International Journal of Orofacial Myology and Myofunctional Therapy
Official Journal of the International Association of Orofacial Myology
50th ANNIVERSARY

Volume 37 | Number 1 | pp. 69-96 2011

Review Article

# Horns, whistles, bite blocks, and straws: A review of tools/objects used in articulation therapy by van Riper and other traditional therapists

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Suggested Citation
Marshalla, P. (2011). Horns, whistles, bite blocks, and straws: A review of tools/objects used in articulation therapy by van Riper and other traditional therapists. *International Journal of Orofacial Myology, 37(1)*, 69-96.
DOI: https://doi.org/10.52010/ijom.2011.37.1.6

# HORNS, WHISTLES, BITE BLOCKS, AND STRAWS: A REVIEW OF TOOLS/OBJECTS USED IN ARTICULATION THERAPY BY VAN RIPER AND OTHER TRADITIONAL THERAPISTS

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## ABSTRACT

The use of tools and other objects in articulation therapy has been bundled into new groups of activities called “nonspeech oral motor exercises” (NSOME) and ‘nonspeech oral motor treatments’ (NSOMT) by some authors. The purveyors of these new terms suggest that there is no proof that such objects aid speech learning, and they have cautioned students and professionals about their use. Speech-language pathologists are trying to reconcile these cautions with basic Van Riper type therapy routines.

The purpose of this literature review was to summarize the ways in which tools/objects were used by Van Riper and other speech professionals between 1939 and 1968. Fourteen textbooks were selected for review.

Van Riper and other developers of traditional articulation therapy regularly used a wide variety of tools/objects in articulation therapy. Tools/objects were used when other auditory, linguistic, and cognitive means failed to stimulate correct phoneme productions. To call these activities “non-speech” methods seems to misrepresent the historic purpose objects have served in articulation therapy. More empirical research is required in this area.

**Key Words:** Articulation therapy, phonetic placement method, oral motor techniques, nonspeech oral motor exercise, nonspeech oral motor treatment, oral sensory-motor techniques, traditional articulation therapy, motokinesthetic method, orofacial myofunctional disorders, oromotor, speech tools, horns, whistles, bite blocks, straws, tongue depressors.

### BACKGROUND

Some speech-language pathologists (SLPs) have cautioned against the use of objects such as horns, whistles, bite blocks, and straws in articulation training (Bowen, 2005; Lof, 2008; Lof & Watson, 2008; Powell, 2008; Forest & Iuzzini, 2008; Muttiah, Georges, & Brackenbury, 2011). Activities that employ these types of tools have been bundled into categories called *nonspeech oral motor exercises* (NSOME; Lof & Watson, 2008) and *nonspeech oral motor treatments* (NSOMT; Lass & Pannbacker, 2008). Employing the term “nonspeech” suggests that using an object in articulation

This paper is an abridged version of an original paper by Pam Marshalla from “Horns, Whistles, Bite Blocks, And Straws: A Review Of Tools/Objects Used In Articulation Therapy By Van Riper And Other Traditional Therapists”. The unabridged version will be published on the Oral Motor Institute website: www.omi.com

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therapy is unrelated to classic processes of speech correction and therefore should be avoided. One writer even stated that it would be a progressive step if these types of activities were condemned (Bowen, 2005). Some arguments against the use of objects in speech treatment have been:

(1) There is insufficient evidence to support the use of objects in articulation therapy.

(2) There has been no demonstrable relationship between so-called "nonspeech" activity and speech.

(3) Articulation improvement cannot be gained if therapists focus on the individual parts of phoneme productions instead of whole phonemes or syllables.

(4) Speech-language pathologists may be using objects indiscriminately in articulation therapy.

Despite objections such as these, Lof and Watson (2008) also demonstrated that the use of NSOME seems to be widespread in North America.

The central questions to be answered in this paper are:

- How did Van Riper and other architects of traditional articulation therapy use objects in articulation therapy?
- What was their rationale for using objects in articulation therapy?
- What types of objects did they use?
- For what purpose did they use these objects?

## METHODS

Textbooks published between 1939 and 1968 were reviewed. 1939 was the year Van Riper published his first textbook (Van Riper, 1939), and he is widely considered to be the main architect of traditional articulation therapy. The final year,1968, was selected as the year that the first principal works about phonological concepts entered the English literature (Chomsky & Halle, 1968; Jacobson, 1968). Phonological theory facilitated a radical shift in the way speech-language pathologists analyze and treat speech impairment.

Ten textbooks were selected for review (Appendix A). These books were chosen because they met the following criteria:

(1) They were used to train students studying the assessment and treatment of speech disorders.

(2) They were published between 1939 and 1968.

(3) Their titles contained the words *speech, speech therapy, speech correction, speech disorders, articulation, articulation therapy,* or *articulation disorders.*

Three other books published before 1939, and one from 1955, were added to this group because Van Riper consistently recommended them as resources for additional methods (Appendix B). Therefore, a total of fourteen textbooks were reviewed. Altogether fifteen speech professionals authored these texts. Four of the writers served as Presidents of the American Speech-Language-Hearing Association (ASHA), and six received ASHA's prestigious Honors of the Association (Appendix C). Van Riper wrote four of the books under review.

Once the review of these fourteen books was completed, three of Van Riper's later texts (Van Riper, 1978; Van Riper & Erickson, 1984, 1996) were surveyed for comparison to the earlier volumes used in the review. One letter Van Riper wrote in 1993 also was reviewed for comments he made about his early work in articulation therapy (Secord, et al, 2007, p. viii).

Each text was read, and findings were recorded on worksheets designed especially for this purpose (Appendix D). Each object named as a tool to teach the movements or positions of phoneme production was added to the list. The page on which the object appeared was noted and its purposes were

described. Objects also were classified according to the following types: Animal product (A), Body part (B), Cold object (C), Eating utensil (E), Food (F), Glass object (G), Heated object (H), Liquid (L), Metal object (M), Musical instrument (MI), Paper object (P), Plant-based object (PB), Rubber object (R), Toy (T), Wooden object (W), Other specified object (OS), and Other non-specified object (ONS).

## RESULTS

A total of 86 different objects, or types of objects, were mentioned in the fourteen textbooks reviewed (Appendix E). Careful scrutiny of Appendix E reveals that many of these objects were regular household items such as spoons, toothpicks, lollipops, mirrors, tissue paper, and ping-pong balls. Several items were common medical/laboratory items such as nasal bulbs, pipettes, and tongue depressors. Some items appear to be alternate names for the same object. For example, the following terms were found: “applicator,” “applicator stick,” “thin applicator,” “wooden applicator,” “stick,” “thin stick,” “thick stick,” “rounded stick,” and “tongue depressor.” It is possible that all of these were terms for the tongue depressor, but the texts did not make that clear so these objects were listed separately. The reader also will notice objects identified by generic names such as “probes,” “wedges,” “tooth props of various sizes,” “other objects,” and “every available device.” There was no way to determine from the texts what these objects actually were, so they were listed exactly as named by the original authors. Van Riper referred to all of these tools as “various instruments and applicators.”

Additional study of Appendix E reveals several objects that will be unfamiliar to the modern reader including: “Fricator,” “Fraenum Fork,” “Ladator,” “S-Concentrator,” and “Ruvinator.” These were specialized wire tools that were developed by Borden and Busse (1925) at the New York University Speech Clinic. Each tool was designed to teach a particular speech movement. The “Fricator” was designed to hold the tongue-tip down. The “Ladator” was designed to hold the lower lip down. The “Fraenum Fork” was designed to teach the tongue to groove for the sibilants. The “S-Concentrator” was designed to teach a smaller and tighter groove at the tongue-tip (a more “concentrated” groove). The “Ruvinator” was designed to push the tongue into a high back position for the lingua-velar phonemes. Van Riper referred to all of these objects as “curious wire contrivances.”

Other unfamiliar items also will be found in Appendix E. The “Velar Hook” was a tool made out of “a rubber pen holder” (Scripture, 1912, pp. 153-155). The object was placed in the mouth and hooked onto the back of the velum. The instructor then used the tool to exert slight forward pressure against the soft palate. The client worked to lift his soft palate up and back against this resistance to close off the nasal port. Froeschels (1948) named three other unusual objects: “Kerr’s Modeling Compound,” “Stents Wax,” and “Stents Plate.” These products are used today for making dental impressions and models, but the purposes for using them in articulation therapy were not described in Froeschels’ text.

