

# Effect of Oral Placement and Expressive Therapies on Speech Intelligibility of Adolescents with Articulation Disorder

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**Abstract:** Intelligible speech is vital to every adolescent's life, but this skill can be confounded with the presence of articulation disorder. Meanwhile, studies have been conducted using different therapies to improve speech intelligibility. This study investigated the effect of oral placement and expressive therapies on speech intelligibility among adolescents with articulation disorders.

The study adopted a pretest-posttest, control group, quasi-experimental research design with a 3x2x2 factorial matrix. Three special centers were randomly selected, and purposive sampling was used in selecting 60 adolescents having articulation disorders comprising 34 males and 26 females. These adolescents were randomly assigned to Experimental Group 1 (n= 22), Experimental Group 2 (n= 21), and Control (n= 17). Speech Intelligibility Assessment Scale (r=0.92) was the instrument used for the study. Participants in the experimental groups were exposed to the oral placement and expressive therapeutic treatments, while those in the control groups were sensitized to a placebo. Three hypotheses were tested at a 0.05 level of significance, while data were analyzed using Analysis of Covariance (ANCOVA), mean scores, and Bonferroni Post Hoc Test.

Findings revealed that there was a significant main effect of treatments  $F_{(2,56)} = 112.52$ ;  $p < 0.05$  (oral placement therapy, expressive therapy, and control group with placebo), and also a significant interaction effect of treatments, gender, and age  $F_{(2, 47)} = 7.37$ ;  $p < 0.05$  on speech intelligibility of adolescents with articulation disorders despite the presence of placebo. Oral placement and expressive therapies were effective in managing the speech intelligibility of adolescents with articulation disorders.

Therefore, speech therapists should adopt these therapeutic interventions in rehabilitating adolescents with articulation disorders.

**Keywords:** Expressive therapy, Oral placement therapy, Speech intelligibility, Articulation disorders.

## INTRODUCTION

Speech as a voluntary act resulting from the activation of respiration, phonation, and articulation is key to oral communication. Successful communication of one's ideas rests on one's self-confidence in one's speech. Therefore, the need to cultivate the skill of effective speech is unequivocally essential. The foregoing clearly indicates the imperative of speech

intelligibility. According to Polat and Atas [1], better speech perception, which is central to improving communication and understanding speech in the presence of background noise, is challenging for any listener. It is therefore important to consider utterance recognition in natural communication situations. Lochland [2] buttresses that utterance recognition on the listener's part in the intelligibility of speech is as necessary as speaker-related factors.

In relation to speech intelligibility, articulation and phonology are key, but articulation tests and phonological evaluations are not necessarily

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assessments of intelligibility [3]. Anyway, the procedures for measuring speech intelligibility vary on a number of dimensions, the primary variable being the linguistic level of the material being evaluated (Single words, words, sentences, and conversations). There are two kinds of tasks that can be used to quantify speech intelligibility, and both are applicable to conversational speech. These tasks include scaling procedures where the listener estimates the proportion of the intended targets that were understood and word identification tests in which the listener attempts to determine (by transcription in the case of conversational speech) exactly what was said. Scaling procedures are probably the most frequently used of the two because of their simplicity and efficiency.

A speaker with a persistent articulation disorder on segmental units is tested in minimal-pair lexical contrasts in initial, medial, and final positions as appropriate to the language. For instance, the /p/-/b/ contrast is tested in the word pairs pit-bit, dapper-dabber, and cap-cab can be highly intelligible. Similarly, some speakers with a phonological disorder can be understood by listeners who are familiar with the phonological pattern. Articulation and phonology are relevant to interpreting an intelligibility deficit, which is usually determined by other means [4]. That is, intelligibility is ascertained by methods other than articulation tests or phonological evaluations, although they may be closely related in a clinical assessment or research interpretation. It is certainly possible for the results of articulation tests and phonological evaluations to be highly correlated with independent judgments of intelligibility. The reasons for this correlation can be determined by closely examining the factors that relate to speech intelligibility.

