

## Clinical Forum

# A Nationwide Survey of Nonspeech Oral Motor Exercise Use: Implications for Evidence-Based Practice

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**S**peech-language pathologists (SLPs) working with children with speech sound disorders may choose from a number of phonetic or phonemic treatment approaches (e.g., Bauman-Waengler, 2008). A *phonetic* treatment approach is typically chosen when it is assumed that the underlying cause of the speech sound difficulty is a motor deficit, so therapy emphasizes the establishment and practice of oral motor movements. Types of phonetic approaches include the sensory motor approach (McDonald, 1964) and the many derivations of the

traditional Van Riper approach (Van Riper & Erickson, 1996). On the other hand, a *phonemic* treatment approach is typically chosen when it is assumed that the child's speech sound disorder is related to poor representation and organization of the sounds within the language system. Phonemic intervention approaches focus on changing the child's phonological rule structure by addressing classes of sounds. Examples of phonemic approaches include minimal pair contrast therapy (Weiner, 1981), cycles approach (Hodson & Paden, 1991), multiple oppositions (Williams, 2000), therapy

**ABSTRACT: Purpose:** A nationwide survey was conducted to determine if speech-language pathologists (SLPs) use nonspeech oral motor exercises (NSOMEs) to address children's speech sound problems. For those SLPs who used NSOMEs, the survey also identified (a) the types of NSOMEs used by the SLPs, (b) the SLPs' underlying beliefs about why they use NSOMEs, (c) SLPs' training for these exercises, (d) the application of NSOMEs across various clinical populations, and (e) specific tasks/procedures/tools that are used for intervention.

**Method:** A total of 2,000 surveys were mailed to a randomly selected subgroup of SLPs, obtained from the American Speech-Language-Hearing Association (ASHA) membership roster, who self-identified that they worked in various settings with children who have speech sound problems. The questions required answers that used both a forced choice and Likert-type scales.

**Results:** The response rate was 27.5% (537 out of 2,000). Of these respondents, 85% reported using NSOMEs to deal with children's

speech sound production problems. Those SLPs reported that the research literature supports the use of NSOMEs, and that they learned to use these techniques from continuing education events. They also stated that NSOMEs can help improve the speech of children from disparate etiologies, and "warming up" and strengthening the articulators are important components of speech sound therapy.

**Conclusion:** There are theoretical and research data that challenge both the use of NSOMEs and the efficacy of such exercises in resolving speech sound problems. SLPs need to follow the concepts of evidence-based practice in order to determine if these exercises are actually effective in bringing about changes in speech productions.

**KEY WORDS:** nonspeech oral motor exercises, articulation/phonological disorders, questionnaire, evidence-based practice (EBP)

based on optimality theory (Barlow, 2001; Stemberger & Bernhardt, 1997), and nonlinear models (Ball & Kent, 1997). (See Bauman-Waengler, 2008, and Bernthal & Bankson, 2004, for reviews of treatment approaches.)

One approach that has been used to address speech sound production problems that appears to have its origins in the phonetic tradition is the use of nonspeech oral motor exercises (NSOMEs). These exercises may include horn/whistle blowing, side-to-side tongue wagging, whistling, cheek puffing, isolated tongue elevation, and pucker-smile alternations (Bahr, 2001; Forrest, 2002). According to Forrest, proponents of NSOMEs assert that these exercises that reduce the complex task of articulation into its component parts will facilitate learning of speech. In addition, some SLPs seem to believe that these exercises will increase the tone and strength of the speech musculature and provide opportunities for children to learn to use primitive oral behaviors such as sucking and chewing, that will in turn help them develop speech sounds. Examples of specific NSOME clinical approaches, usually advocated in self-published sources, include the use of horns and straws as “talking tools” (Rosenfeld-Johnson, 1999), graded exercises for jaw stabilization (Bahr, 2001), and facilitating primitive oral skills to develop speech (Beckman, 1986). Ruscello (2008) outlines many of these NSOMEs approaches and provides an historical prospective on their development.

Regardless of what kind of treatment SLPs decide to select to remediate speech sound errors, they are obligated to make use of the best current research evidence along with their clinical expertise in making therapeutic decisions; these are the basic tenets of evidence-based practice (EBP) (American Speech-Language-Hearing Association [ASHA], 2004; Boswell, 2005; Lass & Pannbacker, 2008). Therapy decisions based on EBP are continually changing because research evidence, which is considered the preeminent verification of effectiveness, is ongoing and thus constantly updated. The judicious use of evidence is crucial to the application of EBP. Boswell reported on a six-step approach to help SLPs use evidence in clinical practice. Step 1 is framing a clinical question (perhaps using the PICO framework where P = population, I = intervention, C = comparison, O = outcome); Step 2 is using internal evidence that SLPs may have from experience with a particular client; Step 3 involves gathering external evidence, usually from research journals; Step 4 is critically evaluating the validity of the internal and external evidence; Step 5 is integrating both internal and external evidence into a treatment plan; and Step 6 is evaluating and continually re-evaluating this process to reflect on the effectiveness of the clinical decisions. Laing Gillam and Gillam (2006) provide a similar seven-step decision-making procedure for using EBP for clinical questions.

Dollaghan (2004) reminds SLPs that when using the EBP paradigm, valid and reliable evidence (Step 3 above) needs to be given more credence than intuition, anecdote, expert authority, and other forms of information that are frequently used in Step 2 (above). Although opinions and a practitioner’s own clinical experience can be useful, they can also be biased (Kamhi, 2004; Lass & Pannbacker, 2008). For example, SLPs may assume that NSOMEs will work because they believe they should work; this therapist bias can have an impact on objective analysis of any intervention approach (for more on therapist bias, see Damico, 1988).

Finn, Bothe, and Bramlett (2005) also cautioned SLPs not to rely on anecdotal evidence or expert authority to guide clinical choices. These authors distinguish between science-based treatment

decisions and pseudoscientific approaches. Whereas scientific approaches rely on research that is empirically based, pseudoscience, although appearing to be scientific, actually makes use of faith, authority, or SLP introspection. Finn et al. identified 10 criteria to distinguish between science and pseudoscience, for example, ignoring disconfirming evidence, relying on anecdotal evidence/personal experience, accepting inadequate evidence, and not subjecting techniques or efficacy claims to peer review (for more information on science/pseudoscience, see Lass & Pannbacker, 2008; Lof, 2006). To work within the EBP paradigm, the best evidence for effective treatment comes from methods that are scientifically based and peer reviewed (Bernstein Ratner, 2006).

