

USING TACTILE TECHNIQUES TO IMPROVE SPEECH CLARITY IN THE ADULT REHABILITATIVE SETTING

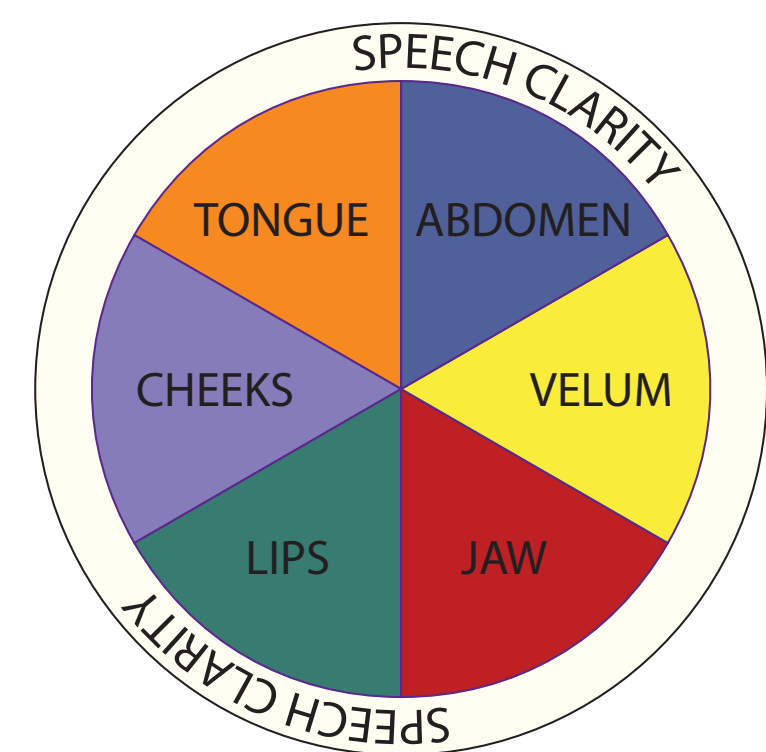
SARA ROSENFELD-JOHNSON, M.S., CCC-SLP

INTRODUCTION

Clinical Research: Single subject case studies can be an effective way to demonstrate client-based improvements in the areas of feeding safety and speech clarity by following the principles of Evidence-Based Practice. When multiple muscle-based systems are impaired (abdominal grading, velar grading, jaw grading, lip grading, cheek grading and/or tongue grading), and multiple treatment methods are needed to achieve improvement, it is challenging to conduct a research study beyond the initial phase. The difficulties arise in:

- isolating and studying only one treatment strategy when multiples are needed to address all of the identified muscle-based deficits effecting speech clarity and feeding safety,
- finding a matched subject when multiple systems are impaired,
- getting consent from enough subjects to participate in the study due to the length of the treatment required to show improvement,
- and, from the practicing clinician’s viewpoint where “quality of life” must be considered, the ethical question of depriving subjects of the full range of therapy options.

Standard speech clarity is based upon adequate skills and simultaneous interdependent coordination in each of the muscle groups pictured below. When even one of these groups is not performing adequately, speech clarity will be disordered (impaired).



The Oral Placement Therapy (OPT) sensory-motor based tactile teaching interventions techniques implemented in this study were developed based upon the early work of Charles Van Riper’s Phonetic Placement Therapy (Marshalla, 2007), Edward Mysak’s work in Feedback Theory (Mysak, 1971) and the principles of motor learning (Maas, et al. 2008). OPT activities are used in conjunction with traditional speech therapy and do not replace direct work on speech sound production. However, working on the isolated muscle skills will facilitate standard movements for speech. All of the activities teach speech-like movements and are not NSOME (Non-Speech Oral Motor Exercises). Research in the area of dysphagia suggests that improving lingual strength through a sensory-motor exercise approach not only aids in swallow rehabilitation, it may also improve dysarthric speech indirectly (Robbins, 2010, 2013). While there may not be a one-to-one correspondence between the oral sensory-motor skills for feeding and the oral sensory-motor skills for speech, there is an overlay of one system to another (Overland &Merkel Walsh, 2013)

Improvements can be made in speech clarity at any age. Using the principles of motor learning (Maas, et al. 2008), muscle skills can improve regardless of age. The role of motor learning can be demonstrated by the fact that: a) our muscles and nervous systems continually adapt and compromise to changes in the environment; b) motor cortical re-organization occurs throughout life; c) this re-organization requires active repetitive training/practice/challenge and learning (Carnaby-Mann 2010).

