



# The Area of Brain Imaging Research in the Field of Child and Adolescent Psychiatry Is Rapidly Developing

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Brain imaging research in the field of child and adolescent psychiatry has become important recently. The importance of the brain from a viewpoint of development related to childhood and adolescent mental illnesses has been emphasized on in the diagnostic classification, as shown by the first appearance of the chapter “Neurodevelopmental Disorders” in the Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition. However, since neuroimaging studies of childhood and adolescent mental disorders deal with the brain undergoing a dynamic developmental process, the results of brain imaging cannot be interpreted properly without a functional and accurate understanding of normal brain development. Kim and Kim [1] argued that the significant reduction in volume and loss of normal asymmetry of the caudate nucleus in attention-deficit/hyperactivity disorder (ADHD) children, reported by Castellanos et al. [2], is considered a very important result in academia because it reflects the abnormal development of the right frontostriatal system in ADHD children, which would have been impossible without the knowledge of normal brain development.

Computed tomography, which was developed in the past, had limitations for children on account of radiological irradiation during brain scans. However, the development of magnetic resonance imaging (MRI) has made it easy to observe structural changes in the brain development process since the early 1990s [3]. MRI can yield images with excellent resolution without irradiation, giving it a distinct advantage in research involving children.

The use of MRI imaging techniques continues to evolve. Research using functional neuroimaging, such as functional MRI (fMRI) or magnetic resonance spectroscopy, has also become possible. In addition, structural neuroimaging using MRI has developed into various methods. For example, the method of viewing inter-brain connectivity, such as diffuse

tensor imaging, is also used very often in the field of child and adolescent psychiatry.

In particular, development in the field of functional cerebral imaging is remarkable. fMRI and functional near infrared spectroscopy are brain imaging methods addressed in numerous studies in the last two decades. Because they are non-invasive, they are useful in brain research involving children and adolescents.

The popularity of artificial intelligence and machine learning is also increasing with time. The field of brain science is no exception. Recently, research on diagnosing diseases and predicting treatment effects by applying artificial intelligence and machine learning algorithms to brain images has gained popularity. This latest technique is also being applied to brain imaging analysis techniques in child psychiatry.

In this special issue, we have prepared reviews that summarize the results of brain imaging studies, particularly in autism spectrum disorder and ADHD, by applying the aforementioned methods. In addition, considering the importance of brain function development in the typical youth, a functional brain imaging research paper was prepared to discuss how the brain response related to the empathic ability of adolescents differs from that of adults. It is expected that brain imaging research in the field of child and adolescent psychiatry will be more active in the future.

## REFERENCES

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