

## **PML Speech Intervention for Cleft Palate Pilot Study – Therapy Manual**

Therapy Manual for a pilot speech intervention applying the principles of motor learning for children with cleft palate speech errors.

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Version: 1.0

## Table of Contents

Introduction .....	2
Treatment overview .....	2
Pre-practice .....	2
Practice .....	3
Equipment.....	4
Set up .....	4
Stimuli.....	5
Treatment goals .....	5
Target selection.....	5
Procedure .....	6
Treatment procedure .....	6
Session plans .....	6
Welcome.....	6
Pre-practice .....	6
Practice.....	7
Summary, farewell .....	8
Probe procedure.....	9
Baseline procedure.....	9

## Introduction

- The treatment provided to the children will be guided by the principles of motor learning (PML); the principles that will be applied include:
  - Practice amount
  - Practice schedule
  - Feedback type
  - Feedback frequency
- Both active and passive cleft speech errors will be targeted throughout the treatment.
  - treatment phase 'a' will target active cleft errors
  - treatment phase 'b' will target passive cleft errors
- Each treatment phase will be 8-weeks of twice weekly therapy, resulting in 16 treatment sessions for treatment 'a' and 16 treatment sessions for treatment 'b'.
- Treatment phases will be alternated for each participant, this means that treatment can start with either treatment 'a' or treatment 'b'.
- Treatment phases will be separated by a 4-week therapy break.
- Each treatment sessions will be 40-60 minutes in duration as required by participant to achieve the prescribed dosage.
- Treatment will commence after a prescribed baseline period (which will be different) for each participant.
- Parents or carers will accompany the child during the treatment sessions.
- Parents will not be instructed on how to deliver the therapy nor will any homework activities be set.
- At the beginning of every 3<sup>rd</sup> treatment, generalization and control probes will be conducted.
- All sessions will be recorded for quality assurance, reliability and fidelity.

## Treatment overview

- Each treatment session will contain a pre-practice and a practice component.
- A participant will move from pre-practice to practice within each session when they reach a criterion of 5 correct productions in a row without a cue.
- If a participant does not reach the criterion in a session, a small amount of practice will still be done to familiarise the participant with the treatment protocol.

## Pre-practice

The purpose of pre-practice is to teach the correct production of the target words and provide qualitative feedback to facilitate learning of the target production. The aim is to have the child learn to produce the target word correctly (i.e. the same way the SLP says the word).

Any number of cues or strategies can be used to elicit the correct production of the target word, these can include but are not limited to:

- a. Auditory-visual modelling of the word
- b. Explanations
- c. Verbal and pictured phonetic placement cues
- d. Forward or backward chaining

- e. Nasal occlusion to facilitate oral airstream
- f. Old sound/new sound
- g. Slowing down word or elongating sounds, then speeding it back up
- h. Initial consonant cues by saying/whispering/posturing of the initial sound

A participant will move from pre-practice to practice once they have completed 5 correct productions of any word without a cue in the pre-practice stage.

In initial sessions, the pre-practice phase could take a considerable amount of time as the SLP is teaching the participant the target words. In subsequent sessions, however it will be shorter.

Where a participant does not reach criterion for moving to production practice, a longer period of pre-practice will be completed and a reduced amount of practice (such as 60 attempts) will be completed as this is the target behaviour that is being moved towards.

### Practice

The practice phase is the core component of the treatment sessions and will form the majority of the session. It has been designed to apply the principles of motor learning to facilitate the practice of the correct speech sounds in order to resolve the cleft type speech errors. The principles of motor learning that will be applied are:

*Practice Amount:* 100-120 practice attempts at the treatment items will be achieved each session.

*Practice Schedule:* Practice will be randomised and varied across treatment items to facilitate better learning and retention.

*Feedback Frequency:* Feedback will be given at a reduced frequency of 60%. Feedback can be given at a consistent rate of 60% throughout or feedback can be delivered with fading feedback throughout sessions and across sessions over time. Therefore, feedback will be given at 100% for the entirety of the first session but gradually reduced until it is rarely used in the final sessions, resulting in feedback being given at a reduced rate of 60% throughout the study. If fading feedback is used, it is to provide our preschool participants with a very clear representation of what they are attempting to achieve until they are very familiar with the activities and then reducing the feedback steadily.

