*J Pediatr Perinatol Child Health 2017; 1 (1): 007-016* *DOI: 10.26502/jppch.7405003*

## Case Report

# Intervention to Develop Social Skills in a Child with Autism with 'Lower Degrees of Impairment'

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**Received:** 30 October 2017; **Accepted:** 25 November 2017; **Published:** 29 November 2017

## Abstract

There is a need to design interventions for children with Autism and *lower degrees of developmental impairment*, in India. These children have been traditionally grouped under 'high functioning' Autism i.e. Autism and an intelligence quotient of more than 65-70. However, measuring intelligence in children younger than five years is practical in western contexts due to the availability of relevant normed scales, which are absent in India. The following case study explains a tailored intervention strategy adopted by a multidisciplinary team to improve social skills of a child (4 year 2 months, male) with Autism but relatively lower impairment. Within the multidisciplinary framework and the embedded Reciprocal Imitation Therapy (RIT), the following factors led to therapeutic improvement: 1) increase in sitting-tolerance i.e. he was able to sit for 30 minutes with a task of his choice, and five minutes with any assigned task; 2) he could make eye-contact during entire conversations; 3) the child's potential to use imitation skills (stronger non-verbal than verbal) substantially improved, accompanied by improvement in receptive and expressive language; and 4) the child's interest in letters and numbers helped the intervention strategies. Within RIT, successful strategies included: modelling of appropriate behaviour; using physical prompts; giving actions as cues to elicit desired verbal responses; coupling actions with verbal responses; multiple repetitions and positive reinforcement. Findings in this study, particularly the improvements in speech and language, are supported by studies stressing on imitation as one of the predictors for development of communication in young children with Autism.

**Keywords:** Autism Spectrum Disorder; High Functioning Autism; Reciprocal Imitation Theory; Social skills

## 1. Introduction

### 1.1 Burden of autism

Children with Autism Spectrum Disorder (ASD) have 'persistent deficits in social communication and social interaction as well as repetitive and restricted patterns of behaviour, interests and activities' [1]. ASD affects 1 in every 68 children in the United States [2]. However, in India, prevalence data are varied due to differences in assessment tools and sample sizes. Surveys conducted by non-profit organizations, research teams and hospitals have reported prevalence of 1 in 66, 1 in 500 and even 1 in 1000 children [3-5]. This kind of varied data on prevalence of ASD indicates an underemphasized burden. This situation is complicated by low awareness and acceptance of Autism among caregivers as well as professionals, partly contributing to limited knowledge on the kinds of interventions that work best for these children.

### 1.2 What is high functioning autism?

Not all children with ASD have similar clinical profiles. Certain children have relatively better functioning - for example, a normal intelligence quotient (IQ). In the western context, this has traditionally been described as High Functioning Autism (HFA) by the American Psychiatric Association, in as early as 2000 [6]. HFA has been widely defined as Autism with an IQ score of not less than 65-70 [7]. Recent evidence in 2010 has indicated that children with HFA have normal intelligence, but also a clear delay or impairment of language acquisition at an early developmental stage [8]. Resulting social skill deficits in these children have also been established. These include inability in orienting towards social stimuli; inadequacy in using eye contact; problems in initiating interactions; difficulties in interpreting verbal and nonverbal cues; inappropriate emotional responses and lack of empathy [9]. As a consequence, children have impaired interactions with their families, peers, teachers and other adults.

### 1.3 Autism with low degree of developmental impairment

These social skill deficits would also apply to children who have *relatively better functioning*, within the Autism spectrum - if *not* normal intelligence or HFA. However, because of their better functioning, these children have insight into their deficits, which could pose a challenge to intervening professionals like psychologists [10]. Another factor, is the substantially large population of first-generation English learners in developing countries like India - or low levels of English exposure at home, which along with Autism, could pose a greater challenge.

Thus, there is a need to design and tailor interventions for children with Autism and *lower degrees of developmental impairment*, in India. Unfortunately, interventions to build social skills are mostly designed for the broader (more conventional) population of children with ASD (e.g. social skills training programs) [11]. Evidence is needed both in terms of individual cases and large sample studies. The following case study is an explanation of a tailored intervention strategy adopted by a multidisciplinary team in Mumbai, to improve social skills of a child with Autism but relatively lower impairment, with a background of low English exposure at home.