EBP creates an interesting predicament because the efficacy of NSOMEs has been questioned based both on empirical data and on the basic underlying assumptions for their use (Clark, 2003, 2005; Forrest, 2002; Kamhi, 2006; Lof, 2003). Nevertheless, it appears that some SLPs use NSOMEs for children with speech sound problems. This is noted by the many therapy materials available for purchase, articles that appear in non-peer-reviewed clinical publications (e.g., *Advance for Speech-Language Pathologists and Audiologists*), information on Web sites, anecdotal reports from practicing SLPs, and continuing education (CE) offerings (Clark, 2005).

Currently, the use of NSOMEs is an area of contention for researchers and clinicians who are interested in remediating children’s sound system disorders. SLPs need to observe the principles of EBP in order to provide appropriate services (ASHA, 2004; Lass & Pannbacker, 2008), but to do so, more research is needed to determine whether, if, and under what circumstances NSOMEs are an effective way to bring about changes in speech sound productions.

Clinical research to study treatment efficacy should begin by determining how SLPs are implementing NSOMEs within their clinical practice. This information can generate clinical questions and appropriate methodologies to experimentally test the effectiveness of various NSOMEs. Once the NSOMEs are tested, the results can then be used to encourage or discourage their use. To begin the process of sorting out some of the dilemmas associated with the application of NSOMEs, a nationwide survey was conducted to determine SLPs’ use of these procedures for children with speech sound errors. Knowing SLPs’ current practice patterns can lead to recommendations about what to study when evaluating the efficiency and effectiveness of NSOMEs following the principles of EBP.

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## METHOD

### Survey Questionnaire and Procedures

Survey items were developed based on a review of the literature, Web site searches, and consultation with SLPs who practice in settings that serve children with speech sound disorders. The questions were designed to explore the types of NSOMEs that SLPs use, the SLPs’ underlying beliefs concerning NSOMEs, SLP training for using these procedures, the application of these exercises across various clinical populations, and specific tasks/materials that SLPs use during intervention. Once the questions were developed, the survey was piloted by having 6 practicing SLPs comment on its readability, relevancy to the topic, neutrality of the questions, and ease of completion. Based on feedback from the SLPs, minor revisions were made to produce the final version of the

questionnaire (see the Appendix). For this survey, the stated definition of NSOMEs was “any technique that does not require the child to produce a speech sound but is used to influence the development of speaking abilities.”

The survey was divided into four parts. Part 1 elicited demographic information from all respondents. Part 2 was to be completed only by those SLPs who identified themselves as being users of NSOMEs. Part 3 was to be completed only by those SLPs who indicated that they did not use NSOMEs. Parts 2 and 3 had parallel questions about NSOMEs, with Part 2 having questions in the affirmative (e.g., “The literature I have read encourages the use of NSOMEs.”) and Part 3 in the negative (e.g., “The literature I have read discourages the use of NSOMEs.”). Part 4 listed a variety of speech sound intervention approaches; all respondents indicated their familiarity and use of these techniques.

A variety of response types was used in this questionnaire. Some of the questions required answers in a “forced choice” format (e.g., *agree/disagree; usually/sometimes/never*); other items requested respondents to quantify their responses using a 0 to 4 (5-point) Likert-type scale (e.g., *strongly agree to strongly disagree; very familiar to very unfamiliar*).

A total of 2000 surveys were mailed to SLPs nationwide along with a self-addressed, stamped return envelope and a cover letter explaining the survey’s purpose, how the respondent’s anonymity would be preserved, and a statement about Institutional Review Board (IRB) approval. SLPs were randomly selected from a subset of the ASHA membership roster, specifically, those SLPs who work with children from birth to 11 years of age. There was only one mailing, with no follow-up reminder mailings.

## SURVEY RESULTS AND DISCUSSION

Surveys from 537 (27.5%) SLPs that were completed sufficiently for analysis were returned (see Table 1). Data were entered into a spreadsheet and were then verified by the second author; any entry errors were corrected. Each of the four geographically divided regions of the United States had a near equal distribution of respondents (i.e., New England/Mid Atlantic: 28%; West: 27%; Midwest: 26%; South: 19%), with only the states of Iowa and Idaho not being represented. Eighty-five percent of the respondents stated that they used NSOMEs to address speech sound production problems; 15% reported that they never used these exercises. In a similar study of SLPs in Canada (Hodge, Salonka, & Kollias, 2005) and in the United Kingdom (Joffe & Pring, 2008), 85% and 71.5%, respectively, of the respondents reported using NSOMEs to change speech sound productions.

All respondents in this study had earned a master’s degree (54% in the 1990s and later), with an additional 6 having earned an EdD. Many (45%) of the SLPs had worked for more than 15 years with children with speech sound disorders; usually in multiple settings, with the elementary schools (38.2%) and early intervention/preschools (38.6%) being the most frequently listed work site.

The remainder of this article will explore respondents’ application of NSOMEs for children with speech sound disorders, organized by pertinent questions from the survey; not all data from the questionnaire will be discussed. The respondents’ aggregated responses are presented, as is a discussion of the theoretical and

**Table 1.** Summary of survey respondents’ demographics (Response rate of 537 out of 2,000 mailings = 27.5%).

<i>Demographic</i>	<i>Percentage</i>
Distribution of geographic regions	
New England/Mid Atlantic	28%
West	27%
Midwest	26%
South	19%
Percentage who use nonspeech oral motor exercises (NSOMEs)	85%
When master’s degree was earned	
1990 to present	54%
1980s	24%
1970s	20%
1960s	2%
Length of time working with children with speech sound disorders:	
15+ years	45%
11–15 years	15%
6–10 years	23%
1–5 years	17%
Employment settings <sup>a</sup>	
Preschools/Early intervention	39%
Elementary school	38%
Middle school	9%
Private practice	5%
High school	5%
Medical settings	3%
Other	2%

<sup>a</sup>These percentages are rounded.

empirical support associated with each question. Only the information from the survey respondents who use NSOMEs is reported.

### How Do SLPs Decide To Use NSOMEs?

Eighty-seven percent of the respondents reported that they learned about this therapy approach by attending CE offerings, workshops, and/or in-services that promote their use. Workshops advocating NSOMEs are prolific (Clark, 2005) and usually are available for CE units (CEUs) needed for licensing and certification. It is possible that many attendees of such conferences believe that ASHA approval of a CEU event means validation of the content, including EBP support; however, this is not the case. The ASHA CEU policy states that “approval of continuing education sponsorship does not imply endorsement of course content, specific products, or clinical procedures” (ASHA, 2008, p. 35). Because CEU events are not held to the rigors of peer-reviewed standards, SLPs ultimately have the responsibility to evaluate the content and the presented evidence carefully in order to justify the application of NSOMEs (Bernstein Ratner, 2005).

