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ORIGINAL ARTICLE

Benefits of medical clowning in the treatment of young children with autism spectrum disorder

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Abstract

We investigated the contribution of group therapy delivered by a medical clown to young children diagnosed with autism spectrum disorder (ASD). So far, scientific publications regarding medical clowning focus on general health advantages. The current study is the first controlled research examining the use of medical clowning in the therapy for children with ASD. Twenty-four children aged 2–6 years old with ASD enrolled in our special education intensive program were examined before and after group sessions with clown intervention (CI) and other intervention (OI). We tested stereotypic behaviors, verbal expression, play reciprocity, and social smiles. Data was collected during 12 weeks of intervention, and the trajectory of change was evaluated in addition to the pre-/post-intervention.

Conclusion: improvement over time in all measures: Significant increase in word production, play reciprocity, and amount of social smiles during CI as compared with OI. We also found a reduction in frequency of stereotypic behaviors during and following CI as compared with before CI. These preliminary results indicate that medical clowning may be beneficial for young children with ASD, since it promotes communication and social reciprocity in a fun and lively interventional setting.

What is Known:
- *Many therapies are used and proven as efficacious interventions for children with ASD.*
- *So far, medical clowning was not tested as an intervention or therapy for ASD.*

What is New:
- *Medical clowning sessions with children with ASD elicited enhanced communication during the interventions as compared with other interventions.*
- *Medical clowning sessions contributed to a decrease in frequency of stereotypic movements over time, in children with ASD.*

Keywords Autism spectrum disorder · Treatment · Medical clowning · Complementary and alternative therapies for ASD

Abbreviations

ADOS-2	Autism Diagnostic Observation Schedule-2nd Edition
ASD	Autism spectrum disorder
CI	Clown intervention
MC	Medical clowning
OI	Other intervention

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Introduction

Autism spectrum disorder (ASD) has become increasingly prevalent during the last few decades [4], and it is estimated that 1–2% of the population meet the criteria for the disorder [39]. A lot of effort is invested in treatments aimed to change and improve its developmental trajectory [9]. Although there are many medical treatments for ASD, pharmacotherapy is mainly aimed to treat secondary or comorbid symptoms and do not address the core symptoms of interaction and communication [11]. Prescribed drugs may have adverse events [23], and families of young children with ASD prefer non-pharmacological interventions [6].

Other cornerstone interventions for the core symptoms of ASD in children are mainly developmental and behavioral interventions [22, 38] which are frequently employed along with developmental interventions, speech therapy, occupational and physical therapy, and dyadic and parental interventions. Complementary and alternative therapies for ASD receive medical attention especially due to parental requests [25], for example animal-assisted therapy [31], hippotherapy (Equine therapy) [2], art therapy [10], and music therapy [28]. Part of those interventions are not evidence-based and not reimbursed. However, parents are spending a lot of "out-of-pocket" money to provide those interventions to their children, in part due to their disappointment from the efficacy of proven treatments [27].

The current study was performed at the special education daycare of our center, which is affiliated with Safra Children's Hospital. The medical clown is a member of the art, music, and therapy team, alongside with a large multidisciplinary team of therapists, who provide ASD-oriented on-going intensive individual and group interventions to the children in the special education daycare.

Across the children's hospital, medical clowning (MC) is an established intervention, aimed to promote the well-being and decrease anxiety of hospitalized children by distraction, enhancement of expression and emotional control, using play and fun techniques, humor, and non-verbal communication [19]. Studies examining the effect of MC demonstrated an effect on anxiety in both children and their parents during preparation for hospitalization, attending surgery, or other invasive procedures [13, 24, 32]. MC was also beneficial in reduction of pain in children with cerebral palsy during botulinum toxin injections [3, 15]. MC was found to improve the overall experience of the child and caregivers during complete physical examinations [24]. Medical stuff had a positive attitude about the contribution of medical clowns to pediatric patients [34]. A recent study inspected the views of a medical team in a disaster-zone field hospital on the performance of volunteer medical clowns on-site. The medical team members thought that the clowns had a positive influence on the team [18]. A recent publication reported the benefit of MC to playfulness among children with intellectual disability [12].Quantitative studies were carried out mostly in acute care settings, but the effect of MC in children with developmental disabilities such as ASD, in a therapy setting, has yet to be tested [19].

