbidity is attention deficit, which exceeds autistically impaired attention and results in further problems (21). In adolescents and adults with Asperger’s syndrome, symptoms of depression may develop over time (22). Depression is the most important comorbidity of Asperger’s syndrome especially during adolescence and in early adulthood.

Therapy
Proved therapeutic methods in autism spectrum disorders
The therapy of Asperger’s syndrome is based on the current knowledge of etiology, symptoms, and empiric evidence of proved and tested treatments. The etiologic background has a crucial influence on the therapeutic options and objectives (diagram 1).

Several behavioral therapeutic programs for autism spectrum disorders exist (Lovaas, TEACCH, language structure, alternative communication systems [13]), for which initial comparative studies showed a positive effect (23) (box 3). Studies of psychotherapeutic treatments that meet the methodological criteria of controlled studies thus far do not exist. For other alternative therapeutic approaches, only subjective empirical reports exist. Therapeutic successes of these have not been identified in scientific studies. Unfortunately, proved standards in the treatment of autism spectrum disorders are currently lacking. It is
Parent-related and family-related measures

- Advice to and training of parents are of great value in the therapy of Asperger's syndrome.
still up to the parents to select from the multitude of different autism therapies the one method that seems most appropriate for their child in terms of demands, effectiveness, efficiency, and ethical safety. Box 3 lists the conventional interventional techniques with regard to their empirically proven effectiveness (24, 25, 26).

**Special procedures in Asperger’s syndrome**

Because of the varied symptoms in Asperger's syndrome, comprehensive therapeutic methods are useful that are based on principles of behavioral therapies and always relate to the support of several functional areas (see guidelines from the DGKJP [14]). The therapy of choice is behavioral therapy in the developmental context, i.e., the therapy considers the current developmental status of the child or adolescent and adapts the measure accordingly. Of particular value in a holistic approach, in addition to behaviors that need modifying, are the cognitive and affective experiences of persons with Asperger’s syndrome, with the aim of expanding these. The capacities in this area should be supported in tune with the child’s development and the existing deficiencies bridged through compensatory mechanisms.

The aims of interventions can be only an alleviation of symptoms and an expansion of skills to enable patients to live independent lives as far as possible. Several interventional methods are individually combined in a multimodal therapeutic plan into a holistic therapeutic approach (diagram 2). The “desired” behaviors are segmented into small learning steps and prompts are given, which will then gradually be faded out. The used amplifiers may be “unusual”, e.g., giving permission to indulge in stereotypical behaviors or special interests for a short while. In addition to behavioral therapeutic measures, the repertoire also comprises pedagogic programs, early support, drug therapy (table 3), and further behavioral

### TABLE 3

<table>
<thead>
<tr>
<th>Target symptom</th>
<th>Drug</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggressive behavior and self harming</td>
<td>Atypical neuroleptics</td>
</tr>
<tr>
<td></td>
<td>Lithium</td>
</tr>
<tr>
<td></td>
<td>Anticonvulsives</td>
</tr>
<tr>
<td></td>
<td>Clonidine</td>
</tr>
<tr>
<td>Stereotypical behaviors, rituals</td>
<td>Selective serotonin reuptake inhibitors</td>
</tr>
<tr>
<td></td>
<td>(SSRIs)**, atypical neuroleptics</td>
</tr>
<tr>
<td>Hyperactivity, impulsive behavior</td>
<td>Stimulants</td>
</tr>
<tr>
<td></td>
<td>Atypical neuroleptics</td>
</tr>
<tr>
<td></td>
<td>Clonidine</td>
</tr>
<tr>
<td></td>
<td>Naltrexone</td>
</tr>
<tr>
<td>Anxiety</td>
<td>Buspirone</td>
</tr>
<tr>
<td></td>
<td>Atypical neuroleptics</td>
</tr>
<tr>
<td></td>
<td>Clonidine</td>
</tr>
<tr>
<td>Depression</td>
<td>Antidepressives of the SSRI type**</td>
</tr>
</tbody>
</table>

*Remschmidt H, Kamp-Becker I: Das Asperger Syndrom. Berlin: Springer Verlag 2006; 182; with kind permission from Springer (7). SSRI, selective serotonin reuptake inhibitor

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**Therapeutic mode**

- The indication is for a highly structured, early onset, comprehensive (multimodal), therapy (based on behavioral therapeutic methods) and support, while integrating parents and social environment.
exercises (e.g., ergotherapy). To learn the new skills and capabilities continually, and to transfer these into real situations, the parents as co-therapists are indispensable for a successful therapy. Self-help organizations and parents’ associations support parents in this necessary and demanding task.