### 1.4 Need to define 'lower degree of impairment' in ASD, in the Indian context

It is widely recognized that a child with Autism and an intelligence quotient (IQ) below 65-70 cannot be defined as having 'high-functioning' Autism [7]. However, measuring IQ for children younger than 5 years is practical in western contexts, due to relevant scales for pre-primary school children. In India, there are no such scales, normed for pre-primary children. Malin's Intelligence Scale for Indian Children (MISIC) is commonly used in India for children 6 years and above. Hence, while it is recognized that children with Autism have varying degrees of cognition, speech and language development, there is no practical definition to categorize children less than 6 years of age, with Autism and 'lower degree of impairment'. In the following case-report, the child, on initial evaluation, had a) clinically observed language delay but *no* impairment; b) *mild* ASD (32.5) on Childhood Autism Rating Scale (CARS); c) *mild* subnormality (64.8) in social functioning on Vineland Social Maturity Scale (VSMS) and d) *no* reported academic concerns. In addition, the child showed substantial improvements in *imitation skills* on CARS and *receptive-expressive language*, on receiving intervention for a mere 7-9 months, which is unusual for a child with Autism and poor overall functioning. Hence, we have classified the child in question as representative of a wider group of < 6 year old children in India with ASD but relatively lower degree of impairment.

## 2. Case Presentation

### 2.1 Background

KA is a 4 year 2 month old right-handed boy, studying in nursery in an English medium school. The child lives with his parents and younger brother who is 9 months old (bilingual: English and mother-tongue; Malayalam). The child's mother is a housewife and father works as an assistant manager in a private company. The parents reported to a multidisciplinary child development centre in Mumbai, with the child's behavioral and speech concerns in February 2014 (discussed below). Outcome assessments after intervention were conducted in September 2014, May 2015 and December 2015.

### 2.2 Onset-duration-progress

The child was born of a non-consanguineous marriage. He was born of full term Caesarean delivery. He cried immediately after birth. Birth weight was 2.75 kg. He received phototherapy for a week, due to neonatal jaundice. No other antenatal, intra-natal or post-natal complications were reported. At 2 years of age, he was admitted for five days for pneumonia. No recurrences were reported. Head injury, seizures or other medical illnesses were not reported. The child started sitting and standing independently at 8 and 11 months respectively and walking independently at 1 year 3 months. He started speaking meaningful words at 1 year 9 months; meaningful phrases at 3 years and meaningful sentences after 3 years 6 months of age. Auditory and vision evaluation results were within normal limits.

### 2.3 Presenting concerns

The child was able to establish eye-contact but could not maintain it (stared off into space or continued with his activity). He appeared to be aloof and not readily aware of other people around him. Repeated calling was required to get his attention. In spite of having some interest in peers, he could not interact with them. He was seen playing

with older children by running around (parallel play), but cooperative group play was not reported .He could not indicate his needs by gestures (for example, pointing). Social smile was inconsistent and not immediate.

The child expressed his needs verbally. However, communication revolved around his needs and wants. Sentences were broken and to the point, without detail. Interactions were not reciprocal; for example, when he was called a "good boy" or positively reinforced, he showed no immediate signs of happiness (for example, smiling) or remorse when he was scolded. He repeated nursery rhymes and sentences posed to him irrelevantly (echolalia). All of his conversations with parents were in Malayalam, with recent exposure to English (2 months). He quickly responded to instructions in Malayalam. The child could not immediately imitate a sound, a simple word or an action; and needed reminders. However, he could imitate well on paying attention. He recognized his family members, but did not initiate contact with them. He showed interest towards his younger brother, but he was not careful, as he pulled or grabbed his face.

In terms of a specific change of environment, the child's family moved from Kerala to Mumbai, few months prior to reporting. The child was close to his grandfather and was upset for a month initially, due to the shifting (he repeatedly asked about his grandfather). He used to attend junior kindergarten in Kerala; however he did not like going to school and threw tantrums by rolling on the floor and crying. Thus, after two weeks of attendance, parents withdrew admission and enrolled him in nursery, to cope with lack of exposure. The child had difficulties adjusting with the new school, but did not throw tantrums. He got agitated while getting ready, but adjusted after reaching school.

The child was extremely restless with a moody temperament. He threw tantrums on not getting what he wanted. He got upset on getting scolded. On getting angry, he banged his head, yelled, hit, or attempted to bite.

The child often stared at his hands or scribbled '1 2 3' on paper or walls – the latter was his favorite activity. He looked at objects very closely. He sung nursery rhymes to himself throughout the day. He indulged in excessive nail-biting, and even bit his toenails. He continued biting nails even on being prohibited. He liked to arrange notes, fold the bundles of notes and keep them in his pocket or a purse. The child's preference for watching TV had reduced after shifting to Mumbai; he stopped watching animation; however he enjoyed the sound of TV and wanted it to be switched on. He liked listening to music. He liked to be cuddled or kissed.

