

Treatment of Children With Speech Oral Placement Disorders (OPDs): A Paradigm Emerges

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Abstract

Epidemiological research was used to develop the Speech Disorders Classification System (SDCS). The SDCS is an important speech diagnostic paradigm in the field of speech-language pathology. This paradigm could be expanded and refined to also address treatment while meeting the standards of evidence-based practice. The article assists that process by initiating a clinical exchange of ideas on the topic of speech treatment. It explores: (a) the treatment of children with speech oral placement disorders (OPD; a new term suggested by the authors), (b) the various types of speech oral placement therapy (OPT) used to treat OPD, (c) the relationships of OPT to current motor learning theories and oral motor treatment, as well as (c) the critical need for appropriately designed, systematic research on OPT.

Keywords

speech treatment, speech disorders, motor learning, oral motor treatment, evidence-based practice

The Speech Disorders Classification System (SDCS; Shriberg, 1993, 1994; Shriberg, Austin, Lewis, McSweeny, & Wilson, 1997) contains a number of subcategories under the subtopic of speech delay. The subtopic of speech delay falls under the overall category of developmental phonological disorders in the SDCS. According to this system, speech delay can result from

- an unknown, possibly genetic, origin,
- otitis media with effusion,
- childhood apraxia of speech,
- developmental psychosocial impairment, or
- craniofacial and sensory-motor impairment in special populations.

These classifications are important diagnostic categories. However, it is unlikely that children within these SDCS diagnostic subcategories fit into homogeneous treatment groups. It is more likely that treatments will vary within each subgroup based on individual needs. This article proposes ideas to further refine and possibly expand the SDCS system to account for this variability. It is hypothesized that at least two treatment subgroups (i.e., children with oral placement disorders and those without) will be found within each SDCS subcategory listed here.

Definition of Speech Oral Placement Disorders

Oral placement disorder (OPD) is a new term suggested by the authors. 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, 2001, in press; DeThorne, Johnson, Walder, & Mahurin-Smith, 2009; Hammer, 2007; Hayden,

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2004, 2006; Kaufman, 2005; Marshalla, 2004; Meek, 1994; Ridley, 2008; Rosenfeld-Johnson, 1999, 2009; Strand, Stoeckel, & Baas, 2006).

Oral placement disorder does not apply to children with speech delay who 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.

Treatment of Speech OPDs

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, a number of SLPs also facilitate speech movements and placements in children with OPD via tactile-proprioceptive input (Bahr, 2001, in press; Hammer, 2007; Hayden, 2004, 2006; Kaufman, 2005; Marshalla, 2004; Meek, 1994; Ridley, 2008; Rosenfeld-Johnson, 1999, 2009; Strand, et al., 2006).

Using the work of OTs and PTs as a model, SLPs first evaluate the movement and placement of mouth structures for speech production. It is more difficult to observe intra-oral than extraoral movements and placements. However, instrumentation such as ultrasound imaging (Sonies, 1998; Ridley, Sonies, Hamlet, & Cohen, 1990, 1991) and palatometry (Fletcher, 2008) will hopefully become increasingly available for this process. Currently, the SLP must infer intraoral movements from a thorough oral mechanism examination (including palpation of the oral structures) and an evaluation of speech production patterns (e.g., fronting, backing, etc.).

Once the SLP identifies and understands the oral movements used in a child's speech production, tactile-proprioceptive techniques for speech articulator placement can be used. These techniques are found in the work of Diane Bahr (2001, in press), David W. Hammer (2007), Deborah Hayden (2004, 2006), Nancy Kaufman (2005), Pamela Marshalla (2004), Merry Meek (1994), Donna Ridley (2008), Sara Rosenfeld-Johnson (1999, 2009), Edythe Strand (Strand, et al., 2006), and others. The methods represent a paradigm of tactile-proprioceptive treatment, different from traditional auditory-visual approaches. This can be termed oral placement therapy (OPT, Rosenfeld-Johnson, 2009) because tactile-proprioceptive oral placement techniques are used to directly facilitate speech sound production.

Phonetic placement therapy (PPT), as discussed by Van Riper in 1954 (pp. 236–238), has been used historically to

improve speech production. Traditional articulation and phonology treatments use auditory-visual cueing and verbal instruction for phonetic placement. OPT uses proprioceptive-tactile input to attain phonetic placement.

Oral placement therapy is combined with other approaches in this paradigm. For example, Diane Bahr (in press) and Nancy Kaufman (2005) also use *bottom-up* speech approaches (e.g., moving from vowel, consonant-vowel, vowel-consonant, to more complex speech productions) in conjunction with OPT. David W. Hammer (2007) and Deborah Hayden (Hayden & Square, 1994) use hierarchical speech approaches (i.e., building speech from sounds a child can produce) along with OPT. Other therapists combine OPT with more traditional articulatory approaches (i.e., building the use of a targeted speech sound from isolation to carry-over in conversation). Carry-over to standard speech sound production is obtained through repetition and practice incorporated into daily homework assignments in all types of treatment.