Speech sound disorders are errors made by children in which they have difficulty correctly pronouncing sounds. These errors often result in difficulty understanding the child. Often, a child is able to say the sound correctly but may not use it in the correct position in the word. Speech sound disorders can be categorized into two primary types: articulation and phonological disorders. A child with an articulation disorder has difficulty producing a particular sound, while phonological disorders refer to the use of a pattern of errors [5]. In general, a child with articulation disorder is often more difficult to understand in conversation and can also have additional difficulties with language and literacy skills, which may cause poor speech intelligibility during communication as a result of weakened articulators [6].

When articulation disorder occurs all the time, it reduces speech intelligibility in a child. However, an impairment exists when errors are seen beyond an age where a child should have learned the correct productions of words and sentences. According to the American Speech, Language and Hearing Association [7], by eighteen months of age, someone should be able to understand 50% of their toddler's speech. By age two, average intelligibility should be 50% to 75%. By age 3, somebody should be able to understand nearly everything their child says or 75% to 100%. At age 4, strangers should also be able to understand what someone's child says, and by age 5, despite a few lingering errors, a child should be understood by most people in most situations.

In most cases, articulation disorder occurs as a result of structural issues, such as a cleft palate, brain damage, or neurological dysfunction, as in a child with Down syndrome, fetal alcohol syndrome, or autism and cerebral palsy. A type of articulation disorder is called primary articulation disorder, which refers to a disability in articulation without other speech or linguistic disabilities, and without a known cause [8]. However, other types of articulation disorders have varying etiologies, including structural, neurological, and auditory causes. A child's inability to coordinate the muscle movements (as in children with cerebral palsy) necessary to produce speech, faulty speech models during the crucial years for speech and language development, as seen in adolescents with a history of chronic ear infections or hearing problems, In many cases, there is not a clearly identifiable reason for the problem, often, a child has completely normal, functioning articulators, but simply has difficulty making particular sounds. In essence, an articulation disorder is a speech disorder that affects the production of individual consonant and vowel sounds correctly [9]. This may be due to imprecise placement, timing, pressure, speed, or flow of movement of the lips, tongue, or throat. A child's ability to produce sounds occurs gradually with development. Although we expect certain sounds to be produced by a certain age, every child develops speech at his or her own rate [7]. Speech sounds are physical sounds that are the end products of articulation. When a person's oral communication differs from normal speech to the point of interfering with communication, it is labeled a speech disorder [6].

However, many adolescents outgrow their speech sound issues. As the opening sentence reflected, some adolescents do not. Speech development charts are

easily accessible on the Internet that show the ages at which adolescents should acquire certain sounds. According to ASHA [7], a child should be able to produce all English sounds correctly by the age of eight years. Suppose speech sound issues have not been eliminated naturally by age eight. In that case, the issues are referred to as "residual" or "persistent" speech sound errors, and therapy should be sought for these errors to be eliminated [10]. Articulation errors, or an incorrect pronunciation of speech sounds, lead to articulation disorder, the most common of early childhood communication disorders [11]. Articulation errors can make the spoken language difficult for a communication partner to understand. Articulation disorder can occur in isolation (one at a time) or clusters (multiple errors). An adolescent who makes many errors in articulation will be more difficult to understand than an adolescent who makes only a few errors during communication. Therefore, the speech intelligibility of adolescents with an articulation disorder needs to be enhanced for better communication. Many therapies, including oral placement and expressive therapies, have been viewed as effective interventions for better speech production for adolescents with articulation disorders.

Oral placement therapy (OPT) is a type of oral-motor therapy used by Speech and Language Pathologists to target specific movements needed for speech clarity. It is one aspect of an oral "motor" therapy program that addresses the "motor" components and movements used in speech production. This therapy differs from traditional speech therapy in that the strategies used continue to utilize auditory and visual stimuli (watch and listen) while adding the tactile and proprioceptive sensory systems. This allows the client to feel the movements as well as hear and see them.

