

# STUTTERING

## Treatment For Adults

This is the first article in a two-part series on stuttering. This article discusses the onset and development of stuttering, and stuttering in adults. The second article will be published in the May issue of *Current Therapeutics* and will focus on the treatment of stuttering in preschool children.

Effective communication is an essential of everyday life, and stuttering impairs this function. Severe cases may be rendered almost mute. Stuttering usually starts in early childhood, at around 2–4 years, and appears after a period of apparently unremarkable development of speech and language. The prevalence is around 1%, and around two-thirds of those who stutter have relatives who also stutter. This article describes the epidemiology of stuttering, and then explores issues specific to treating adults with developmental stuttering.

### Onset and Development of Stuttering

The terms stuttering and stammering are interchangeable, although the latter is rarely used outside the UK. Stuttering usually starts in early childhood, at around 2–4 years. Neurological insults later in life may cause

dysfluent speech that resembles developmental stuttering to some extent. However, the differences between such neurogenic 'stuttering' and developmental stuttering are so great that the two are usually studied separately. This article deals only with developmental stuttering.

Stuttering is unusual among developmental disorders because it typically appears after a period of apparently unremarkable development of speech and language. Children do not usually begin to stutter when their language development is at the single word level, but rather when they start putting words together in more complex utterances.

The onset of stuttering may be sudden or gradual. It sometimes begins as suddenly as overnight. There are even reports of severe cases of such sudden onset presenting at hospital casualty departments. The early course of the disorder may be cyclical or unremitting and is typically marked by strings of syllable repetitions. In time these repetitions tend to be accompanied or replaced by signs of more effortful speech such as syllable fragmentation, prolongation of speech sounds and even complete cessation of speech. At this stage, the dysfluent speech may be accompanied by extraneous facial and body movements, and aberrant respiratory patterns such as speaking on inspiratory air. The speaker is likely to begin to fear and avoid particular words and speaking situations. The progression to more effortful speech may commence soon after onset or after many months or



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## Salient Points

- Stuttering starts in the first few years of life
- Stuttering begins after a period of unremarkable speech and language development
- Prevalence is around 1%
- Available data indicate that stuttering is a speech motor disorder
- Speech pathologists provide treatment for stuttering in adulthood
- Effective, long-term control of stuttering in adulthood is possible

years. Clinically, it is striking that the behavioural and psychological features of stuttering are different in each individual.

There are many measures of stuttering severity, but the most useful in clinical and research contexts is per cent syllables stuttered (%SS). Mild stuttering is less than 5 %SS, mild-to-moderate is around 5–10 %SS, moderate is 10–15 %SS, moderate-to-severe is around 15–20 %SS and severe stuttering more than 20 %SS. Measures of %SS, along with speech rate measures of syllables per minute, are made on-line while the patient speaks. This is done with a button-press counting and timing device (Fig. 1). In mild stuttering, speech disruptions can be brief as well as infrequent, but in severe cases speech can be disrupted every few syllables for more than 30 seconds, making verbal communication virtually impossible.

The distribution of stuttering frequency is skewed so that there are more mild and mild-to-moderate cases of stuttering than moderate-to-severe and severe cases. Data suggest this to be the case with both adults and children.<sup>[1,2]</sup> Stuttering severity varies within speakers, and may be influenced by variables such as fatigue, anxiety, audience size and speaking situation.

## Stuttering causes social maladjustment and hinders attainment of occupational potential

### Epidemiology of Stuttering

It is generally accepted that the incidence of stuttering in adulthood is around 1% in all cultures. Not all children who begin to stutter go on to do so in later life. Some children recover without any formal therapy and there are serious methodological difficulties in determining precise estimates of the rate of such 'natural recovery.' For example, it is not ethical to deny best practice treatments to stuttering children in a prospective study of natural recovery rates. Consequently, virtually all data pertaining to natural recovery are retrospective and rely on

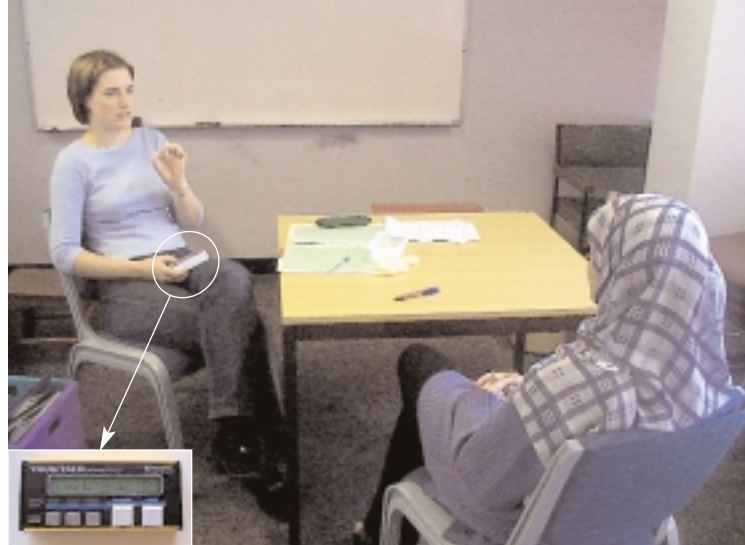
subject recall. This is probably one reason why estimates of the rate of natural recovery have ranged between 30 and 90%.