The following sequence is seen in many forms of OPT (Bahr, 2001, in press; Crary, 1993, p. 224; Hayden, 2004, 2006; Marshalla, 2004, 2007; Meek, 1994; Rosenfeld-Johnson, 1999, 2009; Young & Hawk, 1955):

1. Facilitate speech movement with assistance of a therapy tool (e.g., bite block) and/or other tactile-proprioceptive facilitation technique (i.e., manipulation of oral structure by therapist);
2. facilitate speech movement without therapy tool and/or other tactile-proprioceptive technique; and
3. immediately transition movement into speech with and without therapy tool and/or other tactile-proprioceptive facilitation technique.

(Note: This will be different based on the individual child. Some children can handle speech work along with sensory-motor facilitation. Other children may need the speech production added once the appropriate movement is established. Information on motor learning theories can assist the SLP in understanding how this may work.)

When a child receives speech OPD remediation, the following sequence may be seen:

1. The child is first assessed to evaluate if he or she can produce speech sound(s) in isolation using auditory-visual cueing and/or verbal instruction.
2. If the child *can* produce the targeted speech sound(s), then tactile-proprioceptive placement work is *not* needed and typical speech production work can begin.
3. If the child *cannot* attain targeted speech sound(s) with auditory-visual input, a thorough assessment of oral sensory and motor function for speech is required.

4. Once abnormal oral placement patterns are identified, a hierarchy of tactile-proprioceptive therapeutic activities is used to teach targeted movements needed for speech. This is hypothesized to teach the “feel” of speech while developing motor plans or gestures for speech. The section on motor learning theories explains these processes. Oral placement is practiced until the child performs the movement and speech sound without a therapy tool and/or other facilitation technique. 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. Hayden (2006), Strand, Stoeckel, and Bass (2006), as well as DeThorne et al. (2009) 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. Another way to facilitate the /m/ sound would be through Prompts for Restructuring Oral Muscular Phonetic Targets (PROMPT) or Moto-kinesthetic, hands-on speech facilitation approaches where the therapist brings the child’s lips together manually.

Speech Oral Placement Therapy (OPT) and Motor Learning Theories

Oral placement therapy may be congruent with current yet somewhat opposing theories of motor learning (i.e., *dynamic systems theory* and *schema theory*). Kent (2008) discusses the differences between these theories in his recent article entitled “Theory in the Balance.” According to Kent, dynamic systems theory has not been widely applied in speech-language pathology. Most OPTs appear to be based on the schema theory and motor programming. However, Edythe Strand’s (Strand, et al., 2006) Dynamic Temporal and Tactile Cueing (DTTC) and Deborah Hayden’s (2004, 2006) Prompts for Restructuring Oral

Muscular Phonetic Targets approaches appear to have been developed from dynamic systems theory. Both theories may have some value in the discussion of OPT.

Dynamic systems theory (Kent, 1999, p. 60–62) is based on “motor gestures,” which are “abstract representations of movement.” Sensory processing and motor output are inextricably connected to form synergies that are said to be “softly assembled to create stable but flexible units of action.” A particular synergy is related to a specific movement goal but may accomplish different motor tasks. Kent provides this example: In “oral motor control . . . a synergy based on lip and jaw muscles can be useful in eating and drinking but also in forming the bilabial sounds of speech” (p. 62). The difference between these tasks is in the assembly and tuning of the movements. The child must know which gestures to use, then assemble and tune the gestures for speech. Gestures for speech are tuned and assembled differently than gestures for eating, drinking, or other mouth activities. Oral placement therapy assists the child in developing, assembling, and tuning the oral motor gestures needed for targeted speech sounds. This is qualitatively different from the idea of motor planning for speech production.

Maas et al. (2008, p. 279–280) discuss schema theory (i.e., the work of Schmidt, 1975, 2003, and Schmidt & Lee, 2005). They say, “schema theory . . . assumes that production of rapid discrete movements involves units of action (motor programs) that are retrieved from memory and then adapted to a particular situation.” Motor programs are said to be generalized by capturing the unchanging aspects of a movement. A single generalized motor program (GMP) may govern a general class of movements that is graded for the demands of a particular task. Oral placement therapy appears to help establish oral motor plans that cannot be established by traditional auditory-visual cueing and verbal directions. It uses the concept of the GMP to place those motor plans directly into speech production.