The child showed very little interest in toys. He banged or manipulated a toy or an object on taking it in his hand. In a toy shop, he did not show interest to explore (in contrast to a food store). He got agitated at the sound of the pressure cooker whistle or a baby crying, and covered his ears. He did not like loud voices.

The child had bladder and bowel control, but could not indicate toilet needs directly or through gestures or actions. He depended on his mother for bathing and toilet care. He brushed his teeth and attempted to wash his face on his own, but had to be reminded to use soap. He was comfortable with changes in daily routine. He had no difficulties in

falling asleep or waking up on his own. He had not been given enough chances to feed himself. He had no appetite concerns.

The child could write alphabets correctly, but with prompting. Letters were poorly formed and unclear. He wrote all over the page, overlapping the letters as well. He could count from 1-20, but his mother reported that he could count till 100.

### 2.4 Intervention

Based on pre-intervention psychology, occupational therapy (OT) and speech therapy (ST) assessments (discussed in subsequent sections), a multidisciplinary and individualized intervention plan was designed for the child. This included monthly parental counseling with the psychologist, OT four times a week (45 minute individual sessions) and ST twice a week (45 minute individual sessions). ST was initiated, 3 months after beginning OT. Within this larger intervention model, the psychologist also implemented 'Reciprocal Imitation Training' (RIT), a naturalistic behavioral intervention that teaches imitation to children with ASD within a social-communicative context [12-13]. RIT is effective at teaching spontaneous, generalized object and gesture imitation and improvements in imitation are associated with increased verbal imitation and spontaneous language [14]. RIT can be used for children with ASD up to six years of age, it is effective for children with less severe symptoms and who are already responsive to an extent, to parents – these indications fitted with the child's condition.

RIT is based on the following rationale [14]: Children with ASD have overall deficits in social communication i.e. language delay and delay in acquisition of imitation skills. Imitation plays a foundational role in developing more complex social-communicative skills such as language. Imitation skills strongly predict vocabulary size in children with ASD. Imitation skills along with number of hours of therapy are strong predictors of language skills, two years later in children with ASD. Children with ASD rely more heavily on imitation than joint attention, versus their typically developing peers.

Imitation could be of different kinds. Examples of Object imitation include: a) A child is spinning the wheels of the car. The clinician can mimic this action with another similar toy. b) The clinician can initiate actions as well – he can open the door of the toy car and say "open" or roll the car and say "vroom vroom." Gesture imitation is attempted only after object imitation has been learned by the child. Examples include: a) Conventional gestures: waving "hello/goodbye", nodding or shaking head, blowing a kiss, smiling or frowning. b) Descriptive: physical actions for "big" or "small," pantomiming drinking. Words can be attached to actions – for e.g. rubbing tummy and saying "yummy." The clinician can model gestures related to play – for e.g. if the child is spinning wheels, then she can spin her finger in a circle and say "spin spin spin."

RIT techniques followed in the case of the child in question were: 1) Describing the imitation to impress performance of the same action. 2) Modeling a social skill for the child to imitate. 3) Modeling play actions with objects and ensuring that actions are 'big' enough to be noticed by the child and describing the action.4) Using wait

time, to give the child, the chance to imitate the clinician's action spontaneously.5) Prompting imitation (verbally or physically) if the child did not imitate after the third model. 6) Not imitating behaviors aimed to be decreased. 7) Imitating appropriate play behavior for e.g. if the child flapped his hands to show excitement, the clinician imitated the *emotion*, but showed a different action (e.g. clapping hands or throwing hands in the air).

### 2.5 Pre- and post-intervention assessments

**2.5.1 Pre-intervention psychology evaluation (February 2014):** On the Childhood Autism Rating Scale (CARS), the child's score was 32.5, indicative of mild Autism. He had deficits in communication and social interaction; restricted interests and displayed high activity level. Attention Deficit Hyperactivity Disorder-Test (ADHD-T) indicated that he had significant difficulties of inattention, hyperactivity and impulsivity, however as these behaviors occurred during the course of a Pervasive Developmental Disorder, he could not be assigned a diagnosis of ADHD. On Vineland Social Maturity Scale (VSMS), the child obtained a social quotient of 64.8, indicative of mild impairment in social functioning. Deficits were reported in socialization, communication and activities of daily living.

**2.5.2 Post-intervention psychology evaluation (September 2014 and May 2015):** Two evaluations were conducted after intervention i.e. in September 2014 and May 2015. In the former - on assessment by CARS, the child obtained a score of 28.5 and did not meet the criteria for Autism. However, concerns were noted in social interaction, hyperactivity, verbal and non-verbal communication and listening responses. Hence, the child qualified for a diagnosis of Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS). On VSMS, social quotient increased to 90.5 (from 64.8), indicative of Average Social Functioning.

