DRESSING AFTER STROKE

by

Marion Eraser Walker

Thesis submitted to the University of Nottingham
for the degree of Master of Philosophy,
October 1991

ABSTRACT

The hterature available indicates that dressing difficulties after stroke are common and persistent. Previous studies have documented dressing ability but none have investigated each individual component of the dressing process using a detailed dressing assessment suitable for stroke patients.

The aims of this study were: to develop a dressing assessment (Nottingham Stroke Dressing Assessment) breaking dressing down into its component parts; to identify dressing problems; and to investigate the relationship between dressing ability and physical, perceptual and cognitive disabilities due to stroke.

A series of 60 male and female stroke patients were assessed on their dressing abihties using the Nottingham Stroke Dressing Assessment on four occasions over their first 14 days after admission to the Nottingham Stroke Unit. During this time patients were also assessed on the Rivermead ADL scale, Rivermead Motor Function and other physical, perceptual and cognitive assessments. The frequency of problems in dressing were determined. The most difficult problems were pulling up trousers, putting shoe on affected foot and pulling up pants. The relation between dressing score and all other assessments was determined using a Spearman's Rank Correlation Coefficient. There were statistically significant correlations between dressing and activities of daily living, gross motor function, leg and arm function, perception, sensation, language, hand eye co-ordination and intelligence. No significant relation was found with apraxia, memory, pre-morbid IQ or reasoning ability.

These resuhs suggest that motor recovery and perceptual abihties are important determinants of dressing abihty as has been suggested by previous studies.

ACKNOWLEDGEMENTS

I would like to express my gratitude to Trent Regional Health Authority and the Chest, Heart and Stroke Association, without whose financial aid I could not have embarked upon this study.

I would also like to thank Dr Nadina Lincoln, my supervisor and co-ordinator of the Nottingham Stroke Research Unit, for her expertise, constructive criticism and her constant support throughout this study. My thanks also to Dr John Bendall, my current supervisor, for his encouragement and assistance in preparing this thesis, and also posthumous thanks to my previous supervisor Professor Tony Mitchell.

I am also grateful to the doctors, nurses and therapists of the Nottingham Stroke Unit who kindly gave me access to their patients.

Many other people have helped me over the duration of the study and I would particularly hke to thank Dr John Gladman, research fellow; Cath Sackley, physiotherapist; Sally Ann Adams, physiotherapist; Jacqui Jackson, physiotherapist; Dr Liz Carr, nurse; Fiona Nouri, occupational therapist; Judi Edmans, occupational therapist. My thanks also to Adele Dudley for her clerical assistance.

Special thanks to my friend and research colleague Avril for her help, support and Celtic charm. Also thanks to Wilma, Sharon and my parents for all their encouragement and practical help.

Finally, a very special thank you to my husband Alan and children Nikki and Andrew for their love and constant support and for helping me prepare this thesis by making numerous sojourns into the depths of the Peak District.

CONTENTS

TABLES

APPENDICES

CHAPTER 1

INTRODUCTION

1.1 STROKE

Apoplexy is the old name for Stroke, derived from the ancient Greek language meaning 'struck down violently' (Mulley, 1985). This describes the sudden onset, which is characteristic of stroke. It has a devastating effect on a person; indeed there is no time for adjustment to the loss of movement on one side of the body, any alteration in speech and, as found in some patients, the accompanying confused state.

Stroke is a descriptive term for a chnical syndrome of vascular origin that affects cerebral function. The World Health Organisation (WHO) defines stroke as 'rapidly developed clinical signs of focal (or global) disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than of vascular origin' (Aho et al, 1980). Another definition commonly referred to is 'A cerebrovascular accident (CVA or stroke) is a sudden attack of weakness affecting one side of the body, resulting from an interruption to the blood flow of one side of the brain (by thrombosis, embolus, or ruptured aneurysm). A stroke can vary in severity from a weakness in a limb with some perceptual problems to a profound paralysis and considerable impairment' (Isaacs, 1983; Thompson, 1987). It is the third most frequent cause of death m Western countries and 150-250 people in every 100,000 may be expected to have a stroke (Aho et al, 1980).

Everyday in Nottingham three people have a stroke: one dies within 24 hours, one recovers spontaneously not requiring treatment and one survives with some level of disability (Nottingham Stroke Research Booklet, 1991). It is estimated that every year approximately 10% of survivors from stroke will suffer a recurrent stroke (Thompson and Morgan, 1990).

A prevalence survey of stroke patients in hospital conducted in Nottingham in May 1985 (Payman et al, 1988) found that of the 813 patients on medical or health care of the elderly wards, 187 (20.5%) had stroke as the primary reason for being in hospital and a further 83 (9%) had a history of stroke not thought to be directly related to their current problem. However, it has been estimated that between 40% and 70% of all strokes in the United Kingdom are not admitted to hospital but are managed at home by primary heahh care teams (Bamford et al, 1986). These figures give some indication that the total care of the stroke patient has major financial imphcations for the National Health Service. It has been estimated the average Health District in England and Wales spends at least £3 million on stroke services each year (Kings Fund Forum Consensus Statement, 1988).

Both the incidence and prevalence of stroke increase with age. Several community studies have demonstrated that the risk of stroke is 15 to 30 times higher at age 75 or over than for ages under 65 (Garraway et al, 1979; Oxfordshire Community Stroke Project, 1983; Reunanen et al, 1986). It has, however, been reported that stroke is on the decline throughout the world (Acheson and Williams, 1980; Garraway, Whisnant and Drury, 1983). Ebrahim in 1990 stated four possible reasons for this: treatment of high blood pressure; reduced exposure to risk factors associated with high blood pressure (reduced salt intake); reduced exposure to other risk factors for stroke (increased exercise, stopping smoking, leading a 'healthy lifestyle'); and the competing risk of ischaemic heart disease.

As every stroke patient is different, measurement of recovery is not easy. However, it is generally accepted that most recovery of muscle function occurs in the first few months (McDowel and Louis, 1971; Hewer, 1976; Wade et al, 1985) and in most cases the leg begins to improve first (Mulley, 1985). Recovery may continue for one year in some patients with 70% to 80% of patients being able to walk within six months of their stroke (Wade et al, 1985).

Recovery has two components: adaptive, learning new ways to overcome difficulties; and intrinsic, promoting neural recovery to overcome difficulties (Wade et al, 1985). Many people see retraining of the nervous system as the main aim of therapy despite the fact that there is little or no evidence that therapy can influence intrinsic recovery. Occupational therapists generally teach and encourage patients to make the best use of their residual abilities, thereby encouraging an adaptive recovery.

1.2 THE ROLE OF THE OCCUPATIONAL THERAPIST IN STROKE CARE

The occupational therapist has been perceived in the past as a 'Jack of all trades' with no experience in any one field, and is often associated with great basket-making skills. Thankfully these views are gradually being dispelled. Occupational therapy is a profession supplementary to medicine and aims to restore patients to their previous level of independence following illness or trauma. However when this is not possible the aim is to maximise residual function. This challenge can be no greater than in the treatment of stroke.

Thompson and Morgan (1990) describe five main areas of occupational therapy treatment for stroke patients: to establish independence in activities of daily living (ADL); to improve physical function; to alleviate communication problems; to alleviate perceptual problems; and to assist in resettlement.

A survey conducted in Southampton (Smith, 1989) documenting how occupational therapists spend their working time, highlighted that the most extensively used treatment category was personal ADL. The grades of occupational therapy staff who most frequently conducted this treatment were helpers, basic grade occupational therapists and senior I occupational therapists, in that order. It would therefore seem that it is often the least experienced member of the occupational therapy department who carries out the treatment in the activities of daily living.

In another study carried out in Manchester (Andrews, 1984) the average

proportion of time estimated for training patients in activities of daily living by all grades of occupational therapy staff was 28%. In relation to the percentage of time engaged in other activities, this would suggest that therapy staff spend a large proportion of their working day engaged in training patients to become independent in activities of daily living.

1.3 DRESSING DIFFICULTIES AFTER STROKE

Occupational therapists traditionally give dressing practice to stroke patients during their stay in hospital, but despite this many are still unable to dress several weeks after admission to hospital. Edmans and Lincoln (1987) found that in a group of 150 stroke patients admitted consecutively to hospital and assessed at one month and two years after stroke, 41% and 36% respectively still required assistance to dress.

Ebrahim and Nouri (1987) studied 120 patients at six months after the onset of stroke, to establish the extent and type of help provided by relatives and friends. Help was most often given for bathing (65%), dressing (54%), in the toilet (38%) and with feeding (21%). In further analysis, Ebrahim and Nouri document that of those patients given help in dressing, 35% of wives were given help by their husbands and 61% of husbands were given help by their wives. This difference may have arisen because the husbands were more disabled than the wives but it is more likely to confirm the statement made by Kinsella and Ford (1985) reporting their study of hemi-inattention after stroke, that 'it can be easily seen that in dressing it is quicker and easier for the wife to dress the patient completely rather than leave him to struggle as far as he can before coming to his assistance'.

Further statistics on the prevalence of dressing difficulties following stroke include those based on the Frenchay Community Study by Wade, Langton-Hewer et al (1985): at one week after stroke 21% were independent, at three weeks 49% and at six months 69%. Different studies produce a varying frequency of difficulties, but they all confirm

the basic premise that dressing difficulties after stroke are common.

1.4 RELATION BETWEEN DRESSING AND OTHER DEFICITS

Dressing is a complex skill and independence is often regarded by medical staff as an essential criterion for discharge home. It is therefore surprising that this is a little researched area with no standardised assessment available for stroke patients.

Previous studies concerning dressing after stroke have mainly concentrated on the association between perceptual difficulties and dressing dependence. Williams (1967) observed the correlation between copying ability and dressing activities in hemiplegia. She included 136 patients in the study, all of whom were tested within the first week after hospitalisation. Tests included a complete activity of daily living evaluation, and patients were also asked to reproduce three simple line drawings: a house, a clock and a flower. This was followed by daily training in upper extremity dressing in the occupational therapy department. The dressing treatment consisted of putting on and removing a front opening shirt and a pullover garment. Therapists selected the methods of treatment they preferred; some used one-handed dressing techniques while others used specialised techniques such as use of mirrors to recognise errors, dressing classes, and colour and texture clues. Treatment ranged from 1 week to 36 weeks. Patients were reassessed at discharge on the same activities of daily living assessment as was used in the first week of admission.

Williams concluded that there was a positive correlation in independence in upper extremity dressing and the ability to produce a normal drawing. Also if patients who do normal drawings are not independent in upper extremity dressing on admission to hospital they have a higher capacity to achieve independence in these skills than patients who do abnormal drawings. There was no relationship between the ability to learn upper extremity dressing and the age or sex of the patient or length of time in treatment. However Williams did not attempt to describe the individual components of the daily

living assessment or indeed state if it was a standardised assessment. It is also unclear if dressing of the upper extremity was included in a global dressing score within the ADL assessment, or if a separate assessment was used. This seems relevant information to convey as the ADL assessment appears to be the only outcome measure used.

Bach et al (1971) also studied the ability to draw and independence in activities of daily living. Patients were allocated a category on their performance in ADL on admission to hospital: independent requiring minimal assistance, requiring moderate assistance or dependent. Patients were then asked to copy a simple line drawing of a house and also to draw a self portrait. This study also found a positive correlation between copying ability and independence in ADL. Although both Williams and Bach emphasised the predictive value of their findings they did not attempt to explain the results obtained. It may have been that poor drawing ability and more dependence both reflected more brain damage.

Warren (1981) investigated the relationship of constructional apraxia and body scheme disorders with dressing performance in adult CVA. Body scheme was assessed by asking the patient to complete three tests - body identification, constructing a body puzzle, and drawing a person. Similarly, constructional apraxia was assessed by asking the patient to reproduce four drawings: a house, a clock, a flower and a diamond. Findings illustrated a positive correlation between body scheme disorder and difficulty in upper extremity dressing, and a further positive correlation between constructional apraxia and difficulty in upper extremity dressing. Warren concluded that of the two tests, body scheme and constructional apraxia, the former was a better predictor of dressing performance.

Tsai, Howe and Lien (1983) examined visuospatial deficits in stroke patients and their relationship to upper extremity dressing performance using three simple tests; figure-ground, design copy and block design. The patient's score on each visuospatial test was a significant predictor of dressing performance in the left hemiplegics, while in

the right hemiplegics the prediction of dressing performance was dependent on the sum of the three visuospatial tests. The authors, however, did not give any suggestion as to why there was a difference between the two sides.

Bjorneby and Reinvang (1985) also investigated the relationship between apraxia and difficulties in ADL, stating the same finding of many other authors that 'hterature on the relationship between apraxia and ADL is sparse'. While finding some positive correlations between apraxia and difficulties in ADL, they suggest that patients with persistent apraxic signs may have difficulty in maintaining ADL skills; of the 120 patients admitted to their study, 68 with a right-sided hemiplegia and 52 with a left-sided hemiplegia, 43% were independent in dressing on admission, 78% were independent on discharge and only 53% were independent six months later. The authors state that this would endorse the findings of Fugl-Meyer and Jaasko (1980) who demonstrated that most of their patients gained independence while in hospital but function had deteriorated six months after discharge from hospital. The authors also acknowledge that the therapists in hospital may evaluate function too optimistically in hospital and that the home environment may be more revealing of existing problems. Bjomby and Reinvang (1985), unlike the previously mentioned authors, have looked at dressing independence of the whole body and not just upper extremity dressing. They do not, however, give any details of how they measured this skill or indeed if dressing was broken down into its component parts.

It would therefore appear that perceptual and apraxic difficulties experienced by stroke patients greatly hinder performance in dressing. However a study documenting these effects, on detailed dressing ability, using a standardised dressing assessment has yet to be undertaken.

The relationship of clothing to self-esteem was observed by Adams (1987). She documents that the British Geriatric Society and Royal College of Nursing jointly set up a working party to find ways of improving geriatric care in hospitals (British Geriatric

Society and Royal College of Nursing, 1975). They considered that independence was a vital factor in the maintenance of human dignity and that dignity would be enhanced if patients were in their own clothes. Adams also quotes the minimum standards of care policy set down by the DHSS (DHSS, 1972). It stated 'all patients should have the necessary range of clothing either personally owned or provided by the hospital on a personal basis'. From her study Adams noted that 19 of the 20 patients on a geriatric ward were in day clothes compared with 4 of the 23 patients on a medical ward; patients were found to be largely similar in terms of diagnosis, marital status, age and length of stay in hospital. Although finding no relationship between self-esteem and an individual's clothing, all patients who wore day clothes said they preferred to do so rather than wear night clothes during the day, with one gentleman poignantly stating "they're (clothes) symbolic of freedom: you could get up and walk out of here". Perhaps the difference between wards in proportion of patients wearing day clothes is an indication that there is more occupational therapy input for dressing practice on geriatric wards *than* on medical wards.

The humiliation of being shown how to dress is summed up by Mulley (1985): 'it is degrading to have to be dressed by someone else. Dressing independently gives stroke patients a sense of dignity, self respect and achievement.'

1.5 SUMMARY

Stroke is common, with many patients surviving the pathological event. Survivors usually have residual disability and, theoretically, many of the possible impairments from stroke may result in disabled dressing and dressing related handicaps. The evidence available indicates that dressing difficulties after stroke are common and persistent and although occupational therapists routinely assess dressing ability, a detailed standardised assessment of dressing after stroke has not yet been compiled. The relationship between dressing and perceptual ability has been documented but in a limited fashion. A study

of the relationship between overaU dressing ability and cognitive, perceptual and physical abiUty after stroke has not yet been undertaken.

1.6 SKILLS REQUIRED TO DRESS INDEPENDENTLY

Many skills are thought to be required to achieve independence in dressing after stroke; it may be the failure in one necessary skiU that constitutes dependence or it may be the combination of many failures. These skiUs required may include motor abiUty (the patient must have active movement, be able to reach for garments, grasp and also release them, have balance and co-ordination), sensation (tactile, perception and vision), memory (verbal and visual), reasoning abihty, comprehension of language and inteUigence.

If these skills are a prerequisite to dressing independence, each must in turn be assessed.

1.7 JUSTIFICATION OF ASSESSMENTS USED IN STUDY

AU assessments were selected on the basis of three main quaUties: standardisation, vaUdity and reUabiUty. Each quaUty wiU be considered.

1.7.1 STANDARDISATION OF ASSESSMENTS

In order to obtain accurate results, each assessment must be administered in a consistent way. The terms of the assessment must be precisely defined and comprehensive instructions provided. Administration procedures should be strictly adhered to, as the reUabiUty of the assessment could be affected.

1.7.2 VALIDITY OF ASSESSMENTS

The CoUins dictionary defmition of vaUdity is 'sound; capable of being justified'. To obtain a 'sound' assessment it must be:

(a) Relevant e.g. does it measure what it was designed to measure?

(b) Complete e.g. has it coUected aU the relevant mformation?

(c) Accurate e.g. "the indication of proportion of times that an answer to a question will be correct" (Young, 1971).

1.7.3 RELIABILITY OF ASSESSMENTS

A **reliable** test must be sound and consistent, and must also have:

(a) Inter-rater reUabiUty, e.g. do different assessors assessing the same subject obtam the same score?

(b) **Intra-rater** reUabiUty, e.g. does the same assessor on different occasions obtain the same score?

(c) Test-retest, e.g. on retesting the same patient in a situation where nothing is expected to have changed, are the same scores obtained?

(Partridge and Bamitt, 1986)

In Ught of these three quaUties, mstruments assessing nine areas of function were chosen for administration. Detailed descriptions of each assessment are given in Chapter 3.

1.7.4 ACTIVITIES OF DAILY LIVING

'The most commonly used indicator of recovery after stroke is achieving independence in self care.' (Ebrahim, 1990)

There are three main categories into which an ADL scale will fall:

Checklist. This type of scale acts as an aide memoire to ensure no aspect of disability is overlooked. These scales tend to describe deficits but do not measure them.

Slimmed Index. In these scales, patients are tested on several individual items (each being scored) and the individual scores are summed up to give a total. The Barthel Index (Mahoney and Barthel, 1965), Northwick Park (Benjamin, 1976) and the Kenny Self Care Evaluation (1965) are examples of this type of scale.

Hierarchical Scale. These scales are based on the premise that certain activities precede others. The inherent assumption is that 'a person who is less fully independent will have lost the specific functions in a predictable sequence' (Gresham et al, 1980).