The respondents also reported that their clinical observations support or justify the use of NSOMEs. That is, 92.7% of the respondents stated that they had observed improved nonspeech oral motor skills as a result of NSOMEs, 86.3% had observed improved speech productions, and 68% had used NSOMEs as a “fall back” technique because other speech elicitation techniques did not work.

It is a concern that SLPs may be using only subjective observations to evaluate the validity of NSOMEs instead of using the guiding principle of EBP, specifically, that evidence should be empirically based (Finn et al., 2005; Smith, 2005). SLPs should not choose to use NSOMEs based simply on perceived therapeutic changes in the absence of any real data. To do so would be eerily similar to the facilitated communication phenomenon of the 1990s (Koenig & Gunter, 2005; Shane & Kearns, 1994) in which some SLPs believed that they observed remarkable changes in client performance only to be shown that their subjective observations were unsubstantiated by research data. In order to avoid subjectivity in observations and therapist bias, the EBP principles must be followed. Namely, the intervention protocol must be implemented in such a way that the results can be evaluated explicitly to determine if NSOMEs are responsible for any changes in speech productions.

### **Do SLPs Believe That Speech Develops From Early Motor Behaviors?**

SLPs may assume that one way to develop speech production skills is to work on primitive oral movements. Sixty percent of the respondents reported that they believe that speech develops from early oral motor behaviors such as sucking and chewing; however, this belief is not supported by the research literature (Kent, 2000).

Data indicate that even in early stages of development, the movements for one primitive motor pattern, chewing, and the motor patterns for speech are specific for each task and dissimilar from each other (Kent, 2000; Moore & Ruark, 1996; Moore, Smith, & Ringel, 1988). Researchers have reported that the neurological principles for the coordination of muscle activity during early spontaneous speech are significantly different from reflexive and vegetative actions. These data would challenge the idea that speech sound errors can be remediated through intervention that focuses on the development of nonspeech oral motor skills. Furthermore, research on later skills by Green, Moore, Higashikawa, and Steeve (2000) suggested that the development of speech sounds during the preschool years is greatly influenced by changes in the coordination of articulator movement for various speech tasks. These results contradict the notion that exercising or improving nonspeech oral motor movements will improve speech. Green et al. also discussed negative transfer of learning, proposing that young children's speech development may actually require them to "overcome" the oral motor movements used for chewing and swallowing in order to produce speech. In other words, the techniques that are frequently used during NSOMEs may actually interfere with learning to produce speech.

### **What Are the Most Frequently Used NSOMEs and Do SLPs Think That These Movements Will Transfer to Speech Movements?**

The survey listed 12 different NSOME procedures for respondents to indicate if they *usually*, *sometimes*, or *never* used them. The categories of *usually* and *sometimes* were combined to obtain the nine most frequently used NSOMEs (in rank order): (1) blowing, (2) tongue "push ups," (3) pucker-smile alternations, (4) tongue wags (lateralizations), (5) "big smile" exercises, (6) tongue-to-nose-then-to-chin movements, (7) cheek puffing, (8) blowing kisses, and (9) tongue curling.

SLPs must assume that these isolated motor movements will transfer to mandatory movements of the oral structure for speech. However, research calls into question the practicing or training of

these nonspeech movements for the purpose of improving speech (Ruscello, 2008). Because isolated movements of the tongue, lips, and other articulators are not the actual gestures used for the production of any sounds in English, their value for improving the production of speech sounds is doubtful (Lof, 2003). That is, no speech sound requires the tongue tip to be elevated toward the nose, no sound is produced by puffing out the cheeks, and no sound is produced in the same way as blowing is produced.

The neurology literature (e.g., Bonilha, Moser, Rorden, Baylis, & Fridriksson, 2006; Love, 2000; Schulz, Dingwall, & Ludlow, 1999) has shown that the control of speech movements and nonspeech movements is mediated at different nervous system locations. Because of this difference, the training of irrelevant nonspeech movements will not transfer to speaking because they are controlled by different parts of the brain. One clinical example may help illustrate this. A client can have dysphagia but may not have a speech disorder (e.g., dysarthria). This could only occur if the same structures (i.e., lips, tongue, palate) that have different function (i.e., swallowing and speaking) are mediated at different neurological locations (Weismer, 2006). In addition to neurological differences, these structures also have physiological differences. Hodge and Wellman (1999, p. 222) pointed out that "muscle fibers are selectively recruited to perform specific tasks, so static non-speech tasks do not account for the precise and coordinated activity needed during speech." Ruscello (2008) reviewed the many neurological and physiological differences between speech and nonspeech movements and concluded that training oral movements that are irrelevant to speech movements will not be effective speech therapy techniques.

Because transfer of learned behaviors is dependent on relevancy, the context of learning is crucial. For stimulation to improve articulation, the activities must be done using relevant behaviors for the specific goal (i.e., improved speaking skills) (Clark, 2005; Forrester, 2002; Schmidt & Lee, 2005; Weismer, 2006). However, most NSOMEs are decontextualized, and they dis-integrate the highly integrated task of speaking (e.g., practicing tongue elevation to the alveolar ridge with the desire that this isolated task will improve production of the lingual-alveolar sound /s/). Lof (2002, 2003) provided a few examples of how a motor task (e.g., shooting a free throw using a basketball; see also Weismer, 1996) must be learned in the context of the actual performance goal. By analogy, no one would teach a ballplayer to pretend to hold a ball and then pretend to throw it toward a nonexistent hoop with the eventual hope of improving free-throwing ability. Breaking down basketball shooting or the speaking task into smaller, unrelated chunks that are irrelevant to the actual performance is not effective. One final nonspeaking example would be the illogical finger pounding on a tabletop to simulate playing on a piano. Learning and improving piano playing must be practiced on a piano, not on a tabletop. Likewise, learning and improving speaking ability must be practiced in the context of speaking. Tapping fingers on a table is to piano playing as tongue wagging is to speech. To improve speaking, children must practice speaking rather than use tasks that only superficially appear to be like speaking (Clark, 2003).