In May 2015, on assessment by VSMS, social quotient increased to 92 (from 90), indicative of Average Social Functioning. On DSM-5, the child did not meet criteria for ADHD but met criteria for ASD. ASD was diagnosed in association with required support for social communication; and restricted, repetitive patterns, without intellectual impairment and language impairment.

**2.5.3 Pre-intervention occupational therapy evaluation (February 2014):** The child was restless, fidgety and impulsive. Attention span was poor; he could sit at one place for less than 5 minutes. Eye-contact was fleeting. Speech was delayed. When he was asked to write, he managed to write alphabets from A to H with a static tripod grasp. Letter alignment, formation and font size were inappropriate. In terms of sensory concerns, the child responded negatively to unexpected loud noises, avoided getting messy, and sought all kinds of movements and could not remain still (he enjoyed playground equipment). He showed stubbornness and temper tantrums. He had poor frustration tolerance and cried easily. He was sensitive to criticism. He was assessed on the Visual-Motor Integration scale and scored 1 (expected: 4) with poor performance in copying patterns, coloring within lines and dot-to-dot joining. He could not recognize colors and shapes, or body schemes and showed poor visual matching. In terms of personal-social skills, he recognized family members; gave social smile and waved 'bye-bye'. He responded inconsistently to name-call. Eye-contact was fleeting. He did not prefer solitary play. He engaged in peer

play, but sometimes he hit and pushed other kids. In terms of psycho-social skills, he could initiate few activities, but could not complete any. He got excessively distracted and wanted to do activities of his choice.

### 2.5.4 Post-intervention occupational therapy evaluations(September 2014, May 2015 and December 2015):

Comparisons of results have been summarized in Table 1.

| Sl No. | Domain | Sep-14 | May-15 | Dec-15 |
|---|---|---|---|---|
| | | **Child's age: 4 years 9 months** | **Child's age: 5 years 5 months** | **Child's age: 6 years** |
| 1 | Hyperactivity, impulsivity, restlessness, fidgetiness | Reduced; performed tasks with sustained attention | Not a concern, distracted when someone cried around | Sat for long periods of time and completed tasks; restless only in active environment |
| 2 | Attention span and sitting tolerance | Attended to a task for 15-20 minutes | Attended to a task for significantly longer than 15 minutes | Attended *and completed* tasks, lasting significantly longer than 15 minutes |
| 3 | Eye-contact | Maintained | Maintained | Appropriate and sustained |
| 4 | Pre-handwriting | Could write A to Z (upper and lower case); numbers from 1 to 10; he could stabilized the paper; concerns in letter formation and word spacing | Concerns persisted in word spacing, formation and alignment of letters. Font size was not adequate. | Could write A-Z and numbers from 1 to 50; needed further improvement in word spacing; showed correct letter alignment and formation and font size |
| 5 | Sensory concerns | No concerns observed in auditory, tactile, vestibular and behavioural responses | No concerns | No concerns |
| 6 | Visual-motor integration score | 7 (expected: 7) | 10 (expected: 10) | 12 (expected: 12) |
| 7 | Visual perceptual skills | Child could identify some body parts; could identify shapes and colours; showed fair visual matching and figure-ground perception, and poor visual discrimination | Child could identify some body parts; could identify shapes and colours; showed fair visual matching, figure-ground perception as well as visual discrimination; he could locate few objects in space; understood directional language; but got confused between left and right; constructional praxis was fair | Child could indicate all body parts; could identify shapes and colours; showed fair to good performance in visual matching and discrimination (he could fix shapes in shape sorter), figure-ground perception (he could see an object in a busy background) and spatial relations (he could locate most objects in space); fair understanding of position of objects in space; fair praxis |
| | a. Body scheme | | | |
| | b. Visual discrimination, matching | | | |
| | c. Color recognition | | | |
| | d. Shape recognition | | | |
| | e. Figure-ground perception | | | |
| | f. Spatial relations | | | |
| | g. Position in space | | | |
| | h. Constructional praxis | | | |
| 8 | Cognitive skills | Not assessed | He could not recall learnt material; showed orientation and organizing skills; he could only arrange few cards in correct sequence (problem solving was not assessed) | Improvement in visual and auditory memory; he was well-oriented in time, place and person; good organizing skills; greater accuracy in sequencing cards; he understood the goal and rules to be applied to solve a problem |

| | | | | |
|---|---|---|---|---|
| 9 | Psycho-social skills | He consistently responded to name-call; gave good eye contact; engaged in peer play – did not hit or harm anybody; However, he was stubborn and threw temper tantrums on occasions; he initiated and completed most activities with sustained attention | Could initiate an activity which he completed with some distractions; showed fair frustration tolerance (play skills not assessed) | Could initiate and complete a task without getting affected by distractions; showed fair frustration tolerance; child engaged in peer group play and was comfortable in familiar games |