The ADL assessment chosen for this study of dressing after stroke was the Rivermead Activities of Daily Living Scale self-care section (Whiting and Lincoln, 1980). This assessment is a hierarchical scale having the advantage that not every item in the assessment has to be tested. This cumulative model is known as Guttman scaling (Williams et al, 1976). The activities assessed are ordered hierarchically according to their difficulty. Thus as the patient improves, they can do progressively more items in the hierarchy. Other benefits of this scale are that people of the same scores can do the same activities and it is quicker to administer than a conventional additive scale. With reference to dressing, the Rivermead ADL scale details slightly more information than other assessments, as can be seen in Table 1. It may be argued that the main drawback of this assessment is its insensitivity at the lower end of the scale as it does not include

a measure of continence.

1.7.5 MOTOR FUNCTION

Most physiotherapy departments use a motor assessment to record a patient's level of function. But while many assessments record difficulties they do not provide an overaU score. This in turn makes it difficult to communicate the results to others and also to compare changes in performance (e.g. Bobath, 1978). Lincoln and Leadbitter (1979) comment on the need for a suitable motor assessment - 'motor assessments used in hospitals were too long to be of practical use, and others had not been shown to be either rehable or vaUd.' The Rivermead Motor Assessment (Lincoln and Leadbitter, 1979) was therefore developed because of the shortcomings of alternative procedures. It is a hierarchical test, vaUd and reUable, able to provide an overaU score and results can quickly and easily be communicated to others (Appendix 3).

The assessment of hand-eye co-ordination was obtained by using a pursuit rotor. This piece of apparatus was originaUy devised by Koerth in 1922 and has been used in many research experiments. It was chosen despite its size (not easily transported) for its abiUty to accurately quantify a patient's performance.

1.7.6 SENSORY FUNCTION

'Despite the important role of sensation, there is no satisfactory way available to measure it cUnicaUy; one of the major problems is to develop measures of an essentiaUy subjective phenomenon' (Wade et al, 1985).

Due to the absence of an accurate tool to measure the different components of sensation, a sensory assessment currently under development in Nottingham was used. This is standardised and there is evidence to suggest it is reUable over time, though inter-rater reUabiUty has not been estabUshed (Lincoln et **al,** In Press).

1.7.7 PERCEPTION

Perceptual disorders may be defined as 'an impairment in the recognition or appreciation of sensory stimuh in the presence of an intact sensory input system' (Wade et al, 1985).

The Rivermead Perceptual Assessment Battery [RPAB] (Whitmg et al, 1985) has been widely adopted by occupational therapists as a standard assessment instrument. It was devised for occupational therapists and is standardised in both adminstration and scoring and is also reUable over time and between assessors. It has been vaUdated by comparison of the performance on RPAB subtests with psychological tests of visual perception. It consists of 16 subtests ranging in difficulty between simple matching of pictures to more complex three dimensional spatial tasks.

1.7.8 MEMORY

Impaired memory is common in both patients who have suffered a stroke (Tinson and Lincoln, 1987; Wade et al, 1986) and im the normal ageing population. There are many aspects of memory functioning which are relevant to performance in dressing; perhaps the most relevant of these would be short-term recaU of verbal and visual material, as mentioned in Chapter 1.6. Various scales have been developed to measure memory specificaUy; these include the Wechsler Memory Scale [WMS] (Wechsler, 1945), the Rey Auditory Verbal Learning Test [AVLT] (Lezak, 1976) and the Benton Visual Retention Test [VRT] (Benton, 1974). The Recognition Memory Test [RMT] (Warrington, 1984) was chosen for this study as it was a vaUdated and standardised test, could be used with a wide age range and was appropriate for patients with communication problems and those unable to use their dominant hand for writing.

Verbal memory was also assessed using the logical memory subtest of the Wechsler Memory Scale. This is a standardised memory scale specificaUy designed for

clinical use. The logical memory subtest has been shown to be the most sensitive to memory problems following brain damage (Brooks and Lincoln, 1984).

1.7.9 REASONING ABILITY

The breakdown of reasoning ability can seriously hamper daily activities, including difficulty in sequencing the steps needed for dressing. 'The literature on reasoning disorders is fragmented with a lack of theoretical cohesion and an absence of rationales for many of the techniques currently in use' (Goldstein and Levin, 1987). Reasoning ability can be assessed by several measures, such as the Wechsler Adult Intelligence Scale [WAIS] (Wechsler, 1955) picture arrangement subtest which requires the patient to order a number of separate scenes into a logical sequence and the modified Card Sorting Test (Nelson, 1976). However, these assessments are lengthy to administer, and patients may be easily aware of failures which might reduce their co-operation with subsequent tests.

The test chosen for this study was What's in the Square? board game. This test, although not validated, is standardised in procedure, not stressful to the patient and is quick and easy to administer.

1.7.10 LANGUAGE

Speech therapists use long, linguistically complex and carefully validated aphasia tests which are not suitable for administration by other professionals. Short tests are available: a very short version of the Minnesota Test for the Differential Diagnosis of Aphasia (Powell et al, 1980) and the subtest of mini-mental state examination in neurological patients (Dick et al, 1984). Both have been criticized as being either too insensitive to be useful or they have not been validated (Frenchay Aphasia Screening Test Manual [FAST], Enderby et al, 1987). The FAST is a valid, reliable, sensitive and simple method of identifying patients with aphasia and is suitable for use by all health

care workers (Enderby et al, 1987). It provides an indication of deficits in the four main areas of expression, understanding, reading and writing.

1.7.11 APRAXIA

Apraxia has been defined as 'an impairment of the abiUty to carry out purposeful movement by an individual who has normal primary motor skills (strength, reflexes and co-ordination) and has no marked sensory or intellectual disturbances' (Hecaen, 1981). It is a complex disorder and is discussed in greater **detail** in Chapter 5. Constructional apraxia, considered to be a sub-type of apraxia (Siev and Freishtat, 1976) is often cUnicaUy assessed by asking the patient to copy a drawing of a Greek cross, thereby assessing theh: abiUty to integrate the separate elements required to produce this drawing. The Block Design subtest of the WAIS (Wechsler, 1955) is also used to assess constructional apraxia. The patient is asked to reproduce patterns drawn on cards, using coloured blocks. This assessment is very **similar** to and based on the same principles as the Cube Copying subtest of the RPAB. The apraxia subtest of the Western Aphasia Battery [WAB] (Kertesz, 1982) was chosen to assess apraxic difficulty as it was felt to have more relation to real life activities and corresponded with the definition of apraxia being used.

1.7.12 INTELLIGENCE

The most commonly used **detailed** test of inteUectual abiUty used by psychologists in the United Kingdom is the WAIS (Wechsler, 1955). It was originaUy produced for use in the USA and has 11 subtests. The WAIS is vahd and reUable and can often detect quite subtle deficits. However, it takes a considerable time to administer and requires a trained clinical psychologist.

Raven's Coloured Progressive Matrices (Raven, 1958) is another popular

assessment and was the assessment of choice. It has increasingly found favour with others researching into stroke (Kertesz and McCabe, 1977; David and Skilbeck, 1984). It is relatively brief to administer and requires only a minimal motor response (verbal or pointing). It can also be used with aphasic patients. It is, however, affected by perceptual problems, especially visual inattention.

The National Adult Reading Test [NART] (Nelson and Warrington, 1983) is a standardised test specifically designed to estimate the premorbid intelligence levels of adult patients suspected of suffering from intellectual deterioration. Its benefits are manyfold; it is quick and easy to use, not stressful to patients, can be used for a wide age range and can be used for all social classes. It does not, however, take into consideration if the patient had a speech impediment prior to their stroke and does not predict accurately for patients with a very high or very low IQ. Also patients with aphasia are unable to do this task.

The National Adult Reading Test and Raven's Coloured Progressive Matrices were chosen to indicate overall level of intelligence as neither on its own would be appropriate for all patients,

1.8 JUSTIFICATION OF STATISTICAL TESTS USED

The data collected for this study was either nominal or ordinal scale data and therefore non-parametric tests were used. These included Spearman's Rank Correlation to examine the relationship between two variables for ordinal data, Kendall's Coefficient of Concordance to measure the degree of association between sets of rankings, Kappa Coefficient of Agreement to measure the agreement between categorical variables and the Mann-Whitney 'U' test to compare the difference between data from two independent samples, for ordinal data.

1.9 AIMS OF THE STUDY

The aims of the study were to develop a detailed dressing assessment for stroke patients, to identify the problems that occur in relearning to dress, to ascertain if certain aspects of the total dressing process cause more difficulties than others, and finally to investigate the relationship between dressing abilities and cognitive, perceptual and physical problems.

CHAPTER 2

THE NOTTINGHAM STROKE DRESSING ASSESSMENT

2.1 INTRODUCTION

After searching the relevant literature, it became apparent that a comprehensive dressing assessment for stroke patients was currently unavailable. Occupational therapists either use a dressing checkUst for each item of clothing or assess overaU dressing abiUty as part of an activities of daily Uving assessment (e.g. Mahoney and Barthel, 1965; Katz, 1963).

In order to identify problems in dressing accurately and record a patient's current level of abiUty, a detailed assessment documenting each stage of dressing was required. This assessment needed to satisfy certain criteria. It had to:

be cUnicaUy useful,
provide comprehensive data,
be able to detect smaU changes,
be easy and quick to administer,
be easily communicable.

It was in the absence of such an assessment that the Nottingham Stroke Dressing Assessment [NSDA] was developed.

2.2 DRESSING ASSESSMENT

Due to garment variation in clothes worn, a separate assessment was compiled for males, with 36 stages (Chapter 2.2.2), and females, with 56 stages (Chapter 2.2.3). AU

garments commonly worn by men and women were included in the assessment. Perhaps the most obvious item that was excluded, worn commonly by older women, was that of a foundation garment, better known as a 'roU-on' or corset. It was decided to exclude this item as it was a restrictive garment and women often chose not to wear it even though they had been accustomed to putting one on every day prior to their stroke. The usual method of dressing is undergarments first, then additional outergarments. It is of note that some older women wear their bra outside their vest and do so by choice. If the final layer of clothing is on top of the additional garments, the sequence in which one puts on outergarments is entirely the patient's preference. One such order of dressing may be; affected leg in trouser, sock on affected leg, affected foot in shoe, non affected leg in trouser, non affected foot in sock, and finaUy non affected foot in shoe.

AU garments were subdivided into the various stages and order of movements required to successfuUy dress. For example, a jumper was subdivided into:

put affected arm through sleeve
put non affected arm through sleeve
puU jumper over head
puU jumper down to waist.

In addition it was felt necessary to document other factors. Could the patient:

cross affected leg over non affected leg
cross non affected leg over affected leg
reach affected foot
reach non affected foot
stand unsupported for ten seconds
stand and puU up lower garments

These stages are relevant when putting on garments on the the lower half of the body. As failure in the above functions could preclude dressing independence for many

garments, it was feh necessary to ìnclude them in the NSDA.

Adjustment (could the patient position clothes in such a way that they are lying over the appropriate contours of the body) and sequencing (could the patient put their clothes on in the correct order, i,e, underwear first and outer garments last) were also scored, A comments section was included so that the therapist could document anything of relevance ìn that particular stage of dressìng, whether the patient managed theìn fastenings or if they used any aids. In order to obtain accurate results and to eUminate inter-rater unreUabiUty each component of the assessment had to be standardised. A comprehensive set of instructions was therefore compiled for each item of clothing, as shown in 2.2.4.

Additional data coUected on the dressing assessment included the patient's name, patient number ìn the study, sex, age and side of stroke.

2.2.1 SCORING

The patient's level of abiUty in dressing was assessed on each item of clothing worn, along with assessment of the additional functions deemed to be important ìn the dressing process (2.2). A four tier scoring system was used: 0 = dependent, 1 = dependent with verbal assistance, 2 = independent (with or without an aid) and 9 = not appUcable / did not wear this item of clothing. The score of 0, 1 and 2 were used to document the actual level of the patient's abiUty and the score 9 was only appUcable for computing purposes. As there was a variation in the number and type of garments the patient could wear, thereby giving a different maximum score, results were totaUed and the actual score was expressed as a percentage of the possible total.

Time taken to dress was not recorded. However if the patient was in distress or if that stage of donning the garment was not completed within five minutes, the patient was scored as being dependent.

2.2.2 MALE DRESSING ASSESSMENT

Name:

Date of Birth:

Age:

Address:

Date of Onset:

Months Post Onset:

Date of Admission to Study:

Side Affected:

Date of Assessment:

Patient Number:

SCORING

0 = dependent
1 = dependent on verbal assistance only
2 = independent
9 = not applicable

	SCORE	COMMENTS AND AIDS USED
Cross affected leg over non-affected leg		
Cross non-affected leg over affected leg		
Reach affected foot		
Reach non-affected foot		
Standing - static		
Standing - dynamic		

UNDERWEAR

Pants

Selecting correct hole with affected leg

Selecting correct hole with non-affected leg

Pulling up

Vest

Selecting correct hole with affected **arm**

Selecting correct hole with non-affected arm

Pulling over head

Pulling down

Socks

Pulling sock over affected toes

Pulling sock over non-affected toes

Pulling up affected leg

Pulling up non-affected leg

OVERCLOTHES

Shirt/Cardigan		
Selecting correct hole with affected arm		
Selecting correct hole with non-affected arm		
Pulling around back/over head		
Pulling down		
Jumper		
Selecting correct hole with affected arm		
Selecting correct hole with non-affected arm		
Pulling over head		
Pulling down		
Trousers		
Selecting correct hole with affected leg		
Selecting correct hole with non-affected leg		
Pulling up		

SHOES

Putting shoe on affected foot		
Putting shoe on non-affected foot		
Lacing shoe on affected foot		
Lacing shoe on non-affected foot		

ADJUSTMENT OF **CLOTHING**

(a) Does not make any attempt

(b) Makes minimal attempt

(c) Adjusts clothes as far as physically possible

(d) Adjusts clothes independently

SEQUENCING

(a) Aware of sequencing difficulties

(b) Unaware of sequencing difficulties

(c) No problems

2.2.3 FEMALE DRESSING ASSESSMENT

Name:

Date of Birth:

Age:

Address:

Date of Onset:

Months Post Onset:

Date of Admission to Study:

Side Affected:

Date of Assessment:

Patient Number:

SCORING

0 = dependent
1 = dependent on verbal assistance only
2 = independent
9 = not applicable

	SCORE	COMMENTS AND AIDS USED
Cross affected leg over non-affected leg		
Cross non-affected leg over affected leg		
Reach affected foot		
Reach non-affected foot		
Standing - static		
Standing - dynamic		

UNDERWEAR

Pants		
Selecting correct hole with affected leg		
Selecting correct hole with non-affected leg		
Pulling up		
Bra		
Selecting correct hole with affected arm		
Selecting correct hold with non-affected arm		
Pulling over head		
Pulling down		
Pulling up to shoulders		
Stockings/Tights/Socks		
Pulling stocking over affected toes		
Pulling stocking over non-affected toes		
Pulling up affected leg		
Pulling up non-affected leg		
Vest/Slip		
Selecting correct hole with affected arm		
Selecting correct hole with non-affected arm		
Pulling over head		
Pulling down		

OVERCLOTHES

Dress

Selecting correct hole with affected arm
Selecting correct hole with non-affected arm
Pulling over head
Pulling down

Blouse/Cardigan

Selecting correct hole with affected arm
Selecting correct hole with non-affected arm
Pulling around back/over head
Pulling down

Jumper

Selecting correct hole with affected arm
Selecting correct hole with non-affected arm
Pulling over head
Pulling down

Skirt/Waist Slip

Putting affected leg through waistband
Putting non-affected leg through waistband
Pulling up

or

Putting affected arm through skirt
Putting non-affected arm through skirt
Pulling over head
Pulling down

Trousers

Selecting correct hole with affected leg
Selecting correct hole with non-affected leg
Pulling up

SHOES

Putting shoe on affected foot		
Putting shoe on non-affected foot		
Lacing shoe on affected foot		
Lacing shoe on non-affected foot		

ADJUSTMENT OF CLOTHING

(a) Does not make any attempt

(b) Makes minimal attempt

(c) Adjusts clothes as far as physically possible

(d) Adjusts clothes independently

SEQUENCING

(a) Aware of sequencing difficulties

(b) Unaware of sequencing difficulties

(c) No problems

2.2.4 STROKE DRESSING ASSESSMENT GUIDELINES

GENERAL INSTRUCTIONS

1. Position the patient in an upright chair which has arms.
2. Place clothes randomly within the patient's field of vision and within easy reach.
3. Aids that are famiUar to the patient may be used.
4. Only score what the patient does, not what you think they are capable of.
5. The patient's final attempt is scored.
6. If the patient is stiU having difficulty after five minutes or is visibly distressed and required help - score 0 (dependent).
7. If verbal encouragement is required - score 1 (independent with verbal assistance).
8. If faciUtation of a movement is required to complete the task - score 0.
9. If medical problems prevent the patient from completing the task - score 9 (not appUcable),

SPECIFIC INSTRUCTIONS

1. Cross leg over - must be able to lift one leg off the floor and cross over other leg. May cross at knee or ankles,
2. Reach foot - may cross leg over to reach foot. Must be able to touch toes,
3. Standing - must be able to sit to stand independently.

   Static - stand for ten seconds unaided.

   Dynamic - reach down and puU up lower garments whilst standing.

GARMENTS WORN ON THE UPPER HALF OF THE BODY

1. Selecting the correct hole with arm - must be able to feed sleeve onto appropriate limb.
2. PuUing over head - if unable to puU over head due to garment not pushed over elbow, score 0.
3. PuU around back - garment must be in a suitable position to put in second arm. May be pulled around waist.
4. Pulling down - must be able to push garments over shoulders and puU down to encircle the waist.

GARMENTS WORN ON THE LOWER HALF OF THE BODY

1. Selecting correct hole with leg - must be able to feed trouser leg onto appropriate limb.
2. Pulling up - must be able to sit to stand independently and be able to pull garment up fuUy to cover bottom.
3. Shoes - foot must fit snugly in shoe.
4. Lacing shoes - may include one-handed method, toggle and elastic lace aids.

2.3 PILOT STUDY

With the consent of the individual patients, the unit consultant and the ward based occupational therapist, a pilot study was conducted on the Nottingham Stroke Unit (described in detail in Chapter 3.1) to test the feasibiUty of this assessment. Ethical approval for this study was granted from the appropriate Ethical Committee (Appendix 1).

AU patients had a primary diagnosis of cerebro vascular accident (CVA), had some dressing difficulties, were medically stable and considered by the consultant to be suitable for an intensive rehabilitation programme. Patients were excluded if they had a previous history of dementia, due to the possibiUty of variabiUty in performance of activities. Patients were also excluded if they had received cerebral surgery since the onset of their stroke, thereby potentiaUy altering their prognosis.

Included in the pilot study were seven patients aged between 58 and 71 years (mean age 63.1 years). Of these patients, four had suffered a right and three a left hemiplegia. Time of assessment since onset of stroke ranged from three to seven weeks (mean six weeks).