Appendix E also reveals that the hands and fingers were considered “objects” in this review. Manipulation of oral structures with the hands and fingers was recommended by all but one of the authors, and they were the main tools recommended in the two books written about the motokinesthetic method (Stinchfield & Young, 1938; Young & Hawk, 1955). The hands and fingers were treated as one single object and recorded as “hands/fingers” because authors often did not differentiate between them. Some authors specified a thumb or finger to be used, but generally the hands and fingers were treated generically. Van Riper used his hands and fingers in various ways to stimulate oral positions for phoneme productions; however, with Irwin he hinted that the motokinesthetic method probably relied *too* heavily on the hands and fingers (Van Riper & Irwin, 1958). Van Riper and Irwin preferred to have clients use their own hands and fingers as feedback mechanisms to supplement the auditory and visual sensations they experienced while learning phonemes.

The authors also referred to the teeth as "objects" relative to jaw, lip, cheek, and tongue manipulation. The upper central incisors were used to stimulate lower lip elevation, and the side teeth were used to stimulate lateral tongue elevation. The side teeth also were used as objects against which the cheeks could brace.

The 86 objects were organized in Appenix F according to the authors who discussed them. Appendix F reveals that all fifteen authors employed objects in the process of articulation therapy. Some authors recommended only a few objects while others named a wide variety. The number of objects mentioned and/or discussed by each author ranged from 2 to 24. Authors who named the most items included Van Riper (1954) who named 22 and Scripture (1912) who named 24. Authors who described how to employ a small number of objects relied upon wooden objects (tongue depressors and other "sticks"), the hands and fingers, household mirrors, and hand-drawn diagrams and palatograms as their main tools of articulation training. Some writers described how they utilized objects in great detail (e.g., Nemoy & Davis, 1937; Young & Hawk, 1955). Other authors described the use of objects only in passing (e.g., Eisenson & Ogilvie, 1963; Carrell, 1968).

Van Riper termed the process of using objects in articulation training the *phonetic placement method*. He wrote: "For centuries, speech correctionists have used diagrams, applicators, and instruments to ensure appropriate tongue, jaw, and lip placement… [These] phonetic placement methods are indispensable tools in the speech correctionist's kit… Every available device should be used to make the student understand clearly what positions of tongue, jaw, and lips are to be assumed" (Van Riper, 1954, pp. 236-8).

Appendix G contains a summary of the stated purposes served by the 86 objects by category. A quick scan of this appendix reveals that tongue depressors and other wooden objects were used for far more purposes than any other single item. The hands and fingers were the next most widely used items. The reader also can verify that while a few objects were used for only one purpose, most objects were used for multiple purposes. The overall purpose of using objects was "to manipulate the tongue, lips, and jaw [and] to touch mouth surfaces for showing tongue placement" (Carrell, 1968, p. 99).

Appendix H lists the 86 objects according to the goal they served, organized by subsystem and structure. The appendix reveals that the objects were used for a variety of goals, from attaining lip rounding for /w/ to gaining tongue-back elevation for /k/ and /g/. No objects were used to teach whole phonemes; therefore, there was no one tool for /p/, or /l/, or /k/, and so forth. Instead, it was found that objects were used to teach component speech movements, and the objects varied according to the targeted goal. Thus one tool might be used to teach the velum to rise while another was used to encourage the tongue to groove. Objects were used to facilitate changes in each of the four primary speech subsystems: respiration, phonation, resonation, and articulation. These textbooks collectively described methods for using objects to teach a total of 72 distinct movement skills, or types of movements, provided in Appendix H and summarized here:

- *Jaw:* Objects were used to teach dissociation, grading, and direction of the lower jaw's vertical (up and down) movements. Objects were used to stabilize the lower jaw's vertical position in order to achieve appropriate amounts of mouth openness and closure (i.e., grading). Objects were used to guide the jaw left, right, forward, or back in order to achieve a midline position. Objects also were used to inhibit unnecessary jaw movements.
- *Lips:* Objects were used to teach bilabial and labio-dental contact, as well as lip rounding and retracting. Objects also were used to inhibit unnecessary lip movements and to reduce tension in the lips both before and during phoneme productions.

- *Cheeks:* Objects, especially the hands and fingers, were used to hold the cheeks in position against the lateral dentition (side teeth) during phoneme production.
- *Tongue:* Objects were used to stimulate general gross tongue movement as well as to prevent unnecessary tongue movement. Objects were used to elevate the tongue-tip to the maxillary anterior alveolar ridge. They also were used to hold the tongue-tip against the alveolar ridge, to prevent the tongue-tip from reaching the alveolar ridge, and to tease the tongue-tip away from the alveolar ridge. Objects were used to elevate the tongue-back to the soft palate as well as to elevate the sides of the tongue to the upper side teeth and gums. Objects were used to create both wide and narrow central grooves in the tongue, as well as to create a tiny central groove at the tongue-tip. Objects were used to teach the tongue-tip to curl up and back for the retroflex /r/. Objects also were used to push the tongue back into the mouth when it habitually postured in an anterior or interdental position.
- *Palate:* Objects were used to stimulate specific locations on the palate at points where the tongue was to make contact. For example, the anterior portion of the alveolar ridge was stroked with an object at the point Van Riper called “the spot” in order to teach lingua-alveolar contact (Van Riper, 1947, p. 191).
- *Respiration:* Objects were placed on and around the chest, and in front of the mouth and nose, in order to teach clients to become aware of their own patterns of inhalation and exhalation. Objects also were used to teach prolongation of exhalation. Small objects and tubes were used to teach the discrete differences in airflow for each of the fricatives and affricates.
- *Phonation:* Objects, especially the hands and fingers, were placed on the face and throat to educate clients about several facets of voice. They were used to teach clients how to produce phonemes with and without voicing as well as how to produce voiced sounds and words without tension.
- *Nasal Resonance*/*Velum:* Objects, especially the hands and fingers, were placed on the face to help clients become aware of, to modify, and to control their own oral and nasal resonance. Paper and tissue “flags” were held in front of the mouth and nose to help clients control the direction of oral and nasal airflow. Objects also were placed directly against the velum to teach it to raise and lower.
- *Prosody/Fluency:* Objects, especially megaphones and wind instruments, were mentioned on occasion as aids in the teaching of certain aspects of prosody and fluency including pitch, stress, loudness, rate, and intonation modulation.

Review of the textbooks revealed that collectively the authors had devised activities using objects to teach every component movement necessary for production of all Standard North American English consonants, vowels, and diphthongs. Nemoy and Davis (1937) were the only authors to discuss a variety of specific object techniques for every consonant. Scripture (1912) described how to use objects to teach each consonant except /h/. Young and Hawk (1955) were the only authors to describe how to apply these ideas specifically for every consonant as well as for every vowel. The other writers concentrated on methods to address movements for only the more problematic consonants, including /l/, /r/, /k/, /g/, and the fricatives/affricates. An example of selected procedures to teach the movements and positioning required for /s/ from the texts are presented in Appendix I.

In regard to the logistics of using objects in articulation therapy, each of these authors recommended that objects should be employed *after* a client has failed to produce a correct phoneme from an auditory-visual model and from direct verbal instruction. In each of his texts, Van Riper claimed that the training of any phoneme begins with stimulating the auditory system (*auditory training*), and then proceeds to providing an auditory-visual model for the client to imitate (*stimulation method*). He contended that if auditory training and the therapist's model alone did not teach the client to produce the correct phoneme right away, then other methods needed to be employed. These other methods included the phonetic placement method and those objects employed in its application (Figure 1).

