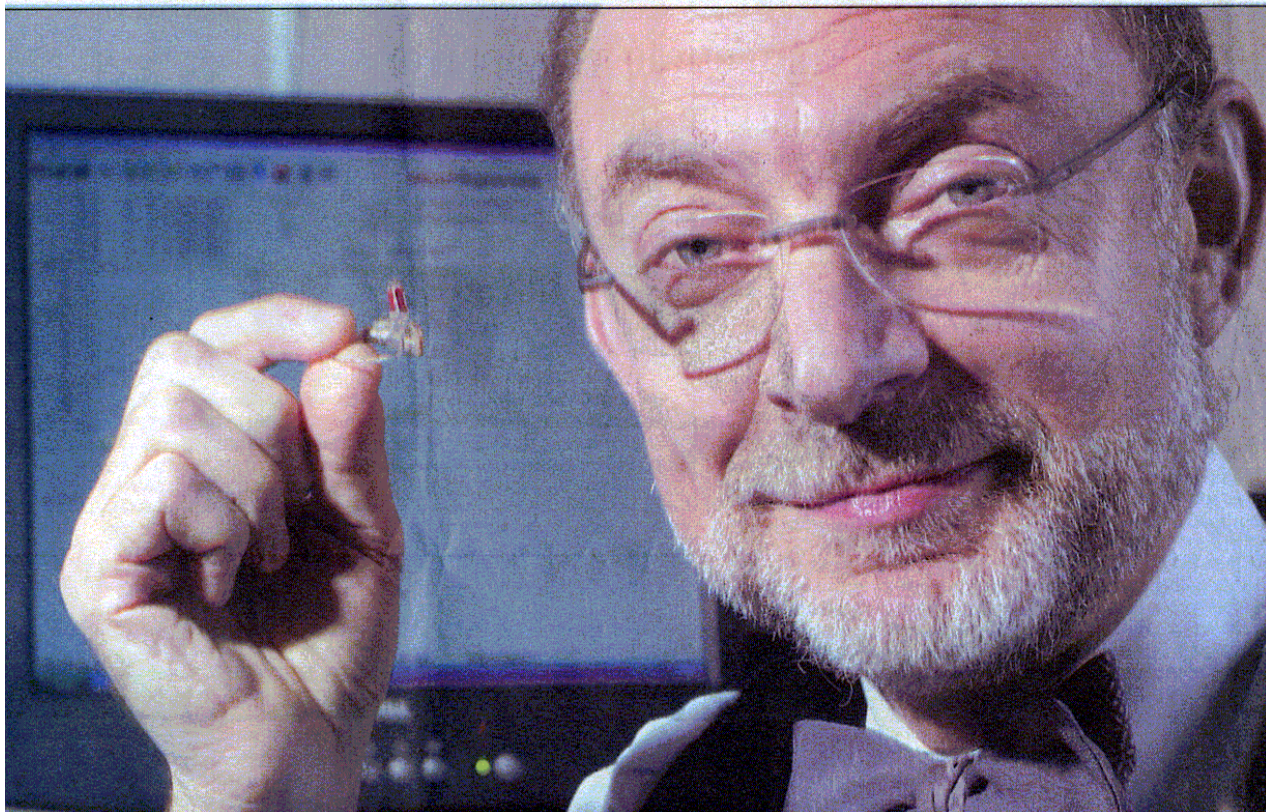
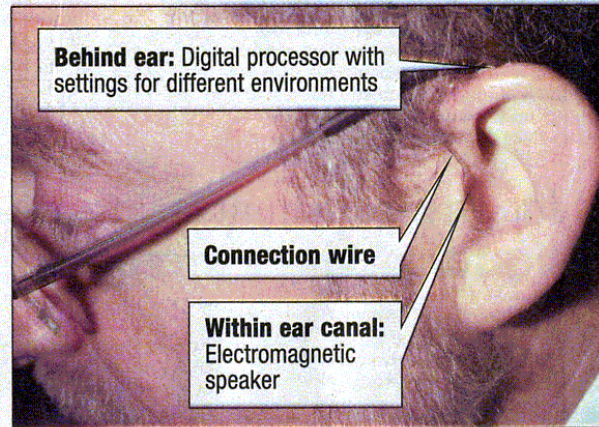


# Lend an ear



Audiologist Natan Bauman, founder and director of the Hearing, Balance and Speech Center, holds his new hearing aid device, the Vivatone, which is so small it leaves the ear canal open, leading to more natural sound amplification. Top, Bauman models his design.

By Abram Katz  
Register Staff

Perhaps the biggest reason people refuse to obtain hearing aids is cosmetic.

They don't want their ears filled with plastic. Appearance is important, but the hard of hearing often give up because their expensive little amplifiers aren't doing a good job.

Now Hamden audiologist Natan Bauman has the solution to both problems. His new Vivatone hearing aid is so small that it is virtually invisible. And because of its diminutive size, the instrument does not fill and block the ear canal. The result is less discomfort and more natural hearing.

