An Evaluation of the Robertson Dysarthria Profile (Revised) With reference to

Cerebral Vascular Accident,

Head Injury and Motor Neurone Disease

Client Groups.

by Sean Pert

A dissertation submitted to the Department of Psychology and

Speech Pathology,

The Manchester Metropolitan University,

in part fulfilment for the degree of

BSc(Hons) Speech and Language Pathology.

Supervising Tutor

Miss Sandra Robertson MSc LCST Reg.MCST LLCM

May 1995

Name: S.F. Pert

Course: Speech Pathology and Therapy

AN EVALUATION OF THE ROBERTSON DYSARTHRIA PROFILE (REVISED)

With reference to Cerebral Vascular Accident, Head Injury and Motor Neurone Disease Client Groups.

ABSTRACT

Dysarthria is a motor speech disorder which is both physically disabling and potentially socially isolating. One assessment of this disorder is the Robertson Dysarthria profile (RDP). In the second stage towards a revised version of the RDP (1982), an evaluation of a pilot version of the new profile was carried out. Selective revisions were made to the profile, with reference to the literature and to the findings of a survey of Speech and Language Therapists in England (Andreae, 1994). The resultant pilot version was evaluated with adult acquired dysarthrics. A parallel study was carried out with dysarthrics with Parkinsonism and Multiple Sclerosis by Snowden (1995).

Each section of the profile was analysed to evaluate if certain aspects of the RDP(R) were typical of dysarthria caused by a certain pathology or trauma. Findings supported this hypothesis. Qualitative information as to the effectiveness of the RDP(R) was also collected from both clients and clinicians.

KEYWORDS				
DYSARTHRIA	ASSESSMENT	MOTOR NEURONE DISEASE	CEREBRAL VASCULAR ACCIDENT	HEAD INJURY

ACKNOWLEDGEMENTS

I would like to express thanks to Ms Sandra Robertson for her ongoing support, advice and enthusiasm in this study. Also to Kevin Rowley for his assistance with the statistical analysis of the results.

Many thanks to all the Speech and Language Therapists who took time to assist me in this study and gave such helpful feedback on the profile.

Also to Andrew Russell, Gerrard Woods and Michael Ryan for their patient support guiding me through the computer programs used to produce the pilot RDP(R) scoring form.

Finally, to all the dysarthric clients who so kindly took the time to take part in this study.

Introduction

Aims of the study

The aims of this study were:

i) To establish if *The Robertson Dysarthria Profile (Revised), (hereafter RDP(R))* pilot was

still an effective tool for assessment of dysarthric clients.

ii) To administer the RDP(R) in the settings and in the manner in which it was designed to be used so that both quantitative and qualitative information could be gathered to further refine the profile.

iii) To address issues both theoretical and practical that would make a future revised version of the Robertson Dysarthria Profile a more effective tool.

iv) To examine if the RDP(R) could be used to support differential diagnosis of the underlying neuropathology.

The Nature of Dysarthria

Dysarthria is a motor speech disorder. Motor speech disorder is a diagnostic term that encompasses two major sub-groups, dyspraxia (apraxia) and dysarthria (anarthria). The disorders are therefore associated with the production of speech itself in its strictest definition. It is not concerned with other aspects of language, what Brown called "the central language processes" (in Darley, Aronson & Brown, 1975, p1). There may be impaired language function co-occurring (e.g. aphasia, dementia) in a dysarthric client (Darley, Aronson & Brown, p1, 1975).

Dysarthria presents as disturbances of "...respiration, phonation, articulation, resonance and prosody" (Darley et al, p3, 1975). This use of the term *dysarthria* expanded the definition from applying simply to articulation and stresses the highly related nature of the processes of speech and the intricate interconnections of the body parts of the speech mechanism (Darley et al, p3-4, 1975).

The main components of motor speech (structures) are;

1 Abdominal muscles

2 Diaphragm

3 Ribcage

4 Larynx

5 Tongue/Pharynx

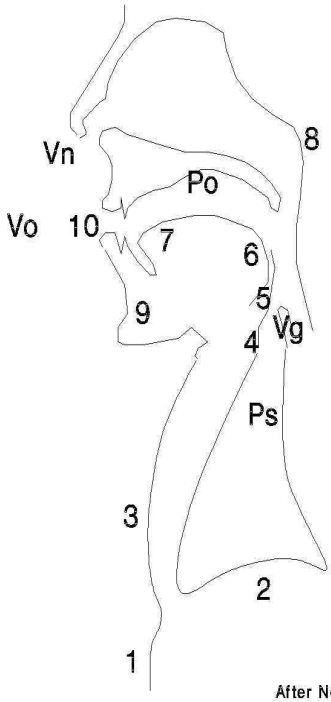
6 Posterior tongue

7 Anterior tongue

8 Velopharynx

9 Jaw

10 Lips



After Netsell, p3, 1986

These structures then provide a series of valves that have corresponding pressure systems associated with them. The five main pressures to be noted (that may be measured instrumentally, or inferred from clinical observation and speech patterns) are;

Ps Subglottal air pressure

Po Intraoral air pressure

Vg Glottal air flow

Vo Oral air flow

Vn Nasal air flow

Taken from Netsell, p3, 1981, 1985

The disturbances in muscular control affect the processes of speech by the resultant weakness, slowness, incoordination, or altered muscle tone from damage to the central or peripheral nervous system (Darley et al, 1975, p2-3).

Dysarthria is accordingly a symptom of neurological disease affecting motor speech aspects. There are "...disturbances in muscular control" (Darley et al, p2, 1975). Dyspraxia, is contrasted to dysarthria in that it is the planning of motor speech acts which is disrupted. This is discussed with reference to the RDP(R) (See differential diagnosis).

The Client Groups

Traumatic Head Injury

Head injury can lead to speech and language disability, as well as associated physical and psychological difficulties.

The population is predominantly younger than other dysarthric groups due to the higher incidence of road traffic accidents and risk taking behaviour of the younger population. In addition, survival rates enhance this age effect "Survival rates are particularly high for children who, along with young adults, constitute the age group at highest risk for head injury; and, with the increasing sophistication of early medical management, the rate of survival continues to improve." (National Institute for Health, U.S.A, 1995). A similar scenario exists in the U.K. where around 50% of the patients admitted to hospital are under 20 years old (Wilkinson, p91, 1993).

Speech and communication difficulties are common in survivors of traumatic head injury. "Approximately 50,000 of the estimated two million people who suffer traumatic brain injury (TBI) each year in the United States have severe persisting communication problems as a result "(NIH, 1995). Dysarthria is a commonly found speech difficulty in this client group.

Other common deficits, depending on site and severity of brain damage, affect:

Intellectual function,

mood, behaviour, personality,

vision,

neuromuscular functioning (speech and /or general)

(After Wilkinson, p101, 1993).

Cerebral Vascular Accident

Cerebrovascular disease is characterised by a "...sudden loss of neurological function" (Wilkinson, 1993, p63). C.V.A. or "stroke" as it more commonly known is caused by one of two mechanisms, namely infarction (Ischaemic stoke) and haemorrhage (Haemorrhagic stroke). This form of neurological disease is the most common cause of speech and language disorder (Murdoch, p51, 1994).

