

## LACE (Listening and Communication Enhancement)

Listening and Communication Enhancement (LACE) is an interactive computerized training program that is home-based, self-paced and individualized. It is designed to improve listening and communication skills by actively involving patients in the hearing aid fitting process, building confidence, and providing effective listening strategies.

While hearing aids can help one's ability to detect sounds, they do not affect other important factors in the brain's ability to understand — listening, communication, and comprehension. Enhanced listening skills lead to better comprehension and communication and vice versa.

When most patients receive a therapeutic device, such as an artificial limb, they are given physical therapy to help them learn to adjust. The same needs to happen with hearing aids. If patients do not learn how to use their brains to listen and "fill in the gaps" that hearing aids can't provide, hearing aids benefits may be minimized. LACE can develop skills and strategies that can help patients compensate for those limitations.

### How does LACE work?

LACE has been shown to improve listening skills and speech understanding in difficult situations in a large room. By using individualized computer training, LACE overcomes many of the limitations of traditional therapy. Computerized training has been proven effective for visual and cognitive therapy.

For four weeks, a user spends a half-hour, five days a week working with the computer program at home to help enhance listening skills. The user gets immediate feedback regarding correct comprehension and can monitor his or her improvement from the beginning of therapy.

LACE provides a variety of interactive and adaptive tasks that are divided into three main categories: degraded speech, cognitive skills and communication strategies.

For degraded speech exercises, speech is either time compressed to simulate rapid speech or presented with background babble noise or a single competing speaker. The difficulty level of the task is based on the accuracy of the person's response to the previous task. The patient listens to and identifies the signal, then sees the correct response on the screen. If he or she understands correctly, the next sentence will be a little more difficult, or if he or she was incorrect, the next sentence will be easier. For rapid speech, the ratio of time compression changes in a similar adaptive manner, minimizing boredom and frustration.

LACE also gives stimulating training exercises to enhance auditory memory and speed of processing, two elements of listening that are particularly important in noisy environments. Also, LACE presents interactive communication strategies.

In addition to the immediate feedback for each task, LACE provides the patient with a graph depicting daily progress and improvement from the start of the training. Furthermore, the results of the training are tracked and electronically transmitted to a secure Web site accessible by the audiologist so that the progress and any needed modifications in training can be implemented.

LACE was conceived of by Dr. Robert Sweetow, professor of otolaryngology and director of audiology at UCSF. Sweetow developed it with Jennifer Henderson-Sabes and Monica Miller of UCSF, and Gerry Kearby, Earl Levine and Rob Modest at NeuroTone, Inc.