The unlimited power of oral placement therapy (OPT) in the rehabilitation of children with Speech Oral Placement Disorders (OPD)

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Abstract

Oral placement therapy (OPT) is a multi-sensory approach that takes into account that, for some clients, just looking and listening is not enough; they need to feel what they are doing with their mouths in order to know how to eat, drink and speak and to provide the additional feedback that their brain appears to need. Talk Tools TM describe OPT as, "an important addition to traditional speech treatment methods for clients with placement and movement deficits"
Oral placement therapy (OPT) combines the senses traditional speech therapy relies on auditory and visual with tactile, proprioceptive and interoceptive sensory systems.
Talk Tools® [١]training applies a unique, hierarchical approach, where activities and goals build upon each other, resulting in a measurable, results-driven path both therapists and clients across all ages and diagnoses with the goal of:

- speech clarity
- improved feeding
- independence
- improved quality of life

This interactive, hands-on course includes highly motivating activities that concentrate on the whole senses of the child: the orofacial region, (jaw, lips and tongue), the sensory system, posture, abdominal strength, tone, seating, and fascia. Techniques learned can be readily implemented across many therapy environments private practices, hospitals, schools and home.

This study is a review study on how powerful and effective is the oral placement therapy (OPT) as a treatment step technique in various motor speech disorders and other neurological disorders.

[١] Talk Tools is an approach to improve speech clarity and feeding skills as well as to improve oral structure awareness.

The study includes ٢٥ Egyptian and Arab children (males and females) between the age of ٣ to ٦ years, they have been exposed to oral placement therapy for at least ٢٠ sessions. The Children are selected at random exhibit various neurological disorders and oral speech disorders such as Autism spectrum disorders and motor disorders.

The results show that the children ceased drooling starting from the first month of intervention and a significant progress in the child's feeding ability, transitioning from liquids to semi-solid foods is detected. Additionally, the children began vocalization, vocal folds vibration and improvement of lip rounded and mouth closure.

Key words: oral placement therapy (OPT), oral speech disorders (OPD)

فاعلية برنامج التأهيل الفموي الحركي (OPT) فى علاج اضطرابات النطق الناتجة عن اضطرابات حسية حركية

الملخص:-

يعد برنامج التأهيل الفموي الحركي العلاجي (OPT) تقنية للتعلم عن طريق اللمس والحس ؛فهي تقنية تعتمد على التحفيز الذاتي من خلال اللمس، والذي يجب أن يتزامن مع العلاج التقليدي التحفيزي التكاملي السمعي والبصري؛ لتحسين وضوح النطق والكلام ،وتعد طريقة التأهيل الفموي الحركي إضافة مهمة للطرائق المعالجة التقليدية للنطق والكلام وخاصة عندما يكون الاضطراب متعلق بالمشكلات الحركية و الحسية ،حيث يستخدم برنامج التأهيل الفموي الحركي بهدف تحسين إدراك العضو المختص بالنطق وتأهيله. تحتاج اضطرابات النطق الناتجة عن مشكلات حسية و حركية ،و منها العضلات المسئولة عن النطق و الكلام ،و التى تؤدى إلى العجز فى التنظيم والتنسيق والتآزر بين أعضاء النطق والكلام إلى التأهيل الفموي الحركي لمعالجة تلك الاضطرابات ، فيأتى دور برنامج التأهيل الفموي الحركي الحديث لتحسين أداء تلك العضلات المسئولة عن النطق و الكلام.

يعمل برنامج التأهيل الفموي الحركي بالتوازي مع طرائق التحفيز الأخرى لكونها منهج يقوم بدمج الجوانب الحسية والحركية والسمعية والبصرية لحل مشكلات تلك الاضطرابات و التحسين من الأداء الوظيفي لأعضاء النطق و الكلام.

استهدف هذا البحث إبراز مدى فاعلية برنامج التأهيل الفموي الحركي فى علاج و تحسين الاضطرابات الناتجة عن مشكلات حركية و حسية مثل مشكلات البلع، و اضطرابات طيف التوحد ،والشلل ،و تأخرالنمو العام، واضطرابات النطق و مشكلات الصوت، و غيرها من الاضطرابات.

و قد تكونت عينة البحث من ٢٠ طفلًا (إناثًاو ذكورًا) تتراوح أعمارهم بين ٦-٣ سنوات و يعانون من اضطرابات فى النطق و الكلام ناتجة عن مشكلات حركية و حسية مختلفة. وقد أسفر البحث عن مجموعة من النتائج منها:

- أدى البرنامج العلاجي للتأهيل الحركي الفموي إلى تحسين إدراك العضو المختص بالنطق، والتأهيل (الفصل والفرز، وإدارة الحركة والثبات والذاكرة العضلية). كل هذا ضروري لتطويرالنطق و الكلام بشكل واضح لدى أطفال العينة.
- ساهم التحفيز السمعي و البصري و الحسي الذى يعتمد عليه البرنامج إلى تحسين استجابة الأطفال للعلاج و التفاعل البناء و تحسين اضطرابات النطق والصوت، واضطرابات الطلاقة، و المهارات الحركيه لديهم.
- اثبت البحث أن تقنية االعلاج عن طريق التحفيز الذاتي واستخدام أدوات التوك تولز (talk tools) الحسية- والذي يرافق العلاج التقليدي و يعتمد على التحفيز السمعي والبصري -فعالٌ فى اضطرابات النطق الناتجة عن مشكلات حركية و حسية.