There are also problems extrapolating clinically meaningful recovery rates from these estimates. For example, such estimates are typically based on non-clinical populations and will not necessarily pertain to stuttering children who present to clinics. Many children recover within 6 months of onset but available data indicate that recovery occurs up to 4 years after onset in some cases.<sup>[3]</sup> This information means that the timing of early intervention is problematic, and is addressed in the companion article on the treatment of stuttering in early childhood (to be published in the May 2000 issue).

At present, two incontrovertible predictors of natural recovery are known. The first is sex. The male : female ratio at onset is about 2:1 but in adulthood that ratio increases to at least 4:1 because more girls recover. The

second incontrovertible predictor of natural recovery is time since onset, with the number of recoveries dropping off sharply as years pass.<sup>[4]</sup> For example, if a child begins to stutter at 2 years and is still stuttering at 7 years, then there is virtually no chance of natural recovery.

Around two-thirds of those who stutter have first or second degree relatives who also stutter. Further, monozygotic concordance rates are higher than dizygotic concordance rates. Hence heredity plays a part in the disorder, however, the method of genetic trans-



**Figure 1.** A speech pathologist at the Stuttering Unit uses a button-press counting and timing device (inset) to measure per cent syllables stuttered and syllables per minute with a stuttering patient.

mission is unclear.<sup>[5]</sup> At present, the first genetic linkage studies are under way.

### Effects of Stuttering

Those who stutter may find effective communication impossible and severe cases may be rendered almost mute. As the disability of stuttering is apparent only when speaking, it can be hidden by remaining silent and avoiding contact with others. Therefore, the social and personal ramifications of this disorder can be serious. In adults, stuttering has been shown to cause social maladjustment and to hinder attainment of occupational potential. Stuttering may cause a lifetime of concern and embarrassment in everyday speaking situations. Clinically significant anxiety figures prominently in the disorder,<sup>[6]</sup> with one data source indicating that 44% of stutterers seeking treatment warrant a comorbid diagnosis of Social Phobia according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV).<sup>[7]</sup>

### Treatment of Stuttering in Adults

Treatments for adults who stutter have been developed without reference to theories of the cause of the disorder, mainly because none of the many aetiological theories that have been proposed have yet to be found satisfactory. There is evidence that the disorder causes widespread respiratory, acoustic, kinematic and electro-

physiological perturbation to the speech system, and this appears to have prompted general agreement that the disorder is one of speech motor control.<sup>[8]</sup> Although genetic involvement in its distal origins is apparent, beyond this little is known about why the speech disturbances of stuttering occur.

Consequently, it is perhaps not surprising that treatment of adults who stutter has been developed from an historical base. From all accounts, it

meta-analysis of the treatment effects of prolonged-speech, relative to the effects of other types of stuttering treatment. Andrews, Guitar and Howie<sup>[12]</sup> concluded that treatments based on prolonged-speech were more effective than other known interventions for stuttering adults. Subsequently, the technique has become best practice for the control of stuttered speech. Speech pathologists are responsible for the diagnosis and treatment of stuttering, and

## The prolonged-speech technique has become best practice for the control of stuttered speech

appears that during the 18th century an American physician invented a technique of restructuring the patient's speech with an unusual, drawling way of speaking. Nothing is known of the success of these efforts but they were revisited in the mid 1960s with a programme of scientific research that developed a technique known as prolonged-speech.

### Prolonged-Speech

In a series of single-subject experiments, Goldiamond<sup>[9]</sup> showed that subjects could remain stutter-free while shaping this slow drawling speech pattern towards more natural sounding speech. Subsequently, prolonged-speech achieved widespread popularity as numerous variants were adopted worldwide (for reviews, see references 10, 11). This was a landmark development in the history of stuttering treatment because for the first time ever, a scientifically developed procedure was shown capable of controlling stuttered speech.

