

The Application of Cognitive Remediation Therapy in The Treatment of Mental Disorders

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Summary: Cognitive impairment is common in patients with mental disorders. At present, one of the only effective ways to improve cognitive impairment is cognitive remediation therapy. This article reviews the application of cognitive remediation therapy in the treatment of mental disorders.

Key words: cognitive remediation therapy, mechanism of action, mental disorders

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Cognitive function refers to a series of related conscious/unconscious mental activities, including pre-attentive sensory gating, attention, learning and memory, problem solving, planning, reasoning and judgment, understanding and representation, creativity, intuition and insight, spontaneous thoughts, introspection, self-consciousness and meta-cognition.^[1] It is now recognized that a variety of common mental disorders, such as anxiety spectrum disorders, mood disorders, schizophrenia and others, are accompanied by defects in cognitive function, such as in, attention, working memory, executive function, procedural memory and learning, processing speed, fear-inhibitory learning (Fear extinction), semantic memory defects etc.^[1] Cognitive remediation therapy is the only effective way to improve cognitive impairment in patients with mental disorders.

1. Cognitive Remediation Therapy

Cognitive Remediation Therapy (CRT) is a method based on behavior training in order to sustainably and widely improve cognitive activities (attention, memory, executive function and so on).^[2] In recent years, with the development of computer technology, the Computerized Remediation Therapy (CCRT) has

been derived from CRT. CCRT is a way to improve cognitive function by training individual brain specific brain circuits, which is based on the neural plasticity of the individual. Compared with CRT, CCRT can be more standardized, affordable, noninvasive, and the treatment makes possible real-time adjustment of treatment difficulty and accurate recording of the training results down to the millisecond. Thus is it possible to maximize efficacy, reduce human error and improve cost benefit.^[3]

2. Cognitive Remediation Therapy in the Treatment of Mental Disorders

2.1 Schizophrenia

In 2011, a meta-analysis of 40 randomized controlled trials (RCT) showed^[4] that CRT had a low-moderate efficacy and a certain degree of continuity for the improvement of schizophrenia in patients with overall cognition (Effect Size, ES)=0.45) and function (ES=0.42) and also has a low curative effect on mental symptoms, but this effect disappeared at follow-up. CRT combined with other rehabilitation therapy can improve the functional outcome of patients with schizophrenia more effectively. Treatment parameter settings (such as cognitive modification treatment, course of treatment

and computer use) were not associated with cognitive outcome measures. CRT is more effective for stationary phase patients.

In 2015, another meta-analysis with inclusion of 11 RCTs showed that^[5] CRT has no significant effect on the overall cognitive function in first-episode schizophrenia, but it has a low curative effect on the single cognitive function dimension of visual learning and memory (ES=0.23). This paper showed that CRT has low efficacy in improving psychiatric symptoms (ES=0.19) and social functioning (ES=0.18) in first-episode schizophrenia.

2.2 Other Mental Disorders

In addition, in recent years multiple Meta-analyses have shown that cognitive remediation therapy has a low to high degree of efficacy in improving anxiety disorder, depression, eating disorders, schizoaffective disorder, mild cognitive impairment /Cognitive function, psychiatric symptoms, and the daily functioning of patients with early stage dementia.^[3,6-10]

In short, cognitive deficits are not only state characteristics but also trait characteristics in many mental disorders. In the case of schizophrenia, cognitive impairment is the core symptom independent of both positive and negative symptoms. At present, antipsychotic drugs which are the major treatment for mental disorders have little effect on cognitive deficits in schizophrenia.^[11] In contrast, CRT has a definite ameliorative effect on cognitive and psychiatric symptoms in a variety of patients with common mental disorders. Therefore, the treatment guidelines of United States / Canada / the United Kingdom and other countries recommend cognitive remediation therapy as a treatment for stable and refractory schizophrenia.^[12,13]

