

# **THE ACQUISITION OF ENGLISH AS A FOREIGN LANGUAGE IN CHILDREN WITH COCHLEAR IMPLANTS**

## **LA ADQUISICIÓN DEL INGLÉS COMO LENGUA EXTRANJERA EN NIÑOS CON IMPLANTES COCLEARES**



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**ELENA DEL CAMPO LADRERO**  
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**HISPÁNICA**

**TUTORES: Antonio Benítez Burraco**  
**Juan Gabriel Vázquez González**

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## **ABSTRACT**

The invention of cochlear implants has had a huge impact in the Deaf community's daily life. Although these people have still an auditory loss and might have problems, such as difficulties to understand some words with similar pronunciation or impediments in order to listen to someone's speech, owing to surrounding noises; this device has also multiple advantages, mostly in education, for instance, a lower dependence on visual support or lip-reading, an improvement in oral and written expression and even the possibility of receive bilingual education. With this study, we want to discover if implanted children have syntactic, morphological or phonological obstacles when they learn English as a foreign language. For finding this, and using a sample of eight children between 7-17 years old, a questionnaire has been realized by their teachers in order to know which obstacles appear in the different parts of linguistic and despite of having found different difficulties in each child, wearing a cochlear implant, except one case, has not been a problem for children in order to learn English.

Key words: bilingualism, cochlear implants, kids.

## **RESUMEN**

La invención de los implantes cocleares ha supuesto un gran cambio en la vida cotidiana de la comunidad sorda. Aunque estas personas siguen teniendo pérdida auditiva y pueden presentar problemas, como por ejemplo: dificultad para entender palabras con similar pronunciación o impedimentos a la hora de entender un discurso, debido al ruido que puede rodearles; este cambio también ha tenido múltiples ventajas, sobre todo en lo que a educación respecta, tales como una menor dependencia del apoyo visual y de la lectura de labios, una mejoría en la expresión tanto oral como escrita o incluso la oportunidad de recibir una educación bilingüe. Con este estudio se pretende averiguar si niños implantados tienen obstáculos sintácticos, morfológicos o fonológicos, a la hora de aprender inglés como lengua extranjera. Para ello, y utilizando una muestra de ocho niños de edades comprendidas entre 7-17, se ha realizado un cuestionario a cada profesora con intención de conocer cuáles son aquellos obstáculos en las distintas partes de la lingüística, y a pesar de que se han encontrado dificultades distintas en cada niño, que lleven un implante, excepto en un caso, no ha sido problema para que aprendan inglés.

Palabras claves: bilingüismo, implante coclear, niños.

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## 1. INTRODUCTION

As the Confederación Estatal de Personas Sorda (2013) affirms, the group of Deaf people is diverse. Several factors influence in the classification, on the one hand those related to the kind of deafness: place of the lesion, moment of the apparition, the degree of loss hearing and on the other hand those related to the individual (age, social, familiar and educational context...)

In Spain, Deaf people possess different methods of communication, hence, in some cases, Spanish or Catalan sign language is the first language (L1) whereas for others oral language is the L1, and sometimes Deaf people dominate both, sign and oral language. Of course, there are users of hearing aids or cochlear implants (CNSE 2013).

The number of implanted people in Spain has been increased since the first surgery was performed in 1985. Currently, there are 14.500 implanted users (according to the data from 30 December 2016), and more than 40 centers which carry implementations through, thus, cochlear implants are not something from the future but from the present (Federación AICE, 2015).

It is necessary here to explain some concepts that are relevant within the aim of this study. Firstly, we are going to define what a cochlear implant is, secondly, the benefits and risks of the surgery and thirdly, the factors and precautions that people have to take into account.

### 1.1 Cochlear implants

FIAPAS (2013) defines cochlear implant as “as a transducer which converts acoustic signals into electric signals and the latest stimulates the auditory, vestibular nerve and produces an auditory sensation in the implanted person” (p.108, own translation).

There are different types of cochlear implants:

These types are classified according to three criteria: the place of electrodes (intra-cochlear or extra-cochlear), the number of channels (single-channel or multiple- channel) and the manner of treating the acoustic signals (if there are or are not an extraction of the different formants of the sound). Another classification is according to the place of electrodes inside the cochlea (lateral or perimodiolar) the method of stimulation (pulsating, consecutive, monopolar, bipolar) and the manner of transmission of the signals in terms of skin (percutaneous or transcutaneous connections). (FIAPAS, 2013, p. 108, own translation)

Cochlear implants are not only a surgery operation but also a recovery program is needed. The triumph would be possible with a correct election of candidates, an effective surgery, an adequate rehab, a close coordination among specialists, who integrate the program, and the maintenance of the internal and external components from the cochlear implant (FIAPAS, 2013).

Regarding specialists, and according to FIAPAS this team has to be formed by:

- An otorhinolaryngologist who will make an essential examination.
- An expert in otoneuroradiology who studies bones and the state of the auditory system temporally.
- An audiologist and an audioprosthesis technician who assess if the patient achieves the criteria in order to be implanted.
- Psychiatrists and psychologists. These experts select the candidates and follow the patient throughout the whole process (before and after the implantation).
- Speech therapists. Their job depends on patients' age, but in general, they analyze the capacity of comprehension of the language (in terms of sounds, words, and sentences).
- A unit of people who check the implant's programming.
- A unit who provides technical support for the maintenance of the implant.
- A coordinator who informs about cochlear implants. Families have to be conscious of the range of possibilities from the beginning of the process and during the whole patient's life: there may be both, thrilling or modest progress. (FIAPAS, 2013).

## 1.2 The benefits of cochlear implants

Some years ago, when early cochlear implants do not exist, a considerable amount of mistakes, on the basis of oral and written expression, were committed by Deaf people. The majority of them were not able to relate or describe in a precise manner. In some cases, relatives and even specialists could not understand what hearing-impaired individuals conveyed (FIAPAS, 2013).

By contrast, nowadays early cochlear implants have astonishing results caused by the technological advances and research carried out. These new generations are absorbed in an aural culture with less dependence in visual learning.

The FDA (Federal Food and Drug Administration, 2014) states specific profits:

1. Cochlear implants allow people to hear from low sounds to loud ones:

People report that they can perceive different types of sounds, such as footsteps, slamming of doors, sounds of engines, ringing of the telephone, barking of dogs, whistling of the tea kettle, rustling of leaves, the sound of a light switch being switched on and off, and so on. (FDA, 2014)

2. Implanted patients can understand speech without the necessity of lip-reading. In case that this would not be possible, the implant helps them to read lips.
3. Making and understanding phone calls are highly possible.
4. Perceiving music: someone singing or the sound of some instruments.

## 1.3 The risks of cochlear implants

However, all the previously benefits might be impeded by a number of risks due to the surgery. These risks can be divided into minor and serious complications. Related to the first ones and according to FIAPAS (2013) patients might suffer transitional facial

paralysis, gustatory disturbances, tinnitus, attacks of dizziness, seromas, etc. Belonging to grave hazards, subjects may undergo meningitis, or the flap and erosion of the subsequent wall from the external auditory canal.

Furthermore, it is a widely held view that implanted people are not deaf, but in fact, they are still deaf; cochlear implants relieve but they do not eradicate deafness. Those who are implanted do not get a normal hearing, they have to develop lip-reading, they may confuse sounds or words (puente, fuente/ fun, gun), and have some difficulties in order to understand speech when they are surrounded by noise or if two or more people speak at the same time. Moreover, cochlear implants are not an automatic system, in other words, the acquisition of the language is a slow process, it takes 36 months to perceive speech efficiently and even this effectiveness has its limits. Disorders as dyslalia, anomaly which makes people pronounce an amount of phonemes incorrectly (Caraballo. A, n.d), or difficulties as agrammatism: inability to form words correctly, modifying them (inflection) and also when the subject suppresses words of grammatical content as prepositions, articles, etc. (FIAPAS 2013), can appear during preschool and primary school. When they have to use new terms, words with double entendre or technical expressions, sometimes, they feel quite insecure. Relatives must stay alerted since an excess of confidence may appear when children have acquired colloquial language; nonetheless, the hard part is the acquisition of abstract functions of language. Children might decrease their efforts and parents do not realize it. It is a process of constant evolution (FIAPAS 2013).