الكلمات المفتاحية: برنامج التأهيل الفموي الحركي ، اضطرابات النطق ، الاضطرابات الحركية الحسية

I- Introduction

Oral Placement Therapy encompasses a diverse range of techniques and exercises tailored to meet the unique needs of each individual. One fundamental technique employed in OPT is "Prompts for Restructuring Oral Muscular Phonetic Targets" (PROMPT). Figure (١). PROMPT involves tactile cues provided by the therapist to guide the movement and positioning of oral structures during speech production. This hands-on approach facilitates muscle awareness and coordination, enabling clients to achieve clearer articulation and improved phonemic accuracy. Massey et al. (٢٠٢١).

Figure (١). illustrates the tactile tools used to facilitate muscle awareness and muscle coordination and oral structure awareness.

The therapy involves a systematic and hierarchical approach, breaking down oral movements into smaller, more manageable components. The therapist assesses the individual's oral motor skills, including lip, tongue, and jaw movements, to identify specific areas of weakness or dysfunction. Based on this assessment, a tailored intervention plan is created to target and strengthen the necessary muscle groups.

In addition to these structured programs, Oral Placement Therapy incorporates a variety of "Oral Motor Exercises" targeting specific muscle groups involved in speech and feeding. These exercises may include lip rounding, tongue lateralization, jaw stabilization, and tongue elevation exercises, among others.

By systematically targeting individual muscle movements, these exercises aim to improve muscle strength, coordination, and control within the oral cavity, laying the foundation for improved speech and feeding abilities. Massey et al. (٢٠٢١).

A- <u>Speech Oral Placement Disorders (OPD)</u>

Children with speech OPDs may have typical or atypical oral structures. The key to the definition of OPD lies in the child's ability or inability to imitate auditory-visual stimuli and follow verbal oral placement instructions.

Suggested definition: Children with OPD cannot imitate targeted speech sounds using auditory and visual stimuli (i.e., "Look, listen, and say what I say"). They

also cannot follow specific instructions to produce targeted speech sounds (e.g., "Put your lips together and say m"). Although the term OPD is new, the concepts surrounding the term have been discussed by a number of authors and clinicians (Bahr, ٢٠٠١, in press; DeThorne, Johnson, Walder, & Mahurin-Smith, ٢٠٠٩; Hammer, ٢٠٠٧; Hayden, ٢٠٠٤, ٢٠٠٦; Kaufman, ٢٠٠٥; Marshalla, ٢٠٠٤; Meek, ١٩٩٤; Ridley, ٢٠٠٨; Rosenfeld-Johnson, ١٩٩٩, ٢٠٠٩; Strand, Stoeckel, & Baas, ٢٠٠٦).

Oral placement disorder does not apply to children with speech delay; these children can imitate targeted speech sounds using auditory-visual stimuli and can follow specific verbal instructions to produce targeted speech sounds. Yet, some speech-language pathologists (SLPs) use methods developed for these children to treat children with OPDs.

B- <u>Applications of Oral Placement Therapy</u>

Oral Placement Therapy finds application across a broad spectrum of speech, feeding, and oral motor disorders, making it a versatile approach in clinical practice. One primary area of application is "Articulation Disorders", characterized by difficulties in producing speech sounds accurately. OPT interventions focus on addressing underlying oral motor deficits contributing to articulation challenges, such as inadequate lip and tongue movement or poor jaw stability. Through targeted exercises and techniques, individuals with articulation disorders can improve speech clarity and precision. Rosenfeld-Johnson (١٩٩٩)

Another significant application of Oral Placement Therapy is in the management of "Feeding and Swallowing Disorders". Children and adults with feeding difficulties, including oral aversion, poor oral motor coordination, and swallowing disorders, can benefit from OPT interventions. By targeting specific oral motor skills involved in chewing, sucking, and swallowing. Oral Placement Therapy aims to improve oral intake, enhance feeding efficiency, and address underlying sensory and motor issues contributing to feeding challenges.

Moreover, Oral Placement Therapy is widely utilized in the treatment of "Motor Speech Disorders", such as apraxia of speech and dysarthria. These disorders are characterized by impaired motor planning and coordination necessary for accurate speech production. OPT interventions focus on improving the precision and coordination of oral motor movements through targeted exercises and techniques, ultimately enhancing speech intelligibility and communicative effectiveness. Rosenfeld-Johnson (٢٠٠٨).

In addition to clinical applications, Oral Placement Therapy is increasingly utilized in educational settings to support "Language Development".

Oral Placement Therapy can complement traditional language therapy approaches, facilitating improved speech production and language acquisition.

