重复经颅磁刺激联合社交康复训练治疗注意缺陷多动障碍儿童临床研究

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摘要 **目的** 观察重复经颅磁刺激(rTMS)联合社交康复训练对注意缺陷多动障碍(ADHD)儿童的影响。**方法** 选择2019年3月—2022年6月在南京医科大学附属儿童医院治疗的ADHD儿童60例,采用随机数字表法分为对照组与观察组,每组30例。对照组接受常规药物治疗,1次/d,持续治疗12周。观察组在常规药物治疗基础上接受rTMS联合社交技能教育和提升项目(PEERS)社交康复训练,其中rTMS治疗15 min/次,2次/周,持续治疗12周;PEERS社交康复训练课程包含沟通、信息交互、游戏启动、自我倡议、分歧解决、社会语用学6个部分,共12次课,50 min/次,1次/周,持续12周。分别于治疗前后采用注意缺陷多动障碍筛查量表(SNAP-Ⅳ)评分评价患儿注意力不集中及多动/冲动情况;采用Weiss功能性缺陷程度评定量表(父母版)(WFIRS-P)评价患儿社会功能领域功能缺陷情况;采用儿童社交焦虑量表(SASC)评价患儿焦虑情绪;采用儿童抑郁障碍自评量表(DSRSC)评价患儿抑郁情绪;并分析WFIRS-P家庭评分、社会活动评分与SNAP-Ⅳ评分、SASC评分和DSRSC评分的相关性。**结果** ① SNAP-Ⅳ评分:与治疗前比较,2组治疗后SNAP-Ⅳ注意缺陷、多动/冲动、对立违抗评分均明显降低($P<0.05$)。与对照组比较,观察组治疗后SNAP-Ⅳ注意缺陷、多动/冲动、对立违抗评分均明显更低($P<0.05$)。② WFIRS-P评分:与治疗前比较,2组治疗后WFIRS-P家庭、学习/学校、生活技能、自我观念、社会活动和冒险活动评分均明显降低($P<0.05$)。与对照组比较,观察组治疗后WFIRS-P家庭和社会活动评分均明显更低($P<0.05$)。③ SASC、DSRSC评分:与治疗前比较,2组治疗后SASC、DSRSC评分均明显降低($P<0.05$)。与对照组比较,观察组治疗后SASC、DSRSC评分均明显更低($P<0.05$)。④ 相关性分析:WFIRS-P家庭评分与SNAP-Ⅳ多动/冲动及对立违抗评分呈正相关关系($r=0.357$,$P=0.005$;$r=0.284$,$P=0.028$),与SASC评分($r=0.352$,$P=0.006$)和DSRSC评分($r=0.353$,$P=0.006$)均呈正相关关系。WFIRS-P社会活动评分与SNAP-Ⅳ对立违抗评分呈正相关关系($r=0.293$,$P=0.023$),与DSRSC评分($r=0.347$,$P=0.007$)呈正相关关系。**结论** rTMS联合社交康复训练可有效改善ADHD儿童注意缺陷多动障碍和焦虑、抑郁情绪,提高家庭及社会活动功能。

关键词 注意缺陷多动障碍;重复经颅磁刺激;社交康复训练;社交技能教育与提升项目;社会活动功能;焦虑;抑郁

注意缺陷多动障碍(attention deficit hyperactivity disorder,ADHD)是儿童期发病的神经发育障碍,在全球儿童及青少年中发病率约为5%。ADHD主要表现为过度活跃、注意力不集中、冲动,常伴有焦

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虑、抑郁、睡眠障碍等症状，甚至存在功能障碍[1]，这将严重影响患儿的认知功能及学习能力。未经有效干预的儿童及青少年ADHD症状可能会持续至成年期，对患者及家庭产生持续的负面影响。有研究表明，多巴胺及去甲肾上腺素等神经递质系统的异常，影响大脑执行、注意力及情绪调节等功能[2]。精神兴奋剂（包括盐酸哌甲酯和盐酸托莫西汀）是临床治疗ADHD的常用药物，其作用机制主要是通过增强多巴胺和去甲肾上腺素的作用，提高多动症患者前额皮质活动，从而改善执行和注意力功能[3-4]。但是ADHD药物治疗存在一些毒副作用（如胃肠不良反应、睡眠障碍、血压与心率升高等），大大降低患者的治疗依从性[5]，因此探寻更为安全、有效的ADHD治疗方案至关重要。

