Vocal Cord Dysfunction

(Abductor Spasmodic Dysphonia)

Referral: Patient self-referred to Hruska Clinic PRIME program with diagnosis of abductor/mixed spasmodic dysphonia/Vocal Cord Dysfunction (VCD). Onset of symptoms 4 years ago without injury, fully diagnosed 3.5 years ago. Primary treatment thus far was speech therapy and Botox without much relief of symptoms. Found PRIME through Facebook group. Other symptoms include peripheral neuropathy of LEs, shortness of breath.

Triage: Medical history (including discussion with patient on the phone) and images demonstrate posterior open bite, minimal visual complaints or issues. Due to the patient being out of town but within driving distance it was decided to bring patient to Lincoln initially for dental integration and physical therapy/PRI intervention and not come through full PRIME week.

First Visit (Evaluation): Patient demonstrates very breathy voice with poor vocal endurance and power, chronic neck tension. Limited posterior occlusion was confirmed in person.
Objective testing: B PEC pattern demonstrated with following measurements.

	LEFT	RIGHT
Straight Leg Raise	100 Degrees	90 Degrees
Adduction Drop Test	Positive	Positive
HG IR	Limited	Limited
HG HZ Abd	Limited	Limited
Cervical Axial Rotation	Limited	Limited
Cervical Lateral Flexion	Limited	Limited

With utilization of an over-the-counter double guard all tests were negative, however continues to demonstrate poor expiratory power.

Treatment:
1. Supine Hooklying Hamstring with IO/TA (and balloon). Able to exhale into balloon 2x, but unable to exhale or maintain pressure for inhalation after 2nd breath.
2. Seen at dental office with PT for impressions and bite registration for PRI MOOO appliance (was planned prior to initial evaluation but confirmed this need at initial evaluation).

Second Visit (2 weeks later): Patient could notice improvements in neck tension with over-the-counter double guard and improvements in power exhaling into balloon which seemed to make overall breathing easier. Seen initially at dental office with PT present for MOOO fitting and calibration. Patient demonstrated neutrality (full passive mobility) of the neck, thorax and pelvis following calibration of MOOO. She will initially wear the MOOO as much as possible.

Treatment:
1. Reviewed Hooklying Hamstring with IO/TA (and balloon).; added right arm reach
2. Stair Short Seated Balloon Anterior Neck Inhibition; without and with right arm reach
3. Seated Kazoo reverberation (difficult to maintain resonance of kazoo); goal to work on controlled prolonged exhalation with kazoo
4. Goal technique: Standing Sensory Shift with Kazoo Reverberation [Sensory shift #2] (once seated kazoo was 'mastered')

Third Visit (1 month later): Patient can tell she has more power in her voice, and it sounds "normal" for brief periods of time. Usually sounds very wavy when she talks. Was able to talk in front of a larger crowd of 75-100 people (at church) for the first time in years.

Still requires MOOO device for neck neutrality.

Treatment:
1. Seated Kazoo: Prolonged controlled exhale. Prolonged exhale with power low to high. Prolonged exhale with waver or oscillation of pitch low to high and back.
2. Standing Sensory Shift with Kazoo Reverberation [Sensory shift #2]; add gradual increase of power as she prolongs her exhale
3. Reverse Curl Downs with Kazoo, vocalization/projection of "laaaa" or "maaaa" loud enough to hear across the room
4. Short Kneeling Alternating Reciprocal Crossovers with vocalization 1 – 2 – 3 – 4 – 5
   Goal: Loud, 1 breath with pause between numbers and increase length (6 – 7) as able with both right and left trunk rotation
   Overall goal: prolonged exhalation with power and control

Fourth Visit (1 month later): Continues to feel more confident in voice but feels power trails off at end of breath/sentence.

With MOOO continues to be neutral. Hruska Adduction Lift Tests 3/5 bilaterally in MOOO

Without MOOO still demonstrates: limited cervical axial rotation to the left, HGIR on the right, and HG HZ Abd bilaterally, but neutral in pelvis.