C- The Transformative Impact of Oral Placement Therapy

The transformative impact of Oral Placement Therapy extends beyond the realms of speech and feeding, profoundly influencing the lives of individuals with diverse communication and oral motor challenges. For children with developmental delays or neurological conditions, such as cerebral palsy or Down syndrome, OPT offers a structured and effective approach to address underlying oral motor deficits, promoting functional communication and feeding skills.

Moreover, Oral Placement Therapy holds promise for individuals with "Autism Spectrum Disorders (ASD)" who may experience challenges in speech production, feeding, and oral motor coordination. By systematically targeting specific oral motor skills, OPT interventions can enhance communication abilities and improve social interactions for individuals with ASD, fostering greater independence and quality of life. Bahr & Rosenfeld-Johnson (٢٠١٠).

Furthermore, Oral Placement Therapy plays a crucial role in "Rehabilitative Care" for individuals recovering from traumatic brain injuries, strokes, or other neurological conditions affecting speech and swallowing function. OPT interventions are tailored to address specific motor speech and feeding challenges encountered during the rehabilitation process, facilitating optimal recovery and functional outcomes. Bahr & Rosenfeld-Johnson (٢٠١٠)

In the context of "Early Intervention", Oral Placement Therapy holds immense potential for infants and toddlers with feeding difficulties or developmental delays. Early identification and intervention using OPT techniques can promote the development of foundational oral motor skills crucial for speech and feeding, laying the groundwork for improved communication and feeding abilities as children grow and develop.

D- Incorporating Oral Placement Therapy into Clinical Practice

Integrating Oral Placement Therapy into clinical practice requires a comprehensive understanding of its principles, techniques, and applications, as well as specialized training and expertise. Speech-language pathologists and therapists undergo extensive training to become proficient in OPT interventions, equipping them with the knowledge and skills necessary to implement effective treatment plans tailored to the unique needs of each client.

Central to the successful implementation of Oral Placement Therapy is "Individualized Treatment Planning". Each client undergoes a thorough assessment to identify specific oral motor deficits and communication goals, guiding the development of personalized treatment plans. These plans incorporate a variety of OPT techniques and exercises tailored to address the individual's unique needs, ensuring targeted intervention and measurable progress over time. Hayden (٢٠٠٦). Moreover, collaboration and "Interdisciplinary Team Approach" are essential components of effective Oral Placement Therapy. Speech-language pathologists work collaboratively with other healthcare professionals, including occupational therapists, physical therapists, and nutritionists, to provide holistic care addressing the multifaceted needs of individuals with speech, feeding, and oral motor challenges. This interdisciplinary approach ensures comprehensive assessment and intervention, promoting optimal outcomes for clients. Bahr & Rosenfeld-Johnson (٢٠١٠).

E- Advancements in Oral Placement Therapy Techniques

In recent years, advancements in technology and research have contributed to the evolution of Oral Placement Therapy techniques, expanding its scope and effectiveness. One notable advancement is the integration of "Biofeedback Technology" into OPT interventions. Biofeedback devices provide real-time visual or auditory feedback on muscle activity within the oral cavity, enabling clients to monitor and adjust their oral motor movements during therapy sessions. This immediate feedback enhances kinesthetic awareness and facilitates more precise and controlled muscle movements, ultimately optimizing treatment outcomes.
Furthermore, the emergence of "Tele-practice" has revolutionized the delivery of Oral Placement Therapy services, particularly in remote or underserved areas. Tele--practice allows for virtual therapy sessions conducted via secure online platforms, providing access to expert intervention and support regardless of geographical location. Through Tele-practice, speech-language pathologists can remotely guide clients through Oral Placement Therapy exercises, monitor progress, and provide ongoing support and guidance, ensuring continuity of care and maximizing treatment effectiveness.

F- Research and Evidence Base

The efficacy of Oral Placement Therapy is supported by a growing body of research and empirical evidence, affirming its effectiveness in addressing speech, feeding, and oral motor challenges across diverse populations. Numerous studies have demonstrated positive outcomes following OPT interventions in children and adults with various communication and oral motor disorders, including apraxia of speech, dysarthria, articulation disorders, and feeding difficulties. Duffy (٢٠١٩)
For example, a systematic review conducted examined the effectiveness of Oral Placement Therapy in children with speech sound disorders. The review found that OPT interventions led to significant improvements in speech production accuracy, articulation skills, and overall communication abilities, highlighting the efficacy of this therapeutic approach in addressing speech sound disorders.
Similarly, a randomized controlled trial by Rebecca et al. (٢٠٠٩) investigated the impact of Oral Placement Therapy on feeding skills in infants with feeding difficulties. The study revealed that infants who received OPT interventions demonstrated significant improvements in oral motor function, feeding efficiency, and weight gain compared to those in the control group, underscoring the effectiveness of OPT in addressing feeding challenges in infants.