Ischaemic strokes occur when there is inadequate blood supply to an area of the brain. This may be from occlusion (narrowing) of the blood vessels through inflammation or arterio sclerosis. Alternatively, a blood clot (thrombosis) may cause a partial or total blockage of a vessel. Either way, the areas post-blockage are damaged and the neural tissue dies very rapidly from oxygen deprivation.

Haemorrhage is the rupturing of a blood vessel. The pressure of blood directly damages surrounding tissue and the in pouring of blood compresses and damages surrounding tissue. Secondary bleeding into the sub-arachnoid space and cerebrospinal fluid may also occur.

Whatever the mechanism, C.V.A. may cause a communication disorder, and dysarthria is a common difficulty encountered in this clinical group.

Motor Neurone Disease

M.N.D. is an idiopathic progressive degenerative disease affecting the upper and lower motor neurones *only* (Knowles and MNDA). There are three sub-types which have characteristic patterns of degeneration (See *Medical Diagnosis and Type of Dysarthria*, below.

The Dysarthrias, Sub-Groups and Their Classification

Dysarthria is perhaps a misleading term as it encompasses more than one clinical presentation. The dysarthria***s*** are usually classified according to the site of the lesion in the central or peripheral nervous systems. A knowledge of the site of lesion, linked with the functional anatomy of that area/structure can therefore allow the informed clinician to predict the types of disability that may occur as a result. As Murdoch points out "The type of dysarthria that results from damage to the neuromuscular system depends very much upon where in the neuromuscular system that damage is located" (1990, p206).

Damage may occur in the neuromuscular junctions, the lower motor neurones, the upper motor neurones, the cerebellum, the extra-pyramidal system as well as the speech mechanism muscles themselves. The extra-pyramidal system may be influenced by some sub-cortical structures including the basal ganglia.

The types of dysarthria, i.e. *flaccid, spastic, hypokinetic, hyperkinetic, ataxic and mixed* form clinically distinguishable groups. (Darley et al, p13, 1975). They are related to the site of lesion.

Clinically recognised types of dysarthria together with their lesion sites.

Dysarthria type ***Lesion site***

Flaccid dysarthria Lower motor neurones

Spastic dysarthria Upper motor neurones

Hypokinetic dysarthria Basal ganglia and associated brainstem nuclei

Ataxic dysarthria Cerebellum and/or its connections

Mixed dysarthria Lesions of multiple systems

Darley, Aronson & Brown, p13, 1975.

Accurate identification of neuropathy (site of lesion) can lead to a prediction of clinical presentation through a knowledge of the intact motor speech system functioning. In the same way, accurate perceptual analysis of speech characteristics may be related to the site of lesion (Darley et al, 1975, p9). This is the basis of both the Mayo clinic study by Darley, Aronson & Brown (1975) and on which the diagnostic *Frenchay Dysarthria Assessment* (Enderby, 1983) is based.

Similarly, each speech process is controlled by a different part of the motor speech system. The reader is referred to Murdoch (1990, 1994), where these relationships are detailed.

Although the dysarthrias form separate and identifiable clinical groups, there is recognised overlap and relationships between these group (Enderby, 1986). This is referred to in the discussion section.

Medical Diagnosis and Expected Type of Dysarthria

1, Traumatic Head Injury

The site of lesion obviously varies in this population. *Flaccid, spastic and mixed dysarthrias have been reported following head injury*. In the acute stage, shortly after the trauma, language disturbance may co-occur. Dysarthria may persist even if the language functioning spontaneously resolves (Murdoch, p137-8, 1994).

2, Cerebral Vascular Accident

Again, the site of the lesion varies. *Flaccid, ataxic and mixed* dysarthrias are possible (Murdoch p215, p270 and p274).

3, Motor Neurone Disease (M.N.D)

i) Amyotrophic lateral sclerosis: The most common form of M.N.D. affecting approximately 66% of cases (MNDA/Knowles). This involves upper and lower motor neurones. The selective degeneration results in a *mixed spastic-flaccid type dysarthrias* (Murdoch, p275, 1994).

ii) Progressive bulbar palsy: Motor cells in the cranial nerves (lower motor neurones) controlling speech and swallowing are affected and results in *flaccid or possibly mixed type dysarthrias* (Murdoch, p218, 1994).

iii) Progressive muscular atrophy: This affects approximately 7.5% of M.N.D cases (MNDA/Knowles). It is predominantly a degeneration of lower motor neurones. *Flaccid or possibly mixed type dysarthrias* are therefore associated with this condition.

In this study, the above types of dysarthria are therefore expected. The study by Snowden (1995) examined Multiple Sclerosis (M.S) and Parkinson's disease (P.D). Multiple sclerosis is an idiopathic demyelinating disease. Mixed dysarthria is characteristic of M.S.

Parkinson's disease is another idiopathic disease generally associated with hypokinetic dysarthria (Murdoch, p235, 1994).

Assessment of Dysarthria

Dysarthria may be assessed in a number of ways. Auditory perceptual assessments use listeners to make value judgements about the client's speech, as a whole and / or different aspects or components of the speech.

Perceptual tests include:

Assessment of Intelligibility of Dysarthric Speech (Yorkston & Beukelman, 1981)

The *Robertson Dysarthria Profile* (1982),

The *Frenchay Dysarthria Assessment* (Enderby, 1983)

The *Mayo Clinic speech and voice dimensions* (Darley, Aronson & Brown, 1975)

Unpublished assessments were found to include perceptual evaluations of (Gerratt, Till, Rosenbek, Wertz & Boysen, in Moore, Yorkston & Beukelman, 1991, p78):

Diadochokinesis, Vowel prolongations,

Articulation, Nasality,

Voice quality, Prosody,

Speech naturalness, Speech intelligibility,

Ability to modify speech.

Objective testing uses instrumental techniques, in the main, to assess the functioning of individual aspects of the motor speech system. Repeated observations allow a large data base, of agreed parameters and units, of both normal and dysarthric speakers, to be compiled. The debate on both what to measure, how to measure it and the collation of all this into a widely accessible database is still ongoing (Luschei, p12-13, in Moore et al, 1991).

The Robertson Dysarthria Profile

The Robertson Dysarthria Profile (RDP) was first published in 1982. It is a tool designed for the assessment of clients with the motor speech disorder, dysarthria, by Speech and Language Therapists. Based upon the fundamental findings of the now acclaimed Mayo clinic study (Darley et al, 1975)

its aims were to "...provide the practising speech therapist with:

1. a profile of the client's abilities and disabilities.

2. descriptive information to help in classification of the dysarthric problem.

3. a sound basis to build a therapy and management program."

(Robertson, p1, 1982).

Robertson felt that the first two aims had been met to some degree by the publication of the profile and that the final aim was developed by the publication of a practical treatment program to complement the assessment (Robertson and Thomson, p1, 1986).

Revision of the RDP

The author of the profile has started the process of revising the profile for the following reasons. Firstly, there has been a wide usage of the profile by numerous Speech and Language Therapists who informally expressed ways in which the profile might be improved. Secondly, the changing role of the speech and language therapist in relation to the areas assessed in the profile, notably motor speech acts and eating and drinking difficulties, have begun to diverge into specialist fields (Dysphagia assessment is discussed in the context of dysarthria assessment, below). Thirdly, the development of dysarthria assessment and research into motor speech disorders since the profile's publication demands a re-evaluation of its content. This will ensure that the most appropriate and accurate testing is administered so that the Speech and Language Therapist can deliver a quality service to this often neglected client group (Robertson and Thomson, p1, 1986).