### **What Do SLPs Believe Are the Benefits of NSOMEs? What About Strengthening Articulators?**

The respondents were asked to rate NSOMEs on the *usually*, *sometimes*, or *never* used scale for 15 purported benefits of such exercises. By combining the categories of *usually* and *sometimes*,

the 10 most frequent benefits reported (in rank order) by the respondents were improved (1) tongue elevation, (2) awareness of the articulators, (3) tongue strength, (4) lip strength, (5) lateral tongue movements, (6) jaw stabilization, (7) lip and tongue protrusion, (8) drooling control, (9) velopharyngeal competence, and (10) sucking ability. The Canadian study (Hodge et al., 2005) listed “articulator strength” and “enhanced awareness” as two of the most important benefits reported by their respondents, as well.

Given that some respondents reported to frequently use NSOMEs to improve articulator strength, it is important to understand the relationship between strength and speaking (see Ruscello, 2008). The following three questions need to be asked:

- How much strength is actually needed to be a proficient speaker?
- Do NSOMEs actually increase strength?
- How is strength measured?

According to the research, very little strength is needed for speaking. For example, Barlow and Abbs (1983) reported that only 10% to 20% of the maximum force of lip movement is required to talk. Forrest (2002) pointed out that during speaking, interlabial pressure and jaw strength needs are very low, especially considering the maximum performance abilities of these articulators. This means that talking uses very little of the articulator strength that is available. What is needed are agile articulators, not strong articulators, and this agility cannot be enhanced through NSOMEs that encourage movements unrelated to speech. Besides, it has been reported that children with speech sound errors do not have weak articulators (e.g., Dworkin & Culatta, 1980); in fact, Sudbery, Wilson, Broaddus, and Potter (2006) found that children who had speech sound errors actually had *stronger* tongues than did typically developing children.

The second question asks if NSOMEs increase strength. If strengthening of the articulators is necessary (see reviews of muscle strength, tone, and endurance by Clark, 2003, 2005; Ruscello, 2008), traditional muscle strengthening principles would need to be followed, such as using sets of multiple repetitions against resistance until failure (e.g., as is done for weight lifting to increase bicep strength) (Clark, 2005; Duffy, 2005; Hodge, 2002). It is doubtful that most SLPs perform NSOMEs following these basic principles (e.g., asking the child to tongue wag until failure). If these principles are not used, then the NSOMEs probably will not actually build muscle, contrary to the stated goal of such exercises.

The final question addresses how strength is measured. Because strength is typically measured subjectively (Solomon & Munson, 2004) (e.g., feeling the force of the tongue pushing against a tongue depressor or against the cheek), SLPs cannot initially verify that strength is diminished and then report increased strength following NSOMEs (Clark, 2005; Hodge, 2002). Only objective measures (e.g., using a dynamometer, force transducer, or the Iowa Oral Performance Instrument; see Barlow & Abbs, 1983; Clark, 2005; Weijnen et al., 2000) can corroborate statements of strength needs and improvement. Without nonsubjective measurements, testimonials of strength gains are suspect.

### **Do SLPs Think That NSOMEs Will “Warm up” the Structures, Thus Preparing the Child for Speech Therapy?**

Most SLPs (68%) indicated that they only used NSOMEs as a “warm-up,” and then they directly worked on speech productions,

whereas 25% evenly divided therapy time between implementing exercises and employing techniques that specifically targeted speech. Only 7% of the respondents used NSOMEs exclusively instead of other activities to target productions.

Warm-up has a physiological purpose during muscle exercise: to increase blood circulation so muscle viscosity drops, thus allowing for smoother and more elastic muscle contractions (Safran, Seaber, & Garrett, 1989). Warm-up exercises are often used in voice therapy to increase blood flow to the laryngeal muscles (Elliot & Gramming, 1995); however, there are equivocal research findings on the effectiveness of such exercises to remediate voice disorders (Milbarth & Solomon, 2003). Warm-up of muscles may be appropriate (Pollock et al., 1998) when a person is about to initiate an exercise regimen that will maximally tax the system (e.g., distance running, weight training). However, muscle warm-up is not required for tasks that are below the maximum (e.g., walking, lifting a spoon to mouth). Because speaking does not require anywhere near the oral muscular maximum, warm-up is not necessary. When waking up in the morning, it is doubtful that many people warm up their arms before dressing or warm up their mouths before uttering their first “good morning” because the muscles are already prepared for such tasks.

If clinicians are not using the term warm-up to identify a physiological task to “wake up the mouth,” then perhaps they believe that they are providing some form of “metamouth” knowledge about the articulators’ movement and placement. Survey respondents rated “awareness of the articulators” as the second most frequent reason to use NSOMEs; it was the third most frequently reported reason in the Canadian study (Hodge et al., 2005). Awareness and its role in therapy is always an issue. It is well known that young children have difficulty with various metaphonological tasks (Kamhi & Catts, 2005). For articulation awareness, Klein, Lederer, and Cortese (1991) reported that children age 5 and 6 years had very little consciousness of how speech sounds were made; 7-year-olds were not very proficient with this either. According to Koegel, Koegel, and Ingham (1986), some children older than 7 years were successful during a metalinguistic speech intervention program, but only when they had the “cognitive maturity required to understand the concept of a sound” (p. 26). Based on the literature, it would appear that young children cannot take advantage of the nonspeech mouth cues provided during NSOMEs that can be transferred to speaking tasks. More research is needed to determine the minimum cognitive, linguistic, and motor abilities of children that are necessary for such “meta” skills.

### **Do SLPs Combine NSOMEs With Other Treatment Approaches?**

Data exist that NSOMEs, as the sole procedure in therapy, do not change speech sound productions (e.g., Guisti Braislín & Cascella, 2005; Hayes, 2005). Because most respondents (93%) reported that they provided their clients with a combination of approaches, it is very difficult to “tease apart” which approach is providing therapeutic benefit. Additionally, whenever intervention approaches are combined, it is unknown if and how they actually work in conjunction with each other to enhance performance.

There is evidence that NSOMEs are irrelevant to performance when they are combined with other therapies. Hayes (2005) showed that the children she studied improved using a traditional articulation/phonetic approach, but that the addition of NSOMEs either in

combination or as the initial therapy approach was not beneficial. Occhino and McCane (2001) also reported that NSOMEs before or along with articulation therapy did not have an additive or facilitative effect. Still other researchers, specifically Roehrig, Suiter, and Pierce (2004), found that the addition of NSOMEs to a traditional articulation therapy approach did not add to participants' overall progress; improvement following therapy with NSOMEs was not different from improvement following articulation therapy alone. SLPs can take solace in the fact that NSOMEs probably do not harm the child when they are used in combination with traditional approaches. For example, in their case study, Bush, Steger, Mann-Kahris, and Insalaco (2004) reported that oral motor treatment did not improve or reduce the success of treatment. However, Hayes (2005) found that some children may be negatively affected by a combination approach. (See Lass & Pannbacker, 2008, who evaluated these and other studies and summarize the lack of effectiveness of NSOMEs for changing speech sound productions.) It seems reasonable that if there is no speech improvement using combined approaches, then SLPs should eliminate the approach that is not effective so as to not waste valuable therapy time with an ineffectual technique.