The basic tenants of OPT also align with the research of Moore and his colleagues (Green et al., 1997; Moore & Ruark, 1996; Moore, Smith, & Ringel, 1988; Ruark & Moore, 1997). Their research revealed that motor coordination for speech production is likely controlled by different neural mechanisms than motor coordination for eating, drinking, and other nonspeech tasks, particularly beyond 2 years of age. Oral placement therapy facilitates movements used in speech production only and supports the idea that eating, drinking, speaking, and other oral activities have distinct motor plans.

Oral Placement Therapy in Relationship to Oral Motor Treatment

Until now, there was no term for OPT, so it was frequently filed under the heading of oral motor treatment. Not all

therapy under this umbrella term is the same. Treatments targeting specific movements for speech sound production have unfortunately been categorized with treatments not targeting specific speech sound production. This can be better understood by reviewing Bahr's research regarding the misunderstanding and confusion surrounding the term *oral motor treatment*.

Bahr (2008) found some of the first references to the term "oral motor" in 1980s peer-reviewed journal literature describing feeding and motor speech behaviors (e.g., Alexander, 1987; Morris, 1989). However, some recent authors and presenters (Banotai, 2007; Bowen, 2005; Clark, 2005; Flaherty & Bloom, 2007; Insalaco, Mann-Kahris, Bush, & Steger, 2004; Lass, Pannbacker, Carroll, & Fox, 2006; Pannbacker & Lass, 2002, 2003, 2004; Polmanteer & Fields, 2002; Pruett-Hayes, 2005; Ruscello, 2005; Williams, Stephens, & Connery, 2006) appear to narrowly define and equate the term oral motor treatment with nonspeech oral motor exercise and treatment (NSOME/NSOMT). It is important to note that the majority of these articles and presentations did not appear in peer-reviewed journals.

The recent narrow use of the term oral motor treatment has apparently caused significant misunderstanding and confusion within the field of speech-language pathology. According to Bahr (2008), 74% of 500 SLPs surveyed said they had heard the general statement "oral motor treatment does not work" from colleagues, professors/instructors, and other sources. Bahr then looked at how these same therapists defined oral motor treatment. Approximately 70% of SLPs considered feeding/oral phase swallowing, motor speech, oral awareness/discrimination, and oral activities/exercises as part of oral motor treatment. With 74% of therapists hearing the general statement "oral motor treatment does not work," and approximately 70% of therapists defining oral motor treatment as feeding/oral phase swallowing, motor speech, oral awareness/discrimination, and oral activities/exercises, the confusion and misunderstanding in the field of speech-language pathology regarding the term oral motor treatment is understandable.

Oral placement therapy for speech is a form of oral motor treatment, but it only targets movements used in speech sounds. It can be used with both children and adults who cannot imitate targeted speech sounds (Rosenfeld-Johnson, 2008). OPT for speech does not include activities unrelated to speech sound production such as "tongue wagging" and "cheek puffing" (Lof & Watson, 2008). The concepts of OPT are consistent with information in articles by authors discussing NSOME/NSOMT (e.g., recent articles found in *Language Speech and Hearing Services in Schools*, 39, July 2008). Only speech movements are targeted in OPT. Movements dissimilar to speech are not used in OPT to facilitate speech. Therefore, OPT for speech is not NSOME/NSOMT.

A number of forms of OPT are listed in Table 1. The approaches seem to have some important common characteristics. Most of them appear to involve task analysis that is systematically and hierarchically applied. Only movements needed for identified speech sounds are targeted. These movements are facilitated in a repeated manner, so appropriate speech movements can be generalized throughout the processes of co-articulated speech. Most of the listed approaches involve hands-on, tactile-proprioceptive facilitation techniques. However, two of the approaches (i.e., palatometry and ultrasound imaging) reflect instrumentation currently unavailable to most SLPs.

Implications for the Field of Speech-Language Pathology

This article is meant to stimulate a clinical exchange among SLPs regarding the appropriate treatment of children with speech delay. It describes a treatment group (i.e., children with OPD) not defined in past literature. It also explores the variety of current treatments for children with OPD (i.e., OPT). The authors suggest the expansion and refinement of the SDCS to address treatment categories because children fitting current SDCS diagnostic categories do not appear to form homogenous treatment groups. The relationships of OPT to current motor learning theories and oral motor treatment are described, so that SLPs can use this information as part of a clinical exchange. It is important for SLPs to understand that OPT is a form of oral motor treatment; however, it is not NSOME/NSOMT. Knowledge of motor learning theories is also crucial for SLPs, because current OPTs are based on these. The clinical exchange is ultimately needed to develop appropriate treatment studies to fulfill the requirements of evidence-based practice.