In general, CRT content includes repetitive exercises, strategies for how to make up for cognitive defects, and how to extend training tasks to everyday learning and work.^[14] Compared with other behavioral therapies for schizophrenia, the advantage of CRT is that it can simultaneously correct the patient's cognitive defects and behavioral symptoms.^[14] The ultimate goal of CRT is to improve the patient's social adaptation by improving certain cognitive dimensions. However, after testing the current CRT regiment, the association between schizophrenia specific cognitive function improvement and social adaptation was still low.^[15] In addition the consistency on (still taking schizophrenia as an example) the first, second, fourth, fifth and eleventh items of the A Measurement Tool to Assess Systematic Reviews (AMSTARZ) is less than 50% when meta-analyses were

conducted for CRT. Furthermore, the data extraction, gray literature retrieval, literature quality evaluation were below the standards recommended by AMSTAR.^[16]

The major limitations of CRT in psychiatric disorders include its failure to illuminate underlying mechanisms for patients' issues, lack of standardization in treatment settings, lack of clarity on what CRT's actual curative effects are, and CRT's curative effects not being closely associated with patient social adaptation. For example, the factors that currently affect the efficacy of CRT might include individual characteristics (such as age, genotype and brain development status and so on), treatment characteristics (such as method, frequency and process etc.) and improving cognitive instruments (such as exercise, nootropic drugs and physical therapy etc.)^[17]. Cognitive impairment in different mental disorders is not the same, lacking of corresponding set of evaluation tools also limits the relevant efficacy of study.

Therefore, there is still a need for further development and establishment of more targeted and standardized cognitive remediation therapies, a need for more large sample RCTs of CRT to patients with mental disorders, and a need to carry out further research for factors influencing CRT efficacy. Further meta-analyses of CRT should adhere most closely to the standards set forth in AMSTAR. Finally, the development of targeted, standardized social adaptation skills for the CRT exercises is also essential to improvement of the cognitive function and social adaptability of patients with mental disorders.

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认知矫正治疗在精神障碍治疗中的应用

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概述: 精神障碍患者普遍存在认知功能缺陷, 目前唯一对改善认知功能缺陷有效的手段是认知矫正治疗。本文综述了认知矫正治疗在精神障碍患者治疗中的应

用。

关键词: 认知矫正治疗, 作用机制, 精神障碍

References:

1. Millan MJ, Agid Y, Brüne M, Bullmore ET, Carter CS, Clayton NS, et al. Cognitive dysfunction in psychiatric disorders: characteristics, causes and the quest for improved therapy. *Nat Rev Drug Discov.* 2012; **11**(2): 141-168. doi: <http://dx.doi.org/10.1038/nrd3628>
2. Wykes T, Spaulding WD. Thinking about the future cognitive remediation therapy—what works and could we do better? *Schizophr Bull.* 2011; **37** (Suppl 2): S80-S90. doi: <http://dx.doi.org/10.1093/schbul/sbr064>
3. Motter JN, Pimontel MA, Rindskopf D, Devanand DP3, Doraiswamy PM4, Sneed JR. Computerized cognitive training and functional recovery in major depressive disorder: A meta-analysis. *J Affect Disord.* 2016; **189**: 184-191. doi: <http://dx.doi.org/10.1016/j.jad.2015.09.022>
4. Wykes T, Huddy V, Cellard C, McGurk SR, Czobor P. A meta-analysis of cognitive remediation for schizophrenia: methodology and effect sizes. *Am J Psychiatry.* 2011; **168**(5): 472-485. doi: <http://dx.doi.org/10.1176/appi.ajp.2010.10060855>
5. Revell ER, Neill JC, Harte M, Khan Z, Drake RJ. A systematic review and meta-analysis of cognitive remediation in early schizophrenia. *Schizophr Res.* 2015; **168**(1-2): 213-222. doi: <http://dx.doi.org/10.1016/j.schres.2015.08.017>
6. Beard C, Sawyer AT, Hofmann SG. Efficacy of attention bias modification using threat and appetitive stimuli: a meta-analytic review. *Behav Ther.* 2012; **43**(4): 724-740. doi: <http://dx.doi.org/10.1016/j.beth.2012.01.002>
7. Anaya C, Martinez Aran A, Ayuso-Mateos JL, Wykes T, Vieta E, Scott J. A systematic review of cognitive remediation for schizo-affective and affective disorders. *J Affect Disord.* 2012; **142**(1-3): 13-21. doi: <http://dx.doi.org/10.1016/j.jad.2012.04.020>
8. Tchanturia K, Lounes N, Holttum S. Cognitive remediation in anorexia nervosa and related conditions: a systematic review. *Eur Eat Disord Rev.* 2014; **22**(6): 454-462. doi: <http://dx.doi.org/10.1002/erv.2326>
9. Tchanturia K, Giombini L, Leppanen J, Kinnaird E. Evidence for Cognitive Remediation Therapy in Young People with Anorexia Nervosa: Systematic Review and Meta-analysis of the Literature. *Eur Eat Disord Rev.* 2017; **25**(4): 227-236. doi: <http://dx.doi.org/10.1002/erv.2522>
10. Rodakowski J, Saghafi E, Butters MA, Skidmore ER. Non-pharmacological interventions for adults with mild cognitive impairment and early stage dementia: An updated scoping review. *Mol Aspects Med.* 2015; **43-44**: 38-53. doi: <http://dx.doi.org/10.1016/j.mam.2015.06.003>
11. Keefe RS, Bilder RM, Davis SM, Harvey PD, Palmer BW, Gold JM, et al., Neurocognitive effects of antipsychotic medications in patients with chronic schizophrenia in the CATIE Trial. *Arch Gen Psychiatry.* 2007; **64**(6): 633-647. doi: <http://dx.doi.org/10.1001/archpsyc.64.6.633>
12. Stahl SM, Morrissette DA, Citrome L, Saklad SR, Cummings MA, Meyer JM, et al., "Meta-guidelines" for the management of patients with schizophrenia. *CNS Spectr.* 2013; **18**(3):150-162. doi: <http://dx.doi.org/10.1017/S109285291300014X>
13. Lecomte T, Abidi S, Garcia-Ortega I, Mian I, Jackson K, Jackson K, et al. CPA Treatment Guidelines on Psychosocial Treatment of Schizophrenia in Adults. *Can J Psychiatry.* 2017; **62**(9): 648-655. doi: <http://dx.doi.org/10.1177/0706743717720195>
14. McGurk SR, Mueser KT, Covell NH, Cicerone KD, Drake RE, Silverstein SM, et al. Mental health system funding of cognitive enhancement interventions for schizophrenia: summary and update of the New York Office of Mental Health expert panel and stakeholder meeting. *Psychiatr Rehabil J.* 2013; **36**(3): 133-145. doi: <http://dx.doi.org/10.1037/prj0000020>
15. Nuechterlein KH, Green MF, Kern RS, Baade LE, Barch DM, Cohen JD, et al. The MATRICS Consensus Cognitive Battery, Part 1: Test Selection, Reliability, and Validity. *Am J Psychiatry.* 2008; **165**(2): 203-213. doi: <http://dx.doi.org/10.1176/appi.ajp.2007.07010042>
16. Bryce S, Sloan E, Lee S, Ponsford J, Rossell S. Cognitive remediation in schizophrenia: A methodological appraisal of systematic reviews and meta-analyses. *J Psychiatr Res.* 2016; **75**: 91-106. doi: <http://dx.doi.org/10.1016/j.jpsychires.2016.01.004>
17. Keshavan MS, Vinogradov S, Rumsey J, Sherrill J, Wagner A. Cognitive Training in Mental Disorders: Update and Future Directions. *Am J Psychiatry.* 2014; **171**(5): 510-522. doi: <http://dx.doi.org/10.1176/appi.ajp.2013.13081075>



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