#### 1.4 Factors which affect the results

There is some evidence to suggest that some factors can provoke an improvement in patients. Firstly, the duration of the deafness, if an auditory deprivation is detected prematurely, the surgery will be performed earlier and, consequently, the patient will achieve gratifying effects. Another factor related to time and deafness is the appearance of the loss of hearing, postlocutive adult patients (deafness arises after language acquisition is consolidated, FIAPAS 2013) are highly likely to show more favorable results than prelocutive adult patients (deafness emerges before the appearance of language, FIAPAS 2013) since postlocutive adults have an aural memory which facilitates them how to



interpret voiced information sending by the cochlear implanted. The third factor is the motivation: the impulse given from the family, specialist and from oneself is a key to rehab and learning. Other factors are: if the patient has used hearing aids before the operation, if they have a good lip-reading, the existence of a normal cochlear anatomy, the use of advanced strategies of stimulation or a standard function of the nervous system (FIAPAS 2013).

Moreover, it is highly recommended to teach sign language not only to CIs patients but also to every child since sign language:

1. Increases children's communicative abilities, the achievement of oral language and their IQ.
2. Reduces the level of child's frustration.
3. Strengthens cognitive and psychomotor development, control of space and visual attention (Algueró, n.d) & (Madrid Contigo, 2016).

## **2. JUSTIFICATION**

The choice of this theme started by the fascination with sign languages, specifically, LSE (Lenguaje de Signos Española), a visual and spatial channel of communication that people are not used to it. It as a full language , that possesses a rich and typical grammatical structure which involves the configuration of hands (its movements, its orientations, and its spatial place) and the no manual elements such as labial, facial and lingual movements. This language is neither universal nor mime, and it is not a representation of the oral language (as people tend to think) they are two languages independently, on the one hand, it is true that people who do not know anything about sign languages can guess the meaning of some signs because they are iconic signs, but on the other hand, the majority of signs are indecipherable unless you know sign language (Sierra, 2012).

We have focused on bilingualism due to its multiple benefits: apart from better job and learning opportunities, bilingualism or multilingualism means learning new cognitive strategies; realizing that our mother tongue is only one way of representing our reality and our personal experiences; connecting with other cultures and respect them (Ardila, 2012).

And even as noted by Seachrists (2014): “Studies around the world show that bilingual people start showing the symptoms of Alzheimer’s disease about 5 years later than monolingual people” .

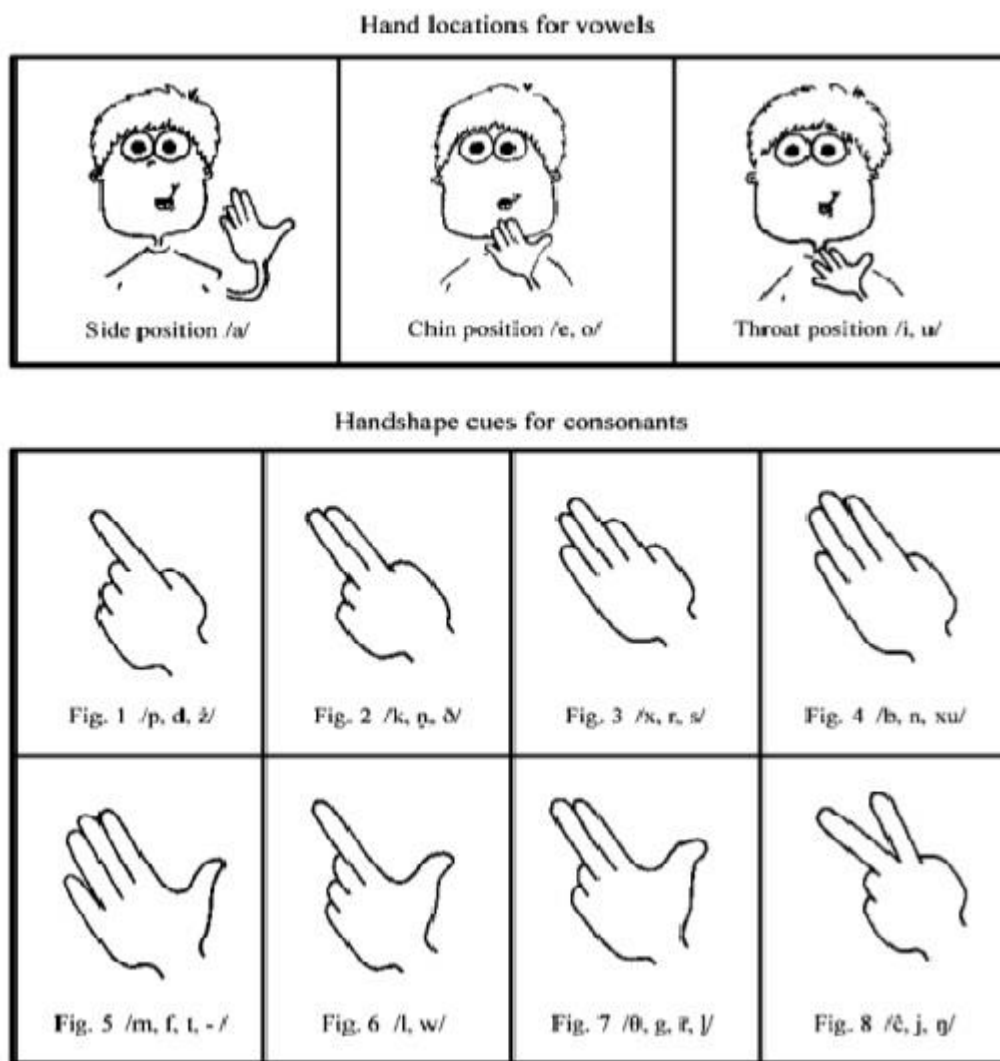
Since the invention of cochlear implants and hearing aids, Deaf people decide to use these electronic devices, consequently, the first topic of study, which was going to be focused on the acquisition of English as a foreign language in Deaf children who cannot hear and whose main mean of communication is sign language, had to be dismissed in view of the small cases that there are currently. Hence, we decide to choose a study of the acquisition of English as a FL (foreign language) in deaf children who use cochlear implants, and although some implanted people are exempted of learning, in particular, English, others are able to speak two or more languages and even they have done official languages exams as Cambridge or Trinity. This was a push to investigate more about this theme and to discover if the barrier of communication between Deaf people and normal hearing people has vanished.

Nevertheless, before the creation of cochlear implants or if Deaf people decide not to wear CIs, the bilingualism is quite different. We can find two types of bilingualism:

1. When Deaf people learn two different sign languages.
2. When Deaf people learn sign language and oral language.

Focused on the second type, we find that the most common methodology used is the bimodal language, meaning, signing the word and pronouncing it at the same time. Sometimes, cued-speech is also included, this method consisted in supplementing lip-reading, in order to reach this, lip-reading is combined with eight different hand configurations which can be placed in three different positions close to the face. These configurations, for instance, allow deaf children to identify consonants through the position, shape, and movement of the hand whereas vowels are located according to the articulation of the configurations. Simultaneity between mouth and hand is needed, and it is important

to mention that cued speech is a phonetic system that represents what is heard or spoken not written (Belloch, 2014) ; (Gotzens, 1992).



Spanish version of Cued Speech from Torres & Ruiz (cited in Moreno-Torres & Torres, 2008)

### 3. OBJECTIVE

The aim of this study is to obtain data about English language acquisition in deaf Spanish children fitted with cochlear implants.

To reach this target, we will base on several articles and a quantitative research (questionnaires). From the data obtained, we will observe some issues for implanted children when they are acquiring their second language (English), checking that some

difficulties are the same for normal hearing kids. Finally, we will dispel some myths about bilingualism in implanted infants.

After the searching of bibliography, the scarce studies about the acquisition of English as a foreign language in Spanish implanted patients have underscored the necessity of research which encompasses these themes.

#### **4. THEORETICAL FRAMEWORK**

##### **4.1 Acquisition of the first language in children with cochlear implants (CIs)**

During the first stages of language learning, a child discovers, through acoustic representations regularities that show him grammatical rules of spoken language. This provides children a framework for the later acquisition of language. Owing to deaf children's late diagnosis, "deaf children typically must be painstakingly taught language instead of the experience-based acquisition language that characterizes typical development" (Markman, et al.,2011).