### What Disorder Populations Do SLPs Treat Using NSOMEs?

Nine different disorder populations were listed on the questionnaire, and the respondents were asked to indicate if they used NSOMEs *usually*, *sometimes*, or *never* for each. The categories of *usually* and *sometimes* were combined and showed that the respondents used NSOMEs to treat a wide variety of childhood speech disorders. Specifically, SLPs reported that they used these techniques for children with (in rank order) (1) dysarthria, (2) CAS, (3) structural anomalies (e.g., cleft palate), and (4) Down syndrome. Somewhat less frequently, SLPs reported that they used NSOMEs for children (1) in early intervention regardless of diagnoses, (2) who were identified as late talkers, (3) with phonological disorders, (4) with hearing impairment, and (5) with functional misarticulations. Perhaps due to methodological differences, this order is different from the results reported in the Canadian study (Hodge et al., 2005). That study found that SLPs were most likely to use NSOMEs with children with (1) phonological disorders, (2) CAS, (3) dysarthria, (4) Down syndrome, and (5) cerebral palsy.

Although SLP caseloads may consist of children with different subtypes of speech sound disorders, the causes of the problems are likely to be different for each subtype (Lewis et al., 2006). It is difficult to understand why the same intervention procedure would be beneficial across disorder etiologies that are so radically different (see the section on "Grandiose Outcomes" by Finn et al., 2005). For example, it is doubtful that the learned motor skill gesture as practiced through NSOMEs would be beneficial for problems that are language based (i.e., late talkers, phonologically impaired, hearing impaired). If NSOMEs were to be effective for any group of children, the most logical candidates would be those children with a motor movement disorder (i.e., phonetic disability), but surely not those with a language-based problem.

Respondents did indicate that they used NSOMEs for children with disorder types that are associated with problems of oral motor structure and function (i.e., dysarthria, Down syndrome, and structural deficits). However, as discussed by Clark (2003), adequate

diagnosis of specific neuromuscular deficits is extremely difficult and often involves subjective judgments and interpretation because normative data and objective measures typically are not available for many oral motor function tasks. Lack of adequate diagnosis makes it difficult to apply appropriate treatment techniques to improve assumed oral motor deficits. In the adult dysarthria literature, for example, Hodge (2002), Duffy (2005), and others generally do not advocate using NSOMEs for these clients, a population that some may assume could benefit most from these exercises.

Many SLPs reported that children with CAS often receive NSOMEs. Lof (2004), however, argued that this diagnosis would be one of the least appropriate disorder subtypes for NSOMEs. By definition, children who are accurately diagnosed with CAS will have adequate oral structure movements for nonspeech tasks but not for speech activities (Caruso & Strand, 1999). This being the case, it would be unreasonable to use procedures that work on nonspeech movements in the hope of changing speech movements (Davis & Velleman, 2000).

### Do SLPs Report an Accurate Understanding of the Scientific Literature on NSOMEs?

The survey revealed that many of the respondents either misunderstood or were not familiar with the research literature on the disassociation between nonspeech movements and speech production. However, as a group, these respondents reported being *very familiar* (i.e., mean rating 3.05 on a scale with 0 = *unfamiliar*; 4 = *very familiar*) with the research that examined the efficacy of using these techniques, and 61% of the respondents agreed with the statement "The literature I have read strongly encourages the use of NSOMEs." Respondents were also asked to report their level of familiarity (0 = *unfamiliar*; 4 = *very familiar*) with the theoretical basis related to NSOMEs and speech. The mean level for the group was 2.74, meaning that these SLPs believe that they have sound theoretical backing to use NSOMEs in their clinical practice. In fact, the available efficacy research, as well as the theories of motor development and motor skill learning, do not support the use of NSOMEs (Lof, 2003); reports that do advocate for the use of NSOMEs are anecdotal and are available in non-peer-reviewed publications. Bernstein Ratner (2005) discussed the "gap" between research evidence and clinical practice, speculating that many practitioners do not read professional journals, nor do they typically incorporate new evidence into their existing belief systems. Reasons for this may include relying on unreliable resources (Kamhi, 2004), as well as a paucity of outcome data in professional journals.

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## CLINICAL IMPLICATIONS

The results of this nationwide survey (see Table 2 for a summary of findings) support the speculation that the use of NSOMEs by SLPs is frequent. It was also found that SLPs use these exercises for children with a wide variety of disorder subtypes, assume that the exercises have benefits that lead directly to speech improvements, and believe that there is empirical evidence for their use. However, the currently available research does not support the use of NSOMEs to bring about changes in speech sound productions (Lass & Pannbacker, 2008; Ruscello, 2008). The conflicts and controversies associated with the application of NSOMEs may continue