Children with ASD exhibit impairments in the ability to recognize facial identities and expressions and to scan human faces in a normal pattern [8, 33]. Face processing in ASD is different than in typical persons, while object processing is similar [26, 30]. Individuals with ASD may show preference to non-human faces (e.g., cartoons) and use the fusiform gyrus, atypically, for recognizing non-human faces [14, 37]. Participants with ASD required more extreme presentations of facial expressions than typical participants in order to correctly recognize them [35]. The exaggerated facial expressions and mimics used by the MC may provide a more understandable presentation of human emotion to children with ASD. By doing so, the MC may create more accessible social scenarios. This intervention for children with ASD could improve their ability of interpretation of facial expressions. We hypothesized that intervention by a MC will improve communication and interaction and diminish repetitive behaviors in children with ASD. We also postulated that MC may be appreciated by the multidisciplinary medical staff. This is the first evidence-based study aimed to examine the benefits of MC for children with ASD in a therapeutic setting.

Materials and methods

Participants

The study included 24 children, 22 boys (91.7%) and 2 girls (8.3%) aged 2–6 years (M = 4.14, SD = 1). All participants were diagnosed with ASD according to DSM-5 [1] criteria and ADOS-2 (Autism Diagnostic Observation Schedule-2nd Edition) [21] and had neurodevelopmental, cognitive, and neuropsychological testing prior to admission. The participants were heterogeneous in the severity of autism symptoms, cognitive abilities, and socioeconomic background. All participants received the same group setting clown-mediated treatment.

Setting

Our classes are nursery and preschool programs that provide education and therapeutic interventions in a weekly and yearly setting. Early intervention is provided by a multidisciplinary team, with at least 10 h/week of individual therapy, and at least four h of group therapy. Once per week, the MC conducts a group therapy session, with the participation of eight to ten children that surround the clown and the pedagogical team assists from behind the half circle. This setting is used in the

same way for other group interventions. During the sessions, the clown is using body language, facial expressions, sounds, games, and tricks to encourage the children to laugh, imitate, play, interact, initiate and take turns, along with considering the group's norms (such as waiting in line, clapping, imitating, and considering the wishes of peers).

Study design

The participants in the current study were tested under two conditions: clown intervention (CI) condition and other intervention (OI) condition as control. The children were tested at three time intervals:

A. Ten minutes before the intervention started
B. During the intervention (if applicable)
C. Ten minutes after the intervention ended

Every week, the same children were tested at the same time intervals, and the same aspects were measured during CI, and also during OI group activities, that occurred on a different day of the same week. All subtests were administered on subsequent weeks for 12 weeks.

CI description

The medical clown was dressed with regular clothes that were more colorful and exaggerated, and carried a suitcase with different accessories. The same medical clown participated at all study sessions. The clown that participated in the study had two years of experience and training working with children with different disabilities including ASD. She received ongoing supervision by a certified psychologist. The intervention was performed as described, in the format of group therapy, including activities that required reciprocity (such as moving objects, playing with the clown, showing ridiculous movements and slapstick), and simplified language including repetitions and imitations of children's expressions and gibberish.

OI description

Other interventions (OI) that served as the control condition were group activities using the same setting, such as group music therapy or play therapy, and were administered by other therapists or by a teacher well-known to the children.

Measurements

In order to assess the efficacy of CI versus OI, we measured a number of parameters during the medical clowning intervention and evaluated the children before, during (when it was applicable), and immediately after the intervention.