重复经颅磁刺激（repetitive transcranial magnetic stimulation，rTMS）是一种物理治疗方法，具有无创、安全、定位准确、操作简便等优点[6]。rTMS磁信号可以无衰减地透过颅骨刺激皮层神经元，去极化地发挥脑皮质功能的调节作用。有研究采用低频rTMS治疗ADHD患儿，可以有效改善患儿在学校的注意缺陷症状和在家庭中的多动/冲动症状，安全性较好[7-10]。但既往研究显示，该方法对ADHD患儿焦虑、抑郁情绪的改善作用并不明确[8]。社交技能教育和提升项目（program for the education and enrichment of relational skills，PEERS）是一项家长辅助参与的针对儿童社交技能缺陷的社交技能训练课程，可以提升患儿社交技能，缓解社交困难，减轻焦虑和抑郁情绪[11-13]。本研究采用rTMS联合PEERS训练干预ADHD儿童，取得良好疗效。

1 临床资料

1.1 病例选择标准

1.1.1 诊断标准 符合《注意缺陷多动障碍早期识别、规范诊断和治疗的儿科专家共识》[14]有关ADHD的诊断标准。

1.1.2 纳入标准 ① 年龄8～14岁；② 病程＜40个月；③ 母语为汉语，父母均为汉族；④ 韦氏儿童智力量表（Wechsler intelligence scale for children，WISC）第4版（WISC-Ⅳ）[15]评分≥70分；⑤ 患儿家长对本研究方案知情同意，并自愿签署知情同意书。

1.1.3 排除标准 ① 既往或现在合并其他精神疾病；② 合并患有神经系统器质性疾病；③ 合并患有其他重大器质性疾病。

1.1.4 中止和脱落标准 ① 患儿及其家长中途主动退出本研究；② 患儿依从性差，无法配合完成治疗。

1.2 一般资料

选择2019年3月—2022年6月南京医科大学附属儿童医院收治的60例ADHD儿童，按照随机数字表法分为对照组与观察组，每组30例。2组性别、年龄、病程、WISC-Ⅳ智力水平分布等一般资料比较，差异无统计学意义（$P>0.05$），具有可比性。见表1。本研究方案经南京医科大学附属儿童医院伦理委员会审批通过（审批号：201902104-1）。

表1 2组一般资料比较

Table 1 Comparison of general data between two groups

组别	例数	性别		年龄/($\bar{x}\pm s$，岁)	病程/($\bar{x}\pm s$，月)	WISC-Ⅳ评分/分				
		男	女			≥120	110～119	90～109	80～89	70～79
对照组	30	15	15	9.76±1.52	22.24±2.14	0	1	13	9	7
观察组	30	16	14	10.94±1.63	23.04±1.27	0	2	14	7	7

2 方 法

2.1 治疗方法

2.1.1 对照组 接受常规药物治疗。给予盐酸托莫西汀胶囊（规格：10 mg，生产批号：D587546，生产厂家：美国礼来公司）治疗，初始剂量0.5 mg/（kg·d），2周后根据临床治疗情况及耐受程度调整剂量至1.2 mg/（kg·d），1次/d，持续治疗12周。

2.1.2 观察组 在对照组基础上接受rTMS联合PEERS社交康复训练。

2.1.2.1 rTMS治疗 采用重复经颅磁刺激治疗仪（武汉依瑞德公司，型号：CCY-2型）进行rTMS治疗。治疗时患儿采取舒适坐姿，依据国际标准脑电电极10-20导联系统定位，取前额叶背外侧区（F4点）为刺激位点，刺激频率1 Hz，刺激强度为患儿运动强度80%，刺激时间2 s，间隔时间28 s，共30个序列。15 min/次，2次/周（治疗间隔时间2～3 d），持续治疗12周。