**Table 2.** Summary of survey findings from the speech-language pathologists (SLPs) who reported using NSOMEs.

<i>Question</i>	<i>Response</i>
How do SLPs decide to use NSOMEs?	Continuing education activities <ul style="list-style-type: none"><li>• 87% by attending continuing education offerings, workshops, and/or in-services</li></ul> Clinical observations <ul style="list-style-type: none"><li>• 92.7% observed improved nonspeech oral motor skills as a result of NSOMEs.</li><li>• 86.3% observed improved speech production because of NSOMEs.</li><li>• 68% have used NSOMEs as a “fall back” technique because other speech elicitation techniques did not work.</li></ul>
Do SLPs believe that speech develops from early motor behaviors?	60% believe that speech develops from early oral motor behaviors such as sucking and chewing.
What NSOMEs are used the most because SLPs believe they will transfer to speech movements?	Most frequently (in rank order) used procedures: (1) blowing, (2) tongue “push ups,” (3) pucker-smile alternations, (4) tongue wags (lateralizations), (5) “big smile” exercises, (6) tongue-to-nose-then-to chin movements, (7) cheek puffing, (8) blowing kisses, (9) tongue curling
What do SLPs believe are the benefits of NSOMEs?	Most frequently (in rank order) identified “benefits”: (1) tongue elevation, (2) awareness of the articulators, (3) tongue strength, (4) lip strength, (5) lateral tongue movements, (6) jaw stabilization, (7) lip and tongue protrusion, (8) drooling control, (9) velopharyngeal competence, (10) sucking ability
Do SLPs think that NSOMEs will “warm up” the structures, thus preparing the child for speech therapy?	<ul style="list-style-type: none"><li>• 68% used NSOMEs as a “warm-up” and then they worked directly on speech productions.</li><li>• 25% evenly divided therapy time between NSOMEs and techniques that specifically targeted speech.</li><li>• 7% used NSOMEs exclusively instead of activities targeting speech.</li></ul>
Do SLPs combine NSOMEs treatment with other treatment approaches?	<ul style="list-style-type: none"><li>• 93% used a combination of approaches.</li></ul>
What disorder populations do SLPs treat using NSOMEs?	Most frequent (in rank order) disorder populations: (1) dysarthria, (2) apraxia of speech (CAS), (3) structural anomalies (e.g., cleft palate), (4) Down syndrome, (4) children in early intervention regardless of diagnoses, (5) late talkers, (6) phonological disorders, (7) hearing impairment, (8) functional misarticulations
Do SLPs report an accurate understanding of the scientific literature on NSOMEs?	SLPs’ self-rating of “familiarity” with the scientific literature: <ul style="list-style-type: none"><li>• 3.05 (4 = very familiar) mean rating with the research that examined the efficacy of using NSOMEs</li><li>• 2.74 (4 = very familiar) mean rating with the theoretical basis that supports the use of NSOMEs</li><li>• 61% agree with the statement “The literature I have read strongly encourages the use of NSOMEs.”</li></ul>

until SLPs embrace the principles and practices of EBP, which direct them to evaluate the effectiveness and efficacy of intervention methods. In order to do this, SLPs must keep up to date by reading peer-reviewed research literature (Bernstein Ratner, 2005, 2006) and by integrating external evidence with their internal evidence.

The step-by-step procedures reported by Boswell (2005) and Laing Gillam and Gillam (2006) for evaluating clinical effectiveness can be helpful for SLPs who wish to follow the EBP mandates. This includes the integration of internal and external evidence in the development of treatment plans for children with speech sound disorders. Also needed are ways to evaluate the effectiveness of different treatment approaches that are used for children on a specific caseload. Then these plans and approaches must be continually re-evaluated by SLPs so they can reflect on the effectiveness of their decisions. Upon reflection, SLPs must then determine if the evidence has been obtained through established scientific methodologies (using levels for evidence; Lass & Pannbacker, 2008) or if they are pseudoscientific. Two of the pseudoscientific criteria reported by Finn et al. (2005) are especially relevant for NSOMEs. One is that professionals should not overly trust their own experiences

(a form of internal evidence) for determining treatment effectiveness because confirmation bias and judgment errors can wrongfully lead SLPs to believe that positive changes occurred (Finn, 2004). The second is that professionals should not adopt a treatment approach that bypasses scientific scrutiny and peer review. Personal testimonials that frequently occur in venues such as CEU events can convince some SLPs that NSOMEs can work, even when scientifically obtained data do not concur with these statements (Kamhi, 2004).

Koenig and Gunter (2005) addressed many of the fads that frequently occur in the practice of speech-language pathology. They recommend that one way to avoid falling into the fad trap is to understand EBP and to “adapt the science practitioner model, reconceptualizing clinical practice as a form of research, and collapse the distinction between researchers and clinicians” (p. 230). This recommendation needs to be followed by all practitioners in order to provide the most efficacious services to our clients.

Clark (2005) provided a framework for understanding neuromuscular function (i.e., strength, endurance, tone, sensation) and how various NSOME treatment approaches have addressed these functions to overcome impairments. She believes that this framework

can be used to conduct well-designed clinical studies by clinician/researchers. As of now, it is her conclusion that “the highest levels of evidence do not include support for NS-OME (sic) treatments in the management of speech disorders, and thus many clinicians may appropriately reject the use of these techniques” (p. 35). It is imperative that more empirical data, obtained from studies using the highest levels of evidence (see Lass & Pannbacker, 2008), be gathered following scientific principles in order to determine whether this conclusion stands. If the EBP paradigm is followed, NSOMEs should not presently be part of a treatment approach to remediate speech sound errors because there is no scientific evidence supporting their use (Lass & Pannbacker, 2008; Ruscello, 2008) and because recommendations for their use are generally based only on “expert opinion.”

Results from the current survey can be used to help guide the development of research questions because it shows how SLPs are using NSOMEs within their clinical practice. By knowing these practice patterns, appropriate methodologies can then be developed to experimentally test the effectiveness of NSOMEs for any of the disorder groups with which they are currently being used. As the final step, following the EBP principles, recommendations can be made about whether or not NSOMEs are appropriate for use with each disorder group.

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If you **DO NOT** work with children who have speech sound problems please:

give this to a colleague who does and check this box

or

check this box and mail the incomplete survey in the enclosed envelope

## PART 1: YOUR DEMOGRAPHIC INFORMATION

1. Enter the year each of your degrees were obtained (leave blank if it does not apply):

_____ Bachelors	_____ Masters
_____ PhD	_____ EdD

2. On the line below, write the name of the state in which you work:

\_\_\_\_\_

3. Enter the percent of the time you work at each of these settings. The total should equal 100%:

_____ %	Early intervention (Birth to 3)
_____ %	Preschool
_____ %	Elementary school
_____ %	Middle school
_____ %	High school
_____ %	Medical
_____ %	Private practice
_____ %	Other : _____

4. Check the number of years you have worked with children with speech sound problems as part of your caseload:

<input type="checkbox"/> 1-5 years	<input type="checkbox"/> 6-10 years
<input type="checkbox"/> 11-15 years	<input type="checkbox"/> More than 15 years

5. Check the total number of children currently on your caseload:

<input type="checkbox"/> 1 - 10	<input type="checkbox"/> 11 - 20
<input type="checkbox"/> 21 - 30	<input type="checkbox"/> 31 - 40
<input type="checkbox"/> 41 - 50	<input type="checkbox"/> 51 - 60
<input type="checkbox"/> 61 - 70	<input type="checkbox"/> More than 71

6. Check the total number of children currently on your caseload receiving services for some type of speech sound problem:

<input type="checkbox"/> 1 - 10	<input type="checkbox"/> 11 - 20
<input type="checkbox"/> 21 - 30	<input type="checkbox"/> 31 - 40
<input type="checkbox"/> 41 - 50	<input type="checkbox"/> 51 - 60
<input type="checkbox"/> 61 - 70	<input type="checkbox"/> More than 71

