

**Current Research in the Field of Oral-Motor, Muscle-Based Therapies:
Response to: Logic, Theory and Evidence Against the Use
of Non-Speech Oral Motor Exercises to
Change Speech Sound Productions by Gregory Lof**

Jennifer A. Bathel, M.S., CCC-SLP

Recent literature, publications, commentaries, and presentations have emphasized the need for evidence-based research in the substantiation of oral-motor or muscle-based non-speech therapy practices (Apel, 1999; Baker & McLeod, 2004; Gierut, 1998). Out of the same claims are cautions against oral-motor therapy approaches independent of, and in conjunction with, traditional speech therapy (Clark, 2003, 2005; Forrest, 2002; Hodge, 2002; Lof, 2003; Lof, 2006; Moore & Ruark, 1996; Strand & Sullivan, 2001). It has been argued that oral-motor exercises do not prepare, strengthen, or improve movement of the oral musculature required for accurate speech production (Bowen, 2005; Clark, 2003; Forrest, 2002; Hodge, 2002; Lof, 2003), but rather, train muscles for non-speech movements. This argument has pervaded due to a lack of research in oral-motor, muscle-based practices. The most recent review of the literature designed to negate the validity of oral-motor therapies was presented at the American Speech, Language, and Hearing Association's national convention (ASHA convention 2006) in Miami, Florida. Gregory Lof was invited to present his logic and theories against the use of oral-motor, non-speech therapy techniques.

His handout was widely circulated before and after the convention via the internet (listserves, e-mail, and web pages) and word-of-mouth. It has been widely discussed as testimony against the use of oral-motor speech practices. Lof's handout, entitled "Logic, theory and evidence against the use of non-speech oral motor exercises to change speech sound productions," is an outline of his philosophy opposing the use of non-speech, oral motor therapies, and a literature review of some of the more current research data supporting his stance. He makes compelling and accurate arguments regarding overall practices of speech-language pathology and research paradigms. However, he chose to tack each statement to isolated aspects of oral-motor therapy, and while many of the statements do not discredit muscle-based oral-motor programs, they can be interpreted as such. This article will discuss Lof's arguments and why and how his points are

sometimes accurate, inaccurate, or too narrowly focused. It will also attempt to explain how and why so many speech-language pathologists (SLP's) continue to use, and find success using, muscle-based, oral-motor speech therapy techniques.

PART-WHOLE TRAINING AND TRANSFER

Relevance to Speech

Lof (2006, p. 1) gives two definitions of non-speech oral-motor exercises (NS-OME) (p. 1) and suggests non-speech oral-motor exercises do not change speech production.

1. *Any technique that does not require the child to produce sound but is used to influence the development of speaking abilities* (lof & Watson, 2004; In Press).
2. *A collection of nonspeech methods and procedures that claim to influence tongue, lip, and jaw resting postures, increase strength, improve muscle tone, facilitate range of motion, and develop muscle control* (Ruscello, In Press).

Without transfer and maintenance of skill sets to speech production, this is true, as non-speech oral-motor exercises in and of themselves do not improve speech clarity or speech production ability. For example, tongue wagging, lip licking, and exercises focusing on improving strength of articulators have not proven effective in the management of speech disorders when used in isolation and especially when used with clients who do not exhibit muscle-based deficits (Abramahansen & Flack, 2002; Bush, Steger, Mann-Kahris, & Insalaco, 2004; Christensen & Hansen, 1981; Colone & Forrest, 2000; Fields & Polmanteer, 2002; Gommerman & Hodge, 1995; Giusti & Cascella, 2005; Occhino & McCane, 2001; Roehrig, Suiter, & Pierce, 2004). These exercises do improve muscle skill not achieved prior to therapeutic intervention, but when muscle skill is not directly applied to speech production, only the skill learned is improved, not speech clarity. The following example illustrates how muscle-based practices can improve speech clarity: a child who produces /m, p, b/ phonemes with tongue protrusion (tongue acts as lower lip) has the approximated /m, p, b/ phonemes in

their phonemic repertoire, but has speech clarity deficits as a result of a muscle-based deficits. A muscle-based, oral-motor program targeting tongue retraction (through exercises and during speech tasks) will improve the clarity of those phonemes.

