

# Childhood stutter: subsidies for pediatricians and health professionals

## *Gagueira infantil: subsídios para pediatras e profissionais de saúde*

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### ABSTRACT

Stutter is a disorder of human communication that begins in childhood and may result in poor social, emotional, and occupational adjustment. Pediatricians can provide guidance, clarification, and appropriate referral for its resolution. Some pediatricians, when contacted by parents of children who stutter, tell them to ignore the speech disorder referring to this disruption as normal occurrence during the speech development of children. However, this type of guidance will only prove valid for those children who manage to overcome the disorder. For those who keep stuttering, therapy is often disregarded, influencing stutter prevention and increasing the risk of chronicity.

**Key words:** Speech, Language and Hearing Sciences; Stuttering; Child; Speech Disorders; Language Development Disorders.

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### RESUMO

*A gagueira é um distúrbio da comunicação humana que tem início na infância e que pode resultar em mau ajustamento social, emocional e ocupacional. O pediatra pode prestar orientações, esclarecimentos e encaminhamento adequado para sua solução. Alguns pediatras, ao serem procurados por pais de crianças com gagueira, os orientam a ignorar o problema de fala, referindo-se às rupturas tidas como normais durante o período de desenvolvimento de fala da criança. No entanto, esse tipo de orientação só será realmente válido para aquelas crianças que superam o distúrbio. Para aquelas que continuam gaguejando, as possibilidades de terapia serão descartadas, o que irá influenciar na prevenção da instalação da gagueira e no aumento de risco de sua cronicidade.*

*Palavras-chave:* Fonoaudiologia; Gagueira; Criança; Distúrbios da Fala; Transtornos do Desenvolvimento da Linguagem.

### INTRODUCTION

Stuttering is a universal disorder found in all cultures, races, ages, and sexes. It can be an isolated speech disorder or it can be associated with other disorders. The increased risk of social, emotional, and occupational maladjustment<sup>1,2</sup> for people with stuttering requires that health and education workers be sufficiently knowledgeable to help these individuals and their families, providing guidance and clarification and referring them an evaluation by a speech therapist<sup>3</sup> who is qualified to handle the issue adequately. Teachers, pediatricians, family doctors, and psychologists are often some of the professionals to whom parents resort at first for guidance on how to resolve the issue of stuttering. Inadequate referral and intervention may have

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important consequences for children with stuttering and their families.

This article discusses fluency and stuttering (etiology, risk factors, and therapeutic principles) with the aim of updating knowledge and offering convenient solutions regarding the approach an issue of great social relevance.

## FLUENCY

Fluency is defined as a continuous and smooth flow of speech production, which can vary from one individual to another and in the same individual, depending on emotional, situational, and linguistic factors. The main measures of an individual's fluency take into account disruptions in speech flow and rate, commonly expressed in words and syllables per minute. Disruptions in speech flow are called disfluencies. Disfluencies may be related to problems in the grammar-encoding and phonological encoding processes or in phonetic plan retrieval.<sup>4</sup> Both the national and international literatures offer proposals for disfluency classification; the most widely accepted of them considers disfluencies as common and stuttered<sup>5</sup>. Common disfluencies appear in the speech of all individuals, fluent or with a stutter, and are more related to language processing, while stuttered disfluencies are the most distinctive features of stuttering and are more related to speech processing. Common disfluencies include: hesitation, interjection, review, unfinished words, and repetition of words, phrases, and segments. The stuttered disfluencies comprise sound prolongation, blocks, repetition of sounds and syllables, pauses and intrusions.

Studies carried out with fluent individuals, speakers of Brazilian Portuguese, show that the pattern of speech disruptions does not vary significantly throughout life, which may indicate that the neuro-linguistic system's maturing toward fluency is already functionally set in the early years and remains stable throughout life.<sup>6</sup> There seems to be variation during the phases of life in terms of speech rate, which may indicate acquisition, development, stabilization, and degeneration.<sup>6</sup> Generally, fluent speakers disrupt their speech at a maximum of 10% (8% common disfluencies and 2% stuttered disfluencies). It is important to highlight that in terms of stuttered disfluencies, fluent speakers showed only repetition of syllables (each syllable repeated no more than twice), and

prolonged end of words and pauses. Consequently, blocks, repetition of sounds, and intrusions are more related to stuttering.

According to the neuropsycholinguistic model of stuttering, two operating systems must be balanced for speech to be fluent: the symbolic system and the sign system.<sup>7</sup> In general terms, the symbolic system is responsible for the processing of language and segment, while the sign system is related to prosodic or suprasegmental processing. Consequently, all speakers can have breaks in speech fluency, whether due to failures in the sign system, in the symbolic system, or in the integration of both. What distinguishes fluent speakers from stutterers is that the former recover fluency quickly.