The children were tested by four subtests from ADOS-2 and from RBS-R(Repetitive Behavior Scales-Revised) [5]. Those specific subtests were chosen by the criteria of being acceptable tools for the assessment of ASD that can be performed in the daycare environment and without much interference to the child's routine. The specific subtests in the study were:

1. Repetitive and stereotypic behaviors: The subtest is a part of scale 1 RBS-R. The subtest included counting the number of the repetitive and stereotypic behaviors of the child for a duration of two min. We coded for stereotypic behaviors before, during, and after CI. Due to lack of resources, we were unable to collect matched data for OI condition.
2. Spontaneous production of meaningful words: The subtest included counting the number of meaningful words that the child said spontaneously, during a duration of 10 min. This measurement was documented before and after intervention (both CI and OI). We did not collect data during the intervention sessions, since the children are often expected to remain quiet and listen to the therapist/teacher during group therapy or circle time (OI).
3. Social smiles: This subtest included counting the number of social smiles the child made toward the medical clown as well as peers in the group during the session of CI and OI. Coding for social smiles in response to the experimenter is part of ADOS-2 module 1 procedure.
4. Playing "catch the ball": This subtest included counting the number of times that the child tossed back, or tried to toss back a ball that was tossed to him or her in a game of "catch the ball". In this subtest, we tested playing "catch the ball" in two conditions:

   (a) Playing with the examiner
   (b) Playing with a peer

The counting continued for one min or stopped when reciprocity stopped if less than one min elapsed. This measurement was performed before and after CI. Classroom routine did enable testing this subscale before and after OI.

Statistical analysis In order to evaluate the efficacy of the medical clowning, we used SPSS V.21 repeated measures ANOVA to calculate the difference between conditions (clown intervention (CI) or other intervention (OI)) and differences in relation to intervention session time (before, during, and after the interventions) for all the subtests in the study.

Results

Repetitive and stereotypic behavior We found a reduction in repetitive and stereotypic behaviors during (M = 0.47, SD =

0.16) and after CI (M = 0.84, SD = 0.24) in comparison with the time before (M = 2.02, SD = 0.53) the CI $F(2,46) = 6.94$, $p < 0.01$, $\eta = 0.232$.

In addition, we found a continuous reduction in repetitive and stereotypic behaviors during the 12 weeks of CI, starting from the first week (M = 1.93, SD = 0.35) to the last week (M = 0.46, SD = 0.12) of the CI $F(11,253) = 3.76$ $p < 0.001$, $\eta = 0.141$ (Fig. 1).

Spontaneous production of meaningful words Four non-verbal or pre-verbal children were excluded from the statistical analysis. In twenty verbal children, we found significant differences in the production of spontaneous meaningful words, between the CI condition and the OI condition $F(1,18) = 35.61$, $p < 0.001$, $\eta = 0.664$. Children spoke more under the CI condition (M = 5.55, SD = 0.79) than under the OI condition (M = 4.06, SD = 0.60) with an incremental response of spontaneous speech. According to the number of clown interventions across the 12 weeks of the study, from the first week (M = 3.24, SD = 0.65), to the last week (M = 5.88, SD = 0.81), there was an increase in the production of spontaneous meaningful words $F(11,198) = 5.76$, $p < 0.001$, $\eta = 0.243$.

During CI, there was a significant increase in meaningful words produced compared with OI, and the improvement persisted and enhanced over time (Fig. 2).

Playing "catch the ball" We found significant improvement in playing with the examiner after clown intervention, as compared with before clown intervention $F(1,22) = 26.58$, $p < 0.001$, $\eta = 0.547$. Children tossed the ball to the examiner more times after CI (M = 1.80, SD = 0.27) than before CI (M = 1.53, SD = 0.24). Significant differences and steady improvement were found during the 12 weeks of the study $F(11,242) = 23.62$, $p < 0.001$, $\eta = 0.518$, from the first week (M = 1.15, SD = 0.27), to the last week (M = 2.91, SD = 0.41).

In "playing catch" with another child, we also found significant differences between before and after CI $F(1,23) = 16.60$, $p < 0.001$, $\eta = 0.419$. After CI, the children tossed the ball to another child more times (M = 1.16, SD = 0.21) than before CI (M = 0.91, SD = 0.16). Significant persistent differences were found during the 12 weeks of the study $F(11,253) = 23.41$, $p < 0.001$, $\eta = 0.534$, from the first week (M = 0.71, SD = 0.21), to the last week (M = 2.33, SD = 0.36) (Fig. 3).

