

Principles of Treatment

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Treatment Process

Stage 1: Establishment of speech sounds

- Elicit and stabilize speech sound production
- Establish speech sound contrast

**Treatment Process:
Stage 1 - Establishment**

1. Perceptual Training:

- Conceptualize the contrast between the error and the target speech sound
- Discrimination task:
 - "Tell me if they are the same or different"
 - "Tell me if it is correct/incorrect"

External discrimination (judgment of trainer's production)
↓
Internal discrimination (judgment of his own production)

**Treatment Process:
Stage 1 - Establishment**

2. Production Training

- Start at sound in isolation/syllable level (consonant+vowel)/word level

Method 1: Imitation

- Model the targeted speech sound
- Elicit imitation

Method 2: Contextual utilization

- Apply if client fails to imitate the targeted speech sound
- Contextual testing: identify the sound context/word position that the target can be correctly produced

**Treatment Process:
Stage 1 - Establishment**

- Example: Target /d/
 - /di/ (low): correct; /dai/ (knife): incorrect
 - /i/: facilitate phonetic context
- Make use of this particular context/position to facilitate correct production of the targeted speech sound in other contexts

Method 3: Phonetic placement

- Apply if client fails to imitate the target and no facilitative context
- Instruct the client how to produce the target speech sound by visual/tactile/verbal cues

**Treatment Process:
Stage 1 - Establishment**

1. Verbal cues:
 - Metaphor
 - Describe how to articulate the target speech sound verbally
2. Visual cues:
 - Mirror work
 - Drawings which show the articulators involved
3. Tactile cues:
 - Use of cotton stick/finger to touch the articulators involved
 - Put the hand in front of the mouth to feel the air-stream

**Treatment Process:
Stage 1 - Establishment**

Example 1: Cues for /f/

1. Verbal cues:
 - metaphor: "sounds like noise of the wind"
 - place of articulation: "the upper front teeth and the lower lip"
 - manner of articulation: "leave a groove between the upper front teeth and the lower lip for the air-stream to pass through"
2. Visual cues:
 - trainer seats beside the client, ask the client to look at his mouth from the mirror putting in front of them
3. Tactile cues:
 - The client puts his hand in front of his mouth to feel the air-stream
 - Trainer uses a cotton stick to touch the lower lip to indicate the place of articulation

**Treatment Process:
Stage 1 - Establishment**

Example 2: Cues for /j/

1. Verbal cues:
 - Metaphor: "the sound of bird singing"
 - Place of articulation: "tongue blade and hard palate behind alveolar ridge"
 - Manner of articulation: "moves the tongue blade upward to touch the hard palate behind the alveolar ridge, then moves quickly downwards to release air-stream"
2. Visual cues:
 - Pictures showing the horizontal or lateral view of articulatory placement
3. Tactile cues:
 - Use of cotton stick to touch the place of articulation

Treatment Process: Stage 1 - Establishment

Method 4: Successive Approximation

- Apply when client fails to imitate, no facilitative contexts, cues are not useful
- Break complex speech movements into a series of successive motor steps
- Example 1: /ch/
 1. produce [d]
 2. produce [t]: produce [d] with a strong aspiration
 3. remove tip of the tongue slowly during the release
- Example 2: /x/
 1. prolong the [x] portion of the [ch]
 2. produce /x/

Treatment Process

Stage 2: Generalization

Production of targeted speech
sound at other levels

Treatment Process: Stage 2 - Generalization

1. Different positions in a word
 - Syllable initial, word initial: e.g. /niao₃er₂/ (bird)
 - Syllable initial, word final: e.g. /shen₁ti₃/ (body)
 - Syllable final, word initial: e.g. /xiao₃niao₃/ (small)
 - Syllable final, word final: e.g. /ping₂an₁/ (safe)
2. Different phonetic contexts
 - Example: target /n_/
 - Different vowel: e.g. /nu₂/ (female), /ni₂/ (you)
 - Different diphthong: e.g. /nai₂/ (milk), /nao₂/ (cow)
 - Different final consonant: e.g. /neng₂/ (can), /nian₂/ (year)

**Treatment Process:
Stage 2 - Generalization**

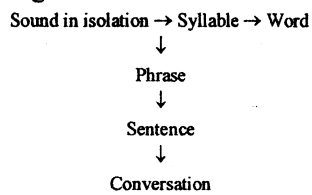
- Example: target /_n/
 - preceding syllable: e.g. /xian₁ sheng₁/ (sir)
 - syllable that follows: e.g. /xin₁ xian₁/ (fresh)

3. Different sounds in the same class

- Example 1: Aspiration /p/ → /t, k, q, c, ch/
- Example 2: Affricate /z/ → /c, ch, zh/