## STUTTERING

Stuttering is a human communication disorder which directly affects fluency of speech, causing interruptions in the segmental chain due to failures in temporal motor programming, with successive attempts to resume fluency.<sup>8</sup> Such interruptions cause a decline in speech rhythm during the act of speaking, which can be followed by facial and body distortions reflecting the motor effort to speak. In addition, given their difficulty to speak, stutterers can face social and emotional limitations and eventual social isolation. Stuttering can be classified as idiopathic (or developmental) or acquired (neurogenic and psychogenic).<sup>9</sup> Developmental stuttering is defined as a genetic dysfunction of the central nervous system, with no apparent brain damage or other known causes, which brings important social and psychological consequences for the child who stutters.<sup>10</sup> It starts in childhood<sup>10,11</sup>, mainly between two and five years of age – the most significant period of acquisition and development of speech and language – when children are trying to learn to speak. In this period, while the child's language grows considerably, it is not appropriately followed by a development in speech and articulation, which causes the onset of stuttering. Developmental stuttering is found in approximately 70-80% of the total cases of childhood stuttering and its prevalence is of 20-30%.<sup>12</sup>

Acquired stuttering can occur after language acquisition and development. Neurogenic stuttering occurs with fluent speakers and is a rare phenomenon resulting either from well-defined brain damage, of either vascular origin, such as a cerebrovascular ac-

cident (CVA), or traumatic origin, as is the case of skull fractures.<sup>9,13</sup> Furthermore, this subtype of stuttering may start a few years after the occurrence of the brain damage. Psychogenic stuttering may be associated with emotionally traumatic events and can be related to psychiatric manifestations.<sup>13,14</sup> This type of stuttering occurs, therefore, because of psychopathological changes. There is still the pharmacogenic or drug-induced forms of stuttering, caused by ingestion of drugs<sup>13</sup>, namely psychopharmacogenetic, anticonvulsants and the bronchodilator Theophylline.<sup>15</sup>

The prevalence rate for idiopathic, or developmental, stuttering is of about 1% worldwide<sup>16</sup>, which can be considered a significant number. According to the Brazilian Institute for Fluency (IBF), its prevalence and incidence rates in the Brazilian population are of 1 and 5%, respectively; in the city of Belo Horizonte, 118,772 people stutter and 23,754 have stuttered for some time. Its prevalence rate is lower than its incidence rate because of spontaneous remission, which for about 80% of children can happen in 6 to 12 months or before adolescence. However, it is unclear what factors lead to spontaneous remission. This disorder has a ratio of three men to one woman.<sup>17</sup> In childhood, between the ages of 2 and 6, the ratio is 2:1, which indicates that the prevalence of stuttering in males is found since the onset of the disorder.<sup>18</sup> Girls have more facility to spontaneously recover from stuttering<sup>18</sup>, which can be explained by girls' being more capable of using linguistic resources and by boys' being more demanded by their families.

## ETIOLOGY

Contrary to previous beliefs, stuttering is not a disorder of exclusively nervous or emotional nature. It is known that some psychological symptoms create a predisposition to it while others are consequences of stuttering. Emotional factors are defined as feelings that listeners inspire in the individuals, their reactions to the stutter.<sup>19</sup>

The causes of stuttering are on the agenda of the world's main research centers on fluency disorders. Evidence shows that stuttering is a disorder of genetic or neurophysiological origin. In spite of its genomic origin,<sup>20-22</sup> heredity alone cannot be held accountable for its manifestation.<sup>17,23</sup>

Many genes are involved in susceptibility to stuttering and finding these genes is a difficult process

since each of them is in a different locus and their effect on the disorder is due to individual characteristics.<sup>24</sup> There are three genes involved in the etiology of stuttering. The mutations these three genes undergo trigger small defects in the execution of cell-recycling activity, in which the useless cellular components are degraded and reused. The identification of a recessive autosomal locus for the disorder, on the long arm of chromosome 3, is the basis of its genetic origin.<sup>25</sup>

Recent advances in imaging techniques have increased our understanding of the etiology of this speech disorder. Studies comparing cerebral activation of stutterers and fluent speakers have been developed in the past 20 years. In general terms they show that among stutterers the areas responsible for speech processing in left hemisphere are subactivated and correlated areas in the right hemisphere are hyperactivated, when compared to fluent speakers.<sup>26</sup> In addition, it has been found that children who stutter tend to display developmental anomalies in Broca's area (less gray matter in the left inferior frontal gyrus) and disorganization of the white matter in the left Rolandic operculum below the motor representation of speech articulation.<sup>12</sup> These anomalies of the left hemisphere of the brain are also observed in adults with persistent stuttering<sup>27,28</sup>, usually with low functional lateralization of the speech-related processes.<sup>28</sup>

Other studies associate stuttering with basal nuclei and the supplementary motor area (SMA).<sup>30,31</sup> The basal nuclei have a key role in automating fast motor sequences, such as speech, and providing clues of timing for the SMA, which relies on a clear distinction between focal activation (initiation of movements) and diffuse inhibition (inhibition of involuntary movements) of the cerebral cortex.<sup>30</sup> Failures in this process can result in difficulty to initiate movement and release of involuntary movements, both commonly found in stuttering patterns.