G- Future Directions and Innovations

Looking ahead, the field of Oral Placement Therapy continues to evolve with ongoing research, technological advancements, and innovations in clinical practice. Future directions in OPT may involve the integration of "Virtual Reality (VR) Technology" to enhance engagement and motivation during therapy sessions, as well as the development of "Augmented Reality (AR) Applications" tailored to deliver personalized OPT interventions in immersive and interactive formats.
Furthermore, ongoing research efforts aim to explore the neurobiological mechanisms underlying the effectiveness of Oral Placement Therapy interventions, shedding light on the neural plasticity and mechanisms of motor learning involved in optimizing oral motor function and speech production. Rosenfeld-Johnson (٢٠٠٩).

II- Aims of the study

The study aims to: -

١- Introduce the effective power of oral placement therapy (OPT) to improve and coordinate the oral muscles which are used for speech, feeding and drinking.

٢- Illustrate that the tools of oral placement therapy (talk tools) are designed for the individual's specific needs and abilities and start at the lowest level and work up to the more complex challenging exercises in various disorders.

٣- Focus on the privilege of oral placement therapy over the other therapies on how it combines the auditory, visual and tactile stimulations with a special tool suit the individual's special needs and abilities.

III- Literature of Review

The studies done by (Bahr, ٢٠٠١, in press; Hammer, ٢٠٠٧; Hayden, ٢٠٠٤, ٢٠٠٦; Kaufman, ٢٠٠٥; Marshalla, ٢٠٠٤; Meek, ١٩٩٤; Ridley, ٢٠٠٨; Rosenfeld-Johnson, ١٩٩٩, ٢٠٠٩; Strand, et al., ٢٠٠٦) revealed that ; when a child with an OPD is treated using auditory-visual imitation and verbal instruction alone, clinical improvements in speech production and intelligibility may be extremely limited and progress may be slow. Occupational therapy (OT) and physical therapy (PT) colleagues facilitate movement patterns using the tactile and proprioceptive sensory systems. Because speech is a fine-motor, tactile proprioceptive act as oral placement therapy facilitates speech movements and placements in children with OPD via tactile-proprioceptive input.

Clark, (٢٠٠٣) highlighted in his study how the oral motor techniques (as OPT) have been used to address neuromuscular impairments in the oral musculature and explores potential applications to the speech and swallowing musculature. His study presented the key issues discussed in relation to active exercise that are related to different treatment targets (e.g., strength, endurance, power, range of motion), specificity of training, progression, and recovery. Also he discussed the factors influencing the potential effectiveness of the motor exercises and physical modalities, along with discussion of additional issues contributing to the controversy surrounding oral motor therapies.

The study presented by Forrest (٢٠٠٢) the utility of oral-motor exercises in the remediation of children's speech acquisition delays continues to be a controversial issue. His study discussed some of the empirical evaluations of the efficacy of the

nonspeech activities in effecting speech changes. The purpose of his study is to review the extant studies of the relation between oral-motor exercises and speech production in children as well as to examine the motor learning literature to gain a broader perspective on the issue. The results of his examination lead to questions about the procedures that are currently applied as well as to suggestions for future development of nonspeech activities in the treatment of children's phonological/articulatory disorders.
Powell (٢٠٠٨b) study concentrated on the clinical forum examining the use of nonspeech oral motor treatments (NSOMTs) to remediate speech sound disorders in children. His method was based on the Conclusions to eight clinical questions formed and based on the findings that were reported in the clinical forum. Theoretical and clinical challenges are also identified.
the study Conclusions illustrated that the (NSOMTs)have serious theoretical and empirical shortcomings ; and insufficient evidence to support the routine clinical application of these procedures to remediate developmental speech sound disorders was reported.

The article of Ruscello (٢٠٠٨) showed that the Oral placement is practiced until the child performs the movement and speech sound without a therapy tool and/or other facilitation technique and the tactile-proprioceptive treatment techniques are hypothesized (in schema theory) to establish muscle memory/motor plans so the child can retrieve the oral placement for speech sound production. As soon as placement is attained, it is immediately transitioned into speech.

De-Thorne et al. (٢٠٠٩) have written about the use of tactile-proprioceptive treatment techniques to facilitate speech production in recent journal literature. If a traditional articulation treatment approach is used, the speech sound is taught in isolation and then expanded to syllables, words, phrases, sentences, and so on. However, phonological process, bottom-up (e.g., V, CV, VC, CVC, etc.), or other speech treatment approaches may also be combined with OPT. The goal of OPT is to transition appropriate oral movements into speech during the same therapy session. For example, if a child cannot produce the /m/ sound with auditory-visual cueing and/or verbal instruction, then a thin bite block or tongue depressor may be placed on the inner borders of the lips to attain the appropriate oral movement and speech sound. Once the sound is attained it can be moved immediately into speech work.

III- Method and Methodology: -

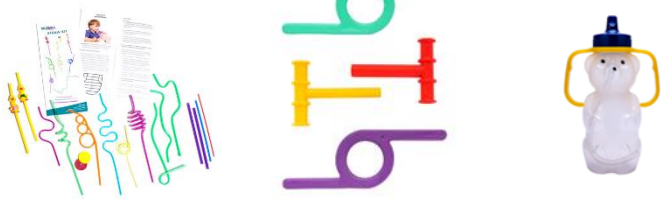
A- Participants

٢٥ Egyptian and Arab children (males and females) between the age of ٢ till ٦ years. Children are selected at random exhibit various neurological disorders such as autism spectrum disorder (ASD) and Motor disorders.
The speech sessions are carried in "New Vision Association for special needs in Alexandria city.