The first stage of the revision of the profile was to collect Speech and Language Therapist's views on the profile in its original format and what form they thought a revised assessment should take. The views of 37 therapists in England who had used the RDP in the past year were collated and analysed by Andreae (1994). He found that therapists rated initial assessment, planning therapy and monitoring progress as the most important uses of the profile and that the profile was essentially fulfilling its aims (p33, 1994).

Areas recommended for revision were:

1, The introduction of more objectivity through revision of the scoring system and normative data.

2, A re-evaluation of the assessment of dysphagia.

3, A reduction in the time required to administer the profile.

This study describes the changes made to the RDP with reference to the above findings and to other published research. It also attempts to evaluate the revised profile with reference to diagnosis and assessments by therapists.

The Robertson Dysarthria Profile (Revised) -

Contrasts with the Original Profile.

Rating System as proscribed by the author of the RDP

The original profile requires a score graded from Normal, Good, Fair, Poor and None (p4, 1982). Confusion over the use of "good", meaning good on the continuum for a dysarthric client (who may never achieve normal), had led to the use of a five point scale. The revised profile now uses a score of 1 to 5 which range between Normal and None. Implications for inter-judge reliability are addressed in the discussion section.

Normative data of Diadochokinetic Rates for the Adult Population.

As part of speech acquisition, it is recognised that motor speech refinements are not complete until around fourteen years of age (Netsell, p1986). Younger subjects are therefore less efficient than adults at these tasks.

It has also been recognised that ageing has an effect on the motor abilities of all people in the normal population. This is reflected in consistently smaller number of repetitions of speech tasks and shorter duration for voiceless fricatives and vowels (See appendix 2).

The section to which these data can be referred in the RDP(R) are:

I. RESPIRATION

1. Ability to sustain /s/ on exhalation also / /

On the RDP the following ratings were advised;

/s/

20-30 seconds= Normal

15-19 seconds = Good

10-14 seconds = Fair

1- 9 seconds = Poor

0 seconds = None

in the light of the variation with age, these will be revised. The means for ability to sustain /s/ for the normal population range from 25 seconds (15-40 year olds) to 14 seconds (71+). Although these are means, slight adjustment is justified in the scaling described above.

II. PHONATION

2. Ability to sustain /a:/

IV. DIADOCHOKINESIS

1. Ability to repeat "oe-ee" rapidly (N)

2. Ability to repeat "pa-pa" rapidly (N)

3. Ability to repeat "la-la" rapidly (N)

4. Ability to repeat "ka-la" rapidly (N)

5. Ability to repeat "p-t-k" rapidly (N)

The original RDP made similar time-sustained to profile ratings in the manual. All these will have to be revised slightly, especially for older clients.

The Relationship between DDK rates and Severity of Dysarthria

As Robertson points out in the introduction to the original profile, "The relationship between diadochokinetic rates and accurate and adequate articulation has long been under discussion" (p2, 1982).

Luschei (1991, in Moore, Yorkston and Beukelman, p10-13) argues that DDK rates are measures of maximal performance that have "...little to do with speech", and proposes a drive towards the use of instrumentation to complement clinical observation.

However, Darley, Aronson and Brown (1975) in the Mayo clinic studies observed that the use of a DDK test elicited not just information about rate, but also other parameters such as loudness and rhythm. For example, for ataxic dysarthria, /p / and /t / and /k / elicited irregularities of pitch, loudness and rhythm, termed *dysrhythmia*. (p164-5)

6 subjects were slow, two were dysrhythmic and two exhibited both features during DDK testing. Robertson (1977, quoted in Robertson, p2, 1982) also found a link between DDK rates and slow speech in Dysarthria linked to long term effects of anti-epileptic drugs.

Generally, slower DDK rates were observed in this study. This was usually associated with slowed connected speech rate, but not always.

Wit, Maassen, Gabreels and Thoonen (1993) carried out a study with developmental spastic dysarthria in children using maximum repetition rates and maximum sound prolongation rates. Although they acknowledge that studies on children cannot be applied to adults without caution due to maturational differences, their findings are interesting. They concluded that maximum performance tests are valuable in diagnosing spastic dysarthria, despite large intra-subject and inter-subject variability in both normal and dysarthric speakers.

It is therefore surmised that more research specific to dysarthria needs to be carried out using DDK rates and other maximal measures of performance. In the assessment of dysarthria they could prove very useful, especially if linked with other observations such as pitch and loudness.

Deletion of Non-Speech DDK rates

These tasks were not thought to be useful in the light of research found in the literature. Netsell (p98, 1986) emphasises that "...activation of the speech neural mechanisms with *meaningful speech* may be the only valid test of function for the speech motor system".

Luschei (in Moore, Yorkston and Beukelman, 1991, p3-14) emphasises the need for **objective** measurements of non-speech acts using instrumentation. Objections to this would be that, in the U.K., Speech and Language Pathologist's do not have access to such technology to make objective measurements part of a profile of the dysarthrias. Andreae (1994, p25) found that, of 11 Speech and Language Therapists that made comments about instrumentation, 10/11 "...dismissed instrumentation as impracticable in terms of finance, availability, proficiency in use and time terms." This was also the case in clinics in the U.S.A. In a survey of Department of Veteran Affairs Medical Centres, only 6/66 clinics has appropriate instrumentation for dysarthria assessments of *any* type (Gerratt, Till, Rosenbek, Wetz and Boysen, in Moore et al, 1991, p77-93).

Dysphagia Assessment

Section V: Reflexes

The aim of this section in the original profile was to assess the client's chewing, swallowing and coughing reflexes. This section has now been deleted and reference to dysphagia is now made in the questionnaire section.

The co-occurrence of dysarthric communication problems and dysphagia shows a strong positive correlation (Martin and Corlew, 1990 in Kennedy, Pring and Fawcus, p216, 1993). However, it was found that for patients with CVA, swallowing and speech were not necessarily associated and could respond to therapy separately (Netsell, 1986 in Kennedy et al, p216, 1993). Parkinson's disease with severe dysarthria could exist with minimal dysphagia, no dysphagia or the opposite (Sarno, 1968; Duvoisin, 1982, in Kennedy et al, p216, 1993).

The linear relationship between (meaningful) speech and non-speech acts by the vocal tract is now in question. Several authors propose that there is a separate neuronal network or patterns of neural activation for sucking, chewing and swallowing than for

speech (Dubner, Sessle and Story, 1978; Netsell, 1980 in Netsell, p98, 1986). This has obvious implications for dysarthria assessments where both dysphagia and non-meaningful speech acts are utilised.

In the light of the publication of the professional standards of the College of Speech and Language Therapists, *Communicating Quality*, suspected dysphagia should only be assessed by a specialist therapist, who has received post-graduate training in dysphagia assessment (1991, p186-7). However, to alert the non-specialist to possible difficulties, the RDP(R) Eating and Swallowing section is composed of five simple questions that might be found in any initial screening for dysphagia. There is the issue that some clients will have poor awareness of their difficulties, and even carers may not have thought about the connections with safe eating and drinking and dysarthria. For this reason, this section should be viewed as one informal probe in the usual assessment procedure for dysphagia.