Some studies suggest that there are also problems in the auditory processing/feedback in persons with stuttering.<sup>3,33</sup>

## EARLY DIAGNOSIS

It is essential that the diagnosis of developmental stuttering be made as early as possible, while still in childhood, in order to minimize the negative aspects associated with the disorder and potentialize quality of life for these speakers. The initial difficulties to

speak can result in embarrassment, fear, or frustration, leading children to develop a tendency to avoid words and communicative situations, which can further aggravate them. The prognosis for spontaneous recovery is good if referral to a speech therapist for parental counseling and treatment is done before the onset of social and emotional responses to stuttering.<sup>34</sup>

At the time of diagnosis, the risk of the child becoming an adult stutterer must be evaluated because for stuttering to arise and persist it requires the interaction of constitutional (hereditary and neurobiological) and environmental factors (psychological, linguistic and social).<sup>7,34</sup> The Stuttering Foundation of America (SFA) has proposed a fast route for pediatricians to follow with families of children who are seeking guidance on stuttering<sup>34</sup>. It takes into account the family history for developmental stuttering; the age at onset (prognosis is good when made before three and a half years of age); the time of emergence (for those over six months the prognosis is less optimistic); sex (worse prognosis for the males); and other associated communication disorders that decrease the chances of spontaneous remission.

Andrade<sup>7</sup> proposed a risk protocol to be used for evaluating children with symptoms of developmental stuttering. This protocol takes into account, in addition to the issues presented by SFA: the typology of disfluencies, the greater the number of types of disfluencies the child with a stutter has, the worse the prognosis; associated qualitative factors regarding body and facial tension; medical history in pre, peri, and post-natal care; the reactions of the child, family, and people in social contact have to the stuttering, and previous professional guidance.<sup>7</sup> This protocol guides any speech-language interventions and indicates three possible types of results: low risk, risk, and high risk. Different treatment programs are presented for each of the three results.<sup>23</sup>

The precipitating factors that contribute indirectly to the onset of the disorder include: stress, pressure, insecurities, traumas, and emotional factors. Excessive linguistic demand on the child should also be taken into consideration, which includes inappropriate vocabulary for the child's age and excessive articulatory speed.<sup>25</sup>

Sustaining factors that indicate the degree of chronicity of stuttering can include psychological factors and attitudes that harm fluency. In this case, they encompass the communicative environment and negative interpersonal interactions that may generate fear

of words and of communicative situations.<sup>36</sup> Furthermore, excessive concern or denial of the problem on the part of parents can also be seen as factors that account for the worsening of stuttering.

In addition to surveying the risk factors for stuttering to become chronic, it is important that the speech therapist evaluate the individual's speech in an objective and subjective manner in order to characterize it. To this end, a typology of disfluencies, speech rate, frequency of disruptions, and movements associated with the degree of severity of stuttering should be established. The individual's perception of his or her speech as well as the therapist's are also part of the evaluation. In Brazil, studies have been made in order to know the speech fluency of fluent individuals,<sup>6,37,38</sup> which contributes to the diagnostic accuracy of stuttering and other fluency disorders.

## EARLY PREVENTION

Stuttering usually becomes evident between two and three years of age, when the brain's language formation process is at its peak. Treatment is much more effective and quick at this early stage, when performed by a specialized professional.<sup>35</sup> However, stuttering can be treated at any age, and adolescents and adults also benefit significantly from therapy.

Understanding the etiology, characteristics, and the impact and limitations that stuttering causes in each individual is essential for the treatment. The best option is indirect treatment, which basically consists of guidance and counseling for parents, relatives, and teachers on how to behave around the child in order to stop the case progressing when the child is up to four years old, has been disfluent for less than a year and has low risk of developing stuttering, according to the risk protocol.<sup>7,23</sup> However, for children older than four years with steady stuttering for more than a year and of risk or high risk, the option is speech-language treatment directly with the child.<sup>23</sup>

There are many good speech-language treatments. The Stuttering Foundation of America has established two large groups of treatment: stuttering modification and fluency shaping. The therapeutic process of stuttering modification is based on the principle that the majority of disfluencies result from avoidance, conflicts, fears or effort to talk. Thus, this treatment includes strategies aimed at reducing avoidance, fear, and negative speech-related atti-

tudes. Changes may also be induced in the manner of stuttering, speech rate, and tension when speaking. The treatments based on fluency shaping are carried out by means of speech monitoring and are based on the theory of conditioning and programming, and principles of fluency. The therapeutic process seeks gradual control of fluency until the usual patterns of conversation are achieved.