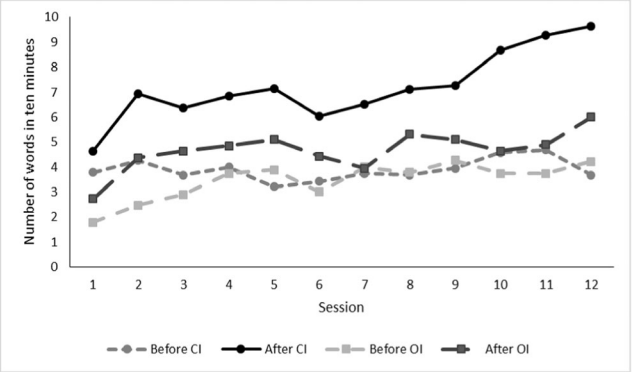

Fig. 2 Spontaneous expression of meaningful words count

Social smiles We found significant differences in the amount of social smiles during CI condition compared with OI condition $F(1,23) = 24.43$, $p < 0.001$, $\eta = 0.515$. Children smiled more under CI condition (M = 5.68, SD = 0.8) than under OI condition (M = 4.52, SD = 0.76). In addition, there was an incremental increase in the number of social smiles during the 12-week study period $F(11,253) = 10.47$, $p < 0.001$, $\eta = 0.313$, from the first week (M = 4.17, SD = 0.7), to the last week (M = 5.81, SD = 0.83) (Fig. 4).

Discussion

The aim of the current study was to examine the benefit MC may have on various communicative behaviors among young children with ASD. The immediate result of the CI in the current study included a decrease in stereotypical behaviors during and after MC group therapy. When compared with OI,

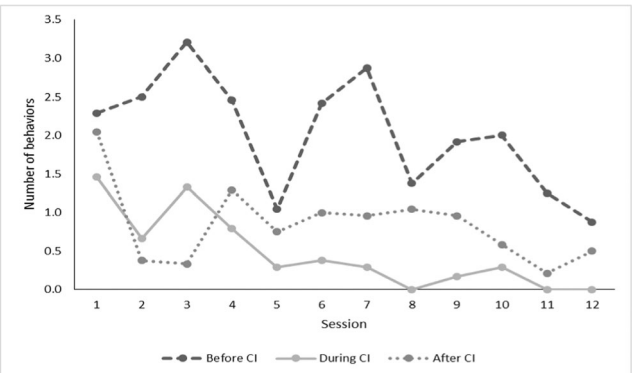

Fig. 1 Repetitive and stereotypic behaviors count

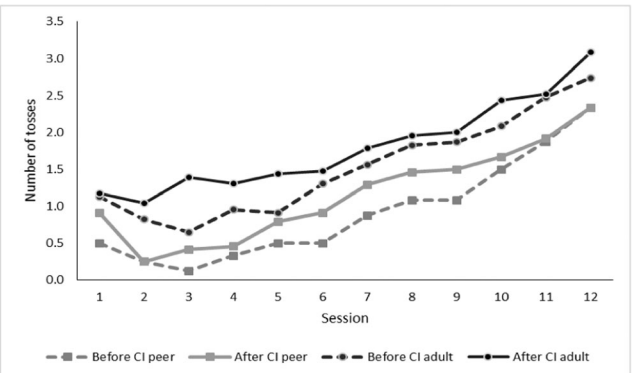

Fig. 3 Ball tosses with a peer and with adult count

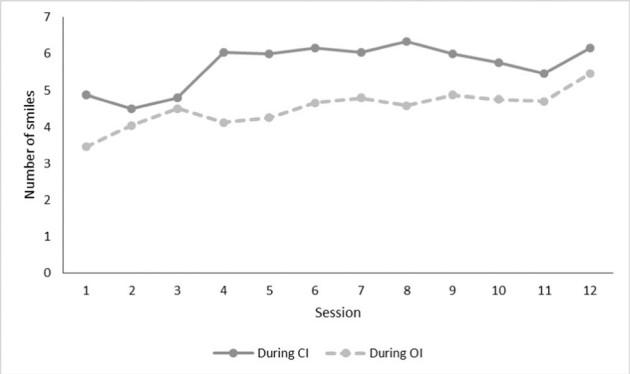

Fig. 4 Spontaneous production of social smiles toward peers count

CI improved verbal output and social smiles were an immediate and constant response. Reciprocal ball tossing improved after the CI with a peer and with an adult.