2.1.2.2 PEERS社交康复训练 患儿通过参与偶剧表演的方式接受训练；家长通过讨论家庭作业完成

情况、评估游戏完成质量和辅助指导社交技巧的方式,与患儿共同接受技能培训。PEERS社交康复训练课程包含沟通、信息交互、游戏启动、自我倡议、分歧解决、社会语用学6个部分,共12次课,50 min/次,1次/周,持续治疗12周。见表2。

表2 PEERS社交训练课程表

Table 2 PEERS social training curriculum

编号	课程方向	培训对象	课程概述
1	沟通	患儿 家长	介绍社交训练课程流程,强调遵循培训人员指导原则
2	沟通	患儿 家长	通过寻找患儿共同爱好相互交流,引导建立友谊,并学习如何在社交中恰当使用幽默 学习如何帮助患儿创造实践交流的机会;学习如何在患儿无法恰当使用幽默技巧时,安抚情绪并提供建议
3	信息交互	患儿 家长	通过分享喜欢的童话故事,开启话题 学习鼓励患儿的技巧;学习如何在患儿无法熟练地开启话题时,安抚情绪并提供建议
4	信息交互	患儿 家长	学习如何进入和退出话题 学习如何在患儿无法熟练地进入和退出话题时,安抚情绪并提供建议
5	游戏启动	患儿 家长	介绍《稻草人》《玫瑰与金鱼》等偶剧内容及角色,并为患儿示范如何扮演角色 学习偶剧表演过程中如何鼓励患儿的技巧
6	游戏启动	患儿 家长	学习如何邀请朋友加入自己的偶剧表演;学习如何加入朋友的偶剧表演 在患儿无法熟练地邀请朋友或加入朋友的偶剧表演时,安抚患儿情绪并提供建议
7	自我倡议	患儿 家长	介绍萝卜蹲和拍手游戏等多人游戏规则;学习如何提出开展不同游戏的建议 学习如何在患儿无法熟练地提出不同建议时,安抚情绪并提供建议
8	分歧解决	患儿 家长	学习如何寻求和给予帮助 学习如何在患儿无法熟练地寻求和给予帮助时,安抚情绪并提供建议
9	社会语用学	患儿 家长	学习如何独处 学习如何在患儿无法独处时,安抚情绪并提供建议
10	社会语用学	患儿 家长	学习如何轻声说话 学习如何在患儿无法做到轻声说话时,安抚情绪并提供建议
11	社会语用学	患儿 家长	学习如何在社交中礼貌用语 学习如何在患儿无法做到礼貌用语时,安抚情绪并提供建议
12	总结回顾	患儿 家长	回顾全部课程所学知识及社交技巧 审查及回顾全部课程辅助策略

2.2 观察指标

2.2.1 注意缺陷多动障碍 采用注意缺陷多动障碍筛查量表(Swanson, Nolan and Pelham-Ⅳ rating scale, SNAP-Ⅳ)[16]对患儿注意力不集中及多动/冲动情况进行评估。包括注意缺陷、多动/冲动和对立违抗3个方面,共26个条目,所有条目均采用0~3分4级评分制。评分越高表示患儿注意力不集中及多动/冲动情况越严重。

2.2.2 社会功能领域功能缺陷 采用Weiss功能性缺陷程度评定量表(父母版)(Weiss functional impairment rating scale-parent form, WFIRS-P)[17]对患儿社会功能领域功能缺陷情况进行评估。包括家庭、学习/学校、生活技能、自我观念、社会活动和冒险活动6个方面,共50个条目,所有项目均采用0~3分4级评分制。评分越高表示患儿社会功能领域功能缺陷越严重。

2.2.3 焦虑情绪 采用儿童社交焦虑量表(social anxiety scale for children, SASC)[18]对患儿焦虑情绪进行评估。共10个条目,所有条目均采用0~2分3级评分制。评分越高表示患儿的焦虑程度越严重。

2.2.4 抑郁情绪 采用儿童抑郁障碍自评量表(depression self-rating scale for children,DSRSC)[19]对患儿抑郁情绪进行评估。共18个条目,所有条目均采用0～2分3级评分制,其中10个条目为反向计分,计算时需转换后,再计算总分。评分越高表示患儿抑郁程度越严重。