*Feedback Type:* Knowledge of results feedback (KR), whether a sound was right or wrong will be given in the practice. As the participants will be pre-schoolers, who can be heavily influenced by daily events, they may struggle and require additional support from time to time. In these circumstances, the treating clinician will use their clinical judgment as to whether the child requires more KR feedback. It is possible to return to doing some pre-practice once practice has commenced if the participant is struggling to engage in the activities.

## Equipment Technology

- Zoom Q2n video and audio recorder
  - Set to record full HD video
  - Set to record 24-bit/96Hz audio
- Pack of AA batteries
- 128GB Micro SD card in Zoom Q2n and spare Micro SD card

## Intervention materials

- Participants' stimuli (8 x 10 cards with pictures and word)
- Data sheet
- Participants' probe word set (for every 3<sup>rd</sup> session)
- Speech pathology assessments and test forms for baseline and follow-up assessments
  - Great Ormond Street Speech Assessment (GOS.SP.ASS'98)
  - Diagnostic Evaluation of Articulation and Phonology (DEAP)
  - Peabody Picture Vocabulary Test – fourth edition (PPVT-4)
  - Pre-school Language Scales – fifth edition (PLS-5)
  - Test of Narrative Retell (TNR)
  - Intelligibility in Context Scale (ICS)
  - Speech intelligibility and acceptability rating from Universal Parameters for Reporting Speech Outcomes in Individuals with Cleft Palate
  - Nasometer – Zoo Passage and Nasal Sentences
- Range of stimuli games (e.g. wind-up toys, spinning tops, playdough, bouncy balls, board games, stickers, stamps)
- Watch/clock/timer

## Set up

Prior to the participant arriving:

- Confirm room booking with local Speech Pathology team
- Locate room and place a 'quiet please therapy in progress' sign on the door
- Text parent if the room location is different to previous time
- Insert new batteries and micro SD card into Zoom Q2n and place it on table
- Locate participant's stimuli and data sheet and place on table
- Set up motivational games
- Remove any distractions from room
- If it is a probe session, locate probe stimuli and data sheet

## Stimuli

Each participant's treatment goals and stimuli will have been selected by the investigating team based on the errors identified during the participants' speech assessment results: from the DEAP and the GOS.SP.ASS'98.

## Treatment goals

At least 1 active cleft speech error (treatment a) and at least 1 passive cleft speech error (treatment b) will be selected as a treatment target. A participant will have at least 2 treatment target goals, but may have more. Examples of treatment goals are:

- (Participant) will produce alveolar plosives in the target word in a short phrase correctly in 80% of 100 trial opportunities in the practice phase of treatment.
- (Participant) will produce oral pressure consonants in single words correctly in 80% of 100 trial opportunities in the practice phase of treatment.

Goals can be targeted at single word, short phrase or sentence level, depending on the ability of the individual participant.

A participant will be deemed to have met their goal criterion if they achieve their goal (or higher) in three consecutive treatment probe sessions.

## Target selection

For each treatment goal (error) to be targeted, a set of 10 words will be selected that correspond to the target. The treatment items will be motivating and age appropriate for the participant, stimutable, and there will be independence between the targets (active versus passive). Treatment items will be produced in single words, in short phrases or in sentences, depending on the participants' individual goals.

These treatment items will be presented on picture cards that are age appropriate and engaging for the participants. The words in addition to a picture will also be written on the card.