It is also understood that neural systems require motor patterns to be learned in the context of the intended action (Hodge & Wellman, 1999; Weismer, 2006). However, as will be discussed further on, motor patterns can also be refined when broken down for short periods of time to improve specific skills which are then incorporated into context immediately after improvement. Lof states:

“Tasks that comprise highly organized or integrated movements (such as speaking) will not be enhanced by learning the constituent parts of the movement alone; training on just the parts of these well-organized behaviors can actually diminish learning. Highly organized tasks require learning the information processing demands, as well as learning time-sharing and other inter-component skills.”

Learning a non-speech movement or an isolated movement alone, without immediate transfer to a meaningful context, will only improve the movement alone and not the movement in a sequential task. If this is always true, Lof’s statement should then apply to traditional articulation and phonological approaches, as they would also diminish learning. Isolating sounds and sound elicitation tasks use constituent parts of speech movements alone. If neural systems “require motor patterns to be learned in the context of the intended action,” then statements against the use of isolated skill sets should not apply just to non-speech, oral-motor aspects of speech, but to all speech and language skills that are implicitly taught or trained in isolation first. What needs to be made clear is this: isolated skill sets or muscle movement tasks can (and sometimes must) be refined in isolation prior to or in the midst of being immediately transferred to contextual tasks.

STRENGTH

If a person is unable to produce clear speech sounds due to an inability to move the articulators to the correct position, their speech will be distorted. Non-speech, oral motor exercises are designed to facilitate appropriate movement patterns for adequate speech clarity. Isolating component parts is used after the complex system is in use (speech and language) and when it breaks down. If a person is unable to produce speech

sounds appropriately and assessments of oral motor movement patterns are found to be deficient, oral-motor, muscle-based therapies are applied. This is regularly translated as strength. When a child is unable to retract their tongue inside the oral cavity, behind the teeth, for example, this is often labeled as “weakness.” When a person is found to be unable to touch the alveolar ridge with the tip of his/her tongue (e.g., for the production of /t/ or /d/) to produce speech, or at all, this too is generally described as “weakness.” Lof reiterated findings that suggest additional or improved strength is not necessary for speech production, given that very little strength is required for speech (see Bunton & Weismer, 1994). The research findings to date, regarding strength, are adequate for those with normal/appropriate strength for speech. However, many of the clients seen by SLPs and at Sara R. Johnson & Associates do not have normal baseline strength/ability for speech movements (i.e., children and adults with Down syndrome, CP, etc.). The “very little strength” required for speech may be too much for some clients with functional disorders affecting muscle systems. Clients with reduced tone and coordination, on the other hand, comprise a larger population of those seen for speech clarity concerns and have not been appropriately addressed in the literature to date.

While muscle strength alone is not the objective for speech clarity improvements, it is a component of addressing muscle movement and coordination for speech. Lof goes on to ask: “How do SLPs objectively document weakness of articulators and also objectively document supposed increases in strength after NS-OME?” This is a good question that largely misses the point. SLPs should not address strength (and most do not, rather they simply misname the descriptor of ability, range of motion, rapidity of movement, and coordination), but should instead address movement and coordination appropriate for proper place, manner, and articulation of speech. The ability to move the articulators to the correct place for appropriate manner of speech is often impaired in children with muscle-based disorders. Impaired movement or the ability to achieve the desired movement is targeted during intervention, not the *strength* required for such movements. Movements required for speech are small and refined. Therefore, movements used in muscle-based therapies should not be gross or outside the movement patterns of speech.

Researchers in the field of communication disorders have also suggested muscle-based techniques provide excessive application of strengthening activities, requiring more muscle strength than is necessary for speech production (Clark, 2003). Studies have revealed that only twenty percent of maximum articulator strength is actually used during the production of speech (Barlow & Mueller, as cited in Forrest, 2002). Muscle-based therapy techniques recognize individual speech contacts may only require 20% of maximal force. To maintain appropriate force over multiple speech contacts, as in continuous speech, research documents the need for increased strength to produce adequate levels of control in this condition (Clark, 2003). This type of muscle force during rapid speech conditions is labeled muscle power by Clark. Luschei furthers the discussion that the tongue...

...requires considerable muscular strength to move *quickly* (e.g., Dworkin & Culatta, 1985), even if contact forces are not great. In other words, while high forces may not be observed during lingual speech movements, significant power may be necessary to produce the forces at an adequate speed. Thus, strength training for a patient such as this may focus on improving power as opposed to force, with the ultimate goal of improved speed of articulator movement, which would result in articulatory accuracy and intelligibility (p. 410, as cited in Clark, 2003).