2.3 统计学方法

采用GraphPad Prism 10软件进行数据分析。计量资料服从正态分布以($\bar{x}\pm s$)表示,组内采用配对t检验,组间采用两独立样本t检验;不服从正态分布以$M(P_{25},P_{75})$表示,组内比较采用配对样本Wilcoxon检验,组间比较采用两独立样本Mann-Whitney U检验。计数资料采用χ^2检验;等级资料采用秩和检验。不符合正态分布、线性关系的连续变量采用Spearman相关性分析。$P<0.05$为差异有统计学意义。

3 结 果

3.1 2组治疗前后SNAP-Ⅳ评分比较

与治疗前比较,2组治疗后SNAP-Ⅳ注意缺陷、多动/冲动、对立违抗评分均明显降低,差异均具有统计学意义($P<0.05$)。与对照组比较,观察组治疗后SNAP-Ⅳ注意缺陷、多动/冲动、对立违抗评分均明显更低,差异均具有统计学意义($P<0.05$)。见表3。

表3 2组治疗前后SNAP-Ⅳ评分比较[$M(P_{25},P_{75})$] 分

Table 3 Comparison of SNAP-Ⅳ scores between two groups before and after treatment [$M(P_{25},P_{75})$] Scores

组 别	例数	时 间	注意缺陷	多动/冲动	对立违抗
对照组	30	治疗前	23.00(22.00,24.00)	19.00(18.00,20.25)	13.00(12.00,14.00)
		治疗后	12.00(11.00,13.00)1)	9.00(7.75,10.25)1)	7.00(5.75,9.00)1)
观察组	30	治疗前	22.00(20.75,24.00)	19.00(18.00,20.25)	13.00(12.00,14.00)
		治疗后	10.00(9.00,12.00)1)2)	8.00(6.00,9.00)1)2)	6.00(4.75,6.00)1)2)

注:与治疗前比较,1) $P<0.05$;与对照组比较,2) $P<0.05$。

Note: Compared with that before treatment, 1) $P<0.05$; compared with the control group, 2) $P<0.05$.

3.2 2组治疗前后WFIRS-P评分比较

与治疗前比较,2组治疗后WFIRS-P家庭、学习/学校、生活技能、自我观念、社会活动和冒险活动评分均明显降低,差异均具有统计学意义($P<0.05$)。与对照组比较,观察组治疗后WFIRS-P家庭和社会活动评分均明显更低,差异均具有统计学意义($P<0.05$)。见表4。

表4 2组治疗前后WFIRS-P评分比较[$M(P_{25},P_{75})$] 分

Table 4 Comparison of WFIRS-P scores between two groups before and after treatment [$M(P_{25},P_{75})$] Scores

组 别	例数	时 间	家庭	学习/学校	生活技能
对照组	30	治疗前	9.00(6.00,13.00)	8.00(6.00,11.25)	7.00(5.75,9.25)
		治疗后	6.00(4.00,9.00)1)	7.00(5.75,10.00)1)	5.50(4.00,8.25)1)
观察组	30	治疗前	8.50(6.00,12.00)	10.00(7.00,12.00)	8.00(6.00,11.00)
		治疗后	3.50(2.00,6.25)1)2)	7.50(4.75,10.00)1)	5.00(4.00,8.00)1)

组 别	例数	时 间	自我观念	社会活动	冒险活动
对照组	30	治疗前	4.50(3.00,6.25)	6.50(3.75,8.00)	4.00(2.00,6.25)
		治疗后	4.00(2.75,5.00)1)	5.50(3.00,7.00)1)	3.00(1.75,4.00)1)
观察组	30	治疗前	4.50(3.00,8.00)	5.00(3.00,8.25)	5.00(3.00,7.00)
		治疗后	2.00(1.00,4.25)1)	3.50(1.00,5.00)1)2)	2.50(1.00,4.00)1)

注:与治疗前比较,1) $P<0.05$;与对照组比较,2) $P<0.05$。

Note: Compared with that before treatment, 1) $P<0.05$; compared with the control group, 2) $P<0.05$.