The pilot study was conducted by a senior occupational therapist experienced in stroke care and research methods. The assessment did not appear to cause any visible distress to the patients. It did, however, highUght the omission of two stages in the dressing process. These were the inclusion of a waist sUp into the list of assessed garments and the stage of puUing socks up the affected and non-affected leg.

The occupational therapist documenting the patients dressing abiUties thought the assessment was quick and easy to administer and other than the previously mentioned omissions, aU areas to be observed were already included in the assessment. The pilot study also demonstrated the feasibility of administrating the assessment without imposing greatly on treatment sessions by the ward based therapists. This was due to the good communication and forward planning that existed between both therapists.

2.4 A STUDY OF THE INTER-RATER RELIABILITY OF THE NOTTINGHAM STROKE DRESSING ASSESSMENT

2.4.1 INTRODUCTION

Inter-rater reUabiUty is a measure of the extent to which there is agreement between different assessors. If the information from this assessment is to be easily and accurately communicated from one therapist to another and the results by one assessor able to be accepted as generaUy representative, the inter-rater reUabiUty needs to be high.

2.4.2 METHOD

Two senior occupational therapists experienced in stroke care and research methods, independently completed the dressing assessments on 15 patients whilst observing them getting dressed. One therapist was randomly aUocated to be the clinical therapist during each assessment, thus giving the patient physical or verbal advice if required. Both therapists positioned themselves in fuU view of the patient and did not speak to each other throughout the assessment. On completion of each assessment discussion of findings were prohibited.

Patients were those who had been admitted consecutively to the Nottingham Stroke Unit and foUowed the same inclusion and exclusion criteria as described for the pilot study. Seven women and eight men were included in the study. Ages ranged from 57 to 86 years (mean age 72.2 years). Time of assessment since onset of stroke ranged from two to five weeks (mean time since stroke 3.1 weeks). To give some indication of the patient's level of functional abiUty the total dressing score was observed from rater 1. This iUustrated a dressing score ranging from 30 to 97 with a mean score of 61, thereby including patients with considerable dressing difficulties.

After the completion of 15 assessments, resuhs from rater 1 and rater 2 were cross tabulated on a BBC computer using the Statistical Package for the Social Sciences (SPSS X, 1988). Kappa's coefficient was used to examine the level of agreement between the two assessors after chance agreement had been removed from consideration. This coefficient was calculated for each stage of the dressing assessment. The guidelines used for interpreting the significance levels were those defined by Fleiss (1981). He suggests that less than 0.40 is poor agreement, 0.40 - 0.59 is fair agreement, 0.60 - 0.74 is good agreement and 0.75 - 1.00 is exceUent agreement.

2.4.3 RESULTS

The Kappa coefficients for each stage are shown in Table 2, There was exceUent agreement on 36 items, good on one, fair on three and poor agreement on one item,

2.4.4 DISCUSSION

The Nottingham Stroke Dressing Assessment would appear to have a good level of inter-rater reUabiUty, Indeed, of the 41 stages assessed, 36 had a Kappa value of 0.75 or more, indicating exceUent agreement. However not aU of the stages in the dressing assessment could be analysed, as some of the garments in the assessment were not worn by any of the 15 patients studied.

Included in the results were one good and three fair agreements. These were putting pants on the non-affected leg, putting shoe on the non-affected foot, reaching non-affected foot and pulling bra down. Although aU these stages reached an acceptable level of agreement between raters, there does seem to be a certain amount of disharmony in the decision of scores. It may be that the guidelines for these stages of the dressing assessment require further clarification or it may simply be that the recording therapists are giving more attention to the donning of garments on the affected

side of the lower half of the body.

The only stage in the dressing assessment that did not reach an acceptable level of agreement between raters was adjustment of garments, obtaining a Kappa value of 0.13. Of the 15 patients assessed the raters agreed on only six occasions. This would suggest that the four categories describing the patients' abiUty to adjust their clothing (Chapter 2.2.2) is too subjective and therefore does not add any reUable information to the patients overaU abiUty to dress themselves.

2.5 MAIN STUDY

FoUowing the pilot study, the amended NSDA was administered to a further 60 consecutive patients admitted to the Nottingham Stroke Unit. Adhering to the same inclusion and exclusion criteria as described for the pilot study, one further exclusion criteria was added to the main study; if the patient had not spoken or understood English prior to their stroke, one could assume that they would be unable to carry out the additional cognitive and perceptual tests required for this study. The frequency of dressing problems, consistency of problems and the relationship of dressing problems with physical, cognitive and perceptual difficulties were then investigated using the NSDA.

CHAPTER 3

METHODS

3.1 SUBJECTS

The investigation of dressing difficulties was conducted on the Nottingham Stroke Unit. There are two types of stroke unit, the intensive care unit which takes patients in the acute phase for investigation and medical treatment, and the rehabiUtation unit which takes patients once the acute medical emergency has settled (Andrews, 1987), The Nottingham Stroke Unit was of the latter type. The unit was first opened in 1984 with ten beds in total for male and female patients. In addition to the ward staff there was a stroke research team, estabUshed a year previously. The unit was established to encourage specialised rehabiUtation techniques by experienced professionals and also to provide opportunities for research into the many different aspects of stroke rehabiUtation.

An average of 60 patients are treated armuaUy. Patients were admitted to the Stroke Unit by referral from the general medical and health care of the elderly medical wards at Nottingham's two district hospitals, the City Hospital and University Hospital. AU patients had a primary diagnosis of cerebrovascular accident (CVA). Referrals were made as early as possible, when the patient was medicaUy stable and the admitting consultant was of the opinion that the patient showed the potential to improve with intensive rehabilitation. It was therefore the middle band of patients who were referred to this speciaUsed unit, thus excludmg patients who were either 'too bad' or 'too good'. Unless there is careful selection of patients for admission the unit wiU graduaUy accumulate a large number of stroke patients who wiU require long-stay care. To combat this problem an arrangement was estabUshed with the original referring ward that they would accept patients back if the speciaUst skills of the Stroke Unit were no longer

required and the patient could not be discharged. Therefore the Nottingham Stroke Unit was acting as a highly specialised unit with limited resources.

3.2 PROCEDURE

Patients were admitted to the study if, in the opinion of the ward-based occupational therapist, they demonstrated difficulties in dressing on admission to the ward. AU patients admitted to the ward during the study period had some degree of dressing difficulties. Included in the study were three patients who could put on their clothes but were unable to complete the dressing process due to difficulty with the fastenings. Before assessment by the research occupational therapist aU patients had been seen by the ward-based occupational therapist, who gave general advice on dressing techniques.

Patients were excluded from the study if they had a previous history of dementia; such a patient's performance may fluctuate considerably due to the nature of their co-existing pathology. Due to the battery of cognitive assessments to be administered, patients were also excluded if they did not speak or understand English prior to their stroke. A final factor in excluding patients from the dressing study was if the patient had undergone cerebral surgery since the onset of their stroke, thereby potentiaUy altering their prognosis.

On explanation of the proposed study, verbal consent was requested from aU patients.

3.3 ASSESSMENTS

Patients admitted to the study were assessed using measures of physical, cognitive and perceptual function to investigate factors possibly associated with dressing performance. Assessments were conducted over the first 14 days of admission to the

Stroke Unit. With the exception of the ADL, motor and sensory assessments being carried out routinely by the ward-based therapists, an experienced senior occupational therapist in stroke care and research methods conducted the remaining assessments. All cognitive assessments took place in a quiet room free from distractions. Each assessment is designed to measure the extent of loss of a particular function and, when available, a standardised assessment was used. Where no standardised measure was available, as in the case of dressing and sensation, it was necessary to use an unpublished test.

With the exception of the National Adult Reading Test, Recognition Memory Test and the Nottingham Sensory Assessment, aU tests were administered to aU patients. These tests were only omitted if the patient had speech or comprehension difficulties.

3.3.1 NOTTINGHAM STROKE DRESSING ASSESSMENT

Using the Nottingham Stroke Dressing Assessment, as described in Chapter 2, patients were assessed after their morning wash. The assessment was conducted on four occasions spaced over the patient's first 14 days on the Stroke Unit. This was to enable the researcher to record the consistency of dressing difficulties during this period.

Prior to assessment aU patients had been seen by an occupational therapist and had received some general advice on dressing techniques. AU patients were assessed at their bedside in an upright chair with arms. Clothes were randomly laid out on the bed within the patient's field of vision. Hearing aids, spectacles and dressing aids were suppUed if the patient was accustomed to using these.

One occupational therapist documented the dressing abiUties of aU 60 patients eUgible for the study, intervening only to give verbal advice or to put on garments for dependent patients.

3.3.2 RIVERMEAD ACTIVITIES OF DAILY LIVING (self-care section)

The Rivermead ADL assessment (Whiting et al, 1980) is a hierarchical scale devised to evaluate a patient's progress in self-care activities for both clinical and research purposes. It is standardised in procedure and scorable so that statistical analysis of data is possible.

The self-care section consists of 16 items; each item is scored on a three point scale.

1 = dependent

2 = independent, but requires verbal supervision

3 = independent

A total score provides information on the number of items on which the patient is independent.

The 16 items included drinking, cleaning teeth, combing hair, washing face/hands, make-up/shave, eating, undressing, indoor mobility, bed to chair, lavatory, outdoor mobiUty, dressing, wash in bath, in/out bath, overaU wash and floor to chair (details in Appendix 2). The additional benefits of using this assessment were that it was famiUar to the author, widely recognised and used in routine clinical work.

3.3.3 RIVERMEAD ASSESSMENT OF MOTOR FUNCTION

The Rivermead assessment of motor function (Lincoln and Leadbitter, 1979) is a vaUdated and reUable measure of assessing physical recovery from stroke. It has been demonstrated to be standardised in procedure and to have good inter-rater reUabiUty. This test was familiar to the author, is widely used and was routinely administered to aU patients admitted to the Nottingham Stroke Unit,

It is divided into three sections:

(a) Gross function

(b) Leg and trunk

(c) Arm

(DetaUs in Appendix 3)

Each section foUows the cumulative model known as Guttman scaUng. The principles of this scaling system have previously been discussed in relation to the Rivermead Assessment of Activities of DaUy Living (1.7.4).

Patients are assessed on each item and recorded as either a pass or faU. The score of 1 is given if the patient did the activity according to the specific guideUnes of the assessment and 0 if they did not do it. Assessment is stopped after three successive O's have been scored as the patient is very likely to be unsuccessful in the remaining tasks. This not only shortens the length of the assessment procedure but also helps to conserve the patient's energy.

3.3.4 THE RIVERMEAD PERCEPTUAL ASSESSMENT BATTERY

The Rivermead Perceptual Assessment Battery (Whiting et al, 1985) was designed to assess deficits in visual perception following a stroke and was specificaUy designed for use by occupational therapists. It may be used to assess the severity of the deficit and also to monitor changes over time.

The battery comprises 16 subtests: picture matching, colour matching, size recognition, series, animal halves, missing article, figure ground, sequencing pictures, body image, right/left copying shapes, right/left copying words, 3D copying, cube copying, canceUation and self identification (detaUs in Appendix 4).

It is standardised in both administration and scoring and is also reUable over time

and between assessors.

3.3.5 THE FRENCHAY APHASIA SCREENING TEST

As many stroke patients have speech problems with consequent comprehension difficulties it was felt necessary to include a speech assessment which would identify such patients.

The Frenchay Aphasia Screening Test (Enderby et al, 1987) was designed to cover four main aspects of language: comprehension, expression, reading and writing.

(a) Comprehension

This is tested using two drawings: a boating scene and *six* geometric shapes. The patient is given instructions of graded length and Unguistic difficulty to point to various objects. One point is scored for each fuUy correct response.

(b) Expression

The patient is asked to describe the picture of a boating scene and is given points according to the completeness of his response. The picture is then withdrawn and the patient is informed that they wiU now do something different. He is then asked to name as many animals in 60 seconds and the score depends on the number named.

(c) Reading

Five written instructions of graded difficulty are presented to the patient with regard to the picture. Each correct response scores one point.

(d) Writing

If the patient can write he is asked to write a description of the picture. The score depends upon the number of correctly spelled words and the level of grammatical construction.

(See Appendix 5)

3.3.6 COLOURED PROGRESSIVE MATRICES

The Coloured Progressive Matrices assessment [CPM] (Raven, 1958) was designed to assess as accurately as possible a person's present clarity of observation and present level of intellectual function. The test comprises three sets of 12 problems. Each problem is presented as a pattern divided into four sections: one section is missing and six options are given. The patient then indicates which option completes the pattern (see Appendix 6).

Interpreting the significance of a person's total score is achieved by comparing it in terms of percentage frequency with other people of the same age. In this way it is possible to classify a person into one of the following categories:

1. Intellectually superior.
2. Definitely above the average in intellectual capacity.
3. Intellectually average.
4. Definitely below average in intellectual capacity.
5. Intellectually impaired.

3.3.7 THE NATIONAL ADULT READING TEST

The National Adult Reading Test [NART] (Nelson, 1983) is a standardised test

specificaUy designed to provide a means of estimating the premorbid inteUigence levels of adult patients suspected of suffering from intellectual deterioration.

It comprises a Ust of 50 words printed in order of increasing difficulty (see Appendix 7). All words are **'irregular'** with respect to the common rules of pronunciation. This reduces the chance of the patient reading by phonetic decoding rather than word recognition. The patient reads aloud down the list of words and the number of **errors** are recorded. From the score of reading errors, one can predict a FuU-**Scale** IQ. This in turn is closely related to the patient's premorbid IQ.

3.3.8 APRAXIA SUBTEST OF THE WESTERN **APHASIA** BATTERY

The apraxia subtest of the Western Aphasia Battery [WAB] (Kertesz, 1982) was included into the dressing study to identify patients with apraxic difficulties. This test consists of 20 items in four descriptive categories:

(a) Facial, e.g. put out your tongue, close your eyes.
(b) Intransitive (upper limb), e.g. salute, make a fist.
(c) Transitive (instrumental), e.g. use a comb, use a key.
(d) Complex, e.g. pretend to drive a car, pretend to play a piano.

(See Appendix 8)

Patients are asked to perform each movement on verbal command. If the patient **cannot** carry out the command or does it **incorrectly** then the examiner performs the movement and the patient is asked to imitate it. If a good performance is achieved by either method a score of 3 is given. Impaired but recognisable performance was scored 2 and a poor or approximate performance scored 1. If no performance, unrecognisable or unrelated gesturing was given then a score of 0 was given. Therefore a maximum score of 60 could be obtained. The cut off score (49 points) separating apraxics from

non-apraxics was calculated on the results of 21 non brain-damaged, age-matched patients (Kertesz, 1982).

3.3.9 VERBAL MEMORY

If a patient is to retain the sequential methods of dressing, as taught by the occupational therapist, a sound verbal memory is required. It is for this reason that the logical memory test from the Wechsler Memory Scale (Wechsler, 1945) was used. This is a standardised memory test specificaUy designed for clinical use. The logical memory subtests consists of two short passages (see Appendix 9). The patient is asked to listen carefuUy and to repeat the content, word for word, at the end of each passage. After 30 minutes the patient is again asked to recaU the events as told in the two short passages. Scores for immediate and delayed recaU are obtained by the average number of facts remembered on both passages.

3.3.10 RECOGNITION MEMORY TEST

The Recognition Memory Test (Warrington, 1984) is a vaUdated and standardised test for visual memory, comprising two sections; recognition memory for words and recognition memory for faces. The same general procedure is used for administration of both tests. In each case 50 stimulus items, words and faces, are presented. The patient has to respond 'yes' or 'no' to each item according to whether they found the word or face 'pleasant' or 'not pleasant'. This is to ensure that the patient has actuaUy looked at the picture and word (see Appendices 10 and 11).

Memory function is tested immediately after the 50 stimuU in each section. Retention is tested by a two choice recognition task; the patient has to point to the face or word that they had seen previously and are encouraged to guess if uncertain.

3.3.11 NOTTINGHAM SENSORY ASSESSMENT

The scarcity of a vaUdated sensory assessment for stroke patients led to the development of an unpubUshed sensory test. This test assessed ten aspects of sensation: Ught touch, temperature, pain, pressure, tactile locaUsation and bilateral simultaneous touch, joint appreciation sense, joint direction sense, joint position sense and stereognosis.

Patients were assessed on the hemiplegic side of their body using a three point scoring system:

Normal	-	2
Impaired	-	1
Absent	-	0

(Details in Appendix 12)

AU tests were done with the patient blindfolded to prevent them from obtaining visual clues. However, to ensure as far as possible that they understood what was being asked of them and with those patients who found speaking difficult, a trial run was first performed with visual control.

3.3.12 PURSUIT ROTOR

The Pursuit Rotor was used to assess the hand eye co-ordination of patients participating in the study. It involves a tracking task with a target in the shape of a multisided star. The patient has to keep the tip of a metal stylus in contact with a Ught on the target as it travels a star pathway. The Ught travels at a constant speed but may be adjusted to different speeds. The setting chosen was ten revolutions per minute; this was felt to be a suitable speed for most stroke patients to attempt. The measure of performance for the pursuit rotor is time on target. The clock accumulating the subject's score is operated by a current passing through the stylus and the Ught on the target, so

that it runs only when the subject is on target.

3.3.13 WHAT'S IN A SQUARE?

The What's in a Square? board game (Arnold Limited) was used to assess reasoning abUity, This game is graded in difficulty but for the purpose of the study it was used in its simplest form. The board comprises 16 squares, forming a 4 x 4 grid. Along the top of the grid four different pictures of coloured roofs were placed and down the left hand side four different designs of houses. The patient is then given 16 cards with a mixture of different houses with coloured roofs and is asked to cross match the components on the card and place it in the 'cortect' square. One point was given for each correctly placed card (see Appendix 13).

CHAPTER 4

RESULTS

4.1 INTRODUCTION

A considerable amount of data was coUected during this project and so for ease of reference the results wiU be presented in several sections.

These are:

DetaUs about the patients in the study;

The frequency of dressing problems;

Observations from the comments section of the dressing assessment;

The consistency of dressing problems over time;

The effect of sex and side of stroke on dressing abUity;

The effect of age on dressing abiUty;

The relation between the Nottingham Stroke Dressing Assessment with the physical, perceptual and cognitive assessments;

The relation between stages of dressing and the physical, perceptual and cognitive assessments;

The relation between the Rivermead Perceptual Assessment Battery subtests and the overaU dressing score;

The relation between the sensory assessment subtests and the overaU dressing score.

As far as possible aU data was analysed on an ICL VME 2900 series mainframe at Cripps Computing Centre, University of Nottingham, using the Statistical Package for the Social Sciences (SPSSX, 1988).