HYPOTHESES

The following hypotheses were made and evaluated:

- Improvements in feeding skills and speech clarity can be made for adults Post-CVA (Dysarthria) and Post-TBI (Dysarthria and Apraxia) using Oral Placement Therapy (OPT), despite numerous years post incident, when all other research-based options have been exhausted
- Adults with the diagnosis of Down syndrome can improve feeding safety and speech clarity when work on their muscle-based deficits is addressed directly.
- There is a direct correlation between working on muscle-based skills in the abdomen, velum, jaw, lips, cheeks and tongue (OPT) and improved speech clarity and feeding skill levels.

METHOD

Three adults were seen for diagnostic testing after they were discharged from their present speech therapy program, as having reached their maximum potential in both speech clarity and feeding skills. However, there continued to be a significant gap between what the clients were saying and what the listener could understand. The discharge summary, in each case, indicated that augmentative or alternative non-verbal communication systems should be encouraged, as no improvements in speech clarity could be expected with continued emphasis on verbal productions.

An Oral Placement Therapy (OPT) approach was implemented for three adults with the diagnosis of multiple articulation disorder, secondary to flaccid dysarthria and/or a motor planning deficit (AOS: Acquired Apraxia of Speech). Each client displayed imprecise lingual movements, jaw instability, inadequate breath support, limited lip mobility and poor postural control, resulting in speech sound errors.

The clients were seen for one 45 minute individual session per week, with homework assignments given to them by their treating Speech Language Pathologist. The homework was designed to allow the client to practice their highest level of success in each OPT activity, as noted in that weekly therapy session. Homework was practiced a minimum of two additional times per week for 15-20 minutes per practice session.

CASE STUDY

The first case study involves a 73-year-old male with the diagnoses of Flaccid Dysarthria and Oral Preparatory Dysphagia, who had sustained a CVA in 1969. Since that time he has resided in an extended care facility. He is non-ambulatory. Although his cognitive skills were intact, at the start of this study, his primary mode of communication was writing on a pad of paper. He used a soft voice to speak and had numerous phoneme errors. During the initial evaluation The Goldman Fristoe Test of Articulation (GFTA-2) was administered and a video speech sample was made. **An independent judge rated his speech sample as “20% intelligibility” prior to OPT intervention and at “60% intelligibility” following three months of OPT intervention.** This case study demonstrates how, after more than 43 years, skills can improve; thereby questioning the idea that progress can only be expected within a given time frame.

An OPT program (Rosenfeld-Johnson, 2001) was incorporated using a hierarchy of bite blocks, horns, straws, feeding techniques and speech-like lingual activities.



BEFORE OPT:
ADULT 43 YEARS
POST-CVA:
FLACCID DYARTHRIA

INITIAL PROGRAM PLAN
SENSORY DIAGNOSIS: UNDER RESPONSE

FEEDING:
a. Liquids: Straw #2
b. Purees: Frontal Placement
c. Solids: Dysphagia Mechanical Soft

ORAL PLACEMENT THERAPY ACTIVITIES:
a. Bite-Tube Hierarchy
red (5X), yellow (3X), purple (1X)
b. Jaw Grading Bite Blocks: BB #5
c. Bubble Blowing Hierarchy: Step #3
d. Horn Blowing Hierarchy: Horn #1