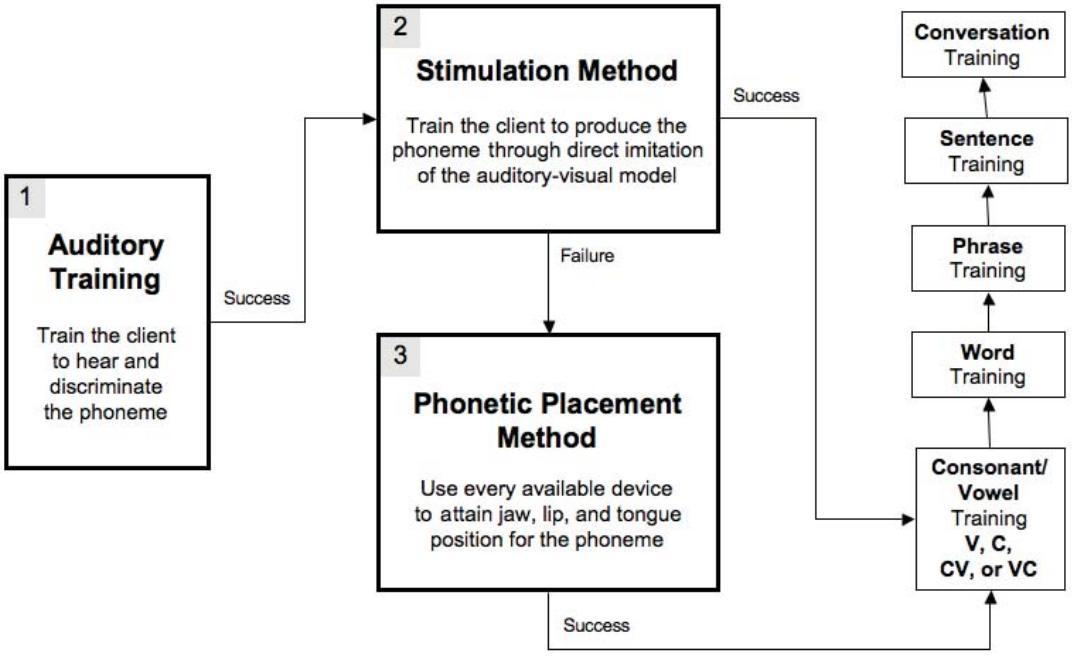


**Figure 1**. A selected portion of Van Riper's model of articulation therapy showing the relationship between auditory training, the stimulation method, and the use of objects when teaching phonemes.

## DISCUSSION

Many points of discussion resulted from this textbook review. Objects were a regular part of traditional articulation therapy according to Van Riper and the writers of the fourteen textbooks reviewed, and to suggest otherwise is historically inaccurate. Van Riper called this the *phonetic placement method*, and he himself used a wide variety of objects for this purpose. The main purpose of using an object was to teach dissociation, direction, and grading of oral movements for phoneme position/placement. Authors of these historical texts used objects to assist independent movements when a client could not accomplish them without assistance.

Van Riper taught that objects were to be used only *after* a client had failed to imitate an auditory-visual model of the target phoneme. In other words, he posited that one should not begin teaching a phoneme with an object. Van Riper explained that phoneme training begins with *auditory training*. Once the client is aware of the phoneme, can identify it, and can

discriminate it from other similar phonemes, the actual process of teaching production begins with modeling the phoneme for the client to imitate—the *stimulation method*. However, according to Van Riper, if auditory training and a therapist's auditory-visual model do not stimulate a better production of the target phoneme with accurate movement and positioning right away, other methods, including the phonetic placement method and the objects it employs, should be used to teach place, manner, and voicing.

None of the writers in the textbook reviews suggested that an object alone would bring about phoneme emergence or correction. Objects were to be used to stimulate appropriate dissociation, grading, or direction of movement, and then these movements were to be used to teach target phonemes. This is a two-step process that Van Riper described as follows: "The therapist…is attempting to give [the client] the appropriate location and formation. As soon as this has been achieved, the therapist stimulates [the client] with the correct sound" (Van Riper, 1954, p. 147).

A misunderstanding of the basic phonetic placement process may be causing some of the recent concern among speech-language pathologists about using objects in articulation therapy. Some academics and clinicians who condemn the use of objects or tools (including the hands and fingers) in speech therapy, by calling these activities NSOME/NSOMT, have implied that therapists are attempting to use objects alone to cause phonemes to emerge or correct. According to Powell for example, "Party horns… blow ticklers… bubbles… straws… Items such as these are being used by speech-language pathologists (SLPs) across America to treat a wide range of communication disorders… they employ nonspeech tasks as an indirect means of modifying speech production" (Powell, 2008, p. 374). If it is true that SLPs are using objects alone to correct phonemes, this runs counter to the historic use of objects as presented by the authors reviewed.

One of the current arguments against using objects is that there has been no demonstrable relationship between speech and "nonspeech" activity (e.g., Wilson, Green, Yunusova, & Moore, 2008). Some authors are warning that it is inappropriate to have clients chew gum to get the jaw to move up and down, to bite on a bite block to stabilize the jaw at various heights, to blow whistles to learn lip rounding, or to press the tongue-tip against a spoon to learn tongue-tip elevation. Those clinicians who disapprove of such measures fail to consider the sample of clients with oral sensory-motor delays/deficiencies who may require help in producing appropriate jaw, lip, tongue, or velar movements as preparatory skill development before specific phoneme training is possible. Van Riper called these clients "clumsy-tongued individuals" and "the slow of tongue" (Van Riper, 1947, p. 132). The need to develop some basic movement skills in order to control structures associated with speech has merit. In Van Riper's words: "In modern speech correction, the emphasis on tongue exercises has almost disappeared. Yet for certain of the clumsy tongued individuals with whom we work, modern forms of these exercises are very valuable" (p. 132).

Van Riper's texts clearly point to and recommend that speech-language pathologists engage in these routines in order to attain preliminary movement approximations for speech. He wrote: "Whenever possible the articulatory exercises given should proceed out of the movements used in the biological functions" (Van Riper, 1939, p. 242). Van Riper even recommended the use of "non-speech" activity itself when working with young children: "With smaller children it is often necessary to begin by training them in imitation of non-speech movements" (Van Riper & Irwin, 1958, p. 144). Modern SLPs are trying to reconcile these basic Van Riper methods with recent cautions about the use of objects or tools in so-called "non-speech" activity. Much confusion about why and how to use objects in articulation therapy appears to be the result.

It also has been argued that articulation improvement cannot be achieved if therapists focus on the individual parts of phonemes instead of the whole phoneme in a syllable or word (e.g., Bowen, 2005; Bunton, 2008; Forest, 2002; Lof, 2003; Kahmi, 2008). For example, when teaching

/k/, the warning is to leave jaw, lip, and tongue control alone, and just teach /k/ within the language context. This procedure ignores clients with oral sensory-motor issues who simply cannot elevate the back of the tongue on demand. How long must a speech-language pathologist model /k/ in syllables or words with no success before he or she decides to do something directly to help the client lift the back of the tongue? Van Riper and the other authors reviewed suggested that this help should be given right away. According to each of the reviewed textbooks, word drilling often is not enough to correct the articulation of phonemes. The early authors of articulation texts in this review concluded that therapy should switch quickly to the individual phoneme (or syllable) when failure occurs, and further assistance on place, manner, and voice features should be given right away. Objects may be used to teach these features if necessary. This recommendation represents basic articulation therapy as taught by the authors under discussion.

The reader will note that some of these authors utilized unsanitary and potentially harmful or dangerous object activities that are not compatible with current safety requirements. For example, Nemoy and Davis (1937) recommended placing small bits of paper on the back of the tongue to teach posterior tongue elevation, and the aspiration of such objects represents a risk that was not identified.

Some may claim that Van Riper modified his views about the use of objects in articulation therapy later in life. A review of his final thoughts on the subject may shed light on this conjecture. Examination of the last edition of Van Riper's textbook revealed that he had continued discussing these methods as a regular part of therapy (Van Riper, 1978). It is therefore apparent that Van Riper advocated the use of objects in articulation therapy for at least four decades, from 1939 through 1978.

Beginning in 1984, however, Van Riper collaborated with a colleague (Erickson) in writing another basic text, *An Introduction to Speech Pathology and Audiology* (Van Riper & Erickson, 1984). In the introduction, Van Riper noted that the very purpose of the text had changed from being a collection of methods for speech-language pathologists, to a general introductory text for undergraduate speech and other students. The section of the text on articulation was highly influenced by this transformation. The authors made more generalized statements about articulation therapy, they introduced phonological theory, and they dropped almost all of Van Riper's specific phonetic placement methods along with the discussion of the objects he used to accomplish them. This seems to have become the model for many articulation/phonology textbooks published since that time.