3.3 2组治疗前后SASC、DSRSC评分比较

与治疗前比较,2组治疗后SASC、DSRSC评分均明显降低($P<0.05$)。与对照组比较,观察组治疗后SASC、DSRSC评分均明显更低($P<0.05$)。见表5。

表5　2组治疗前后SASC、DSRSC评分比较[$M(P_{25},P_{75})$]　分

Table 5　Comparison of SASC and DSRSC scores between two groups before and after treatment [$M(P_{25},P_{75})$]　Scores

组别	例数	时间	SASC评分	DSRSC评分
对照组	30	治疗前	11.50(10.00,14.00)	27.50(25.00,30.00)
		治疗后	11.50(9.75,13.00)1)	26.00(24.00,29.00)1)
观察组	30	治疗前	13.50(10.75,15.00)	27.00(25.00,29.00)
		治疗后	8.00(5.75,11.00)1)2)	15.50(15.00,18.00)1)2)

注:与治疗前比较,1) $P<0.05$;与对照组比较,2) $P<0.05$。

Note: Compared with that before treatment, 1) $P<0.05$; compared with the control group, 2) $P<0.05$.

3.4　WFIRS-P家庭、社会活动评分与SNAP-Ⅳ、SASC及DSRSC评分相关性分析

Spearman相关性分析结果显示,WFIRS-P家庭领域评分与SNAP-Ⅳ多动/冲动及对立违抗评分呈正相关关系($r=0.357$,$P=0.005$;$r=0.284$,$P=0.028$),与SASC评分($r=0.352$,$P=0.006$)和DSRSC评分($r=0.353$,$P=0.006$)呈正相关关系。见图1。WFIRS-P社会活动评分与SNAP-Ⅳ对立违抗评分呈正相关关系($r=0.293$,$P=0.023$),与DSRSC评分($r=0.347$,$P=0.007$)呈正相关关系。见图2。

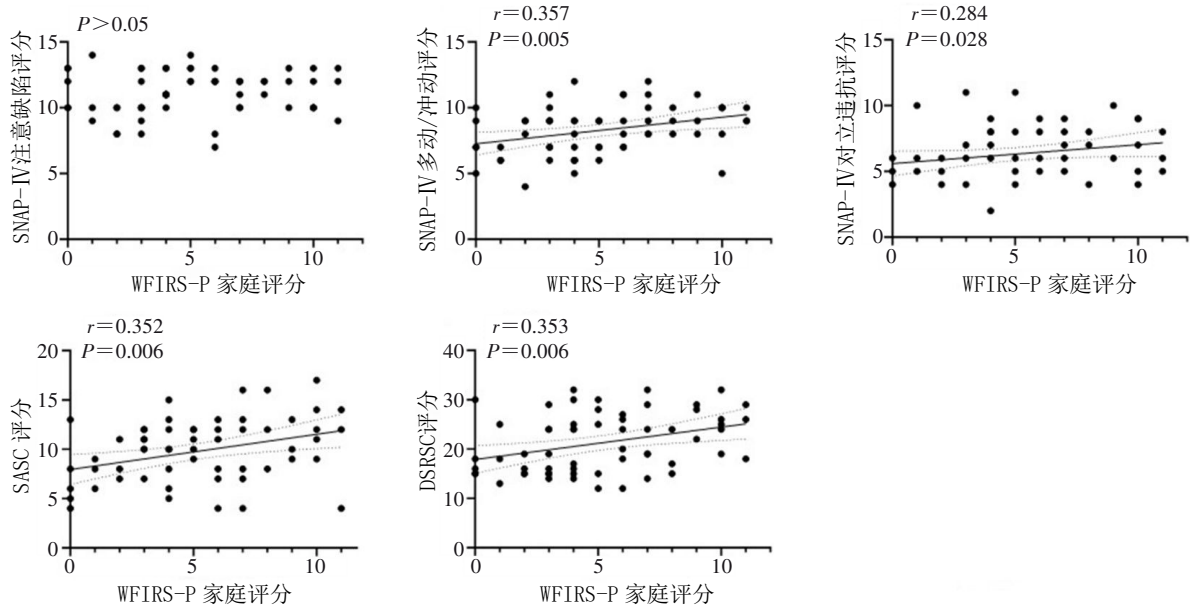

图1　WFIRS-P家庭评分与SNAP-Ⅳ、SASC及DSRSC评分相关性分析

Figure 1　Correlation analysis between WFIRS-P family scores and SNAP-Ⅳ, SASC and DSRSC scores

