Assessment and treatment of dysarthria

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Purpose of this presentation

- A general introduction to provide an overall context. The other speakers in this conference will provide detail on specific areas which will expand what I say here!
- I am focusing on dysarthria
What is dysarthria?

“a group of motor speech disorders resulting from a disturbance in neuromuscular control” (Palmer, 2005)

5 systems which can be affected by dysarthria: respiration, phonation, resonance, articulation and prosody.

Impairments --can result from damage to the central or peripheral nervous system, leading to “weakness, slowing, incoordination, altered muscle tone, and inaccuracy of oral and vocal movements” (Palmer & Enderby, 2007)
Categories of Dysarthria

- Developmental
- Acquired
- Progressive
- Static
## Types of dysarthria and causes

<table>
<thead>
<tr>
<th>Developmental</th>
<th>Acquired</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Childhood</strong></td>
<td><strong>Acquired</strong></td>
</tr>
<tr>
<td>Cerebral Palsy and other stable neurological conditions acquired in pre and peri-natal period.</td>
<td>Dystrophy (childhood progressive disease)</td>
</tr>
<tr>
<td><strong>Adult</strong></td>
<td><strong>Brain Injury (including traumatic such as head injury and non-traumatic such as stroke).</strong></td>
</tr>
<tr>
<td>Continuation from childhood of neurological condition.</td>
<td>Brain Injury (including traumatic such as head injury and non-traumatic such as stroke).</td>
</tr>
</tbody>
</table>
How many people have dysarthria - children

<table>
<thead>
<tr>
<th>Disorder in general pop</th>
<th>Dysarthria</th>
<th>Referral for SLT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Incidence</td>
<td>Incidence</td>
</tr>
<tr>
<td></td>
<td>Prevalence</td>
<td>Prevalence</td>
</tr>
<tr>
<td><strong>TBI</strong></td>
<td>280 per 100,000</td>
<td>1 out of 1500 per year</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CP</strong></td>
<td>2 per 1000 live births</td>
<td>2-3 per 1000</td>
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</tbody>
</table>
How many people have dysarthria - adults

<table>
<thead>
<tr>
<th>Disorder in general population</th>
<th>Dysarthria within the disorder</th>
<th>Referral for SLT</th>
</tr>
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<tbody>
<tr>
<td><strong>Incidence</strong></td>
<td><strong>Prevalence</strong></td>
<td><strong>Incidence</strong></td>
</tr>
<tr>
<td>TBI</td>
<td>275 per 100,000</td>
<td>100-150 per 100,000 severe</td>
</tr>
<tr>
<td>PD</td>
<td>17 per 100,000</td>
<td>200 per 100,000</td>
</tr>
</tbody>
</table>
### How many people have dysarthria - adults

<table>
<thead>
<tr>
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<th>Dysarthria within the disorder</th>
<th>Referral for SLT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
<td>150,000 yearly in UK</td>
<td>250,000 in UK</td>
<td>20%</td>
</tr>
<tr>
<td>MND</td>
<td>2 per 100,000</td>
<td>7 per 100,000</td>
<td>Not known</td>
</tr>
<tr>
<td>MS</td>
<td>4 per 100,000</td>
<td>144 per 100,000</td>
<td>Not known</td>
</tr>
<tr>
<td>PND</td>
<td>1%</td>
<td>10 million in UK</td>
<td>Not known</td>
</tr>
</tbody>
</table>
# Classification of dysarthria

<table>
<thead>
<tr>
<th>Type</th>
<th>Part of nervous system implicated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spastic</td>
<td>Upper motor neurones</td>
</tr>
<tr>
<td>Flaccid</td>
<td>Lower motor neurones</td>
</tr>
<tr>
<td>Mixed</td>
<td>Upper and lower motor neurones</td>
</tr>
<tr>
<td>Ataxic</td>
<td>Cerebellar</td>
</tr>
<tr>
<td>Hypokinetic</td>
<td>Extrapyramidal tract, substantia nigra</td>
</tr>
<tr>
<td>Hyperkinetic</td>
<td>Extrapyramidal tract, Basal ganglia,</td>
</tr>
<tr>
<td>Type</td>
<td>Features</td>
</tr>
<tr>
<td>------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Spastic</td>
<td>Strained and hoarse voice, hypernasality and slow imprecise articulation. Often accompanied by swallowing and drooling difficulties.</td>
</tr>
<tr>
<td>Flaccid</td>
<td>Isolated areas of involvement depending on which motor neurone is affected.</td>
</tr>
<tr>
<td>Ataxic</td>
<td>Excess loudness, tremor and irregular articulatory breakdowns. Intonation, pitch and volume and also be affected as well as difficulty with alternate tongue movements.</td>
</tr>
<tr>
<td>Hypokineti</td>
<td>Breathy monotone voice with reduced loudness and articulation tends to be accelerated and imprecise.</td>
</tr>
<tr>
<td>Hyperkineti</td>
<td>Features strained hoarseness and voice arrests.</td>
</tr>
<tr>
<td>Mixed</td>
<td>Similar symptoms to spastic dysarthria, and tends to be accompanied by a wet sounding voice with rapid tremor, poor laryngeal and tongue movements and poor control of lips.</td>
</tr>
</tbody>
</table>
Speech sample 1