According to Szagun (2006), the development of a language in children with cochlear implants differs from the acquisition by normal hearing kids in a number of important ways. Both produce sounds which are not recognized as words (vocalizations), however, in the case of cochlear implants users, their vocalizations are more frequent, more varied and last longer than in normal hearing infants. Regarding the method of pronunciation, as normal hearing (NH) children, cochlear implants users commit deviations from adults' models, although, in the last ones tend to be more perceptible. Szagun observed a notable difference between NH and CI learners: cochlear implants recipients imitate more recurrent what they hear around themselves; some research indicate that at the beginning of the acquisition, almost the 30% of recordings related to the oral production are repetitions, this could be because cochlear implanted kids are asked to repeat constantly. Finally, the individual differences among children with cochlear implants are widely biggest than those in normal hearing children. It has been reported that there are three groups: a first one formed by those with a quick development in the language, a second one which integrates

infants with slow advancement and a third one which includes children with a remarkable slow progress.

#### 4.2 Phonological production

Szagun (2006) & Wermke (2016) claim that babies show a preference for their mother's prosodic, it might be possible since infants:

Having had ample opportunity to become acquainted with their “mother language” in their mother's womb during the last third of pregnancy, neonates exhibit in their crying characteristic melodic patterns influenced by their environment – precisely by the language spoken by their mother –, and that even before they coo their first sounds or try out speech-like “syllabic babbling. (Wermke, 2016)

This find seems to be especially obvious in tonal languages (as Mandarin or Lamnso), “where pitch and pitch fluctuation determines the meaning of words”. This discovery would explain how infants, at the age of 6-10 months are able to pronounce long vowels sounds and to combine a vowel and a consonant producing syllables, this phase is called: babbling. Though in this stage, these sounds are not referring to an object or person, specifically, considering that children have not developed yet a capacity to communicate intentionally. Knowing that this stage (babbling) is the first step for a person in order to learn how to talk, it may explain the delay in the phonological field for children with cochlear implants who start to babble at the age of 12-25 months.

The study of Madrid & Moreno-Torres (2014) provides a basis for knowing the phonological progress in children with CI. Firstly, they expound a possible reason for the impairment in babbling: children's habitual surrounding tends to use less frequently language and when it is used, the utilization is poor. However, Ledeberg & Spencer (Cited by Madrid & Moreno-Torres, 2014) highlight that, these days, there is not an association between babbling and the successive linguistic skills: if an implanted baby babbles early, this does not mean that the subsequent language learning would advance swiftly. Nonetheless, according to recent reports, the invention of cochlear implants have contributed positively to the phonetic- phonological acquisition, since despite being a

slower process compare to normal hearing learners, irregularities vanish as time goes by (Moreno-Torres & Moreno 2008).

Madrid & Moreno-Torres (2014) have analyzed the phonological variations in cochlear implants recipients: In regard to these users, undoubtedly, they possess a domain of voiceless plosives /p,t,k/ and nasals /m,n,ɲ/, quite the contrary, laterals, taps and thrills /l, ɾ, r/, voice and voiceless fricatives /f,θ,s,x, ʝ/ and approximants /β, ɸ, ɣ/ are a difficulty. In spite of being the same results from normal hearing children, these have a major percentage of right realizations. Within syllabic level of CI infants, omission from syllabic (atonic and tonic) margins predominate whereas simplification of consonantal groups and epenthesis scarcely appear. In the level which affects the whole word phonologically, CI infants commit, mostly, inconsistencies and metathesis. In the suprasegmental aspect, the manner of articulation seems to be the responsible of digressions in the phonemic pattern. Dodd (Cited by Madrid & Moreno-Torres, 2014) asserted that it happens as the place of articulation is visible on the lips while the manner of articulation and sound are perceived by acoustic signs which are limited by implants.

Madrid & Moreno-Torres' research (2014) based on Fernández, L.I & Cano L, P. (Cited by Madrid & Moreno-Torres, 2014) have confirmed that implanted children make omissions from both syllabic margins, atonic and tonic and specifically in the consonants /n/, /l/, /r/ (uyár instead *lugar*) whereas in normal hearing infants this is not appreciated. In the case of NH child, they omit consonants like /p, t, k, b, d, g/ owing to, surely, their scant appearance in the Spanish language. What is curious is that omissions of plosive consonants (/umbeáño/ instead of cumpleaños or /wãñitos/ instead of gusanitos) emerge despite the fact that those consonants are acquired at an early age.

Bouton et alii (Cited by Madrid & Moreno-Torres, 2014) found notable differences between NH children and CI users about their categorical perception, in other words, the process of identification of phonological contrast. E.g. Place of articulation, acoustics, etc (Madrid & Moreno-Torres, 2014) and categorical precision, meaning, the effectiveness achieved when sounds are perceived (Madrid & Moreno-Torres, 2014). The first ones reach

during their first twelve months of life the categorical perception whereas categorical precision happens during the whole childhood and even during part of the adolescence. As regards CI children, they have a similar achievement as NH kids of the categorical perception while the development of the categorical precision differs slightly from NH children due to restrictions of the implant.

After reading these studies, there is some evidence to suggest that phonological distinctive features and the irrelevant gaps between both groups of kids may disappear at the same time that technology of cochlear implants improves.

#### 4.3 Lexicon in CIs users

In a comparative study with an implanted Spanish child and two typically developing (TD) Spanish children, Moreno-Torres & Torres (2008) found that CI girl, Blanca, produced more lexemes than NH children. Additionally, the three infants produced almost the same number of verbs. Nonetheless, CI girl produced prominently more nouns.

Irrespective of these differences found during the first 12 months of CI use, the girls was making significant progress: “In 12 months of auditory experience, her development seemed similar to that of 18-month old NH children” (Moreno-Torres & Torres , 2008, pp.503-504). Moreover, the results from this study suggest that lexicon and phonetic progress increased over the next year (13-24 months of CI use) whereas grammatical progress was slower.

#### 4.4 Grammar in CIs users

Moreno-Torres & Torres (2008) analyzed the results and claimed that implanted girl, Blanca:

Started to use all forms of the definite article (el, la/las, los: the) and the singular masculine form of the indefinite article (un:a). The more frequent forms were ‘el’, ‘la’ and ‘un’. The feminine indefinite article (una:a) was used very occasionally, and mostly as part of songs or fixed phrases. A similar pattern was observed in the two NH children. (p.502)

Nevertheless, differences in terms of using indefinite and definite articles between NH and CI children were found:

Both NH children seemed to acquire first the masculine/feminine opposition, while in the deaf child the first opposition was definite/ indefinite[...], the article ‘un’ is more frequent in Blanca (38%) than in NH children (13% NH1 and 16% in NH2). [...] Close examination of error types showed that Blanca had a marked preference for masculine forms. She often used a masculine article with a feminine noun. In both NH children the opposite pattern was found. (Moreno-Torres & Torres, 2008, p.502)

Moreno-Torres & Torres (2008) explain that mistakes made by the implanted girl related to using masculine articles (specifically, ‘el’ mistakes since errors with ‘un’ were constant through the year) with feminine nouns increased in the second half of the year, thus, both authors argue that the reason might be that during the first half of the year the girl was memorizing the combination of the article + the noun.

Regarding grammar, this study suggests that Blanca shared similarities with NH children in terms of the acquisition of articles, they produced the most common articles (‘un’, ‘la’, ‘el’). The main difference is the one related to the errors between the mixed genders of articles and nouns.

On the one hand, based on this study we cannot generalize about CI children’s linguistic advancement but on the other hand, these findings are the point of departure for future research.

#### 4.5 Stimulating children

Szagun (2006) observed that parents can provide not only negative effects yet also positive results. For instance, if parents supply a stimulating conversation whose content would be rich and related to their kids’ interests, these little speakers will acquire language sooner. The findings indicate that parents must avoid saying persistent repetitions of common and stereotyped expressions like: “Por favor”, “Buenos días” or “Gracias”. Never must parents make hypercorrections, using a strong stress in syllables or prolong vowels,



because of this, the natural melody of sentences are destroyed. By contrast, progenitors, when they are maintaining a play with their child at the beginning of the acquisition, they should wait for their children's reaction instead of pronouncing to them a series of phrases time after time; when children speak more fluently but commit any mistakes, then, parents could show how are clauses correctly through repetitions (this last advice is exactly what parents of normal hearing children have to do) or expansions, meaning, when you take the words your child says about what they see and do and repeat them while adding in missing words/grammar (Yeh, 2011). Some examples of these extensions are:

- Repetitions with a correct pronunciation:  
Kid: Cocholate.  
Mother: Chocolate, sí.
- Repetition with a correct pronunciation and a correct grammar:  
Kid: Perro come.  
Mother: Sí, un perro está comiendo.
- Repetition after correcting the grammar  
Kid: Yo andé mucho.  
Mother: Yo anduve mucho.
- Repetition with an addition of a correct grammar and extending content  
Kid: Pájaro vuela.  
Mother: ¡Sí! El pájaro está volando muy lejos.