Assessment of Articulation

Task 3. Consonant clusters. The number of stimulus items has been reduced from 20 to 12, ten selected from the original items and the introduction of two new items, *blue* and *glad*.

The task still covers some common clusters of the form CCVC (8), CCV (2) and CCCVC (2).

Clusters not assessed are Word initial pr-, br-, dr-, kr-, gr-, fr-, sn-, sp-, st-, sw-, shr, spr-, skw- and skr-. The assessment is only a sample and difficulties would lead to a fuller assessment sampling a full range of clusters.

Assessment of Intelligibility

The RDP measured intelligibility under two conditions, 1. reading aloud and 2. spontaneous speech (Robertson, p15, 1982). The reading section involved the *Grandfather passage* (after Darley et al, p298, 1975). Spontaneous speech involved an interaction with the Speech and Language Therapist. These tasks were then rated by three judges, the therapist, a relative or close friend and a stranger.

Andreae (p30, 1994) reported that Speech and Language Therapists had great difficulty finding strangers to judge intelligibility. Therapists expressed a need for either a basic screening of intelligibility or a broader assessment of communicative competence.

Intelligibility in the RDP(R) is measured in section VI. There are 7 items to score.

Task 1. The client reads 5 words, one from a list grid. The words are a set of 40 items, 8 sets of 5. The five words progress from 2 to 6 syllables and are randomly selected.

Task 2. The client is then asked to read 3 phrases, 1 from each list (there are three lists).

Task 3. The client is asked to read the passage *The World is Melting!*.

Tasks 3 to 7 are formed form the original RDP section VIII. Prosody and rate items.

As with the articulation section, this section is audio tape recorded. Stimulus items may be found in appendix 4.

Other Assessments of Intelligibility

It is convenient to survey this area at this point, as findings in the literature are relevant to the RDP. Several assessments assess intelligibility of dysarthric speech. These include the *Assessment of Intelligibility of Dysarthric Speech*, The *Robertson Dysarthria Profile* and the *Frenchay Dysarthria Assessment*. There are other assessments available, especially in the U.S.A., but the three aforementioned are probably the most widely used in the U.K.

Intelligibility is possibly one of the most important and useful assessments that can be carried out by both researchers and Speech and Language Therapists (Connolly, 1986, p371). Intelligibility distinguishes dysarthric subjects from normal speakers (Tikofsky and Tikofsky, 1964 in Darley et al, p8, 1975) and is "a frequent, if not universal, consequence of dysarthric speech" (Yorkston and Beukelman, 1981, p1).

It is also an indicator of the sum deficits in the motor speech systems involved in speech production, and therefore serve as a measure of disability. Robertson and Thomson (p63, 1986) points out that intelligibility is a direct result of the efficiency of the integration and co-ordination of the motor speech processes. More over, it is the primary aim of all therapy to work on the motor speech sub-systems of respiration, phonation, articulation, supra-segmental aspects and rate to culminate in improved intelligibility.

Yorkston and Beukelman (1981, p2) surmise the purpose of assessing intelligibility:

1, To rank order different dysarthric speakers.

2, To compare performance of a single dysarthric speaker to normal performance.

3, To monitor changing performance over time.

Different Measures of Intelligibility and Their Validity

The difficulty with attempting to measure intelligibility is that a short, simple test is required which reflects the client's intelligibility in naturalistic conversation settings, i.e. good external validity is required. Yorkston and Beukelman (1981) propose that "...individuals who are judging (intelligibility) must not have precise fore-knowledge of what the speaker is saying". The authors of the *Assessment of Intelligibility of Dysarthric Speech* circumvent this difficulty by employing a rigid procedure. Speech samples recorded for assessment are always judged by other clinicians than those who recorded the speech data.

In the *Frenchay Dysarthria Assessment*, work by Yorkston and Beukelman (1980) and Black and Haagen (1963) is adapted and re-standardised. Randomly selected items from an array are presented to the client by the therapist, ensuring that the

therapist does not see the items. The therapist then transcribes the items and compares them to the stimuli cards.

Reading has been criticised as having poor external validity,"...the situation and hence the style of speaking does not mirror that of everyday conversation" and may be affected by the subjects reading skills (Connolly, p373, 1986).

The assessment of intelligibility in the RDP(R) uses the judgement of the clinician. This has been criticised by some authors as "...disordered speech tends to be more intelligible to professional clinicians than to the average listener" (McCroskey & Mulligan, 1963 in Connolly, p373, 1986).

Questionnaire

Section VII. Communicative Competence and

Section VIII. Eating and Swallowing

Both these section are now assessed by two, five item, self-assessment questions. They may be rated by the client, the carer or the Speech and Language Therapist.

The Pilot Study of the Robertson Dysarthria Profile (Revised)

This study is a parallel with the study by Snowden (1995), addressing Parkinsonian and Multiple Sclerosis clients. The same pilot RDP(R) forms were used in similar settings, and the results analysed in the same manner so that direct comparisons of clinical groups (classified by neuropathy) could be made.

The main factor to consider in interpreting the results is that comparisons between client groups assessed by both researchers may be subject to inter-observer discrepancies.

Research by Enderby (1986) proposes that a simple auditory perceptual assessment may be used to "...assist neurological diagnosis" (p194). Since the RDP is such a test, and claims to highlight the dysarthric's main areas of motor speech difficulty, it is hypothesised that the RDP sections may also help support medical diagnosis.

Subjects

13 clients participated in the study. All had a diagnosis of dysarthria confirmed by a Speech and Language Therapist. All clients lived in the Greater Manchester area. Speech and Language Therapists with dysarthric clients under their care approached potential subjects and explained the nature of the study. The sample was therefore an opportunistic and self-selecting sample. The age of the clients ranged from 19 to 82 years, one female and 12 males.

The clients fall into four different categories:

1, Head Injury N=5

2, Cerebral Vascular Accident N=5

3, Motor Neurone Disease N=2

4, Neuropathy from Drug Overdose N=1

Total: 13

Further details about the clients form appendix 5.

Setting

Administering of the RDP(R) was carried out on Hospital wards, in treatment rooms at various rehabilitation centres and at clients' homes.

Equipment

RDP(R) Scoring Form,

Stimulus Cards,

Pen Torch,

Spatula (Tongue depressor),

Stopwatch,

Digital counter.

Method

The RDP(R) was administered according to the instructions that formed part of the original profile, observing the revisions detailed above as directed by the author, S.J. Robertson.

The RDP method is detailed in *Dysarthria Profile*, which forms appendix 3.

The profiles were administered in one session. The length of time a profile took to administer was dependant on the rate at which the client was comfortable with. A clinical judgement was made either by the examiner, or jointly by a supervising Speech and Language Therapist as to when to terminate the assessment.

Judgements were made at the time of assessment. The section on intelligibility was audio-tape recorded and judged at a later time. These tapes were then destroyed to preserve anonymity.

Results Analysis

Each client's profile was completed. These form appendix 9. The result for each item was reversed. The original rating reflected a higher score for normal performance and lower for disordered / deviant performances.

For the sake of analysis, ratings were reversed in order to give a higher score, the more deviant the performance on items in the profile. This is in line with studies such as the Mayo clinic study (Darley et al, 1975).

