PhoRTE[4,5] (Phonation Resistance Training Exercises) ***PhoRTE Protocol & Vocal Intensity Norms***

PhoRTE Protocol

Population Presbyphonia/presbylaryngis, sarcopenia (adults)

Pre-Treatment Vocal intensity assessment

Dosage

Duration	Day	Week
45min	2x	1x

Target Increase +5dB/wk

Treatment Plan 4 weeks (or until +20dB loudness increase)

Exercises
1. Sustained Phonation (SP)
2. Pitch Glides (PG)
   a. Ascending (↑)
   b. Descending (↓)
3. Functional Phrases (FP)
   a. High (↑)
   b. Low (↓)

Repetitions 8 – 10 trials

Cueing Use a "strong" voice

Maintenance 3x/wk, 1x/day *(Exercises 2 and 3 only)*

Modifications*

Pre-treatment: Deriving assessment measures

Dosage:

Duration	Day	Week
30min	1x	2x

Cueing: Visual Biofeedback: use of a loudness/dB meter in view of client

Cueing: Visual: Raising hand to signal to become louder

*Based on clinical judgment and clinical setting constraints

Vocal Intensity Norms

Average Habitual Speaking Intensity for Adults and Children (in dBA)[1]

	Adult Males		Adult Females		Children	
	Mean	SD*	Mean	SD*	Mean	SD*
nonsingers	62.1	2.70	62.1	3.30	59.7	3.35
singers	61.2	4.00	62.0	4.95	61.5	2.75

*SD for below Mean calculated from ±2 SD range (skewed distribution)

Average Dynamic Speaking Range for Adults and Children (in dBA)[1]

	Adult Males		**Adult Females**		**Children**	
	Mean	SD*	Mean	SD*	Mean	**SD***
nonsingers	30.2	4.15	21.9	1.45	26.1	5.25
singers	30.6	6.60	29.9	5.15	26.6	4.90

*SD for below Mean calculated from ±2 SD range (skewed distribution)

Normative Voice Intensity Data for Younger and Older Adults (in dB SPL)[2]

	Younger* Males		**Older** Males**		**Younger* Females**		**Older** Females**	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Voice	74.6	3.2	74.0	4.6	74.7	3.9	74.0	4.2
Speech	69.7	3.4	65.8	4.9	67.8	4.3	66.4	4.0

*Mean Age: 19.1 yrs, SD: 1.4, Range: 18 - 28

**Mean Age: 72.0, SD: 4.8, Range: 63 - 86

PhoRTE[4,5] (Phonation Resistance Training Exercises) ***PhoRTE Assessment Measures***

Procedures

1. Start recording for speech samples
    a. Recording device should be ~30cm from patient
2. Direct patient to complete vocal intensity assessment tasks
    a. Each sample should be about 30 sec long (if possible)
3. Analyze intensity of speech on speech analysis software (Praat, Voice Analysis App, etc.)
    a. Analyze middle section (i.e. 10sec - 20sec mark) of sample to avoid onset/offset intensity of task
4. Record dB measures for each task
    a. Average habitual measures to obtain *Habitual Loudness (L_H) and Max Loudness (L_M)*

Vocal Intensity Assessment Tasks

Task	Condition	Directions
Sustained Phonation /a/	Habitual	"Say "ah" normally and comfortably for as long as you can."
	Max	"Say "ah" as loud but as comfortably as you can for as long as you can."
Reading Aloud[6]	Habitual	"Read this passage aloud in your most comfortable volume."
	Max	"Read this passage aloud as if you are talking in front of an audience."
Spontaneous Speech[6]	Habitual	"Look around and describe what you see."
	Max	"Look around and describe what you see but say it as if I am losing my hearing."

Habitual Loudness Task Measures

Item	dB_S	dB_F	dB_{avg}
Sustained Phonation			
Reading Aloud			
Spontaneous Speech			
Habitual Loudness (L_H)			

Maximum Loudness Task Measures

Item	dB_S	dB_F	dB_{avg}
Sustained Phonation			
Reading Aloud			
Spontaneous Speech			
Maximum Loudness (L_M)			

dB_S = start of sample (or ~10sec mark); dB_F = end of sample (or ~20sec mark)

Vocal Intensity Calculations and Measures

Loudness	dB_{avg}
L_H	
L_M	

Calculations		dB
R_S =	(___ – ___) / 2 (L_M – L_H) / 2	
T_S =	___ + ___ L_H + R_S	
T_F =	___ + 20dB R_S + 20dB	

R_S = Starting Range; T_S = Starting Target; T_F = Final Target

Deviation from the Norms for Habitual Loudness

Demographics	Performance (L_H)	Normative Data		Performance Comparison	SD_{comp}	Severity Rating*
		Mean	SD_{norm}			
Sex:				(___ – ___) / SD =		
Age:				(L_H – Mean) / SD =		

*Language severity classifications: *WNL* = ±1 SD; *MILD* = -1 to -1.5 SD; *MODERATE* = -1.5 to -2 SD; *SEVERE* = <2SD

PhoRTE[4,5] (Phonation Resistance Training Exercises) ***PhoRTE Treatment Measures***

Sustained Phonation (SP) /a/

	dB	sec
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

	dB	sec
SP_{avg}		

Pitch Glides (PG) /a/

↑	dB
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

↓	dB
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

	dB
$PG_{\uparrow avg}$	

	dB
$PG_{\downarrow avg}$	

		dB
PG_{avg} =	(___ + ___) / 2 ($PG_{\uparrow avg}$ + $PG_{\downarrow avg}$) / 2	

Functional Phrases (FP)

	Phrase
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

↑	dB
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

↓	dB
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

	dB
$FP_{\uparrow avg}$	

	dB
$FP_{\downarrow avg}$	

		dB
FP_{avg} =	(___ + ___) / 2 ($FP_{\uparrow avg}$ + $FP_{\downarrow avg}$) / 2	

Total Phonation (TP) Average

		dB
TP_{avg} =	(___ + ___ + ___) / 3 (SP_{avg} + PG_{avg} + FP_{avg}) / 3	

PhoRTE (Phonation Resistance Training Exercises) **PhoRTE Progress Summary[3]**

Demographics

Patient ID: _____

Age: _____

Sex: _____

Diagnosis: _____

Key

SP_{avg}, PG_{avg}, FP_{avg}, TP_{avg} calculated from *PhoRTE Treatment Measures* sheet
T_F and **T_S** calculated from *PhoRTE Assessment Measures* sheet
T_+ indicates any time performance was above **T_F**
___ is space to input +5dB intervals from **T_S**
Round all averages up to the nearest whole number (i.e. 59.5 → 60) when plotting data
Cueing Codes: (0) Independent, (1) Visual Biofeedback, (2) Visual, (3) Verbal, (4) Model

Date										
SP_{avg}										
PG_{avg}										
FP_{avg}										
TP_{avg}										

dB	**T_+**									
T_F = ___										
___										
___										
___										
___										
T_S = ___										
Cues										

All materials prepared and modified by Juan Diego Cabrera

References

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