

**Original Research**

## **Paediatric Dentist: The Difference Maker for Children Suffering from Speech and Language Delay**

**Bhagyashree Thakur<sup>1\*</sup>, Ajinkya M. Pawar<sup>2</sup>, Pankaj Gupta<sup>2</sup>**

### **ABSTRACT**

Child's overall development and cognitive ability depend on the speech and language development. A speech and language delay is usually associated with increased difficulty with reading, writing, attention and socialisation. The knowledge of delay in the speech and language development may help in intervention and assistance to the child at a young age, when the chances of improving the developments are more acceptable. This includes a variety of tests for the child, which needs to be integrated with the routine clinical practice to improve and help the child to overcome the developmental delay of language and speech. The paediatric dentist can play a vital role in this development by his/her skill all of which is aimed to the well-being of the child. This review highlights on the treatment integrations of paediatric dentists, which can help the child suffering from speech and language delay.

**KEYWORDS:** Early intervention, Identification, Language delay, Paediatric dentist, Speech, Language, Clinical practice

### **INTRODUCTION**

Speech and language development are one of the most useful pointers of a child's overall development and intellectual functioning. These also allow a child to communicate successfully. The mechanics of oral communication or the motor act of communicating by the articulation of verbal expressions is referred to as 'speech,' whereas the understanding, processing and production of communication all together are referred to as 'Language' [1]. The verbal production of language is speech, and conceptual processing of communication is the language [2]. A delay in both speech and language skills can lead to dissatisfaction of a child as well as miscommunication about what he/she may be trying to convey [3,4]. The disorders associated with speech include stuttering or dysfluency, articulation disorders, or unusual voice quality and language problems can

involve difficulty with grammar (syntax), vocabulary or words (semantics), sound production (phonology), units of word meaning (morphology) and using language in social contexts (pragmatics). The disorders of speech and language can separate or con joint [3,4]. Children of 5 years of age or maybe younger, who suffer from a speech and language disorder may be associated with diminished reading skills, poor verbal and spelling skills, behaviour problems and impaired psychosocial adjustment. This in turn may lead to an under achievement and lower *Intelligence quotient* (IQ) of the child [5]. Thus, it is very important for an early screening and identification of a speech delay, which may result in a successful early intervention and treatment.

This review article discusses the aetiology, screening tests, management and most importantly the role of a

<sup>1</sup> Assitant Professor, Department of Dentistry, Sir HN Reliance Foundation Hospital, Mumbai, Maharashtra, India

<sup>2,3</sup> Assitant Professor Department of Conservative Dentistry and Endodontics, Nair Hospital Dental College, Mumbai, Maharashtra, India

\*Corresponding author email id: drbhagyashreethakur@gmail.com

paediatric dentist in the early diagnosis and multidisciplinary treatment by referral of paediatric patients suffering from speech and language delay.

## PATTERN OF NORMAL SPEECH DEVELOPMENT

It comprises of four processes; language processing, generating of motor commands, articulatory movements and emission of air sent from the lungs [6]. To determine if a child has a speech delay, the clinician must have a basic knowledge of speech milestones. The normal pattern of speech development is shown in Table 1 [7]. The symptoms of speech and language disorders will vary depending on the type of impairment.

## CAUSES OF SPEECH DELAY

### Hearing Loss

A proper hearing for the early years of life plays a very important role in speech and language development, and loss of hearing at this stage may

cause profound speech delay. Loss of hearing can be conductive, sensorineural or mixed. Conductive hearing loss occurs in the external or middle ear where sound waves are not able to convey to the inner ear. However, when the inner ear or the hearing nerve is damaged, sensorineural type of hearing is resulted. This loss occurs when some of the hair cells within the cochlea are damaged. Mixed hearing loss occurs when there is combined sensorineural and conductive hearing loss [8–10].

### Maturation Delay

Maturation delay accounts for a high percentage of late talkers. A delay in the maturation of the central neurologic process takes place in this condition. This condition is more often seen in boys compared with females, and they are associated with a family history of ‘late bloomers’ [11].

### Expressive Language Disorder

Speech is delayed that is children suffering from this disorder fail to develop the use of speech at the usual

**Table 1: Pattern of normal speech development of a child from the age of 1 month to 5 years**

Age of the Child	Achievement
1–6 months	Coos in response to voice
6–9 months	Babbling
10–11 months	Imitation of sounds without meaning; says ‘mama/dada’
12 months	Imitates 2 and 3 syllable words, says ‘mama/dada’ with meaning
13–15 months	Vocabulary: 4–7 words with jargon, less than 20% speech is understood by strangers
16–18 months	Vocabulary: 10 words, with some echolalia and extensive jargon; 20–25% speech understood by strangers
19–21 months	Vocabulary: 20 words; 50% speech understood by strangers
22–24 months	Vocabulary: more than 50 words, 2 word phrases, dropping out of jargon, 60–70% speech understood by strangers
2–2.5 years	Vocabulary: 400 words, includes name, 2–3 word phrases, using pronouns, diminished echolalia and 75% speech understood by strangers
2.5–3 years	Use of plurals and tenses, knowledge of age and sex; counting 3 objects correctly, 3–5 words per sentence, 80–90% speech understood by strangers
3–4 years	3–6 words per sentence; asking questions, conversing, relating experiences, storytelling, almost all speech understood by strangers
4–5 years	6–8 words per sentence, colour names, counts 10 pennies correctly