SPEECH: 1 word per breath group
20% intelligibility



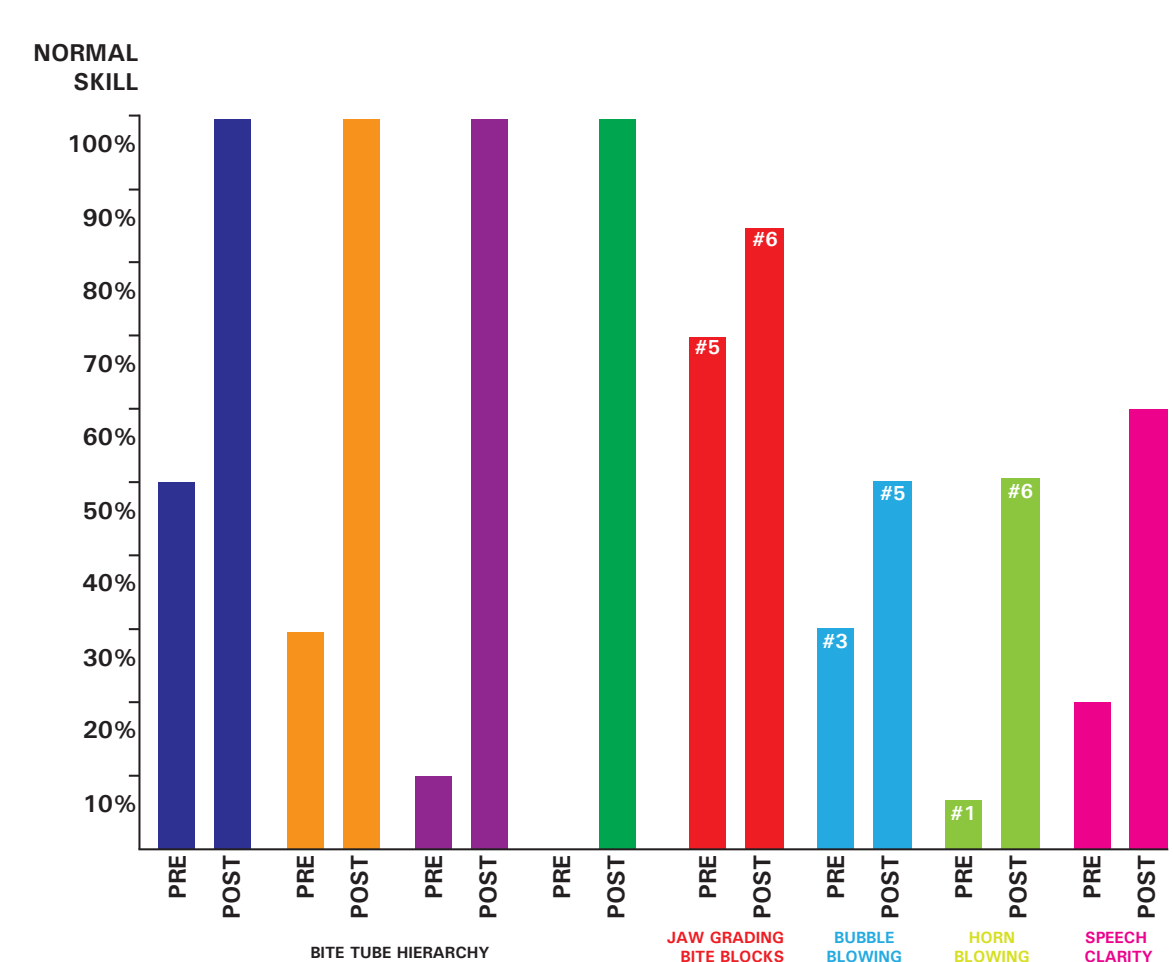
AFTER 3 MONTHS OF OPT:
ADULT 43 YEARS
POST-CVA
INDEPENDENT JUDGE
RATED SPEECH
SAMPLE 60%
INTELLIGIBLE

THREE MONTHS LATER – PROGRAM PLAN
SENSORY DIAGNOSIS: UNDER RESPONSE

FEEDING:
a. Liquids: Straw #5
b. Purees: Spoon Slurp – 7 times
c. Solids: Dysphagia Advanced