4.2 SUBJECTS

In the twelve months from November 1987 to October 1988 62 patients were admitted to the Nottingham Stroke Unit. Of these patients two were excluded from the study. One lady had received surgery for an aneurysm resulting in hemiplegia and bUndness in one eye and one gentleman did not understand English prior to his stroke.

Included in the study were 37 male and 23 female patients. Patients were aged between 21 and 79 years (mean age 62.4 years, S.D. 9.5). Of these patients, 28 had suffered a left hemiplegia, 30 a right hemiplegia, one a bUateral stroke and one a brainstem stroke. AU patients had been transferred to the Stroke Unit from general medical and health care of the elderly medical wards and were deemed medicaUy stable on entry to the study.

On admission to the study the range of scores, the mean score and standard deviation for aU physical, perceptual and cognitive assessments were recorded (Table 3).

4.3 FREQUENCY OF DRESSING PROBLEMS

The frequency of problems in dressing were determined separately for men and women. Table 4 Ulustrates the frequency of independence in aU four dressing assessments for male patients. AU assessments were conducted within the first 14 days of admission to the Stroke Unit by the research occupational therapist. Scores are given in a percentage form. The most difficult components were pulling trousers up, putting shoe on the affected foot, lacing shoes and puUing pants up.

The frequency of independence in the four dressing assessments of female patients is shown in Table 5. A simUar pattern of difficulty was found in the female patients, with lacing shoes, pulling up trousers and putting shoe on the affected foot again being the most difficult components in the dressing process. Standing, both static and dynamic, was a common problem in dressing for men and women.

Generally, one may observe that for many of the garments, putting the affected Umb into the garment is a more difficult component than inserting the non affected Umb.

4.4 COMMENTS SECTION - FASTENINGS

From the comments section of the Nottingham Stroke Dressing Assessment one could identify the number of patients who had difficulty with the fastenings on their garments. Recording difficulty with fastenings was felt to be the easiest method of accumulating this type of information, as the permutations of fastenings on different items of clothing is endless. The foUowing fmdings are based on observations made during the second dressing assessment. The second assessment was chosen for observation as it was felt that the patient would be more at ease with the presence of the research therapist.

Of the women (n=23) seven required assistance in the fastening of their main outer garment; three being dependent with dress fastenings and four with skirt fastenings. Seven women wore a bra during the assessment period, with only four managing to fasten the cUp independently.

Of the men (n=37) eight required help with shirt buttons and 14 with the cUp and zip fastenings on trousers.

4.5 CONSISTENCY OF DRESSING PROBLEMS OVER TIME

Due to the large variation in clothes worn, garments were only included in this analysis if worn by more than 15 patients. Excluded items included skirt, bra, blouse and cardigan. Consequently 35 components of dressing were observed for females and 31 components for males. These components were ranked separately for males and females in a hierarchical fashion, by examining the frequency of independence. This procedure was carried out for aU four assessments of both female and male patients.

Firstly, to measure the degree of association between the sets of rankings for the male and female assessments, KendaU's Coefficient of Concordance was appUed. This demonstrated a high agreement between the four sets of rankings; male assessments W = 0.95, female assessments W = 0.89.

Secondly, to investigate the consistency of problems in getting dressed, the relationship between the four individual dressing assessments was observed. This was measured using the Spearman Rank Order Correlation Coefficient.

Each assessment was compared with each of the other three assessments, for males and females separately. The order of problems was highly significantly correlated between each assessment, as can be seen in Table 6.

4.6 THE EFFECT OF SEX AND SIDE OF STROKE ON DRESSING ABILITY

The effect of sex and side of stroke on dressing abiUty was investigated using a Mann-Whitney 'U' test. This non-parametric test indicated no significant difference between male and female patients (U = 328,0 p>0,05) or patients with a right or left sided hemiplegia (U = 340.0 p>0.05) in their dressing abiUty.

4.7 THE EFFECT OF AGE ON DRESSING ABILITY

The effect of age on dressing abiUty was investigated using a Spearman Rank Correlation Coefficient. This showed no statisticaUy significant cortelation between age and dressing abiUty (r = -0.14 p>0.05).

4.8 RELATION BETWEEN THE NOTTINGHAM STROKE DRESSING ASSESSMENT WITH THE PHYSICAL, PERCEPTUAL AND COGNITIVE ASSESSMENTS

To obtain an overaU score for dressing and aUowing for garment variation, a percentage score of independence was formulated. Performance on the second dressing assessment was selected for investigation as the patient was more likely to be at ease with the presence of the research therapist than on the first occasion. Dressing scores ranged from 5% to 100% (mean score 64.9, S.D. 23.4). This dressing score was then cortelated with aU other physical, perceptual and cognitive assessments using a Spearman Rank Cortelation Coefficient.

Table 7 Ulustrates the cortelations. This shows that out of the sixteen abiUties assessed, nine were significantly cortelated with dressing abiUty.

Activities of daUy Uving, gross motor function and leg function were significantly correlated at the 0.1% level, pursuit rotor was signùficantly cortelated at the 1% level and arm function, Coloured Progressive Matrices, Frenchay Aphasia Screening Test, Rivermead Perceptual Assessment Battery and sensory assessment were significantly correlated at the 5% level.

This non-parametric test Ulustrated that there was no statisticaUy significant relation between the dressing assessment and the Wechsler Logical Memory, Recognition Memory Test, National Adult Reading Test, apraxia and What's in a Square?.

4.9 RELATION BETWEEN STAGES OF DRESSING AND PHYSICAL, PERCEPTUAL AND COGNITIVE ASSESSMENTS

To investigate the relation between the stages of dressing with the physical, perceptual and cognitive assessments, aU 58 stages were examined. As the scoring system for the dressing assessment was a four point scale, a Spearman Rank Cortelation

Coefficient was used to cortelate each of the stages of dressing with the physical, perceptual and cognitive assessments that had been demonstrated to be significantly correlated with dressing abUity (refer to Table 7). Table 8 Ulustrates the significant cortelations identified; 31 stages were significantly correlated at the 0.1% level, 42 stages were sigrùficantly correlated at the 1% level and 52 stages were significantly cortelated at the 5% level.

GeneraUy the items of clothing worn on the lower half of the body were significantly cortelated with the physical assessments and the items of clothing worn on the upper half of the body were significantly cortelated with the cognitive assessments.

4.10 RELATION BETWEEN RIVERMEAD PERCEPTUAL ASSESSMENT BATTERY SUBTESTS AND OVERALL DRESSING SCORE

As dressing abiUty is thought to be closely related to perceptual abUities (Warten, 1981; WUUams, 1967; Bach et al, 1971) each subtest of the Rivermead Perceptual Battery Assessment was cortelated with the overaU dressing score using the Spearman Cortelation Coefficient. Table 9 displays this relationship. This indicates that 10 of the 16 subtest scores were significantly cortelated with dressing abiUty. Dressing abiUty was most closely associated with performance on tasks requiring visual matching, spatial abiUties and a canceUation task designed to measure visual inattention. There was no significant relation between dressing and written copying tasks.

4.11 RELATION BETWEEN SENSORY ASSESSMENT SUBTESTS AND OVERALL DRESSING SCORE

To investigate the relationship between dressing abiUty and sensation, each subtest of the sensory assessment was cortelated with the overaU dressing score usmg the Spearman Rank Correlation Coefficient. Results indicated a significant correlation for

six of the ten subtests (Table 10). Kinaesthetic sensation was related to dressing abiUty but Ught touch, temperature, pain and pressure were not.

CHAPTER 5

DISCUSSION

5.1 INTRODUCTION

The discussion has been divided into four sections: the limitations of methods used, the discussion of the results, the impUcations for occupational therapists, and suggestions for future research.

5.2 LIMITATIONS OF METHODS

The results of any study are only vaUd in proportion to the adequacy of the methods used (Luker, 1986). In this section the vaUdity of the methods used in the study will be examined and their weaknesses unearthed.

5.2.1 VALIDITY OF TOOLS

The term vaUdity is often used in relation to tests and other tools of measurement. The Collins dictionary definition of vaUdity is 'weU grounded on principles; sound'. It is therefore the degree to which an instrument measures what it purports to measure. It is a complex concept which is related to the relevance, completeness and accuracy of the information produced by the measuring tool (Bennett and Ritchie, 1975).

There are various aspects of vaUdity including face, construct, content, predictive and concurtent but it is generaUy acknowledged that face and content vaUdity are preferable for use in the social sciences (Fox, 1982).

In this dressing study, the degree of subjectivity involved in the identification of dressing difficulties leaves the vaUdity of the results open to question. However the

dressing assessment was developed after extensive reviews of the existing literature, consultations with colleagues and patients, and acting on the weaknesses observed in the pilot study. It can therefore be argued that this assessment has a high degree of face and content validity. The validity of the other assessments administered have been discussed in Chapter 1.

5.2.2 SINGLE DATA COLLECTOR

Observations were undertaken by the same researcher. This may have introduced the possibility of bias over the four assessments of dressing if the researcher could recall previous difficulties in donning certain garments. As, however, the inter-rater reliability of the dressing assessment at this point in the study, was not yet established, a single observer was felt to be necessary to assess the consistency of dressing abilities.

To help overcome the possibility of bias, the dressing assessment followed an exact format with set guidelines to discourage subjectivity.

5.2.3 SCOPE OF THE DATA COLLECTION

A considerable amount of information was collected during the assessment period and it is possible that relevant information was missed. To the best of the author's knowledge all areas deemed to have an influence on the ability to dress oneself were included, thus compiling a lengthy battery of physical, perceptual and cognitive assessments.

5.2.4 SAMPLE OF PATIENTS

The means by which the sample of patients was selected was discussed in Chapter 3. It may be argued that the selection of patients from a specialist unit is not a

representative sample of the stroke population.

The phUosophy of the Stroke Unit at the time of conducting the study was to admit patients who were neither 'too good' or 'too bad' and who were considered by the consultant to have the potential to improve with intensive rehabiUtation. GeneraUy, patients who have little deficit following stroke do not need the expertise from a highly speciaUsed unit. That is supported by Andrews et al (1981) who state 'those with mUd or moderate disabihty will probably make a good recovery wherever they are treated'. Whereas Blower and AU (1979) concluded from a review of the hterature that evidence from stroke units suggest that it is the severely, as opposed to the profoundly, disabled who benefit the most from specialist units.

The main reason in not recruiting patients from the general medical wards was that due to pressure for beds, patients are discharged very quickly and often with Uttle warning. In contrast the stroke unit provided patients with residual problems and as the average length of stay on the ward was three months, patients were unlikely to be discharged soon after admission.

5.2.5 STATISTICS

When a large number of tests for associations between variables are conducted on one set of data it is possible that statisticaUy significant results may occur by chance. In this study, because of the breadth of the data coUection, many such procedures were used. The possibiUty that some results were significant by chance must be considered when interpreting the results, particularly when addressing the results of the Spearman's Rank Test of Cortelation.

5.3 DISCUSSION OF RESULTS

The frequency of problems in dressing for men and women (Tables 4 and 5)

illustrate simUar difficult components. These include pulling pants up, puUing trousers up, putting shoe on the affected foot and lacing shoes - aU items worn on the lower half of the body. In order of difficulties experienced, it would then generaUy appear from the 60 patients observed, that putting the affected side into the garments was next difficult, foUowed by putting the non-affected side in, and least difficuh was putting garments over the head. Although it is difficuh to generaUse between male and female clothing, this would seem to be the order of problems experienced by both male and female patients.

The main difficulty in the interpretation of the frequency of problems for female patients is that very few patients wore the same combination of garments. For example, only seven of the 23 women chose to wear a bra and on further investigation these patients were generaUy less handicapped. This may account for putting non-affected arm into bra and pulUng it over the head as the easiest items in the dressing process. Cart (1987) observed 'that few elderly women wear bras and suggested the reason for this was not Uberation, but the difficulty encountered when trying to put one on, due to a complex fastening requiring strength and dexterity'. It is with reference to the smaU numbers of female patients wearing the same items of clothing that care must be taken when drawing conclusions from the study data.

From the comments section of the dressing assessment one could observe the difficulties experienced in the fastening of garments. It is of note that 14 of the 37 men who had difficulty in fastening their trouser cUp, could not do so due to an obese abdomen. However, it was not recorded if they could fasten their trouser cUp before their stroke.

The age and sex of a patient did not have any relation to the abiUty to dress, thus confirming the findings of Warten (1981). Dressing problems over the four assessments for both male and female patients was very highly significantly cortelated between each assessment. This would suggest that the order of problems iUustrated in Tables 4 and

5 are consistently experienced by male and female patients within two weeks of admission to the Nottingham Stroke Unit. However, to ascertain if this order of problems still exists outwith this period, further data coUection would be required.

When the overaU dressing score was correlated with the physical and cogiUtive assessments, dressing as a global skill was most significantly cortelated with the physical abiUties of stroke patients. This confirms the observation by MuUey (1985) who states 'in practice, dressing difficulty is usuaUy because of physical difficulties - or lack of confidence.' This would appear to be true of patients who have difficulty putting garments on the lower half of their body, but patients experiencing difficulties with garments of the upper half of the body appear to have a higher incidence of perceptual difficulties. The latter significant cortelation is supported by the works of WiUiams (1967), Bach et al (1971) and Warren (1981). However further analysis of the correlations between perceptual tasks and dressing abUity (Table 9) demonstrated tasks requiring visual matching, spatial abiUties and a canceUation task designed to measure visual inattention were more significant, whereas there was no significant relation between dressing and written copying tasks, which is in direct contrast to results reported by others (WiUiams, 1967; Warten, 1981). This contrast in results may be due to the fact that the written copying task in the Rivermead Perceptual Assessment Battery is a timed task coming towards the end of a lengthy battery. Patients also rarely complete this task in the aUotted time, thus scoring poorly.

The Frenchay Aphasia Screening Test was significantly cortelated with dressing performance at the 5% level of significance. Some caution must be used when interpreting this result. It may be that this significant cortelation has arisen by chance. The reason for this possibiUty has previously been discussed in Chapter 5.2.5. The author's suggestion that this may be a chance finding is based on further analysis of the stages of dressing with the Frenchay Aphasia Screening Test. It is significantly cortelated with only the lacing of shoes (Table 8). No other significant cortelations were noted.

Dressing apraxia is often quoted when discussing problems encountered by stroke patients. It is therefore surprising that apraxia as defined by Hecaen (1981) was not sigrůficantly correlated with overaU ṁdependence in dressing or with any of the individual stages of dressing. Indeed 25% of patients included in the study were identified as having significant apraxic difficulties.

The term apraxia was first used by Steinthal in 1871, but more recently De Ajunaguerta and Hacaen ṁ 1960 have added to the understandṁg of this area. Apraxia is described by Hecaen as 'an impairment of the abiUty to carry out purposeful movement by an ṁdividual who has normal primary motor skiUs, that is, strength, reflexes and co-ordination, and has no marked sensory or inteUectual disturbances'.

Many types of apraxia have been described over the years including ideomotor, ideational, constructional and dressing. Beaumont (1983) however reports that these terms are not used consistently, and the existence of some of the specific forms is hotly contested.

Dressing apraxia is a particular deficit in putting on clothes. The order in which a patient puts on their clothes may be wrong, garments may be put on inside out or may even try to put their pants over their head. In its mUd form patients may dress eventuaUy but only after a series of fruitless attempts and after long reflection. In marked cases, however, patients may be unable to even start dressing themselves. MiUer (1986) states 'dressing is a lengthy, hit-and-miss affair. Patients may stumble upon the correct procedure, and surprise themselves in the process, but then be unable to repeat the success'.

The reported incidence of dressing apraxia varies between studies. Hacaen (1962) reported that in a large study of patients with cortical brain damage, 4% of patients with left hemisphere lesions and 21% with right sided damage showed dressing apraxia. Wade et al (1985) states that regardless of which hemisphere is involved, dressing apraxia is often associated with constructional apraxia. This is endorsed by Hacaen and Albert

(1978) who also add that dressing apraxia is much less frequent than constructional apraxia (in a ratio of 1:4). Piercy (1964), however, suggests that this ratio is the result of the 'order of fragiUty' of two activities, in this case dressing abiUty being more resistant to disrupting influences than constructional activities.

Poeck (1969), however, denies this dressing problem the independent status of apraxia. He claims the problem results from one of several underlying symptoms, including ideomotor apraxia, spatial disorientation or neglect of one side. This view is echoed by MiUer (1986) who states that dressing apraxia is not a specific unitary disorder, but that it is one manifestation, among many, of other underlying dysfunctions.

It appears, therefore, that there is much conflict in describing the components of apraxia. In a review of **apraxia,** Concha (1987) confirms this uncertainty in definition by stating 'it is easier to say what an apraxia is not than to say what it **is'.**

Investigating the relationship between dressing abiUty and sensation indicated a significant correlation for six of the ten subtests admiiistered; kinaesthetic sensation was related to dressing abiUty but Ught touch, temperature, pain an pressure were not. It seems then, that whUe it is particularly important in dressing for patients to know where their Umbs are in space, their abiUty to **feel** the garment is less important.

5.4 IMPLICATIONS OF THE FINDINGS FOR OCCUPATIONAL THERAPISTS

The Nottingham Stroke Dressing Assessment, as described in Chapter 2, was useful in identifying problem areas in the dressing process. It would appear from the frequency of problems that certain items of clothing are easier to put on than others. This is perhaps a relevant observation for female patients as they have a wider range of clothes available to them. Therefore, whUe it may not be acceptable for occupational therapists to suggest to men that it would be easier to wear a skirt, for women who have difficulty in puttmg on trousers or a dress it may provide a successful alternative.

Similarly, advice on fastenings could make dressing easier for some patients.

From the comments section of the dressing assessment it would suggest the use of elastic waist-bands in trousers and skirts, velcro fastenings, use of elastic thread in cuff buttons or indeed no fastenings at all would be of great benefit to stroke patients.

When analyzing the effect of cognitive, perceptual and physical problems in relation to dressing ability it appears that difficulty with garments on the upper half of the body is more closely associated with perceptual abilities and that difficulty with garments on the lower half is more closely associated with physical abilities. The former would suggest the need for further treatment in perceptual tasks. It is of note that Andrews in 1984 documented from a study of 203 occupational therapy departments throughout the United Kingdom, that 23% did no work at all on the assessment and treatment of perceptual disorders. However, despite many occupational therapists attempting to treat perceptual problems directly, results of some studies have failed to show any beneficial effect of practice on perceptual tasks (Edmans and Lincoln, 1989; Robertson et al, 1991).