All the above improvements persisted over time, and there was a constant incremental response in repeated measures over a 12-week period.

The preliminary data of our study may indicate that medical clowns can facilitate the production of expressive language and non-verbal communication; play as mediators for social behavior; and may have a positive influence of reduction in repetitive and stereotypical behaviors. These preliminary findings indicate the benefits of medical clowning dyads in a group setting for children with autism.

Previous medical clowning studies showed the benefits in facilitating communication and interaction in typical children. Though some people may fear clowns (coulrophobia) [7, 17] most children do love medical clowns [29]. Medical clowns do not wear a lot of makeup or a very colorful costume, but use a more casual approach. Clowns are considered "professional communicators" and need to be attuned to the child's developmental level and to their current situation within the hospital [16]. Sensitivity to the child's condition is the basis for communication between the child and the clown, and the foundation for the medical clown's work [20]. Medical clowns are not just entertainers, rather, they are considered part of a multidisciplinary complementary therapy team. In many hospitals across the world, medical clowns are included as staff [36].

Smiles and laughter are an essential component of emotional communication. Since social relationship and communication are impaired in ASD children, provoking smiles and laughter is a common tool of treatment to promote dyadic communication even by mere imitation. Shared enjoyment helps the child to interact with others.

The main challenges of evaluating the treatment effect of one discrete intervention is separating it from the influence of all other interventions that the child with ASD receives, and discerning it from the ongoing developmental changes that occur at a very fast pace at a young age. As such, we opted for case-control immediate measurements before and after each clown intervention and compared it, when preschool settings enabled by a case control to a different semi-structured group setting, such as guided play, without the clown's presence.

The main limitations of the study is the intuitive nature of the intervention and the required training of the medical clown. Since the intervention tools used are based on enhancing and exaggerating the child's responses, the treatment setting is not structured, and the sessions can vary according to the level of interaction driven by the children in the group and the clown. The clown is not using a structured intervention, but an intuitive approach according to their personal skills. Since the intervention for children with autism elicit different responses than expected by the clown, from a typical child, teaching the clown about different abilities in children with ASD is warranted, with ongoing guidance by the "case manager" psychologist. Indeed, the current study followed the clown therapy throughout the course of 12 weeks, during which the clown's familiarity with the children may have improved and adapted to their humoristic preferences, while the children themselves felt more comfortable in the clown's company. These factors may have contributed to the observed improvements over time. Although the group setting of the intervention has obvious benefits, it is possible that a smaller group or a 1:2 or 1:1 setting may have the potential for even better outcome. Further studies should discern which features in the settings of medical clowning intervention are responsible for the facilitation of language and social behavior, and subsequently, specific tools may be easily implemented in the intervention provided by other professions.

Authors' contributions Shahar Shefer: Conception and design of the research, initial draft of the article.

Ruth Rosenan: Data analysis, editing of final draft and final approval of the version to be published.

Odelia Leon Attia: Data analysis and interpretation of results, approval of final draft.

Hamutal Ende: Medical clown, performed the interventions in the study and contributed to data collection, approval of final draft.

Ori A. Wald: Data collection and data processing, approval of final draft.

Lidia V. Gabis: Conception and design of study, interpretation of results and drafting the initial article.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki

declaration and its later amendments or comparable ethical standards. Helsinki committee at the Sheba Medical Center, Ramat-Gan, Israel, approval no. SMC-0551-13, approved the current study.

Informed consent Informed consent was obtained from all parents of the children whom participated in the study.

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