While muscle-based therapies may require more force of the muscle than is required for speech contacts, to maintain contacts necessary for accurate speech sounds the muscle should be facilitated as closely as possible to normal maximal forces, allowing it to approximate the most typical function possible with regard to speed. Muscle-based therapy does not attempt to increase maximal force beyond normal maximal measures, but uses muscle coordination as a goal for speakers who exhibit muscle weakness or hypotonia resulting in speech production disorders. The desire to increase strength is related to the ability to maintain accurate muscle function in rapid, co-articulated, speech movement, rather than surpass the exertion normally used in typical speech productions. This is the goal for oral-motor, muscle-based therapies such as those implemented by Sara Rosenfeld-Johnson.

The objective documentation for weakness and strength (returning to Lof's question) is relatively simple. Can a client achieve the movement required for specific speech sounds? Can they coordinate movements of speech during connected speech? The client's ability to achieve appropriate movement for speech is the objective measure used to address movement of the articulators. The same measures are taken pre and post therapeutic intervention, and the client's ability to achieve appropriate movement patterns for speech is the objective measure for the therapy used. Lof is therefore correct in his position that muscle strength and isolated movements should not be the long-term goals of speech intervention.

RELEVANCY TO SPEECH

To further examine isolated movements as therapy targets, Lof uses the example of an athlete's need to practice a motor task in the context of actual performance, and would find agreement with this fact among athletes and speech pathologists alike. He then goes on to suggest that pretending to shoot a basket in the hope it will transfer to improving actual performance is ineffective. However, many psychological paradigms, including sports psychology, Neuro-Linguistic Programming, and Positive Mental Imaging, do not agree. Creating a positive mental image does help athletes perform better, which indicates that pretending to shoot a basketball and actually shooting a basket during a game are more closely linked than Lof suggests. The movement in the arm, hand, and wrist can be practiced without the ball in hand, as can bending one's knees and extending fully for a "shot." Practicing isolated movements related to the entire patterned movement are used in all sports; they are also used in therapeutic speech settings for connected speech. The goal is to refine individual related movements to aid in better overall performance. Another example given is the futility of drumming fingertips on a tabletop to become a better piano player. Interestingly, many people who learned to play the piano as a child, myself included, remember learning to do just that. Practicing how scales are played using muscle memory for the thumb to cross under the third finger in order to play a ten-note scale with one hand assists in developing the skill required for whole pieces of music to be played.

Linking positive mental imaging and muscle memory is somatosensory feedback. The reason speech pathologists, athletes, and musicians isolate muscle movement patterns is to refine the necessary movements required to perform the whole task. To adequately execute a speech movement in the context of conversational speech (or free throw in a basketball game) one must be able to perform each desired movement fluidly. Traditional articulation and phonological therapies rely heavily on visual and acoustic feedback systems. Research and clinical documentation have shown that somatosensory feedback systems are “central to achieving the precision requirements of speech movements” (Nasir, et. al, 2006, p. 1). Nasir, et. al found somatosensory (how muscles feel when moving for task specificity) feedback “plays a role that extends from brainstem responses to cortical control” (p.1). This study altered jaw movements from their target goals independent from auditory intentions. This provided evidence that muscle movement and movement awareness affect speech production. While contextualized speech is always the goal, isolated muscle skill sets do prove necessary for speech target accuracy.

These examples are used to illustrate the same neural and motor learning parameters targeted to improve speech clarity. The use of non-speech oral-motor exercises alone, outside the context of speech, is not effective. Studies trying to prove this point have failed due to various methodological and parametric flaws (Abrahamsen & Flack, 2002; Bush, Steger, Mann-Kahris, & Insalaco, 2004; Christensen & Hanson, 1981; Colone & Forrest, 2000; Fields & Polmanteer, 2002; Gomberman & Hodge, 1995; Guisti & Cascella, 2005; Hayes et al., In submission; Occhino & McCane, 2001; Roehrig, Suiter, & Pierce, 2004). Non-speech, oral-motor exercises should not be used outside the context of speech. Similarly, phonological and articulation therapies target specific phoneme or syllable production in isolation before transferring learned muscle skills into connected speech. Oral motor movements used to produce a correct phoneme (place and manner of articulation) are practiced over and over to improve muscle-memory and motor planning. This is the same way an athlete practices a free throw repetitively to improve his shooting average in an actual game (performance) and a novice piano player learning the fundamentals of scale mastery to eventually play a concerto. Muscle-based, non-speech oral-motor movements should be used to improve the place and manner of

articulation for a child with muscle deficits. In turn, non-speech, oral-motor practices should not be used in isolation without transfer and relevance to speech production. A child who practices blowing bubbles, for example, but is not required to immediately practice abdominal control or lip rounding in the context of speech, will only become better at blowing bubbles.