Modern textbooks on articulation and phonology continue to acknowledge the phonetic placement method as one viable option in articulation therapy, but the many details of how to utilize objects generally are not included. As examples, Bernthal and Bankson (2004), Bauman-Waengler (2004), and Pena-Brooks and Hegde (2000) present general statements about the phonetic placement method, offering a few sample methods as illustrations. Likewise these texts acknowledge the motokinesthetic method (Stinchfield & Young, 1938; Young & Hawk, 1955), but the great details of the ways in which these therapists used their hands and fingers to teach positioning of the speech structures are absent. The reduction of phonetic placement techniques and motokinesthetic methods into simplified paragraph descriptions has left generations of therapists lacking specific knowledge about the vast array of objects, including the hands and fingers, which were used to influence oral movement in Van Riper's time. Perhaps the misunderstanding and misuse of objects today has been the inevitable result.

Phonetic placement methods and the objects used to accomplish them endured into the 1980s in a few books including Vaughn and Clark (1979), Bosley (1981) and Hanson (1983). In the 21st century, the details of object use for phonetic placement and motokinesthetics have survived and thrived by shifting them away from main introductory textbooks designed for students, and into practical instructional manuals designed for working professionals.

A number of modern guidebooks contain procedures for using objects in the process of speech movement instruction. These include Bahr (2001), Bleile (2006), Gilbert and Swiney (2007), Marshalla (2004 and 2007), Rosenfeld-Johnson (2001 and 2005), and Secord et al (2007). Although the term "oral motor" (simply meaning "mouth movement") has been attached to some of them, many of the techniques contained in these manuals are updated versions of what Van Riper called "the old traditional methods." As an example, Van Riper (1947) used a pencil to teach lip rounding, and he called it a *phonetic placement method*, while Gilbert and Swiney (2007) used a gummy worm to teach lip rounding, and they called it an *oral motor technique*. The goal and procedures are the same, but the tool has been modernized and the vocabulary updated.

Phonetic placement techniques and their objects are employed when a client simply cannot learn a specific speech movement in any other way. Secord, a protégé of Van Riper, wrote that one uses these and other methods "when the client cannot produce a target sound at all" (Secord, et al., 2007, p. 3). He continued: "In a manner of speaking, the clinician needs to 'roll up her sleeves' and actually teach the client how to say the target sound" (p. 3). This is a process of teaching the mechanics of sound production (phonetics), not the use of a phoneme within a language (phonology). Professional speech-language pathologists today welcome these ideas in manuals and continuing education programs because the rich assortment of phonetic placement techniques that formerly appeared in articulation therapy textbooks are no longer included in modern texts.

## CONCLUSIONS AND IMPLICATIONS FOR THERAPY

This textbook review strongly suggests that objects can and should continue to be used to teach speech movements in articulation therapy when the phonetic placement method is employed. To claim that this is a new idea, to ban the use of objects in articulation therapy, or to assert that this is "non-speech" activity ignores the fact that practicing clinicians have been using objects continuously in speech training in the United States since at least 1912. Using objects to teach speech movement is exactly what Van Riper and other traditional therapists often did when a client could not produce a target phoneme by imitating it. Speech-language pathology students would benefit from being taught to appreciate the historic value served by objects in speech movement training instead of being taught to ignore or condemn this process. Seasoned professionals would benefit from considering how these ideas might apply to clients who do not respond well to model-and-imitate methods of phoneme stimulation.

The traditional therapists of these textbooks used tongue depressors and other "sticks" more than any other tools in articulation therapy. SLPs today continue to use tongue depressors, but some problems exist. The present author has found that tongue depressors are too wide, too thick or too thin, the wrong shape, and simply too clumsy for many of the delicate oral adjustments necessary in articulation training. Additionally, wood can have an unpleasant taste and feel in the mouth even when it is flavored, and an adult-sized tongue depressor can splinter fairly easily when a client bites down hard on its thin edge. Alternatives to the tongue depressor are welcome for these reasons. For example, a modern flexible plastic dental pick often can be slipped between the upper central incisors and placed so that it sits between the tongue-tip and the alveolar ridge. This tiny tool allows for more direct instruction about tongue-tip placement for /s/, /z/ and the other lingua-alveolar phonemes than does the much larger tongue depressor.

SLPs also find that they cannot use their hands and fingers as easily as the therapists in this review because of new restrictions regarding sanitary procedures. SLPs often do not have sinks for proper hand sanitation in their therapy spaces, they may not be provided with gloves, and they may have clients who do not respond well to gloves or commercially available hand sanitizers. SLPs in the schools often work in groups and cannot sanitize their hands for every

student simultaneously. Therapists in many environments find they cannot manipulate the papers, toys, and games of therapy while keeping their hands sanitized. They also cannot touch clients with the hands when working via on-line video services. Some SLPs work for employers who prohibit them, for legal reasons, from touching clients with the hands and fingers. An obvious solution to each of these situations is to employ a variety of sanitized objects the therapist can use or the client can use on himself.

Van Riper wrote that "every available device" should be used for phonetic placement. Speech-language pathologists who employ phonetic placement techniques today have a much wider range of tools from which to choose due largely to the invention of synthetic materials. For example, Van Riper may have used matches, pencils, toothpicks, and sticks to adjust jaw position, but a modern therapist can use a set of sanitary and professionally designed bite blocks. Many appropriate objects are being used today for phonetic placement:

- *Inexpensive household items:* Including plastic straws, tubes, swizzle sticks, spoons, and eyedroppers. Metal spoons can be used as well.
- *Inexpensive items designed to improve oral hygiene:* Including toothbrushes, toothettes, tongue scrapers, dental picks, dental floss, and dental floss handles.
- *Inexpensive toys:* Including plastic horns, whistles, bubble wands, kazoos, and harmonicas.
- *Professionally designed oral/nasal tools:* For example, the Lip Retractor, Z-Vibe, LifteR, Oral Probe, Lip Gym, Nasal Clamp, ChewyTube, Maroon Spoon, Jaw Grading Bite Blocks, and Progressive Jaw Closure Tubes.
- *Safe and sanitary tapes:* Including latex-free and nonabrasive Kinesio Tape.

Objects are used when auditory bombardment, modeling, phonological awareness activities, reading programs, minimal pairs, and other linguistic and cognitive means are not enough to teach correct phoneme production. Phonetic placement techniques are employed as a last resort when a client needs to learn the specific movements of place, manner, voice, and resonance for particular phonemes, and there is nothing "nonspeech" about that. Nor is there anything new about it. Using objects is one of the traditional ways to teach speech movements in articulation therapy.

## NEED FOR RESEARCH

Most of the activities utilizing objects that are recommended by the textbook writers of this review have not been tested using modern tools or research methodologies. Theoretical and opinion pieces on whether objects should or should not be used in treatment provide no evidence that these practices are ineffective. While this literature review does not prove that they are effective, the longevity and persistent presence of these methods over the past century, as demonstrated in this article, suggests that these methods have clinical value and warrant further investigation.

Some research on the use of objects for training phonetic placement has been initiated. The electropalatometer is being used to assess and guide tongue placement for sound production today (e.g., McLeod & Singh, 2009; Gibbon, 1999; Dagenais, Critz-Crosby & Adams,1994; Fletcher, 1992). An appliance for training /r/ was shown to have been effective when combined with auditory stimulation (Clark, Schwarz & Blakely, 1993). Research on SpeechBuddies suggests that tactile biofeedback on tongue position for /r/, /l/, /s/, /ʃ/, and /tʃ/ reduces treatment time in some clients (Rogers, 2010; Rogers & Galgano, 2011). These projects are a beginning, but they address tongue movements only and some of this equipment is beyond a typical therapy budget. Therapists need research on the traditional roles that simple inexpensive objects have played and continue to play in learning all the speech movements of respiration, phonation, resonation, and articulation advocated by Van Riper and these other traditional writers. Ultrasound, magnetic resonance imaging, and even film

or videotape could demonstrate these changes. The question to be asked is whether or not the object made learning correct movement and position for target phonemes easier, faster, or more efficient.