Bauman plans to take the Vivatone national and already is working with manufacturers.

About 25 million Americans experience some degree of hearing loss, from trouble understanding speech in a crowd to losing ocular connection to the surrounding world.

The market for hearing aids should be expansive, but only about 2 million sets are sold a year in the United States.

More units will start moving soon as life — and loud noise — catches up to baby boomers.

"I used to see people in their 60s. Now people in their 50s are complaining. It could be in the 40s for kids who listen to loud sounds," Bauman said.

Noises we're all exposed to — sirens, smoke detectors, lawn equipment — are aggravated by earsplitting concerts, decibel-crazy discos, high-powered audio systems, and perpetual use of headphones.

We're born with about 25 percent more hearing capacity than we need to perceive sounds perfectly,

Bauman said. Squander that and you start damaging delicate bits of anatomy in the inner ear that cannot be re-grown or restored.

"In general, the environment is noisier. Music is louder. People listen through earphones more than through the radio," Bauman said.

Hearing starts at the eardrum and ends in the cochlea. There, thousands of tiny hairs stand waiting for sound waves.

When the minute pressure of sound hits the hairs, they sway back and forth. Nerves connected to the hairs carry the signals to the brain's hearing center.

We're all born with about 20,000 of these hairs per ear. Unlike real hair, however, once they break or fall out, they do not re-grow. The louder the sound, the more vigorously the hairs are bent back and forth, Bauman said.

A sufficiently loud noise will bend and break hairs immediately. At times the hair is jerked so violently that it is torn off its base.

Fortunately, the hair cells are durable and bend to sound for decades.

Even normal use catches up. If you bend and unbend a paper clip repeatedly, it will eventually break. An analogous process happens to the tiny hair-like projections in the ear.

This is why hearing gradually declines as we age. Bauman said that about one-third of the population at age 60 could benefit from hearing aids. Around half of 70-year-olds need them, and by 80 virtually everyone requires them to hear, he said.

## Audiologist offers alternative to traditional hearing aids

Sometimes damaged hair cells continue to send messages to the brain, which interprets the impulses as noise. The result is a constant whining or droning called tinnitus. Most people experience some degree of tinnitus as they age, as well.

Hearing aids have become so small they can fit entirely in the ear canal. However, this is not optimal, Bauman said.

The hearing aid plugs the ear, creating what audiologists call "insertion loss." Often a person wearing hearing aids also experiences an effect called occlusion. This makes the wearer's voice sound different to himself. The effect is like the head being in a barrel. No one else hears this, but it can be disturbing to the hearing aid wearer.

Because of insertion loss, normal hearing aids are designed to boost higher frequency sounds.

As we age, we lose the ability to hear high-frequency consonants, which is why normal speech starts to sound like mumbling, Bauman said.

Adding volume to high frequency sounds accentuates this loss, making it harder for the person wearing hearing aids to discern speech, especially in a crowd.

Bauman's hearing aid does away with insertion loss because it does not fill the ear canal. The minuscule speaker is so small that the ear does not register its presence, Bauman said.

The wearer can hear better because his ears are not clogged and there's no need to amplify higher frequencies to compensate for insertion loss, Bauman said.

The hearing aid has a tiny guide

wire that keeps the speaker from slipping out of the ear. The hearing aid produces very little sensation.

Unlike other hearing aids, the amplified sound travels directly to the eardrum and is not guided through a tube.

"The speaker is in the ear with no additional plumbing," Bauman said. "The speaker is electromagnetic," just like normal radio speakers, except extremely small.

Small is acceptable because the speaker is not required to make loud noise, he said. Production models of the hearing aid will have even smaller speakers.

The speaker is connected to a battery and circuitry that fits unobtrusively behind the ear. A digital processor has four "memories," or settings suitable to different environments. The wearer can switch by pushing a button on the device.

Obviously, the best alternative is to maintain good hearing as long as possible.

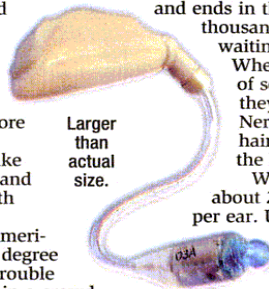
Bauman suggests wearing ear protectors in loud environments. The sponge type fills the ear and is effective up to a point. If the protector can attenuate the noise by 15 to 20 decibels and the person is in a 120-decibel concert, he will still be exposed to a damaging 100 decibels.

The Vivatone will cost about \$1,500 apiece for analog and \$2,500 each for digital. Other manufacturers charge between \$3,000 to \$5,000 list price for one hearing aid.

Bauman advises against putting off getting hearing aids. The less the brain hears, the less it is able to hear. Hearing parts of the brain can atrophy, causing preventable hearing loss.

If you notice or suspect hearing loss, consult your physician.

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Larger than actual size.