TASK SPECIFICITY

Task specificity is the best way to learn and practice a new skill. This is true if the person has the underlying ability to perform the new skill. Lof uses the example of a piano player tapping fingers on a tabletop versus playing the piano. He argues that tapping one's fingers on a tabletop is an illogical way to learn and improve piano playing skills. This is obviously true. One does not learn to play the piano without a piano. However, awareness, coordination, and muscle tone can be specifically targeted in isolation (drumming one's fingers on a tabletop) in conjunction with contextual practice (using a piano and pieces of music). A common scenario in speech therapy rooms is the child who cannot perform movement patterns shown to him/her visually or auditorially, but possesses imitation skills for other social and communicative actions. If a child does not have the underlying muscle skill to perform a movement necessary for the desired speech sound, he/she will not be able to produce it. Muscle-based therapies address such inabilitys by first obtaining the desired movement, then transitioning the movement immediately to speech tasks.

The *Part-whole training and transfer* argument (p.2-3) outlined by Lof suggests only whole training is effective. If this is true, it is not oral-motor, muscle-based therapies that are under scrutiny, but every part-whole speech, language, or behavior model. This includes traditional articulation, phonological, fluency, literacy, language, and behavioral approaches to therapeutic intervention (and many more). Muscle-based therapies have focused on part-to-whole training due to clients' inability to succeed at the *whole* level. Complex movements are easier to attain and maintain if they are broken down into manageable parts. Children, for example, who have difficulty with speech clarity during conversational or running speech are able to achieve intelligible speech at the single word, single syllable, or single sound (if even that is distorted or disordered)

level. Fluidity of movement is possible when all parts of the desired movement are precise and refined. When any single, task-specific movement within the context of the whole is disrupted, fluidity is not achieved. Clients with speech disorders who cannot achieve speech clarity due to a functional difference or inability to pattern movement appropriately and continuously fail to achieve intelligible speech at the word or sentence level until the reason for the distortion is addressed. Once the muscle-based (movement) deficits are addressed, contextual speech is integrated with carryover and maintenance of speech clarity.

Critics of oral-motor, muscle-based therapies argue that individual movements should not be used to teach complex movements due to existing research that claims this segmentation will actually make learning additional complex movement more difficult (Clark, 2003). However, physiological, neurological, and developmental research indicates complex muscle movements are first learned specifically (Hibberd & Jinks, 1998). Muscle physiologists look at muscle specificity to determine how certain muscles function based on their intended movements. Strength and endurance are subsequently targeted as therapeutic goals to achieving desired muscle movements (Hibberd & Jinks, 1998). The principles of muscle specificity have been applied to speech and oral-motor therapies in general to determine how to improve strength, tone, endurance, and coordination for accurate speech production. By isolating specific muscle function, specific speech sound errors due to inadequate patterning of muscle movement can be targeted and improved through a muscle-based approach. Oral-motor, muscle-based therapies should also integrate multi-sensory and multi-modal systems through the use of tactile and articulator placement methods (in addition to more traditional visual and auditory techniques) to implement the principles of muscle specificity. This can be used in conjunction with audio-visual cueing systems. These combined principles of non-speech oral-motor, muscle-based therapies lead to the integration of movements required for complex speech production (see generally, Kaufman, 1995; Hayden, 1994).

These methods are not considered complete until the client can integrate the individual movements into the more complex movement of continuous speech. The majority of this methodology relies heavily on tactile techniques, rather than the traditional auditory and visual cues, and is applied in a hierarchical fashion (Rosenfeld-

Johnson, 2001). Segmented movements are not utilized in muscle-based therapy tasks if the child demonstrates the ability to use more complex movements that can be transitioned to speech sound production immediately. When this is true, muscle-based therapists are advised to teach speech movement within applicable speech contexts, and with as little segmentation of movement as possible, to assure adequate and successful attempts by the client.