Others believe retraining of perceptual deficits can influence recovery. Diller and Weinberg (1977) illustrated significant improvements on visual inattention tasks by using a scanning machine. This apparatus is 78" long and 8" wide and is studded with two rows of ten coloured lights. The activation of each light is controlled by a separate button whereupon the 'trainer' can activate the lights singly, in pairs, or in any desired sequence. The patient sits facing the target light situated in the middle of the board and is required to point to it as it travels around the board. The training was augmented by using the two rows of coloured lights and having the patient turn and call out the number of lights that are on. Patients with right-sided brain damage due to CVA were trained for one hour each day for a one month period. Diller and Weinberg (1977) concluded that the treated groups improved more on visual inattention tasks than the controls receiving only traditional occupational therapy for hand eye skills. They also state it is possible to train patients with hemi-inattention to improve their performance on reading, copying and

written arithmetic; to improve their performance on tasks of spatial locaUsation and spatial relations; and to improve interpersonal gaze. However, although the authors suggest that it has some effect, they do not document if this success in retraining of perceptual difficulties generalises to activities of daUy Uving or indeed dressing abiUty.

Towle, Edmans and Lincoln (1990) evaluated the effect of treatment gained from attendance at a 'perception group'. This group consisted of patients who had been identified on the Rivermead Perceptual Assessment Battery as having visuospatial problems. The group consisted of three to five patients, practising perceptual tasks under the supervision of two therapists. An A-B-A design was used to evaluate treatment. Patients were assessed weekly on the Rey complex figure copying (Rey, 1959), letter canceUation (Whiting et al, 1985) and the Rivermead Perceptual Assessment Battery cube copying task) Whiting et al, 1985). The authors concluded that 'although training patients in a group is a way of making more effective used of therapists time and seems to be beneficial for some patients, it is stiU very expensive for the gains achieved .... improvements were fairly minimal .... The effect of these improvements on functional daily Ufe skills was not formaUy evaluated but no clinicaUy obvious changes occurred'. The findings of Towle, Edmans and Lincoln (1990) endorse the results of intensive case studies by Lawson (1962) and Luria (1972) who concluded training techniques appear to yield a meagre payoff for a great deal of effort.

If perceptual practice does not greatly improve perceptual abiUties or has no carry over into activities of daUy Uving then there is unlikely to be any effect on dressing skills. It would therefore seem more appropriate that dressing difficulties were treated directly by repetition and implementation of strategies to overcome perceptual difficulties.

Dressing problems with lower garments were associated with difficulties with mobiUty. Therefore further treatment to improve general mobiUty, such as remedial activities to improve sitting balance, weight transference and overcoming the fear of falling while bending down, may help to improve the patient's abiUty to dress their lower

half.

The major impUcation from the findings of this observational study is the need for further research into this Uttle known area. This would clarify what techniques are best used to overcome dressing difficulties and would therefore complement a more effective and time efficient occupational therapy service.

5.5 SUGGESTIONS FOR FUTURE RESEARCH

'There is an increasing pressure on therapists to evaluate their practice more efficiently by becoming involved in research' (Partridge and Bamitt, 1986). The foUowing recommendations for further research were noted by the author during the investigation of dressing after stroke.

5.5.1 INVESTIGATION OF CURRENT PRACTICE

Although certain dressing procedures are used routinely by occupational therapists they have not been systematicaUy documented on the basis of the problem identified or the cognitive and physical deficits. Therapists teach patients to put affected limbs into garments first and to use dressing aids, and they also give advice on the suitabiUty of garments. Various techniques to overcome perceptual difficulties are also used, such as coloured thread to mark armholes, the use of tabs to indicate back/front or inside/outside and coloured thread to cortectly aUgn buttons to button holes. These techniques are used only if the therapist is aware of them and are often used only as a last resort.

Further research is required to investigate the strategies used to overcome dressing problems so that patients need not undergo lengthy trial and error procedures.

5.5.2 TIMING OF DRESSING PRACTICE

There is some debate over the most appropriate time to commence dressing practice. Some therapists feel treatment should start when the patient is medically stable whUe others beUeve it is detrimental to start before sitting balance has been established. Although it would appear that patients benefit from dressing practice whUe in hospital, it may be that patients are more receptive to treatment after discharge from hospital when their personal aims of independence in waUdng and discharge to home have been achieved. It is at this time that the extent of the patient's disabiUties become more obvious to the carer. Such research, documenting the effects of intensive dressing practice at six months post discharge from hospital is curtently being investigated at the Nottingham Stroke Research Unit.

Further detaUed investigation into dressing may result in a code of practice thus giving therapists 'tried and tested' guidelines.

5.5.3 NEED FOR TREATMENT AFTER DISCHARGE

When patients are admitted to a busy general medical ward they are often seen by a therapist for dressing on only one or two occasions. Once patients are medicaUy stable they are either moved to a ward for the health care of the elderly for slow stream rehabiUtation or discharged home. FoUow up care for patients requiring occupational therapy has long been 'a bone of contention'. Patients are commonly referted on discharge to the domiciUary occupational therapist for necessary aids and appUances. After these aids have been suppUed the patient rarely receives further support from the occupational therapy service. This is not because therapists feel the patient would no longer benefit from treatment but because staff shortages make further treatment physicaUy impossible. It is also possible that many stroke patients sUp through the net while in hospital and receive no occupational therapy at aU.

The literature suggests that there is a wide time range for optimal recovery. McDowel and Louis (1971) state there is little recovery after three months, Hewer (1976) states four months, while CarroU (1962), Adams and McComb (1953), Hurwitz and Adams (1972) and Andrews, Brocklehurst, Richards and Laycock (1981) aU have reported recovery after six months.

Surely then, evaluation of the benefits derived from aU aspects of occupational therapy must be investigated in stroke patients after discharge from hospital.

CONCLUSION

In the absence of a standardised assessment, the Nottingham Stroke Dressing Assessment was developed to identify problem areas in releaming to dress foUowing a stroke.

Problems were simUar for men and women, with the order of difficulty in dressing consistent over the assessment period. Pulling up pants, pulling up trousers, putting shoe on the affected foot and lacing shoes were the most frequently affected components of the dressing process.

The age and sex of the patient or side of stroke was not significantly associated with dressing abiUty.

The relationship between the overaU dressing score of the Nottingham Stroke Dressing Assessment and other physical, perceptual and cognitive assessments was examined. There were significant cortelations between dressing abiUty and activities of daUy Uvmg, gross function, arm, leg and trunk function, hand eye co-ordination, language, non-verbal inteUigence, perception and sensation. However, no significant cortelation was found between dressing abiUty and memory, premorbid IQ, apraxia and reasoning abUity.

The relation between the stages of dressing with the physical, perceptual and cognitive assessments was then investigated. GeneraUy the items worn on the lower half of the body were significantly correlated with the physical assessments and the items worn on the upper half of the body were significantly correlated with the perceptual and cognitive assessments.

In conclusion, the problems that influence dressing performance vary according to the items of clothing worn, but dressing as a global skiU has been demonstrated to be heavUy dependent on the physical abiUties of the stroke patient.

REFERENCES

Acheson, R.M. and WiUiams, D.D.R. (1980) Epidemiology of cerebrovascular disease: some unanswered questions. In Clinical Neuroepidemiology (Ed. F.C. Rose), pp. 88-104. Pitman Medical, London.

Adams, C.F. and McComb, S.G. (1953) Assessment and prognosis in hemiplegia. Lancet; 2: 266-9.

Adams, S. (1987) The relationship of clothing to self-esteem in elderly patients. Nursing Times, September 9; 83(36): 42-45.

Aho, K., Hannsen, P., Hatano, S., Marquardsen, J., Smimov, V.E. and Strasser, T. (1980) Cerebrovascular disease in the community: Results of a WHO coUaborative study. BuUetin of the World Health Organisation; 58: 113-130.

Ajuriaguerra, J.D., Hecaen, H. and Angelergues, R. (1960) Les Apraxies. Varietes cUniques et lateralisation lesionneUe. Revue Neurologique; 102: 566-594.

Andrews, K. (1987) RehabUitation of the older adult. Edward Arnold, London.

Andrews, K., Brocklehurst, J.C, Richards, B. and Laycock, P.J. (1981) The rate and recovery from stroke and its measurement. International RehabiUtation Medicine; 3: 151-161.

Andrews, K., Brocklehurst, J.C, Richards, B. and Laycock, P.J. (1982) The recovery of the severely disabled stroke patient. Rheumatology and RehabiUtation; 21: 225-30.

Andrews, K. (1984) What would occupational therapists do if they had more staff? International RehabiUtation Medicine; 7: 137-139.

Arnold, E.J. Limited. What's in a Square? Lockwood Distribution Centre, Leeds.

Bach, P., Tracy, H.W. and Huston, J. (1971) The use of the self-portrait method in the evaluation of hemiplegic patients. Southern Medical Journal; 64(12): 1475-1480.

Bamford, J., Sandercock, P., Warlow, C. and Gray, M. (1986) Why are patients with acute stroke admitted to hospital? British Medical Journal: 292: 1369-72.

Beaumont, J.G. (1983) Introduction to Neuropsychology. BlackweU Scientific PubUcations. Oxford.

Benjamin, J. (1976) The Northwick Park ADL Index. British Journal of Occupational Therapy; 39: 301-306.

Bennett, A.E. and Ritchie, K, (1975) Questionnaires in Medicine. Oxford University Press, London.

Benton, A.L. (1974) The Revised Visual Retention Test. Psychological Corporation, New York.

Bjomby, E.R. and Reinvang, I.R. (1985) Acquiring and maintaining self-care skills after stroke: the predictive value of apraxia. Scandinavian Journal of RehabiUtation Medicine; 17: 75-80.

Blower, P. and AU, S. (1979) A stroke unit in a general hospital: the Greenwich experience, British Medical Joumal; 2: 644-649.

Bobath, B. (1978) Adult Hemiplegia: Evaluation and Treatment. Heinemann Medical Books, London.

British Geriatric Society and Royal CoUege of Nursing (1975) Improving Geriatric Care in Hospital. London: Royal College of Nursing.

Brooks, N. and Lincoln, N.B. (1984) Clinical Management of Memory Problems: Assessment for RehabiUtation. Croom Helm, London.

Carr, E. (1987) Clothing: a comfort or a catastrophe? Geriatric Nursing and Home Care; October: 11-12.

Carroll, D. (1962) The disabUity in hemiplegia caused by cerebrovascular disease: serial study of 98 cases. Joumal of Chronic Disease; 15: 179-179.

Concha, M.E. (1987) A Review of Apraxia. British Joumal of Occupational Therapy; July: 222-226.

David, R.M. and Skilbeck, C.E. (1984) Ravens IQ and language recovery foUowing stroke. Joumal Clinical Neuropsychology; 6(3): 302-308.

DHSS (1972) Minimum Standards or Care in Geriatric Hospitals and Departments. London: HMSO.

Dick, J.P.R., GuUoff, R.J., Stewart, A. et al (1984) Mini-mental state examination in neurological patients. Joumal of Neurology, Neurosurgery and Psychiatry; 47: 496-499.

DiUer, L. and Weinberg, J. (1977) Hemi-inattention in rehabiUtation: the evaluation of a rational remediation program. Advances in Neurology, Vol.18, Raven Press, New York.

Ebrahim, S. (1990) Clinical Epidemiology of Stroke. Oxford University Press, Oxford.

Ebrahim, S. and Nouri, F.M. (1987) Caring for stroke patients at home. International RehabiUtation Medicine; 8: 171-173.

Edmans, J.E. and Lincoln, N.B. (1987) The frequency of perceptual deficits after stroke. Joumal of Chnical RehabUitation; 1: 273-281.

Edmans, J.E. and Lincohi, N.B. (1989) Treatment of visual perceptual deficits after stroke: four single case studies. Intemational DisabiUty Studies; 11: 25-33,

Enderby, P.M., Wood, V.A., Wade, D.T. and Langton-Hewer, R. (1987) The Frenchay Aphasia Screening Test: a short, simple test for aphasia appropriate for non-specialists. Intemational RehabUitation Medicine; 8: 166-170.

Fleiss, J.L. (1981) The measurement of inter-rater agreement in: Statistical Methods for Rates and Proportions. John WUey and Sons: New York.

Fox, D.J. (1982) Fundamentals of research in nursing. Appleton-Century Crofts, Norwalk, Connecticut (4th edition).

Fugl-Meyer, A.R. and Jaasko, E. (1980) Post stroke hemiplegia and ADL performance. Scandinavian Joumal of RehabiUtation Medical Supplement; 7: 140-152.

Garraway, W.M., Whisnant, J.P. and Drury, I. (1983) The changing pattem of survival foUowing stroke. Stroke; 14: 699-703.

Garraway, W.M., Whisnant, J.P., Furlan, A.J., PhilUps II, L.M., Kurland, L.T. and O'FaUon, W.M. (1979) The declining incidence of stroke. New England Joumal of Medicine; 300: 449-452.

Goldstein, F.C. and Levin, H.S. (1987) Disorders of reasoning and problem-solving abiUty. Neuro-psychological RehabiUtation. ChurchiU-Livingston.

Gresham, G.E., PhUUps, T.F. and Labi, M.L.C. (1980) A.D.L. Status in Stroke: Relative Merits of Three Standard Indexes. Archives of Physical Medicine and RehabiUtation; 61: 355-358.

Hecaen, H. (1962) Clmical symptomatology in right and left hemisphere lesions. In Interhemisphere Relations and Cerebral Dominance (Ed. V.B. Mountcastle), John Hopkins University Press, Baltimore.

Hecaen, H. (1981) The Handbook of Clinical Neuro-psychology. John WUey & Sons: New York.

Hecaen, H. and Albert, M.L. (1978) Human Neuro-psychology. Interscience, John WUey & Sons: New York.

Hewer, R.L. (1976) Stroke rehabiUtation. In: Stroke (Eds: F. Gillingham, C. Mawdsley and A.E. WiUiams) Churchill Livingston, London.

Hurwitz, L.J. and Adams, G.F. (1972) RehabiUtation of hemiplegia: indices, assessment and prognosis. British Medical Joumal; 1: 94-98.

Isaacs, B. (1983) Understanding Stroke Illness. Chest, Heart and Stroke Association, London.

Katz, S., Ford, A.B., Moskowitz, R.W., Jackson, B.A. and Jaffe, M.W. (1963) Studies of Ulness im the aged. The index of A.D.L.: a standardised measure of biological and psychosocial function. Joumal of American Medical Association; 185: 914-919.

Kertesz, A. (1982) The Westem Aphasia Battery. Gmne and Stratton: New York.

Kertesz, A. and McCabe, P. (1977) Recovery patterns and prognosis in aphasia. Brain; 100: 1-18.

Kenny Self Care Evaluation (1965) Schoening, H.A., Anderegg, L., Bergstrom, D., Fonda, M., Steimke, N. and Uhich, P. Archives of Physical Medicine im Rehabilitation; 46: 689-697.

Kings Fund Forum Consensus Statement (1988) Treatment of stroke. British Medical Joumal; 297: 126-128.

KinseUa, G. and Ford, B, (1985) Hemi-mattention and the recovery pattems of stroke patients, Intemational RehabiUtation Medicine; 7: 102-106,

Koerth, W, (1922) A pursuit apparatus: eye hand co-ordination. Psychological Monographs; 31(1): 288-292.

Lawston, I.R. (1962) Visual-spatial neglect im lesions of the right cerebral hemisphere: a study in recovery. Neurology; 12: 28-33.

Lezak, M.D. (1976) Neuropsychological Assessment. Oxford University Press: New York.

Lincoln, N.B. and Leadbitter, D. (1976) Assessment of motor function in stroke patients. Physiotherapy; 65(2): 48-51.

Lincoln, N.B. et al. The unreliability of sensory assessments. Clinical RehabiUtation (In Press).

Luker, K. (1986) Who's for research? Nursing Tunes; 82, 31 December: 55.

Luria, A.R. (1972) The Man with a Shattered World. Basic Books: New York.

Mahoney, F.I. and Barthel, D.W. (1965) Functional evaluation: The Barthel Index. Maryland State Medical Joumal; 14: 61-65.

McDowel, F. and Louis, S. (1971) Improvement in motor performance in paretic and paralysed extremities following non-emboUc cerebral infarction. Stroke; 2: 395-399.

Miller, N, (1986) Dyspraxia and its Management, Croom Helm: London,

MuUey, G.P. (1985) Practical Management of Stroke. Croom HeUn: London.

Nelson, H.E. and Warrington, E.K. (1983) The National AduU Reading Test. NFER-Nelson: Windsor.

Nelson, H.E. (1976) A modified Card Sorting Test sensitive to frontal lobe defects. Cortex; 12: 313-324.

Nottingham Stroke Research Booklet (1991) General Hospital, Nottingham.

Oxfordshire Community Stroke Project (1983) Incidence of stroke in Oxfordshire: first year's experience of a community stroke register. British Medical Joumal; 287: 713-717.

Partridge, C. and Bamitt, R. (1986) Research Guidelines: A handbook for therapists. Heinemann Medical Books: London.

Payman, B.C., Hawthom, P.J., Newman, D. and Jewitt, P. (1988) Prevalence and characteristics of patients with stroke in Nottingham hospitals. Clinical RehabiUtation; 2: 191-198.

Piercy, M. (1964) The effects of cerebral lesions on inteUectual function: a review of curtent research trends. British Joumal of Psychiatry; 110: 310-352.

Poeck, K. (1969) 'Modem Trends in Neuropsychology', in A.L. Benton (Ed), Contributions to Clinical Neuropsychology, pp. 1-29, Aldine: Chicago.

PoweU, G.E., BaUey, S. and Clark, E. (1980) A very short version of the Minnesota Aphasia Test, British Joumal of the Society of Clinical Psychology; 19: 189-194.

Raven, J.C. (1958) Guide to using the Coloured Progressive Matrices. Lewis: London.

Reunanen, A., Aho, K., Aromaa, A. and Knekt, P. (1986) Incidence of stroke in a Finnish prospective population survey. Stroke; 17: 675-681.

Rey, A. (1959) Le test de coupie de figure complexe. Editions centre de psychologie appUque, Square Jouvenet: Paris.

Robertson, I.H., Gray, J.M., Pentland, B. and Waite, L.J. (1990) A randomised controUed trial of microcomputer-based rehabUitation for unilateral visual neglect. Archives of Physical Medicine and RehabUitation; 71: 663-668.

Siev, E. and Freishtat, B. (1976) Perceptual Dysfunction in the AduU Stroke Patient: A manual for evaluation and treatment. Charles B. Slack: New Jersey.

Smith, S. (1989) How occupational therapy staff spend their work time. British Joumal of Occupational Therapy; March, Vol.52, No,3: 82-87,

SPSSX Users Guide (1988) 3rd edition. McGraw Hill: New York.

Steinthal, H. (1871) Abriss der sprachwissenschaft. Berlin. Quoted by J.L. Signoret and P. North (1979) In: Les Apraxies GestueUes. Masson: Paris.