**Table 1:** Occupational therapy assessment results, after intervention (clinical observations).

### 2.5.5 Pre- and post-intervention speech therapy evaluations (February 2014 and November 2014):

Comparisons of results have been summarized in Table 2.

| Sl No. | Domain | Feb-14 | Nov-14 |
|---|---|---|---|
| 1 | Oral peripheral mechanism | Normal in appearance, adequate in function | Normal in appearance, adequate in function |
| 2 | Vegetative functions | All functions* are appropriate; drooling and tongue thrust absent | All functions are appropriate; drooling and tongue thrust absent |
| 3 | Mode of communication | Verbal and non-verbal | Verbal and non-verbal |
| 4 | Cognitive pre-requisites of language learning | Occasional eye-contact; frequently attended to activities of choice; attention was divided, alternating and selective; fair verbal imitation skills; poor joint attention and joint referencing skills | Frequently established eye-contact and maintained it for some time; frequently attended to activities of other's choice and showed integrated attention for more than 5 minutes; attended to activities of his choice for up to 30 minutes; Selective attention emerged; good verbal imitation, joint attention and joint referencing skills |
| 5 | Comprehension | He could comprehend simple unidirectional commands of routine use with prompts | He could comprehend simple, unidirectional and related bidirectional commands of routine use with occasional prompts. |
| 6 | Expression | He expressed needs via 2-3 word phrases, few rudimentary gestures and pointing to desired objects; Echolalia present for almost all the words and sentences heard by him. | He expressed verbally by frequently using 3-4 word utterances (simple, complete/ incomplete) and occasionally by nonverbal mode (especially when he was not aware of the object). Echolalia and jargon reduced. |
| 7 | Vocabulary | Receptive vocabulary consisted of nominal words like few animals, fruits, vehicles, vegetables, preposition, action verbs and kinship terms. He could comprehend 'wh' questions like 'what', 'who', 'where' and 'yes/no'. | Receptive and verbal expressive vocabulary included more common nouns, verbs, adjectives, prepositions and nominal words. Shapes, colors concept, size, time and number concepts were well developed. He could comprehend and express gender markers. He developed expression of 'wh' questions and 'yes/no'. |

| | | | |
|---|---|---|---|
| 8 | Socialization | Restricted | Attempted to share experiences verbally and non-verbally; Intentional speech like greeting, requesting, arguing, etc. were noted on occasions; Presupposition skills, logical thinking, topic initiation and sequencing skills emerged |
| 9 | Receptive-Expressive Emergent Language Scale (REELS) | Receptive language: 23-24 months | Receptive language: 40-41 months |
| | | Expressive language: 10-12months | Expressive language: 36-37 months |
| | | Chronological age: 50 months | Chronological age: 59 months |

*Vegetative functions include blowing, sucking, swallowing, chewing and biting.

**Table 2:** Speech therapy assessment results (clinical observations) before (February 2014) and after intervention (November 2014).

## 3. Discussion

Within the multidisciplinary framework and the embedded RIT, factors leading to improvement in the child's condition, included: 1) increase in sitting-tolerance i.e. he was able to sit for 30 minutes with a task of his choice, and 5 minutes with any assigned task; 2) He could make eye-contact during entire conversations; 3) the child's potential to use imitation skills (stronger non-verbal than verbal; actions >words) which substantially improved on receiving intervention, accompanied by improvement in receptive and expressive language; and 4) the child's love for letters and numbers. Within RIT, successful strategies included: modelling of appropriate behaviour; using physical prompts; giving actions as cues to elicit desired verbal responses; coupling actions with verbal response; multiple repetitions (by therapist and parent); positive reinforcement-praise and giving rewards such as reading, numbers-which the child liked. Findings in this study, particularly the improvements in speech and language, are supported by other studies stressing on imitation as one of the predictors for development of communication in young children with Autism [15-16]. To conclude, this case study demonstrates that children with 'low developmental impairment' namely their social-language-communication profile, within the Autism spectrum, can benefit from multidisciplinary intervention that is customized to their special needs.

## Acknowledgements

The authors acknowledge the team of New Horizons Child Development Centre, Dadar, Mumbai, India.

## Conflict of Interest

The authors declare no competing interests.

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