4　讨　论

4.1　rTMS联合社交技能训练可改善ADHD儿童注意缺陷多动障碍和焦虑、抑郁情绪

本研究结果显示,与对照组比较,观察组治疗后SNAP-Ⅳ注意缺陷、多动/冲动、对立违抗评分和SASC、DSRSC评分均明显更低,提示rTMS联合社交康复训练可改善ADHD儿童注意缺陷、多动/冲动、对立违抗等障碍情况以及焦虑、抑郁情绪。与GÓMEZ等[9]和GARDNER等[13]研究结果一致。可能与以下因素有关:① 有研究显示,学习、记忆、注意力、意志、计划及决策等功能与大脑前额叶皮质有关[20-21]。在ADHD儿童的抗扫视任务中,背外侧前额叶皮层亢进,其大脑功能障碍可能与背外侧前额叶皮质异常有关[22-24]。rTMS通过8字线圈的电流交变形成脉冲磁场,神经组织在磁场作用下产生感应电流,神经元去极化产生兴奋或抑制作用,实现脑神经刺激[6];通过使用低频率重复发放脉冲,rTMS得以实现对大脑背外侧前额叶的抑制性干预,从而改善ADHD儿童注意缺陷多动障碍。② PEERS社交康复训练课程针对ADHD儿童进行问候、建立友谊、使用幽默技巧、邀请朋友、加入朋友、表达不