Treatment:
1. Continue working with balloon and kazoo
2. Long Seated Alternating Crossovers
3. Reverse Curl Downs: Vocalize "Laaaa" but add words with consonant at beginning and end "Ten" - "Men" with pause between words as she lowers
4. Addition of Posterior Mediastinum expansion activities including: Modified All Four Belly Lift, Standing Supported Bilateral Posterior Mediastinum Expansion, Standing Wall Press. Goal: Standing Supported Bilateral IO/TA with vocalization
5. Left Stance in Left AF IR Position from the Left AIC Pattern with vocalization or kazoo

Fifth Visit (1 month later): Doing exercises throughout the day and can feel they help her get control of her voice when it wavers. Still notice the waviness most of the time. Doesn't feel limited in talking on the phone or ordering food at a drive through which she never would have done before.

In "good" shoes she is neutral in and out of the MOOO, however in her flip flops she demonstrates limited left hip adduction. Recommended that she continue to wear her shoes for upright activity (even though it's summertime) but to slowly wean from her MOOO during the daytime and primarily wear it just at night or if she notices neck tension.

Treatment:
1. Continue Reverse Curl Downs and Long Seated Alternating Crossovers as she feels they help her with her breathing and voice
2. PRI Wall Supported Squat with Alternating Respiratory Trunk Rotation (and balloon). R arm reach x 2, L arm reach x 2, Alternating arm reach with vocalization
3. Reciprocal Step Through – No block initially, goal 2" block reciprocal step through left > right
4. Continue Posterior Mediastinum Expansion techniques as needed

Sixth Visit (6 weeks later): Overall feeling great physically. Still have good and bad voice days. Continues to do at least balloon exercises daily. Only wearing MOOO at night.

Neutral without MOOO; continued 3/5 Hruska ADDuction Lift Tests bilaterally.

Treatment:
1. Long Seated Alternating Crossovers (count for each exhale, hold each position 3-4 breaths)
2. Left and Right Reciprocal Step Through: Count out lout “one”, “two” as arms come forward with each step.
3. Propulsive Stair Ascension: Vocalize “Shift” -> “up” -> “Shift” -> “up”
4. Scapular Compressive Lateral Stair Downward Locomotor Movement with Vocalization
5. Optional activities: kazoo, balloon, PME inhibition techniques as needed

Goal: Coordinate Leg Power with Arm Reach with exhalation/vocalization

Seventh Visit (6 weeks Later): Overall doing well. Much less wavy unless tired. If anything feels limited its volume when tired or at end of a long sentence.
Continues to be neutral with 90-degree straight leg raise without MOOO. Hruska ADDuction Lift tests improved, but still 3/5 (not quite to a 4) bilaterally. Hruska ABDuction Lift tests 2+/5 bilaterally (both lateral hips cramp with attempted abduction).

Treatment:
1. Continue long seated activities with volume control and counting
2. Single Leg Stance with Overhead Arm Reaching (multiple options discussed)
    a. R leg stance with R arm overhead reach
    b. L leg stance with R arm overhead reach
    c. L leg stance with L arm overhead reach
    d. R leg stance with L arm overhead reach

*Take note of challenges and hold each with vocalization and counting. If any are more challenging emphasize that position the most.

3. Continue Propulsive Stair Ascension with vocalization
4. Right and Left Interrupted Reciprocal Step Through with counting “one”/ ”two”
5. Scapular Compressive Lateral Stair Downward Locomotor Movement & Scapular Compressive Lateral Stair Upward Locomotor Movement (with vocalization)

Has been able to go without splint at night and feels fine. Will continue to wear it if she feels “clenchy” or neck tension is increased.

Eighth [final] Visit (6 weeks later): Feeling great. Continues to do exercise 20-30 minutes a day as a routine. Maintaining volume for long periods of time is the biggest challenge. Feel confident with exercises and would like to work on strengthening of shoulder muscles for posture. Have used splint on occasion if my neck is tight but not often.

Neutral without MOOO; Hruska ADDuction Lift scores 3+/5 bilaterally, Hruska ABDuction lift scores 3/5 bilaterally, Spirometric measurements 3700ccs exhalation (WNL for age)

Treatment:

1. Review Overhead arm reach activities. Left stance with left arm reach was most challenging but able to do all well.
2. Standing Wall Supported Resisted Alternating Respiratory Reach
3. Left Stance in Left AF IR Position from the Left AIC Pattern with Right Upper Extremity Resisted Reach
4. Continue Stair activities/interrupted step through as needed

Plan to continue with independent home program and follow-up here as needed or via e-mail/telehealth. Discharged from PT.