

# Reversion to a Previously Learned Foreign Accent After Stroke

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**ABSTRACT.** Roth EJ, Fink K, Cherney LR, Hall KD. Reversion to a previously learned foreign accent after stroke. *Arch Phys Med Rehabil* 1997;78:550-2.

Foreign accent syndrome occurs rarely after stroke. Most patients with this syndrome develop an aphasia characterized by a new accent. This report presents a 48-year-old man who sustained a left parietal hemorrhagic stroke resulting in right hemiparesis and the inability to speak. As spontaneous speech emerged several weeks later, he was noted to have a Broca's aphasia and a Dutch accent. Analysis of his speech demonstrated final consonant deletion, substitution of "d" for "th" sounds, vowel distortions, additional "uh" syllables added at the end of words, and errors in voicing. This speech pattern has persisted for more than 5 years after the stroke. Elicitation of additional history found that the patient was born in Holland and lived there until the age of 5 years, when he moved to the United States with his family. Before his stroke, he had no foreign accent. This report illustrates the importance of considering foreign accent syndrome during aphasia recovery and suggests several pathogenetic mechanisms that may contribute to the development of this syndrome.

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**F**OREIGN ACCENT syndrome, also known as "pseudoaccent"<sup>1</sup> or "unlearned foreign language,"<sup>2</sup> is the acquired inability to make the phonetic and phonemic contrasts that are associated with the present language, which results in a listener's perception of the speech as foreign. It is a rare consequence of stroke that involves the language cortex and becomes manifest during the recovery phase after stroke.

Foreign accent syndrome was first described by Pick<sup>3</sup> in 1919, and there have been at least 12 reports with detailed descriptions of patient histories (table 1). Mayo Clinic reported an additional 13 cases,<sup>4</sup> and Berthier<sup>5</sup> noted an additional 4 cases. Previously described accents have included Polish, German, English, Spanish, Nordic, Asian, French, and Irish. Foreign accent syndrome is often transient, but can be persistent.

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Submitted for publication October 10, 1995. Accepted in revised form September 25, 1996.

Supported in part by the Rehabilitation Research and Training Center on Enhancing Quality of Life of Stroke Survivors, sponsored by the US Department of Education National Institute on Disability and Rehabilitation Research (grant H133B30024-94), The Dr. Scholl Foundation, The Henry Foundation, and the Rehabilitation Institute of Chicago.

Presented at the 56th Annual Assembly of the American Academy of Physical Medicine and Rehabilitation, Anaheim, CA, October 1994.

No commercial party having a direct financial interest in the results of the research supporting this article has or will confer a benefit upon the authors or upon any organization with which the authors are associated.

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0003-9993/97/7805-3726\$3.00/0

Reports of many previous cases have noted the presence of a mild aphasia that emerged from a nonfluent, agrammatic aphasia. Some patients also exhibited a mild dysarthria. A recent report by Takayama<sup>6</sup> was the first to describe a patient with foreign accent syndrome but no aphasia. In most cases the patients presented with the development of a new foreign accent without having been exposed to that accent in the past.<sup>3-5,7-12</sup> This report describes a second patient who had exposure to a particular language in the distant past, lost the accent, and after stroke reacquired speech patterns characteristic of that previous language.

## CASE REPORT

The patient was a 45-year-old man with a medical history of hypertension who presented with a sudden onset of right-sided weakness and aphasia. Computed tomography and magnetic resonance imaging of the brain showed a 3cm × 5cm hyperdense area, suggestive of hemorrhage in the left parietal area, with extension into the ventricles (fig 1). The patient's speech was initially characterized by the inability to speak, and the only communication was by blinking the eyes to indicate yes or no. Approximately 2 months after the stroke, the patient began to develop a nonfluent Broca's aphasia, with characteristics of speech that sounded like a Dutch accent. His ability to produce spontaneous speech improved gradually, but his Dutch accent persisted. Formal analysis of his speech and linguistic functioning was performed approximately 4 years after his stroke, and the results are listed in tables 2 and 3.

Additional history of the patient revealed that he was born in Groeningan, Holland, and moved to the United States at the age of 5 years. As a teenager, he lost his accent completely, and acquired an American dialect. He had visited Holland only once, approximately 10 years before his stroke. He had no accent until the time of his stroke, and has had persistence of the accent for at least 5 years after the stroke.

## DISCUSSION

Foreign accent syndrome has been described as a change in phonemic features present in natural language, which to the listener is interpreted as a foreign accent.<sup>11</sup> A feature common to most described foreign accent cases is the presence of an associated nonfluent aphasia with a lateralized lesion which then emerges into an accent. This disorder can be differentiated from aphemia, which is defined as an articulatory disorder without the aphasia,<sup>10</sup> and dysprosody,<sup>7</sup> in which only the "melody" or stress and intonation of language is affected. Both segmental and prosodic elements of speech seem to be affected in foreign accent syndrome.