Oral placement therapy, propounded by Sara1 Rosenfeld-Johnson, is facilitated when a child cannot produce an ordinary speech sound. Oral placement therapy uses tools from Talk tools to increase the child's awareness of his or her mouth and placement of each part of the mouth and its muscles [12]. Purdy *et al.* [13] note that the purpose of oral placement therapy ranges from helping to increase the awareness of the oral mechanism to helping to increase the precision of volitional movements of oral structures for speech production. Speech-language Pathologists believe that students enjoy these tools because they see their usage of these tools as fun, and also, they learn to experiment with their oral muscles [14]. OPT is a tactile

teaching technique used for adolescents and adults with oral placement disorders who cannot learn standard speech sound production using auditory and visual teaching methods alone. Since non-verbal adolescents with articulation disorders have difficulty in making a purposeful speech, OPT emerged to help these adolescents develop their sound productions. Idiculla [15] stated that oral placement as therapy is more effective when compared with other conventional techniques of speech therapy in enhancing the speech development of children with peculiar disabilities such as Down syndrome, autism, cerebral palsy, and childhood language disorders, developmental delays, and apraxia.

Similarly, Expressive Therapy (ET) is a multimodal approach that uses all forms of reinforcement to bring out speech and expression of feelings and emotions in adolescents. Expressive therapy is a broad category and can be used to treat various conditions of speech sound disorders by helping adolescents familiarize themselves with their own emotions and expressions. This can be used for adolescents suffering from articulation disorder, self-esteem issues, learning problems, and eating disorders. Expressive therapy uses Arts work to access imagination and creativity, which can generate new models of living and contribute to the development of a more integrated sense of self, with increased self-awareness and acceptance [16]. Adolescents may interact with art therapy, music therapy, writing therapy, drama therapy, or dance therapy. Each of these channels allows the individual to emphasize their own emotions through creative expression. For some, it may be extremely difficult to speak about internal battles that they are facing verbatim. By representing an event or feeling through aesthetics, they feel more comfortable. The therapist uses modality to help the patient explore themselves and communicate their concerns with others in an honest manner.

Expressive therapy can address individual differences in the way people communicate. Pascoe, Stackhouse, and Wells [1] noted that the approach is especially useful for people who do not know how to use feeling words. Some people are more tactile, while others respond more to visual cues. These differences allow therapists to use the appropriate therapy with particular patients. During art therapy, the client will either draw or paint images that reflect their thoughts and emotions on paper instead of verbally. This is a way to improve the speech sound disorder present during words and sentence formation.

In effect, adolescents with articulation disorders have anatomical (structural) and physiological (functional) defects in the mouth and throat areas that make it more difficult for them to make precise movements of the articulators [17]. A combination of anatomical and physiological difficulties sometimes results in open mouth posture and tongue protrusion. Many adolescents with articulation disorders have hypersensitive (tactile defensive) or hypersensitive reactions to touch around the mouth. The inability of adolescents with articulation disorders to make a meaningful speech is a constant concern to parents and teachers. Hence, intervention strategies are needed to address this problem among adolescents.

### **Objective of the Study**

1. To investigate the effect of Oral Placement as therapy on speech intelligibility of adolescents with articulation disorders.
2. To investigate the effect of Expressive Therapy on speech intelligibility of adolescents with articulation disorders.
3. To determine the moderating role of gender and age on the effect of the therapies on speech intelligibility of adolescents with articulation disorders.

### **Hypotheses**

The following null hypotheses were tested in the study:

- H<sub>01</sub>: There is no significant main effect of treatments on speech intelligibility of adolescents with articulation disorders
- H<sub>02</sub>: There is no significant interaction effect of treatments and gender on speech intelligibility of adolescents with articulation disorders
- H<sub>03</sub>: There is no significant interaction effect of treatments and age on speech intelligibility of adolescents with articulation disorders

## **METHOD**

### **Design**

The study adopted a pre-test, post-test, control group quasi-experimental research design with a 3x2x2 factorial matrix.