The scores translated as follows:

Original Scoring System **Converted to:**

5 - Normal -> 1 - Normal

4 - Adequate -> 2 - Adequate

3 - Fair -> 3 - Fair

2 - Poor -> 4 - Poor

1 - None -> 5 - None

The results for each section were then summed for each client. These section totals were then collated for each client group, Head injured (H.I.), Cerebral Vascular Accident (C.V.A.), Motor Neurone Disease (M.N.D.) and Neuropathy from drug overdose. These data form appendix 8. Means and standard deviations were then calculated for each client group with reference to each section of the profile. The data and accompanying graphical interpretations form appendices 6 and 7 respectively.

The two groups with comparable numbers of subjects, H.I. and C.V.A were then analysed further. Independent-t tests were carried out between these two groups for each section in the profile.

Reference was made to the results of the comparative study by Snowden (1995) in order to detect group differences, section by section. Client data for this study is included in appendix 6.

Results

Independent-t tests. This is a parametric test that analyses results from different subjects in order to establish a significant difference in scoring between groups.

To be statistically significant, results must be at the 5% level or better. This means that the results have a less than 5% probability of occurring by chance.

Key - Used in the six tables, below.

n% - level of probability of occurring by chance alone (5% level is the accepted level of significance).

NOT SIGNIFICANT - results have a greater than 5% chance of occurring by chance.

n% but NOT VALID - where NA on the RDP(R) have been translated as scores of 0. This is therefore not an accurate result and no conclusions may be drawn.

n% but caution! - where one result of NA has been included in analysis as an arbitrary score of 0. Results are not valid, but re-analysis using n=4 would yield a similar result. Results provided for descriptive purposes.

Summary of Independent-t Tests

A comparison of scores of Head Injured and C.V.A. clients for each section of the RDP(R).

RDP(R) Section Independent-t Level of Significance

I. Respiration -1.458 20% (t=1.397)

II. Phonation -0.398 NOT SIGNIFICANT

III. Facial Musculature -0.535 NOT SIGNIFICANT

IV. Diadochokinesis 0.775 NOT SIGNIFICANT

V. Articulation -0.560 NOT SIGNIFICANT

VI. Intelligibility 2.238 10% (t=1.860)

/Rate /Prosody

VII. Communicative -3.323 2% but NOT VALID

Competence

VIII.Eating & -3.312 2% but NOT VALID

Swallowing

Degree of freedom = 8 for all sets. Two tailed test values used (Independent-t values, p26, Robertson, Stirling and Wilkie, 1984).

Data collected by S.Pert

Calculated on *SUPASTAT* 3.2k (Eglen).

Descriptive Statistics for H.I. and C.V.A groups

The descriptive statistics confirm the results of the independent-t tests.

Respiration

H.I. and C.V.A means and standard deviations are comparable and do not form distinct groups. They are similar in the aspects addressed by this section and suggest that both groups have difficulties with respiration to a similar degree.

M.N.D results appear to be separate from H.I. in that both subjects had less difficulty with this section. No conclusions can be made on this sample size.

Phonation

Means and standard deviations were very similar for both groups. There is a great deal of similarity of performance on the aspects addressed by this section of the profile. This is confirmed by the independent-t test result which illustrates that the groups do not perform differently.

Facial Musculature

Means and standard deviations were similar for both groups and again, this suggests that the groups perform similarly on the aspects addressed in this section and have similar levels of difficulty with facial musculature. This is confirmed by the independent-t test.

Diadochokinesis

There is a great degree of similarity of means and standard deviations for the two groups. This is confirmed by the independent-t result. These results, compared with the norms support the hypothesis that dysarthrics globally have difficulty with diadochokinesis.

Articulation

There is very good agreement between means and standard deviations for this section. Again, this suggests that both clinical groups have difficulty with articulation, at a similar degree of severity. This is supported by the independent-t test (not significantly different).

Intelligibility / Rate / Prosody

Means and standard deviations are related, but not closely so. There is overlap between the two groups. They are significantly different at the 10 percent level. The fact that the level of probability is so high and the occurrence of overlap (see graph) suggest that the groups are not significantly different on the parameters examined in this section of the profile.

Communicative Competence

None of the H.I. group were able to complete this section for various reasons and so were given a score of 0. It is therefore not possible to compare results. However, the fact that 4/5 C.V.A. clients were able to complete this section while none of the H.I. clients could illustrates that the groups are *significantly* different. If this is an appropriate way to measure communicative competence, i.e. if this has validity, for the H.I. population is in question and addressed in the discussion section, below.

Eating and Swallowing

The means and standard deviations were not similar, but there was overlap between the groups. The groups were significantly different, but for the same reasons referred to in the communicative competence section.

Age in Clinical Groups

H.I. and C.V.A. are very different in terms of mean ages, standard deviations and age ranges. This may reflect the factors that contribute to the incidence of the mechanism of neuropathy. This is discussed, below.

A comparison of scores of Head Injured and Parkinson's Disease clients for each section of the RDP(R).

RDP(R) Section Independent-t Level of Significance

I. Respiration 0.651 NOT SIGNIFICANT

II. Phonation 0.394 NOT SIGNIFICANT

III. Facial Musculature 4.879 1% (t=3.355)

IV. Diadochokinesis 1.111 NOT SIGNIFICANT

V. Articulation -0.387 NOT SIGNIFICANT

VI. Intelligibility .474 1% (T=3.355)

/Rate /Prosody

VII. Communicative 6.946 1% but NOT VALID

Competence

VIII. Eating & 5.139 1% but NOT VALID

Swallowing

Degree of freedom = 8 for all sets. Two tailed test values used (Independent-t values, p26, Robertson, Stirling and Wilkie, 1984).

Data collected by S.Pert and C.Snowden (1995) Comparative Study.

Calculated on *SUPASTAT* 3.2k (Eglen).

A comparison of scores of Head Injured and Multiple Sclerosis clients for each section of the RDP(R).

RDP(R) Section Independent-t Level of Significance

I. Respiration 1.833 20% (1.833)

II. Phonation 2.986 2% (t=2.896)

III. Facial Musculature 7.307 1% (t=3.355)

IV. Diadochokinesis 7.071 1% (t=3.355)

V. Articulation 2.041 10% (t=1.860)

VI. Intelligibility .761 1% (t=3.355)

/Rate /Prosody

VII. Communicative 24.529 1% but NOT VALID

Competence

VIII. Eating & 17.095 1% but NOT VALID

Swallowing

Degree of freedom = 8 for all sets. Two tailed test values used (Independent-t values, p26, Robertson, Stirling and Wilkie, 1984).

Data collected by S.Pert and C.Snowden (1995) Comparative Study.

Calculated on *SUPASTAT* 3.2k (Eglen).

A comparison of scores of Cerebral Vascular Accident and Parkinson's Disease clients for each section of the RDP(R).

RDP(R) Section Independent-t Level of Significance

I. Respiration -0.955 NOT SIGNIFICANT

II. Phonation -0.080 NOT SIGNIFICANT

III. Facial Musculature 8.286 1% (t=3.355)

IV. Diadochokinesis 1.692 20% (t=1.833)

V. Articulation -1.000 NOT SIGNIFICANT

VI. Intelligibility 3.474 1% (t=3.355)

/Rate /Prosody

VII. Communicative 6.946 1% but caution!

Competence

VIII. Eating & 5.139 1% but caution!

Swallowing

Degree of freedom = 8 for all sets. Two tailed test values used (Independent-t values, p26, Robertson, Stirling and Wilkie, 1984).

