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CHRONIC FATIGUE SYNDROME:
A CASE REPORT

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Central Auditory Processing Disorder and Chronic Fatigue Syndrome : A Case Study

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Chronic fatigue syndrome is a condition characterized by the onset of disabling fatigue after an initial viral-like illness (Anderson, Anderson, & Glanze, 1994). Symptoms which accompany the fatigue include muscle and joint pain, low-grade fevers, sore throat, headache, and memory deficits. Depression frequently accompanies the condition, and treatment is directed toward the relief of symptoms.

There are several reasons that this case is interesting. Firstly, the client presented with an "apparent" dialectal difference as an adult. Although there is much information related to dialectal differences of children (e.g., Bountress, 1984; Iglesias & Anderson, 1993; Taylor & Payne, 1994), there is relatively little related to such differences found in adults. Secondly, the on-going case history information and additional test results changed the clinicians' thoughts about the possible etiology of the problem and thus the course of treatment. Although these changes extended over a period of more than 18 months, the basis of the problem may have predated our involvement by several years. Specifically, this client had been diagnosed with Chronic Fatigue Syndrome approximately three years before coming to our clinic for evaluation and treatment. Further, her reported "tone deafness" predated that diagnosis, extending back to her childhood. Finally, this case provides an example of a collaborative diagnostic approach. More professionals, representing diverse fields, became involved as the problem became less clear.

Initial case history

The client was a 38-year-old African American woman who was raised in central Virginia. She first attended the clinic in the Fall of 1992, as a self-referral to improve the intelligibility of

her connected speech. Her presenting complaint revolved around her perceived mispronunciation of words. The primary assessment tool employed during the November, 1992 evaluation was the Templin-Darley Test of Articulation (Templin & Darley, 1960). Results of that testing indicated that the client's speech patterns contained substitutions and omissions characteristic of a dialectical difference rather than a specific articulation disorder. Because she perceived her dialectical speech patterns as a problem, she chose to enroll in treatment during Spring, 1993.

Additional case history information and results of testing

Early in the Fall semester, 1993, she was re-evaluated using the Templin-Darley Test of Articulation to determine the success and carry over from Spring, 1993 treatment sessions. The categorization of errors was essentially unchanged.

It was at this time that the client expressed the complaint of difficulty understanding her husband's speech. The clinicians who spoke to her husband reported that he spoke very distinctly, almost to the point of over-articulation. In addition, the client revealed that she had been diagnosed with Chronic Fatigue Syndrome approximately four years earlier. Her symptoms included difficulty remembering numbers and messages, flat affect, increased fatigue, and episodic dizziness related to sudden changes in body position. She stated that her family made fun of her because she could not discriminate between environmental sounds occurring on television or in reality, or between different environmental sounds (e.g., the doorbell and the telephone). Finally, she felt that many of her difficulties were becoming progressively worse.

Treatment sessions during the Fall, 1993 semester revealed that, although she had no trouble correctly placing and moving her tongue for the production of different vowels, she could not auditorily discriminate the difference between the vowels. It was recommended that a complete audiologic evaluation be scheduled.

Audiologic results. The audiologic evaluation was completed November 1, 1993. Testing revealed hearing sensitivity within normal limits bilaterally, normal tympanograms, ipsilateral acoustic reflexes present at expected levels, and excellent word recognition ability (see Table 1). A slight reduction in hearing sensitivity was noted for the right ear at 4000 Hz, possibly due to noise exposure during her ten-year employment at a sewing factory. Because of the client's

Table 1. Audiologic Results (thresholds in dB HL; word recognition presented at 40 dB HL).

	250 Hz	500 Hz	1 KHz	2 KHz	4 KHz	8 KHz	word rec.
right ear	0	5	5	10	25	10	100%
left ear	5	0	5	5	10	10	100%

expressed difficulty discriminating (vowel) sounds in the presence of normal peripheral hearing, she was scheduled for a central auditory processing evaluation two weeks later.

The Staggered Spondaic Word Test (Arnst & Katz, 1982) was administered first. The results, presented in Table 2, revealed that the client had no difficulty with words presented in isolation; but, that she experienced great difficulty whenever competition was present, regardless test ear.

Table 2. Results on the Staggered Spondaic Word Test.

Condition	Corrected Error Scores
right non-competing	0%
right competing	8%*
left competing	12%**
left non-competing	0%

* ~4 standard deviations below the mean ** ~3 standard deviations below the mean

The Staggered Spondaic Word Test can be interpreted as a test of central auditory processing ability, or as a site-of-lesion test. In the former case, the interpretation appeared to support many of the client's complaints (e.g., problems with articulation, frequent confusion, and difficulties with short-term memory). In the latter case, the findings suggested a lesion in the non-auditory reception areas of the brain, located anteriorly in the fronto-parietal or anterior temporal areas.