## SUMMARY

A review of fourteen selected textbooks written in the first half of the 20th century revealed that traditional therapists considered it standard practice to use objects when teaching dissociation, grading, direction, and positioning of the articulators for phoneme production. To call these activities “non-speech” methods seems to misrepresent the historic purpose objects have served in articulation therapy. Van Riper recommended that every device available should be used to help clients learn specific speech movements when imitation of an auditory-visual model of a phoneme proved unsuccessful. He used the term *phonetic placement method* to describe this process. Speech-language pathologists who are implementing basic Van Riper routines continue to use objects to teach phonetic placement. Student clinicians need to be taught to appreciate the role objects have played in articulation therapy throughout the past century. Professionals need to consider how the implementation of such activities might help clients who do not respond well to simple model-and-imitate phoneme teaching routines. Empirical research on the effectiveness of using objects to teach oral movement for phoneme production is needed

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**ACKNOWLEDGEMENTS**

**Financial**
Pamela Marshalla received no remuneration for the study of this topic or the writing of this article. Rhonda J. Branford, MAT, CCC-SLP, Donna Ridley, MEd, CCC-SLP, and Diane Bahr, MS, CCC-SLP, voluntarily edited and provided feedback throughout the process. The OMI is an all-volunteer study group and does not advertise or endorse particular groups or individuals. The OMI website is donated by Marshalla Speech and Language.

**RELATED INFORMATION**

**Declarations of interest**
Pamela Marshalla owns Marshalla Speech and Language through which she writes and publishes books, serves as an instructor of continuing education seminars, and provides consultation on children with speech disorders. She voluntarily co-chairs the OMI study group. Marshall’s books include: *Carryover Techniques in Articulation and Phonological Therapy* (2010), *Frontal Lisp, Lateral Lisp* (2007), *Paraxial Uncovered: The Seven Stages of Phoneme Development* (2007), *Successful R Therapy* (2004), *Becoming Verbal with Childhood Paraxial* (2001), *How to Stop Drooling* (2001), *How to Stop Thumb sucking* (2001), and *Oral-Motor Techniques* (1992). She has developed one standardized test, *Marshalla Oral Sensorimotor Test* (2007), and she has produced one children’s music CD, *Do You Like Pie?* (2008). Several of her seminars have been recorded and made available for purchase and/or online continuing education training.

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## APPENDIX A. TEN TEXTBOOKS ORIGINALLY SELECTED FOR THE REVIEW.

1. Anderson, V. A. (1953). *Improving the child's speech*. New York: Oxford University.
2. Berry, M. F., & Eisenson, J. (1956). *Speech disorders: Principles and practices of therapy.* NY: Appleton-Century-Crofts.
3. Carrell, J. A. (1968). *Disorders of articulation.* Englewood Cliffs: Prentice-Hall.
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## APPENDIX B. FOUR TEXTBOOKS RECOMMENDED BY VAN RIPER AND THEREFORE ADDED TO THE REVIEW.

1. Borden, R. C., & Busse, A. C. (1925). *Speech correction.* NY: Crofts.
2. Nemoy, E. M., & Davis, S. F. (1937). *The correction of defective consonant sounds*. Magnolia, MA: Expression.
3. Scripture, E. W. (1912). *Stuttering and lisping*. NY: Macmillan.
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## APPENDIX C. AUTHORS FROM THE TEXTBOOK REVIEW WHO SERVED AS PRESIDENT OF THE AMERICAN SPEECH-LANGUAGE-HEARING ASSOCIATION, AND/OR WHO RECEIVED ASHA'S PRESTIGIOUS HONORS OF THE ASSOCIATION.

- Mildred F. Berry received ASHA's Honors of the Association in 1971.
- James A. Carrell served as ASHA president in 1956, and he received ASHA's Honors of the Association in 1974.
- Jon Eisenson served as ASHA president in 1958, and he received ASHA's Honors of the Association in 1967.
- Sara Stinchfield Hawk served as ASHA president in 1939 and 1940, and she received ASHA's Honors of the Association in 1953.
- Charles Van Riper received ASHA's Honors of the Association in 1957. Van Riper is widely considered to be the main architect of modern day articulation therapy.
- John V. Irwin served as ASHA president in 1968, and he received ASHA's Honors of the Association in 1970.

## APPENDIX D. SAMPLE DATA COLLECTION WORKSHEET.

**Types**: Animal product (A), Body part (B), Cold object (C), Eating utensil (E), Food (F), Glass object (G), Heated object (H), Liquid (L), Metal object (M), Musical instrument (MI), Paper object (P), Plant-based object (PB), Rubber object (R), Toy (T), Wooden object (W), Other specified object (OS), and Other non-specified object (ONS).

| **Source: Van Riper, 1947** | | | |
|---|---|---|---|
| **Object** | **Page** | **Type** | **Purpose** |
| Small sponge | 171 | A | Place between tongue-tip and alveolar ridge; Press tongue-tip upward against sponge to teach elevation. |
| Spoon | 171 | E, M | Press down on tongue-tip to teach tip elevation. |
| Tongue Depressor | 171 | W | Press down on tongue-tip to teach tip elevation. |
| Pencil | 171 | OS, W | Place between lips to teach rounding; Place between lips and push in-and-out with the tongue to encourage tongue-tip movement. |
| Probe | 171 | ONS | Place between lips to teach rounding; Place between lips and push in-and-out with the tongue to encourage tongue-tip movement. |
| Stick candy | 172 | F | Lick with tongue to teach tip elevation. |
| Spoon | 172 | E, M | Lick with tongue to teach tip elevation. |
| Other object | 172 | ONS | Lick with tongue to teach tip elevation. |
| Sugar | 172 | F | Lick with tongue to teach tip elevation. |
| Probe | 172 | ONS | Place across front of tongue; Teach the tip to curl up and around it in order to encourage tip elevation. |
| Match (Long wooden match) | 172 | OS, W | Tease the alveolar ridge in order to teach the tongue-tip to curl up and articulate with it. |
| Probe | 173 | ONS | Place lengthwise along midline of tongue in order to teach tongue grooving. |
| Pencil | 173 | OS, W | Place lengthwise along midline of tongue in order to teach tongue grooving. |
| Spoon | 173 | E, M | Place bowl-down on tongue to teach tongue grooving. |
| Every available device | 186 | (All) | Teach every position of jaw, lips, and tongue. |

**Appendix D con't**

| Object | Page | Type | Purpose |
|---|---|---|---|
| Tongue Depressor | 186 | W | Place on tongue-tip to inhibit tip elevation. |
| Tooth props | 186 | ONS | Place between teeth to help it "to assume the proper dental opening." |
| Thin applicators | 186 | ONS | Teach the tongue-tip to elevate; Teach tongue grooving. |
| Wedges | 186 | ONS | To groove the tongue. |
| Curious wire contrivances | 186 | M | Teach lateral contact of the tongue and teeth. |
| Small tubes | 187 | ONS | Teach a midline airstream. |
| Thin stick | 190 | W | Teach a midline groove. |
| Match | 191 | OS, W | Mark the alveolar ridge for tongue-tip contact. |
| Tongue Depressor | 191 | W | Mark the alveolar ridge for tongue-tip contact. |
| Pencil | 191 | OS, W | Bite on to stabilize the jaw for /s/ |
| Spoon | 191 | E, M | Place on tongue to teach the groove for /ʃ/; Encourage the tongue to wrap up and around the bowl of the spoon to teach a gross central groove. |
| Finger | 192 | B | Teach the lower lip to move up to the upper teeth for /f/ or /v/. |
| Feather | 192 | A | Teach airflow on /f/ and /v/. |
| Tongue depressor | 192 | W | Push the tongue back for /r/. |

## APPENDIX E. THE 86 OBJECTS, OR TYPES OF OBJECTS, RECOMMENDED IN THE TEXTS

| | | | |
|---|---|---|---|
| Adhesive tape | Aluminum applicators | Applicator | Applicator sticks |
| Balloons | Bent metal tongue depressor | Blunt toothpicks | Breath indicator |
| Bubble; bubble pipes or wands | Bunsen burner flames | Candle flames | Candy lipstick |
| Cold pieces of metal | Cord | Cotton | Curious wire contrivances |
| Diagrams and palatograms | Electrodes | Every available device | Feathers |
| Fricator | Fraenum fork | Fudge frosting | Gum |
| Hands/fingers | Harmonicas | Honey | Kerr's Modeling Compound |
| Ladator | Large circle with a small hole in the center | Lollipops | Masking tape |
| Matches | Megaphones | Mirrors | Nasal bulbs |
| Orange sticks | Other objects | Paper boats | Paper flags |
| Peanut butter | Pencils | Pieces of paper | Ping-pong balls |
| Pinwheels | Pipe cleaners | Plastic boats | Probes |
| Recorders | Rope | Rounded sticks | Ruvator |
| Saliva | S-Concentrator | Side teeth | Slates |
| Small bits of paper | Small glass tubes (Pipettes) | Small rubber balls | Small rubber bulbs |
| Small rubber tubes | Small sponges | Spoons | Stents Plate |
| Stents Wax | Stick candy | Sticks | Strips of paper |
| Sugar | Tambour | Teeth | Thick sticks |
| Thin applicators | Thin sticks | Tissue paper flag | Tongue depressors |
| Tooth props of various sizes | Toothpicks | Trumpets | Upper central incisors |
| Various instruments and applicators | Velar hook | Vinegar | Wedges |
| Whistles | Wooden applicators | | |