同建议、处理分歧、使用礼貌用语等社交技巧训练，同时引导家长鼓励和辅助患儿在模拟角色表演和游戏场景中将社交技巧融入不同的社交场景中，有助于缓解患儿焦虑、抑郁情绪。

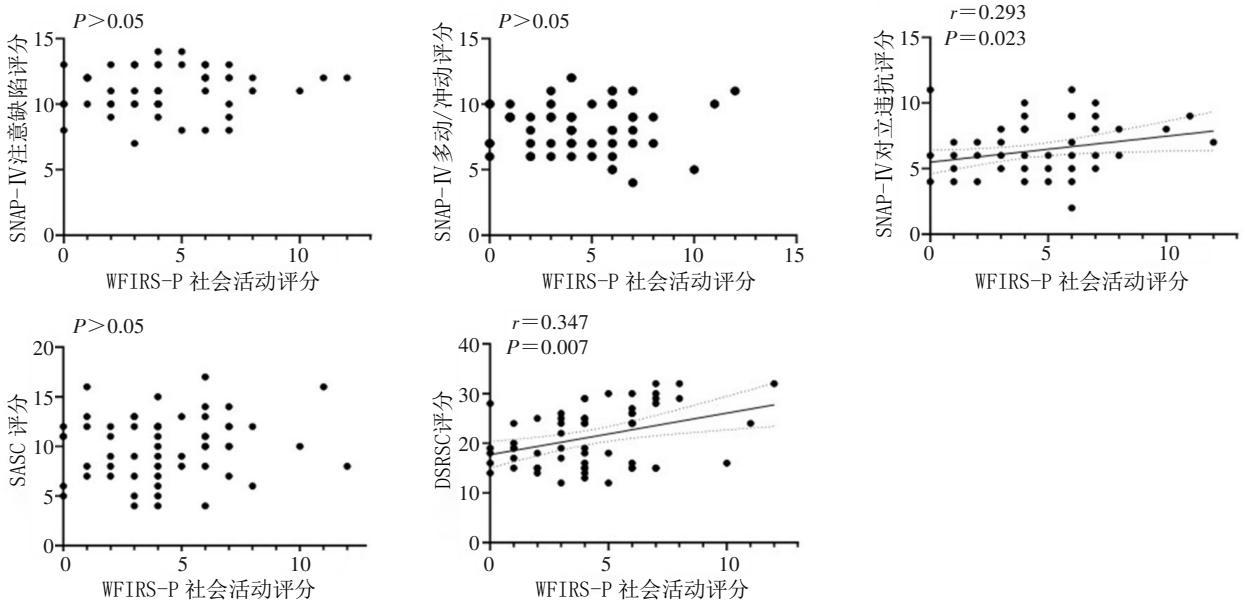

图2 WFIRS-P社会活动评分与SNAP-Ⅳ、SASC及DSRSC评分相关性分析

Figure 2 Correlation analysis between WFIRS-P social activity scores and SNAP-Ⅳ, SASC and DSRSC scores

4.2 rTMS联合社交康复训练可改善ADHD儿童家庭及社会活动功能

本研究结果显示，与对照组比较，观察组WFIRS-P家庭、社会活动评分明显更低，WFIRS-P家庭评分、社会活动评分均与SNAP-Ⅳ对立违抗和DSRSC评分呈正相关关系，WFIRS-P家庭评分与SNAP-Ⅳ多动/冲动和SASC评分也呈正相关关系，提示rTMS联合社交康复训练可改善ADHD儿童家庭及社会活动功能，ADHD患儿家庭及社会活动功能改善可能与其多动/冲动、对立违抗以及焦虑、抑郁情绪的改善相关。可能与以下因素有关：① 通过rTMS对大脑背外侧前额叶进行抑制性干预，ADHD患儿注意缺陷多动障碍等大脑功能障碍明显改善，有利于患儿扮演家庭角色、承担家庭分工，促进ADHD患儿更积极融入亲子互动、家庭互动，从而提高家庭功能。② PEERS社交课程训练通过引导ADHD患儿参与偶剧表演和多人游戏互动，可培养患儿兴趣爱好，促进患儿主动结交朋友和维持友谊，这对改善患儿社会活动功能有正面意义；在家长的鼓励及辅助下，ADHD患儿可以更有信心地参与偶剧表演和游戏互动，还可以让ADHD患儿家长加深对疾病的理解和认知，缓解育儿压力，改善家庭氛围；此外，ADHD患儿熟练掌握各种社交技巧，有助于缓解其与家庭成员的关系、打破社交壁垒和建立友谊关系，从而提高ADHD患儿家庭和社会活动功能。

5 小 结

rTMS联合社交康复训练可有效改善ADHD儿童注意缺陷多动障碍、焦虑、抑郁情绪，提高家庭及社会活动功能。但本研究仍存在一些不足之处，如本研究样本来源于单中心、样本量较少、缺乏随访等，下一步研究将开展多中心、大样本临床随机对照研究，并加强随访，为rTMS联合社交康复训练治疗ADHD儿童提供更科学的循证依据。

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Clinical Study of Repetitive Transcranial Magnetic Stimulation Combined with Social Rehabilitation Training on Children with Attention Deficit Hyperactivity Disorder

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ABSTRACT **Objective** To observe the effect of repetitive transcranial magnetic stimulation (rTMS) combined with social rehabilitation training on children with attention deficit hyperactivity disorder (ADHD). **Methods** A total of 60 children diagnosed with ADHD in the Children's Hospital of Nanjing Medical University from March 2019 to June 2022 were randomly divided into control group and observation group, with 30 cases in each group. The control group received routine medication, once a day for 12 weeks. The observation group received rTMS combined with the program for the education and enrichment of relational skills (PEERS)