ORAL PLACEMENT THERAPY ACTIVITIES:
a. Bite-Tube Hierarchy
red (10X), yellow (10X), purple (10X), green (10X)
b. Jaw Grading Bite Blocks: BB #6
c. Bubble Blowing Hierarchy: Step #5
d. Horn Blowing Hierarchy: Horn #6

SPEECH: 3 words per breath group
60% intelligibility



The second case study features a 27-year-old male, with the diagnosis of Down syndrome, who progressed from poor speech clarity to intelligibility on the conversational level in one month. He presented with Flaccid Dysarthria and Intestinal Atresia that required him to be on a mashed diet. During the initial evaluation, The Goldman Fristoe Test of Articulation (GFTA-2) was administered, and a video speech sample was made. **An independent judge rated his speech sample as “40% intelligibility” prior to OPT intervention and at “80% intelligibility” following one month of OPT intervention.**



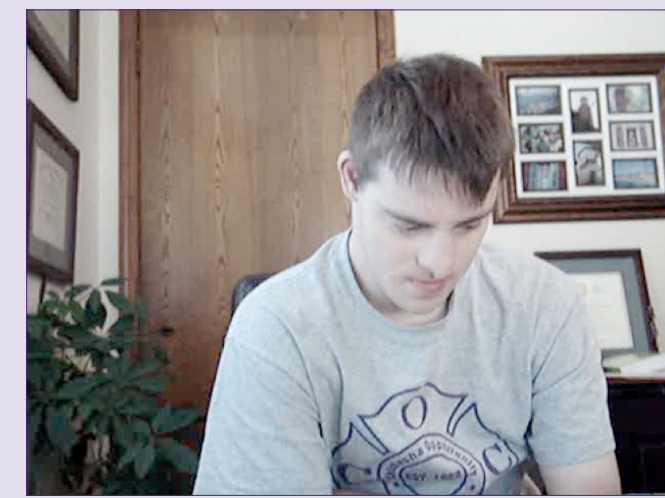
BEFORE OPT:
ADULT WITH
DOWN SYNDROME-
INDEPENDENT JUDGE
RATED SPEECH
SAMPLE 40%
INTELLIGIBLE

INITIAL PROGRAM PLAN
SENSORY DIAGNOSIS: UNDER RESPONSE

FEEDING:
a. Liquids: Straw #2
b. Purees: Spoon Slurp – 17 times
c. Solids: Dysphagia Mechanical Altered

ORAL PLACEMENT THERAPY ACTIVITIES:
a. Bite-Tube Hierarchy
purple
b. Jaw Grading Bite Blocks: BB #2
c. Bubble Blowing Hierarchy: Step #3
d. Horn Blowing Hierarchy: Horn #6