7. Check the average number of intervention sessions per week for children currently on your caseload with speech sound problems:

<input type="checkbox"/> 1	<input type="checkbox"/> 2
<input type="checkbox"/> 3	<input type="checkbox"/> 4
<input type="checkbox"/> 5	<input type="checkbox"/> More than 5

8. Enter the percent of the children currently on your caseload with speech sound problems who receive each type of service (this should total 100%):

_____ %	Individual sessions only
_____ %	Combination of Individual and Group
_____ %	Group sessions only

9. If you use treatment groups, check the average number of children per group for speech sound problems:

**Do not use groups**

<input type="checkbox"/> 1 - 2	<input type="checkbox"/> 3 - 4
<input type="checkbox"/> 5 - 6	<input type="checkbox"/> 7 - 8
<input type="checkbox"/> 9 - 10	<input type="checkbox"/> More than 10

10. Check the service delivery model you use most frequently when providing intervention for children with speech sound problems (choose only one):

<input type="checkbox"/> Pull-out services only
<input type="checkbox"/> In-classroom only
<input type="checkbox"/> Combination of pull-out and in-classroom
<input type="checkbox"/> Combination of pull-out and indirect classroom (e.g., consulting)
<input type="checkbox"/> Home/Center (Early Intervention, Birth-to-3)

APPENDIX (P. 2 OF 7). NONSPEECH ORAL MOTOR EXERCISE QUESTIONNAIRE



**This portion concerns your use of nonspeech oral motor intervention tasks. Nonspeech oral motor techniques are defined as any technique that does not require the child to produce a speech sound but is used to influence the development of speaking abilities.**

**Check one of the boxes below and then go to the appropriate section:**

- I do not use nonspeech oral motor tasks in therapy (Skip Part 2 and go to Part 3 on Page 5)
- I use nonspeech oral motor tasks in therapy (Go to Part 2, skip Part 3 and then go to Part 4 on Page 7)

## PART 2: USE OF ORAL MOTOR EXERCISES

1. Please check either "Agree" or "Disagree" for these statements. **Leave blank if it does not apply:**

	Agree	Disagree
a. I was encouraged or taught to use nonspeech oral motor techniques in my university training.	<input type="checkbox"/>	<input type="checkbox"/>
b. I have observed improved <i>speech</i> production skills as a result of using nonspeech oral motor techniques.	<input type="checkbox"/>	<input type="checkbox"/>
c. I have observed improved <i>nonspeech</i> oral motor skills as a result of using nonspeech oral motor techniques.	<input type="checkbox"/>	<input type="checkbox"/>
d. I have found that other types of speech elicitation techniques did not work for some of my clients so I use nonspeech oral motor techniques.	<input type="checkbox"/>	<input type="checkbox"/>
e. I was convinced about the usefulness of nonspeech oral motor techniques by a colleague.	<input type="checkbox"/>	<input type="checkbox"/>
f. I have attended continuing education offerings, workshops, and/or in-services on the use of nonspeech oral motor techniques.	<input type="checkbox"/>	<input type="checkbox"/>
g. The literature I have read strongly encourages the use of nonspeech oral motor techniques.	<input type="checkbox"/>	<input type="checkbox"/>
h. The Internet sources I have read encourage the use of nonspeech oral motor techniques.	<input type="checkbox"/>	<input type="checkbox"/>

2. Referring to Question 1 (a – h) above, indicate the TWO most influential sources of information you have received concerning nonspeech oral motor exercises by placing the letters in the boxes below:

3. Place a check in only one box to indicate your level of agreement with the following statements along the continuum from "Strongly Agree" to "Strongly Disagree".

	Strongly Agree	Strongly Disagree
←-----→		
a. The use of discrete oral motor tasks is necessary for the development of intelligible speech.	<input type="checkbox"/>	<input type="checkbox"/>
b. Children with speech sound problems often lack the strength needed to produce intelligible speech.	<input type="checkbox"/>	<input type="checkbox"/>
c. Speech develops from early oral behaviors, such as sucking or chewing.	<input type="checkbox"/>	<input type="checkbox"/>
d. Oral motor exercises serve as a foundation for the development of more complex motor movements necessary for speech production.	<input type="checkbox"/>	<input type="checkbox"/>
e. The research literature supports the use of nonspeech oral motor tasks to correct speech sound errors.	<input type="checkbox"/>	<input type="checkbox"/>
f. Dividing the complex behaviors of speech into component oral motor movements is an effective method to correct speech sound errors.	<input type="checkbox"/>	<input type="checkbox"/>
g. Muscle movements for nonspeech oral tasks will transfer to muscle movements for speech sound productions.	<input type="checkbox"/>	<input type="checkbox"/>

**APPENDIX (P. 3 OF 7). NONSPEECH ORAL MOTOR EXERCISE QUESTIONNAIRE**

4. Nonspeech oral motor techniques are used with many different clients. Please check one of the three boxes to indicate if you use these techniques for the following clients:

	Usually	Some-times	Never
a. Children with phonological disorders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Children with developmental apraxia of speech (DVA)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Children with dysarthria	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Children with functional articulation disorders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Children with structural anomalies (e.g., cleft palate)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Children with Down Syndrome	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Children in early intervention	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Children who are "late talkers"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Children with hearing impairment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Nonspeech oral motor techniques often utilize various **materials**. Please check one of the three boxes to indicate if you use these materials:

	Usually	Some-times	Never
a. Horns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Balloons	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Tongue depressors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Straws	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Bite sticks or bite blocks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Brushes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Whistles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Kazoos	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Facial Flex®	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Nonspeech oral motor techniques often utilize a variety of **procedures**. Please check one of the three boxes to indicate if you use these procedures:

	Usually	Some-times	Never
a. Whistling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Pucker-smile alternations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Tongue "push ups"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Tongue lateralizations (wags)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Tongue curling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Tongue grooving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Cheek puffing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Tongue to nose then chin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Jaw lateral and vertical movements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Blowing (e.g., cotton balls)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. "Big smile" exercises	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l. Exaggerated lip licking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m. Blowing kisses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. Please check **one** box below to select which of the four statements best describes your use of nonspeech oral motor exercises when working with children who have speech sound problems:

- I use nonspeech oral motor exercises almost exclusively during therapy sessions.
- I use nonspeech oral motor exercises exclusively until the client reaches a set criterion, and then I move to directly targeting speech productions.
- I divide therapy time equally between nonspeech oral motor exercise and directly targeting speech productions.
- I use nonspeech oral motor exercise only as a "warm up" and spend most of the therapy session directly targeting speech productions.