B- Tools

All the tools that are used are the original oral placement tools made and designed by Talk Tools® [٢]organization. Tools been divided according to its function as following:

- Feeding including :(straws, siring feeding, spoon-feeding, chewing bites)
- Sensory including: (sensory message, toothiest, vibrator, sensei)
- Speech :(bite blocks, horns, jaw exerciser, Tongue Tip Lateralization & Elevation Tools, bubbles). Figure (١)

Feeding	
Sensory	

[٢] https://talktools.com/ . Talk Tools is an approach to improve speech clarity and feeding skills as well as to improve oral structure awareness.

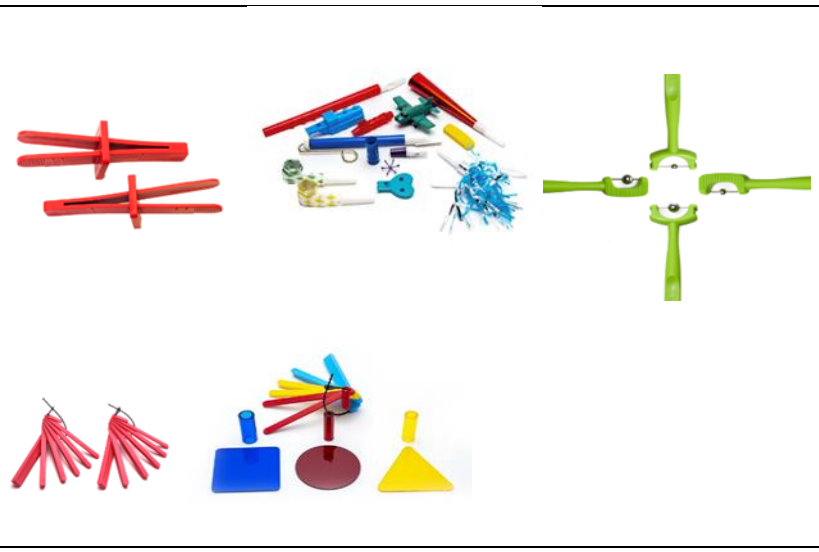
Speech	

Figure (١) different talk tools for different purposes including (feeding , sensory awareness and speech

C- Speech training sessions: (Examples on case samples)

- **Case Sample ١**

The child is ٣ years old and is diagnosed as cerebral palsy (C.P), she suffers from drooling, open mouth, tongue protrusion, breathing dysfunction and Vocalization with no precise articulated speech sound. Regarding feeding, only soup and water or soup with rice can be swallowed.

Intervention period: ٣ months

Intervention program: The program has been divided into three parts: feeding, sensory awareness, increase muscle strength and endurance.

Training session:

١- First month training:

The session starts by employing toothiest to enhance **sensory awareness**; toothiest is used on the cheek's sides for ٣ times both sides for ٥ mins both sides then we used sensei on level ٣ vibration setting to get the maximum sensation on both sides.

After applying the toothiest and removing it from his mouth, the child begins to exhibit a salivary swallowing reflex.

Following that, exercises are focused on improving **muscle strength and endurance**, starting with red chewing bites. Figure (٢) The red one is chosen because it is designed to specifically target the stability of the upper and lower molars and jaw muscles strength. Then, exercises are done to assist the jaw in sustaining at least one bite on the red chewing bites.[١]

Figure (٢) illustrates the red chewing bites to help in the stability of upper and lower jaw muscles strength.

Following the muscle endurance exercises, the **feeding** targets are performed by using a yogurt-like texture, starting by spoon feeding; placing the spoon on the lips and encouraging the child to close his lips around it and pull it into his mouth. The therapist provided verbal support to swallow and applied external pressure from the chin to guide the tongue inside.

At the end of the session, the sensory stimulation is admitted to the cheeks, upper and lower lips, focusing particularly on the mentalis muscles and the ethmoid sinus to prevent any muscle tension happened while working.

٢- Second month training:

In the second month of training, focusing on the improving the sensory awareness by incorporating toothiest during the initial segment of the session. Additionally, the exercises for muscle strengthening and endurance are modified by introducing the yellow chewing bite to enhance muscle endurance and jaw stability. With regards to feeding, introducing semi-solid foods such as purees using spoon feeding are introduced.

٣- Third month training:

The levels of difficulty across various components of the program are in progress; in the feeding aspect, we introduced "sautéing" of half-cooked food by placing it on the back molars to support jaw chewing movements. Straw feeding is

introduced using the honey bear drinking technique to develop the muscles of the lower and upper lips. To enhance jaw muscle strength and endurance, the red and yellow chewing bites are introduced, focusing this time on achieving a sequence of bites on the molars.

