

# Cochlear implantation in deaf children and adolescents: effects on family schooling and personal well-being

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Accepted 15 June 1999

## Abstract

The paper is an attempt to answer the main questions raised by that part of the deaf community which still consider cochlear implants (CI) an attack against the psychophysical integrity of the pre-lingually deaf. Methods: The psychological well-being of six adolescents and six children was assessed pre- and post-implantation using various tools, i.e. projective tests, assessment scales (AS), and structured interviews with parents and teachers. The analysis of post-implant findings shows a reduction of stereotype elements, more dynamic modes of figurative expression, quite good relationships within their own social environment and gradual, positive integration both at home and at school. Cochlear implantation would seem to cause no psychological disruption. Our sample group show an improvement in their modes of expression — more consistent with the mental and effective age — and a greater awareness of personal limits, together with the ability to judge the appropriateness of their own behavior. © 1999 Elsevier Science Ireland Ltd. All rights reserved.

*Keywords:* Psychology; Projective tests; Assessment scales; Deafness

## 1. Introduction

The assessment of both the psychological characteristics and the educational environment of profoundly deaf children, candidates for cochlear implantation, is common practice in almost all certified cochlear implant (CI) centres [1]. The main goals of such evaluation are:

- to avoid the non-use of the implant;
- to verify the presence of adequate educational resources;

- to verify the existence of cognitive, space-temporal and behavioral pre-requisites (along with the acceptance of limits and rules) and the basic requisites needed for the development of linguistic competence;
- to create a rehabilitation protocol tailored to the specific needs of each subject.

Non-use of the implant is an important element which points to the uneasiness induced by various factors, including non-acceptance from an aesthetic point of view or unpleasant sound quality of the implant [2].

The present study is an attempt to draw attention to the ‘secondary effects’ of cochlear implan-

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tation that is, not so much the direct influence of implantation on hearing and language performance skills, as on the psychological well-being of the subjects and their consequent integration in family and educational surroundings [3]. This should be stressed for two reasons: one, to answer the questions raised by that part of the deaf community who still consider cochlear implantation an attack against the psychophysical integrity of the pre-lingually deaf; and two, to assess the educational and emotional resources linked to CIs, considering that maladjusted behavioral patterns can heavily interfere with learning processes.

## 2. Materials and methods

Of the total group of subjects who received cochlear implantation in our centre (35, of whom 32 Clarion and 3 Med-E1 Combi Plus 40) 12 were selected for our study: six adolescents (12–18 years, four males and two females, all Clarion) and six children (4–9 years, four males and two females, four Clarion and two Med-E1).

All subjects underwent an accurate pre-implant assessment protocol, based on audiological, psychological, linguistic and educational data. After surgery they underwent regular fitting sessions, along with language performance and psychological tests to assess progress [4].

Since none of the standardized personality tests can cover all aspects of the personality alone, and owing to the extreme complexity of this field of investigation, we decided to use various tools for the definition of patient profile [5]. These include projective tests, assessment scales (AS) and structured interviews within two basic contexts.

### 2.1. Psychological well-being

#### 2.1.1. Projective personality tests

- Draw a man [6];
- draw a tree [7];
- draw a house [2].

#### 2.1.2. Self-assessment scales

- Emotional instability (EI);
- pro-social behaviour (PB);
- physical and verbal aggressiveness (PVA) [8].

### 2.2. Family/school integration

#### 2.2.1. Structured interviews

- With parents;
- with teachers at school (twice per year).

#### 2.2.2. Hetero-assessment scales

- Emotional instability (EI);
  - pro-social behaviour (PB);
  - physical and verbal aggressiveness (PVA) [8].
- As far as projective personality tests (PPT) are concerned — carried out pre-implant and once a year post-implant — the drawings were analysed taking into account the quality of the graphic aspect, the presence of symptomatic elements and the picture as a whole [9]. The following three AS are indicators of the child's ability to establish a good relationship with his own social environment:
- the EI scale measures the tendency of the child to experience states of uneasiness, insufficiency and/or vulnerability as an expression of insufficient emotional and behavioural self control;
  - the PB scale measures the extent to which the individual tends to offer help, to promote initiatives involving other people and to share personal objects and experiences;
  - the PVA scale measures the degree of aggressiveness, both physical (fights, assaults) and verbal (insults).

These tools (AS) were applied to subjects above 7 years of age, 1 year after implantation. In this context the use of self-assessment questionnaires brings to light the individual's awareness of the existence of possible behavioural problems, just as the use of hetero-AS (filled in by the parents, the teachers and the speech therapist) enables one to fit information within a specific context and to study the differences between how the child esteems himself and how he is considered by adults.

Finally, the structured interviewing sessions (IS) were carried out by the clinical psychologist who interacted with the parents and any other significant figure involved in the subject's well-being. In fact, discussions usually stressed interpersonal relationships, educational problems both at school and at home and emotional development. The sessions took place at least twice a year or more if particular problems arose.

### 3. Results

Results obtained from projective tests and AS have been compared to normative data (obtained on normal hearing children of the same age group) but have also been evaluated as intra-individual variation after one year of rehabilitation.

#### 3.1. Projective personality tests

The results obtained from these tests can be summarized as follows:

1. draw a man test: progressive transition towards an increasingly clearer sexual identification; expressions of various states of mind; normalization of the size of the figure of the human body (more active reaction to environmental pressures); gradual disappearance of stereotype elements.
2. Draw a tree test: constant reduction of stereotypes; correct placement of the drawing in relation to effective age; further specific elements (sawed branch, trunk/foilage proportions); gradual disappearance of superimposed elements e.g. fruit in the foliage.
3. Draw a house test: presence of a base line (contact with reality); correct proportions of the roof (mental elaboration); solid wall structures (well articulated psychological defence mechanisms); presence of doors and windows (availability for social relationships); various elements — closed gate, fence around the house, winding path — which can indicate the possible presence of difficulties in interpersonal relationships.