### **Participants**

The population for the study comprised all adolescents with articulation disorders. The study adopted purposive sampling in selecting 60 adolescents with articulation disorders from three special centers in Lagos State, comprising 34 males and 26 females. These were randomly divided into experimental group 1 (Oral Placement Therapy) with 22 adolescents' experimental group II (Expressive Therapy) with 21 adolescents, and Control Group (with placebo) with 17 adolescents. The special centers used are (1) Child and Adolescent Center, Oshodi, (2) Lagos University Teaching Hospital, Yaba, Lagos, and (3) AMTOWA Special and Inclusive Centre, Ikorodu, Lagos.

### **Ethical Issue**

Participants' consent was obtained through the filing of consent forms which was done by the directors of the special centers used for this study.

### **Intervention Procedure**

Participants in this study were exposed to treatments three times a week, and the treatment lasted for six (6) weeks. During the period, participants in each of the experimental groups were treated with oral placement and expressive therapies, while the control group was held with an ordinary placebo method. The researchers carried out the treatment packages themselves with the assistance of speech pathology experts. At the end of six weeks, post-test measures were conducted.

### **Instrument**

The research instrument utilized in the study was Speech Intelligibility Assessment Scale (SIAS). The SIAS is an observation rating scale to determine the speech intelligibility of the participants. It was used to establish the baseline of the speech and at the end of the treatment to assess the effectiveness of oral placement and expressive therapies. The instrument was standardized with a reliability coefficient of 0.91 after its pilot testing. Oral Placement and Expressive therapies were used as treatment packages. The treatments lasted for eight weeks, out of which two (2) weeks were used for pre and post-treatment assessments. The researchers engaged four research assistants who are speech pathologist graduates to help in the administration of the instrument. Participants were exposed to treatments for six (6)

weeks, three times per week. During the period, participants in each of the experimental groups were treated with oral placement and expressive therapies, while the control group was held with an ordinary placebo. The researchers carried out the treatment packages themselves with the assistance of speech pathology experts. At the end of six weeks of treatment, post-test measures were conducted.

### Analysis

Analysis of covariance (ANCOVA) and Bonferroni Post-Hoc test were used to analyze the results obtained in the study.

### Participants' Characteristics

Participants for this study were mainly adolescents with articulation disorders. 60 adolescents that participated in this study include 24 males and 36 females. The participants were divided into three groups; two experimental groups and one control group. Group 1 (Oral Placement Therapy) with 22 participants, group 11 (Expressive Therapy) with 21 participants, and group 111 (control group) with 17 participants.

## RESULTS

### Hypothesis One

There is no significant main effect of treatments on the speech intelligibility of adolescents with articulation disorders.

The effect for treatment is high, as shown in partial eta square ( $\eta^2 = 0.80$ ). This indicates that 80% of the total variance is explained by the treatment. The implication of this result is that there is a significant

main effect of treatments (oral placement and expressive therapies) on the speech intelligibility of adolescents with an articulation disorder. Apparently, participants in expressive therapy performed better than those in oral placement therapy. This was discovered using multiple classification analysis and Bonferroni post hoc test analysis. The result of the test is presented in Tables 2 and 3, respectively. The MCA analysis in Table 2 shows that expressive therapy has the highest mean, followed by oral placement and finally the control group (34.40, 29.86, and 12.78, respectively).

### Hypothesis Two

There is no significant interaction effect of treatment and gender on speech intelligibility of adolescents with articulation disorders.

It can be observed that the p-values of both the covariant (gender) and the grouping variable (treatment \* gender) were not significant hence the reason for accepting the null hypothesis. The effect of size for the interaction effect, as seen in the partial eta square ( $\eta^2$ ), was 0.023. This indicates that only 2.3% of the total variance is explained by the interaction effect of treatment and gender, while the remaining 97.7% are explained by other variables unknown to the researcher. The implication of this result is that there is no significant interaction effect of treatment and gender on speech intelligibility of adolescents with an articulation disorder.