In Conclusion of case ١, it is observed that the child ceased drooling starting from the first month of intervention, significant progress in the child's feeding ability and transitioning from liquids to semi-solid foods. In addition to the ability of the child to coo and babble following the intervention, and the improvement in mouth closure is noticed.

- **Case Sample ٢:**

The child is ٤ years and ٦-month-old and diagnosed as Developmental coordination disorder. He suffers from drooling, open mouth, tongue muscle weakness, hoarse sound and muscles discoordination.

Regarding **speech** the child produces only bilabials and the vowel /a/

Intervention period: ٣ months

Intervention program: The program has been divided into three parts: feeding, sensory awareness, increase muscle strength and endurance.

Training session:

١- First month training session:

The objective is to introduce the tool to the child due to his severe behavioral reaction to anything placed in his mouth so the following method is used:

- **Gradual Introduction:** Introduce the tool slowly and in a non-threatening manner. Start by showing the tool from a distance and allow the child to observe it without pressure to interact with it immediately.
- **Desensitization:** If the child has strong reactions, consider a desensitization approach where you gradually expose them to the tool over time. This could involve starting with just allowing the child to touch or hold the tool briefly, and then gradually increasing their interaction with it.

- **Positive Reinforcement:** Use positive reinforcement techniques such as praise, rewards, or favorite activities when the child shows any willingness to engage with the tool. This helps create positive associations with the tool.
- **Modeling and Play:** Demonstrate the use of the tool yourself or with a toy to show its purpose and function. Encourage the child to play with the tool in a non-demanding way, allowing them to explore it at their own pace.
- **Patience and Understanding:** Understand that this process may take time and patience. Be supportive and empathetic towards the child's reactions, and avoid forcing them to interact with the tool if they are not ready.

٢- Second month training:

After the first month, the child begins to accept the appropriate tools in his mouth. Consequently, we initiated a focus on addressing drooling by utilizing sensory toothiest. We increased the number of repetitions to twice per session, with one at the beginning and another at the end. To achieve the desired results.

Following that, the exercises aimed to enhance the muscle strength and endurance, specifically focusing on the tongue.

The sensory toothies to stimulate passive reflexes is utilized, as the tongue was not yet exhibiting active reflexes. The toothies is applied in backward and forward movements, as well as in lateral positions on both the left and right sides of the tongue. Figure (٣)

Figure ٣: Spinner and Toothies is an excellent tool for diagnosing sensory-motor deficits, promoting awareness of the oral cavity, and reducing "fixing."

The bite blocks starting by bite block#٢ to increase jaw muscle resistance are used as a second step. Figure (٤)

Figure٤: Talk Tools Jaw Grading Bite Blocks

Finally, chewing bite in its grading red, yellow, purple, green to increase jaw muscle strength is used. The speech isn't target in the second month plan until the oral motor awareness is achieved.

Phonation: in this step, the oral-nasal coordination during breathing is the main target. By the end of the month, the child successfully transitioned from using horn #١ to being prepared to transition to horn #٢. Figure (٥)

Figure٥: Horn kits and horn hierarchy by talk tools to improve phonation

٣- Third month training session:

By the third month, the speech exercises are started with the vowel /u/ to improve lip protrusion during phonation, using bubble blowing. Then the practice to produce the velar back sound /k/ by activating the soft palate with the back of the tongue, employing a sensory toothies and tongue depressor is achieved together with active exercises to improve the tongue muscles using the "tongue elevation and lateralization" tool. Figure (٦)

Figure ٦: tongue elevation and lateralization" tool to improve tongue muscle tone.

In Conclusion, case ٢ showed remarkable and good results in the production of the vowel rounded /u/ & the back-velar consonant /k/ sounds. The vibration of vocal folds is improved, lip rounding started to exist in his speech at the end of the third month started to transition to produce "CV" syllabic structures.

- **Case Sample ٣:**

The child is ٦ years old and is diagnosed as high functioning autism disorder[١]. He suffers from open mouth, tongue motor planning disfunction, poor dissociation, poor feeding skills, poor lip closure and speech errors.

Intervention period: ٤ months

The intervention Program plan: The first two month concentered on enhancing the open mouth problem by improving the tone of the jaw muscles strength and working on the poor lip closure and speech errors.

During the initial two months of intervention, the child is effectively introduced to all the used tools without requiring sensory enhancements for oral motor skills. The child is demonstrated adequate to the sensory awareness of his mouth and muscles despite muscle weakness affecting speech and feeding quality.