expected age. Children have normal comprehension, intelligence, hearing, emotional relationships and articulation skills. This disorder is difficult to distinguish at an early age from the more common developmental speech and language delay. A child suffering from this disorder is at a high risk to 'dyslexia' (language-learning disabilities) [12,13].

### **Bilingualism**

Bilingualism is commonly defined as the use of at least two languages by an individual. A child brought up in a bilingual environment at home may lead to a temporary delay (for both languages). Comprehension of the two languages spoken is normal for a child of the same age, and he/she becomes proficient in both languages before they reach to age of 5 years [14,15].

### **Selective Mutism**

A child with selective mutism (formerly elective mutism) does not speak in certain conditions, like at school, but speaks at other times, like at home or with friends. This disorder often commences before a child is 5 years old. It is usually first noticed when the child starts school [16].

### **Receptive Aphasia**

It is also known as Wernicke's aphasia – a type of fluent aphasia. A child suffering from this disorder has a serious comprehension of the language being spoken. They often say many words that don't make sense. They usually do not realise saying the wrong words; for instance, they might call a fork a 'gleeble'. They may also speak together a sentence of meaningless words. Most children suffering from the disorder come up a speech of their own, understood only by those who are close and familiar with them [17].

### **Early Loss of Teeth**

Riekman carried out a study in which the speech of 14 children, who had had their primary maxillary incisors extracted as a result of nursing bottle caries, using a standard test of articulation was checked. The average

age at which the extractions were performed was 34 months, and the age at which the articulation test was given was 109 months. The findings of this study suggested that some degree of speech impairment may develop and persist, if premature extractions of the four maxillary deciduous incisors are performed in a child younger than 3 years of age. Turgut *et al.* carried out a study to investigate the loss of primary anterior tooth and removable dentures and their effect on the speech of children with early-childhood caries (ECC). They concluded, tooth loss did not influence articulation. Nevertheless, dentures temporarily effected articulation of the [s], [j], and [z] speech sounds [18].

### *Oral defensiveness and aversions with sensory integration disorder (SID)*

Oral defensiveness falls into two main categories [19]:

**1. Hyposensitivity:** Individuals with hyposensitivity have low oral tone and are barely aware of what's happening inside their mouths. This 'oral numbness' so to speak can cause significant speech and feeding delays.

**2. Hypersensitivity:** On the other hand, individuals with hypersensitivities are highly sensitive to any of the oral stimulation. Even a slightest touch might be uncomfortable and painful, which can lead to texture/food aversions and speech and feeding delays.

Tung *et al.* points out in their study that articulation disorders in young children are due to defects taking place during a certain stage of sensory and motor development. Some children with functional occlusion disorders may also have sensory integration dysfunction (SID). They hypothesised; speech therapy was less effective in children with SID than in those without. The study concluded that speech therapy improves the occlusion performance of child who has functional occlusion disorders, whether or not they have SID. They also added that it resulted in greater improvement in children not suffering by SID. SID may affect the advantageous treatment results of speech therapy in young children with articulation disorders.

## CLINICAL EVALUATION OF A CHILD FOR DELAY DISORDERS

### Speech Delay

A thorough case history and examination are the most important factors that govern the evaluation of a child suffering with speech delay. If the child fails to babble by the age of 12–15 months; comprehend simple commands by the age of 18 months; talk by 2 years; make sentences by 3 years; alternatively, to tell an easy story by 4–5 years, a physician should highly be considered [4,7,20].

### Tests for Screening

There is no existing recommendation for/against use of screening tests in primary care to detect speech and language delay in children through 5 years of age. The screening tests involve a number of approaches in which the milestones of speech and language developments are taken into consideration [4]. Various concerns requiring a speech and language evaluation of a child is enumerated with age (Table 2) [21]. The delay is often detected by a questionnaire for parents and their concern [22]. The instruments developed for diagnoses have not been widely evaluated. Those used for assessing multiple developmental components

include speech and language component, for example, the ages and stage's questionnaire, clinical adaptive test/clinical linguistic and auditory milestone scale, Denver developmental screening. Some of the screening tests include ward infant language screening test, assessment, acceleration and remediation; WILSTAAR, McArthur communicative development inventory, fluhaarty speech and language screening, early language milestone scale and several others [23–28]. Out of these, the early language milestone scale is the simplest tool, which can be used to assess the delay in children who are younger than 3 years of age. This test addresses to the expressive, receptive and visual delay [29]. For children in an age group ranging from 2.5 to 18 years of age, Peabody picture vocabulary test is a useful instrument, which relates to the word comprehension [30].