METACOGNITION AND AWARENESS

Lof cites research that aids in our understanding of children's metacognitive skills. It is understood and accepted that children have poor metaphonological awareness (Kamhi & Catts, 2005), meta-articulation awareness (Klein, Lederer, & Cortese, 1991), and metalinguistic awareness (Koegel, Koegel, & Ingham, 1986). Lof points out that until we have a way to scientifically pinpoint when each of these skills is mastered, we cannot understand how children perceive sound. If this is true, then the majority of speech and language early intervention is futile because it cannot be proven scientifically before the age of seven years (Koegel, Koegel, & Ingham 1986). Again, citing research against one specific modality of speech intervention (oral motor, in this case) and using broad-based research findings (as mentioned above) is inaccurate and deceptive. Lof then goes on to suggest that because children have unspecified metacognitive skills, they should not engage in NS-OME tasks. If a child does not have metaphonological or meta-articulation skills then NS-OME tasks should not be a problem and may work to the child's advantage. In addition, if we take Lof's definition of NS-OME (p. 1) verbatim, then meta-cognitive skills are not necessary.

PSEUDOSCIENCE AND EVIDENCE-BASED PRACTICE

Human research (especially behavioral research) is by its nature variable and extremely complex, as it is merely a snapshot. Too many variables are present to use one method of intervention with every child in the same way it is illogical to take every research finding as proof for or against a specific therapeutic approach. Humans are "notoriously nonsensical and unfit subjects for scientific scrutiny" (Bannister, 1966), and it is unreasonable to expect a control for every possible variable. Therefore, scientific

methods are not always an appropriate means of assessing human behavior. Evidence-based practice was designed to uphold or create standards for best practices, not to hijack the individual nature and yet unexplained aspects of human behavior. It is therefore necessary to uphold standards for qualitative research methods. It is unfortunate that descriptive research and clinical data is considered by most EBP proponents to be pseudoscientific research. Qualitative methodologies such as case studies, parent report, and clinician feedback and documentation are vital to understanding how therapies work in dynamic systems. Descriptive/qualitative research methodologies do not control for every possible variable, and as a result are not considered by many to support or negate findings. This places the entire clinical world at a loss and implies clinicians should not report what works because it is not scientific. If this is the definition of evidence-based practice, then a vast amount of data will be lost or deemed useless. Lof cites clinical experience as a caution and liability to evidence of effectiveness, which suggests clinicians are poor judges of success in therapy.

In addition, other reports claim combination approaches and holistic approaches to speech and language therapy should also be discredited or considered invalid, and should not be used because it is impossible to discern which approach worked and which did not. This is crucial to experimental scientific research. The point, however, is this: the clients we treat as speech-language pathologists have varying disorders with co-morbid conditions. It is impossible to account for every variable and possible cause and solution. Therefore, clinicians combine their efforts to treat each client as they present. Using only one approach to treat a variety of presentations of a single disorder is impossible. It is also unethical, for while it is a neat package for experimental or controlled research, it does not address each client's circumstance. Therefore, descriptive/pseudoscientific research is necessary to guide other forms of research and practice. Clinicians *and* researchers (both academia and funded agencies) need to work together to create and support evidence-based practices.

Despite the low volume of research being done with oral-motor/muscle-based interventions, oral-motor therapies are widely used by speech-language pathologists (SLPs) worldwide. Two recent surveys, which included 149 and 537 participants, both suggested 85% of SLPs had used non-speech oral-motor therapies in recent therapeutic

practice (Hodge, Salonka, & Kollias, 2005; Lof & Watson, 2004). In the 537-participant survey, 86% of clinicians reported “they have observed changes in speech” because of non-speech oral-motor therapy methods (Lof & Watson, 2004). Clinical experience and testimonials alone do not meet the stringent scientific requirements of SLPs advocating evidence-based research. They undeniably do, however, provide substantiation for what works (clinically), in addition to providing a sound theoretical basis for future research.

Evidence-based practice should involve “the integration of best research evidence with clinical expertise and patient values” (Sacket et al., 2000, p. 1). Recently, the American Speech-Language-Hearing Association initiated a plea for evidence-based research to drive therapeutic practices. However, many SLPs believe “whatever works” (Forrest, 2002, p. 22) should also drive research topics. Sacket’s definition of evidence-based practice does not suggest a unidirectional approach to the research process in which clinical practice has to wait for research to be completed; rather, it suggests an integration of clinical expertise with sound research evidence, which leads to a bi-directional approach to research necessary for progressive clinical innovation and best practices. While research can dictate practice, practice should also drive research. In fact, this is imperative. Speech-language pathology should be as patient-advocating as other social and medical practices (social work, occupational therapy, physical therapy, etc.) insofar as trusting the evidence presented by clients, families, and clinicians *in addition to* controlled studies that account for and eliminate all other possible influences.