The language of our patient generally was grammatically correct and lexically full, with a slightly slowed rate secondary to pauses between words. Occasional subjective word finding difficulties were noted by the patient on the Boston Naming Test, although his score was in the normal range (50 to 60). Analysis of his speech found inconsistent errors, including

Table 1: Foreign Accent Syndrome Cases

Case Report	Age	Etiology	Language	Articulation	Accent
Pick, 1919 <sup>3</sup>	26	L hemisphere stroke	Agrammatism; anomia; paraphasia	Uncertain	Czech to Polish
Monrad-Krohn, 1947 <sup>7</sup>	30	L frontal trauma	Agrammatism; paraphasia	Impaired	Norwegian to German
Whitty, 1964 <sup>8</sup>	27	L prerolandic gyrus AVM	Normal	Impaired	English to German
Whitaker, 1982 <sup>9</sup>	30	L hemisphere stroke	Mild agrammatism	Impaired	American to Spanish
Schiff et al, 1983 <sup>10</sup>	60	Infarct in L prerolandic gyrus	Mild anomia	Impaired	Portuguese to Chinese
Graff-Radford et al, 1986 <sup>2</sup>	56	L mid frontal gyrus infarct	Rare paraphasia	Impaired	American to Nordic
Blumstein et al, 1987 <sup>11</sup>	62	L prerolandic and postrolandic gyrus infarct	Mild agrammatism	Impaired	Boston to French
Gurd et al, 1988 <sup>12</sup>	41	L basal ganglia infarct	Normal	Uncertain	English to French
Seliger et al, 1992 <sup>15</sup>	65	L subcortical infarct; centrum semiovale	Normal	Impaired	American to Irish
Ingram, 1992 <sup>13</sup>	56	Lentiform nucleus	Apraxia; rare paraphasia	Impaired	Australian to Asian, Swedish, German
Takayama et al, 1993 <sup>6</sup>	44	L precentral gyrus infarct with petechial hemorrhage	Normal	Normal	Japanese to Korean
Ardila et al, 1988 <sup>14</sup>	26	L embolic stroke; Broca's area	Broca's aphasia	Impaired	Spanish to English
Present Case	45	L parietal hemorrhage	Agrammatism; mild anomia	Impaired	American to Dutch

Abbreviations: L, left; AVM, arteriovenous malformation.

changes in vowel length, consonant production, and intonation, with frequent syllables placed at the end of a word (table 3). Similar findings have been noted by other authors.<sup>2,5,7,9,11,13,14</sup> Reasons that this collection of speech abnormalities results in the perception of a foreign accent, rather than an interpretation of impaired speech, are unclear. The foreign accent, when per-

ceived by true speakers of that language, is not really that of their language.

Locations of the lesions seen with foreign accent syndrome have varied and include precentral gyrus, premotor mid frontal gyrus, left subcortical prerolandic and postrolandic gyri, and our case in the left parietal area. There does not appear to be a consistent lesion inducing the syndrome. Berthier<sup>5</sup> noted a correlation between location and recovery, however, reporting that two patients with lesions in the premotor cortex made good recovery while two patients with precentral, primary motor, and adjacent sensory cortex involvement had persistent symptoms.

It has been proposed that foreign accent syndrome results from alterations of normal language characteristics, which are interpreted as a foreign accent that is generic in nature.<sup>5,11</sup> Theories of pathogenesis suggested by Seliger<sup>15</sup> included unmasking of previously suppressed neural circuitry, expression of hierarchical neural organization, or the presence of multiple anatomic locations for different languages being selectively damaged, allowing expression of only the unaffected area. The patient in this report has had persistence of the accent. In contrast, other reports have suggested that the syndrome is temporary. For this reason, it is important that rehabilitation specialists be aware of



Fig 1. Magnetic resonance image of the brain of a 45-year-old man showing a hyperdense area suggestive of hemorrhage in the left parietal area and extension into the ventricles.

Table 2: Language Testing Results

Language Test	Results (no. correct/no. possible)
Boston Diagnostic Aphasia Examination	
Auditory Comprehension	
Complex Ideational Material	10/12 (83%)
Oral Expression	
Nonverbal Agility	6/12 (50%)
Verbal Agility	11/14 (79%)
Automatized Sequences	8/8 (100%)
Repetition of Words	10/10 (100%)
Repeating Phrases	16/16 (100%)
Oral Sentence Reading	9/10 (90%)
Reading Comprehension	
Reading Sentences & Paragraphs	10/10 (100%)
Boston Naming Test	
Score*	54
Normal Range	50-60

\* Patient noted subjective word finding difficulties.

Table 3: Phonologic Analysis

Error Type	Example
Final consonant deletion	tole/told toe/told therapis/therapist hoe/hole
Substitution of d for th	duh/the day/they dat/that
Vowel distortions	eksunt/accnt leddur/ladder eez/is Hullan/Holland see-zuz/scissors
Additional uh syllable added at the end of words	fleduh/fled cook-ee-suh/cookies ow-suh/house
Errors of voicing	s for z in kids s for z in cookies d for t in credited

foreign accent syndrome and its characteristics when caring for the poststroke patient.

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