SPEECH: No final speech sounds
40% intelligibility



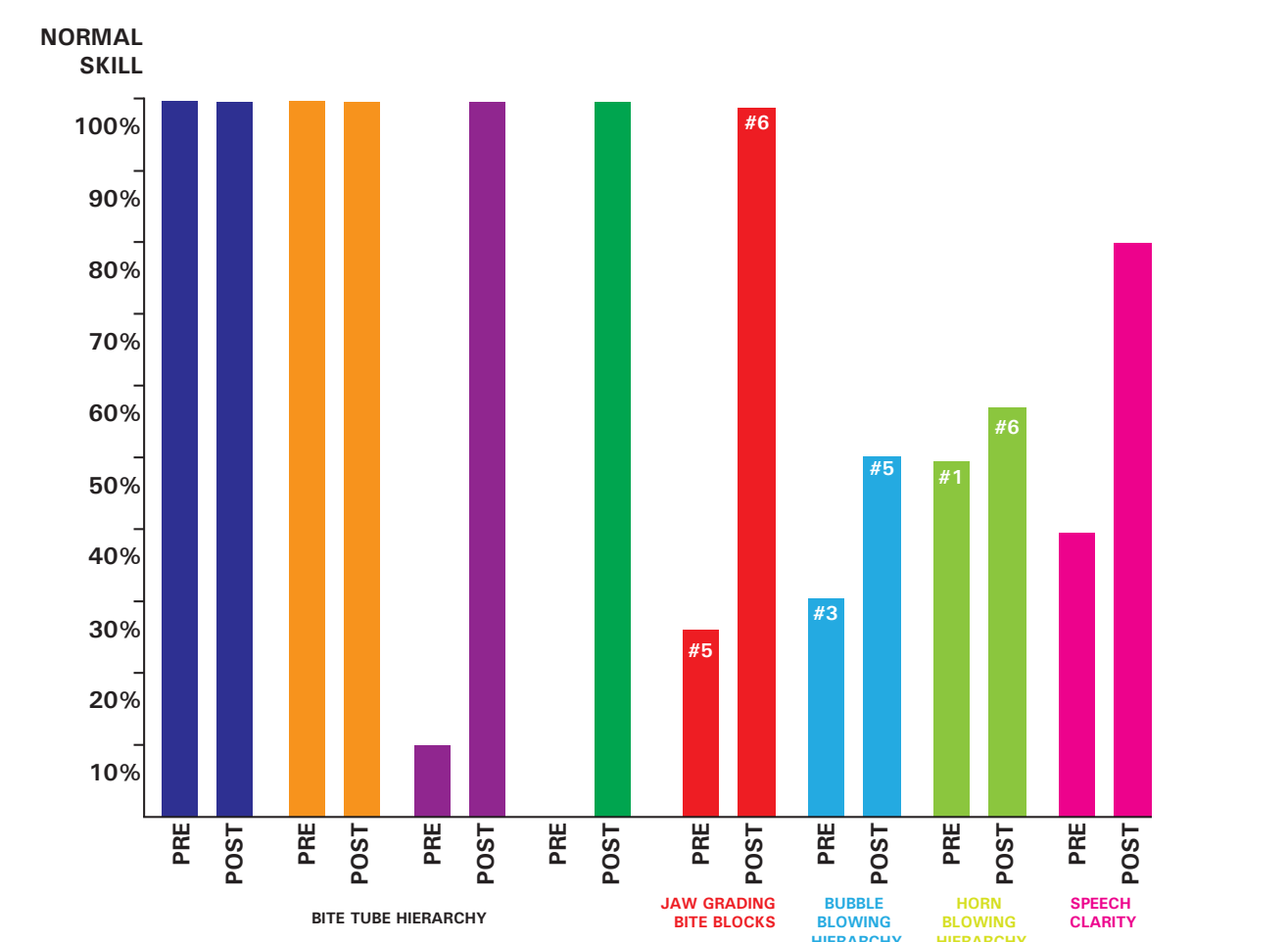
AFTER 1 MONTH OF OPT:
ADULT WITH
DOWN SYNDROME-
INDEPENDENT JUDGE
RATED SPEECH
SAMPLE 80%
INTELLIGIBLE

ONE MONTH LATER – PROGRAM PLAN
SENSORY DIAGNOSIS: UNDER RESPONSE

FEEDING:
a. Liquids: Straw #3
b. Purees: Spoon Slurp-all purees
c. Solids: Normal Diet

ORAL PLACEMENT THERAPY ACTIVITIES:
a. Bite-Tube Hierarchy
purple, green
b. Jaw Grading Bite Blocks: BB #7
c. Bubble Blowing Hierarchy: Step #5
d. Horn Blowing Hierarchy: Horn #7

SPEECH: Using all final speech sounds
80% intelligibility



The final case study involves a 20-year-old male with the diagnoses of both Acquired Apraxia of Speech (AOS) and Dysarthria, who had sustained a Traumatic Brain Injury (TBI) at 17 years of age. After three years of traditional speech therapy he was discharged as “non-verbal” with the suggestion that he would never speak and should continue to use his augmentative devise for communication. His expressive language skills using his “touch and type” system were considered to be within normal limits. **An independent judge rated his speech sample as “0% intelligibility” prior to OPT intervention and at “80% intelligibility” following five years of OPT intervention.**