## APPENDIX F. A SUMMARY OF THE 86 OBJECTS ORGANIZED BY AUTHORS.

| Text | Objects recommended | Total |
|---|---|---|
| Anderson (1953) | Whistles, paper boats, balloons, bubbles, pinwheels, candles, feathers, harmonicas, recorders, mirrors, hands/fingers, tongue depressors, applicator sticks. | 13 |
| Berry & Eisenson (1956) | Tongue depressors, peanut butter, adhesive tape, orange sticks, gum, candy lipstick, fudge frosting, vinegar, ping-pong balls, plastic boats, hands/fingers, paper flags, feathers, lollipops, honey, masking tape, rounded sticks. | 17 |
| Borden & Busse (1925) | Mirrors, diagrams, palatograms, Fricator, Fraenum fork, S-Concentrator, Ladator, Ruvator, bent metal tongue depressor, wooden applicator, tongue depressors, teeth. | 12 |
| Carrell (1968) | Mirrors, hands/fingers, tongue depressors. | 3 |
| Eisenson & Ogilvie (1963) | Mirrors, hands/fingers, diagrams, palatograms. | 4 |
| Froeschels (1948) | Hands/fingers, tongue depressors, probe, mirrors, balloons, teeth, candle flames, small glass tubes (pipettes?), Stents Plate, Kerr's Modeling Compound, Stents wax. | 11 |
| Nemoy & Davis (1937) | Strips of paper, small bits of paper, pieces of paper, feathers, mirrors, hands/fingers, tongue depressors, upper central incisors, side teeth, toothpicks, a large circle with a small hole in the center, saliva. | 12 |
| Scripture (1912) | Bunsen burner, Tambour, breath indicator, thick stick, hands/fingers, mirror, cotton, small rubber ball, rubber tubes, nasal bulbs, probe, applicator, toothpick, pencil, stick, aluminum applicator, tissue paper flag, velar hook, electrode, cold pieces of metal, slate, trumpets, megaphones, rubber bulbs. | 24 |
| Stinchfield & Young (1938) | Hands/fingers, tongue depressors. | 2 |
| Van Riper (1939) | Every available device, various instruments and applicators, tongue depressors, tooth props of various sizes, thin applicators, wedges, curious wire contrivances, small tubes, hands/fingers. | 9 |
| Van Riper (1947) | Small sponges, spoons, tongue depressors, pencils, probes, stick candy, other objects, sugar, matches, every available device, various instruments and applicators, tooth props, thin applicators, wedges, curious wire contrivances, small tubes, thin sticks, hands/fingers, feathers. | 19 |
| Van Riper (1954) | Sponges, spoons, tongue depressors, pencils, probes, stick candy, other objects, sugar, matches, every available device, various instruments and applicators, tooth props, thin applicators, wedges, curious wire contrivances, small tubes, thin sticks, hands/fingers, feathers, blunt toothpicks, upper central incisors, thick stick. | 22 |
| Van Riper & Irwin (1958) | Mirror, hands/fingers, saliva, teeth, spoon, pipe cleaners. | 6 |
| Young & Hawk (1955) | Hands/fingers, tongue depressors, cord/rope. | 3 |

## APPENDIX G. A SUMMARY OF THE STATED PURPOSES FOR ALL 86 OBJECTS BY CATEGORY.

| Category | Named Object | Purpose for Using the Object |
|---|---|---|
| **Food** | Peanut butter | To place on the alveolar ridge in order to teach tongue-tip elevation.<br>To place on the velum in order to teach tongue-back elevation. |
| | Honey | To place on the alveolar ridge in order to teach tongue-tip elevation. |
| | Lollipops | To place on the alveolar ridge in order to teach tongue-tip elevation.<br>To place between the lips to teach rounding and closure. |
| | Fudge frosting | To place on the lips for increased awareness.<br>To lick off the lips for improved tongue mobility. |
| | Candy lipstick | To place on the lips for increased awareness.<br>To lick off the lips for improved tongue mobility. |
| | Stick candy | To lick with the tongue in order to teach tip elevation. |
| | Sugar | To lick with the tongue in order to teach tip elevation. |
| | Vinegar | To lick off the lips for improved tongue mobility. |
| | Gum | To teach up-down jaw movements.<br>To increase overall flexibility of the articulators. |
| **Body parts** | Hands/fingers | To place on the neck to monitor voice.<br>To place on the nose and face to monitor nasality.<br>To place before the mouth to monitor exhalation.<br>To stabilize the jaw at midline.<br>To adjust any jaw, lip, cheek, or tongue position.<br>To cue any oral position.<br>To inhibit any oral movement or position.<br>To pinch the nose closed and prevent nasal air emission.<br>To press the cheeks against the facial bones in order to prevent puffiness during production of any phoneme.<br>To vibrate against the lips (to “trill” the lips) in order to reduce their tension.<br>To vibrate against the lips (to “trill” the lips) in order to shift vocal tone more forward in the mouth.<br>To place between the front teeth in order to encourage tongue-tip protrusion. |
| | Upper teeth | To bite into the lower lip in order to increase awareness of the lower lip.<br>To bite into the lower lip to teach upward movement of the lower lip. |
| | Teeth | To brace the tongue against.<br>To brace the lips against.<br>To brace the cheeks against. |
| | Side teeth | To brace the sides of the tongue against in order to create a midline channel. |

**Appendix G. con't**

| Category | Named Object | Purpose for Using the Object |
|---|---|---|
| **Eating utensils** | Spoons | To lick with the tongue in order to teach tip elevation.<br>To press downward against the tongue-tip (resistance) in order to teach tip elevation.<br>To press downward against the tongue-back (resistance) in order to teach back elevation.<br>To curl the tongue around in order to teach a gross midline groove. |
| **Wooden objects** | Tongue depressors | To push or pull the lips into any position.<br>To push or pull the jaw into any position.<br>To push the tongue-tip up or down.<br>To tickle the tongue-tip and cause it to rise.<br>To push the sides of the tongue up.<br>To push the tongue into the mouth.<br>To push the tongue back toward the velum.<br>To mark the palate for the tongue's points of articulation.<br>To press against (resist) tongue movements in order to develop the tongue's range of movement.<br>To stroke the midline of the tongue in order to create the central groove.<br>To stretch the lips in order to relax them.<br>To stabilize the jaw in order to encourage independent tongue movements.<br>To make a shelf behind the upper central incisors on which the tongue-tip can rest up near the alveolar ridge.<br>To press downward against the tongue-tip to teach tip elevation.<br>To press downward against the tongue-back to teach back elevation.<br>To hold the tongue down. |
| | Toothpicks | To place between the tip of the tongue and the alveolar ridge in order to teach a tiny central groove.<br>To inhibit tongue-tip protrusion.<br>To push the tongue-tip down during production of /t/ in order to teach /tʃ/. |
| | Blunt toothpicks | To push the tongue back into the mouth. |
| | Sticks | To push or pull the jaw, lips, or tongue into any position. |
| | Applicator sticks | To push or pull the jaw, lips, or tongue into any position.<br>To mark the palate for the tongue's points of articulation.<br>To stroke down the midline of the tongue in order to create the tongue's central groove. |
| | Orange sticks | To push or pull the jaw, lips, or tongue into any position.<br>To mark the palate for the tongue's points of articulation.<br>To stroke down the midline of the tongue in order to create the tongue's central groove. |

