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RECONFIGURATION OF PROFESSIONAL IDENTITY OF THE COCHLEAR IMPLANT WEARING PIANIST: PERCEPTION, REHABILITATION, PERFORMANCE

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Abstract
This study aims to explore the way in which medicine and technology can transform sensory challenges into a new form of expression. To a professional pianist with severe hearing loss, the cochlear implant offers the possibility to listen through memory, vibration, and emotion, thus discovering a new path to personal identity. A selection of studies and articles highlights the continuous and collective effort of medicine and technology to support not only auditory rehabilitation in speech, but also the reclamation of one's professional level from before the implant.

Keywords
cochlear implant; musical perception; auditory rehabilitation; neuroplasticity

Introduction

Considering the environment in which musicians practice their profession, hearing loss represents a constant vulnerability, regardless of age, years of experience, or accumulated training. The alteration of one's contact with sound (the accurate perception of pitch, timbre, and the subtle relationship between attack and resonance[2] means a rupture from one's own artistic identity.

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[2] L. Bruns, et al. Understanding music with cochlear implants. Sci. Rep. 6, 32026; doi: https://doi.org/10.1038/srep32026 (2016).

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The theme of this article stems from the question: in what way and to what extent is the relationship with music transformed when hearing is no longer the same? In fact, many of those we listen to and admire in concerts or recordings have faced medical issues; whether confronted with physical injuries or depression, they were forced to rebuild their technique, perception, and self-confidence. Investigating how a performer can reconstruct their relationship with music with the help of a cochlear implant thus becomes relevant for the artistic community.

At the same time, music is also a therapeutic tool used in the process of auditory rehabilitation and social integration of children and adults in the post-implantation period, regardless of whether they have studied music in the past. Thus, music does not constitute a privilege accessible only to those who embrace an artistic career, but a universal form of expression, a source of cognitive, emotional, and social development.

1. The cohlear implant

The cochlear implant is the most effective prosthetic method used in cases of severe or profound hearing loss. It consists of two components: an internal part, the actual implant surgically placed behind the ear, which contains an electrode array system, and an external part with a microphone that picks up sounds and transmits them via cable to the internal part.



Fig. 1.- External processor with microphone and batteries, worn above the ear, tied with a cable to the magnetic transmitter.[3]

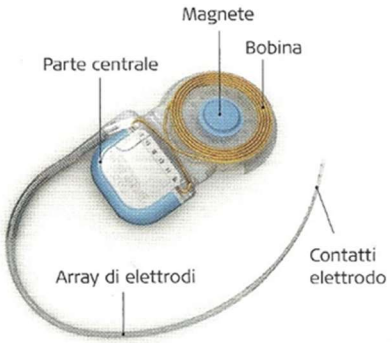


Fig. 2. – Internal part [4]

C. Lam, BCJ. Moore, M. Salorio-Corbetto, DA. Vickers. The Relationship Between Hearing Experiences, Music-Listening Behaviors, and Chord-Discrimination Abilities for Cochlear Implant Users. Trends in Hearing. 2022; 26. doi: https://doi.org/10.1177/23312165221143902.

M. Eitel, N. Ruth, P. Harrison,K. Frieler, & D. Müllensiefen. (2024). Perception of Chord Sequences Modeled with Prediction by Partial Matching, Voice-Leading Distance, and Spectral Pitch-Class Similarity: A New Approach for Testing Individual Differences in Harmony Perception. Music & Science, 7.

https://doi.org/10.1177/20592043241257654 (Original work published 2024).

[3] Source: https://therapyandwellnessconnection.com/insights/deaf-children-still-need-speech-therapy-even-with-cochlear-implants/ accessed on 16.01.2026.

[4] Source: personal leaflet provided by Med-el following cochlear implant surgery

Unlike a conventional hearing aid that merely amplifies sounds, a cochlear implant stimulates the auditory nerve, bypassing damaged hair cells and restoring lost hearing. The cochlear implant thus restores the functionality of the ear. However, regarding musical auditory perception, this represents a serious challenge for manufacturers and everyone involved in developing implants, as music is a more complex auditory stimulus than speech.

Dr. Charles Limb (director of the Cochlear Implant Center in San Francisco, California, a neurosurgeon, and himself a passionate musician) has conducted several studies to identify the limitations of the cochlear implant regarding music[5]. They found the following:

- music perception is generally poor, especially concerning pitch and melody;
- rhythm, on the other hand, is well-perceived, almost normally;
- timbre, tone color, and sonic subtleties are difficult to differentiate;
- the implant transmits limited spectral information, and the dynamic range is also reduced;
- music tends to sound dissonant;
- the sound feels metallic and robotic.