The objective of the treatment goes far beyond promoting fluency and reducing ruptures; it promotes communication effectiveness and better quality of life for children, who can then become better adjusted in society.

Several studies have been developed to verify the efficacy of drug treatments for stuttering.<sup>24,39,40</sup> However, until this moment no medication has been approved for use in stuttering treatments. Advances in neuropharmacology indicate that certain substances can reduce production of dopamine by acting on the speech regions, which would facilitate motor response. It can be said that many adverse and side effects are found in the use of drugs for treating stuttering, although a decrease of symptoms has been observed in certain individuals who stutter.

## IMPORTANCE/ROLE OF THE PEDIATRICIAN IN THE FOLLOW-UP OF CHILDREN WITH STUTTERING

The pediatrician is one the first professionals to whom parents must resort when faced with childhood issues. Stuttering, like other human communication disorders, is not a specific expertise of pediatricians, so it requires appropriate referral in each case<sup>41</sup>. This will allow for more suitable treatment, thereby reducing the damage the disorder can cause to the individual, as long as it is carried out early and appropriately<sup>34</sup>.

Although around 80% of children show spontaneous remission of developmental stuttering, this should not be considered normal and purely linguistic. This type of stuttering should not be seen as a simple event in children's speech. Pediatricians can contribute to therapeutic success and, consequently, to reducing social and psychological damage. Families must be guided on how to react to their child's speech and on appropriate linguistic behavior, and they must be made aware of attitudes that worsen stuttering as well those that promote fluency.

Some pediatricians, when approached by parents of children with stuttering, advise them to ignore the speech problem and refer to the ruptures as normal during the child's speech development period. This advice will only prove valid for children who overcome the disorder. For those who continue to stutter, the possibilities of therapy will be discarded, which stops prevention of stuttering setting in and increases the risk of chronicity. This can have major consequences for both the child and the family, which could have been prevented.

It is very important that pediatricians do not ignore the speech problems reported by parents and raise the family's awareness and knowledge of factors, as well as positive and negative attitudes to speech fluency. Table 1 summarizes the guidance that can be offered to parents and relatives of children who stutter.<sup>7,42,43</sup>

## CONCLUSION

When diagnosed early, the risks of developmental stuttering, including social, emotional, and occupational maladjustment can be diminished, which contributes to improving the quality of life of individuals. It is crucial that health and education professionals be prepared to detect children with stuttering, provide guidance, clarification, and referrals to specialist professionals.

**Table 1 - Speech-language guidance for families of children who stutter**

1) Talk to the child and give them time to finish what they are saying.
2) Parents must try to speak slowly and always maintain eye contact with the child.
3) Use vocabulary suitable to the child's age and do not demand that they use sophisticated vocabulary not expected from their age.
4) Never criticize the child's speech. Pay attention to the content and not to the form of the child's speech.
5) Treat the child with respect, attention and care in every situation. Be more affectionate and try to express your feelings, both verbally (say you love them) and non-verbally (smile, touch, and stroke).
6) Reduce the amount of questions, comments or praise and show you are listening to their speech. Before you start asking questions, say things like, "We have plenty of time to talk."
7) Make sure the child will not be ridiculed in the school or family environments. Avoid any kind of criticism, embarrassment or exposure.
8) Watch for the days when the child is more fluent and take advantage of those moments to communicate. Do not force the child to expose herself publicly unless she is willing to do so. Always treat the child the same way, regardless of whether she is fluent or not at the moment.
9) Make sure conversation takes place in a non-competitive environment and never make comparisons with other children.
10) Promote a calm, agitation-free lifestyle at home.
11) Be careful with the activities demanded from the child and keep them balanced with rest and leisure.
12) Set aside some time everyday to do something of the child's interest, such as reading and story-telling. Engage in activities in which fluency tends to emerge, such as singing and talking in different rhythms. It is important to show the child in these moments how good it is to communicate.
13) Make it clear to the child that you (the parents) are there for them, but do not overprotect to the point that they do not need to voice wishes and opinions. Bear in mind that helping does not mean doing things for the child.
14) Do not interrupt, correct, finish sentences or tell the child to think, breathe, calm down or start over. Such actions can make the child more anxious, which hinders fluency.
15) Show the child that stuttering is not a forbidden subject and that his speech difficulty will not be different or inferior to others. Showing the children that are natural to speech disfluencies anyone.

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