Initially, the sessions are focused on lip exercises using a tongue depressor placed between the upper and lower lips, with each exercise lasting ٢٥ seconds every time. Figure (٧)

Figure ٧: tongue depressor

Followed by enhance the jaw muscles by using chewing tubes using the red and yellow chewing bite. Figure (٨)

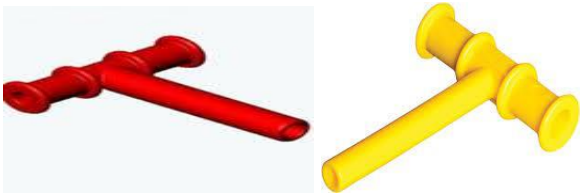


Figure ٨: chewing tubes to develop biting and chewing skills.

a- Regarding feeding

It is observed that the child exhibits a dysfunctional pattern of eating characterized by a preference for crunchy foods such as chips, biscuits, and similar items. Consequently, the implementation of the single bite technique to facilitate regulation of chewing and swallowing movements is introduced using the following methods:

١. **Portion Control**: Encourage the child to take smaller, manageable bites of food.
٢. **Slow Pace**: Encourage the child to eat slowly, taking time to chew each bite thoroughly before swallowing.
٣. **Verbal Reminders**: Prompt the child to take smaller bites verbally, reinforcing the technique during meals.
٤. **Modeling**: Demonstrate proper chewing and swallowing techniques yourself as an example for the child to emulate.
٥. **Positive Reinforcement**: Provide praise and encouragement when the child successfully takes smaller bites and chews thoroughly.
٦. **Movement Coordination**: Guide the child to place pretzels at the corners of the lips, and instruct them to use the tip of their tongue to move the food to the molars, initiating the chewing process. This method helps in fostering controlled movement and effective chewing of food items like pretzels.

During the second two months of intervention (the third and the fourth month of intervention), the enhancement of the articulation muscles are the main target to be achieved before lips and jaw muscles. The used tool in this "tongue lateralization & elevation" to improve the tone of the articulation muscles.

b- Regarding the production of speech:

The phonological and articulation assessment is made and the results showed the devoicing process in the case speech; all the voicing sounds are produced voiceless sounds. The occurrence of speech errors regarding laterals /l/ sound and rhotic /r/ sound due to the weakness and discoordination of the tongue muscle.

The treatment plane started to work on sounds in isolation then the sounds in different syllabic structures in hierarchy CV < CVC< CVCV syllables the random words

In Conclusion, **case ٣** showed progress of partial closure of the open lips and mouth which indicates ongoing lip exercises as necessary step until the achievement of the full closure of the mouth and lips. Significant progress has been noted in feeding, with an improvement of ٨٠٪ compared to previous levels. In terms of speech, voiced sounds such as /z/ and /g/ have shown improvement at the word level, suggesting the advancement to work at the sentence level in future sessions.

Case Sample ٤:

The child is ٦ years old and is diagnosed as Global developmental disorder (GDD)[١]. She suffers from tongue thrust, articulation disorder, metathesis, poor dissociation, poor feeding skills, poor lip closure and speech errors.

Intervention period:٤ months

The intervention Program plan: The child suffers from whole body muscles weakness and discoordination. Her receptive and expressive language is good but articulation errors are detected due to severe muscle weakness. like her peers

Articulation test shows articulation errors as substitution; the following sounds are substituted to another sounds:

/s/ → /θ/

/ð / → θ /

/ʃ/ → /θ/

/k/ → /t/

/g/ → /t/

/d/ → /t/

The intervention plan is focused on the strengthening the tongue muscles, various OPT tools for those purposes are used.

Training sessions:

١- First month training session

The OPT tools which are specifically designed to target the intrinsic muscles of the tongue are employed as the straws, commencing with Straw number One. Figure (٩). Subsequently, the exercises focusing on tongue elevation and lateralization, with an emphasis on building resistance in the tongue muscles are done using tongue elevators.

Figure ٩: different straw numbers to develop swallowing skills

Our objective was to achieve a ٣٠-second hold in the elevated tongue position; however, the child was only able to maintain this position for ١٥ seconds before experiencing resistance.

To address this, several strategies are performed:

١. **Gradual Progression:** Incrementally increase the duration of the tongue elevation exercise. For instance, begin with a ١٥-second hold and gradually extend the duration by ٥-second increments as the client's endurance improves.
٢. **Rest Intervals:** Incorporate brief rest periods between exercise sets to allow for muscle recovery, which can enhance overall stamina.
٣. **Frequency:** Ensure consistent and regular practice of the exercises to promote muscle strengthening and endurance.
٤. **Variations:** Introduce different exercise variations to target various aspects of muscle strength and coordination, including alternative resistance objects

٢- Second month training session

The regimen established in the first month focusing on the preparation of the tongue muscles is performed. The exercises aimed at working on speech sounds in isolation are presented; selecting two specific sound pairs for this month: /s/ and /θ/, as well as /t/ and /d/.

The efforts are concentrated on refining the production of the /s/ sound, addressing the issue of tongue thrust and protrusion that the child exhibited while articulating the previously practiced sounds.

Additionally, several techniques are incorporated to enhance the production of speech sounds and support overall vocal function. These techniques included:

١. **Articulation Exercises:** Practicing specific speech sounds, such as /s/, /t/, /d/, and /l/, which require precise tongue movements and positioning.
٢. **Phonetic Drills:** Engaging in exercises that involve repeating consonant-vowel combinations and tongue twisters to improve muscle coordination and strength.
٣. **Voice Onsets:** Utilizing techniques that involve the gradual initiation of vocal fold vibration to enhance control over the voice and tongue movements.
٤. **Resonance Exercises:** Performing tasks that focus on adjusting vocal resonance, such as humming and chanting, to support the coordination of tongue and vocal tract functions.