Data collected by S.Pert and C.Snowden (1995) Comparative Study.

Calculated on *SUPASTAT* 3.2k (Eglen).

A comparison of scores of Cerebral Vascular Accident and Multiple Sclerosis clients for each section of the RDP(R).

RDP(R) Section Independent-t Level of Significance

I. Respiration 0.334 NOT SIGNIFICANT

II. Phonation 1.859 20% (t=1.833)

III. Facial Musculature 12.131 1% (t=3.355)

IV. Diadochokinesis 7.900 1% (t=3.355)

V. Articulation 1.891 10% (t=1.860)

VI. Intelligibility 1.650 20% (t=1.833)

/Rate /Prosody

VII. Communicative 1.364 NOT SIGNIFICANT

Competence

VIII. Eating & 2.179 10% but NOT VALID

Swallowing

Degree of freedom = 8 for all sets. Two tailed test values used (Independent-t values, p26, Robertson, Stirling and Wilkie, 1984).

Data collected by S.Pert and C.Snowden (1995) Comparative Study.

Calculated on *SUPASTAT* 3.2k (Eglen).

A comparison of scores of Parkinson's Disease and Multiple Sclerosis clients for each section of the RDP(R).

RDP(R) Section Independent-t Level of Significance

I. Respiration 1.401 NOT SIGNIFICANT

II. Phonation 2.537 5% (2.306)

III. Facial Musculature 3.556 5% (2.306)

IV. Diadochokinesis 3.757 5% (2.306)

V. Articulation 2.362 5% (2.306)

VI. Intelligibility 1.570 NOT SIGNIFICANT

/Rate /Prosody

VII. Communicative 1.853 NOT SIGNIFICANT

Competence

VIII. Eating & 3.309 5% (2.306)

Swallowing

Degree of freedom = 8 for all sets. Two tailed test values used (Independent-t values, p26, Robertson, Stirling and Wilkie, 1984).

Data collected by C.Snowden (1995) Comparative Study.

Calculated on *SUPASTAT* 3.2k (Eglen).

Summary of descriptive Information for Head Injured Dysarthric Clients

See RDP(R) scoring form for full description of items.

Section I. Respiration

(a) normal 5

(b) normal 5

(c) normal 3 shallow 2

(d) normal 5

(e) exhalation 5

(f) without 5

stridor

Section II. Phonation

(a) normal 5

(b) do not occur 4 do occur 1

(c) normal 2 monotonous 3

(d) normal 3 hypernasal 2

(e) normal 3 breathy+weak 1 intermittent 1

Section III. Facial Musculature

(a) NA 4 droops on left side 1

(b) NA 3 droops on right side 1 droops on left side 1

(c) normal 5

(d) normal 5

(e) normal 4 decreased 1

(f) normal 5

(g) normal 3 fixed (term added) 2

Section VI. Intelligibility / Rate / Prosody

(a) normal 2 too slow 3

(b) normal 2 syllabic 3 + 1 with insufficient stress

Summary of descriptive Information for Cerebral Vascular Accident Dysarthric Clients

Section I. Respiration

(a) normal 3 shallow 2

(b) normal 2 rapid 2 slow 1

(c) normal 2 shallow 3

(d) normal 2 slow 2 rapid 1

(e) exhalation 5

(f) without 4 with 1

stridor

Section II. Phonation

(a) normal 4 too low 1

(b) do not occur 5

(c) normal 3 monotonous 2

(d) normal 4 hyponasal 1

(e) normal 3 breathy 1 hoarse+intermittent 1

Section III. Facial Musculature

(a) NA 3 droops on right side 2

(b) NA 4 droops on right side 1

(c) normal 3 decreased 2

(d) normal 4 furred 1+ deviation right 1

(e) normal 5

(f) normal 2 deviates to right 2 to left 1

(g) normal 2 deviates to right 2 to left 1

Section VI. Intelligibility / Rate / Prosody

(a) normal 3 too slow 1 festinates 1

(b) normal 3 syllabic 1 with prolongation 1

Discussion

Interpretation of the Results

The results show that although H.I. and C.V.A dysarthrics differ very much in age, they have comparable levels of difficulty with aspects of motor speech and hence for many sections of the RDP(R). Major differences are highlighted by the questionnaire section. None of the H.I. clients were thought able to complete this section. This was for two main reasons. Firstly, several of the clients had very low levels of awareness of their disabilities. Secondly, many had severe emotional lability, or uninhibited behaviour patterns. These factors had several consequences for the administration of the profile. It was much more difficult to keep the client's attention and therefore profiles took much longer to administer than with C.V.A. clients. In addition to this, most H.I. clients had associated psychiatric problems and required a much higher level of care. A questionnaire was not relevant to this population.

Comparison of H.I. and C.V.A. with Parkinson's Disease and Multiple Sclerosis Clients

P.D. and M.S. Scoring Patterns

Using Independent-t tests, Snowden (1995) found that Parkinson's disease (P.D) clients and Multiple Sclerosis clients (M.S) scored differently to a significant level on the following four sections of the RDP(R):

* Phonation

* Facial Musculature

* DDK

* Articulation

* Eating & Swallowing

H.I. and P.D. Scoring Patterns

Independent-t tests of data collected by Pert and Snowden (1995) shows the H.I. and P.D. clients scored differently to a significant level for the following two sections of the RDP(R):

* Facial Musculature

* Intelligibility

H.I. and M.S. Scoring Patterns

Independent-t tests of data collected by Pert and Snowden (1995) shows the H.I. and P.D. clients scored differently to a significant level for the following sections of the RDP(R):

* Phonation

* Facial Musculature

* DDK

* Intelligibility / Rate / Prosody

C.V.A and P.D. Scoring Patterns

Independent-t tests of data collected by Pert and Snowden (1995) shows the H.I. and P.D. clients scored differently to a significant level for the following two sections of the RDP(R):

* Facial Musculature

* Intonation / Rate / Prosody

C.V.A and M.S. Scoring Patterns

Independent-t tests of data collected by Pert and Snowden (1995) shows the H.I. and P.D. clients scored differently to a significant level for the following two sections of the RDP(R):

* Facial Musculature

* DDK

Sections of The RDP(R) that have different scoring between

Clinical Groups

	Section	HI / CVA	HI / PD	HI / MS	CVA / PD	CVA / MS	PD / MS
I	Respiration						
II	Phonation			****			***
				****			***
III	Facial		****	****	******	****	***
	Musculature		****	****		****	***

IV	Diadochokinesis		****		****	***
			****		****	***
V	Articulation					***
						***
VI	Intelligibility	****	****	***		
	/Rate	****	****	***		
	/Prosody					
VI	Communicative					
	Competence					
VII	Eating &					***
	Swallowing					***

Key

Shading indicates a difference in scoring patterns at a significant level (5% or less probability of occurring by chance alone).

These finding lend support to the hypothesis that the sections of the RDP(R) may assist in medical diagnosis.

RDP(R) - An Effective Assessment Tool?