This is due to the fact that the 20-24 electrodes cannot compensate for the auditory refinement normally provided by approximately 15,000 hair cells.

And yet, many musicians who see their own language suppressed by hearing loss tend, in general, not to give up on music once they receive an implant, even though many of them are forced to interrupt their performing careers. They return, in one form or another, to practicing music. However, it may be necessary to reinvent and adapt the practice method, adjusting to the current reality.

First and foremost, one can identify both the weaknesses and vulnerabilities regarding piano playing after implant surgery, but especially the assets (for they do exist).

2. Limitations / Vulnerabilities:

- Hearing fatigue[6]: cochlear implant users suffer from auditory fatigue, known as hearing fatigue, due to the constant effort to identify sounds; practice is often limited to 2-3 hours due to a reduced capacity to focus over longer periods;

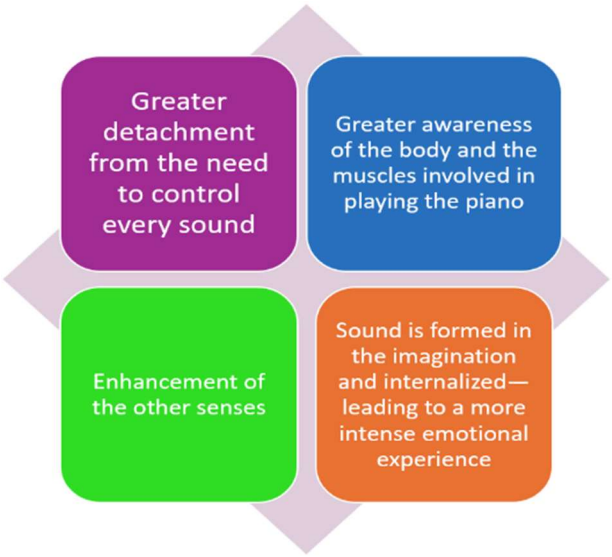
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[5] Charles J. Limb, Alexis T. Roy, Technological, biological, and acoustical constraints to music perception in cochlear implant users, (Hearing Research, 2014), Volume 308, Pages 13-26, ISSN 0378-5955, https://doi.org/10.1016/j.heares.2013.04.009 https://www.sciencedirect.com/science/article/pii/S0378595513001020

[6] Cato Philips, Laure Jacquemin, Marc JW Lammers, Griet Mertens, Annick Gilles, Olivier M. Vanderveken, and Vincent Van Rompaey. "Listening effort and fatigue among cochlear implant users: A scoping review." Frontiers in neurology 14 (2023): 1278508

- the need for external feedback;
- a higher degree of anxiety during concerts;
- difficulties in differentiating pitch, melody, and sonic subtleties (seemingly, these difficulties deprive music of its most beautiful parts: melody, harmony, color, beauty, and emotion).

Current Strengths:

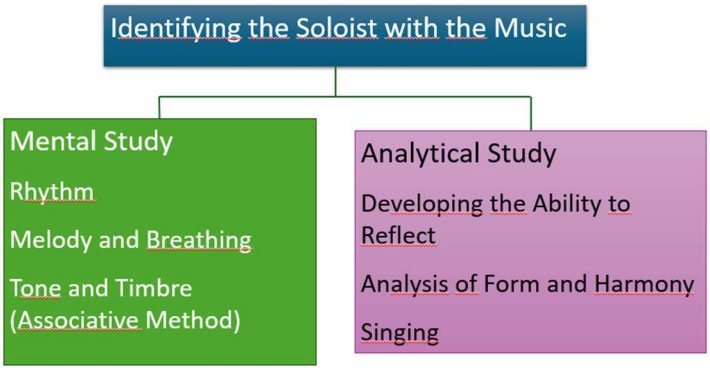


- rhythm becomes a compensatory anchor;
- greater detachment from the need to control every sound (no longer chasing perfection; the need for excessive control over sound can lead to self-sabotage);
- a better awareness of the body and the muscles involved in piano playing;
- the exacerbation of the other senses (the pianist develops a multimodal strategy: tactile, visual, as well as pre-implant auditory memory);
- because the sound is formed in the imagination, internalized, the emotional experience can be more intense than in the pre-implant period.

In his article *Currents and Trends in Modern Pianism*, Theodor Bălan mentions Rudolph-Maria Breithaupt (1873-1945, pianist, musicologist, pedagogue), noting that although Breithaupt emphasized the importance of hearing in the quality of pianistic interpretative performance, he did not elevate it to the status of a sound creator, but rather considered it a "controller of emission"[7].