### Diagnostic Evaluation

All the children suffering from delay in speech and language should be referred for audiometry. Furthermore, tympanometry if done can be a useful tool in further diagnosis. They provide a definite and quantitative means and help in ruling out peripheral hearing loss. Another test that can be used is the functional magnetic resonance imaging [31,32].

**Table 2: Alarm suggesting need for immediate speech–language evaluation**

Age	Receptive	Expressive
12 months	–	Fail to babble, point or gesture
15 months	Fail to look at or point to 5–10 objects/persons when named by parents	Fail to use at least 3 words
18 months	Fail to follow one-step directions	Fail to say 'mama/dada' or other names
2 years	Fail to point at pictures/body parts when named	Fail to use at least 25 words
2.5 years	Fail to respond verbally or nod/shake head to questions	Fail to use unique 2-word phrases, including noun-verb combinations
3 years	Fail to understand prepositions or action words	Fail to use at least 200 words
	Fail to follow 2-step directions	Repeats phrases in response to questions (echolalia)
At any age	–	Has reduced or lost previously acquired speech/language milestones

## Therapy

The primary goal of treatment is to make the child aware and teach the strategies for comprehending spoken language and producing appropriate communicative nature, and aid parents learn ways of encouraging their children's communication skills. The possible treatments various disorders leading to a speech and language delay have been listed in Table 3.

## The Difference Maker –Role of Paediatric Dentist

The apex bodies working on the treatment of speech and language delay for children have put some recommendations forward, which are as follows: (1) According to American Academy of Pediatrics (AAP), all infants and young children should undergo periodic screening for developmental delays in the primary care settings; (2) Center for Disease Control and Prevention

**Table 3: The treatment options for various disorders leading to a speech and language delay in children**

Disorder	Treatment
Hearing loss	Children with hearing loss should be referred to an audiologist. The audiologist, as part of an interdisciplinary team of professionals, will perform an evaluation and suggest the most appropriate intervention program
	Early family-centred intervention promotes language (spoken and/or signed) and cognitive development
	Children identified with hearing loss who begin services early may be able to develop language (spoken and/or signed) on par with their hearing peers
Maturation delay	Speech–language therapy interventions are effective. Parent-provided therapy under the guidance of a clinician is as effective as clinician-provided therapy. Interventions lasting longer than 8 weeks may be more effective than those lasting less than 8 weeks
	Prognosis is excellent. Children typically have normal speech by the age of school entry
Expressive language disorder	Active intervention is necessary because this disorder is not self-correcting
	Speech–language therapy interventions are effective. Parent-provided therapy under the guidance of a clinician is as effective as clinician-provided therapy. Interventions lasting longer than 8 weeks may be more effective than those lasting less than 8 weeks
Bilingualism	The child usually becomes proficient in both the languages before the age of 5 years
Selective mutism	Children should be referred to a speech–language pathologist for evaluation, and to a therapist for behavioural and cognitive behaviour therapies, which appear to be effective. Parents and teachers can be referred to the Selective Mutism Information and Research Association for advice
	Combined intervention including behavioural modification, family participation, school involvement and in severe cases, treatment with fluoxetine (Prozac) is promising
Receptive aphasia	The effect of speech–language therapy is much smaller than it is for other groups. Parent-provided therapy under the guidance of a clinician is as effective as clinician-provided therapy. Interventions lasting longer than 8 weeks may be more effective than those lasting less than 8 weeks
	It is rare for these children to develop normal oral language capacity
Early loss of teeth	The replacement of lost primary anterior teeth is important as dentures have a positive psychological impact even at preschool age, when aesthetics becomes important
Hypersensitivity/hyposensitivity	Gum massage to begin with, as it provides input to all the areas of the mouth. Vibration with Z-Vibe and V-Grabber can be effective in oral sensitivities

(CDC) recommends developmental screening for autism, speech and language delay and developmental delays in primary care setting and (3) American Speech–Language Hearing Association recommends; speech–language screening be conducted by trained speech–language pathologists [4].

The pre-school children suffering from speech and language delay are always at a risk of learning disabilities once they reach school age, which may lead to overall academic underachievement and lower IQ scores [4,33–35].

Paediatric dentists are primarily involved in treating young children. The communication with these patients is extremely important for co-operation and successful treatment. While communicating with the child, the paediatric dentist can identify any evident abnormal speech or delayed language skills. Hence, screening a child for speech and language delay can be combined with routine clinical practice, followed by referring the child for thorough diagnostic evaluation and appropriate treatment.

## CONCLUSION

Developmental problems in early years can always cause disorders in later life, and early treatment can facilitate successful outcomes for children with multiple risks. The high prevalence of speech and language difficulties in young children underscores the need to target these delays in early years, to reduce the adverse outcomes and thus optimise chances of improvement. It is important that the paediatric dentist should not harm the patient's confidence leading to social effects.

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