Therapy in Asperger’s syndrome, as in other autism spectrum disorders, is always long term therapy since building up basic skills (e.g., the “theory of mind”) that develop intuitively and without particular application in healthy children require long, patient, and explicit instruction. Basic contact and behavior training is central to therapy. Because of the patient’s lacking ability to generalize, such behaviors need to be practiced in many different real situations. A further important point in the treatment is the stepwise expansion of areas of interest in the direction of more close-to-reality activities or tasks. An early start for therapeutic steps is of utmost importance for its likely chances of success (27). Interventions should always be highly structured as well as directional and concrete.

Treating comorbidities – such as hyperactivity or depressive disorders, phobias, and obsessive-compulsive disorders – should not be neglected. This may necessitate drug treatment (28) (Table 3). The evidence regarding drug therapy is contradictory, and a therapeutic effect of the drugs has been observed only for a part population (“responders”). Further, drug treatment (e.g., with risperidone) is advisable in extremely rigid and compulsive behaviors, in aggressive reactions that cannot be treated with other means.

Course and prognosis
The core symptoms of Asperger’s syndrome vary with the psychological development but are retained into adulthood as a persistent and pervasive disorder (29). In most of the affected persons, contact and social behaviors improve gradually, compared with such symptoms in childhood and adolescence. Certain routines in everyday life are handled more easily, but the basic communication impairment, and stereotypical behaviors, limited interests, and a limited capacity to establish contact with others remain. The course of Asperger’s is variable. Although the prognosis is better in Asperger’s than in childhood autism, the course of the condition depends not only on good cognitive and language skills. The occurrence of comorbid disorders substantially impairs further developmental opportunities and the prognosis.

Conflict of Interest Statement
The authors declares that no conflict of interest exists according to the Guidelines of the International Committee of Medical Journal Editors.

References


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For Volume 17/2007 we plan to offer the topic "The Emergency Management of Cardiac Arrhythmia."

Solutions to the CME questionnaire in Volume 5/2007:
Clemens K, Klasicl E: "Managing Nausea, Emesis and Constipation in Palliative Care": 1/b, 2/d, 3/c, 4/a, 5/d, 6/c, 7/b, 8/a, 9/e, 10/d.
Please answer the following questions to participate in our certified Continuing Medical Education program. Only one answer is possible per question. Please select the answer that is most appropriate.

**Question 1**
**According to ICD-10, Asperger’s syndrome is one of the**

a) personality disorders.
b) pervasive developmental disorders.
c) affective disorders.
d) behavioral and emotional disorders with onset in childhood and adolescence.
e) schizotype and delusional disorders.

**Question 2**
**Which statement relating to autism spectrum disorders is correct?**

a) The term subsumes all developmental disorders.
b) The term refers to early childhood autism at a high functional level.
c) The term describes a three-dimensional concept and includes early childhood autism, Asperger’s syndrome, and atypical autism.
d) The term describes the presence of autistic traits.
e) The term refers to pervasive developmental disorders without any further description.

**Question 3**
**Which statement about the epidemiology of Asperger’s syndrome is correct?**

a) Asperger’s syndrome is more common than early childhood autism.
b) No studies exist about the epidemiology of Asperger’s syndrome.
c) In 95% of autistic persons, a mental disability is present.
d) The male:female sex ratio in Asperger’s syndrome is 4:1.
e) Contradictory results exist about the epidemiology of Asperger’s syndrome; the median of the prevalence rates of studies so far is 2–3.3 per 10 000 school age children.

**Question 4**
**Which statement about the symptoms is correct?**

a) Persons with Asperger’s syndrome have problems in recognizing and predicting the needs and emotions of other persons.
b) Extreme withdrawal from the human environment is characteristic for Asperger’s syndrome.
c) Persons with Asperger’s syndrome have increased sensitivity towards the needs and emotions of other people.
d) Persons with Asperger’s syndrome make contact with their environment in many and appropriate ways but have problems talking to others.
e) Persons with Asperger’s syndrome are geniuses but bizarre people, who are always highly gifted.

**Question 5**
**Which statement relating to language development in Asperger’s syndrome is correct?**

a) In Asperger’s syndrome, the delay in language development that is typical for early childhood autism is absent.
b) Asperger’s syndrome is accompanied by a delay in language development.
c) Language development in Asperger’s syndrome happens early but the language consists merely of echolalias.
d) The language/speech of Asperger’s patients is unremarkable, even with respect to intonation and pragmatic aspects of language.
e) Persons with Asperger’s syndrome can speak but do so only rarely.