The RDP(R) did appear to highlight the major aspects of difficulty for all clients. Discussion with the Speech and Language Therapists involved in the therapy of the clients confirmed that the findings of the profile were consistent with their informal clinical opinions.

The norm referenced items were particularly useful in that they allowed direct comparison with the non-dysarthric population and therefore a more objective view of severity of the dysarthria.

The descriptive information sections were very useful in "filling in the picture" of the client. Some aspects not addressed by the profile that were noted during assessment related mainly to the H.I. clients. Terms related to the poor elevation of the soft palate could be included in a future RDP, such as *fixed, tension of fauces but no elevation* etc.

The results of the comparison of clinical groups suggest that the profile may be used to support a differential diagnosis where this has not been established. With larger numbers of subjects to support these findings, certain sections could be used in this manner with confidence. This would be particularly useful if there is co-occurring

neurological damage. Ludlow states that one component of a good design for dysarthria research is the:

1. Comparisons of the targeted patient group with several other patient groups to determine if a measurement attribute is specific to the targeted group

(in Moore et al, 1991, p34).

She argues that this method is even "...more valid than the frequently used approach that compares a patient group with a normal control group." (in Moore et al, 1991, p35).

It is interesting that the Diadochokinesis section was able to differentiate between certain groups. A closer analysis of this, along with the figures for /a:/ and /s:/ prolongation could be related to the data collected for the normal population (Robertson and Tanner, 1994). This could lead to the calculation of accurate severity ratings for each patient group.

Criticisms of the Study

No attempt was made to identify the type of dysarthria. Relationships between dysarthria type and RDP(R) section differential values may have been more informative.

Inter-observer reliability was not measured or recorded.

Sample sizes are small and may not reflect the full range of clinical presentation for each client group.

The Questionnaire Section

These were very difficult sections of the RDP(R) to score. People tended to reply to questions with an answer that lay at either end of the scale. This was probably because the questions were perceived as negative from client's point of view. Perhaps, for example, they had never related coughing to unsafe swallowing and they may deny any incidents through fear. This may be especially true of clients with a degenerative disease, where all losses are a step nearer to the end. In contrast, clients with very poor awareness and low insight will not be able to report accurately. If a 5 point scale is to used in the final version, statements with strongly agree -> strongly disagree should replace the numbers and **statements** rather than questions used as items where possible. This would allow true item correlations to be carried out to establish if the statements are effective. See *Internal Consistency*, below.

Difficulties of Other Co-occurring Speech & Language Pathology

Differentiating dysarthria from apraxia. It may be differentiated from dyspraxia using an articulation test (along with other tests and clinical observations). Dyspraxics tend

to make errors of complication, whereas dysarthrics tend to make errors of simplification (Darley et al, p8, 1975). Co-occurring conditions cannot be ruled out, which may have skewed the results, these include dysphasia, dementia, transient ischemic attacks and slow onset C.V.A.

Difficulties of Assessing a Bilingual Dysarthric

One bilingual client was assessed using the RDP(R). The Speech and Language Therapist reported that the client had made an excellent recovery from a traumatic head injury. The therapist also reported more rapid recovery in speech when using his native language than in English. The two areas which may be confusing in a dysarthria assessment, but which are aspects of second language use were schwa insertion for clusters and the vowel quality / general phonology. Use of a Bilingual co-worker in assessment is therefore strongly advised.

Standardisation Issues

The use of Norms in Standardisation

This has proved particularly useful in the scoring of DDK testing,and in /a:/ and /s/ prolongation. The assessing of norms would give data as to the *range* of scoring for all the tasks in the general population. The norm data for DDK rates gave interesting results for DDK's and so other tasks which are assumed to be normal may present problems for a portion of the non-dysarthric general population. As Kline asserts "...if a test is to be used for practical purposes of selection and guidance, it is essential that its norms do meet...high standards" (p164, 1986).

Inter-Tester Reliability

Perceptual analysis of speech remains the primary tool for the assessment of communication disorders, but little research has been carried out regarding the reliability of such assessments in the clinical setting (Kearns and Simmons, p131, 1988).

Kline, describing *Characteristics of a good tests* asserts that "Test-retest reliability is obviously essential." (p3, 1986). With reference to the RDP(R), good inter-observer reliability is essential for accurate diagnosis and accurate rating of severity of disability.

Kearns and Simmons (1988) addressed this issue with a study on the inter-observer reliability for the evaluation of the speech of 10 ataxic dysarthric subjects. This study is very relevant, as Speech and Language Pathologists were used as reliability judges. The Darley et al (1975) perceptual characteristics were used in the study.

Two important findings resulted. Firstly, agreement were at levels above those that could be produced by chance when minimal training was given. Secondly, there was a need to evaluate agreement for *each deviant speech characteristic*, as overall agreement was found to mask specific agreement levels for some deviant speech characteristics.

Therefore, any dysarthria assessment should be standardised not just for inter-judge reliability, but also for inter-judge reliability on each deviant characteristic or behaviour. In addition to this, to ensure good reliability, a short training course using actual dysarthric speech data, on a regular basis should be undertaken by any therapist wishing to use the assessment.

Internal Consistency

This is not a simple issue when applied to any auditory perceptual dysarthria assessment. Each section has face validity, in that the tasks appear to assess the components of the motor speech system, to Speech and Language therapists. Also, the effect of therapy aimed at components highlighted by the original profile has been successful according to reports from therapists "Good for identifying areas of breakdown and monitoring change" (Andreae, p31, 1994). This then appears to fulfil its third aim, to be "a sound basis on which to build a therapy and management program." (Robertson and Thomson, p1, 1986). To establish sound statistical support for this qualitative data, item analysis should be carried out on a larger population of dysarthric clients. A high correlation for individual item scores to the section total as a whole would establish if the items were good measures of the motor speech component. Also, item analysis could be used to establish if the RDP(R) is more sensitive to a particular client group than another. These steps would be particularly useful for the questionnaire section, and are strongly recommended (Likert, cited in OUCT, p26, 1976). The profile may be analysed in the future in an analogous way to a Likert - type scale which has a five point rating.

Concurrent Validity

In the light of this pilot study, the parallel study by (Snowden, 1995) and the opinions expressed in the survey by Andreae (1994), concurrent validity calculated and contribute to the standardisation of the RDP(R). This could be achieved by reference to the Frenchay Dysarthria Assessment (Enderby, 1983).

The RDP and the *Frenchay Dysarthria Assessment* have different aims. The former "...with treatment planning as a priority" (Robertson, p2, 1982) and the latter "..to categorically diagnose dysarthria." (Enderby, p6, 1983). However, both are auditory perceptual tools that are designed to be used by Speech and Language Therapists in the assessment of dysarthria. The same parameters are therefore being tested for, but both have a differing focus. A result of significant but not very high correlation would be expected, reflecting the main aim of assessment i.e. the dysarthric speech characteristics, but also reflecting the differences between the tests (after Kline, p5, 1986).

Drooling Observations and Medication

A poor swallowing mechanism and / or poor sensory awareness around the lip area can lead to a build-up of saliva causing drooling, gurgled voice and spraying during speaking. This is important in the assessment of speech, as performance can be very different if the client is taking medication to control this, or if the client is not. Salivation is usually controlled by *hyoscine* (p4, MNDA/Oliver, Rose & Hirsch). The RDP may therefore advise the Speech and Language Therapist to collect details of

drugs taken and dose as this will affect results (and skew standardisation data, if this is encountered during future data collection). In addition, drugs may affect muscle functioning or the patient's level of concentration and awareness.