Research confirming and/or refuting therapeutic efficacy for oral-motor, muscle-based treatment of speech disorders is inconclusive (Clark, 2003; Forrest, 2002; Lof, 2003). However, the majority of editorial literature on the topic challenges the efficacy of these therapies. From the perspective of muscle-based therapists, much of the criticism cited in the literature is inaccurate in its narrow examples and definitions. It criticizes, for example, the use of muscle-based therapy in the treatment of functional articulation, phonological disorders, and other inappropriate diagnoses (Clark, 2003; Forrest, 2002). Muscle-based practitioners do not advocate the use of muscle-based therapies with these populations (Rosenfeld-Johnson, 2001). Muscle-based therapy is designed to address the absence of refined muscle movement occurring secondary to

muscle dysarthrias, lack of control, or lack of accuracy (Rosenfeld-Johnson, 2001), which, by definition, do not occur in traditional articulation and phonological disorders. Populations exhibiting these difficulties affecting the movements of speech are the intended recipients of oral-motor, muscle-based therapies. In other words, clients exhibiting muscle-deficits as secondary to various forms of dysarthria due to neurological, chromosomal, and syndrome/disease processes that cause these conditions, are appropriate recipients of oral-motor, muscle-based therapies.

Research involving oral-motor, muscle-based therapies is needed to determine assessment and treatment efficacy for such therapeutic techniques. Proponents of evidence-based research argue only large-scale, controlled, and peer-reviewed research are acceptable; unfortunately, new theories and therapies require time to acquire funding and support until smaller qualitative and quasi-experimental studies are first completed. Sara Rosenfeld-Johnson and Associates are beginning such research with the desire to complete large-scale, controlled, and peer-reviewed studies in addition to qualitative works. It is our desire to consider all current theories, logic, research findings, anecdotal evidence, and valid techniques that work.

Gregory Lof outlined the current opposing views of oral-motor, and non-speech oral-motor, interventions. He described his logic, theory, and evidence against speech therapy practices, and applied broad anti-task-specific arguments to non-speech oral-motor therapies only. However, he succeeded in making anti-task-specific arguments for all behavioral therapies, speech and language alike. Much of the logic and theories can be applied to the basic foundations of speech-language therapy, not just oral-motor exercises as he tries to suggest. Evidence-based and scientific research and practice is a broad category that should embrace all forms of evidence-based outcome measures from researchers and clinicians alike. Contributions to the literature and knowledge of speech systems should come from all practitioners, not just those affiliated with institutions. Clinicians are the engine behind clinically applied speech-language pathology and they should be encouraged, not discouraged, to supply documentation of their work. Muscle-based speech interventionists such as Sara R. Johnson & Associates have joined the evidence-based push for best practices. It is their hope to provide such information.

Clients, families, and clinicians alike support the use of NS-OME, because they have seen such therapies work to improve speech clarity. Eighty-five percent of clinicians in the United States and Canada reported using NS-OME to change speech sound productions (Lof & Watson, 2004; Hodge, Salonka, & Kollias, 2005). However, they aren't using these techniques because they read in the literature that they should; they report having learned muscle-based techniques from other clinicians who teach from their clinical findings. Clinicians using Sara R. Johnson's therapies report seeing greater improvement in clients' speech clarity when the use of non-speech oral-motor exercises is an integral part of speech and language intervention programs. Many clients, families, and clinicians apply Sara R. Johnson's techniques after previous therapies have failed, as preventative therapies for future structural complications (as seen in cleft-palate, Down syndrome, cerebral palsy populations, etc.), and as additional therapeutic interventions for more specific speech clarity concerns.

Speech-language pathologists are professionals, educated at the master's level and trained at accredited universities by PhD-level professors with backgrounds in applied research designs. So why do they continue to use non-speech oral-motor exercises if the research to support such efforts is lacking? The answer is simple; clinicians see improvements in speech clarity through their use of NS-OMEs. Evidence-based practices for clinicians who continue to use NS-OMEs consist of clinical data tracking, parent reports, client reports and improvement, case studies, and quasi-experimental studies. Clinicians see greater improvements in their client's speech clarity through the use of NS-OME in conjunction with more traditional speech therapy practices than they do with traditional auditory and visual methods alone. Evidence-based success is, therefore, determined by goals achieved by clients through the use of methods that work. Speech-language pathologists are educated and trained professionals who use all methods available to them to help each client improve speech and language goals; they *use what works* to improve speech clarity for each and every client. The logic, theory, and evidence against the use of non-speech oral-motor exercises are not sufficient to deter them.

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