BEFORE:
ADULT 2 ½
YEARS POST TBI-
INDEPENDENT
JUDGE RATED
SPEECH SAMPLE 0%
INTELLIGIBLE-
GROPPING
BUT NO INTELLIGIBLE
VERBAL OUTPUT

INITIAL PROGRAM PLAN
SENSORY DIAGNOSIS: MIXED RESPONSE

FEEDING:
a. Liquids: Straw #4
b. Purees: Spoon Slurp – 1 time
c. Solids: Dysphagia Mechanical Altered

ORAL PLACEMENT THERAPY ACTIVITIES:
a. Bite-Tube Hierarchy
red, yellow
b. Jaw Grading Bite Blocks: BB #4
c. Bubble Blowing Hierarchy: Step #1
d. Horn Blowing Hierarchy: Horn #1

SPEECH: None verbal
0% intelligibility



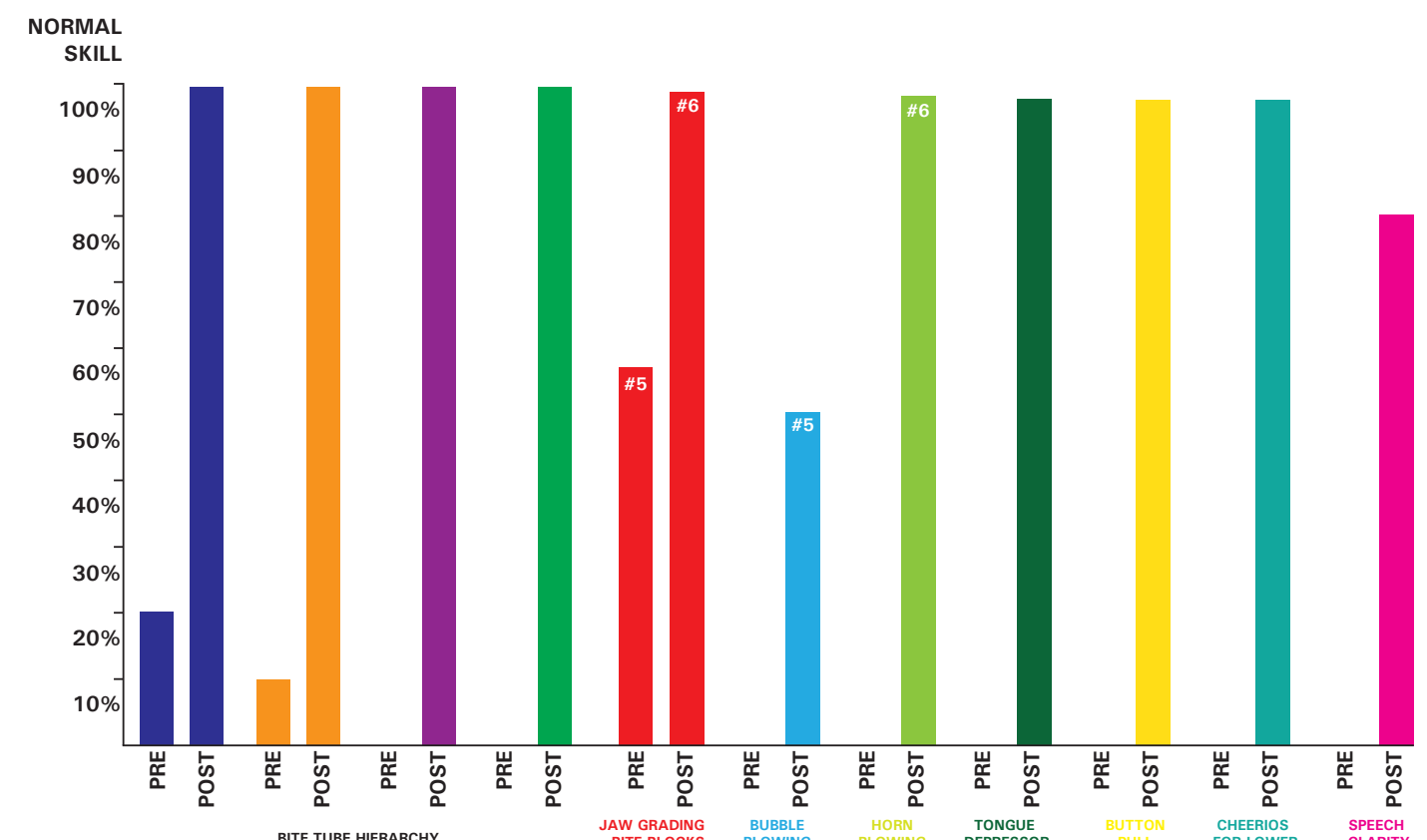
AFTER:
ADULT 8 YEARS POST
TBI - INDEPENDENT
JUDGE RATED
SPEECH SAMPLE 80%
INTELLIGIBLE
MATT IS NO
LONGER USING THE
AUGMENTATIVE SYSTEM
TO COMMUNICATE