Thompson, S.B.N. (1987) A stochastic model of cerebrovascular accident prognosis. PhD Thesis, School of Information Science, Portsmouth Polytechnic, Portsmouth, UK.

Thompson, S.B.N. and Morgan, M. (1990) Occupational Therapy for Stroke RehabiUtation. Chapman and HaU: London.

Tinson, D.J. and Lincoln, N.B. (1987) Subjective memory impairment after stroke. Intemational DisabiUty Studies; 9: 6-9.

Towle, D., Edmans, J.A. and Limcoln, N.B. (1990) An evaluation of a group treatment programme for stroke patients with perceptual deficits. Intemational Joumal of RehabiUtation Research; 13: 328-335.

Tsai, L.J., Howe, T.H. and Lien, I.N. (1983) Visuospatial deficits in stroke patients and their relationship to dressing performance. Joumal of the Formosan Medical Association; 82: 353-359.

Wade, D.T., Hewer, R.L., Skilbeck, C.E. and David, R.M. (1985) Stroke: A Critical Approach to Diagnosis, Treatment and Management. Chapman and HaU: London.

Wade, D,T,, Langton-Hewer, R., SkUbeck, C.E., Bainton, D. and Bums-Cox, C. (1985) ControUed trial of a home-care service for acute stroke patients. The Lancet; February 9: 323-326.

Wade, D.T., Parker, V. and Langton-Hewer, R. (1986) Memory disturbance after stroke: frequency and associated losses, Intemational RehabiUtation Medicine; 8(2): 60-64.

Warren, M. (1981) Relation of constructional apraxia and body scheme disorders to dressing performance in adult CVA. American Joumal of Occupational Therapy; 35: 431-437.

Warrington, E.K. (1984) Recognition Memory Test. NFER-Nelson: Windsor.

Wechsler, D. (1945) A standardised memory scale for clinical use. Journal of Psychology; 19: 87-95.

Wechsler, D. (1955) Wechsler Aduh InteUigence Scale. Psychological Corporation: New York.

Whiting, S.E. and Lincoln, N.B. (1980) An ADL assessment for stroke patients. British Joumal of Occupational Therapy; 2: 44-46.

Whitmg, S.E., Lincoln, N.B., Cockbum, J. and Bhavnani, G. (1985) The Rivermead Perceptual Assessment Battery. NFER-Nelson: Windsor.

WUUams, H.G.A., Johnston, M., WUUs, L.A. and Bennett, A.E. (1976) DisabUity A model and measurement technique. British Joumal of Preventative Social Medicine; 30(2): 71-78.

WUUams, N. (1967) Correlation between copying abiUty and dressing activities in hemiplegia. American Joumal of Physical Medicine; 46: 1332-1340.

Young, D.W. (1971) Assessment of questions and questionnaires. Methods of Information in Medicine; 10: 222.

TABLE 1 COMPARISON OF HEMS INCLUDED IN VARIOUS ADL SCALES

HEM	BARTHEL	NORTHWICK PARK	KATZ	KENNY	RIVERMEAD
Dressing	+	+	+	+	.
Undress	-	.	.	.	+
Dress	-	-	-	.	+

(+ = included)

(Ebrahim, 1990)

TABLE 2 INTER-RATER RELIABILITY

	K	Level of Agreement
Pants affected leg	.87	ExceUent
Pants non affected leg	.63	Good
Pants puU up	1.00	Excellent
Vest affected arm	.90	ExceUent
Vest non affected arm	.89	ExceUent
Vest over head	.86	ExceUent
Vest puU down	1.00	ExceUent
Sock etc over affected toes	1.00	Excellent
Sock etc over non affected toes	1.00	ExceUent
PuU sock up affected leg	1.00	ExceUent
PuU sock up non affected leg	1.00	ExceUent
Shirt/blouse affected arm	1.00	ExceUent
Shirt/blouse non affected arm	1.00	ExceUent
Shirt across back	1.00	ExceUent
Shirt/blouse puU down	1.00	ExceUent
Trousers affected leg	.90	ExceUent
Trousers non affected leg	1.00	ExceUent
Trousers puU up	1.00	ExceUent
Dress affected arm	1.00	ExceUent
Dress non affected arm	1.00	ExceUent
Dress over head	1.00	ExceUent
Dress puU down	1.00	ExceUent
Jumper affected arm	1.00	ExceUent
Jumper non affected arm	1.00	ExceUent
Jumper over head	1.00	ExceUent
Jumper puU down	1.00	ExceUent
Bra affected arm	1.00	ExceUent
Bra non affected arm	1.00	ExceUent
Bra over head	1.00	ExceUent
Bra puU down	.50	Fair
Bra puU up to shoulders	1.00	ExceUent
Shoe affected foot	1.00	ExceUent
Shoe non affected foot	.50	Fair
Cross affected leg over non affected	1.00	ExceUent
Cross non affected leg over affected	1.00	ExceUent
Reach affected foot	.70	ExceUent
Reach non affected foot	.42	Fan:
Standing (static)	1.00	ExceUent
Standing (dynamic)	1.00	ExceUent
Sequencing	1.00	ExceUent
Adjustment	.13	Poor

K = Kappa coefficient of agreement

TABLE 3 INITIAL VALUES OF PHYSICAL, PERCEPTUAL AND COGNITIVE ASSESSMENTS

	Range	Mean	S.D.
Dressing	0-100	59.52	24.15
Activities of daUy Uving	0-16	5.83	2.46
Gross function	0-10	2.86	2.25
Leg and tmnk	0-10	2.77	2.55
Arm	0-14	2.13	3.49
Pursuit rotor	0-84	40.68	23.85
Coloured progressive matrices	0-33	17.74	7.99
Frenchay Aphasia Screening Test	0-30	18.31	10.07
Rivermead Perceptual Assessment Battery	0-303	166	80.88
Sensation	0-89	42.88	35.10
Logical Memory Immediate RecaU	2-15	8.25	3.06
Half hour delay	0-13	6.44	3.50
Recognition - Faces	20-45	32.97	5.72
Recognition - Words	20-49	39.39	7.19
National Aduh Reading Test	2-47	28.18	11.43
Apraxia	5-60	50.30	13.09
Reasoning abUity	0-32	27.60	7.67

TABLE 4 FREQUENCY OF INDEPENDENCE - MALE DRESSING ASSESSMENT

	n	Assessment 1	2	3	4
		%	%	%	%
Trousers puU up	37	19	24	30	30
Shoe affected foot	37	19	19	31	28
Lacing shoes - affected foot	24	23	25	28	32
Lacing shoes - non-affected foot	24	23	25	28	32
Pants puU up	37	24	22	35	38
Dynamic standing	37	24	24	27	24
Socks over affected toes	37	27	30	38	43
Static standing	37	30	35	35	32
Trousers affected leg	37	32	43	57	51
Vest affected arm	25	33	44	60	64
Cardigan affected arm	5	33	20	20	20
Cardigan across back	5	33	20	60	40
Cardigan puU down	5	33	80	60	80
Jumper affected arm	13	40	46	58	62
Socks puU up affected leg	37	46	43	57	51
Socks over non-affected toes	36	50	50	58	64
Pants affected leg	37	54	65	76	70
Shirt affected arm	31	59	65	67	66
Socks puU up non-affected leg	36	61	61	80	75
Shirt across back	31	62	58	79	66
Cross affected leg over	37	65	73	76	76
Cardigan non-affected arm	5	67	80	80	80
Shirt puU down	31	72	90	70	86
Jumper puU down	13	73	68	50	77
Vest puU down	25	75	72	76	76
Pants non-affected leg	37	78	78	89	87
Vest non-affected arm	25	79	80	84	84
Jumper non-affected arm	13	80	77	83	85
Shoe non-affected foot	36	81	78	81	84
Shirt non-affected arm	31	83	94	93	97
Cross non-affected leg over	37	84	87	89	87
Trousers non-affected leg	37	87	78	81	84
Vest over head	25	88	88	84	80
Reach affected foot	37	89	95	92	89
Reach non-affected foot	37	95	97	95	95
Jumper over head	13	100	100	100	100

n = number of patients to which appUcable

TABLE 5 FREQUENCY OF **INDEPENDENCE - FEMALE** DRESSING ASSESSMENT

	n	Assessment 1	2	3	4
		%	%	%	%
Lacing shoes - affected foot	10	30	33	42	42
Lacing shoes - non-affected foot	12	30	33	42	42
Trousers puU up	9	33	56	56	44
Shoe affected foot	23	33	35	22	35
Blouse across back	2	34	50	34	34
Dynamic standing	23	35	39	44	52
Skirt puU up	2	37	37	50	37
Static **standing**	23	39	52	61	61
Pants puU up	23	39	44	44	35
Cardigan affected arm	5	40	40	50	75
Cardigan across back	5	40	40	50	50
Cardigan puU down	5	40	50	75	100
Vest affected arm	7	43	71	57	43
Trousers affected leg	9	44	44	56	56
Stockings/socks over affected toes	19	45	42	45	50
Skirt anected leg	2	50	50	50	50
Skirt non-affected leg	2	50	100	100	50
Stockings/socks pull up affected leg	19	50	47	45	55
SUp affected arm	8	50	75	75	75
Trousers non-affected leg	9	51	56	56	67
Bra puU down	7	55	70	82	80
Stockmgs/socks over non-affected toes	19	55	68	70	70
Vest puU down	7	57	57	71	71
Cardigan non-affected arm	5	60	60	75	100
Stockmgs/socks puU up non-affected leg	19	61	68	70	70
Pants affected leg	23	61	65	65	65
Pants non-affected leg	23	61	83	70	70
Dress affected arm	10	66	70	78	78
Dress over head	10	66	70	78	100
Blouse puU down	2	67	100	67	100
Blouse affected arm	2	67	100	67	67
Blouse non-affected arm	2	67	100	100	100
Skirt affected arm	2	67	100	67	100
Bra puU up to shoulders	4	70	78	78	90
Cross affected leg over	23	74	74	70	74
Reach affected foot	23	74	74	74	70
SUp puU down	8	75	77	100	88
Dress non-affected arm	10	78	80	89	100
Jumper affected arm	12	82	83	90	100
Reach non-affected foot	23	83	87	87	78
Shoe non-affected foot	23	83	78	78	74
Bra affected arm	7	85	100	92	100
Vest non-affected arm	7	86	71	100	100
Vest over head	7	86	86	100	100
SUp non-affected arm	8	88	88	88	75
SUp over head	8	88	88	100	100
Dress puU down	10	89	80	89	100
Cross non-affected leg over	23	91	91	83	83
Jumper non-affected arm	12	91	82	90	100
Jumper over head	12	91	91	100	100
Jumper puU down	12	91	80	80	82
Bra non-affected arm	7	100	100	100	100
Bra over head	3	100	100	100	100
Skirt non-affected arm	2	100	100	67	100
Skirt over head	2	100	100	100	100
Skirt puU down	2	100	100	67	67

n = nmnber of patients to which applicable

TABLE 6 CONSISTENCY OF DRESSING PROBLEMS

Male Patients	r_s	df	p
Assessment			
1 with 2	0.96	29	<0.001
1 with 3	0.93	29	<0.001
1 with 4	0.93	29	<0.001
2 with 3	0.91	29	<0.001
2 with 4	0.95	29	<0.001
3 with 4	0.94	29	<0.001
Female Patients			
Assessment			
1 with 2	0.80	33	<0.001
1 with 3	0.89	33	<0.001
1 with 4	0.87	33	<0.001
2 with 3	0.86	33	<0.001
2 with 4	0.80	33	<0.001
3 with 4	0.95	33	<0.001

Spearman Rank Correlation Coefficient

TABLE 7 RELATION BETWEEN PHYSICAL AND COGNITIVE ABILITIES AND OVERALL DRESSING SCORE

Abihty Assessed	r_s	p
Activities of Daily Living	0.56	***
Gross Function	0.67	***
Leg	0.56	***
Arm	0.29	*
Pursuit Rotor	0.36	**
Coloured Progressive Matrices	0.27	*
Frenchay Aphasia Screening Test	0.22	*
Rivermead Perceptual Assessment Battery		
Total Score	0.25	*
Sensory Assessment		
Total Score	0.33	*
Westem Logical Memory Scale		
Immediate recaU	0.15	NS
Half hour delay	-0.05	NS
Recognition Memory Test Faces	0.19	NS
Recognition Memory Test Words	0.21	NS
National Adult Readmg Test	0.14	NS
Apraxia	0.01	NS
What's ṁ a Square?	0.11	NS

Spearman Rank Cortelation Coefficient

Significance *** = $p<0.001$

** = $p<0.01$

* = $p<0.05$

NS = $p>0.05$

TABLE 8 RELATIONS BETWEEN STAGES OF DRESSING AND PHYSICAL AND COGNITIVE ASSESSMENTS

	Gross Function	Leg	Arm	ADL	FAST Total	CPM	ROTA	RTA Total
Pants affected leg	<.001***	<.001***	.09	<.001***	.10	.02*	<.001***	.01*
Pants non affected leg	.002**	.06	.27	<.001***	.35	.38	.001***	.03*
Pants pull up	<.001***	<.001***	.01**	.003**	.10	.03*	.28	.33
Vest affected arm	.06	.03*	.003**	.003**	.19	.05*	.03*	.09
Vest non affected arm	.38	.36	.49	.014*	.09	.35	.013**	.14
Vest over head	.03*	.15	.23	.07	.37	.10	.004***	.02*
Vest pull down	.04*	.09	.16	.02*	.43	.011	.01**	.001
Sock/stocking over affeced toes	<.001***	.004**	.34	.004**	.14	.01**	.14	.04*
Sock/stocking over non affected toes	.01**	.20	.32	.014*	.19	.016*	.16	.057
Sock/stocking pull up affected leg	<.001***	.001***	.48	.015*	.35	.07	.11	.30
Sock/stocking pull up non affected	.011*	.19	.21	.01**	.26	.04*	.18	.08
Blouse/shirt affected arm	.50	.48	.48	.05*	.38	.09	.14	.01**
Blouse/shirt affected arm	.33	.44	.22	.004**	.15	.13	.055	.009**
Blouse/shirt pull down back	.19	.35	.14	.12	.24	.02*	.25	0
Blouse/shirt pull down	.35	.18	.12	.004**	.17	.08	.015*	.002**
Trousers affected leg	<.001***	.01*	.24	.01**	.21	.12	.07	.24
Trousers non affected leg	.002**	.23	.47	.002**	.43	.23	.002**	.16
Trousers pull up	<.001***	<.001***	.62*	.03*	.23	.007**	.26	.31
Dress affected arm	.42	.16	.30	.09	.40	.22	06	.43
Dress non affected arm	.33	.14	.17	.08	.09	.23	-	.21
Dress over head	.42	.17	.69	.014*	.06	.29	.27	.02*
Dress pull down	.30	.16	.13	.10	.06	.36	.07	.05*
Jumper affected arm	.10	.08	.12	.34	.19	.001**	.39	.013*
Jumper non affected arm	.39	.47	.44	.46	.35	.31	.24	.13
Jumper over head	.05*	.14	.66	.02*	.50	.32	.07	-
Jumper pull down	.46	.43	.43	.15	.21	.13	.011*	.018*
Cardigan affected arm	.22	.09	.68	.21	.15	.45	.006**	.06
Cardigan non affected arm	.26	.45	.47	.50	.20	.45	.05*	.053
Cardigan pull down back	.34	.18	.64*	.22	.29	.50	.03*	.35
Cardigan pull down	.28	.41	.48	.24	.69	.46	.05*	.02*
Shoe affected foot	.001***	<.001***	<.001***	.001***	.69	.39	.48	.37
Shoe non affected foot	.02*	.11	.14	.014*	.68	.44	.03*	.002**
Lace shoes affected foot	<.001***	.002**	.10	.002**	.62*	.65**	.02*	.02*
Lace shoes non affected foot	<.001***	.002**	.10	.002**	.62*	.65**	.02*	.02*

TABLE 8 (continued)

	Gross Function	Leg		ADL	FIM Total	CPM	ROTA	RPE Total
Adjustment	<.001***	.045*	506	.004**	.185	<.001***	.002**	<.001
Sequencing	.485	.445	212	.060	.094	.019*	.182	.165
Cross affected leg over	<.001***	<.001***	418	.006**	.094	.250	.019*	.263
Cross non affected leg over	.003**	.072	200	.003**	.425	.012*	.283	.258
Reach affected foot	.005**	.051	913	.080	.373	.301	.018*	.079
Reach non affected foot	.009**	.268	555	.003**	.117	.312	.005**	.004
Static standing	<.001***	<.001***	100**	.002**	.481	.083	.030*	.476
Dynamic standing	<.001**	<.001***	100**	.002**	.283	.085	.102	.395

Spearman Rank Correlation Coefficient

Significance *** = $p < 0.001$

** = $p < 0.01$

* = $p < 0.05$

NS = $p > 0.05$

TABLE 9 RELATION BETWEEN RIVERMEAD PERCEPTUAL ASSESSMENT BATTERY SUBTESTS † AND OVERALL DRESSING SCORE

AbiUty Assessed	r_s	p
Picture matching	0.38	**
Object matching	0.41	***
Colour matching	0.37	**
Size recognition	0.34	**
Series	0.23	*
Animal halves	0.33	**
Missing article	0.25	*
Figure ground	0.19	NS
Sequencing pictures	0.18	NS
Body image	0.30	*
Copy shapes	0.21	NS
Copy words	0.09	NS
3D copy	0.25	*
Cube copy	0.14	NS
CanceUation	0.42	***
Self identification	0.20	NS

† see detaUs in Appendix

Spearman Rank Correlation Coefficient

Significance *** = p<0.001
** = p<0.01
* = p<0.05
NS = p>0.05

TABLE 10 RELATION BETWEEN SENSORY ASSESSMENT SUBTESTS AND OVERALL DRESSING SCORE

AbiUty Assessed	r_s	p
Light Touch	0.14	NS
Temperature	0.23	NS
Pain	0.21	NS
Pressure	0.25	NS
TactUe location	0.29	*
BUateral stimulation	0.31	*
Joint appreciation sense	0.27	*
Joint direction sense	0.34	*
Joint position sense	0.48	***
Stereognosis	0.34	*

Spearman Rank Cortelation Coefficient

Significance	***	=	$p<0.001$
	**	=	$p<0.01$
	*	=	$p<0.05$
	NS	=	$p>0.05$

APPENDIX 1

ETHICAL APPROVAL

Department of

.....