**Question 6**
**Which diagnostic criteria (according to ICD-10) have to be met in Asperger’s syndrome?**

a) Qualitative impairments in social interaction and communication are present; language development is delayed; intelligence is below average.
b) Qualitative impairments in social interaction and communication are present; language development is in the normal range; intelligence is average. No stereotypical and repetitive behaviors occur.
c) Qualitative impairments in social interaction and stereotypical and repetitive behaviors are present; intelligence is below average.
d) Qualitative impairments in social interaction and stereotypical and repetitive behaviors are present; language development is not delayed; intelligence is average.
e) The criteria for early childhood autism are met; intelligence is average.

**Question 7**

**Which statements about the etiology of Asperger’s syndrome are correct?**

a) The cause of Asperger’s syndrome is not known; a strong environmental influence is suspected.
b) The following are contributing factors: genetic factors, associated physical disorders, cerebral or cerebral functional disorders, biochemical anomalies, neuropsychological deficiencies and their interaction.
c) The following factors are causative: birth trauma, physical disorders, cerebral disorders, and environmental factors.
d) An insufficient neuronal network is not under discussion in Asperger’s syndrome.
e) Asperger’s syndrome is regarded exclusively as an acquired/learnt behavioral pattern.

**Question 8**

**Which statement relating to the diagnosis of Asperger’s syndrome is correct?**

a) The diagnosis of Asperger’s syndrome is made exclusively on the basis of the current clinical appearance.
b) Asperger’s syndrome can be recognized from the intelligence profile.
c) A detailed history and behavioral observation are necessary to make a diagnosis. An intelligence test and a neuropsychological exam are advisable.
d) Asperger’s syndrome can be diagnosed on the basis of a genetic test.
e) The only other possible differential diagnosis are other pervasive developmental disorders.

**Question 9**

**Therapy in Asperger’s syndrome**

a) aims at “complete cure.”
b) includes psychodynamic processing of underlying conflicts.
c) is development-oriented, multimodal, long term, highly structured, and follows fundamental behavioral therapeutic tenets.
d) is patient-focused because it is a cerebral functional disorder. The parents and environment of the patient can be neglected.
e) includes supported communication, diets, holding therapy, for which efficacy has been proved.

**Question 10**

**Which statement relating to the course of the disorder is correct?**

a) The good cognitive skills and language skills mean that patients with Asperger’s syndrome are without conspicuous traits as adults.
b) The disorder takes a favorable course; the prognosis is favorable.
c) The prognosis is dependent on language skills and cognitive skills.
d) Concomitant comorbidities hinder the prognosis.
e) The prognosis is similar to childhood autism.
Case study

Asperger's syndrome

Medical history: Paul was a breech presentation and was delivered by caesarean section in week 41 after a complicated pregnancy. His early development was characterized by a clearly delayed motor development. He had shown great fascination with circulating movements and, for example, watched mobiles for hours while performing stereotypical movements. He had rejected physical contact. Up to his third year he had eaten only mashed-up food, slowly moving to solids afterwards. His toilet training had also been notably delayed. His language development, however, had been normal. He had not sought contact with other children. He had perceived the sandpit as crowded if there was only one other child in it. In his nursery and in school, he had remained an outsider – in spite of efforts from his parents and teachers; he had not been able to integrate and had made no friends.

At the age of 8 he had started showing a strong interest in skeletons and had been able to name all the bones. Subsequently, he had been drawing dinosaurs and Super Mario characters and attained a high level of perfection. Nothing had been allowed to change in his room; this would have caused panic attacks in him. Paul had displayed many fears. For a while he had not been able to tolerate "sh" sounds. Then he had displayed a panicky fear of bees and flies and expressed fears of not being able to fall asleep at night.

Psychopathological findings: An awake/alert and fully aware youth with a universal orientation, who had no concentration deficits or mnestic deficits. No
indications were found for impaired formal and imaginative thought processes, no hallucinatory experiences, nor impaired ego consciousness. Notably impaired ability for affective resonance.

**Observed behaviors:** Paul’s eye contact was notable but his facial expressions were limited. His gestures, however, were clearly reduced. His speech was unmodulated, using many stereotypical phrases. On the one hand, he was happy and willing to openly give information about himself, but on the other hand, his capacity for entering into a dialogue was clearly reduced. Mutual communication/interaction was not possible since he did not relate to the expressions of his counterpart but reported in detail and elaborately about his special interests. The standardized procedures applied to history taking and behavioral observation (ADI-R and ADOS-G) showed values way above the cut-off in social interaction, communication, and stereotypical and repetitive behaviors.

**Behavior:** The psychological diagnosis showed that Paul’s IQ was above average but that he had substantial deficits in adaptive behavior. The neuropsychological examination showed deficits in motor skills, “theory of mind,” and cognitive flexibility (executive functions). Moderate depression was diagnosed as a comorbidity. Treatment was delivered elsewhere, with moderate success.