## Procedure

### Treatment procedure

Session plans	Initial 1-3 sessions
0-5 mins	Welcome
5-30 mins	Pre-practice
30-50 mins	Practice <ul style="list-style-type: none"> <li>a. 20 trials</li> <li>2 minute game</li> <li>b. 30 trials</li> <li>2 minute game</li> <li>c. 30 trials</li> <li>(if doing well for time 2 minute game then another 20 trials)</li> </ul>
50 mins	Summary, farewell

	Subsequent sessions
0-5 mins	Welcome
5-15 mins	Pre-practice
15-50 mins	Practice <ul style="list-style-type: none"> <li>a. 30 trials</li> <li>2 minute game</li> <li>b. 40 trials</li> <li>2 minute game</li> <li>c. 30 trials</li> <li>2 minute game</li> <li>(if doing well for time 2 minute game then another 20 trials)</li> </ul>
50 mins	Summary, farewell

### Welcome

Welcome and seat the participant and their family member. Note down anything of importance from previous meeting. Press record on the video/audio recorder.

### Pre-practice

1. Tell the child that they need to copy the SLP and say the word exactly the same by matching the sounds in the word
2. Select a word for training (this can be random or carefully selected as the participant has found it difficult in previous sessions)
3. Provide any number of cues to elicit and shape the correct production of the target word, these can include but are not limited to:
  - a. Auditory-visual modelling of the word
  - b. Explanations
  - c. Verbal and pictured phonetic placement cues
  - d. Forward or backward chaining
  - e. Nasal occlusion to facilitate oral airstream
  - f. Old sound/new sound
  - g. Slowing down word or elongating sounds, then speeding it back up

- h. Initial consonant cues by saying/whispering/posturing of the initial sound
4. Ask the participant to produce the word.
5. Provide knowledge of results feedback by saying if the word was correct or incorrect and why. If it was incorrect provide specific feedback on what they need to do to improve next time.
6. Teach and encourage self-monitoring/self-evaluation by asking them what they thought of their attempt.
7. Repeat the steps above as required until the participant has produced 5 correct productions of any word without a cue and move to practice.

If a participant does not meet the criterion of 5 correct productions of any word without a cue, a small amount of practice will still be done in the session to familiarise the participant with the treatment protocol. If this occurs, it will be discussed with the project team to discuss other ways of eliciting the correct sound and reviewing the appropriateness of the goal.

### Practice

Practice will happen in blocks of 30-40 trial attempts followed by a 2 minute motivational game. This cycle will be repeated at least 3 times in order to aim for at least 100 attempts in a session. Number of trial attempts can be reduced in a block and more opportunities for breaks can be included if it is appropriate for the individual (e.g. break after 20 trials and do 5 lots of 20).

The motivational game can be anything that is enticing, engaging and motivating for the participant. Its purpose is to motivate and reward the participant and have a short break from practice activities, it should not be a therapy-type activity.

The steps for practice are:

1. Tell the participant that we are going to do our practice and they need to remember to say the words exactly as I say them. Remind them that the words we practiced are going to be in single words/short phrases/sentences.
2. Present the target word (randomly selected) on the card and say the target word (in a carrier phrase or sentence as required)
3. Ask the participant to say the word (phrase/sentence)
4. Listen to the participant's production of the target word and rate it as correct/incorrect on the data sheet, if there is **any** doubt about correctness, the word will be marked as incorrect
5. Transcribe the word on the data sheet (feedback will be delayed and not immediate due to the transcription and recording the result on the datasheet)
6. Decide if you will provide feedback and note it on the data sheet
  - a. If providing feedback, provide feedback to the participant only about whether the word was correct/incorrect using phrases such as:
    - i. That was great
    - ii. You got it
    - iii. Good work
    - iv. You didn't get it that time
    - v. That wasn't quite right



7. Move to the next word
8. After 30 trials, play a motivational game for 2 minutes
9. Repeat steps 1-8 until at least 100 trials (at least 3 times) have been completed.
10. No more than 120 trials are to be completed in a session.

Rate of feedback is recorded on the score sheet. You mark if feedback was given for the trial.

Feedback is to be presented randomly

If fading is used it will follow as below so that only 60% of trials are given feedback.