UNIVERSITY HOSPITAL
Queen's Medical Centre
Nottingham
NG7 2UH
Tel: 0602-700111
Ext: 3050

Ask for: Medical Committee Section
Your ref: Our ref: DIJ/MH

5 September 1986

Dear Dr Lincoln,

Re: Investigation of the Acquisition of Dressing Skills after Stroke

The above study has now been carefully considered and I am pleased to be able to report that it has been given Officer-approval. It therefore need not be submitted to the full Ethical Committee.

Yours sincerely

D I Johnston (Dr)
Chairman
Ethical Committee

APPENDIX 2

RIVERMEAD ACTTVUIES OF DAILY LIVING SCALE

(self care)

ADL SCORE SHEET

NAME: DATE:

SELF-CARE ACTIVHY	SCORE	AIDS REQUIRED/COMMENTS
Drinking		
Clean teeth		
Comb hair		
Wash face/hands		
Make up/shave		
Eatmg		
Undress		
Indoor mobiUty		
Bed to chair		
Lavatory		
Outdoor mobiUty		
Dressing		
Wash in bath		
In/out bath		
OveraU wash		
Floor to chan		
TOTAL		

SCORING

3. Independent with/without aid.
2. Verbal assistance only.
1. Dependent (if unfit, unsafe, too soon).

ADL ASSESSMENT

All aids suppUed or recommended to be stated on the form.
Decide where to start. If the patient can do that item, go back three to make sure the patient can do these as well, and forward untU three consecutive faUures - then stop. This appUes to each section.

Instructions should be strictly foUowed.

SELF CARE

Drinking - A fuU cup of hot Uquid, not spilling more than ⅛ of the contents.

Clean teeth - Unscrewing toothpaste, putting toothpaste on brush. Managing tap.

Comb hair - To be presentable on completion.

Wash face and hands - At basin (not with bowl), including putting in plug and managing taps and patient drying himself. AU materials to hand.

Make up or shave - Shaving to be done by patient's preferred method.

Eating - A sUce of cheese on toast eaten with a knife and fork.

Undress - Dressing gown, pyjamas, socks and shoes to be taken off.

Indoor mobiUty - Moving from one room to another - turns must be to the left. Distance of 10 metres.

Bed to chair - From lyimg covered, to chair with arms within reach.

Lavatory - MobiUty to WC (less than 10 metres). To include managing pants and trousers, cleaning himself and transferring.

Outdoor mobiUty - To cover a distance of 50 metres and to include going up a ramp and through a door.

Dressing - Does not involve fetching clothes. Clothes to be within reach in a pUe but not in any specific order. AU essential fastenings to be done up by patient.

Wash in bath - Showing movements, i.e. abiUty to wash aU over. AbiUty to manage taps and plugs.

In and out of bath - A dry bath.

OveraU wash - Not in bath, at basin (not with bowl). Patient must be able to wash good arm, stand up and touch toes from sitting, in order to be able to wash overaU.

Floor to chair - From lying, to upholstered chair without arms, seat 15" high.

APPENDIX 3

RIVERMEAD ASSESSMENT OF MOTOR FUNCTION

RIVERMEAD ASSESSMENT OF MOTOR FUNCTION IN STROKE PATIENTS

Score] or 0 Date:

GROSS FUNCTION

1. Sit; feet unsupported (10 secs)
2. Lying to sitting on side of bed
3. Sit to stand, in 15 secs for 15 secs
4. Transfer from chair towards unaffected side
5. Transfer from chair to chair towards affected side
6. Walk 10 metres independently with an aid
7. Climb stairs, may use banister
8. Walk 10 metres without an aid
9. Walk 5 metres, pick up bean bag from the floor and return
10. Walk outside 40 metres (aid if needed)
11. Walk up and down 4 steps (no banister or wall support)
12. Run 10 metres (4 secs)
13. Hop on affected leg 5 times on the spot

Total

LEG AND TRUNK

1. Roll to aff. side (sup.-sd.ly) no abnormal movt. patterns
2. Roll to unaff. side (sup.-sd.ly) no abnormal movt. pattems
3. Half bridging
4. Sit to stand, hips 90° flex & in standing, wt. thro' both feet
5. crk.ly., unaff. leg over side of bed and return to same position
6. Standing; step unaffected leg on and off block
7. Standing; tap ground lightly 5 times with unaffected foot
8. Ly; d/flex. ankle with leg flexed
9. Ly; d/flex. ankle with leg extended
10. Standing with aff. hip in neutral, flex aff. knee (45°+)

Total

ARM

1. Ly; protract sh. girdle with arm in elevation (arm may be supported)
2. Ly; hold ext. arm in elevation, some ext. rotation (place arm)
3. Flex. & ext. elbow with arms as in '2.'
4. Sitting; elbow into side of body, pro. & supinate
5. Reach fwd., pick up large ball with both hands and place down
6. Reach fwd., pick up tennis ball, release at mid thigh on aff. side x 5
7. As '6.', with a pencil x 5
8. Pick up piece of paper from table in front & release x 5
9. Cut putty with knife & fork & put into container (use non-slip mat)
10. St; pat large ball on floor with palm of hand x 5
11. Continuous opp. thumb & ah fingers (tap=l) more than x14 in 10 secs
12. Sup. & pro. onto palm of unaff. hand (tap=l) x20 in 10 sees
13. St; hand on wall, sh. 90° flex elb. ext. Walk round arm
14. Place string around head tie bow at back
15. 'Pat a Cake' x7 in 15 secs

RIVERMEAD ASSESSMENT OF MOTOR FUNCTION

STROKE ASSESSMENT

General Instructions

1. Items may be attempted in any convenient order but early items on any section should be done before later ones where possible.

   Score 1 if the patient can perform the activity.
   Score 0 if the patient cannot perform the activity.

2. A maximum of three attempts are aUowed on each item.

3. Instructions may be given verbaUy or by demonstration as many times as required.

4. After three consecutive items on any section (in order given on form) have been failed, stop that section and score aU remaining more difficult items as 0.

5. Give no feedback of whether performance is correct or incortect but just general encouragement.

6. If an item cannot be attempted then it is scored 0.

7. AU activities are to be carried out independently unless otherwise stated.

8. AU arm tests refer to affected arm unless otherwise stated.

9. AU sitting positions to be done sitting on chair with feet flat on floor.

10. AU movements to be carried out without aids unless otherwise stated (aid = caUper, splint, tripod, frame, etc).

11. Activities on bed should be performed with bare feet (minimum width of bed = 0.80m).

12. The assessment should be completed in one session (one hour).

STROKE ASSESSMENT INSTRUCTIONS

Gross Function

1. On bed edge, feet unsupported, without holding on for 10 seconds.
2. Using any method and to either side.
3. From any chair (including wheelchair). May use hands and walking aid if necessary. Must stand up in under 15 seconds and stay standing for 15 seconds.
4. May use hands, walking aid and any chair positioned at right angles to wheelchair.
5. As no. 4.
6. Any walking aid - no-one standing by.
7. Any method. May use banister. Up and down a minimum of 10 stairs with no-one standing by.
8. No-one standing by.
9. May use either hand, aid to walk if necessary and bend down any way. No-one standing by.
10. On level tarmac or pavement with aid if necessary, and no-one standing by.
11. May use walking aid but not banister or wall support.
12. In 4 seconds. Fast walk is acceptable.
13. Must hop on ball of foot within a 6 inch square without stopping to regain balance or holding on.

Leg and trunk

1. Starting position should be lying no crk. lying. Patient may bend up knee but not push with foot. Hands should be clasped together and not push or pull on bed.
2. As no. 1.
3. Patient starts in ½ crk. lying with no external rotation. Physiotherapist may position leg. Patient must put some weight through affected leg to lift affected hip clear of bed. He must return to starting position and hold for 2 seconds.
4. Sit with hips approximately 90° flexion, feet flat on floor. May not push with hands. Must put weight through both feet and stand for 2 seconds.
5. Lying near bed edge with affected leg in ½ crk. lying. Lift leg off bed onto support (e.g. floor, stool, box) so that hip is neutral and knee flexed to 90° on completion. Do not allow more than 50° hip external rotation from neutral.
6. Without retracting pelvis or hyperextending knee of supporting leg. Box height 3½ inches.
7. Without retracting pelvis or hyper extending knee of supporting leg. Weight must stay on affected leg.
8. Physiotherapist may hold leg in position, knee at 90°. Do not allow inversion. Must have range of movement of unaffected foot.

Leg and trunk cont.

9. Do not allow knee flexion or inversion. Foot must reach plantigrade (90°).

10. Knee flexion at least 45°.

Arm

1. Arm may be supported.

2. Place arm in position. Must maintain some external rotation. Do not allow shoulder retraction or forearm pronation. Elbow must be held within 30° of fuU extension. Pahn must face mid-Une of body. Elevation beyond 90° flexion.

3. Starting position, arm positioned as in no. 2. Pahn should not face outward during any part of movement. Do not aUow shoulder retraction. Elbow must extend to at least 30° fuU flexion.

4. ¾ range acceptable. Elbow unsupported and at right angles.

5. BaU should be on table in front of patient. Patient must actively protract shoulder, extend elbow, wrist and fingers and maintain throughout movement. Pahns should be kept in contact with baU (20 cm. diameter footbaU).

6. Must pick up bean bag from table in front using whole hand. Release bean bag on midthigh then pick up and release again on table. Shoulder must be protraced, elbow extended and wrist neutral or extended during reach phase.

7. Arm positioned as no. 6. Must use thumb & fingers to grip. Release on table and lap.

8. Must use fingers and thumb to pick up paper. Must not pull paper to table edge. Arm positioned as in nos. 6 and 7.

9. Cut 50 gm. putty into bite sized pieces. Non-sUp mat under plate.

10. Maintain upright position. Continuous bounce with 20 cm. footbaU.

11. Must do movements im consistent sequence.

12. Arm must be away from body. Palm and dorsum of hand must touch palm of unaffected hand. Each tap counts as one.

13. Maintain arm in position. Do not aUow elbow flexion. Wrist must be extended with palm of hand fuUy im contact with waU. Turn feet to pivot body on shoulder untU arm in 90° abduction.

14. Do not aUow neck to flex. Affected hand must be used for more than just supporting latter. String 1 metre long.

15. Mark crosses on waU opposite shoulders.
Pat-a-cake sequence:
clasp both hands together
both hands touch crosses on waU
clap hands
one hand touches opposite cross
clap hands
other hand touches opposite cross
Must be in cortect order. Pahns must touch waU. Each sequence counts as one.

APPENDIX 4

RIVERMEAD PERCEPTUAL ASSESSMENT BATTERY

Rivermead Perceptual Assessment Battery

Whiting, Lincoln, Bhavnani, Cockburn

Record Form

Hospital No:_____

Patient's name: _____

Address: _____

_____

Sex: _____ Occupation: _____

D.O.B: _____ Age:_____In Patient/Out Patient*

Diagnosis: _____

_____

_____

Hemisphere Affected: Right/Left/Both*

Date of Onset:_____Referred by:_____

Tasks Done With: Right/Left/Both Hands*

Premorbid Handedness for Writing: Right/Left/Either*

Glasses: Yes/No*

Estimated Premorbid Intelligence: Below Average/Average/
Above Average*

Other Assessments:

Date of 1st Assessment: _____

Date of 2nd Assessment: _____

Date of 3rd Assessment: _____

'delete as appropriate

RPAB

Scores

	Task	Maximum Score	Score	Time Limit	Time
1	Picture Matching	4		3	
2	Object Matching	4		3	
3	Colour Matching	12		3	
4	Size Recognition	4		3	
5	Series	4		3	
6	Animal Halves	4		3	
7	Missing Article	4		3	
8	Figure Ground Discr.	4		3	
9	Sequencing - Pictures	4		3	
10a	**Body Image**	6		3	
	Body Image	6		3	
	Body Image-Total	12		6	
11	**R/L Copying Shapes L**	36			
	R/L Copying Shapes R	36			
	R/L Copying Shapes-Total	72		**5**	
12	**R/L Copying Words L**	16			
	R/L Copying Words R	16			
	R/L Copying Words-Total	32		**5**	
13	3D Copying Selection	12			
	30 Copying Orientation	12			
	30 Copying-Total	24		3	
14	**Cube Copying 1 S**	9			
	Cube Copying 0	9		3	
	Cube Copying 2 S	9			
	Cube Copying 0	9		3	
	Cube Copying 3 S	9			
	Cube Copying 0	9		3	
	Cube Copying 4 S	9			
	Cube Copying **0**	9		3	
	Cube Copying-Total	72		12	
15	Cancellation	52		3	
16	Body Image - S I	8		-	

Comments

KEY: R=Right L=Left O=Orientation S=Selection S I=Sel(Identification

RPAB

Summary

Classification of Tests	Test No.	Task	Score	Acceptable Score (see Table 14 in Manual)
Form constancy	1	Picture Matching		
	2	Object Matching		
	4	Size Recognition		
Colour constancy	3	Colour Matching		
Sequencing	5	Series		
	9	Sequencing-Pictures		
Object completion	6	Animal Halves		
	7	Missing Article		
Figure ground discrimination	8	Figure Ground Discr.		
Body image	10	Body Image		
	16	Body Image-Self Identification		
Inattention	11	R/L Copying Shapes		
	12	R/L Copying Words		
	15	Cancellation		
Spatial awareness	13	3D Copying		
	14	Cube Copying		

Comments on patient's general performance

APPENDIX 5

FRENCHAY APHASIA SCREENING TEST

Frenchay Aphasia Screening Test

Administration Form

Materials required:
Picture card with attached reading cards, pencil and paper. stop watch.

Check:
Patient is wearing spectacles, if needed. Patient can hear you adequately (raise voice if necessary).

Comprehension

Show patient card with river scene. Say: 'Look at the picture. Listen carefully to what is said and point to the things I tell you to.' Score 1 for each correctly performed. If instructions require repeating, score as error. Unprompted self-correction may be scored as correct. Score range 0 – 10.

Instructions

(a) *River scene*

1 Point to a boat
2 Point to the tallest tree
3 Point to the man and point to the dog
4 Point to the man's left leg and then to the canoe
5 Before pointing to a duck near the bridge, show me the middle hill

(b) *Shapes*

1 Point to the square
2 Point to the cone
3 Point to the oblong and the square
4 Point to the square, the cone and the semicircle
5 Point to the one that looks like a pyramid and the one that looks like a segment of orange

Expression

(a) Show patient the river scene and say: Tell me as much about the picture as you can.' If patient does not appear to understand, say: 'Name anything you can see in the picture.' Score range 0-5.

Score

0 Unable to name any objects intelligibly
1 Names 1-2 objects
2 Names 3 – 4 objects
3 Names 5-7 objects
4 Names 8 or 9 objects or uses phrases and sentences, but performance *not* normal (e.g. hesitations, inappropriate comments, etc.)
5 Normal - uses phrases and sentences, naming 10 items

(b) Remove picture card from view and inform patient that you are now going to attempt something a little different. Then ask him to name as many animals as he can think of in 1 minute. If patient appears doubtful, explain that you want the names of any kind of animal, wild or domestic, and not just those which may have been seen in the picture. Commence timing as soon as patient names first animal and allow 60 seconds. Score range 0-5.

Score

0 None named
1 Names 1 --2
2 Names 3 -5
3 Names 6 - 9
4 Names 10 - 14
5 Names 15 or more

Reading

Check that the patient is wearing correct spectacles for reading purposes. Show patient river scene and first reading card. Ask him to read the sentence to himself, not aloud, and do whatever it instructs him to do. Proceed in the same manner with the remaining four reading cards. Score range 0-5.

Score 1 for each correct.

Writing

Show patient river scene and say: 'Please write as much as you can about *what is happening* in the picture.' If he does not appear to understand say: 'Write anything that you can see in the picture.' If dominant hand is affected ask patient to attempt with non-dominant hand. Encourage if he stops prematurely. Allow a MAXIMUM of 5 minutes. Score range 0-5.

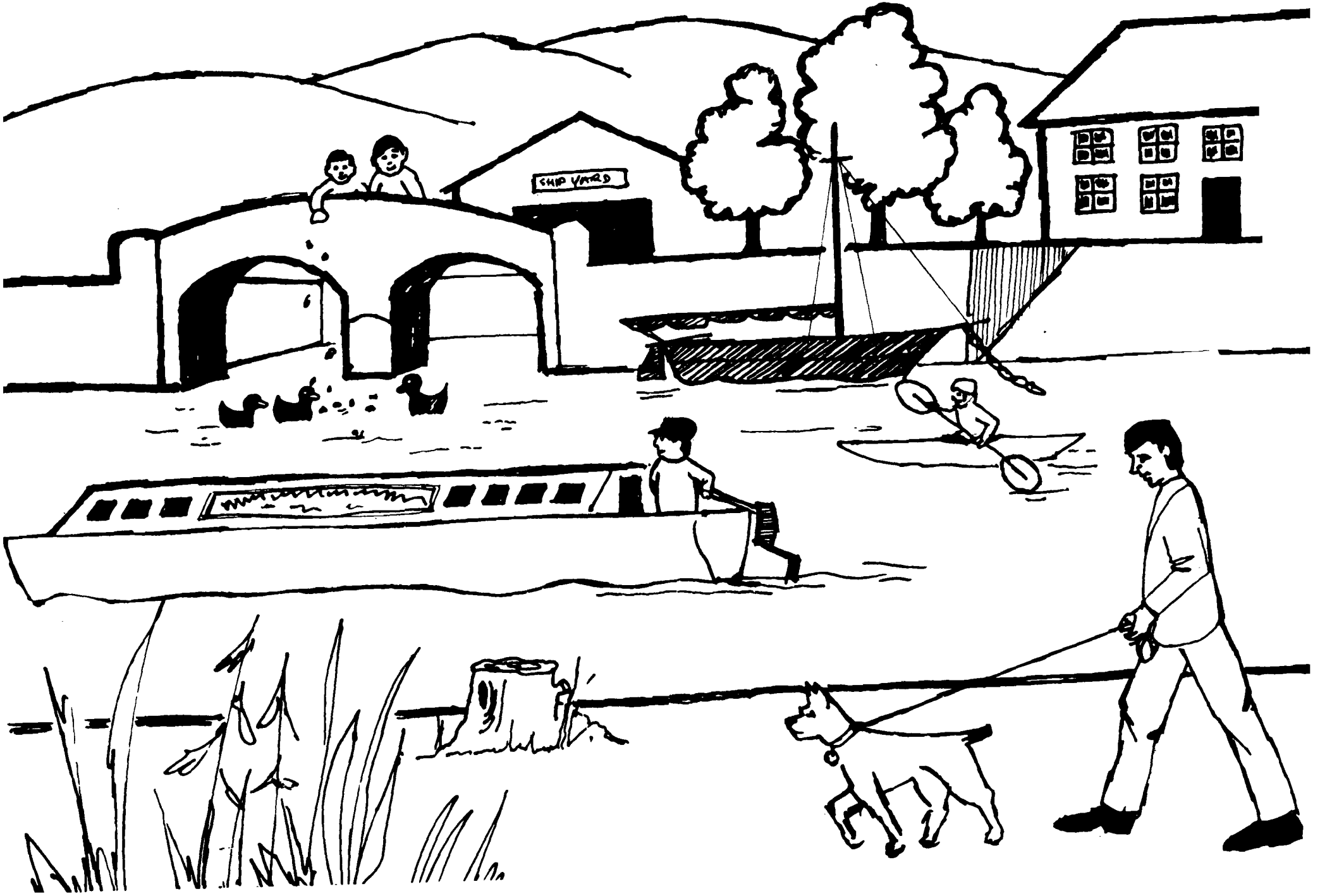
Score

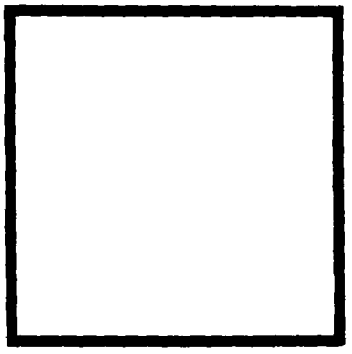
0 Able to attempt task but does not write any intelligible or appropriate words
1 Writes 1 or 2 appropriate words
2 Writes down names of 3 objects or a phrase including 2 or 3 objects
3 Writes down names of 4 objects (correctly spelled), or 2 or 3 phrases including names of 4 items
4 Uses phrases and sentences, including names of 5 items, but *not* considered 'normal' performance, e.g. sentence not integrating people and actions
5 Definitely normal performance, e.g. sentence integrating people and actions

