SEPTEMBER 2011 HEARING SOLUTIONS MEETING

FROM THE BEGINNING TO HEAR AND NOW

PART I OF II

EARLY HEARING AIDS

http://beckerexhibits.wustl.edu/did/19thcent/index.htm

TODAY'S MAJOR HEARING AID MANUFACTURERS PRODUCE 90% OF ALL HEARING AIDS

- **Siemens (Rexton-Miracle Ear-Kirkland)**

Siemens was founded in 1847 with HQs Germany. Siemens is the largest supplier of hearing aids in the world. In 2010 they attempted to sell their hearing aid division for $3B with six bidders but decided to stay in the business. **Rexton and Kirkland**, are subsidiaries of Siemens, which is a 50 year old US company with HQ in MN which distributes hearing technology worldwide and markets a full range of hearing aids with an emphasis on affordability and as a result is an alternative to top brands. **Miracle Ear** is a re-branded subsidiary.

- **Starkey (Micro-Tech-Omni-Audibal-NuEar)**

Starkey is the largest US Company with headquarters in MN was founded in 1967 by William Austin. Starkey has a worldwide workforce of over 4000 and is the largest supplier of digital hearing aids in the USA. **Micro-Tech** is a US company with HQ in MN that emphasizes value and is know for its forward thinking is owned by Starkey.

- **Phonak- Unitron (Owned by Sonova Holding Gp)**

Phonak is a Swiss company with UK HQ in Warrington where ear products are molded. Phonak is a world leader of FM solutions and children fittings alongside of adult prescriptive digital hearing aids.

Unitron has a place with the global leaders and share the same state-of-the-art facilities along side Phonak. Unitron features the **SEVERE TO PROFOUND 360 AIDS WITH 141dB SPL POWER BOOST WITH A PEAK GAIN OF 82dB SPL**

- **Oticon (Share Hq's with ReSound)**

Oticon is a Denmark company founded in 1909 by Hans Demant. Mr. Demant's initial desire was to simply help his hard of hearing wife to lead a better life. Today Oticon is one of the largest suppliers of Hearing Aids in the World.

- **ReSound (Bernafon-Beltone) (Share Hq's with ReSound)**

ReSound is a Denmark company founded in 1876 and the ReSound group now ranks among the top 5 hearing aid manufacturers in the world with distributors in seventy countries and currently employing 4500 people worldwide. Resound recently acquired **Beltone**. **Bernafon** (60 global distributors) and **Oticon** (20 countries and 80 global distributors) share the same HQ in Switzerland. Bernafon was founded in 1946 and the smaller of the two but are the same level in terms of technology.

- **Widex**

Widex is a second generation family owned Denmark company in existence since 1956 that has a patented wax guard system, made the first digital in-the-ear hearing aid and their first hearing aid was a pocket watch model. Widex is one of the 6th largest companies with over 3,000 employees.

SMALLER NOTABLE US MANUFACTURERS

- **Puretone**

Puretone is a British company in business since 1976 and world leader in **tinnitus devices**, in-ear-monitors, noise protection, and hearing aid accessories alongside digital hearing aids. They are the first company to offer rechargeable in-ear hearing aids.

- **Sonic Inovations**

Sonic is a US company located in Utah with international offices and manufacturing centers in 30 countries across the globe. Sonic is one of the fastest growing worldwide cutting edge distributers.

- **SeboTek**

SeboTek is a smaller privately owned US company with HQ in Tulsa near Oral Roberts University. SeboTek is a religious driven fast growing company with the first ever patented RIC technology designed to reduce fitting and servicing expense.

- **Audiotoniq**

An emerging start up company based in Austin, TX scheduled to introduce a revolutionary self testing system and it's first fully contained rechargeable battery and personally programmable hearing aid in early fall 2011. Touted as a premium hearing aid it will be marketed for $900/aid.

- **Hear Source**

A new on-line personal programmable hearing aid provider based in Pensacola, FL offering a line of digital hearing aids manufactured in US at a cost of $995 each which comes with free self programming software and on-line coaching support M-F and $99 repair service for all major hearing aids.

COCHLEAR/BAHA IMPLANT MANUFACTURERS

- **Cochlear Americas**

Cochlear is a US company with HQ in Colorado. Cochlear has 25 years of research experience and provides a variety of implantable cochlear and BAHA hearing solutions in 100 countries and over 3,000 clinics.

- **Advanced Bionics**

AB began in 1993 as a US company with HQ in CA that became a sister company with Phonak in 2009. AB provides cutting edge implant technology and implantable hearing solutions in 50 countries.

HEARING AID MICROCHIP AND SPEAKER MANUFACTURERS

The largest manufacturer of hearing aid chips is ON Semiconductor.

Eighty percent of all speakers are made by one company that is pretty much universally accepted as the standard for microphone speakers.

HEARING AID MANUFACTURING AND MARKETING PROCESS

The process could be likened to the making and marketing of bread where bakers buy wheat, yeast and other ingredients and blend the combination into a core product. The core product is sold to assemblers who form it into different types and textures and wholesale the final product to retail sales outlets for consumption by the general public.

The major hearing aid manufacturers represent the "bakers" by purchasing the raw materials (speakers/microphones/micro processors/etc.) and producing the core product. Secondary manufacturers represent the assemblers who perform research and other stuff to differentiate the product from other similar hearing aid products for ultimate distribution to a network of Audiologists who "bundle" the product with servicing and their overhead for consumption by the general public.

Product costs at various levels is almost impossible to accurately determine but based on a number of corroborative facts suggested approximate prices are $100/aid out the door of the major manufacturers-$800/aid (possibly lower) out the door of the assemblers (secondary manufacturers)-$1,800/aid out the door of Audiologists after adding their cost of doing business including their servicing during the warranty period or life of the aids.