**APPENDIX G. con't**

| Category | Named Object | Purpose for Using the Object |
|---|---|---|
| | Rounded sticks | To push the tongue back into the mouth. |
| | Thick sticks | To push the tongue into position.<br>To teach tip control for the sibilants. |
| | Wooden applicators | To push or pull the jaw, lips, or tongue into any position. |
| | Matches (long wooden matches) | To tickle the tongue-tip in order to encourage it to rise.<br>To mark the target on the alveolar ridge for tip articulation.<br>To place across the lips, from corner to corner, so the tongue can reach out and under, and pull it back, in order to teach the tip to elevation for the lingua-alveolars, and/or to elevate and curl back for /r/. |
| | Pencils | To stroke down the midline of the tongue in order to encourage the tongue's midline groove.<br>To place lengthwise down the midline of the tongue in order to teach the sides of the tongue to elevate up and around it (to groove).<br>To place between the lips in order to teach rounding.<br>To bite on in order to prop the jaw into one position.<br>To place one end between the lips for the tongue to push in and out in order to teach greater range of tongue movement. |
| **Paper objects** | Paper flags | To hold in front of the mouth in order to discover the oral airstream on any phoneme. |
| | Tissue paper flags | To hold in front of the nose in order to discover nasal air emission on any phoneme. |
| | Strips of paper | To hold in front of the mouth in order to discover the oral airstream on any voiceless phoneme. |
| | Paper boats | To hold in front of the mouth in order to discover the oral airstream on any phoneme. |
| | Pieces of paper | To fold in half in order to model the tongue's central groove. |
| | Small bits of paper | To place on the tongue-tip and to spit out in order to teach tip control for /t/ and /s/.<br>To place on the back of the tongue in order to teach tongue-back elevation for /k/. |
| **Rubber Objects** | Small rubber balls | To place between the tongue-tip and alveolar ridge in order to teach tongue-tip elevation. |
| | Small rubber bulbs | To place between the tongue-tip and alveolar ridge in order to teach tip elevation. |
| | Velar hook | A device made from "a rubber pen holder" to hook on to the velum; Designed to use resistance to teach velar elevation for oral sound. |

**Appendix G. con't**

| Category | Named Object | Purpose for Using the Object |
|---|---|---|
| **Plant-based objects** | Cotton | To experience exhalation during phoneme productions.<br>To hold in front of the mouth to discover oral airflow and indirectly teach elevation of the velum.<br>To hold in front of the nose to discover nasal airflow and indirectly teach lowering of the velum. |
| **Metal objects** | Aluminum applicators | To push the tongue back into position for /r/. |
| | Fricator | A blade on a handle designed to hold the front of the tongue down. |
| | Fraenum Fork | A two-tined fork on a handle designed teach a midline groove for the sibilants. |
| | Ladator | A wire tool on a handle designed to hold the lower lip down. |
| | Ruvator | A wire devise designed to guide the tongue into the retroflex position. (Looks like today's Dentex tongue scraper.) |
| | S-Concentrator | A small rubber tube and wire device designed to teach a smaller (more concentrated) midline groove for the sibilants. |
| | Curious wire contrivances | Van Riper's term for the Fricator, Fraenum Fork, Ladator, Ruvator, S-Concentrator. |
| | Bent metal tongue depressor | A metal device similar to a laryngeal mirror designed to hold the tongue down. |
| | Small metal plate | Held under the nose to illustrate nasal air emission. |
| **Glass objects** | Small "glass tubes" or "glass straws" (Pipettes) | To hold outside the front teeth in order to direct the airstream medially down the center of the tongue. |
| | Mirrors | To explore the oral cavity.<br>To learn any jaw, lip, cheek, tongue, or velar movement.<br>To discover the movements and positions of any phoneme.<br>To hold under the nose in order to discover nasal air emission. |

**Appendix G. con't**

| Category | Named Object | Purpose for Using the Object |
|---|---|---|
| **Animal products** | Feathers | To hold in front of the mouth to discover oral airflow and indirectly teach elevation of the velum.<br>To hold in front of the nose to discover nasal airflow and indirectly teach lowering of the velum. |
| | Small sponges | To place between the tongue-tip and alveolar ridge for the tip to press against in order to teach tip elevation. |
| **Liquids** | Saliva | To force through the teeth with the tongue-tip in order to teach /s/.<br>To wet the lips so airflow for /f/ can be felt more easily. |
| **Musical instruments** | Harmonicas | To teach prolongation of exhalation.<br>To direct airflow orally, and indirectly teach elevation of the velum. |
| | Recorders | To teach prolongation of exhalation.<br>To direct airflow orally, and indirectly teach elevation of the velum. |
| | Trumpets | To learn how to make speech sounds and syllables crisp and clear, with a good oral tone. |
| **Toys** | Pinwheels | To teach prolongation of exhalation.<br>To direct airflow orally, and indirectly teach elevation of the velum. |
| | Bubbles, bubble wands, bubble pipes | To teach prolongation of exhalation.<br>To direct airflow orally, and indirectly teach elevation of the velum. |
| | Ping-pong balls | To blow across a table in order to encourage lip rounding. |
| | Toy boats | To blow across a table in order to encourage lip rounding. |
| | Whistles | To teach prolongation of exhalation.<br>To direct airflow orally, and indirectly teach elevation of the velum. |
| | Balloons | To teach prolongation of exhalation.<br>To teach lip rounding.<br>To direct airflow orally, and indirectly teach elevation of the velum. |

**Appendix G. con't**

| Category | Named Object | Purpose for Using the Object |
|---|---|---|
| **Other objects specified** | Masking tape | To place on the lower lip in order to increase awareness of its movement toward the upper the te<br>To place on the sides of the lips in order to prevent rounding. |
| | Adhesive tape | To place on the lower lip in order to increase awareness of its movement toward the teeth.<br>To place on the sides of the lips in order to prevent rounding. |
| | Candle flames | To teach prolongation of exhalation.<br>To monitor airflow through the mouth or nose, and indirectly monitor elevation or depression of ve |
| | Bunsen burner flames | To monitor airflow through the mouth or nose, and indirectly monitor elevation or depression of ve |
| | Pipe cleaners | To encourage the tongue-tip to rise. |
| | Small tubes | To blow air through in order to teach the midline airstream. |
| | Slates | To hold under the nose to reveal nasal air emission. |
| | Electrodes | Device designed to deliver an electrical current to the velum in order to encourage its movement. |
| | Diagrams and palatograms | Hand-drawn diagrams and palatograms made to develop a client's understanding of tongue mov and position. |
| | Megaphones | To increase clarity of vocal tone. |
| | Cords, Ropes | To tie around the waist in order to perceive inhalation and exhalation. |
| | Tambour | A rotating drum designed to record the expulsion of the breath through a tube during the producti any phoneme. |
| | Breath indicator | A device incorporating a tube designed to direct the breath to a tambour or flame in order to illust the expulsion of the breath for any phoneme. |
| | Stents Plate | Purpose not specified. |
| | Stents Wax | Purpose not specified. |
| | Kerr's Modeling Compound | Purpose not specified. |
| **Other non-specified objects** | A large circle with a small hole in the center | An O-shaped object made of unknown material created to help the client develop a midline airstr for the sibilants. |
| | Probes | To push or pull the jaw, lips, or tongue into any position. |
| | Applicators | To push or pull the jaw, lips, or tongue into any position. |
| | Thin applicators | To push or pull the jaw, lips, or tongue into any position. |
| | Tooth props of various sizes | Van Riper's term for any tool designed to help the jaw attain correct position. |
| | Wedges | To help the jaw attain correct position.<br>To stabilize the jaw in position.<br>To help the jaw assume correct position for any phoneme |
| | Other objects | To lick with the tongue in order to teach tip elevation. |
| | Various instruments and applicators | Van Riper's term for any tool designed to push or pull the jaw, lips, tongue, and velum into any po |
| | Every available device | Van Riper's term for any tool designed to push or pull the jaw, lips, tongue, or velum into any position. |