**APPENDIX (P. 4 OF 7). NONSPEECH ORAL MOTOR EXERCISE QUESTIONNAIRE**

8. Mark only one box to indicate your level of familiarity with the following statements along the continuum from "Very Familiar" to "Unfamiliar".

	<b>Very Familiar</b>	<b>←</b>	<b>→</b>	<b>Un- familiar</b>
a. Research that has examined the efficacy of using nonspeech oral motor techniques.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Relationship between nonspeech oral motor tasks and development of speech.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Theoretical basis related to nonspeech oral motor skills and the relationship to speech.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. Please check one of the three boxes to indicate if you use these nonspeech oral motor exercises to improve...

	<b>Usually</b>	<b>Some- times</b>	<b>Never</b>
a. lateral tongue movements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. tongue protrusion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. tongue strength	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. lip protrusion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. lip strength	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. tongue elevation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. jaw stabilization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. sucking ability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. drooling control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. movement of the frenulum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. biting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l. velopharyngeal competence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m. awareness of the articulators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n. swallowing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
o. feeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. I typically train caregivers to carry out nonspeech oral motor exercise as part of a home program.

**Yes**                       **No**

11. I typically train other professionals (e.g., teachers, OT, PT) to carry out nonspeech oral motor exercises as part of a treatment program.

**Yes**                       **No**

12. On a treatment plan I write specific nonspeech oral motor exercises as a goal.

**Yes**                       **No**

13. I believe that nonspeech oral motor exercises can benefit children of any age.

**Yes**                       **No**

**Now skip Part 3  
and go to Part 4  
(on Page 7)**



Please Read This

**If you completed Part 2, DO NOT complete Part 3. Instead, skip Part 3 and go to Part 4 (On page 7).**

**If you DID NOT complete Part 2, then please complete Part 3. Then go on to Part 4 (On page 7).**

**PART 3: YOU DO NOT USE ORAL MOTOR EXERCISES**

1. Please check either "Agree" or "Disagree" for these statements. **Leave blank if it does not apply:**

	Agree	Disagree
a. I was encouraged or taught to use nonspeech oral motor techniques in my university training.	<input type="checkbox"/>	<input type="checkbox"/>
b. I have observed improved <i>speech</i> production skills as a result of using nonspeech oral motor techniques.	<input type="checkbox"/>	<input type="checkbox"/>
c. I have observed improved <i>nonspeech</i> oral motor skills as a result of using these techniques.	<input type="checkbox"/>	<input type="checkbox"/>
d. I have found that other types of speech elicitation techniques for some of my clients are successful.	<input type="checkbox"/>	<input type="checkbox"/>
e. I was convinced about the lack of usefulness of nonspeech oral motor techniques by a colleague.	<input type="checkbox"/>	<input type="checkbox"/>
f. I have attended continuing education offerings, workshops, and/or in-services on the use of nonspeech oral motor techniques and was not convinced of their usefulness.	<input type="checkbox"/>	<input type="checkbox"/>
g. The literature I have read discourages the use of nonspeech oral motor techniques.	<input type="checkbox"/>	<input type="checkbox"/>
h. The Internet sources I have read discourage the use of nonspeech oral motor techniques.	<input type="checkbox"/>	<input type="checkbox"/>

2. Referring to Question 1 (a – h) above, indicate the TWO most influential sources of information you have received concerning nonspeech oral motor exercises by placing the letters in the boxes below:

3. Place a check in only one box to indicate your level of agreement with the following statements along the continuum from "Strongly Agree" to "Strongly Disagree".

	Strongly Agree	Strongly Disagree
	←	→
a. The use of discrete oral motor tasks is necessary for the development of intelligible speech.	<input type="checkbox"/>	<input type="checkbox"/>
b. Children with speech sound problems often lack the strength needed to produce intelligible speech.	<input type="checkbox"/>	<input type="checkbox"/>
c. Speech develops from early oral behaviors, such as sucking or chewing.	<input type="checkbox"/>	<input type="checkbox"/>
d. Oral motor exercises serve as a foundation for the development of more complex motor movements necessary for speech production.	<input type="checkbox"/>	<input type="checkbox"/>
e. The research literature supports the use of nonspeech oral motor tasks to correct speech errors.	<input type="checkbox"/>	<input type="checkbox"/>
f. Dividing the complex behaviors of speech into component oral motor movements is an effective method for improving speech errors.	<input type="checkbox"/>	<input type="checkbox"/>
g. Muscle movements for nonspeech oral tasks will transfer to muscle movements for speech production.	<input type="checkbox"/>	<input type="checkbox"/>

**APPENDIX (P. 6 OF 7). NONSPEECH ORAL MOTOR EXERCISE QUESTIONNAIRE**

4. Mark only one box to indicate your level of familiarity with the following statements along the continuum from "Very Familiar" to "Unfamiliar".



a. Research that has examined the efficacy of using nonspeech oral motor techniques.     

b. Relationship between nonspeech oral motor tasks and development of speech.     

c. Theoretical basis related to nonspeech oral motor skills and the relationship to speech.     

5. I typically train caregivers to carry out some aspect of speech sound training as part of a home program.  
 Yes                                       No

6. I typically train other professionals (e.g., teachers, OT, PT) to carry out some aspect of a speech sound training program.  
 Yes                                       No

**Now Complete  
Part 4  
(on Page 7)**



**If you completed Parts 1 and 2, now complete Part 4.**  
**If you completed Parts 1 and 3, now complete Part 4.**

**PART 4: YOUR USE OF THERAPY TECHNIQUES**

1. Listed below are some techniques used in therapy for speech sound problems. If you do not know about this approach, then check the "Unfamiliar" box. If you do know of this approach, then place a check in only one box to indicate your use of this approach, along the continuum from "Usually Use" to "Never Use".

	Unfamiliar	Usually Use	←	→	Never Use
a. Minimal pairs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Maximal pairs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Van Riper traditional approach for sound elicitation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Van Riper traditional approach for sound stabilization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Auditory bombardment/stimulation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Hodson's cycles approach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Metaphon approach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Whole language approach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Motokinesthetic approach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Phonemic awareness approach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Distinctive feature approach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l. Morphosyntactic approach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m. Sensory motor approach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n. Paired stimuli approach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Thank you for completing this survey.**  
 Please return this in the enclosed self-addressed and stamped envelope no later than **March 15, 2004.**

**If you wish to make any comments about this survey, please do so on the back of this page.**