The Pitch Pattern Sequence Test (Pinheiro, 1977) was also administered because of the client's complaints of "tone deafness" and difficulty differentiating notes on a piano. We used the children's version of this test, which is normed for children up to nine years of age. In spite of the simplicity of this test, the client was unable to successfully perform the task--even on the two-tone learning trials. She was simply unable to distinguish the high tone from the low tone.

Because of the difficulty observed on the Pitch Pattern Sequence Test and the client's complaints, we administered the Sound Effect Recognition Test (Finitzo-Hieber, Gerling, Matkin, & Cherow-Skalka, 1980). Although this test was designed to be administered to young children with severe hearing impairments, the stimulus items on this test appeared to address the client's complaint regarding difficulty identifying environmental sounds (see Table 3).

Table 3. Results of the Sound Effects Recognition Test, presented at 45 dB HL through earphones.

Form	Ear	Number correct	Stimulus/incorrect response
A	binaural	8 / 10	train/knock
			children playing/television
B	left	10 / 10	(no errors)
C	right	7 / 10	airplane/?-car crash
			alarm clock/telephone or typewriter
			water run from faucet/flushing toilet

We concluded that the client indeed had difficulty processing auditory information. It was recommended that she continue to receive treatment through the clinic, and that she return to her family physician to determine the etiology of her problems.

Information processing assessment. Prior to the end of treatment during Fall, 1993, the Ross Information Processing Assessment (RIPA) (Ross, 1986) was administered. Although this instrument is typically used to evaluate patients with closed-head injuries, it was chosen because the SSW results suggested a possible right-hemisphere deficit (see Table 4).

Table 4. Results on the RIPA. Percent correct is based upon raw scores only.

Subtest	Skill evaluated	Percent correct
I	Immediate memory	60%*
II	Recent memory	100%
III	Temporal orientation (recent memory)	100%
IV	Temporal orientation (remote memory)	100%
V	Spacial orientation	60%*
VI	Orientation to environment	--not administered--
VII	Recall of general information	90%
VIII	Problem solving & abstract reasoning	--decreased--*
IX	Organization	60%*
X	Auditory processing & retention	80%*

* lower than the expected score on this subtest

Based upon her performance on the RIPA, this client's severity rating was "moderate." From observations during treatment, from results of testing, and from case history, it was apparent that this client had many characteristics in common to persons having a right hemisphere deficit (Lane & Molyneaux, 1992). These common characteristics included difficulties in the following areas : discrimination of vowel sounds; recognition of pitch and tone; map reading and drawing; recognition of environmental sounds; recognition and expression of emotions; disorientation in space; organization of information; and flat affect.

Medical referral

Because of what we perceived to be mounting evidence suggesting possible cerebral disorder, we referred the client to her primary care physician with a recommendation that magnetic resonance imaging (MRI) be considered. The client received an MRI in February, 1994. The results, reported by the radiologist, indicated "no intra or extra-axial mass lesions ... , no abnormally enhancing lesions ... , no evidence for white matter disease." The radiologist's clinical impression was an "essentially unremarkable MRI of the brain with a partially empty sella." Although this sounds ominous, the physician assured us that it was normal.

Comment

This case presents an interesting exposition of a central auditory processing deficit. Except for a very mild high frequency hearing loss in one ear, this client had normal peripheral hearing sensitivity. When auditory information was presented unilaterally, the client had little apparent difficulty processing the information. However, in the presence of a competing message or when the task involved identifying the source of a sound, the client had significant difficulty. Further, when the task involved discriminating pitch, the client was unable to perform.

These findings may or may not be related to the presence of chronic fatigue syndrome. In an recent article, Trace (1995) quoted Dr. Steven Bornstein, University of New Hampshire, as saying "(CFS) is a systemic illness in which the auditory system is affected." Although no data were presented, Dr. Bornstein reportedly found significantly poorer performance on behavioral tests of central auditory dysfunction among subjects with chronic fatigue syndrome than among a group of normal controls.

This case report and the anecdotal findings reported by Trace point out the need for greater awareness of potential problems associated with this syndrome. More detailed investigations need to be conducted to describe any relationship between chronic fatigue syndrome and central auditory processing. Gathering detailed case history information works only if you ask the right questions and know what to look for. As recently pointed out by Mencher (1995), etiologies are

rapidly changing. Perhaps we need to begin asking about chronic fatigue syndrome in our history taking.

One potentially fruitful area of future research may be an analysis of speech production among those who suffer chronic fatigue syndrome. This woman presented for treatment of a dialectal difference and was found to have substitutions and omissions characteristic of that complaint. Perhaps a more careful examination of her speech patterns might have revealed something else.

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