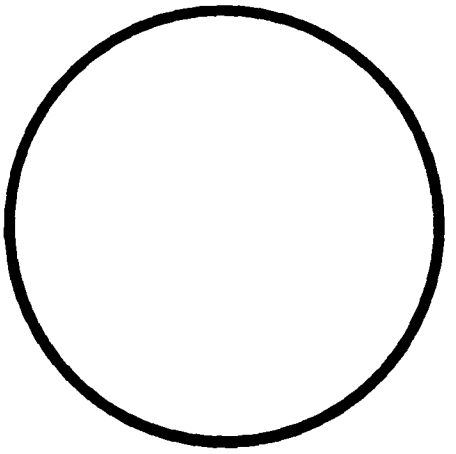
Interpretation

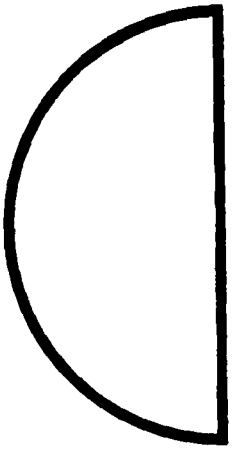
The presence of aphasia is indicated if the **patient** scores below the following cut-off **points. (Referral to** speech therapy for full assessment is suggested.)

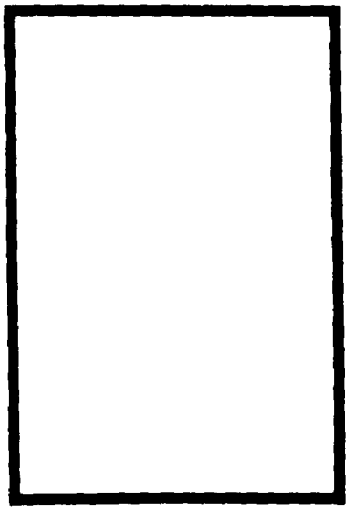
Age	*Raw* ***Score***
Up to 60	27
61 +	25

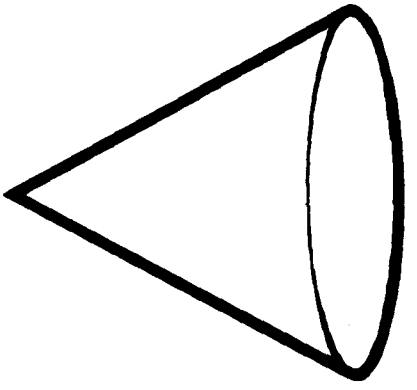

SHIP YARD







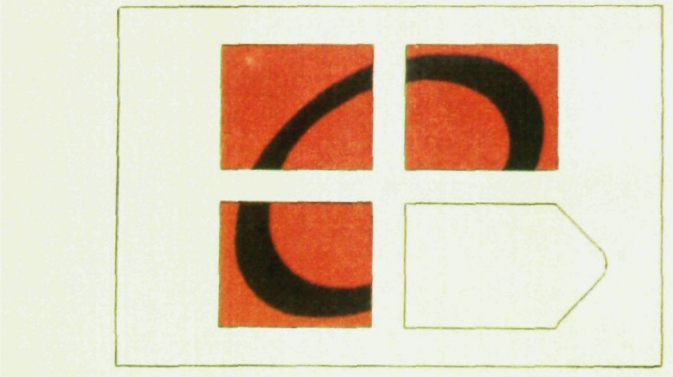


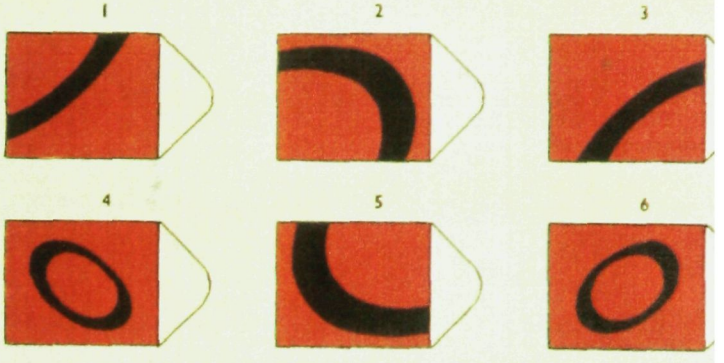


APPENDIX 6

PHOTOGRAPH OF COLOURED PROGRESSIVE MATRIX

A_B 6





APPENDIX 7

NATIONAL ADULT READING TEST

National Adult Reading Test (NART)
Word Card

chord	superfluous
ache	simile
depot	banal
aisle	quadruped
bouquet	cellist
psalm	facade
capon	zealot
deny	drachm
nausea	aeon
debt	placebo
courteous	abstemious
rarefy	detente
equivocal	idyll
naive	puerperal
catacomb	aver
gaoled	gauche
thyme	topiary
heir	leviathan
radix	beatify
assignate	prelate
hiatus	sidereal
subtle	demesne
procreate	syncope
gist	labile
gouge	campanile

APPENDDC 8

APRAXIA SUBTEST OF

THE WESTERN APHASIA BATTERY

APRAXIA TEST

Name: Date:

ITEM	Verbal Command	Imitation	Score
Facial 1. Put out your tongue 2. Close your eyes 3. Whistle 4. Sniff a flower 5. Blow out a match			
Intransitive (upper Umb) 6. Make a fist 7. Salute 8. Wave goodbye 9. Scratch your head 10. Snap your fingers			
Transitive (instrumental) 11. Use a comb 12. Use a toothbrush 13. Use a spoon to eat 14. Use a hammer 15. Use a key			
Complex 16. Pretend 17. Pretend to knock at the door 18. Pretend to fold a paper 19. Pretend to light a cigarette 20. Pretend to play the piano			
TOTAL			

SCORE:

3 good performance
2 impaired but recognizable
1 poor or approximate performance
0 no performance, unrelated, unrecognizable

APPENDIX 9

LOGICAL MEMORY SUBTEST OF

THE WECHSLER MEMORY SCALE

LOGICAL MEMORY

Story 1A

Immediate Time _____

Anna Thompson/ of South/ Croydon/ employed/ as a cleaner/
in an office building/ reported/ at the Town Hall/ Police Station/
that she had been held up/ on State Street/ the night before/
and robbed/ of fifteen pounds/. She had four/ little children/
the rent/ was due/ and they had not eaten/ for two days/.
The officers/ touched by the woman's story/ made a collection/
for her/.

Delay Time _____

Anna Thompson/ of South/ Croydon/ employed/ as a cleaner/
in an office building/ reported/ at the Town Hall/ Police Station/
that she had been held up/ on State Street/ the night before/
and robbed/ of fifteen pounds/. She had four/ little children/
the rent/ was due/ and they had not eaten/ for two days/.
The officers/ touched by the woman's story/ made a collection/
for her/.

LOGICAL MEMORY

Story 1B

Immediate Time _____

The American/ liner/ New York/ struck a rock/ near Plymouth/
on Monday/ evening/. In spite of a blinding/ snowstorm/
and darkness/ the sixty/ passengers including/ 18 women/
were all rescued/ though the boats/ were tossed about/
like corks/ in the heavy sea/. They were brought into port/
the next day/ by a British/ steamer/.

Delay Time _____

The American/ liner/ New York/ struck a rock/ near Plymouth/
on Monday/ evening/. In spite of a blinding/ snowstorm/
and darkness/ the sixty/ passengers including/ 18 women/
were all rescued/ though the boats/ were tossed about/
like corks/ in the heavy sea/. They were brought into port/
the next day/ by a British/ steamer/.

APPENDIX 10

PHOTOGRAPH OF RECOGNITION MEMORY

FOR WORDS


1 AID
2 CAST
3 LESS
4 GUARD
5 SOIL
6 ICE
7 WINE
8 ART
9 LIFT
10 EASE
11 DIVE
12 MAIN
13 WILD
14 IRON
15 HIT
16 HOLD
17 CAUSE
18 OUGHT
19 FORM
20 GIFT
21 SIDE
22 SPORT
23 VIEW
24 SPREAD
25 FALL
BAKE
YOUNG
SAKE
DASH
QUIET
MILE
BEST
TOP
REST
RUSH
HIGH
STRIKE
MELT
SINK
HELP
RAW
MIX
LOAD
LAW
SELF
DROP
BRAVE
BURN
BARK
PACK
26 CAUGHT
27 TERM
28 RACE
29 SOLD
30 BOND
31 GUESS
32 SURE
33 WIND
34 STERN
35 DUE
36 FORCE
37 COAL
38 SELL
39 MEAN
40 STRING
41 TEST
42 PAUSE
43 CARD
44 WAGE
45 BID
46 THROW
47 TASK
48 FRESH
49 DEEP
50 COOL
SING
TAKE
GAUGE
CLUE
SHADE
NUT
FEW
RANK
TYRE
STAMP
STUFF
TREAT
CROSS
BRIGHT
LOW
GRANT
DARE
OUT
DARK
ACT
DRAG
SET
SHARE
HURT
START
MILE

APPENDIX 11

PHOTOGRAPH OF RECOGNITION MEMORY

FOR FACES

APPENDIX 12

NOTTINGHAM SENSORY ASSESSMENT

STROKE UNIT - SENSORY ASSESSMENT FORM

Date:

Key: Normal - 2
Impaired - 1
Absent - 0

	Light Touch	Tempera-ture	Pain	Pressure	Tactile Localisation	Bilateral Simultaneous
Face						
Trunk						
Shoulder						
Elbow						
Wrist						
Hand						
Hip						
Knee						
Ankle						
Foot						

	Joint Appreciation Sense	Joint Direction Sense	Joint Position Sense
Shoulder			
Elbow			
Wrist			
Hand			
Hip			
Knee			
Ankle			
Foot			

STEREOGNOSIS

10p coin Biro Comb Sponge Cup ☐

NOTTINGHAM SENSORY ASSESSMENT

INSTRUCTIONS

The patient wears underwear and sits on a dining-chair without arms if balance permits, if not, with arms. Upper limb, face and trunk are tested first. The lower limb is tested in supine with two pillows beneath the head. Each test is described and demonstrated to the patient before they are blindfolded. The blindfold is removed regularly throughout the test to avoid the patient becoming disorientated.

Three attempts are allowed for each part of the body for each of the tests.

Both sides and aspects of the body are tested for each modality.

TACTILE SENSATION

The patient is asked to indicate whenever they feel the test sensation, either verbally or by a body movement. For each test the skin is touched with the appropriate test item. The body part and the side are tested in a random order. All test sensations are applied in the 'on/off pattem.

SCORING CRITERIA

0 - Absent - fails to identify the test sensation on 3 occasions.

1 - Impaired - identifies the test sensation, but not on all 3 occasions in each region of the body.

2 - Normal - correctly identifies the test sensation on all 3 occasions.

Temperature Two test-tubes, 1 filled with hot water from the kettle, 1 cold water. Use the sides, not the base of the test-tubes.

Light Touch Touch, not brush, the skin lightly with a cotton wool ball.

Pressure Applied by the index finger, sufficient to just deform the skin contour.

Pain Prick the skin with a neurotip, maintaining even pressure.

Tactile Localisation Pressure test repeated with the index finger tip coated with talcum powder to mark the spot touched and the patient is asked to point, describe or indicate on a drawing the exact spot that has been touched. If communication permits this test may be combined with the pressure test. 2 cm of error is allowed.

Bilateral Simultaneous Touch Corresponding sites on both sides of the body are touched at the same time using the finger tips and the patient is asked which side has been touched or indicate as above.

2 Point Discrimination Using blunt dividers, 1 or 2 points are applied simuhaneously to the skin in an irregular order for approximately 0.5 seconds and the patient is asked to say if 1 or both points are in skin contact.
Normal measurements: pahn 8 mm, fingertip 3 mm.
(a) Index finger tip (b) Thenar crease, see diagram.

EQUIPMENT REQUIRED

Blindfold, cotton wool ball, neurotip, 2 test tubes, blunt dividers, picture of body.

KINAESTHETIC SENSATIONS

All 3 aspects are tested simultaneously: appreciation of movement, its direction and accurate joint position sense. The limb on the affected side of the body is supported and moved by the examiner in various directions but movement is only at one joint at a time. The patient is asked to mirror the change of movement with the other limb. If they cannot do this they are asked to indicate whether a movement has taken place. Three practice movements are allowed prior to the blindfolding. The reverse procedure supporting and moving the unaffected arm is attempted if there is a good recovery of movement in the affected limb.

Appreciation of Movement Taking Place	Patient indicates on each occasion that a movement takes place but the direction is incorrect.
Direction of Movement Sense	Patient is able to appreciate and mirror the direction of the test movement taking place each time, but is inaccurate in its new position.
Joint Position Sense	Accurately mirrors the test movement to within 10 of the new test position.

SCORING FOR EACH MODALITY

2	- Normal	- Correct on all 3 occasions
1	- Impaired	- Correct on some of the 3 occasions
0	- Absent	- Incorrect on all 3 occasions

STEREOGNOSIS

The object is placed in the patient's hand for a maximum time of 15 seconds. Identification is by naming, description or by pair-matching with an identical set. Affected side of the body is tested first. The object may be moved around the affected hand by the tester. First answer only is accepted. Five objects for each hand.

SCORING FOR EACH OBJECT

2	Normal	- Item is correctly named or matched.
1	Impaired	- Related name or attempts of descriptions of objects,
0	Absent	- Unable to identify the object in any manner.

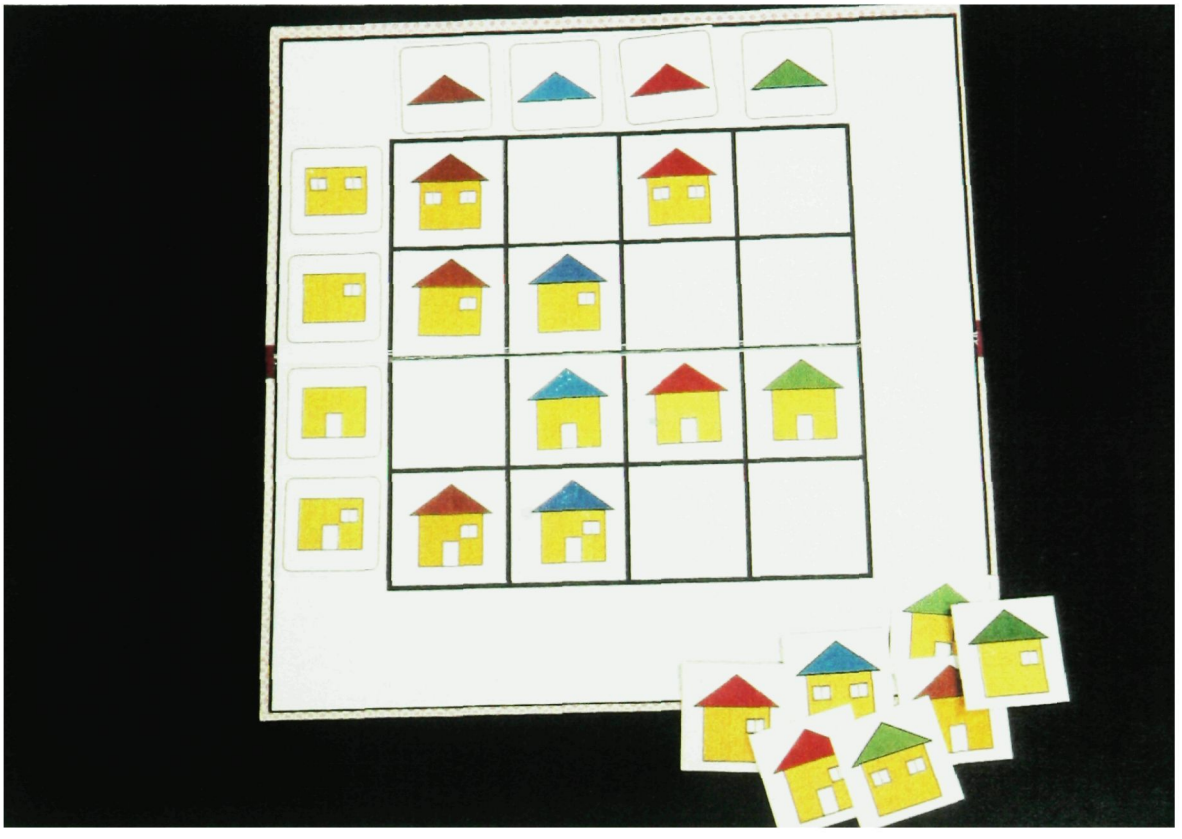
EQUIPMENT REQUIRED

Blindfold, 2p and 10p coins, biro, pencil, toothbrush, comb, scissors, nappy pin, sponge, flannel.

APPENDIX 13

PHOTOGRAPH OF

WHAT'S IN A SQUARE? BOARD GAME



PUBLICATIONS

Walker, M.F. and Lincohi, N.B. (1990)
Reacquisition of dressing skills after stroke.
Intemational Disability Studies; 12: 41-43.

Walker, M.F. and Lincohi, N.B. (1991)
Factors influencing dressing performance after stroke.
Journal of Neurology, Neurosurgery and Psychiatry; 54(8): 699-701.