**Treatment Process:
Stage 2 - Generalization**

4. Different linguistic units



Treatment Process

Stage 3: Maintenance

Maintain the ability to articulate the targeted speech sound in daily contexts

**Treatment Process:
Stage 3 - Maintenance**

- Practice the production of targeted speech sound in different contexts
(training context → daily contexts)
- Trainer gradually fades out modeling, visual/tactile/verbal cues in the treatment process
- Client assumes gradually increased responsibility of self-monitoring of his own productions

Outcome Evaluation

1. Accountability:
 - Demonstrate treatment goals have been met
 - Demonstrate treatment, not maturation, accountable to achievement
2. Goals have been met?
 - Pre- and post-treatment baseline
 - Measure % of accuracy
 - Termination criteria for specific goal
 - 80-90% spontaneous use in intervention settings
 - 50% spontaneous use in daily contexts

Outcome Evaluation

3. Intervention efficient?
 - Single-subject research designs
 - Each client serves as his own control
 - Multiple baseline design
 - Establish multiple baseline during assessment
 - Targets: speech sounds that are teachable or can effectively improve communication ability
 - Control goals: speech sounds that are different enough from the targets
 - Generalization goals: speech sounds that are similar to the targets
 - Compare rate of growth of targets, generalization goals, and control goals

Case Illustration

Case 2: Female Meimei

5 Yr Old

Repaired Lip

Unrepaired Palate

Active, Outgoing, Likes to Interact

Severe Hypernasality

Intelligibility Fair

Some Compensatory Articulation Errors

Has Some Correctly Articulated Consonants

Hypothetic Articulation Errors

- Consistent initial consonant substitution:
 - /l/ → [n] (e.g. deer /lu₄/ → [nu₄])
 - /r/ → [w] (e.g. meat /rou₄/ → [wou₄])
 - /p, t, k/ → [b, d, g] (e.g. candy /tang₂/ → [dang₂])
 - /z, c, j, q, zh, ch/ → [t] (e.g. walk /zou₃/ → [tou₃])
 - /s, x, sh/ → [h] (e.g. umbrella /san₇/ → [han₃])
- Only able to imitate /j/, /zh/ in syllable with vowel /e/

Treatment Process

Multiple baseline:

- Target: /j/
- Generalization goal: /zh/
- Control goals: /_n, _ng/

Treatment Process

1. Establish /j/ at syllable level
 - Perceptual training
 - externally & internally discriminate /je/ & /te/
 - Production training
 - Contextual utilization & successive approximation:
 - Model and elicit imitation of /je/
 - Model and elicit imitation of /je/ + pause (~ 1 sec) + /a/
 - Model and elicit imitation of /je/ + pause (~ 0.5 sec) + /a/
 - Model and elicit imitation of /ja/

Treatment Process

2. Generalize /j/ to other linguistic levels
 - if client can produce /j/ in syllable level with different vowels with 80% spontaneously
 - Continue discrimination and production training at:
word → phrase → sentence → conversation
3. Maintenance
 - Discrimination and production training in daily contexts

Appendix

Speech Sounds in Mandarin

Classification of Consonants

Place/ Manner	Bilabial	Labio- dental	Alveolar	Retroflex	Palatal	Velar	Glottal
Plosive	پ, ب		ت, د			ك, گ	ع, ه
Nasal	م*		ن (n)			(ng)	
Lateral			ل*				
Fricative		ف	س	ش, ر*	خ		ح
Affricative			ظ, ذ	ڙ, ڇ	ج, ڄ		

Underlined: Unaspirated, aspirated

*: Voiced

(): word final consonants

Classification of Consonants

1. Place of Articulation

Bilabial: two lips

Labiodental: lower lip and upper teeth

Alveolar: tongue blade and alveolar ridge

Retroflex: tip of tongue is curled back to articulate with the part of hard palate just behind the alveolar ridge

Palatal: tongue blade; hard palate behind alveolar ridge

Velar: back of tongue, soft palate

Glottal: between vocal folds at the level of larynx

Classification of Consonants

2. Manner of Articulation

Plosive: articulators close completely to build up intral-oral pressure, then air-stream releases explosively

Nasal: articulator close oral cavity completely, air-stream escapes through the nose

Lateral: articulators close partially, air-stream escapes through the lateral sides

Fricative: articulators approximate to an extent that the air-stream passes through them with friction

Affricate: articulators close completely to build up intra-oral pressure, then the two articulators separate, during which air-stream passes through with friction

Classification of Consonants

3. Voiced/voiceless

- voiced: vocal folds vibrate during articulation

4. Aspiration

- Puff of air-stream releases from vocal folds when the articulators separate

Final Consonants & Diphthongs

- Diphthongs: two vowels blend together to make one sound

- /_ai/
- /_ei/
- /_ao/
- /_ou/

- Final consonants:

- /_n/
- /_ng/