WHY DO RETAIL COSTS OF HEARING AIDS CONTINUE TO RISE WHEN SIMILAR ELECTRONIC PRODUCTS CONTINUE TO GO DOWN?

A reasonable guess might be the ever increasing labor intensive cost of doing business for Audiologists where economy of scale and volume is must less significant (less labor intensive manufacture costs distributed over millions of aids-high labor intensive Audiologist cost distributed over a several thousand clients.

Hearing Aid Technology and Features

The objective of hearing aids is to maximize speech understanding and sound quality.

In the 1990's the industry converted from analog to digital technology to manipulate the sound wave to advance the effectiveness of hearing aids resulting in the following features:

STANDARD FEATURES:

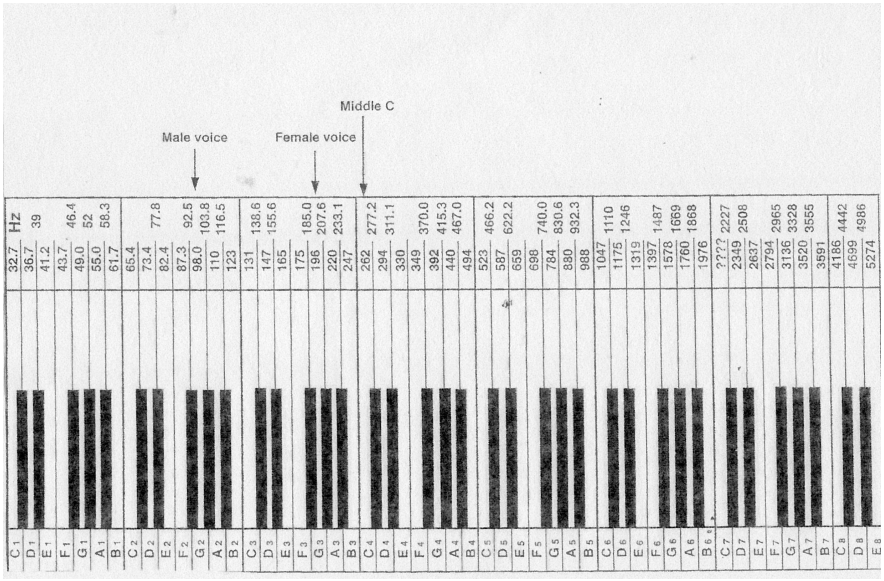
Feedback reduction (squealing)
The newest hearing aids have various versions of this very important feature that allows those with severe hearing losses to use open-ear technology and for not requiring an uncomfortable super-tight fit in the canal.

Noise reduction (not amplifying certain sounds under certain conditions)

While a noise canceling headset actually removes sounds identified as noise this feature merely compresses those sounds that it recognizes as noise such as a fan or air conditioner so that sound recognized as speech will be more prominent. Steady sounds are recognized as noise and fluctuating frequencies as speech.

Channels (affect operation of aids) and Bands (affect aids adjustment)

Channels: Visualize a grand piano keyboard with the ivory keys and sharp and flat black keys. Each key on the keyboard is a separate frequency channel and the keyboard itself represents the frequency spectrum or bandwidth.



Now imagine a small keyboard with fewer keys and a limited bandwidth. A more robust full bodied sound emanates from the grand piano.

A hearing aid with 8 channels divides up the sound into 8 sections-16 channels divides up the sound into 16 sections.

Channels are not adjustable by an Audiologist but Bands are.

Bands: Hearing aids can have one band or multiple bands for each channel and the Audiologist can fine-tune the bands to their patient's loss or preference.

Although it can be said that the more channels and bands the better It is easy particularly in noisy environments, Starkey did a study on how many channels are needed to maximize speech audibility and concluded that after 6 channels there was no improvement. Draw your own conclusion.

Directional microphones (helps locate where sound in coming from)
Directional microphones amplify sounds from certain directions more than sounds from other directions. A drawback is that directional technology can actually hinder the ability to understand speech. You can always opt to turn off (set at omni-directionality) the feature or create a separate profile (memory) where you have both options.

Sudden impact sound limiting (control of spiking noise)
A waiter drops a tray of dishes and you come out of your chair. This is why sound limiting is important. This feature is not prefect but very useful.

Wind noise limiting (deduces sound of air blowing across microphones)
This feature reduces the annoying sound of air blowing across the microphone by compression and frequency adjustment.

Zoom to Speech (compress noise to hear speech better)

Sounds that don't meet the manufacturer's criteria to be classified as speech don't get amplified as much as speech sounds. (Steady sounds=Noise Fluxuating sounds=Speech)

Automatic Integration (preset features vs. chip activating features)

Most of the standard features listed above are optionally automatically integrated with the computer chip making the decisions in one profile and/or with selected presets where you make the decisions in another profile.

TOP OF THE LINE FEATURES:

Remote Controllers

Not new but are getting smaller with more advanced capabilities. With hearing aids becoming smaller there is no longer room for switches and dials to change multiple memories (profiles). With remotes you can change volume, tone and select between multiple memories or programs each of which is designed to work best in a specific environmental setting (normal, noisy, music, telephone).

Looping (rooms, theaters, churches, personal neck loops)

Use of a thin insulated copper wire as a magnet to attract sound waves that can be wirelessly transferred to the hearing aid using an activated magnetic T-coil. A very effective method that, in effect diminishes competing noise outside the loop.

BlueTooth

This technology is probably receiving the most research and development than any other. Remote controllers are synced with a BlueTooth phone or other audio device. The remote then streams the signal wirelessly into your hearing aids. This technology is effective but is currently a pricey option compared to Looping.