Szagun (2006) makes recommendations about stimulating the development of a language in cochlear implants recipients; these suggestions are: keeping a natural communication, they do not have to over-articulate, although, occasionally they must speak slower. Assessments and demands to children are not allowed. As we have claimed before, repetitions can produce a negative effect, however, paraphrasing the message keeping the same content are a helpful resource:

Example: Playing with a boat

Mother: Un barco.

Mother: Un barco que navega en el mar

Mother: Esto es un barco.

Mother: que navega por el mar.

Mother: por el mar, navega.

Another suggestion is asking questions which inquire information, these are commonly called: five Ws and one H (Who, What, Where, When, Why and How). These kinds of questions require children to generate more speech; besides, these questions permit the conversation continues. (Szagun, 2006)

At the end, Szagun (2006) talks about the role of signs and lip-reading, asserting that both are helpful for children and not pay attention to signs means that you are rejecting communication and, therefore, you teach your baby to refuse it too, consequently, infants might try to communicate rather less, besides, no using lip reading suppose a delay in children's language acquisition. This interpretation contrasts with that of Nittrouer, Lowenstein, & Holloman (2016) who argue that "The morphosyntactic structure of sign language is different from that of spoken English. [...] having early exposure to sign-language morphosyntactic structures can inhibit the learning of English morphosyntactic structures" (p.156). They conclude that: "sign language negatively affected morphosyntactic skills for spoken language" (p.144).

Another stimulation according to Moberly, Lowenstein, Nittrouer (2015) is: "A period of early bimodal stimulation provides a benefit to early language acquisition for children undergoing cochlear implantation. These early benefits translate into later benefits in phonemic awareness, working memory, expressive vocabulary, and reading ability" (p.29).

#### 4.6. Bilingualism

Opinions about learning a second language in very young children are contradictory. Some skeptic experts argue that second language interferes in the primary language

precipitating language impairments. Furthermore, code-mixing (alternation between L1 and L2) is erroneously considered a reason of worry since adults may think that the child has difficulties in separating the linguistic system of languages, but, in fact and as Mark Guiberson (2013) explained, this behavior is common in bilingual people: “code-mixing is seen across levels of L1 and L2 proficiency, and even fluent L1 and L2 speakers code-mix” (p.9).

Unfortunately, as Guiberson (cited by Hinojosa, 2017) explains, an 80% of parents believed that bilingualism would be beneficial for their implanted children but only a 38% chose oral bilingualism and 35% of families were discouraged by professionals who said that bilingualism would be so difficult for a child with hearing loss, owing to fake believes.

Talking about professionals, many clinicians and educators have decided to dispirit pediatric cochlear implants recipients to learn a second language. These experts believe:

Because normal-hearing children were assumed incapable of mastering two languages without negative consequences, they believed that a second oral language might surely confuse deaf babies whose auditory and language learning systems were already compromised and would precipitate further delay in oral language acquisition of the primary language”. (Waltzman et al, 2003, p.758)

Professionals should review their mistaken believes which are limited parents in order to benefit their deaf children with a bilingual education. As Hinojosa (2017) tells, many studies have demonstrated that high levels of efficiency in learning a second language for CIs users are possible or that the exposure of a second language at home is not detrimental to the learning of the mother tongue.

Regarding parent’s fear like:

1. Bilingual children have a different linguistic development than monolingual kids. It is proved that for infants who are exposed to several languages at an early age, might take more time to be able to speak and to build complex structures due to a large amount of absorbed information.

2. Receptive language appears before expressive language because children receive the information, then, it is adjusted in the brain and finally, infants convey their knowledge. Consequently, during the beginning stage, bilingual children mark slower in standardized tests because receive and expressive language are not hand in hand (Hinojosa, 2017).

These are temporary and depend on several factors. As Genesee concludes (Cited by Waltzman, McConkey, Green & Cohen, 2003): “Any language impairment found in bilingual children is not because of “the simultaneous acquisition of two languages” (p. 757)

Finally, the John Tracy Clinic provides some advice for parents (who must be the main children’s cornerstone) to give the best bilingual program, and its benefits, to their children:

1. The minimum percentage of language exhibition has to be a 20% if we want children to understand and learn that language, yet if parents look for bilingualism and fluency to change from L1 to L2 or more, the percentage must be a 30%.
2. Bilingualism as a familiar target.
3. Revise expectations.
4. Choose strategies for the exhibition of each language.
5. Monitoring of the learning process.
6. Share achievements.
7. Being tenacious with your child.
8. Create gratifying experiences in the second language (trips, campsites, foreign students at home, music, movies, etc.).
9. Assessment: Every year the implanted child has to be tested with exams which must be similar to the ones using in the country belongs to the L2, L3, etc. Another option is looking for a speech therapist who speaks the different languages that the implanted child is learning. Pragmatic is important

considering that children can pass tests without having fluency in conversation (Hinojosa, 2017).

To sum up, neither professionals nor parents should deprive implanted children of learning English or any other language because it includes numerous cognitive and social benefits.

## **5. METHODOLOGY**

The conception of this project has started with the search of numerous articles in order to obtain general information about cochlear implants and the acquisition of languages in users of those devices.

Firstly, information about how the theme is studied currently was compiled. At first, the search was focused on what a cochlear implant provides, then, a specific exploration was made to collect data about linguistic development and bilingualism.

The database used was: Google Scholar (<https://scholar.google.com/>) , National Center for Biotechnology Information (<https://www.ncbi.nlm.nih.gov/>), Dialnet (<https://dialnet.unirioja.es>), Researchgate (<https://www.researchgate.net/>) or BUHgle (<http://rabida.uhu.es/dspace/handle/10272/11666>) or in websites like Confederación Estatal de Personas Sordas (<http://www.cnse.es/>), Federación de Asociaciones de Implantados Cocleares en España (<http://implantecoclear.org/>) or T-oigo ([http://www.t-oigo.com/main.lasso?-session=\\_TOC:547AA79F0ce512D087WjUs863DFF](http://www.t-oigo.com/main.lasso?-session=_TOC:547AA79F0ce512D087WjUs863DFF)). The key words employed during the search were: deaf children, cochlear implants, bilingualism, acquisition of language, Spanish cochlear implanted kids, bilingüismo, implantes cocleares, among others.

Due to the lack of articles related to the acquisition of English as a second language in Spanish children, we decided to make a questionnaire to teachers who teach English to implanted kids in order to determine what are the main differences in contrast to normal hearing infants and the main obstacles for implanted kids about learning a foreign language.

For making this possible, we made contact with the association of parents with implanted kids in Huelva and with English teachers from Huelva a Córdoba.

Questions included in this questionnaire have been designed based on some studies, which we have mentioned before, that demonstrate linguistic problems in implanted children when they are learning their native language, Spanish in this case. We focus on morphological and syntactic problems, and of course on phonological issues, considering that these depend on acoustic signals.

However, the notion of making a survey or interview and trying to contact with teachers to request information about implanted children and to know the opinion of them has been complex. The attempts of communication have been limited: we only could talk with six teachers, four from Huelva and two from Córdoba.

### 5.1 Participants

Eight deaf children, five boys and three girls, between the ages of 7-17 years who had received a cochlear implant, served as research participants in this study. Four participants study in Cordoba, three of them in IES Luis de Góngora (12, 15 and 16 years old) and the fourth in IES Nuestra Señora de la Estrella (15 years old); and the other four study in Huelva, one in IES José Caballero (17 years old) and the other three in CEIP “Prácticas (7-8 and 11 years). Their teachers were responsible for answering the questionnaires about their students’ level of English. The duration of their English classes is 45 min or 1 hour, depending on the institution.

Despite of the fact that the subjects belong to a heterogeneous group between 7-17 years, the average of the level of English is between elemental-A1, only two of them (from different high schools and cities) have an A2 and A2-B1. All the participants and their normal hearing schoolmates have visual support during English class. Seven out of eight attend English classes with their normal hearing schoolmates; the only one who attends class alone is a girl because her cochlear implant is not working correctly. Moreover, only two of them (from the same school) have extracurricular English classes. Unfortunately, we

only could know the age of implantation of five participants, since neither their teachers, nor their interpreter knew this information.