The Strengths of The RDP(R)

The assessment has an advantage over the Yorkston & Beukelman assessment (1981) in that it leads into therapy "What overall measures of intelligibility cannot provide, however, is detailed guidance as to prioritisation, i.e. as to which aspects of the patient's speech require the most urgent attention and which are less pressing." (Connolly, 1986, p374).

The tentative findings of this and the comparative study by Snowden suggest that it could be possible to use certain section scores as support for diagnosis of underlying neuropathy.

The Future of the RDP

The RDP encourages the clinician to relate the results and observations of the assessment to therapy. No attempt is made to make direct results to standard therapy programs. As Ludlow warns, "If we are successful in developing standardized measures with standard administration, assessment of speech motor control could become highly proscribed" (p32, in Moore et al, 1991). To avoid this, the emphasis should remain on professional judgement and problem solving, so that an improvement in communicative competence can be achieved. The RDP encourages this by highlighting *areas* of difficulty, giving the Speech and Language Therapist "...indications of where to begin in treatment" (Robertson, p2, 1982).

The RDP in a revised form, I feel, with standardisation and linked to brief training in its use and application will confidently bridge the gap between diagnosis of dysarthria type and therapy programs.

The findings of a study of a much larger scale (Kline suggests 300 subjects as a minimum for standardising special groups, p164, 1986), could be used in the following manner,

1, To support neuropathy - motor speech performance relationships,

2, To relate these findings to diagnosis of dysarthria type and hence establish some concurrent reliability,

3, To examine the relationship between the underlying neuropathy, the motor speech components affected, the severity and the dysarthria type.

4, To evaluate therapy, both the effectiveness of different types and how therapy works to cause an improvement in the clients.

The RDP(R) has the potential to utilise data gathered in a very simple, non-intrusive manner to a much greater extent. I look forward to the evolution of this assessment from its present form that serves the client by directing effective therapy, to a future form that also benefits speech pathology by increasing our understanding of this disturbing speech disability.

References

Andreae, J. (1994)

Towards a revised Dysarthria Profile, *The views of Speech and Language Therapists on the Robertson Dysarthria Profile and how it should be revised*.

Dissertation, Manchester Metropolitan University.

College of Speech and Language Therapists (1991)

Communicating Quality, *Professional Standards for Speech and Language Therapists*.

College of Speech and Language Therapists (U.K.)

Connolly, J.H. (1986)

Intelligibility: a linguistic view.

British Journal of Disorders of Communication, 21, p371-376.

Darley, F.L., Aronson, A.E. and Brown, J.R. (1975)

Motor Speech Disorders.

W.B. Saunders Company.

Dworkin, J.P. (1991)

Motor Speech Disorders, *A Treatment Guide*.

Mosby - Year Book, Inc.

Eglen, R. (1994)

SUPASTAT, Statistical Formulae Program for the P.C.

Version 3.2k.

Manchester Metropolitan University.

Enderby, P.M. (1983)

Frenchay Dysarthria Assessment.

College-Hill Press.

Enderby, P.M. (1986)

Relationship between dysarthric groups.

British Journal of Disorders of Communication, 21, 189-197.

Kearns, K.P. and Simmons, N.N. (1988)

Interobserver Reliability and Perceptual Ratings: More than meets the ear.

Journal of Speech and Hearing Research, 31, p131-136.

Kennedy, G., Pring, T. and Fawcus, R. (1993)

No place for motor speech acts in the assessment of dysphagia? *Intelligibility and swallowing difficulties in stroke and Parkinson's disease patients*.

European Journal of Disorders of Communication, 28, 213-226.

Kline, P. (1986)

A Handbook of Test Construction, *Introduction to psychometric design*.

Methuen.

Moore, C.A., Yorkston, K.M. and Beukelman, D.R. Editors (1991)

Dysarthria and Apraxia of Speech, Perspectives on Management.

Paul H. Brookes Publishing Co.

Motor Neurone Disease Association / Knowles, V. (Undated)

Motor Neurone Disease.

Motor Neurone Disease Association, Northampton.

Murdoch, B.E. (1990, 1994)

Acquired Speech and Language Disorders, *A neuroanatomical and functional neurological approach.*

Chapman and Hall.

NIH GUIDE (1995)

Evaluation, treatment, and prognosis of the communication sequelae of traumatic brain injury.

NIH GUIDE, Volume 24, Number 7, February 24, 1995

PA NUMBER: PA-95-034, INTERNET WWW search document.

Netsell, R. (1986)

A Neurobiologic View of Speech Production and the Dysarthrias.

College-Hill Press.

Open University Course Team (1976)

Attitudes, Social science: a third level course.

The Open University Press.

Robertson, S.J. (1982)

Dysarthria Profile.

Winslow Press.

Robertson, S., Stirling, J. and Wilkie, D. (1984)

Statistical Formulae and Tables (4th Edition).

School of Psychology, Manchester Polytechnic.

Robertson, S.J. and Tanner, B. (1983)

Norms for Sustaining Voiced and Voiceless Phonemes and Diadochokinetic Rates in the Normal Adult Population.

Unpublished, Manchester Metropolitan University.

Robertson, S.J. and Thomson, F. (1986)

Working with Dysarthrics, *A Practical Guide to Therapy for Dysarthria*.

Winslow Press.

Snowden, C. (1995)

A study to investigate the value of the Revised Robertson Dysarthria Profile to differentially diagnose the motor speech characteristics of Parkinson's Disease and Multiple Sclerosis.

(Comparative study with Pert (1995) - This study.)

Dissertation, Manchester Metropolitan University.

Wilkinson, I.M.S. (1988, 1993)

Essential Neurology, Second Edition.

Blackwell Scientific Publications.

Wit, J., Maassen, B., Gabreels, F.J.M. and Thoonen, G. (1993)

Maximum Performance Tests in Children With Developmental Spastic Dysarthria.

Journal of Speech and Hearing Research, 36, p452-459.

Yorkston, K.M. and Beukelman, D.R. (1981)

Assessment of Intelligibility of Dysarthric Speech.

C.C. Publications, Inc.

APPENDIX 1
The Robertson Dysarthria Profile (Revised) Pilot Scoring Form.

APPENDIX 2
Norms for sustained voiced and Voiceless Phonemes and Diadochokinetic Rates in the Normal Adult Population (Robertson & Tanner).

APPENDIX 3
The Robertson Dysarthria Profile Booklet (1982).

APPENDIX 4
The Robertson Dysarthria Profile (Revised) Stimulus Cards.

APPENDIX 5
Client information, Medical diagnosis groups, age, scores.

APPENDIX 6
Summary of results expressed as RDP(R) section total, means, range and standard deviations.

APPENDIX 7
Graphs to compare Head Injured dysarthrics with Cerebral Vascular Accident Dysarthrics: Scoring for each section of the RDP(R).

APPENDIX 8
Raw data collated and converted to speech characteristic deviancy scores. Section totals for each client.

APPENDIX 9
Raw data: RDP(R) scoring form for each client.