### Hypothesis Three

There is no significant interaction effect of treatment and age on speech intelligibility of adolescents with articulation disorders.

**Table 1: Analysis of Covariance (ANCOVA) of the Main Effect of Treatments on Speech Intelligibility of Adolescents with an Articulation Disorder**

Source	Types III sum of Squares	df	Mean Square	F-ratio	p-value	Partial Eta Squared
Corrected model	5075.59 <sup>a</sup>	3	1691.86	76.3	0.00	0.803
Intercepts	640.67	1	640.67	28.89	0.00	0.340
Prescore	192.84	1	192.84	8.69	0.00	0.134
Treatment	4989.67	2	2494.83	112.52	0.00	0.801
Error	1241.65	56	22.17			
Total	47661.00	60				
Corrected Total	6317.25	59				

<sup>a</sup>R Squared = 0.803 (Adjusted R Squared = 0.793).

**Table 2: Analysis of Covariance (ANCOVA) of the Interaction Effect between Treatment and Gender on Speech Intelligibility of Adolescents with an Articulation Disorder**

Source	Types III sum	df	Mean of Squares	F-ratio Square	p-value	Partial Eta
Corrected model	5106.412 <sup>a</sup>	6	851.069	37.252	0.000	0.808
Intercepts	612.068	1	612.068	26.791	0.00	0.336
Prescore	190.286	1	190.286	8.329	0.006	0.136
Treatment	4806.797	2	2403.399	105.20	0.000	0.799
Gender	2.839	1	2.839	0.124	0.726	0.023
Treatment * gender	29.134	2	14.567	0.638	0.533	0.023
Error	1210.838	53	22.846			
Total	47661.000	60				
Corrected Total	6317.250	59				

<sup>a</sup>R Squared = 0.808 (Adjusted R Squared = 0.787).

**Table 3: Analysis of Covariance (ANCOVA) of the Interaction Effect between Treatment and Age on Speech intelligibility of Adolescents with an Articulation Disorder**

Source	Type III Sum of Squares	df	Mean Square	F-ratio	p-value	Partial Eta Square
Corrected model	5118.137 <sup>a</sup>	6	853.023	37.70	0.000	0.810
Intercepts	592.866	1	592.866	26.20	0.00	0.331
Prescore	212.451	1	212.45	9.390	0.003	0.151
Treatment	4944.981	2	2472.491	109.28	0.000	0.805
Age	18.238	1	18.238	0.806	0.373	0.015
Treatment * gender	22.748	2	11.374	0.503	0.608	0.019
Error	1199.113	53	22.625			
Total	47661.000	60				
Corrected Total	6317.250	59				

<sup>a</sup>R Squared = .810 (Adjusted R Squared = .789).

The result above shows that the F(2,53) was 0.50 while the p-values were 0.60. Firstly, it can be observed that the p-values of both the covariant (age) and the grouping variable (treatment \* age) was not significant hence the null hypothesis is accepted. The effect size for the interaction effect, as seen in the partial eta square ( $\eta^2$ ), was 0.019. Therefore, there is no significant interaction effect of treatment and age on the speech intelligibility of adolescents with articulation disorders.

**DISCUSSION**

**The Main Effect of Treatments on Speech Intelligibility of Adolescents with an Articulation Disorder**

The result showed that oral placement and expressive therapies were effective in the development

of speech intelligibility among adolescents with articulation disorders. Both therapies proved to be effective in the treatment of articulation disorders. The finding is in line with the study conducted by Kumin [8], who found out that a diagnosis of difficulty with oral motor skills is more frequently given to children with speech intelligibility than a diagnosis of apraxia. 60.2% of children with Down syndrome who received oral placement therapy, as buttressed by Kumin [8], who also recorded a positive effect. The findings of this study are also a confirmation of the comment of Idiculla [15], who stated that after using oral placement as therapy for over five years, along with other conventional techniques of speech therapy, it had been discovered that oral placement has been very effective in assisting children Down syndrome, autism, cerebral palsy, childhood language disorders, developmental delays, and apraxia, who was non-verbal before to

become verbal and started making sounds and producing words.

