Table 1: Summary of the methods of the speech motor learning (SML) approach to the treatment of apraxia of speech: *Copyright Anita van der Merwe 2010*
For more detail see Van der Merwe A., 2011 (in Aphasiology) and 2018 (in American Journal of Speech-Language Pathology – ALSO see AJSLP Supplementary material on Internet).

STAGES in the assessment and treatment process across time	Preparatory: Steps: 1-3	Stage 1:	Stage 2:	Stage 4:	Stage 5:	Stage 6:
	1)Rate ease of production of vowels (V), consonants (C), diphthongs and clusters (CC) on a scale 1 – 4. 1 = easy and produced correctly most of the time. 2 = quite easy and usually correct. 3 = quite difficult to produce and usually incorrect. 4 = very difficult and consistently incorrect. An exact rating is not always possible, A sound can be noted as a 1 to 2, or 2 to 3, or 3 to 4, sound. **2)Select the first set of target sounds** consisting of *three to four consonants* that are not phonetically close, and *three or more vowels* (rounded, neutral and spread). **GENERAL RULE OF THE SML APPROACH**: <u>Always</u> start treatment with a set of the easiest sounds (Cs and Vs with the greatest ease of production) and then in Stages across time (1 to 7 in this document), gradually add more sounds to the target set. In severe apraxia of speech, select only two consonants and three vowels as the first target set.	Rehearse the first set of target consonants and vowels in the CVCV nonwords on the five levels of variation (the five variation levels for CVCV syllable structures).	*Expand* the first set of target sounds and rehearse in CVCV nonwords on the five levels of variation. *First add one or two consonants and another vowel if only three vowels were selected at the start of treatment. It is preferable to first expand the C set before expanding the V set. Be guided by the ability of the client. If too many errors occur, first expand the C set and only add one C at a time. Many errors may occur when new sounds are incorporated, but errors should decline with practice. If not, take away one of the added sounds. *Rehearse the expanded set of target sounds on all five levels of variation. **Stage 3:** Add a further one or two consonants and a vowel (if the client can handle that) and rehearse the expanded set on the five levels of variation. *Continue to expand the target set till all the sounds rated 1 to 2, have been incorporated into the target set.	Rehearse target consonants and vowels (sounds already incorporated into the target set) in the *CVC* syllable structure on the three levels of variation for this structure: *First rehearse the *first group of target sounds* on all three levels of variation in CVC. *Add two to three consonants and two vowels to the first target set of sounds and rehearse the expanded set on the three levels of CVC variation. *Add further sounds to the target set and rehearse the expanded set on three levels of variation. *Continue this way till all target sounds have been incorporated into the target set. Be guided by the ability of the client. Many errors could occur when new sounds are incorporated or a new syllable structure is introduced, but errors should decline with practice. If not, take away one of the added sounds.	Rehearse the target sounds in CVCVC and longer syllable structures, e.g. CVCVCV or CVCVCVC.	Now introduce sounds rated 3 on the scale of ease of production one-by-one into the existing target set. Rehearse these sounds in CVCV and CVC syllable structures. **Stage 7:** Next target the sounds that were rated 4 on the scale of ease of production. Add these sounds one-by-one to the existing target set. Rehearse the whole corpus of sounds on all variation levels. NOTE: *The number of stages as depicted in this table is only a guideline. Each new expanded set of target sounds or a new syllable structure should be noted as a next stage.*

STIMULI for each stage	Preparatory:	Stage 1:	Stage 2 and 3:	Stage 4:	Stage 5:	Stage 6 and 7:
	3) CREATE STIMULI: Open the SML software and capture the first set of target sounds. Create CVCV nonwords on all the levels of variation. The five levels of variation are: *Variation Level 1*: C1V1C1V+ (+ indicates variation of sounds in that position in a series): (e.g. baba, babe, babo, baboo, babi). *Variation Level 2:* C1V1C2V+ (e.g. baka, bake, bako, bakoo, baki). *Variation Level 3:* C1V1C+V1 (e.g. baka, bata, bafa). *Variation Level 4:* C1V+C2V1 (e.g. beka, boka, booka, bika). *Variation Level 5:* C1V+C+V+ (e.g. beka, botoo, boofe, biko).	Start with variation level 1 nonwords and when articulation becomes correct 80% of the time (no distortion, substitution or distorted substitutions) and production becomes more fluent, move on to variation level 2 (and so forth). Identify real words from the nonwords. Insert in a phrase or sentence using the target sounds in VCVC, CV or VC syllable structures. Example: target sounds [m, s, y, o, ee]. Phrases: My mommy See mommy	For each expanded set of target sounds compile the series of nonwords on all variation levels with the assistance of the SML software program. For each expanded set start rehearsal with variation level 1 nonwords and when articulation becomes correct 80% of the time (no distortion, substitution or distorted substitutions) and production becomes more fluent, move on to variation level 2 (and so forth). As in Stage 1 identify real words from the nonwords. Insert in a phrase or sentence using the target sounds in VCVC, CV or VC syllable structures.	Compile CVC treatment stimuli with sounds from the first target set on the three levels of variation: Variation Level 1 for CVC: of the vowel only Variation Level 2 for CVC: of the second consonant Variation Level 3 for CVC: of the initial consonant	Use previous nonword series and add sounds* to the final position of the nonwords. Add the same sounds to all the nonwords on a particular variation level. The controlled variation and consistent parts in the series facilitate rhythmic production. *Be guided by the ability of the client	Compile treatment stimuli for each set of target sounds by using the SML software program. For each set of target sounds: Start with variation level 1 nonwords and when a criterion of 80% correct is reached, and production becomes more fluent, move on to variation level 2 (and so forth). Identify real words and phrases as in previous stages.
STEPS to be followed during treatment	**Pre-treatment** Rehearse production of first target sounds in CV and VC combinations a number of times. Correct production is not a prerequisite for progress to CVCV syllable structures.	**Steps to be followed during treatment are similar for all Stages:** **1.**Model the nonword three times. Client looks and listens. **2.**Blocked practice of each nonword on imitation till criterion of 80% correct is reached (no groping, distortion, substitution, distorted substitutions, additions, omissions or trans-positioning). **3.**Self-initiated blocked practice of nonword with modelling by clinician and gradual fading of model till self-initiated. **4.** Impose a response delay-period of 3-4 seconds once criterion of 80% is reached. Repeat till production of nonword is correct after delay. **5.**Consecutive production of series of nonwords: first on imitation of each nonword consecutively and then in self-initiated mode (if the client can read) till criterion level is met and production of the series becomes fluent and rhythmic. Place stress on syllables that vary. **6.**Increase rate of self-initiated production of series of nonwords till criterion is met, speech rate is near normal and speech becomes fluent. Client should try to eliminate inter-syllabic breaks, but if this is not possible accept this as a natural means of compensation. **7.**Identify real words and phrases and rehearse till criterion is reached and speech becomes fluent. **8.** Repeat same steps with all nonwords and series. **General:** Provide knowledge of results (KR) feedback for 100% of first trials during blocked practice, but reduce KR feedback gradually. During repetition of a series only provide feedback if a nonword is consistently produced incorrectly. Delay KR feedback 3 to 4 seconds after the response and provide it only if the client did not successfully self-correct an error.				