Therefore even though, over time, certain graphic elements — indicating the presence of problems

and specific characteristics — continue to be present, there is however a definite evolution of the modes of expression which become continuously more consistent with the subject's mental and chronological age. For example, in three of the subjects in our group, the sawed branch element — which generally indicates painful or even traumatic experiences in the past — was drawn in a more articulate manner integrating better with the rest of the picture. Another element, that is the proportion between the foliage and the trunk of the tree — which points to the relationship between reason and instinct — stays the same, even though what varies is the mode in which it is depicted (graphic elements become more detailed and harmonic). On the other hand additive and juxtaposed traits (fruit in the foliage, leaves on the branches in a very orderly and stereotyped manner), which are typical of drawings carried out by deaf subjects, are no longer present. It is interesting that those elements which represent contact with the outside world become progressively more numerous, complex and sometimes disorganized. Furthermore, in the 'Draw a House test', the house itself tends to be more contextualized (fitted within a specific landscape) and one can note the presence of elements that indicate on the one hand problems with interpersonal relationships and on the other an increase in personal defense mechanisms.

#### 3.2. Assessment scales

Average values of self- and hetero-AS have been compared to normative data obtained from normal hearing children of the same age group. The small numbers of subjects tested to date and the lack of a homogeneous control group only enables us to offer a description of basic scores.

It is evident that the mean data for implanted subjects both for the self- and the hetero-AS would seem to show no significant difference from that in normal hearing subjects (Tables 1 and 2).

Furthermore a greater difference in mean data can be seen between self- and hetero-assessment in our study group as opposed to that in normative findings (Table 3).

Table 1

Self-assessment scales: comparison of means and S.D.s for implanted and normal hearing subjects<sup>a</sup>

|                    | EI           | PB           | PVA           |
|--------------------|--------------|--------------|---------------|
| Normal hearing     | 19.12 (3.89) | 19.48 (2.68) | 15.54 (4.21)  |
| Implanted subjects | 21.16 (2.48) | 20.00 (1.63) | 17.17 (17.17) |

<sup>a</sup> S.D. in brackets.

This would seem to indicate a greater discrepancy between how implanted subjects evaluate their behavior and how in turn this is assessed by adults, in comparison to the tendency in the normal hearing group. However one variable that should be taken into consideration is the fact that these profoundly deaf subjects inevitably had fewer speech skills even though all the items used were previously illustrated to them and accurately explained.

### 3.3. Structured interviews

From the structured interviews with parents, teachers and/or speech therapists in this context, we will only mention the behavioural traits of the implanted children which they believe to be directly linked to the use of the implant.

Children: tell lies, answer when called, ask why, are able to wait, are more attentive.

Adolescents: answer when called, take part in discussions, are interested in what happens around them (home, school), want explanations, greater respect for rules, play around with peers, offer solutions, are more constant.

Table 2

Hetero-assessment scales: comparison for means and standard deviations for implanted and normal hearing subjects<sup>a</sup>

|                    | EI           | PB           | PVA          |
|--------------------|--------------|--------------|--------------|
| Normal hearing     | 18.51 (5.90) | 19.29 (3.87) | 13.12 (5.00) |
| Implanted subjects | 18.24 (4.45) | 18.57 (2.60) | 14.80 (2.26) |

<sup>a</sup> S.D. in brackets.

## 4. Discussion

From the analysis of findings it is evident that cochlear implantation causes no psychological disruption. On the contrary, even taking into account the differences due to personal experiences, the drawings show up a constant reduction in stereotype and mechanically drawn elements. After implantation it became evident that there was a greater tendency to place the main figure within a specific context, using richer details and more dynamic modes of expression; at the same time there were some graphic elements which indicated lack of order and difficulty in interpersonal relationships. This last mentioned finding can be considered a positive factor since it indicates a greater awareness of personal limits and confirms that the subject is beginning to take note of various new aspects of reality [10].

The results for the Assessment Scales showed that the implanted subjects were able to adapt to changing situations almost as well as normal hearing subjects. The greatest discrepancies between normal and implanted subjects was however to be found in how the subjects evaluated themselves and how they were considered by the adults. In fact the children in the study group tended to consider themselves more inadequate and vulnerable in comparison with the assessment given by teachers and parents. This could be attributed to the characteristic under-esteem typically found in deaf subjects. Furthermore, feelings of insufficiency and vulnerability are typical of adolescents who, in our study group, made up the majority (75%) as opposed to the composition of the control group where they were only 24%. However our results indicate that even implanted adolescents are good judges of the appropriateness of their own behavior.

The future development of a normative group that also includes deaf children and the increase in the number of subjects in our study group will enable us to elaborate a more significant statistical model.

The information obtained during structured interviews has enabled us to follow up the gradual and positive integration of implanted children at home and at school. Indication of active adapta-

Table 3

Comparison between mean data for self- and hetero-assessment scales in implanted and normal hearing subjects

|                    | EI    |        | PB    |        | PVA   |        |
|--------------------|-------|--------|-------|--------|-------|--------|
|                    | Self  | Hetero | Self  | Hetero | Self  | Hetero |
| Normal hearing     | 19.12 | 18.51  | 19.48 | 19.29  | 15.54 | 13.12  |
| Implanted subjects | 21.16 | 18.24  | 20.00 | 18.57  | 17.17 | 14.80  |

tion can be seen in the fact that these children show annoying behavior (tell lies, making excuses, making a lot of noise) which is, however, typical of their age group and as such is to be considered 'normal'.

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