- Hoarse voice
- Monotone
- Loud
- Hypernasal
- No pitch/volume control
- Poor articulation

- SPASTIC/ATAXIC (4)
Speech sample 2

- Breathy voice
- Resonance normal
- Articulation only mildly affected

FLACCID (2)
Speech sample 3

- Hypernasal
- Monotone
- Slightly hoarse voice
- Little articulatory precision

SPASTIC (ATAXIC) (1)
Speech sample 4

- Respiratory /voice arrests
- Tremor
- Good articulation
- Normal resonance

EXTRAPYRAMIDAL (3)
Why is Differential Diagnosis valuable?

- localisation or other aspects of medical diagnosis
- treatment planning
- Unique contribution of our profession

(Rosenbek, 2008)
Differential diagnosis possible?

Yes:

- By listening
- By evaluating the muscle/movement abnormalities assumed to underlie the speech abnormality
- By being attentive to co-existing motor and cognitive symptoms
BUT:

- Reliability of judgements low
  - Speech signal noisy
  - Many people not trained to listen critically
  - More to learn about the underlying pathophysiology
  - Dysarthrias are ‘overlap syndromes’
  - Not everyone with the same type sounds the same
What Should Be Assessed? (Based on WHO ICF)

- Impairment
  - type and severity of dysarthria

- Activity Restriction
  - communication restriction

- Participation
  - social engagement

- Well-Being
Frenchay Dysarthria Assessment

Reflexes
- Cough, swallow, dribble/drool

Respiration
- At rest, in speech

Lips
- At rest, spread, seal, alternate, in speech

Palate
- Fluids, maintenance, in speech

Laryngeal
- Time, pitch, volume, in speech

Tongue
- At rest, protrusion, elevation, lateral, alternate, in speech

Intelligibility
- Words, sentences, conversation
Assessment in Management of dysarthria

ICF

Impairment
- Thorough assessment of the individual to identify which aspects of speech are affected.

Activity
- Assessment of individual’s remaining abilities
- Assessment of their ability to communicate functionally
- Assessment of communication environment to understand potential for communication.

Participation
- Identify aspects of life/role, which are impeded by communication deficit.
- Establish from individual and family the person’s preferences and priorities.

Wellbeing
- Establish individual’s mental and emotional state through formal and informal assessment.
Nature of therapy - dysarthria

- Impairment
- Function // communication
- Psychosocial
- Well-being
Principles of Therapy

- restore function
- help the person to use remaining abilities.
- restore abilities as much as possible by developing strategies.
- improve communication through compensation
- learn other methods of communicating.
- coach others (family, health and social care staff) to learn effective communication skills to maximise the aphasic patient’s competence
Considering Impairment
What are the aims/objectives of Speech and Language Therapy interventions for dysarthria?

**Impairment**

- **Normalisation** of muscle tone and/or increasing strength of movement precision and co-ordination

- **Prosthetic** methods for controlling some of the symptoms associated with dysarthria. Speech and language therapists will work all alongside medical and surgical colleagues in the assessment and monitoring of progress of any medical or surgical intervention.

- **Behavioural techniques** have the aim of “compensated intelligibility”, rather than “normal speech” Examples include:
  - The Lee Silverman Voice Technique, “an intensive, high effort speech treatment designed to rescale the amplitude of motor output of speakers with PD dysarthria” (Pinto, Ozsancak et al. 2004).
  - Dysarthria Treatment Programme (Drummond, Worley and Watson 2003, is designed to target all speech processes simultaneously.
Netsell’s approach (1991)

Bottoms up!

- Respiration
- Phonation
- Resonance
- Articulation
- Prosody
FEEDBACK - it’s how we learn......

Feedback type

- **Knowledge of results** (whether a sound was correct or incorrect) more effective than **knowledge of performance** (how the sound was made or should be made)

- **Judgemental** better than **non judgemental**
  (Kinsey, 1990)
FEEDBACK - it’s how we learn......

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Feedback frequency

- Feedback after a few attempts at production more effective than feedback after every production
FEEDBACK - it's how we learn......

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- **Feedback frequency**
  - Feedback after a few attempts at production more effective than feedback after every production

- **Feedback timing**
  - Feedback given a few seconds after the attempt better than when given immediately
  - (knowledge of performance and immediate feedback after each production useful early on to encourage acquisition of skill before altering feedback regime to promote retention)
Therapy treatment goals

- to identify and reduce the disorder/dysfunction
- to improve or maintain the function and ability
- to assist to achieve potential or integration
- and to alleviate anxiety or frustration.
The Therapy Outcome Measure

30
Considering Activity Restriction

Communication
Getting your message across
What are the aims/objectives of Speech and Language Therapy interventions for dysarthria?