These techniques are integrated into the exercise regimen to improve the client's speech sound production and overall oral motor performance

٣- Third month training session

Incorporating additional time for tongue resistance training by extending the duration to ١٥ seconds, building on the progress achieved in the previous month where we reached ٢٠ seconds.
In terms of tongue positioning and control, the bite blocks are used which are placed on the left and right molars as well as the premolars to increase the biting pressure. The child was guided to gradually touch the bite block with the tip of the tongue in the target position.
For speech sound practice, transitioning from the sound level exercises to word-level exercises using the sounds in familiar words is the goal of this level. For example: -

- **سلة**: /ˈsællæ/
- **سلمى**: /ˈsælma/
- **سن**: /sɪn/

Additionally, the /ʃ/ and /k/ sounds are introduced to be practiced in isolation then in words.

٤- Fourth month training session

The previous techniques are maintained together with increasing the difficulty level of sound production in medial and final positions. Examples are illustrated below: -

For the sound /s/, /d / in medial and final position

For /s/:

- Medial Position:
  - Arabic Word: كرسى
  - IPA Transcription: /korsi/
- Final Position:
  - Arabic Word: فأس
  - IPA Transcription: /fæʔs/

For /d/:

- Medial Position:
  - Arabic Word: جديد
  - IPA Transcription: /gæˈdiːd/
- Final Position:
  - Arabic Word: عيد
  - IPA Transcription: /ʕiːd/

For /ʃ/:

- Initial Position:
  - Arabic Word: شمس
  - IPA Transcription: /ʃæms/
- Final Position:
  - Arabic word: وش
  - IPA Transcription: /weʃ/

For /k/:

- Initial Position:
  - Arabic Word: كتاب
  - IPA Transcription: /kiˈtæːb/
- Final Position:
  - Arabic Word: سمك
  - IPA Transcription: /sæmæk /
  -

Conclusion: Case ٤ showed great progress when the tongue has successfully returned to its neutral position. Figure (١٠)

before **After**

Figure ١٠: shows the great progress of enhancement of tongue protrusion after training.

Regarding the speech sounds errors, the child ‘s speech sounds have been effectively modified and have largely been corrected. While occasional slips may occur in spontaneous speech, the child is now capable of self-correcting any errors made.

IV- General Results: -

The results of the studied cases revealed the following:

Regarding feeding, Oral placement therapy has demonstrated significant benefits in feeding outcomes. Children who undergo the techniques of the oral placement therapy (OPT) by using the talk tools exhibit improved tolerance for foods with varying textures and viscosities, which positively influences their weight and overall health.

Regarding articulation muscles, Oral placement therapy has presented notable changes in facial muscles structure. For instance, children with habitual open mouth posture often transition to a closed mouth position. Additionally, children with poorly defined cheeks muscles have showed marked improvement in cheek definition, and those with persistent tongue protrusion have experienced a return to a neutral tongue position.

For Speech sounds production, children with speech and articulation disorders have led to substantial modifications in sound production by applying the oral placement techniques. This improvement has enhanced speech production and speech intelligibility.

Children suffering from hypernasality or hypo -nasality have showed considerable progress in nasal-oral coordination following oral placement therapy. This advancement contributes to improve phonation, sentence length, reduced speech dysfluency, and overall enhanced speech intelligibility.

Regarding the sensory Awareness, Oral placement therapy has increased the awareness of oral structures. It has been effective in eliminating drooling and reducing or nearly eliminating oral biting behaviors in children with sensory dysfunction affecting the cheeks, tongue, or both.

In summary, the Oral placement therapy has targeted the functionality of oral muscles, leading to enhanced strength, resistance, and normalization of muscle function, which positively impacts overall oral performance. For instance, children who initially struggled with chewing and swallowing different food textures may begin to handle a broader range of foods with ease. Additionally, children who had difficulty with clear speech articulation often show marked improvement in their ability to produce distinct sounds, thereby enhancing their verbal communication.

Furthermore, cases of severe drooling and inappropriate oral biting behaviors, such as biting the cheeks or tongue, have showed significant improvement. Overall, the OPT therapy supports the development of appropriate oral muscle coordination, contributing to improved feeding, speech clarity, and sensory awareness.

V- Conclusion: -

Using the oral placement therapy (OPT) in treatment is a very effective rehabilitative program. I have seen tremendous improvement in terms of muscle strength and movement in cases suffering from oral speech disorders. Feeding difficulties reduce. The progression of disease slows down in OSD and other neurodegenerative disorders. Children become more aware of their oral structures which reduces hyper or hyposensitivity. For example, with the use of a chewy tube hypersensitivity may reduce. They understand the placement of the tongue and lips to produce various sounds. Drooling reduces due to increased stability and strength.

In conclusion, the tools are a fun addition. Above all, it is also a more effective manner. Talk tools experts conduct the training program. Speech therapists can enroll in the course. The course has different levels. A trained therapist will show good results and the cases can produce speech and endure it using only auditory and visual stimuli.

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