## Appendix H. The 72 goals served organized by subsystem and structure.

| Subsystem | Structure | 72 Speech Movement Skills Taught with Objects |
|---|---|---|
| Respiration | Lungs | Objects were used to–– <br>1. Discover the airstream <br>2. Perceive inhalation <br>3. Perceive exhalation <br>4. Monitor exhalation <br>5. Teach the midline airstream <br>6. Cue any aspect of inhalation or exhalation <br>7. Prolong exhalation |
| Phonation | Larynx | Objects were used to–– <br>8. Teach voicing <br>9. Teach voiceless-ness <br>10. Cue any characteristic of voice <br>11. Decrease vocal tension / Teach vocal relaxation <br>12. Teach oral tone <br>13. Shift vocal tone to a more anterior position in the mouth <br>14. Teach prolongation of phonation <br>15. Teach pitch modulation <br>16. Teach intonation patterns |
| Resonation | VP Mechanism | Objects were used to–– <br>17. Discover the nasal airstream <br>18. Teach nasal direction of airflow <br>19. Teach oral direction of airflow <br>20. Prevent nasal air emission <br>21. Teach upward velar movement <br>22. Stimulate velar movement (electrical stimulation) |
| Articulation | All | Objects were used to–– <br>23. Explore the oral cavity <br>24. Increase flexibility of the articulators <br>25. Increase awareness of the articulators <br>26. Increase range of jaw, lip, cheek, or tongue movement <br>27. Learn any jaw, lip, cheek, or tongue movement <br>28. Adjust any jaw, lip, cheek, or tongue position <br>29. Cue any jaw, lip, cheek, or tongue position <br>30. Inhibit any jaw, lip, cheek, or tongue movement |
| | Jaw | Objects were used to–– <br>31. Gently push or pull the jaw into any position <br>32. Teach sequential up-down jaw movements <br>33. Stabilize the jaw at midline <br>34. Prevent lateral jaw movements <br>35. Inhibit any unnecessary jaw movements <br>36. Adjust jaw position up or down |
| | Hard Palate | Objects were used to–– <br>37. Mark the palate at the desired place of tongue contact |

**Appendix H. con't**

| Subsystem | Structure | 72 Speech Movement Skills Taught with Objects |
|---|---|---|
| Articulation Con't | Lips | Objects were used to—<br>38. Push or pull the lips into any position<br>39. Increase awareness of the lips<br>40. Increase awareness of the lower lip<br>41. Inhibit any extraneous lip movement<br>42. Hold the lower lip down<br>43. Reduce tension in the lips / Relax the lips<br>44. Teach lower lip elevation<br>45. Brace the lips against<br>46. Encourage lip rounding<br>47. Prevent lip rounding |
| | Cheeks | Objects were used to—<br>48. Prevent the cheeks from puffing outward during phoneme production |
| | Tongue | Objects were used to—<br>49. Push or pull the tongue into any position<br>50. Increase general mobility of the tongue<br>51. Inhibit any extraneous tongue movement<br>52. Increase awareness of the tongue-tip<br>53. Tickle the tongue tip to encourage tip elevation<br>54. Stroke the tongue-tip to encourage tip elevation<br>55. Resist tongue movements to encourage elevation<br>56. Hold the tongue down during the oral exam<br>57. Push the tongue back into the mouth<br>58. Push the tongue back to the velum for lingua-velar sounds<br>59. Teach tongue-tip elevation for lingua-alveolar sounds<br>60. Teach the tongue-tip to curl up and back for the retroflex /r/<br>61. Teach tongue-back elevation for lingua-velar sounds<br>62. Teach tongue-side elevation for sibilants<br>63. Brace the sides of the tongue against for sibilants<br>64. Stroke down the middle of the tongue to create a groove<br>65. Create a midline channel/groove<br>66. Teach a tinier central groove at the tongue-tip for /s/ and /z/<br>67. Teach control of the tongue-tip for lingua-alveolar sounds<br>68. Make a shelf behind the upper central incisors on which the tongue-tip could rest up near the alveolar ridge for lingua-alveolar sounds<br>69. Develop visual understanding of tongue movement for all sounds |
| All | All | Objects were used to–<br>70. Adjust rate<br>71. Adjust rhythm<br>72. Teach clean and crisp syllable productions |

**Appendix I. Quoted examples of how objects were used to teach specific movements, postures, and positions for /s/ in the reviewed textbooks.**

| Goal | Object | Quoted procedure | Source |
|---|---|---|---|
| Bring front teeth together and stabilize jaw in a high position for /s/ | Hands/fingers | "One of the first steps to aid the trainer in preparation for this sound is for her to bring the child's lower jaw upward in a natural closing." | Stinchfield & Young, 1938, p. 136 |
| Eliminate tongue protrusion on /s/ | Mirror | "Sometimes it is sufficient to show him that people do not stick their tongues out that way. He then watches his own tongue in a mirror." | Scripture, 1912, p. 135 |
| Eliminate tongue protrusion on /s/ | Tongue depressor | "It may be necessary to push the tongue back gently while the pupil attempts to produce *s*." | Nemoy & Davis, 1937, p. 155 |
| Teach an oral airstream for /s/ | Paper flags or feathers | "[Use] paper flags or feathers placed just in front of the lower lip." | Berry & Eisenson, 1956, p. 148 |
| Teach a central airstream for /s/ | Tube | "Small tubes are used to direct the flow of air." | Van Riper, 1947, p. 187 |
| Teach the concept of the tongue groove for /s/ | Diagram or Palatogram | "At times, the correctionist uses diagrams to show children where to place parts of their articulatory mechanism." | Eisenson & Ogilvie, 1963, p. 222 |
| Teach a preliminary or gross tongue groove for /s/ | Spoon | "With mouth open wide and tongue relaxed, place bowl of spoon on front third of tongue. Ask child first to squeeze the sides of the spoon without lifting, then to squeeze and lift." | Van Riper, 1947, p. 172 |
| Teach a narrow tongue groove for /s/ | Orange stick (Manicure tool) | "Groove the tongue along the median raphe with a slender orange stick, and ask the child to curl his tongue around the stick." | Berry & Eisenson, 1956, p. 148 |
| Prevent a t/s substitution | Probe, applicator, toothpick, or pencil | "One cure consists of inserting a probe, an applicator, a toothpick, or a pencil just over the middle of the tongue and pressing it down as the person begins to speak a word beginning with 's'… He cannot close the passage completely, and instead of saying 't' he is forced to say 's'." | Scripture, 1912, p. 132 |

**Appendix I Con't**

| Goal | Object | Quoted procedure | Source |
|---|---|---|---|
| Assist lateral tongue elevation for the tongue groove for /s/ | Tongue depressor | "Pressing the sides of the tongue gently upward with a depressor against the gums at the sides of the palate is another suggestion…" | Stinchfield & Young, 1938, p. 137 |
| Teach the lateral seal of the tongue groove for /s/ | Fingers | "To ensure close contact of the sides [of the tongue] to the dental ridge, the teachers may press outside on either side of the midline of the upper jaw. This outside pressure tends to bring the sides of the tongue upward against the dental ridge." | Young & Stinchfield Hawk, 1955, p. 20 |
| Prevent nasal air emission on /s/ | Fingers | "In stubborn cases, it may be necessary to have the pupil plug his nose with his fingers to force the emission of the breath through the mouth." | Nemoy & Davis, 1937, p. 160 |
| Teach velar elevation for /s/ | Velar Hook | "The hook is placed behind the velum, which is raised against a slight resistance from the hand." | Scripture 1912, p. 155 |
| Establish a clear sound of /s/ | Saliva | "Forcing tiny particles of saliva through the teeth sometimes assists in securing a clear sound of *s*. | Nemoy & Davis, 1937, p. 158 |
| Prevent lingua-dental articulation on /s/ | Tongue depressor | "Push the tongue back with a tongue depressor. Direct the child to make a hissing sound while you hold the applicator in place." | Berry & Eisenson, 1956, p. 149 |
| Prevent lateral air emission during production of /s/ | Fraenum Fork and S-Concentrator | "As a means of correcting an unusually obstinate tendency to spread [lateralize] *S* sounds, the combined Fraenum Fork and S-Concentrator shown in the accompanying diagram will be found effective." | Borden & Busse, 1925, p. 185 |
| Prevent lateral air emission during production of /s/ | Upper side teeth | "The sides of the tongue should at all times maintain tight contact with the upper teeth and gum ridge as far front as the cuspids." | Anderson, 1953, p. 166 |
| Make /s/ less palatal and more alveolar | Fingers or other unspecified tool | "The therapy consists of transforming *f* into *s* by holding the patient's lips away from each other and from the upper incisors while he unduly prolongs *f*." | Froeschels, 1948, p. 138 |