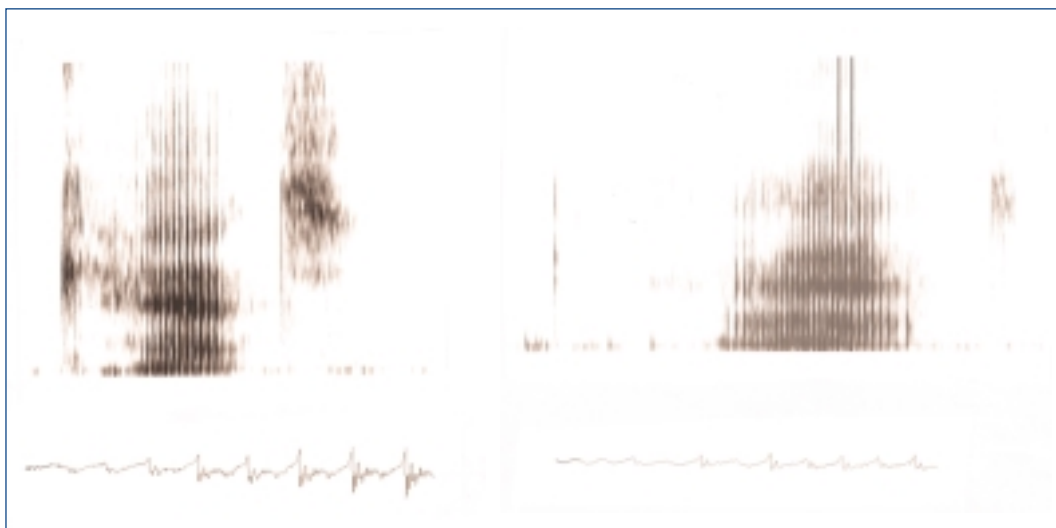
By the end of the 1970s, there were sufficient studies to conduct a

during the past decade the vast majority of adult patients in Australia have been treated with the prolonged-speech technique.

The features of many variants of prolonged-speech include extended vowel production, light articulatory contacts and gradual onset of vocalisation during speech. It has been shown that patients are able to use this speech pattern to control their stuttering in everyday speaking situations and to sound reasonably natural while doing so. Reduced rate of speaking has been shown not to be essential to the success of the treatment.

Figure 2 shows a sound spectrogram of a male speaker saying 'cat' normally and then while demonstrating prolonged-speech. The light articulatory contact can be seen in the reduced acoustic energy in the consonants in the right panel. The gradual onset of vocalisation can be seen in the speech waveform in the right panel, as can the increased vowel duration. As the treatment proceeds, the patient learns to speak with less emphasis on these speech components until such time as speech sounds reasonably natural and occurs at normal speech rate. The mechanism underlying the effects of this procedure are unknown, but there are good grounds to believe that those who stutter have an unstable speech motor system and that prolonged-speech treatment has a stabilising effect on speech motor functioning.

Scientific outcome data have been reported on more than 350 clients who have received prolonged-speech treatment. Some reports have shown that 1 year after treatment, patients have stuttering levels of around 1 %SS in everyday speaking situations. A report currently being prepared by the author and colleagues has shown that it is possible for patients to maintain those treatment benefits for post-treatment periods as long as 7–12 years.



**Figure 2.** Sound spectrograms and speech waveforms of a male speaker saying 'cat' normally (left panel) and with prolonged-speech (right panel), demonstrating light articulatory contact, gradual onset of vocalisation and increased vowel duration. Note that the speech wave form is on a different time scale to the sound spectrogram.

### Shortcomings of Prolonged-Speech

There are serious shortcomings to this treatment, which are currently being addressed by research. Most prominently, the treatment is quite arduous and non-compliance rates are high. The treatment is typically administered over 2–3 weeks in an intensive format. Initially, patients learn a slow and unnatural sounding version of prolonged-speech. Then, in a performance-contingent schedule, clients gradually learn to integrate light articulatory contact, gradual onset of vocalisation and increased vowel duration into stutter-free speech that sounds reasonably natural.

To assist them in achieving that goal, patients master stutter-free prolonged-speech at systematically increasing speech rate targets. After this intensive phase, during which patients learn to use their new, stutter-free speech in everyday conversations, a maintenance programme for at least 1 year is essential. Unfortunately, such a treatment programme is not suitable for all patients.

Another problem with prolonged-speech treatment is that relapse rates are around one-third. Further, patients may achieve stutter-free speech that sounds and feels unnatural. At present, the author and colleagues are engaged in National Health and Medical Research Council funded projects to address these problems.

One report<sup>[13]</sup> has shown that a new technique for prolonged-speech training can cut a traditional 2 week intensive treatment<sup>[14]</sup> down to a 1 day version and can produce speech in some patients that is indistinguishable from normal. In the original study, patients reduced their stuttering by a mean 96.5%, and in the modified programme clients reduced their stuttering by a mean 93.7%.

In another programme of research, the author and colleagues are incorporating cognitive-behavior therapy into the prolonged-speech treatment technique in order to manage patients who have excessive general anxiety and fear of negative social interactions.

### Summary

There are clear signs that treatment research is producing techniques for the control of stuttering that will increase patient compliance rates, and allow durable and natural stutter-free speech to be obtained more effortlessly than has been possible to date. However, treating stuttering close to its onset, or in the preschool years, is quite different. There is general agreement that, in comparison to chronic stuttering in adults, stuttering in preschool children is extremely tractable. For this patient population, treatment methods are completely different, and this is the topic of the companion article (to be published in the May 2000 issue).

The web site of the Australian Stuttering Research Centre is: <http://www.cchs.usyd.edu.au/Academic/ASRC>

*[Editor's note: This comprehensive web site complements the article and is a useful resource for a doctor faced with a stuttering patient.]*

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