To attest to the importance of expressive therapy, Abiodun, Osisanya, and Bamigboye [18] affirmed in their study that the receptive language skills strength of the participants is higher than their expressive language skills strength, expressive language skills strength based on neuropathological conditions was comparable; and participants exposed to speech therapy have better receptive and expressive language skills than participants without.

### **Interaction Effect of Treatments and Gender on Speech Intelligibility of Adolescents with an Articulation Disorder**

The findings of this study show indicate that there is no significant interaction effect of treatments and gender on speech intelligibility of adolescents with articulation disorders. Kwon [19] attests to the fact that the speech intelligibility of adolescents with articulation disorder is not influenced by gender differences. Abiodun, Osisanya, and Bamigboye [18] discovered in their study that receptive and expressive language equivalent was not gender-sensitive.

This finding supports the finding of Dada *et al.* [20] in a study on the use of music as therapy in enhancing the attention of children with intellectual disabilities. The study revealed that sex does not affect the effect of music therapy in enhancing the attention of the study participants. In the same vein, a study by Oyundoyin and Adeleke [21] on physical exercise as therapy in reducing hyperactivity among children with severe mental retardation established that both male and female participants responded equally to the therapy. In the same vein, a study by Dada *et al.* [22] revealed that there is no significant main effect of gender in using cumulative rehearsal as therapy in enhancing auditory verbal memory of persons with Down syndrome. However, the finding of this study negates the result of the study by Oyundoyin and Adeleke [23] in a study on outdoor activities in enhancing the social competence of children with autism. The finding of the study revealed that male children with autism responded better than female children with autism.

### **Interaction Effect of Treatments and Age on Speech Intelligibility of Adolescents with an Articulation Disorder**

Treatments used in the present study were seen as having a significant positive effect on the speech

intelligibility of adolescents with an articulation disorder. However, the finding revealed that there is no significant interaction effect of treatment and age on speech intelligibility of adolescents with articulation disorders. This implies that the effectiveness of both oral placement and expressive therapies was not affected by the age of the research participants. In line with this result, studies such as Shapiro, Shaft, Risley, and Gygi [24] and Stehr *et al.* [25] have shown that age differences of adolescents with articulation disorder have no significant main effect on their speech intelligibility.

The finding of this study supports the work of other scholars such as Kwon [19], Shapiro *et al.* [24], and Stehr *et al.* [25], who found out that age has no effect on the speech intelligibility of adolescents with an articulation disorder. A study by Oyundoyin and Adeleke [21] also revealed that physical exercise as therapy was effective for both younger and older participants in reducing hyperactivity among children with severe mental retardation. However, a study by Oyundoyin and Adeleke [23] revealed that age did not have any intervening effect on the use of outdoor activities and enhancing the attention of children with autism.

## **CONCLUSION**

It becomes more challenging when an adolescent child cannot adjust to the social environment due to speech intelligibility deficiency. The situation becomes more worrisome when an adolescent child is diagnosed with an articulation disorder. The risk factor includes sound speech disorder. As an attempt to provide a solution to the problem of speech intelligibility, especially with adolescents facing articulation disorder, this study has found an oral placement and expressive therapies are of positive impact on adolescents with an articulation disorder.

## **RECOMMENDATIONS**

Oral placement and expressive therapies have been discovered to be useful in enhancing the speech of adolescents with articulation disorders. Therefore, the two therapies should be adopted as viable tools in the treatment of speech intelligibility of adolescents with articulation disorders. Non-Governmental Agencies and Governments should create awareness, and early diagnosis and intervention should be encouraged to prevent secondary disability. All public and private special centers should be mandated with a speech

therapist who will attend to the disorder when identified in young children. In cases of the nonexistence of a therapist, an appropriate referral should be made. General society should be encouraged to change its negative attitude toward those with articulation disorders both in their academic, personal-social, and vocational life.

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