A Call for Research

Of the clinicians listed in Table 1, Hayden (1994, 2006; Hayden & Square, 1994) and Strand (1995; Strand et al., 2006) have published information in peer-reviewed journal literature relative to OPT. Meta-analysis (Robey & Dalebout, 1998) and randomized controlled trials (e.g., Gillam et al., 2008) comparing the variety of tactile-proprioceptive OPT approaches for speech are needed. An epidemiological study like the one used to develop the SDCS (Shriberg, 1994) is recommended to establish the validity of the proposed subgroups (i.e., children with speech OPDs vs. those without speech OPDs).

Bahr (2008) also recommended that doctoral-level researchers and master's-level clinicians work together on this process. Doctoral-level researchers with expertise in oral motor function are needed to develop appropriate studies comparing speech OPT approaches. Master's-level clinicians who use OPT are needed to collect the data for the

Table 1. Some Current Oral Placement Therapies

| Therapists | Type of Treatment | Description |
|--|---|---|
| Diane Bahr (2001, in press) | Hands-on, tactile-proprioceptive and <i>bottom-up</i> speech approaches combined | Therapist's gloved hand/fingers placed near/on lips and/or under tongue base/mouth floor to facilitate appropriate speech oral movements while presenting speech production stimuli (e.g., pictures, words, etc.) beginning with vowels and moving toward increasingly complex speech sound combinations (e.g., CV,VC, CVC, etc.). Appropriate props (e.g., bite blocks to attain graded jaw height) may also be used. |
| Samuel Fletcher (2008) | Palatometry | "Computerized visual-auditory feedback tool that provides an online, dynamic display of the tongue's contact with the hard palate during speech and swallowing functions." (Dorais, 2009, p. 1) |
| David W. Hammer (personal communication, August 19, 2009) | Touch cues | "Combined with sign language (e.g., to prompt the final sound in the signed word), touch cues are used on the therapist's structures as a model or on the child's structures when needed. Visual prompts are provided to indicate manner of production and to signal when the vowel or consonant is added to the sequence (e.g. moving down string for an /s/ and then when hitting a button at the bottom of the string the 'ee' is added for 'see'; pushing finger away from lips while saying 'ah' until finger touches other person's and then vowel is added like 'oo' for 'shoe')." |
| Deborah Hayden (2004, 2006) | Prompts for Restructuring Oral Muscular Phonetic Targets (PROMPT) | Uses tactile-kinesthetic input to shape or reshape muscle actions and speech subsystems to produce speech. |
| Nancy Kaufman (2005) | Visual/tactile cues | Uses least invasive tactile-proprioceptive input only when child cannot produce speech target via visual and auditory cueing. Tactile-proprioceptive cueing demonstrated on therapist before touching child. |
| Pamela Marshalla (2004); Pamela Rosenwinkel (1982) | <i>Oral-Motor techniques in articulation & phonological therapy</i> (2004); <i>Tactile-proprioceptive techniques in articulation therapy</i> (1982) | "Hands-on" and "hands-off" tactile-proprioceptive stimulation added to traditional articulation and phonological therapy for clients who do not progress with visual and auditory stimuli. |
| Merry Meek (1994) | <i>Motokinesthetic Approach</i> [DVDs] | Meek demonstrates hands-on, tactile-proprioceptive manipulation of the oral structures to assist the child in producing specific speech sounds/sound combinations (originally developed by Young & Hawk, 1955). |
| Donna Ridley (2008) | Tactile-kinesthetic cues, muscular manipulation, ultrasound imaging | Hands-on manipulation of child's oral structure to directly facilitate speech sound production. See description of ultrasound imaging below. |
| Sara Rosenfeld-Johnson (1999, 2009) | Oral placement therapy (OPT) | Therapist task analyzes dissociation, grading, and direction of oral and respiratory movements needed for targeted speech sound production and applies appropriate tool(s) with required number of repetitions to teach motor plans similar to standard speech production. Movements and placements are transferred directly into speech production as soon as possible. |
| Barbara Sonies (1998); Donna Ridley (Ridley, Sonies, Hamlet, & Cohen, 1990, 1991) | Ultrasound imaging | Provides auditory and visual feedback regarding tongue shape, movement, and placement during speech production. |
| Edythe Strand (Strand, Stoeckel, & Baas, 2006) | Dynamic temporal and tactile cueing | When child cannot produce speech target via typical auditory-visual imitation, various levels of cueing systematically added (e.g., unison, oral movement without voice, rate variation, and tactile/gestural cues as appropriate). Based on the work of Rosenbek, Lemme, Ahern, Harris, and Wertz (1973). |

studies. This could be completed with relative ease as there seem to be a significant number of clinicians using these techniques. This type of collegial effort could facilitate more cohesion in the field between doctoral level researchers and master level clinicians.

Here are some important questions to ask with such research:

- Which tactile-proprioceptive OPT techniques (for speech) are most effective?
- Which combination of treatment approaches work best with OPT?
- For whom is OPT most effective?

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