[7] Theodor Bălan, „Curente şi tendinţe în pianistica modernă" (Currents and Trends in Modern Pianism), Muzica, Year XXIII, nr.4 (245), p.28-33

From this, we can again identify two directions in approaching individual practice: on the one hand, practicing away from the piano (score analysis, mental practice, finger exercises, etc.) and actual practice at the instrument.



3. Mental practice

Mental practice constitutes an optimal alternative for musicians with cochlear implants due to the reduction in concentration capacity, but also because distorted sounds can distract attention during practice. In fact, musicians with normal hearing also dedicate part of their time to practicing away from the piano.

Addressing the musician Marie-Madeleine Tschachtli in a letter, Dinu Lipatti writes:

> What can I tell you about interpretation? (...) I would summarize, perhaps imperfectly, in a few attitudes the path that, to me, seems to be the one that must lead us toward the truth. Let us seek to discover all the emotion of the work by singing it a lot, in different ways, before beginning to realize it technically. By saying 'singing it,' I am thinking primarily of 'singing it in the mind,' as if it were executed by the most perfect performer. After retaining the impression of absolute beauty that this imaginary interpretation has left us (an impression that we continuously renew, repeating the imaginary execution in the silence of the night), let us then move on to the actual, technical work, dissecting each difficulty into a thousand parts, to eliminate the physical and technical obstacle, not 'in bulk' but 'in detail'.[8]

...and in an interview granted in July 1950 to the Sottens radio station, Lipatti says:

[8] Grigore Bărgăoanu, *Metoda de lucru a lui Dinu Lipatti (Dinu Lipatti's method of practice)*, http://www.dinulipatti.org/metoda-de-lucru-a-lui-dinu-lipatti-ro-a42

> I don't strictly have a method. But obviously, I must establish a plan to ease and shorten the working period (...) I try to learn the work without touching the piano, as much as possible during the first weeks. In the case of a composition for piano and orchestra, in particular, this represents a great advantage, because one learns not only the piano part, but the entire ensemble.[9]

Neuroplasticity is a reality, and it is directly stimulated by repeated actions; thus, every repetition of a passage, whether correct or incorrect, will imprint itself into the motor memory. It is therefore highly important that, before sitting down at the piano for daily practice, one has a clear mind regarding fingerings, phrasing, arm movement, wrist position (*poignet*), the direction of the musical construction, breathing, etc.

However, the main concern of an implanted pianist, after a period of profound deafness, is returning to their previous technical level and recovering agility.

In pianistic literature, there are numerous volumes of studies dedicated to piano technique, e.g., Brahms, Liszt, Cortot, etc. Among them is a compilation of exercises based on scales and the 11 Russian arpeggios compiled by N. Shirinskaya, a Russian pedagogue and author of several materials for students (Ex. 1). These are designed to cover most of the positions and patterns used throughout solo and chamber music piano literature.

4. Several strategies for reintegration into cultural life:

- periodic contact with the audiologist for personalized adjustments to tonotopic map tuning;
- rehabilitation courses that include music therapy, preferably on an individual basis;
- individual practice using music rehabilitation programs (such as Meludia or Musi-CI); these programs are widely used by amateur and professional musicians, therapists, as well as speech-language pathologists; they allow for setting individual goals, choosing the type of exercises, and monitoring progress over time;
- individual or group instrument lessons;
- external feedback;
- active participation in cochlear implant (CI) support groups;
- identifying cultural associations for people with disabilities (for example: www.eucrea.de);
- identifying cultural institutions that organize concerts, opera, and theater performances equipped with assistive listening systems; these allow the implant user to experience a clearer, more stable sound, free from ambient noise;

[9] Ibid

- active participation or attendance at festivals and concerts organized by cochlear implant manufacturers (for example: *Sound Sensation*, *Beats of Cochlea*);
- participating in workshops presenting new accessories (external microphones, AudioLink, etc.) that can enhance the musical experience.



Example 1. - Excerpt from N. Shirinskaya's technical exercise book;
11 Russian arpeggios on the note C, with fingering, p. 85.
These are to be transposed chromatically into all major keys.

Conclusions

In conclusion, even though sound perception has changed, reclaiming one's musical identity and artistic life can become a reality even for musicians who have lost their hearing. This is made possible through collaboration with a multidisciplinary team composed of physicians, audiologists, psychologists, music therapists, and speech-language pathologists, but above all, through one's own effort, resilience, and adaptability.

Drawing upon personal experience, this article presents several practice methods that can be useful in the professional rehabilitation process. Thanks to the implant, hearing loss no longer signifies the ineluctable end of a career, but rather its reinvention.

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