## 5.2 Materials & Methods

For carrying out this study, a questionnaire, which involves questions about the four skills (speaking, listening, writing and reading), has been created *ex profeso*, based on three specific articles: *Development of 14 English grammatical morphemes in Spanish–English preschoolers*, *Should we teach children syntax?* and *Early predictors of phonological and morphosyntactic skills in second graders with cochlear implants*.

The questionnaire is formed by twenty three questions. The first seven questions are associated with the subject's socio-demographic data: age, sex, age of implantation, school, time of English each week, the level of English and if the student takes extra English classes outside the school. Questions two and three are addressed to know if the student has any knowledge of sign language, specifically LSE (Spanish sign language), and if it can be a problem for English syntax (a reason used for some author to argue that sign language causes language impairment in implanted children). Question four is related to neurology, in order to know if girls with cochlear implants have a quicker development than implanted boys, just like normal hearing students. Question five is only asked to know if we would obtain a comparison between NH students and CIs users which learn at the same class and with the same teacher. From questions six to sixteen we try to have a general idea of the level of normal hearing children and implanted children in each skills: question six asks for a general assessment, in a rate of 1 (very deficient), 2 (deficient), 3 (medium) 4 (good) until 5 (excellent), of NH infants and CIs users in the four aptitudes (speaking, listening, reading and writing), questions eight and nine are focused on speaking skills and if a visual support improves implanted student's speaking English (question seven too). Morphology is asked in question ten and eleven to check which morphemes are problematic to NH infants and CIs users. As for writing skills, we find question twelve, and question sixteen for reading skills. With reference to listening skills: questions thirteen, fourteen and fifteen. Finally, question seventeen is focused in syntax, specifically, in the kind of syntactic errors: interference errors, developmental error or unique errors.

## 6. RESULTS

### General Overview

As regards sign language, five know quite LSE whereas three do not know anything about signed language. From those who learnt signed language, two out of five, have issues with the grammatical order in English sentences. A third one, the girl whose cochlear implant does not work well, learns English through sign language.

To return to the previous point of visual support, the six teachers affirm that CIs have difficulties when they have to repeat sentences, without reading them, which have been pronounced previously by the teacher. Moreover, they also have to struggle pronouncing sentences without listening them previously, nevertheless, teachers emphasize that this also happens with NH students. Another similarity between CIs and NH kids is that both detect when teacher makes contractions, for example: *He's happy*, except the boy from IES Nuestra Señora de la Estrella and the children between 7-8 years since their teacher does not make contractions.

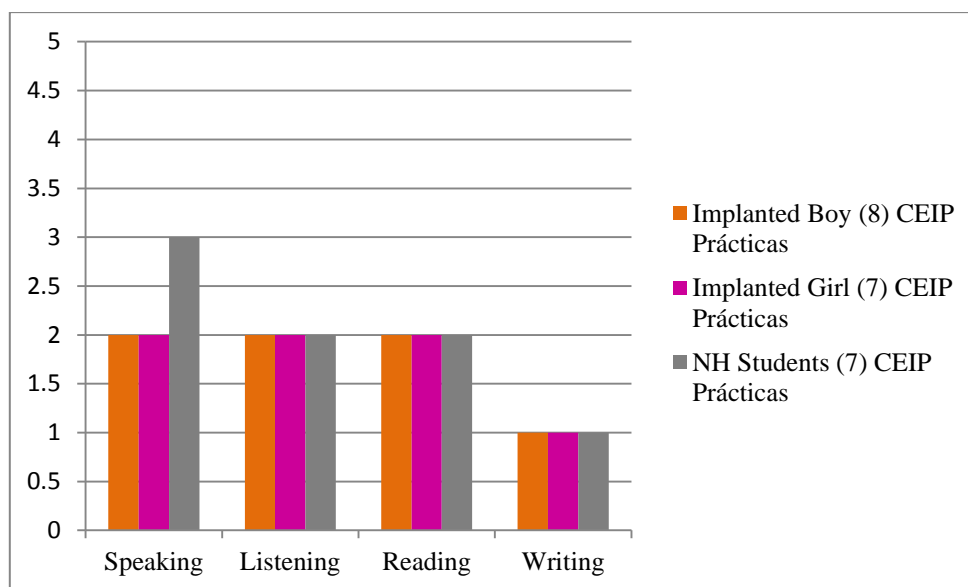
Lastly, all teachers affirm, irrespective of studies (Geers et al. claim: “in children with CIs, a comparable benefits of female gender is founds” (p.627) cited in Boons, et al., 2012), that girls do not possess a faster linguistic development than boys, it depends on several factors not only gender.

### **Students, 7-8 years old**

Regarding students' speaking, writing, reading and listening skills (question 6) , the two students who are in elementary school (7-8 years old) possess the same level as their NH partners, with the exception of speaking (see Table 1). However, we have to take into account that CIs users write and read only words, whereas NH classmates write not only words but also sentences.



Table 1. General Level of English (7-8 years old)



### Phonological problems

Owing to the students' age, questions ten and eleven could not be answered by the teacher because the level of English of these students is lower than the asked in these questions, however, she mentioned phonological problems, in particular with the pronunciation of alveolar plosives /t/ (/ti:/), /d/ /di:/ and the letter "c" /si:/; alveolar fricatives /s/ and /z/; between the voiced post-alveolar affricate /dʒ/ and the voiced velar stop /g/; with the voiced palatal approximant /j/, the voiceless velar fricative /x/ and with the similar pronunciation of "h" /eitʃ/ and eight /eit/. Talking of the misunderstanding of words with similar pronunciation but different phonemes (question thirteen) not only do implanted pupils have issues, but also normal hearing students.

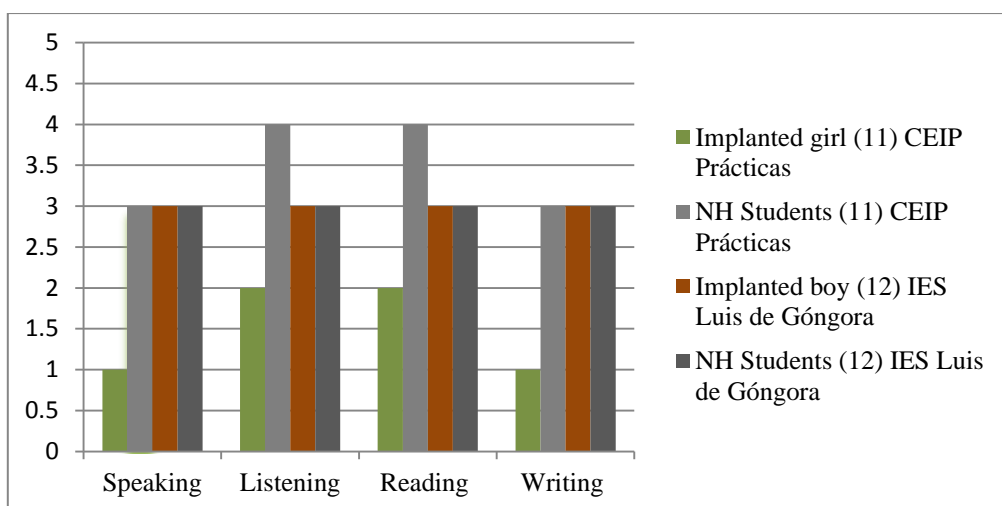
### Syntactic errors

Lastly, teacher explains that her implanted students commit developmental errors (typical mistakes when you are learning your mother tongue), in particular, the omission of the verb e.g. He hungry. Moreover, she adds that her students tend to use infinite verbs instead of conjugating them.

### Students, 11-12 years old

As for the girl and boy who are 11 and 12 years respectively; the boy has a medium level in each skill as their NH schoolmates. In the case of the girl, we observe a major difference between her and her fellow students. In all the skills, the implanted girl is two points below her classmates. Nevertheless, we have to explain that English subject is different from CI infants and NH kids: both CIs students only write words while their classmates write from words to brief texts. Focused on reading, the girl reads from words to simple texts (tales, brief stories) whereas NH students read simple and complex texts; in the case of the boy, he reads from words to complex texts as his NH schoolfellows.