social rehabilitation training in addition to the routine medication, including 15 minutes rTMS treatment a time, twice a week for 12 weeks. The PEERS social rehabilitation training course consisted of 6 parts: communication, information interaction, game initiation, self-initiative, disagreement resolution and social pragmatics, which had 12 classes, 50 minutes per session, once a week, for 12 weeks. Before and after treatment, Swanson, Nolan and Pelham-Ⅳ rating scale (SNAP-Ⅳ) was used to evaluate attention deficit and hyperactivity/impulsivity. Weiss functional impairment rating scale-parent form (WFIRS-P) was used to evaluate social functional behavior. Social anxiety scale for children (SASC) was used to evaluate anxiety. Depression self-rating scale for children (DSRSC) was used to evaluate depression. The correlations of WFIRS-P family score and social activity score with SNAP-Ⅳ score, SASC score and DSRSC score were analyzed. **Results** (1) SNAP-Ⅳ scores: compared with that before treatment, attention deficit, hyperactivity/impulsivity, opposition and defiance scores in SNAP-Ⅳ of both groups decreased significantly after treatment ($P<0.05$). Compared with the control group, attention deficit, hyperactivity/impulsivity and opposition defiance scores in SNAP-Ⅳ of the observation group were lower after treatment ($P<0.05$). (2) WFIRS-P scores: compared with that before treatment, the family, learning/school, life skill, self-concept, social activity and adventure activity scores in WFIRS-P of both groups decreased significantly after treatment ($P<0.05$). Compared with the control group, the family and social activity scores in WFIRS-P of the observation group were lower after treatment ($P<0.05$). (3) SASC and DSRSC scores: compared with that before treatment, the SASC and DSRSC scores of both groups decreased significantly after treatment ($P<0.05$). Compared with the control group, SASC and DSRSC scores of the observation group were lower after treatment ($P<0.05$). (4) Correlation analysis: the family score in WFIRS-P was positively correlated with hyperactivity/impulsivity, opposition and defiance scores in SNAP-Ⅳ ($r=0.357$, $P=0.005$; $r=0.284$, $P=0.028$), the SASC score ($r=0.352$, $P=0.006$) and the DSRSC score ($r=0.353$, $P=0.006$). The social activity score in WFIRS-P was positively correlated with opposition and defiance score in SNAP-Ⅳ ($r=0.293$, $P=0.023$), as well as the DSRSC score ($r=0.347$, $P=0.007$). **Conclusion** rTMS combined with social rehabilitation training can effectively improve attention deficit hyperactivity disorder, anxiety and depression of children with ADHD, and enhance their family and social activity functions.

KEY WORDS attention deficit hyperactivity disorder; repetitive transcranial magnetic stimulation; social rehabilitation training; PEERS; social activity function; anxiety; depression
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Effect of Articular Needling Therapy Combined with Proprioceptive Training on Patients with Knee Osteoarthritis

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ABSTRACT **Objective** To observe the clinical effect of articular needling therapy combined with proprioceptive training on patients with knee osteoarthritis (KOA). **Methods** A total of 90 patients with KOA in the Foshan Traditional Chinese Medicine Hospital Affiliated to Guangzhou University of Chinese Medicine from February 2021 to October 2022 were randomly divided into control group and observation group, with 45 cases in each group. The control group received routine treatments such as stretching therapy, joint mobilization, muscle strength training and intermediate frequency therapy, with each item treated for 10 minutes a time, once a day, six days a week for four weeks. The observation group received articular needling therapy combined with proprioceptive training based on the treatment of the control group, including articular needling therapy 20 minutes a time, once a day, six days a week for four weeks and proprioceptive training 10 minutes a time, once a day, six days a week for four weeks. Before and after treatment, visual analog scale (VAS) score was used to assess knee joint pain level. Western Ontario and McMaster University osteoarthritis index (WOMAC) was used to assess knee joint function. The average trajectory error of the affected limb and Berg balance scale (BBS) were used to assess the balance function of lower limb. **Results** Compared with that before treatment, VAS score, WOMAC score and average trajectory error of the affected limb of both groups decreased significantly after treatment, while BBS score increased significantly, and the differences were statistically significant ($P<0.05$). Compared with the control group, VAS score, WOMAC score and average trajectory error of the affected limb of the observation group were lower after treatment, while BBS score of the observation group was significantly higher, and the differences were statistically significant ($P<0.05$). **Conclusion** Articular needling therapy combined with proprioceptive training can effectively improve pain of knee joint, knee joint function, and balance function of lower limb in patients with KOA.

KEY WORDS knee osteoarthritis; articular needling therapy; proprioceptive training; knee joint function; balance function
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