**Activity**

- **Biofeedback** to enable patients to monitor and modify speech characteristics (Pinto, Ozsancak, et al. 2004)).

- **Assistive devices** can be used, ranging from the low-tech such as an alphabet board, to a high-tech computerised Augmentative and Alternation Communication systems. Voice amplifiers can be used to increase effectiveness of communication.

- **Altering the environment** can improve function E.g. ensuring that the listener has full view of the dysarthric speakers face

- **Working with others**. Speech and language therapists will work with the family, teachers, carers and others to ensure that approaches to improving communication (communication aids or vocal strategies) are incorporated in all situations.
Speech Supplementation Strategies

Topic, alphabet, and combined and control

- Compared three strategies with five patients
- Combined and alphabet cues equalled higher intelligibility and slower speech rates

Hustard K., Jones T., Dailey S., Implementing speech supplementation strategies: effects on intelligibility and speech rate with chronic severe dysarthria. Journal of Speech and Language Hearing Research. 46 (2) 462-74
Considering Participation
Impact

- Isolation
- Frustration
- Loss of confidence
- Loss of independence
- Depression

"I can't—you know—be myself—you know—be human------I don't know me---"
What are the aims/objectives of Speech and Language Therapy interventions for dysarthria?

**Participation**

- Providing education about dysarthria to patient, family, work place/or school
- Promoting self esteem, to increase social interaction and participation in society.
- Facilitate communication in social settings.
- This will lead to increased autonomy
Interventions Supported by Evidence

- Expiratory muscle strength training
- Modifying speech rate
- Lee Silverman Voice Treatment (LSVT)
- Behavioural Communication Intervention
- Speech supplementation strategies
- Systems approach
- Intensity of intervention
- Timing of intervention
Summary of Literature

- Dysarthria occurs at different levels of severity in a number of different aetiological causes.

- The most appropriate and successful treatment for dysarthria is heavily determined by the patients underlying condition and personal circumstances making it difficult to generalise about what will be effective for different patients.

- However treatment seems to be acceptable to patients, and there is some evidence that different approaches are effective in treating.
Aetiological condition associated with Dysarthria – evidence of SLT impact

- Parkinson’s Disease
- Cerebral Palsy
- Multiple Sclerosis
- Motor Neurone Disease
- Non-progressive brain damage
- Stroke
- Ataxias?
Therapy Outcome Measure. (TOM) DYSARTHRIA
Percentage improving on 0,1,2,3,4 domains

<table>
<thead>
<tr>
<th>Clients</th>
<th>None</th>
<th>One</th>
<th>Two</th>
<th>Three</th>
<th>Four</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dysarthria</td>
<td>527</td>
<td>127</td>
<td>87</td>
<td>85</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>23.6%</td>
<td>16.2%</td>
<td>15.8%</td>
<td>17.1%</td>
<td>27.2%</td>
</tr>
</tbody>
</table>
Survey of patients who have dysarthria

“more than half felt they did not receive enough speech and language therapy.”
Key Points from RCSLT guidance to commissioners

1. Speech and language therapists play a unique role in identification and assessment of children and adults with Dysarthria. The ability to diagnose the specific speech disorder, as well as retained communication abilities, is a unique skill of speech and language therapists.

2. Improved communication has an impact on literacy, social skills, peer relationships, self-confidence and behaviour.

3. Difficulties with communication are a predominant feature in reducing access to education, recreation, employment and social integration.

4. There are many underlying pathologies associated with the types of Dysarthria. Speech and language therapists are unique in being able to identify Dysarthria types, which indicates the most appropriate management schedule.
Key Points

5. Assessment and advice is indicated as appropriate and desirable for all persons with Dysarthria. Reassessment is warranted on a regular basis to review communication requirements and revisit the appropriacy of therapy interventions and assisted communication.

6. Specialist assessment and advice relating to augmented communication should be available.

7. Approaches to reducing speech impairment have been found to be effective, with some Dysarthria types e.g. Lee Silverman Voice Therapy for persons with Parkinson's disease, computerised articulation programs with chronic non progressive Dysarthria.

8. There is evidence that some persons with non-progressive Dysarthria benefit, long after the initial insult, indicating the necessity for review and further therapy.
9. Advisory and educational programs for relatives and carers should be part of speech and language therapy services.

10. Persons with progressive dysarthria can benefit from techniques to improve intelligibility of speech as well as communication aids. Both require the unique contribution by the speech therapist to facilitate appropriate use.

11. Persons with dysarthria remain at risk as defined by the Mental Capacity Act (2005). Incapacity Act, Speech and Language Therapists are integral to assessing competence for consenting.
TODAY IS A GOOD DAY