Table 2. General Level of English (11-12 years old)



### Morphological problems

Due to the basic level of English of these students, teachers could not choose which morphemes provoke more confusion in them, nevertheless, implanted boy (12) IES Luis de Góngora's teacher claims that this implanted boy can learn the same structures as his NH schoolmates but maybe he needs a little bit more of teacher's attention, that is why this teacher answers that her implanted student is able to forming new words through morphological derivation (question 11) while implanted girl from CEIP Prácticas cannot, since she possesses a basic level.

### Phonological problems

Furthermore, both implanted students have problems with words of similar pronunciation but different phonemes, although in the girl's class, her NH schoolmates do not have this kind of obstacle.

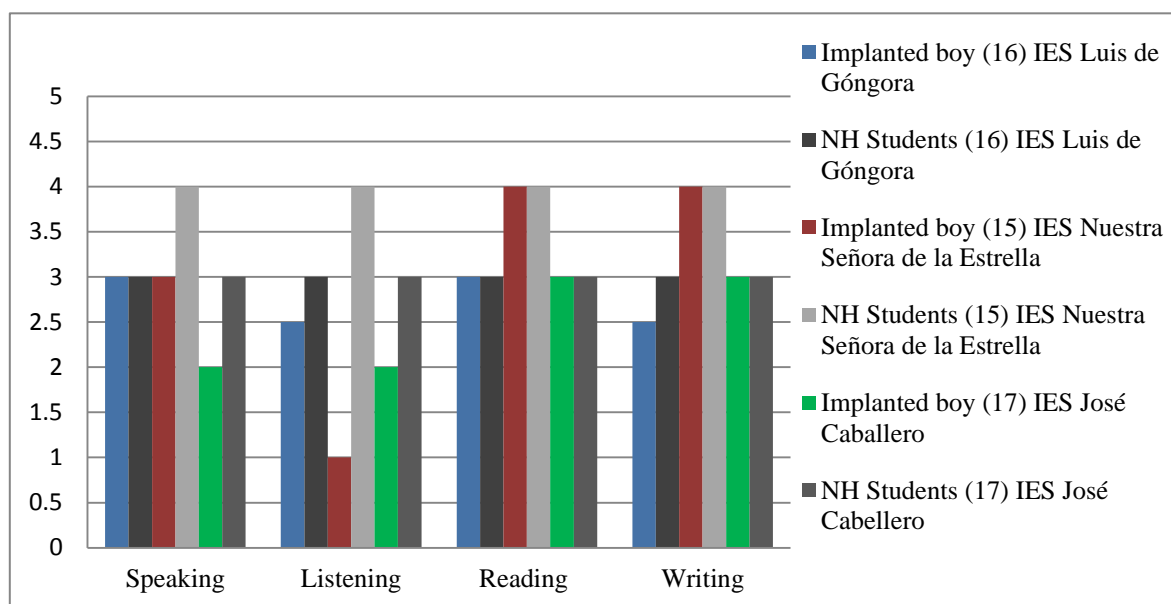
### Syntactic errors

Finally, regarding mistakes, the girl commits developmental and interference mistakes (interference between languages, in this case, Spanish and English) whereas the boy commits only interference errors.

### **Students, 15-17 years old**

Regarding students from 15-17: one of them, who does not appear in the table because, owing to the poorly working of her cochlear implant, she learns English through sign language and, as we mentioned previously, does not attend English class with her classmates. The standard of the student from IES Luis de Góngora is similar to normal hearing students, maybe a little bit lower in listening and writing skills whereas two out of four, are below their NH fellow students in speaking and listening aptitudes (the teacher from the implanted boy from IES Nuestra Señora de la Estrella explains that her student, strikingly, memorize the pronunciation of words and consequently, he can create brief dialogs). As regards English subject, its contents differ from CI students regarding NH kids; for instance, implanted boy from IES Luis de Góngora reads from words to complex texts, as his NH partners, although in terms of writing his NH schoolmates can write complex texts whereas he only can write brief texts; the same happens with the boy from IES Nuestra Señora de la Estrella in terms of writing, however, this boy does not read complex texts whereas his NH classmates do it. Only the older student (17 years old) and with the higher level (A2-B1) does the same writing and reading exercises as his normal hearing students do.

Table 3. General Level of English (15-17 years old)



### Morphological problems

Answers from questions ten and eleven are more diverse in this group, teacher from IES Luis de Góngora declares, as she said previously, that this implanted boy can learn the same structures as his normal hearing schoolmates but maybe he needs a little bit more of teacher's attention, that is why this teacher answers that her implanted student is able to forming new words through morphological derivation (question 11). Teacher from IES Nuestra Señora de la Estrella marked the same problems in CIs users and NH kids: 3<sup>rd</sup> person singular, auxiliary (is/am/are + ing) and irregular 3<sup>rd</sup> person. Finally, teacher from IES José Caballero's answers contrast with the others two teachers and with NH implanted boy's classmates. In this case, implanted student has difficulties with past tense (ed), possessive, irregular past tense, and irregular 3<sup>rd</sup> person, while NH pupils, despite of having problems with possessive, irregular past tense, and irregular 3<sup>rd</sup> person (as their CI schoolmate), they do not have problems with past tense although they commit mistakes with the 3<sup>rd</sup> person singular (morpheme which does not cause issues in CIs boy). As the implanted student from IES Luis de Góngora, the second and third implanted boys of this group can also forming new words through morphological derivation.

### Phonological problems

Regarding misunderstandings of words with similar pronunciation, two out of three have it, only the boy from IES Nuestra Señora la Estrella, does not misinterpret words. For those who have these confusions, in the class of the boy from IES Luis de Góngora, his classmates also misunderstand those types of words, on the contrary to the class from IES José Caballero where NH children do not have misunderstandings.

### Syntactic problems

Finally, answering the last question, this whole group commits interference mistakes.

## **7. DISCUSSION**

As was expected, the younger children are the ones who have phonological difficulties because those children experience an acoustic signal degradation during their first years of live. Fortunately, and as the results of these questionnaires show, phonological irregularities vanish as time goes by.

Although some studies claim that the knowledge of sign language provokes issues with English morphosyntactic structures (Nittrouer et al. 2016), among our participants who know sign language, we observe that a pair of students do not commit these kinds of mistakes, however, the youngest do make these errors, hence, this fact could be related to the age as phonological irregularities and as time passes, and students posses enough knowledge about morphosyntactic structures in English and in LSE, these issues disappear.

Despite having visual supports or listening before speaking, students have pronunciation problems although this is comparable to their normal hearing classmates with have the identical difficulties. Thus, this should not be associated to CIs.

Further research about which grammatical morphemes cause difficulties in CIs users, in terms of mastering, should study. Firstly, since there are not enough information about this topic and secondly, and based on the study of *Development of English grammatical*

*morphemes in Spanish–English preschoolers* (Dun & Scheffner, 2012), we find that the two students who have specific problems have a considerable difference between them. Whereas the boy from IES Nuestra Señora de la Estrella have a mastering in similar morphemes than HEC (Home English Communication) and SEC (School English communication) bilingual (Spanish-English) preschoolers. The boy from IES José Caballero contrast with both preschoolers.

Regarding mistakes, we found that the childish implanted kids commit developmental errors, it is highly possible that the reason is their early age and, besides, due to their knowledge about LSE which in the case, for instance, of the verb “estar”, it does not exist in LSE, it is omitted, therefore, it is perfectly understood that these infants make the same mistake. Moreover as learning your native language and as happen in LSE, these students tend to use infinite verbs instead of conjugating them. On the other hand, the older students have interference mistakes (those errors that reflect Spanish structure) which are possibly the most common one in every person who is learning a second or more languages.

Finally, with reference to general English level, we perceive that CIs students struggle with speaking and listening skills following by writing and lastly reading skills. As we have mentioned before, although cochlear implants are a great invention for these kids, the acoustic signals that they receive are not as accurate as in a normal hearing. This motive lessens listening skills and, consequently, speaking skills since CIs patients face some difficulties in order to understand words perfectly, in spite of having a good lip-reading, considering that some phonemes as we have analyzed before e.g. t/ (/ti:/), /d/ /di:/, cause confusion in students. The main reason, as Dodd asserted (cited by Madrid & Moreno-Torres, 2014) would be that the manner of articulation and sounds are perceived by acoustic signs which are limited by implants. It, also, makes CIs students have some issues with written expression because they might not understand words, then, they write them incorrectly.