FIVE YEARS LATER – PROGRAM PLAN
SENSORY DIAGNOSIS: MIXED RESPONSE

FEEDING:
a. Liquids: Straw #8 (normal skill)
b. Purees: Spoon Slurp (normal skill)
c. Solids: Normal Diet

ORAL PLACEMENT THERAPY ACTIVITIES:
a. Bite-Tube Hierarchy
red, yellow, purple, green
b. Jaw Grading Bite Blocks: BB #7 task completed
c. Bubble Blowing Hierarchy: Step #5
d. Horn Blowing Hierarchy: Horn #12 task completed

SPEECH: Speaking in 4-5 word phrases
80% intelligibility



CONCLUSION

The results were consistent with the aforementioned hypotheses regarding:

- Improvements in feeding safety and speech clarity can be made for adults Post-CVA (Dysarthria) and Post-TBI (Dysarthria and Apraxia) using Oral Placement Therapy (OPT), despite numerous years post incident, when all other research-based options have been exhausted
- Adults with the diagnosis of Down syndrome can improve feeding safety and speech clarity when work on their muscle-based deficits is addressed directly.
- There is a direct correlation between working on muscle-based skills in the abdomen, velum, jaw, lips, cheeks and tongue (OPT) and improved speech clarity and feeding skill levels.

In all three cases, OPT used in conjunction with direct work on speech sound production facilitated improvements in both speech clarity and feeding skill levels for clients who had previously been discharged as having reached their maximum potential. Therefore, the results of this study indicate that:

- Speech-language pathologists should consider using OPT, in conjunction with traditional speech therapy, to address the muscle-based deficits demonstrated by their clients who have diagnoses of Flaccid Dysarthria and/or Acquired Apraxia of Speech (AOS).
- Single subject case studies can be an effective way to demonstrate client-based improvements in the areas of feeding safety and speech clarity by following the principles of Evidence- Based Practice.
- Future studies should be conducted to determine if starting OPT, immediately upon diagnosis would reduce the length and increase the effectiveness of speech therapy for clients with muscle-based speech clarity disorders.

In summary, ASHA teaches us through Evidences Based Practice, that “high-quality research evidence is integrated with practitioner expertise and client preferences and values into the process of making clinical decisions” (ASHA, 2005.) In June 2011, Dr. Paul Rao (prior ASHA president) said, “EBP is not about identifying the one best approach – it is about deciding which among the many acceptable options is likely to work best for a particular individual.” With this in mind, it is never too late to try techniques that have demonstrated improvements on the clinical level when working with adults in the rehabilitative or post-rehabilitative setting. Clinical data and progress is certainly considered a form of EBP, and the evidence here has been collected with positive results. Therefore, **single subject case studies are Evidence-Based Practice and should be shared with other professionals.**

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