- In the first set of 20 trials, feedback will be given for 19 of the 20 trials
- In the next set of 20 trials, feedback will be given for 16 of the 20 trials
- In the 3<sup>rd</sup> set of 20 trials, feedback will be given for 11 of the 20 trials
- In the 4<sup>th</sup> set of 20 trials, feedback will be given for 9 of the 20 trials
- In the final set of 20 trials is completed, feedback will be given for 5 of the trials

### Summary, farewell

Turn off the video/audio recorder. Tell the participant that the session is over for the day and thank them for their hard work or give them a pointer of something to work towards next time. Confirm the time/place for their next session with their parent/carer.

After the participant leaves, calculate the percentage of treatment items correct on the participant's data sheet. Store the data sheets in the participant's folder.

Scan and upload the data sheets to RDM system as soon as practicably possible.

### Probe procedure

At the beginning of every 3<sup>rd</sup> treatment session (sessions 3, 6, 9, 12, and 15), generalisation and control probes will be conducted. The session will follow the exact same procedure as the treatment procedure with the exception that the first 5-10 minutes will be spent collecting probe data.

	Probe sessions
0-5 mins	Welcome
5-15 mins	Probe collection
15-25 mins	Pre-practice
25-50 mins	Practice <ul style="list-style-type: none"> <li>a. 25 trials</li> <li>2 minute game</li> <li>b. 25 trials</li> <li>2 minute game</li> <li>c. 25 trials</li> <li>2 minute game</li> <li>d. 25 trials</li> </ul>
50 mins	Summary, farewell

The procedure for collecting the probes is:

1. Tell the participant that we are going to look at some different words before we do our practice words. Let them know that I want them to say the word after me and I will write what they say down. Tell them that I can't tell them if they got it right or wrong.
2. Present the probe word (randomly selected) on the card/iPad and say the word
3. Ask the participant to say the word
4. Listen to the participant's production of the word and rate it as correct/incorrect on the data sheet, if there is **any** doubt about correctness, the word will be marked as incorrect
5. Transcribe the word on the data sheet
6. Move onto the next probe word

### Baseline procedure

Prior to treatment, participants will attend baseline sessions where their speech and language will be assessed and probe measures collected. As this is a multiple baseline study, the treatment has to be introduced at different times for each participant, in order to demonstrate that change occurs after the commencement of treatment rather than after a specific number of baseline sessions. This means that each participant will have a different number of baseline sessions that they attend prior to treatment. Each participant will be randomly assigned a baseline duration of either 3, 4, 5, or 6 baseline sessions. The assessment battery will be conducted during these baselines sessions and each baseline session can go for 30-60 minutes.

Families will have the baseline sessions explained to them at the beginning of the study, so they will be aware of a delay in commencement of treatment.

Rapport building, identifying interests and preferences for motivational games, and testing for preferences of stimuli presentation (e.g. cards versus iPad) activities will all be incorporated into baseline sessions.

It is recommended that the assessments be conducted in the following order:

1. Case history
2. DEAP
3. GOS.SP.ASS'98
4. PPVT-4
5. PLS-5
6. TNR- Preschool
7. Intelligibility in Context Scale (ICS)
8. Speech intelligibility and acceptability rating from Universal Parameters for Reporting Speech Outcomes in Individuals with Cleft Palate
9. Nasometer

Assessments will be conducted as per their respective assessment manual and/or instructions. Results will be recorded on the appropriate/corresponding test forms where present.

## Appendix A – Data collection sheet

Target	Transcription	Attempt	Attempt	Attempt	Attempt	Attempt	Attempt	Feedback
(Insert set of 10 treatment words x 2)								
		/20	/20	/20	/20	/20	/20	/

## Appendix B – Treatment probe collection sheet

Target	Target transcription	Baseline #1 Date:	Baseline #2 Date:	Baseline #3 Dte:	Baseline #4 Date:	Baseline #5 Date:	Baseline #6 Date:
Insert active treatment words							
Total:							
Insert active untreated words							
<b>Target</b>	<b>Target transcription</b>	<b>Baseline #1 Date:</b>	<b>Baseline #2 Date:</b>	<b>Baseline #3 Dte:</b>	<b>Baseline #4 Date:</b>	<b>Baseline #5 Date:</b>	<b>Baseline #6 Date:</b>
Insert passive treatment words							

[illegible]