## **8. CONCLUSION AND FUTURE RESEARCH**

Biggest dissimilarities flourish during early ages until implanted students reach the same linguistic level as their classmates. Differences exist, as we have mentioned before, because, before surgery, CIs patients receive a late exposure to oral language which makes them development more phonological problems and misunderstanding a wide list of words. Furthermore, the knowledge of LSE might provoke them morphosyntactic mistakes, as changing the sentence order, because in sign language the order is subject-object-verb whereas in the English language is subject-verb-object, or using only infinitive verbs as happen in sign language.

Hardly can we assert that the obstacles that we have analyzed previously in CIs patients would appear in every implanted kid, owing to the small sample of participants. However, the results of this study support the first research hypothesis: there are differences in the acquisition of English as a second language between normal hearing and implanted infants.

More data are needed to be able to test theoretical hypotheses. Furthermore, such data would also be most helpful for language therapists because there are not enough systematic studies which can guarantee which methodology is better for CIs patients in order to have equal access to educational and, moreover, to get the cognitive and social benefits of bilingualism in terms of cultural immersion, career, employment and financial advantages.

With this study, an aim that we want to reach is that teachers, and specially families, become more conscious about their implanted kids' linguistic problems, taking into account that some studies (Boons 2012) have claimed that children of families with a lacking parental motivation and commitment, achieved significantly lower language results. In other words, difficulties do not happen just for the bad functioning of some cochlear implants.

Further research should be underway to explore the factors which affect these kids, among them the famous M.O.M (Means, Opportunity and Motive) which are considered fundamental for learning a language (Kohnert,n.d).

To sum up even though information is not enough, we can observe that implanted kids have some difficulties in the acquisition of language, and these obstacles differ from the ones from normal hearing infants, that is why we believe that a deeper research about the language development and bilingualism in children with cochlear implants must be essential in order to improve children's quality of life. Fortunately, we can also claim that bilingualism in kids using cochlear implants is possible without provoking an impairment in their native language, not only for what we have showed with our participants, but also for all the cases that we have discovered during the realization of this study (Mesa Redonda 2013).



## 9. REFERENCES

- Algueró, M. (n.d). La ventaja de usar el lenguaje de signos con los niños. Guía infantil. Retrieved May 10, 2017, from : <https://www.guiainfantil.com/articulos/educacion/las-ventajas-de-usar-el-lenguaje-de-signos-con-los-ninos/>
- Aprendizaje del Inglés como Segundo Idioma (n.d). American Speech Language Hearing Association. Retrieved April 4, 2017, from: <http://www.asha.org/public/speech/development/La-Adquisicion-de-un-Segundo-Idioma/>
- Ardila, A. (2012) Ventajas y desventajas del bilingüismo. *Forma. func*, 25,(2), 99-114. Retrieved from: <http://revistas.unal.edu.co/index.php/formayfuncion/article/view/39833/43254>
- Belloch, C. (2014). Las Tics en Logopedia: Audición y Lenguaje. Universitat de València. Retrieved from: <http://www.uv.es/bellohc/logopedia/NRTLogo7.wiki?8>
- Boons, T., Broks, J., Dhooge, I., Frijns, J., Peeraer, L., Vermeulen, A., & Wieringen, A.(2012). Predictors of Spoken Language Development Following Pediatric Cochlear Implantation. *Ear & Hearing*, 33(5), 627–639. Retrieved from: <https://www.ncbi.nlm.nih.gov/pubmed/22555184>
- Caraballo. A (n.d). Dislalia infantil, la mala pronunciación de los niños. Guía infantil. Retrieved May 10, 2017, from: <https://www.guiainfantil.com/1042/dislalia-infantil.html>
- CNSE. Confederación Estatal de Personas Sordas (2013). Personas sordas: Sobre las personas sordas. Retrieved March 20, 2017, from <http://www.cnse.es/psordas.php>
- Dulay, C. H., & Burt, K. M (1973). Should we teach children syntax?. *Language Learning*. 23(2), 245-258.

Dunn, D. M., & Sheffner, H. C. (2012). Development of 14 English grammatical morphemes in Spanish–English preschoolers. *Clinical Linguistics & Phonetics*, 26(8), 728–742. doi: 10.3109/02699206.2012.700679

FDA (U.S. Food & Drug. Administration) (2014). Benefits and Risks of Cochlear Implant. Retrieved March 28, 2017, from:  
<https://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/ImplantsandProsthetics/CochlearImplants/ucm062843.htm>

Federación AICE. Federación de Asociaciones de Implantados Cocleares en España (2015). El Implante coclear, una manera de oír. Retrieved April 5, 2017 from:  
[http://implantecoclear.org/index.php?option=com\\_content&view=frontpage&Itemid=81](http://implantecoclear.org/index.php?option=com_content&view=frontpage&Itemid=81)

Gotzens. A. (1992). Bilingüismo y sordera: la experiencia belga. *Cultura Sorda*. Retrieved April 10, 2017, from: <http://www.cultura-sorda.org/bilinguismo-y-sordera-la-experiencia-belga/>

Guiberson, M. (2013) Bilingual Myth-Busters Series Language Confusion in Bilingual Children. *ASHA Wire Journals*, 20, 5-14. doi:10.1044/cds20.1.5

Hinojosa, M<sup>a</sup>F., (Marzo 2017). El bilingüismo para niños sordos. In D. Sindell (Presidency) *La Familia como Protagonista*, Conference performed by T-oigo, Madrid.

Huarte, I. A., & Manrique, R. M. (2013). Incidencias y causas de la sordera. Exploración y diagnóstico. En FIAPAS (Jáudenes, C. et al.) (5<sup>a</sup> ed.), *Manual Básico de Formación Especializada sobre Discapacidad Auditiva* (p. 51). Madrid: FIAPAS.

Kohnert. K. (n.d). Aprendizaje de un segundo idioma: Factores de Éxito en el Bilingüismo Secuencial. Sindell. D (trad.) pp. 1-5. Retrieved April 10, 2017, from: <http://www.t-oigo.com/userfiles/KathrynKohnert2.pdf>

Madrid, C.S., & Moreno-Torres, I. (2014). Producción fonológica en el niño sordo con implante coclear prelocutivo. *Quaderns de Filologia: Estudis Lingüístics*, 19, 47-69.

Madrid Contigo. (2016). Los beneficios de la lengua de signo. Telemadrid.es. Retrieved May 22, 2017, from: <http://www.telemadrid.es/node/%20413451>

Manrique, R. M. (2013). Implantes cocleares. En FIAPAS (Jáudenes, C. et al.) (5ª ed.), *Manual Básico de Formación Especializada sobre Discapacidad Auditiva* (pp. 108-116). Madrid: FIAPAS.

Markman, T., Quittner, A., Eisenberg, L., Tobey, E., Thal, D. Niparko, J., & Wang, N. (2011). Language development after cochlear implantation: an epigenetic model. *J Neurodevelopmental Disord*, 3, 388–404. doi: 10.1007/s11689-011-9098-z

Mesa Redonda (2013). In D. Sindell (Presidency). II Conferencia Internacional sobre la Educación Bilingüe, Conference performed by T-Oigo, Madrid.

Moberly, A., Lowenstein, J., & Nittrouer, S. (2015) Early Bimodal Stimulation Benefits Language Acquisition for Children with Cochlear Implants. *Otology & Neurotology*, 37, 24–30

Moreno- Torres, I., & Torres, S. (2008). From 1-word to 2-words with cochlear implant and cued speech: A case study. *Clinical Linguistics & Phonetics*, 22(7), 491–508. doi: 10.1080/02699200801899145

Nittrouer, S., Lowenstein, J., & Holloman, C. (2016). Early predictors of phonological and morphosyntactic skills in second graders with cochlear implants. *Research in Developmental Disabilities*, 55, 143–160. doi: 10.1016/j.ridd.2016.03.020

Seachrist C. L., (2014). A bilingual brain is prepped for more than a second language. Science News. Retrieved May 22, 2017, from: <https://www.sciencenews.org/blog/growth-curve/bilingual-brain-prepped-more-second-language>

Sierra, C. O. (2012, noviembre). ¿Qué es la lengua de signos? [Web log post]. Retrieved May 14, 2017, from: <http://atendiendonecesidades.blogspot.com.es/2012/11/que-es-la-lengua-de-signos.html>

Szagun, G. (2006, May). Desarrollo del lenguaje en niños con implante coclear (Alejandro Oviedo, trad.). 1-25. Retrieved February 20, 2017, from: <http://www.cultura-sorda.org/desarrollo-del-lenguaje-en-ninos-con-implante-coclear/>

Valero, G. J., & Villalba, P. A. (2013). Resultados de los avances tecnológicos en la atención al niño sordo. En FIAPAS (Jáudenes, C. et al.) (5ª ed.), *Manual Básico de Formación Especializada sobre Discapacidad Auditiva* (pp. 128-137). Madrid: FIAPAS.

Waltzman, S., McConkey, A., Green, J., & Cohen, N. (2003). Second Oral Language Capabilities in Children with Cochlear Implants. *Otology & Neurology*, 24, 757-763.

Wermke, K. (2016). Maternal language shapes infants' cry melodies. Universität Würzburg. Retrieved 27 April, 2017, from: <https://www.uni-wuerzburg.de/en/sonstiges/meldungen/detail/artikel/muttersprache-praegt-babylaute/>

Yeh, K. (2011, 9<sup>th</sup> November). Strategies to help your child talk: using expansions and extensions [Web log post]. Retrieved 12 April, 2017, from: <http://www.playingwithwords365.com/2011/11/strategies-to-help-your-child-talk-using-expansions-and-extensions/>

## 10. SUPPLEMENTAL MATERIALS

### EL APRENDIZAJE DEL INGLÉS EN ALUMNOS CON IMPLANTES COCLEARES

Institución:.....

Edad del alumno:.....

Sexo del alumno:.....

Edad a la que fue implantado.....

Nivel de inglés (A1, A2, B1, etc).....

Duración de las clases de inglés:.....

Según su experiencia con alumnos y alumnas con discapacidad auditiva:

1. ¿El alumno implantado recibe clases de inglés extraescolares?

- ☐ Sí
- ☐ No

2. ¿El alumno implantado sabe LSE (Lengua de Signos Española)?

- ☐ Nada
- ☐ Algo
- ☐ Bastante

3. Si la respuesta anterior es algo o bastante, ¿ha afectado este conocimiento en el orden gramatical del inglés? Por ejemplo, en LSE el orden es sujeto-objeto-verbo; o el verbo ser/estar no se utiliza, por lo tanto, ¿el alumno comete errores como: “I oranges eat” o “I sad”.

- ☐ Sí
- ☐ No

4. En cuanto a los estudiantes con implantes cocleares, ¿las niñas poseen un desarrollo más rápido del inglés?

- ☐ Sí
- ☐ No

5. ¿Los alumnos oyentes están presente en las clases de inglés impartidas a los alumnos con implantes?

- ☐ Sí
- ☐ No

6. Califique del 1 al 5 (1 sería un muy deficiente, 2 deficiente, 3 medio, 4 bueno, 5 muy bueno similar al oyente) las habilidades que suelen mostrar los alumnos con y sin implantes en las siguientes destrezas respecto a esta asignatura:

Alumnos con IC

Speaking 1 2 3 4 5  
 Listening 1 2 3 4 5  
 Reading 1 2 3 4 5  
 Writing 1 2 3 4 5

Alumnos sin IC

Speaking 1 2 3 4 5  
 Listening 1 2 3 4 5  
 Reading 1 2 3 4 5  
 Writing 1 2 3 4 5

7. ¿Trabaja con apoyos visuales en alguna de las cuatro destrezas? (1 sería nunca, 2 a veces, 3 a menudo y 4 siempre).

Alumnos con IC

Speaking 1 2 3 4  
 Listening 1 2 3 4  
 Reading 1 2 3 4  
 Writing 1 2 3 4

Alumnos sin IC

Speaking 1 2 3 4  
 Listening 1 2 3 4  
 Reading 1 2 3 4  
 Writing 1 2 3 4

8. ¿El alumno implantado tiene dificultades al repetir oraciones previamente pronunciadas por el profesor (sin ser leídas por el alumno)?

- ☐ Sí
- ☐ No

9. ¿El alumno implantado presenta alguna dificultad al leer oraciones sin ser escuchadas previamente?

- ☐ Sí
- ☐ No

10. Seleccione los morfemas que causan mayor confusión a la hora de escribir en los niños con y sin implantes:

NIÑOS CON IC	NIÑOS SIN IC
<input type="radio"/> Past tense (ed) "I talk/talked"	<input type="radio"/> Past tense (ed) "I talk/talked"

<ul style="list-style-type: none"> <li>○ Plural –s “I eat grapes”</li> <li>○ Possesive “My dad’s car”</li> <li>○ 3<sup>rd</sup> person sg “She dances”</li> <li>○ Copula (is/are/am) “I am sad”</li> <li>○ Auxiliary (is/am/are + ing) “He is singing”</li> <li>○ Articles “I play with the doll”</li> <li>○ Prepositions “The book is on my desk”</li> <li>○ Irregular past tense “I broke a window”</li> <li>○ Irregular 3<sup>rd</sup> person “She does her homework”</li> </ul>	<ul style="list-style-type: none"> <li>○ Plural –s “I eat grapes”</li> <li>○ Possesive “My dad’s car”</li> <li>○ 3<sup>rd</sup> person sg “She dances”</li> <li>○ Copula (is/are/am) “I am sad”</li> <li>○ Auxiliary (is/am/are + ing) “He is singing”</li> <li>○ Articles “I play with the doll”</li> <li>○ Prepositions “The book is on my desk”</li> <li>○ Irregular past tense “I broke a window”</li> <li>○ Irregular 3<sup>rd</sup> person “She does her homework”</li> </ul>
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11. Una vez conocido ciertos morfemas, ¿el alumno es capaz de formar nuevas palabras que siguen el mismo sistema de formación? Ejp: Happy-Happiness/ Sad- Sadness.

Alumno con IC	Alumno sin IC
<ul style="list-style-type: none"> <li>○ Sí</li> <li>○ No</li> </ul>	<ul style="list-style-type: none"> <li>○ Sí</li> <li>○ No</li> </ul>

12. Centrándonos en el *writing* o expresión escrita, el alumno se dedica a escribir (varias opciones son posibles):

Alumnos con implantes:	Alumnos sin implantes
<ul style="list-style-type: none"> <li>○ Palabras</li> <li>○ Frases</li> <li>○ Textos breves</li> <li>○ Textos extensos</li> </ul>	<ul style="list-style-type: none"> <li>○ Palabras</li> <li>○ Frases</li> <li>○ Textos breves</li> <li>○ Textos extensos</li> </ul>

13. ¿El alumno tiene problemas con la asimilación de palabras con pronunciación parecida pero con fonemas diferentes? Ejemplo: Bet/Get

Alumno con IC	Alumno sin IC
<input type="radio"/> Sí	<input type="radio"/> Sí
<input type="radio"/> No	<input type="radio"/> No

14. ¿Emplea usted contracciones cuando habla en sus clases de inglés? Ejp: He's famous, They've told me a story.

Alumno con IC	Alumno sin IC
<input type="radio"/> Sí	<input type="radio"/> Sí
<input type="radio"/> No	<input type="radio"/> No

15. Si la respuesta anterior es sí, ¿los alumnos son capaces de detectarlas?

Alumno con IC	Alumno sin IC
<input type="radio"/> Sí	<input type="radio"/> Sí
<input type="radio"/> No	<input type="radio"/> No

16. Centrándonos en el *reading* o comprensión lectora del alumno con o sin implante, esta se basa en la lectura de (varias opciones son posibles):

Alumnos con implantes	Alumnos sin implantes
<input type="radio"/> Palabras	<input type="radio"/> Palabras
<input type="radio"/> Frases	<input type="radio"/> Frases
<input type="radio"/> Textos simples (cuentos, historias breves)	<input type="radio"/> Textos simples (cuentos, historias breves)
<input type="radio"/> Textos complejos (libros...)	<input type="radio"/> Textos complejos (libros...)

17. Sabiendo que la lengua materna de los alumnos es el español, ¿cometen errores de algunos de los siguientes tipos a la hora de aprender inglés? (Varias opciones son posibles). Ejp: Pregunta→ *Why does the boy want food?*

- ☐ Developmental. Respuesta: *He hungry*: Omisión del verbo →Es un error que puede ocurrir cuando se aprende la lengua materna.
- ☐ Interference. Respuesta: *He has hungry*. Interferencia entre los dos idiomas, emplea una estructura de su lengua materna: "Él tiene hambre".
- ☐ Unique. Respuesta: *He does hungry*. Respuesta que no refleja similitud con estructuras ni de la lengua nativa (español) ni del idioma que se está aprendiendo (inglés).

Observaciones: