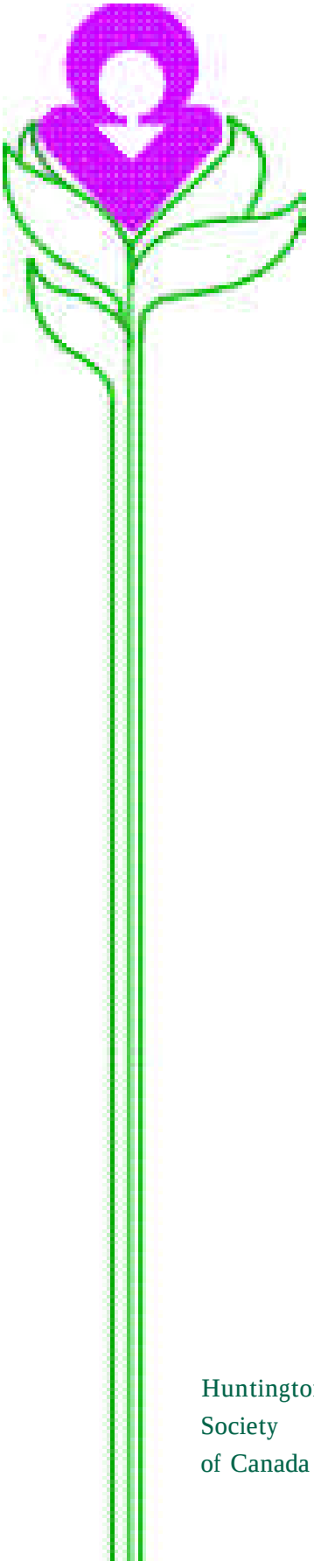


# *A Physician's Guide to the Management of Huntington Disease*

*Second Edition*

Adam Rosenblatt, M.D.

Neal G. Ranen, M.D.

Martha A. Nance, M.D.

Jane S. Paulsen, Ph.D.

Reprinted in Canada with generous funding from the Trillium Foundation and the kind permission of the authors, Foundation for the Care and Cure of Huntington's Disease, and Huntington's Disease Society of America

Huntington
Society
of Canada

# *A Physician's Guide to the Management of Huntington Disease*

*Second Edition*


Adam Rosenblatt, M.D.
*Assistant Professor of Psychiatry*
*Clinical Director*
*Baltimore Huntington's Disease Center*
*The Johns Hopkins University School of Medicine*

Neal G. Ranen, M.D.
*Medical Director*
*Geriatric Psychiatrist/Neuropsychiatrist*
*Health Pathways of Albright Care Services, York, PA*
*Clinical Associate Professor of Psychiatry*
*Pennsylvania State College of Medicine*

Martha A. Nance, M.D.
*Park Nicollet Clinic*
*St. Louis Park, MN*
*Director, HD Clinic, Hennepin County Medical Center, Minneapolis, MN*
*Clinical Assistant Professor of Neurology*
*University of Minnesota School of Medicine*

Jane S. Paulsen, Ph.D.
*Associate Professor of Psychiatry and Neurology*
*Director, Huntington's Disease Clinic and Research Program*
*University of Iowa School of Medicine*



published by
Huntington Society of Canada, 1999

## DISCLAIMER

The indications and dosages of drugs in this book have either been recommended in the medical literature or conform to the practices of physicians expert in the care of people with Huntington disease. The medications do not necessarily have specific approval from the Food and Drug Administration for the indications and dosages for which they are recommended. The package insert for each drug should be consulted for uses and dosage approved by the FDA. Because standards for dosage change, it is advisable to keep abreast of revised recommendations, particularly those concerning new drugs.

Statements and opinions expressed in this book are not necessarily those of the Huntington's Disease Society of America, Inc., nor does HDSA promote, endorse, or recommend any treatment or therapy mentioned herein. The lay reader should consult a physician or other appropriate health care professional concerning any advice, treatment or therapy set forth in this book.

# *Preface*

It has been five years since the publication of *A Physician's Guide to the Management of Huntington's Disease*, by Drs. Ranen, Peyser, and Folstein. A great deal has changed, not only in the field of HD research, but also in the many clinical disciplines which can be brought to bear in the treatment of this condition. Some things, regrettably, have changed little. Huntington disease remains a daunting problem for patients and families, and for physicians. A doctor caring for patients in a community setting may have seen only one or two previous cases. The information found in this guide may help foster a sense of hope.

Huntington disease is a well-studied condition and, although there have been few systematic trials of the interventions we will suggest, this book is the product of many years of both research and hands-on experience. We have organized this edition, like its predecessor, around the three general manifestations of Huntington disease: motor abnormalities; cognitive changes; and various psychiatric disturbances. We provide several generally accepted pharmacological and non-pharmacological treatments for each problem. In addition, the national lay organizations, such as the Huntington's Disease Society of America (HDSA) and the Huntington Society of Canada (HSC), and their local branches, are also excellent sources of information and assistance for patients, family members, caregivers, physicians, and other health care professionals (see Appendix 1).

Major changes from the first edition include the addition of a section on the genetics of HD and the use of both confirmatory and presymptomatic testing; a reworking of the section on psychiatric disorders to reflect major changes in the available medications over the last several years; and, the expansion of the cognitive section to include more recommendations about coping skills and management of behavioural problems.

There are many incurable diseases, such as diabetes mellitus, emphysema, or HD. It is important to remember that incurable does not mean untreatable, that even untreatable diseases may have treatable consequences, and that patients and their families can still benefit greatly from an accurate diagnosis, prognosis, education and support. It is our hope that, with the aid of this guide, a physician meeting someone with Huntington disease will not say "You've got HD....There's nothing you can do about it," but instead will be able to say, "You've got HD, and I can help."

# Table of Contents

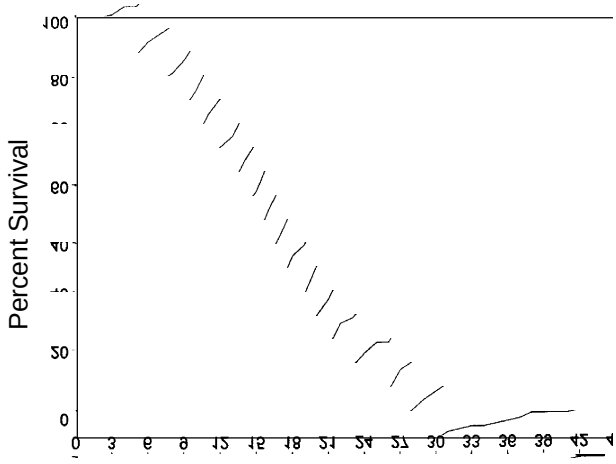
# *Overview and Principles of Treatment*

## OVERVIEW

Huntington disease is a hereditary neurodegenerative disorder caused by an expansion in the IT-15, or huntingtin, gene on chromosome 4, which encodes the protein huntingtin. HD is inherited in autosomal dominant fashion, so that each child of an affected parent has a 50% chance of developing the disease. Most people with HD develop the symptoms in their forties and fifties, although there may be subtle changes much earlier. About 10% of patients have onset of symptoms before age 20 (juvenile HD) and 10% have onset after age 60.

Huntington disease manifests as a triad of motor, cognitive, and psychiatric symptoms which begin insidiously and progress over many years, until the death of the individual. The average survival time after diagnosis is about fifteen to twenty years, but some patients have lived thirty or forty years with the disease.

**Survival of HD Patients over Time**




The movement disorder is characterized both by the emergence of involuntary movements, or chorea, and by impairment of voluntary movements. This latter impairment often contributes more to disability than the chorea itself, resulting in reduced manual dexterity, slurred speech, swallowing difficulties, problems with balance, and falls. Both chorea and impairment of voluntary movements progress in the middle stages of HD, but later, chorea often declines as patients become rigid and unable to initiate voluntary movements. Patients in this advanced state are unable to care for themselves.

The cognitive disorder is characterized initially by a loss of speed and flexibility. This may be seen first

in complex tasks, when the patient is unable to keep up with the pace and lacks the flexibility required to alternate between tasks. Cognitive losses accumulate and patients develop more global impairments in the later stages of the disease.

The most common specific psychiatric disorder in HD is depression. Patients may also suffer from mania or obsessive compulsive disorder. Other symptoms (which may not fit a specific psychiatric category) include irritability, anxiety, agitation, impulsivity, apathy, social withdrawal and obsessiveness.

HD can be roughly divided into three stages. Early in the disease, patients are largely functional and may continue to work, drive, and live independently. Symptoms may include minor involuntary movements, subtle loss of coordination, difficulty thinking through complex problems, and perhaps a depressed or irritable mood. In the middle stage, patients will probably not be able to work or drive and may no longer be able to manage their own finances or perform their own household chores, but will be able to eat, dress, and attend to personal hygiene with assistance. Chorea may be prominent, and patients will have increasing difficulty with voluntary motor tasks. There may be problems with swallowing, balance, falls, and weight loss. Problem solving becomes more difficult because patients cannot sequence, organize, or prioritize information.

In the advanced stage of HD, patients will require assistance in all activities of daily living. Although they are often nonverbal and bedridden in the end stages, it is important to note that patients seem to retain fair comprehension. Chorea may be severe, but more often it has been replaced by rigidity, dystonia, and bradykinesia. Psychiatric symptoms may occur at any point in the course of the disease, but are harder to recognize and treat late in the disease.

HD with onset in childhood has somewhat different features. Chorea is a much less prominent feature, and may be absent altogether. Initial symptoms usually include attentional deficits, behavioural disorders, school failure, dystonia, bradykinesia, and sometimes tremor. Seizures, rarely found in adults, may occur in this juvenile form. Juvenile-onset HD tends to follow a more rapid course, with survival less than 15 years. The vast majority of patients with juvenile onset have inherited their HD gene from an affected father. The reason for this tendency is now understood in genetic terms and will be explained in detail in chapter 2.

The HD gene was identified in 1993. It contains a repeating sequence of three base-pairs, called a triplet repeat. An excess number of CAG repeats in the gene results in a protein containing an excess number of glutamine units. The normal function of huntingtin is not known, but the expansion of the huntingtin gene is likely to be a so-called “gain of function” mutation. In HD, huntingtin protein encoded by the abnormal gene collects in the nucleus of the cell, giving rise to a structure called an inclusion body. Similar intranuclear inclusions have been seen in other neurodegenerative disorders caused by polyglutamine expansions. The mechanism by which the protein aggregation may cause a brain disorder is not fully understood. The neurons may first become dysfunctional then undergo progressive degeneration and die. Certain neurons appear to be more vulnerable in HD. Atrophy is most marked in the corpus striatum of the basal ganglia, including the caudate and putamen. In later phases of the disease, other regions of the brain may be affected.

The clinical diagnosis of HD is made on the basis of the family history and the presence of an otherwise unexplained characteristic movement disorder, and is usually confirmed by a gene test. The gene test can be particularly useful when there is an unknown, or negative family history (as occurs in cases of early parental death, adoption, misdiagnosis, or non-paternity) or when the family history is positive, but the symptoms are atypical. The discovery of the huntingtin gene has greatly simplified the diagnostic evaluation of an individual suspected to have HD. The implications of the diagnosis of HD for the patient and family are profound, and provision should be made for genetic counselling of individuals affected by the results. Genetic counselling and genetic testing are discussed more fully in chapter 2. It is important to remember that the gene test only determines whether or not the HD-causing genetic expansion is present, and not whether an individual's current symptoms are caused by the HD gene.

HD remains a clinical diagnosis. The motor disorder can be delineated and followed longitudinally using a quantitative examination designed for HD, such as the Quantified Neurological Examination, or the Unified Huntington's Disease Rating Scale, which also includes a useful scale for functional capacity. The Mini-Mental State Examination is useful in following the cognitive disorder longitudinally, but it lacks sensitivity in certain areas which are affected in Huntington disease and may be supplemented by a more sophisticated cognitive battery such as the Mattis Dementia Rating Scale.

## Principles of Treatment

Caring for patients with HD is both challenging and rewarding. At times, the lack of definitive treatments can be frustrating, but careful attention to the changing symptoms and good communication between professionals, family members, and affected individuals all contribute to the successful management of the disease.

HD is a progressive disease. The symptoms evolve over time such that treatments which were effective in the early stages may be unnecessary, or problematic later on, and vice versa. For example, medications such as neuroleptics may be started in the early to middle stages to control chorea. However, this category of medications may exacerbate the rigidity and bradykinesia of the later stages, and result in delirium or oversedation as the cognitive disorder progresses. The medication list and the rationale for each medication needs to be reevaluated at regular intervals. Sometimes the most helpful intervention a physician can perform is to discontinue an unnecessary drug.

Symptoms vary over time as a patient passes through different stages of the disease. Symptoms also vary from individual to individual, even within a family. For example, one patient may develop a severe mood disorder, requiring multiple hospitalizations, but have little motor disability. The patient's brother may have debilitating motor symptoms, but no mood disturbance at all. Thus interventions need to be tailored to individual symptoms, and fearful patients should be reassured that their symptoms may not necessarily resemble those of their relatives.

HD patients, like others with injuries to the brain, are highly vulnerable to side effects, particularly cognitive side effects, of medications. The physician should begin with low doses and advance medicines

slowly. Polypharmacy should be avoided where possible. Many of the drugs used in treating symptoms of HD, such as neuroleptics and antidepressants, will not have immediate efficacy and patients need to be told that they may feel worse before they feel better, because they will experience the side effects, before the beneficial effects have appeared.

Pharmacologic interventions should not be launched in isolation, but in a setting of education, social support, and environmental management. Symptomatic treatment of HD needs to be approached like any other medical problem. The clinician should elicit the details of the symptom, its character, onset and duration, and its context including precipitating, exacerbating and ameliorating factors. A differential diagnosis should be generated, non-pharmacologic interventions should be considered, and the clinician should have a way of determining whether the goals of treatment are being met and should formulate a contingency plan if treatment is not working. Sharing some of this reasoning process with patients and families can be reassuring.

Patients with HD will often be accompanied by a caregiver on visits to the doctor. This caregiver can be a crucial informant, particularly in the later stages of the disease, when speech and cognitive difficulties may prevent patients from supplying a history. However, both patient and caregiver may not feel comfortable discussing certain important issues in each other's presence, such as irritability, driving, relationship issues, or sexual problems. Therefore an effort should be made to speak to both individuals alone during the visit.

A few words should be said on the issue of "alternative treatments" for Huntington disease—unproven remedies such as herbs, megadose vitamins, homeopathic preparations, or magnetic devices, which are to be distinguished from experimental treatments taking place as part of a scientific study. Patients should be encouraged to discuss their ideas about these therapies and not to be afraid to tell their physicians that they are trying them. This will allow the doctor to help the patient think through the pros and cons of such a decision, to avoid notoriously dangerous or ineffective nostrums, and to monitor for side effects. Patients should understand that there is no substance, no matter how "natural," which has pharmacologic activity without side effects, and that all treatments carry an element of risk.

We have found it useful to share certain caveats with patients to minimize the risk for those who have chosen to pursue these alternative therapies: 1) Don't spend too much money 2) Don't do something that common sense suggests is dangerous and 3) Don't neglect or discontinue effective medical treatments in favour of an unproven therapy. By following these principles patients are likely to avoid harm.

Physicians wishing to locate scientific treatment trials for their patients may wish to contact one of the national voluntary agencies listed in Appendix 1. Notices about new trials also appear in newsletters of regional and national HD organizations. An important sponsor of clinical trials is the Huntington Study Group, an international consortium of scientific investigators from academic and research centres who are committed to cooperative planning, implementation, analysis and reporting of controlled clinical trials and other therapeutic research for HD. Contact the national voluntary agencies (Appendix 1) for the most up-to-date information about participating sites.

# *Genetics*

## GENETIC COUNSELLING

The discovery of the gene has led to new insights about HD. Not all patients or family members will want or need genetic testing, but all should be offered genetic counselling. This can be provided by the physician or by referral to a genetic counsellor. Here are some of the issues that may be explained:

### *BASIC GENETICS – INHERITANCE PATTERN*

HD is an autosomal dominant disease, which means it affects males and females with equal likelihood. Each child of an affected individual has the same 50% chance of inheriting the abnormal huntingtin gene, and therefore developing the disease one day. Inheriting a normal huntingtin gene from the unaffected parent does not prevent or counteract the disease-causing effects of the abnormal gene.

### *THE HUNTINGTIN (IT-15) GENE AND THE HUNTINGTIN PROTEIN*

The huntingtin gene directs the cell to make the huntingtin protein, whose function is unknown. Huntingtin protein contains a sequence in which the amino acid glutamine is repeated a number of times. These glutamine residues are encoded in the gene by the DNA trinucleotide “CAG.” The number of times that “CAG” is repeated (the CAG repeat number) determines the number of consecutive glutamines in that segment of the huntingtin protein. The huntingtin protein is made in normal amounts, whether it has a normal or excess number of glutamines, but it appears to be processed differently when it has an excess number of glutamines, so that the protein accumulates in the neuron. The details of this process and how it relates to the development of neurologic disease are currently being studied.

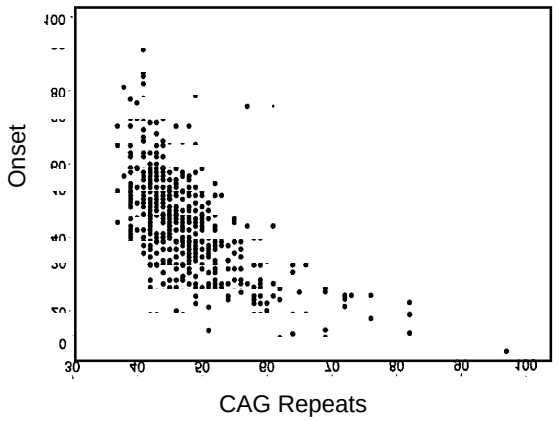
## *CAG Repeats in the Huntingtin Gene*

The normal and abnormal CAG repeat number ranges have been determined only by clinical experience, which includes that of about 10,000 affected and unaffected individuals worldwide. Normal huntingtin genes contain 10–35 "CAG repeats." Repeat sizes of 27–35 are at the upper end of the normal range, and will not result in HD, but sometimes increase into the abnormal range in the next generation, particularly if passed on by a male. The risk for this event has not been quantified. 36–39 repeats are at the low end of the abnormal range, but may not result in HD in the course of a normal life span. People with 40 or more repeats will develop HD if they live a normal life span.

## *CAG Repeat Number and Age of Onset*

There is a rough inverse correlation between the CAG repeat number and the age of onset of HD symptoms. However, the CAG repeat number accounts for only about half of the variation in age of onset. Therefore, although it may be possible to give an age range in which symptoms are most likely to occur, the age of onset cannot be accurately predicted from CAG number alone. The CAG number also does not accurately predict what symptoms an individual will have, or how severe or rapid the course of the disease will be.

**Correlation of Age of Onset with Triplet Repeat Length**




## *Instability of the CAG Repeat Number*

The number of CAG repeats in somatic cells does not change during an individual's life, and genes with normal repeat sizes are almost always transmitted stably to the next generation. In contrast, genes with expanded CAG repeat sizes are prone to expand further as they are passed on to a child, particularly in the case of paternal transmission, although expansions can occur in maternal transmission as well. Thus, children who inherit the abnormal gene often have a larger repeat number than the affected parent, and may consequently tend to develop symptoms at a younger age. The earlier onset of symptoms in a child than a parent is called anticipation. In extreme cases, symptoms may be evident in the child while the father is still asymptomatic.

### *Absent Family History of HD*

Some individuals develop HD without ever knowing they were at risk, because they have no known family members with the disease. This occurs in 2–5% of all cases. Sometimes this can be explained by early death of a parent who carried the gene, but did not live long enough to manifest the symptoms, by adoption, or by mistaken paternity. Others represent "new mutations," caused by rare expansions of parental genes with a high-normal CAG repeat number (27–35 repeats) into the affected range in the child. Individuals with high normal CAG repeat sizes are not themselves at risk for developing HD. Our understanding of the significance for their offspring is likely to improve, and they may be best referred to someone with specialized knowledge, such as a genetic counsellor.

## Genetic Testing

With the discovery of the gene a simple and accurate genetic test became available. The HD gene test usually requires a blood sample, but can be performed on other tissues, such as skin, amniocytes or chorionic villus cells, or autopsy material. The test requires special molecular diagnostic facilities, but at least two dozen university and commercial laboratories in North America perform gene tests for HD.

Genetic testing for HD is potentially useful in three clinical situations: diagnostic, or confirmatory testing; predictive, or presymptomatic testing; and prenatal testing.

### *Diagnostic Testing*

Diagnostic genetic testing refers to the use of a gene test in a patient who has symptoms suggestive of HD, with or without a family history. If the clinical suspicion is strong, this may be the only diagnostic test needed. It is important to remember that the presence of the huntingtin gene with an increased repeat number does not mean that a patient's current symptoms are caused by HD, as the gene is present throughout life. Particularly in children, who have the most to lose by premature genetic diagnosis, the gene test should be used sparingly, and only when the neurologic symptoms strongly suggest the onset and progression of HD.

Confirmatory testing should be performed in a patient who appears to have HD if no other affected family members have previously had a gene test, to be sure that the "family disease" is really HD and not some other condition. Diagnostic genetic testing is also very useful in the evaluation of an individual who appears to have HD but who has a negative or absent family history.

A special note should be made about the effects of an individual's gene test on the individual's family. The presence of an expanded HD gene in one individual has direct implications for that person's

children, siblings, and perhaps his parents and collateral relatives. Any physician who diagnoses HD in a patient must be prepared to face questions from and about these additional family members. Consultation with a genetic counsellor may help to make this difficult situation easier.

## *Predictive Testing*

Predictive testing refers to the use of an HD gene test in a person who has no symptoms but wants to know whether or not he carries the expanded gene. Predictive testing of healthy individuals requires a different clinical approach than the one to which physicians and patients are most accustomed. There are no direct medical indications for or benefits from a predictive test. There are also potential psychosocial risks to predictive testing, including adverse effects on the individual's mood, on relationships with friends and family and on insurability and employability. Predictive testing should be reserved for competent adults who have participated in a careful discussion of their genetic risks and the potential risks and benefits of the test itself.

Table 1:
**Reproductive Options**

- Natural reproduction without genetic testing
- Prenatal testing by amniocentesis or chorionic villus sampling
- Non-disclosing prenatal test
- Decision not to reproduce (may include sterilization)
- Artificial insemination
- Adoption
- Surrogate mother
- Pre-implantation genetic testing and embryo selection

The World Federation of Neurology, the International Huntington Association, and the Huntington's Disease Society of America have published guidelines regarding the genetic and psychological counselling and support that should surround predictive testing. In keeping with these guidelines, Huntington disease predictive testing centres have been established in various provinces. Referral of interested patients to a predictive test centre is highly recommended. A referral list of facilities offering predictive genetic testing for Huntington disease may be found in Appendix 2.

## *Prenatal Testing*

Prenatal testing for HD is possible, and should be performed in conjunction with detailed genetic counselling. Affected or at-risk individuals or couples should be informed of all of their reproductive options (shown in Table 1), with the understanding that different options are appropriate or desirable for different people. For those who desire prenatal testing, the best time to make arrangements is prior to the pregnancy. Chorionic villus sampling can be performed very early, at 8–10 weeks, and a non-disclosing prenatal test, which determines only whether the fetus received a chromosome from the affected grandparent or the unaffected grandparent, without determining whether the fetus or at-risk parent actually carries the HD gene, requires samples from several individuals.

# *The Movement Disorder*

## INTRODUCTION

There are two parts to the movement disorder associated with Huntington disease: the presence of involuntary movements, and the impairment of voluntary movements. The involuntary movements are called chorea, or choreoathetosis, and consist of irregular jerking or writhing movements. Chorea is the most noticeable feature of HD. In fact, the condition is often referred to as Huntington's chorea, yet the impairment of voluntary movement is more highly correlated with functional disability. Abnormal eye movements (interrupted pursuit and slow, hypometric saccades), slow and uncoordinated fine movements, dysarthria, gait disturbance, and dysphagia can be largely independent of chorea and may limit a person's ability to work, care for himself, and communicate. Although it is tempting to treat the highly noticeable chorea of Huntington disease right away, it is important to remember that the drugs used to suppress chorea can have disadvantages of their own, including worsening of voluntary motor disturbance.

Table 2:

**Principles Of Treatment Of The Movement Disorder**

- Consider non-drug interventions first.
- Pharmacologic treatment of chorea may worsen other aspects of the movement disorder, cognition, or mood.
- Chorea may diminish over time, reducing the need for treatment.

## CHOREA

Many patients are not bothered by their chorea and may not even be aware of most of the movements. The physician and patient first need to establish whether the chorea requires any treatment at all. Is the chorea severe enough to interfere with voluntary activities such as writing, cooking, or eating? Does severe chorea seem to be causing falls or accidents? Is highly visible chorea a significant source of distress for the patient?

Before beginning medication for chorea, non-pharmacologic interventions should be considered. Chorea, like most forms of involuntary movement, is worsened by stress, anxiety, or depression, is decreased

during sleep, and often varies with posture or positioning. Treatment of underlying mood and anxiety disorders, and providing a calm, predictable environment are a first step. Various assistive devices may be helpful. These include padded, reclining chairs, padding for the bed, and wrist and ankle weights to reduce the amplitude of the chorea. Sources for some of these devices are provided in Appendix 3.

Doctor and patient also need to have realistic expectations for pharmacotherapy. Medications will not alter the progression of the underlying illness. They will not improve speech or the ability to swallow, prevent falls, or improve fine motor control. In fact, drug-related side effects such as sedation and rigidity may increase the risk of falls and decrease the intelligibility of speech. However, reduction of severe chorea may improve gross motor control and may be of cosmetic value.

Akathisia is an extremely uncomfortable internal sense of restlessness, sometimes induced by neuroleptics, which may cause patients to pace, or be unable to sit still. It can be mistaken for agitation or anxiety, prompting the physician to increase the dose of the offending drug, creating a vicious cycle.

The movement disorder of HD changes over time. In most patients chorea eventually peaks and then begins to decline, while rigidity and bradykinesia become more significant. At this point, the drugs that helped to suppress chorea may no longer be needed, and in fact may worsen HD-related rigidity. Therefore it is important to assess the need for anti-chorea medication at regular intervals, and perhaps to make periodic trials of dose reduction or discontinuation.

Table 3:
## Medications Used To Suppress Chorea

| Class | Medication | Starting Dose | Maximum Dose | Adverse Effects |
|---|---|---|---|---|
| Neuroleptics | Haloperidol | 0.5–1mg/day | 6–8mg/day | sedation, parkisonism, dystonia, akathisia, hypotension, constipation, dry mouth, weight gain |
| | Fluphenazine | 0.5–1mg/day | 6–8mg/day | same |
| | Risperidone | 0.5–1mg/day | 6mg/day | less parkinsonism |
| | Thiothixene | 1–2mg/day | 10–20mg/day | less parkinsonism, more sedation and postural hypotension |
| | Thioridazine | 10mg/day | 100mg/day | similar to thiothixene |
| Benzodiazepines | Clonazepam | 0.5mg/day | 4mg/day | sedation, ataxia, apathy, withdrawal seizures |
| | Diazepam | 1.25mg/day | 20mg/day | same |
| Dopamine Depleting Agents | Reserpine | 0.1mg/day | 3mg/day | hypotension, sedation, depression |
| | Tetrabenazine | 25mg/day | 100mg/day | less hypotension |

Three classes of medication are commonly used to suppress chorea in Huntington disease: neuroleptics, such as haloperidol and fluphenazine; benzodiazepines, such as clonazepam and diazepam; and dopamine depleting agents, such as reserpine and tetrabenazine. Each class has its advantages and disadvantages.

The suppression of movement, regarded as a side effect when neuroleptics are used to treat psychosis, is the desired effect when they are used to treat chorea. Therefore the most popular neuroleptic agents are the high potency drugs, which can also induce the most parkinsonism. Haloperidol and fluphenazine are most commonly prescribed. They should be started at a low dose, 0.5 to 1mg once or twice a day, and gradually increased to efficacy. Doses higher than 6–8mg per day have not generally been found helpful in treating chorea. Risperidone is a newer neuroleptic which does not cause as much parkinsonism as the other high potency agents, but is still useful in suppressing chorea and may relieve agitation as well. It may be also be started at 0.5–1mg once or twice a day, with some patients tolerating doses as high as 6–8mg daily.

In some cases, patients who experience unacceptable rigidity, akathisia, or dystonia with high potency agents may benefit from a lower potency neuroleptic such as thiothixene or thioridazine. This may be preferable to adding an anticholinergic agent to the original drug to counteract the side effects. Lower potency agents tend to be more sedating, however, and are more inherently anticholinergic, producing more tachycardia, postural hypotension, constipation, and delirium. Thiothixene can be started at 1–2mg once or twice a day and increased to 10–20mg/day. Thioridazine, which is even lower potency, can be started at 10mg once or twice a day and increased to about 100mg/day.

Patients starting neuroleptics should be warned about two unlikely, but potentially serious adverse effects. The first is tardive dyskinesia, a syndrome of involuntary movements often first noted in the face and mouth, that develops in some patients taking neuroleptics. Tardive dyskinesia is of concern because the symptoms are usually permanent, and will likely be hard to recognize in someone with HD. The other serious problem is neuroleptic malignant syndrome, a rare, but life threatening reaction characterized by acute onset of delirium, rigidity, and fever, often accompanied by leukocytocis, and elevated CPK. Families should know about this so that the patient can be given prompt medical attention if it develops.

Benzodiazepines, such as clonazepam and diazepam can also be useful in the treatment of chorea. Some clinicians prefer them to neuroleptics because they do not induce parkinsonism or tardive dyskinesia. Sedation and the increased risk of delirium are the main deleterious side effects, along with tolerance, withdrawal symptoms, and the potential for abuse. Long acting varieties such as clonazepam and diazepam are favoured because they require less frequent dosing, provide more even coverage of symptoms throughout the day, and are less likely to precipitate withdrawal symptoms if a dose is missed. Clonazepam may be started at 0.5mg per day, and may be raised as high as 4mg per day, in divided doses. Diazepam may be dosed from about 1.25mg to 20mg per day, also in divided doses.

Some clinicians favour dopamine depleting agents as a treatment for chorea. While these drugs do share some of the “neuroleptic” side effects, they may be milder at low doses, and they have not been shown to cause tardive dyskinesia. The class includes reserpine and tetrabenazine. Reserpine was used in the past as an antihypertensive, and may cause hypotension. This can be minimized by giving the drug at bedtime.

Parkinsonism, restlessness, dizziness, and sedation are other common side effects. The increased rate of depression in patients taking these agents is also of concern. Reserpine may be started at 0.1mg per day and increased weekly to a dose as great as 3mg per day. Tetrabenazine is similar in action to reserpine, but is felt by some clinicians to be more effective and is less likely to cause hypotension. It can be started at 12.5mg bid or tid and increased over several weeks to a maximum of 75 or 100mg per day in divided doses.

## Rigidity, Spasticity, and Dystonia

Rigidity and spasticity tend to emerge later in the course of Huntington disease, except in cases of childhood onset, in which they are often present from the beginning. They can impair gait, lead to falls, and necessitate the use of a wheelchair. Dystonia may include twisting, tilting or turning of the neck (torticollis), involuntary arching of the back (opisthotonos) and arching of the feet. It may be a symptom of HD, or a side effect of neuroleptic therapy.

A variety of medications have been used to treat rigidity, spasticity, and dystonia, all with modest success at best. Benzodiazepines, such as clonazepam, or baclofen, starting at 10mg/day and increasing up to 60mg may relieve stiffness, but may also increase bradykinesia. Tizanidine, a clonidine like drug, is sometimes helpful for spasticity, beginning with 2mg qhs and increasing every 4–7 days to a maximum of 12–24mg in divided doses. Antiparkinsonian medicines such as amantadine 50–200mg/day, levodopa/carbidopa 25/100mg two to three times per day, or bromocriptine beginning at 1.25mg bid, increasing every few weeks, may be helpful with bradykinesia or rigidity, and some clinicians have tried trihexyphenidyl, 2–5mg, bid to tid. All of these medicines may cause delirium and may lose their efficacy after several months. Consultation with a physiotherapist or physiatrist to design a program to mobilize the patient and prevent contractures may be an important component to the management of rigidity and spasticity. Botulinum toxin injections have been used rarely, but might be beneficial if severe rigidity of a small muscle or group of muscles is disturbing function.

## Myoclonus, Tics, and Epilepsy

Myoclonus, sudden brief jerks involving groups of muscles, is more common in juvenile-onset HD, where it may be mistaken for a seizure. Like chorea, myoclonus may not be disabling or particularly distressing, but may respond to treatment with clonazepam or divalproex sodium if treatment is necessary. Tics are brief, intermittent stereotyped movements such as blinking, nose twitching, head jerking, or transient abnormal postures. Tics which involve the respiratory and vocal apparatus may result in sounds including sniffs, snorts, grunts, coughs, and sucking sounds. Patients may be unaware of vocal tics, but family members may find the incessant noises grating. They should be helped to understand that the tics are not under voluntary

control. Tics generally do not by themselves require treatment, but may respond to neuroleptics, benzodiazepines, or SSRIs.

Epilepsy is uncommon, though not unheard of, in adults with HD, but is said to be present in 30% of individuals with juvenile-onset HD. A first seizure in an HD patient should not be attributed to HD without further evaluation as it may be indicative of an additional neurologic problem, such as a subdural hematoma sustained in a fall. The workup of a first seizure should include a complete exam, laboratory studies to rule out an infection or metabolic disturbance, an EEG, and a brain imaging study. The treatment of a seizure disorder in a person with HD depends on the nature of the seizures. In the juvenile HD patient, myoclonic epilepsy or other generalized seizures may suggest divalproex sodium as a first treatment choice. Although seizure management in HD is not usually difficult, for the occasional patient seizure control is quite difficult to achieve, requiring multiple medications or specialized referral.

## Swallowing Difficulties

Dysphagia is, directly or indirectly, the most common cause of death in people with late stage HD, whether through choking, aspiration, or malnutrition. Dysphagia results from impaired voluntary control of the mouth and tongue, impaired respiratory control due to chorea, and impaired judgement, resulting in eating too rapidly, or taking overly large bites of food and gulps of liquid. Dry mouth, which can be brought on by neuroleptics, antidepressants, and anticholinergics, may worsen the problem.

No medications are known to improve swallowing directly. Early referral to a speech-language pathologist will help to identify swallowing difficulties, and periodic reassessment can identify changes in swallowing ability and suggest appropriate non-pharmacologic interventions, such as a change in food consistency. Devices such as enlarged grips for silverware and nonslip plates with raised edges to prevent spilling may prolong independent eating. HD affected individuals should be instructed early in the disease, before the onset of dysphagia, to eat slowly and deliberately, to sit in an upright position during and after meals, to take small bites, and to clear the mouth of food after each bite by taking sips of liquid.

Table 4:
**Swallowing Tips**

- Eat slowly and without distractions.
- Prepare foods with appropriate size and texture.
- Eating may need to be supervised.
- Caregivers should know the Heimlich manoeuvre.

Individuals with dysphagia should avoid doing other activities while eating, in order to concentrate on chewing and swallowing. For instance, patients should not talk while eating, nor be distracted by television or ambient noise. Those who tend to hyperextend the neck due to chorea or dystonia should be encouraged and reminded to use a “chin-tuck” position. Drinking fluid through a straw may be easier than drinking directly from a cup, and the use of a covered cup or mug, like a “sippy cup” used by young children, may prevent spillage due to chorea. Grainy items, such as ground beef or rice, may irritate the pharynx and cause choking. Foods such as steak, which are hard to chew, should also be avoided, or ground to a pureé. Patients may have difficulty adjusting to different textures of food, and may do better if they finish each item on the plate in turn.

In late HD, when even liquids may be difficult to swallow, the texture of food should be soft and smooth, and liquids may be thickened with an additive (see Appendix 3). For those patients who may be unable to follow instructions reliably, a caregiver can cut the food in advance, and ensure that each mouthful has been completely chewed and swallowed before the next bite is begun. Supervision throughout the meal may be necessary, and the family or caregiver should be taught to perform the Heimlich manoeuvre.

In some cases, eating eventually requires so much energy and concentration that the patient becomes tired and frustrated before consuming adequate amounts of food. Weight loss, very prolonged mealtimes or an inability to handle utensils may be the signal that he will need to be fed for at least part of the meal. Self-feeding may be prolonged by having the patient eat more frequent, but smaller meals, and by using "finger foods." The transition to assisted feeding does not have to be all or nothing, as patients may still be able to eat unassisted at certain times and be fed at other times.

Choking may decrease once self-feeding is stopped, because the caregiver will have greater control over the size and frequency of the bites. The caregiver should still promote eating slowly, and not talking while eating, and should make sure the mouth is empty before each bite. With supervision, most patients are able to assist with feeding and to take adequate amounts of food by mouth quite far into the illness. However, before dysphagia and communication difficulties become severe, the issue of feeding tubes should be discussed with the patient and family, to ensure that appropriate nutrition can be maintained throughout the illness. A gastrostomy tube can clearly improve nutritional status in a debilitated person with severe dysphagia, and may prolong life. However, patients and families may not desire this intervention late in the course of HD. The question of whether to use a gastrostomy tube, and other end of life issues are discussed in the final section of chapter 6.

## NUTRITION

Weight loss is a common problem in Huntington disease. This is probably due in part to diminished food intake because of dysphagia, fatigue, and depression. However many HD patients also require a large caloric intake to maintain their body weight. This may be simply due to the expenditure of energy through involuntary movements, but there may be other metabolic reasons not fully understood. Two strategies can be employed to increase the caloric intake of someone with HD: increase the number of meals, or increase the calorie content of the food. The first goal can be achieved by eating five small meals a day or by adding high calorie snacks such as milkshakes. The caloric content of the food can be increased by measures such as adding oil to soups, drinking cream instead of skim milk, adding margarine liberally as a condiment, and focusing on easily eaten, high-calorie foods such as pasta with cream based sauce. Consultation with a nutritionist can help in selecting the most appropriate foods and supplements to meet the patient's needs. Regaining lost weight sometimes results in improved alertness and responsiveness, and often appears to reduce chorea as well. Maintaining hydration is also very important, particularly in the summertime in patients who may not be able to request fluids. Cyproheptadine, an antihistamine, given as 4mg at bedtime, may help increase weight by stimulating appetite in some patients.

## Dysarthria

Dysarthria, a difficulty with the physical production of speech, results largely from impairment of voluntary movement. Speech becomes slurred, dysrhythmic, variable in volume due to inconsistent breath support, and increasingly difficult to understand. Furthermore, just as patients do not always appreciate the presence or degree of chorea, some patients do not seem to be aware of distortions in their speech. For others, articulation is a constant source of frustration. No medications are known to be helpful, and dysarthria may be worsened by agents which suppress chorea. However, several interventions may enhance communication in these patients. The listener must do everything possible to promote successful communication, beginning with allowing enough time. Many HD patients thought to be incapable of communication can be understood if the listener is patient enough. Patients may need to be moved to a quieter, calmer environment, and urged to speak slowly. Patients can be asked to spell difficult to understand words. A communication board can also be useful in some cases. A speech-language pathologist may be able to provide additional insights and management strategies.

Dysarthria may be compounded by cognitive problems found in HD, such as word-finding difficulty, difficulty initiating speech, or difficulty completing a sentence. Even those with severe cognitive impairments often respond to cues, such as asking for the size, shape or color of an object. Even severely impaired patients may be able to respond accurately to a series of yes and no questions. If unsuccessful attempts at communication become very frustrating, it may be better to take a break. The desire for social interaction generally remains, even in those with advanced HD, so strategies for communication should be a priority.

Table 5:

**Coping Strategies For Communication**

- Allow the person enough time to answe questions.
- Offer cues and prompts to get the person started.
- Give choices. For example, rather than asking “what do you want for dinner?” ask “do you want hamburgers or meatloaf?”
- Break the task or instructions down into small steps.
- If the person is confused, speak more simply and use visual cues to demonstrate what you are saying.
- Ask the person to repeat phrases you did not understand, or spell the words.
- Alphabet boards, yes-no cards, or other communication devices may be helpful.

## Falls

Falls are common in persons with HD, and can be a source of significant morbidity. Usually seen more in the moderate to advanced stages, they often result from the combination of spasticity, rigidity, chorea, and loss of balance. Pharmacotherapy to prevent falls could include treatment of chorea, rigidity, spasticity and dystonia, while minimizing the use of drugs such as neuroleptics and benzodiazepines, whose side effects include sedation, ataxia, or parkinsonism. Most efforts at prevention, however, involve not drugs, but modification of the environment and behaviour of the patient. Occupational therapists and physiotherapists can instruct patients in how to sit, stand, transfer, and walk more safely. Installing handrails in key loca-

tions, and minimizing the use of stairs can help to reduce falls. Some families convert a ground floor office or den into a bedroom. Furniture such as tables and desks, particularly items with sharp corners, should be arrayed along the periphery of the room, where they will present less of an obstacle. Floors should be carpeted to lessen the impact when falls do occur. Patients who fall out of bed may have a mattress placed beside the bed at night, or may sleep on a mattress placed directly on the floor.

HD patients will eventually become unable to walk and will need to be transported in a wheelchair. A weighted and padded chair, perhaps with a wedge to keep the hips tilted, or a pommel between the legs, may minimize the chance of a severely choreic or dystonic patient falling or sliding out, or knocking over the chair (see Appendix 3). Use of a wheelchair is not an all or nothing proposition. Mobility may be extended by using the wheelchair for longer excursions and using other assistive devices such as a walker for shorter distances, or in the home. Walkers with front wheels may be particularly useful when rigidity or loss of balance is a problem. Patients who are particularly prone to falls sometimes wear helmets, or elbow and knee pads to minimize injury. Physiotherapy may also help by teaching patients how to minimize injury in a fall and how to get up again after a fall.

## General Safety Measures

A number of other environmental interventions may reduce the risk of injury. Patients who smoke should do so in a room without flammables, such as rugs, curtains and overstuffed furniture. Patients may need to stop using sharp knives and to switch to microwave cooking to prevent burns and spills. Falls in the bathroom are particularly dangerous, but there are a variety of assistive devices that can be installed. Consultation with a visiting nurse, or a visit from a physiotherapist or occupational therapist may be very helpful for any mid-stage HD patient being cared for in the home. A sample home visit consultation form is provided in Appendix 4.

# *The Cognitive Disorder*

## INTRODUCTION

The cognitive disorder in HD is considered a "subcortical" syndrome and usually lacks features such as aphasia, amnesia, or agnosia that are associated with dementia of the Alzheimer's type. The most prominent cognitive impairments in HD involve the so-called "executive functions"—abilities such as organization, regulation and perception. These fundamental abilities can affect performance in many cognitive areas, including speed, reasoning, planning, judgement, decision making, emotional engagement, perseveration, impulse control, temper control, perception, awareness, attention, language, learning, memory and timing.

Several studies have suggested that cognitive and behavioural impairments are greater sources of impaired functioning than the movement disorder in persons with HD, both in the work place and at home. In addition, family members most often report that placement outside the home is initiated because of cognitive and behavioural deterioration rather than motor symptoms.

This chapter provides an overview of cognitive impairments and the related behaviour problems that typically accompany HD. In addition, compensation and adaptation strategies are provided, which physicians may recommend to patients, families and other professionals.

## DISORGANIZATION

Difficulties in planning, organization, sequencing and prioritizing can affect responsibilities at home and at work. Daily tasks, such as attempts to follow a recipe, to maintain a daily planner, to complete a list of household errands, to develop a meeting agenda, or to apply for social security benefits, become daunting.

Many early-stage HD patients complain of problems with organization and report that they just "can't get things done." There are several ways to compensate for poor organization, which can be instituted early in the disease. Routines should be established at work or in the home so that the environment can provide structure and organization. Activities should be organized so that each day is basically the same. For example,

7:00 shower, 7:30 breakfast, 8:00 take bus to work, 8:30 check mail, 9:30 dictate letters, 10:00 coffee, 10:30 staff meeting, 12:00 lunch, 1:00 return phone calls, 2:30 review accounting, 4:00 open meeting to schedule with customers, 5:00 take bus home, 6:00 dinner, 7:00 family time with kids, 8:30 time with spouse, 9:30 read, 10:00 lights out. A central location could be established for posting a daily schedule. Persons who never before used daily planners or computer calendars may need to start. A centralized message center can be used to make lists and organize tasks to be accomplished each day. Additional strategies for dealing with poor organization are offered in Table 6.

Table 6:

**Coping Strategies For Planning And Decision Making**

- Rely on routines, which can be easier to initiate or continue without guidance.
- Make lists which help organize tasks needed to do an activity.
- Prompt each step of an activity with external cues (routine, lists, familiar verbal cues).
- Offer limited choices and avoid open ended questions.
- Use short sentences with 1–2 pieces of information.

## Lack of Initiation

Some family members complain that the person with HD "just sits around all day and won't do anything." Regulation of behaviour involves getting started, maintaining the desired behaviour and stopping unwanted behaviours. The initiation, or starting of an activity, conversation or behaviour is often compromised in HD. A lack of initiation is often misinterpreted as laziness, apathy or lack of interest, and may be a reason for poor performance at work. Once started, persons with HD may be able to execute the behaviours adequately (i.e., compute taxes, calculate sales, administrate employees, teach school), but may be unable to organize and initiate the behaviours at the appropriate time. External initiation often helps the person with HD remain active and participate in both social and work activities. Keeping a daily routine can minimize the need for internal initiation. Maintaining the desired behaviour is usually less of a problem for persons with HD. If this aspect of regulation is impaired, however, the HD patient may be unable to regulate ongoing behaviours in an appropriate manner.

## Perseveration

Perseveration, or being fixed on a specific thought or action, can occur when behaviours are inadequately regulated by the brain. Spouses often report that patients become behaviourally rigid, and tend to get stuck on an idea or task. Established routines and gentle reminders of changing tasks can help avoid problems. An activity that is atypical for the established routine will be particularly stressful and challenging for the person with HD. For instance, travel out of town, or a visit to the doctor or dentist, may disrupt a safe routine. When shifting to a new task, help prepare the person with HD and allow plenty of time for him to adapt to the new idea. There is a delicate balance of how much preparation is needed. Telling of a change in plans too early can cause increased anxiety. Typically, inform the HD patient only one day prior to an event or a few hours before. Allow plenty of time and frequent gentle cues to allow the shift to take place.

## Impulsivity

Some persons with HD experience difficulties with impulse control and may develop problem behaviours such as irritability, temper outbursts, sexual promiscuity and acting without thinking. Some degree of impulsivity and dysregulation of behaviours is quite common in HD. Some strategies to help family members and caregivers cope with impulsivity are addressed below.

## Irritability and Temper Outbursts

One of the most typical complaints we hear from HD families is concern about irritability and temper outbursts. These signs can be present for a couple of reasons. First, it is important to assess for depression when increased irritability is reported. Oftentimes, irritability and temper outbursts diminish when a mood disorder is treated. Many times, however, irritability or outbursts remain even in the absence of a mood disorder.

Examination of the underlying causes of irritability and temper outbursts is helpful in diminishing the frequency and severity of these behaviours. Persons with HD are continually challenged by previously routine tasks or activities that are experienced as overwhelming. HD results in a progressive loss of abilities that often "sneak up" on persons with HD. Several patients have confided that "I didn't realize I could no longer do it." Close attention should be paid to the signals, verbal or nonverbal, that the patient is upset or wanting something, so that they do not get to the stage of exploding before they receive attention.

Table 7:

### Coping Strategies For Impulsivity

- Since the person with HD cannot control their responses a predictable daily schedule can reduce confusion, fear and, as a result, outbursts.
- It is possible that a behaviour is a response to something that needs your attention. Don't be too quick to discount i as an outburst.
- Stay calm. This will help you remain able to think and not react emotionally and impulsively yourself. In addition, staying calm may help the person calm down.
- Let the person know that yelling is not the best way to ge your attention and offer alternative methods for getting your attention.
- Remember, although the things being said are hurtful or embarrassing, generally the person is not doing this intentionally. This is the HD talking, not your loved one.
- The person may be remorseful afterward. Be sensitive to his efforts to apologize.
- Do not badger the person after the fact. It won't help. Remember, this lack of control, likely, is not by choice.
- Medications may be helpful for outbursts and sexually inappropriate behaviour. Talk to your physician.

Knowledge of the person and sensitivity to his needs means that some situations can be anticipated and potential frustration defused. It may be possible to identify situations which trigger frustration and either avoid them or provide diversional activities. An awareness of the person's capabilities is very important, so that he is encouraged to be as independent as possible and allowed to take risks without risking constant exposure to failure.

Although this encouragement to maintain independence is not always possible at work, it is critical to encourage in the home. The person with HD should be encouraged to do things for himself and to

participate in primary decision-making as long as possible, except perhaps in situations where safety is an issue (i.e. driving or cooking). Family members should be responsible for providing a safe environment so that no person is ever in danger. Remove dangerous implements, such as guns, from the house and have emergency numbers near the telephone.

Listed below are some general strategies for families to employ to minimize irritability and some coping skills for temper outbursts.

Table 8:

**Coping Strategies For Irritability And Temper Outbursts**

- Assess your own expectations regarding the HD affected individual. A family member may be unwilling or unable to accept the patient's new limitations.
- Try to keep the environment as calm and controlled as possible.
- Speak in a low, soft voice. Avoid confrontations and ultimatums. Sit down and keep hand gestures quiet.
- Try to identify circumstances which trigger irritability and temper outbursts and avoid them.
- Redirect the HD person away from the source of anger.
- Learn to respond diplomatically, acknowledging the patient's irritability as a symptom of frustration.

## Perceptual Problems

HD causes deficits in spatial perception. The mental manipulation of personal space is impaired, even early in the disease. For instance, the judgement of where the body is in relation to walls, corners or tables may be disturbed, resulting in falls and accidents. Precautions might include carpeting the floors and removing furniture with sharp corners to the periphery of the room, where it will be out of the patient's path. Behaviour problems reported by family members are often due to another kind of impaired perception, unawareness of changes due to HD, which can lead to challenges in providing care.

## Unawareness

Denial is commonly considered a psychological inability to cope with distressing circumstances. We often see this in situations such as the loss of a loved one, a terminal disease, or a serious injury. This type of denial typically recedes over time as the individual begins to accept their losses. Individuals with HD often suffer from a more recalcitrant lack of insight or self-awareness. They may be unable to recognize their own disabilities or evaluate their own behaviour. This type of denial is thought to result from a disruption of the pathways between the frontal regions and the basal ganglia. It is sometimes called "organic denial," or anosognosia, and is a condition that may last a lifetime. We recommend that "unawareness" be used to describe this type of denial in HD to distinguish it from the more familiar kind and to avoid thinking of patients with HD as suffering from a purely psychological problem.

Unawareness often plays a significant role in seemingly irrational behaviour. At first unawareness may be beneficial because it keeps the individual motivated to try things and to avoid labelling himself. In

this way it may prevent demoralization. On the other hand, unawareness may lead to anger and frustration when the individual cannot understand why he cannot work or live independently. The HD patient with unawareness sometimes feels that people are unjustifiably keeping him away from activities that he could do, such as driving, working, or caring for children, and may attempt to do these things against the advice of family and friends. This type of unawareness can become dangerous.

Organic denial is also an issue for health professionals, friends, and family members, who may delay making the diagnosis or keep the diagnosis from the affected individual because they are concerned that he "cannot handle it." Some people interpret the unawareness as a sign that the individual does not want to know. We have not found that talking about HD to a person with unawareness will cause negative consequences.

In our clinical experience, organic denial is not easily amenable to treatment or change. Nevertheless, there are different degrees of unawareness. It may be that the person can talk about her problems, but not acknowledge that she has HD. In such a case, one might try to address the problems while avoiding discussion of the diagnosis. Noncompliance with therapy or nursing care should not automatically be interpreted as intentional. It may be helpful to develop a contract that includes incentives for compliance. Denial can thus be sidestepped, while behavioural goals remain the same. For example, the goal may be to convince an unsafe driver to stop, rather than to accept the diagnosis, or acknowledge why he must stop driving.

Table 9:
**Coping Strategies For Unawareness**

- Do not make insight the central goal. A person may be able to talk about his problems without acknowledging having HD.
- Unawareness will not always respond to interventions, and a person with HD may never seem to "accept" the disease.
- Counselling may help someone with HD come to terms with the diagnosis but may have little impact on specific insight.
- It may be helpful to develop a contract, even a formal written agreement, that includes incentives for compliance but "sidesteps" the awareness issues.

## Attention

There are many different types of attention. In persons with HD, simple attention often remains intact. In contrast, sustained or complex types of attention become impaired by HD. For instance, most persons with HD will experience difficulty with what is called "divided attention," or the capacity to do two things at once. For most people, divided attention is impaired when we are tired, sick, or stressed. In HD, divided attention is compromised most of the time, regardless of extra stress. Consequently, a person may complain that he can't "pay attention" as well as he used to.

Divided attention is needed to drive a car while listening to the radio, talking to the kids in the back seat, or talking on the cell phone. When divided attention is impaired it is recommended that patients try to do only one thing at a time. For instance, an HD-affected person should turn off radios, television, and telephones, and limit conversations while cooking dinner. When swallowing becomes a problem, mealtime distractions should be minimized and the patient should concentrate on chewing and swallowing to limit choking.

# LANGUAGE

Communication, or the transfer of information from one person to another, requires a complex integration of thought, muscle control, and breathing. HD can impair all three of these functions. There are two main aspects to communication: getting the information IN (understanding) and getting the information OUT (talking). Both of these aspects can be impaired by HD, making communication a difficult task.

The most prominent language difficulties in people with HD are (1) speaking clearly (articulation), (2) starting conversation (initiation), and (3) organizing what's coming in and going out.

## *MISARTICULATION*

Motor speech impairments are quite typical in HD. Persons with HD have even been accused of being drunk due to their sluggish speech articulation. A lack of motor coordination causes difficulties with enunciation and the breath control underlying speech.

## *IMPAIRED INITIATION OF SPEECH*

Word finding is often impaired, while knowledge of vocabulary is retained, because it takes the brain much longer to search and retrieve the desired object. Listeners sometimes fail to wait long enough for the brain to do its job.

In addition to speed limitations, the brain fails to regulate the sequence and amount of travelling information, resulting in impairments in starting and stopping. When language initiation is compromised by HD, techniques such as phrasing questions with alternate choice answers (e.g., yes or no; lasagna or spaghetti) may help someone get started or retrieve the desired response.

## *DISORGANIZATION OF LANGUAGE CONTENT*

In contrast to the basic impairments in language output, the basic capacity to understand language remains relatively intact in HD. Even in later stages of the disease, language comprehension may remain when the ability to speak is significantly diminished. This fact is important to communicate to family members, staff at care facilities and other professionals involved. Even if a patient cannot express herself, it is likely that she can understand what is being said. Difficulties with word usage are rare in persons with HD, as are frank aphasia or impairments in semantic memory. The trouble that occurs in persons with HD is an inability to organize the outgoing and incoming language, resulting in miscommunication. To aid the person with HD in organizing language output and input it is best to rely on short simple sentences and to assess understanding frequently during important conversations.

## Learning and Memory

The type of memory impairments found in HD consist mostly of difficulties in learning new information, and in retrieving acquired information, but not in storage of information. Problems occur in getting information in and out, due to the slowed speed of processing and the poor organization of information. Several studies have found that HD patients can demonstrate normal memory for information if offered in a recognition format. If, rather than asking "can you tell me what time your doctor's appointment is today?," one inquires "is your doctor's appointment at 10:00 or 11:00 today?," persons with HD can often answer correctly. Similarly, if patients with HD are given a long list of words to learn and are required to say the words back freely they perform poorly. But if they are given a list of words and asked to recognize which ones were on the earlier list they demonstrate good memory.

It has been observed that persons with severe amnesia such as that associated with Korsakoff's syndrome, herpes encephalitis, or Alzheimer's disease can experience defective explicit memory, such as for names and dates, and intact implicit, or unconscious memory, such as the ability to tie one's shoes. In contrast, persons with HD typically have impairments in skills that depend on implicit memory. Driving, playing a musical instrument, or riding a bike are all motor memories that can be considered implicit, or unconscious. HD impairs this motor memory system, making HD sufferers reliant on more effortful conscious memory systems to drive a car. Consequently, driving will take much more concentration and effort, resulting in increased fatigue and irritability.

Table 10:
**Coping Strategies For Memory**

- Keep day to day activities as routine as possible.
- Use schedules.
- Use "to do" lists and reminders
- Offer a list of choices to assist with recall.
- Provide cues to help with the retrieval of information.

## Timing

Some recent findings have suggested that persons with HD have difficulty with the estimation of time. For instance, persons with HD may be less able to judge how much time has elapsed. Spouses often complain that their once-punctual spouse becomes frequently late and mis-estimates how long activities will take. Frequent reminders may be needed to keep on schedule. It is helpful to allow extra time and avoid time pressure when possible.

## The Progression of Cognitive Impairments

Although performance in IQ tests often remains within the normal range in the early stages of the disease, cognitive deficits are evident in speed of processing, cognitive flexibility (or the ability to shift topics readily) and the organization of complex information. The most sensitive indicator of early HD on the Mini-Mental

State Examination is serial sevens (the ability to subtract 7 from 100 serially) and the most sensitive subscale on the Mattis Dementia Rating Scale is initiation (the ability to begin and maintain verbal and motor behaviours).

There exist few longitudinal studies of the cognitive decline in HD. Based upon the information available, speed, organization, and initiation of behaviour are impaired in early HD, constructional impairments worsen in mid-stage HD, and some abilities remain relatively spared (memory, language comprehension) even in the later stages of the disease. Clinically, as the disease progresses, the severity of cognitive impairments increases and patients are often unable to speak or communicate their views in late stages.

# *The Psychiatric Disorder*

## INTRODUCTION

Patients with Huntington disease who have psychiatric disorders generally suffer from underdiagnosis and undertreatment. It is important to remember that psychiatric problems, particularly depression, are very common and very devastating in HD, but they are also very treatable. Relieving a depression in someone with HD may be the single most effective intervention a physician can perform.

Psychiatric disturbances in HD are varied. Some patients suffer from conditions such as Major Depression, Bipolar Disorder, or Obsessive-Compulsive Disorder which are specific well-described syndromes, found in all sorts of patients. Many, if not most people with HD also experience less well defined, non-specific changes in personality and mood, such as irritability, apathy, or disinhibition. Most of these psychiatric problems are believed to be related directly to the central nervous system injury caused by HD. This issue is discussed further in the chapter on cognition.

## SPECIFIC PSYCHIATRIC DIAGNOSES

### *DEPRESSION*

"Who wouldn't be depressed if they had HD?" Actually, research and clinical experience shows that many HD patients are not depressed, and are able to adapt gradually to having HD. Nonetheless, even severe depression in someone with HD is often explained away as an "understandable" reaction, therefore not requiring additional treatment. This potential for overinterpretation exists in a variety of other serious medical conditions such as AIDS, stroke, and Alzheimer's disease, which have a high comorbidity with depression. In fact, those patients who have a depressive syndrome, even when the depression is "understandable," and even when there are clear triggers, usually respond to standard treatments, including medications and psycho-

therapy. Because depression in HD appears directly related to the brain disease, pharmacotherapy is usually indicated.

Major Depression is a clinical syndrome, a constellation of signs and symptoms which, taken together, suggest the diagnosis. Use of diagnostic criteria helps to distinguish major depression from demoralization, transient changes in mood caused by negative life events, such as bereavement, and from some of the symptoms of HD itself, such as weight loss, trouble with concentration, and apathy. Patients with Major Depression have a sustained low mood, often accompanied by changes in self-attitude, such as feelings of worthlessness or guilt, a loss of interest or pleasure in activities, changes in sleep, particularly early morning awakening, and appetite, loss of energy, and hopelessness. Depressed patients often feel worse in the morning than in the afternoon.

In severe cases of depression, patients may have delusions or hallucinations, which tend to match their depressed mood. A patient may hear voices berating him or urging him to commit suicide, or may have the delusion that he will be going to jail, or that he has killed his family. Depressed patients often display psychomotor retardation, a slowing of speech and movement as a result of depression. In extreme cases they can appear stuporous or catatonic.

Table 11:

**Signs And Symptoms Of Depression**

- Depressed or irritable mood
- Loss of interest or pleasure in activities
- Change in appetite, or weight loss
- Insomnia or hypersomnia
- Loss of energy
- Feelings of worthlessness or guilt
- Impaired concentration
- Thoughts of death or suicide
- Loss of libido
- Feelings of hopelessness
- Social withdrawal
- Psychomotor retardation or agitation

(Based on DSM-IV criteria)

It is important to remember that because depression is a syndrome, with various symptoms and manifestations, the presenting complaint may be something other than a low mood. For example a depressed patient may complain of insomnia, anxiety, or pain, with each problem only a symptom of the depression which is the underlying cause. It is vital to get the whole story, because symptomatic treatment for any of these complaints, e.g. sleeping pills, tranquilizers, or narcotics, could be worse than no treatment at all.

A specific complaint of depressed mood is not necessary to make the diagnosis if the patient has the other symptoms. In fact patients with HD often have trouble identifying or describing their emotional state. Depression in such a patient may be characterized by changes in sleep or appetite patterns, agitation, tearfulness, or a drop-off in functional abilities. In such circumstances the diagnosis should be considered.

In evaluating an HD patient with depression the physician also needs to consider whether some physical problem, other than HD, might be the cause. The patient's medical history should be reviewed for conditions such as hypothyroidism, stroke, or exposure to certain drugs associated with mood changes, such as steroids, reserpine, beta-blockers, and particularly alcohol.

## *Pharmacotherapy of Depression*

Depressed people with HD can usually be treated with the same agents as any other patient with depression, but certain factors may make some drugs easier to use. Many new medications have become available since the first edition of the *Physician's Guide* and the tricyclic antidepressants, while highly effective, should no longer be considered the standard first-line choice. Instead, the physician should consider the Selective Serotonin Re-uptake Inhibitors (SSRIs), such as sertraline (Zoloft), paroxetine (Paxil), fluoxetine (Prozac), and fluvoxamine (Luvox). These offer the advantages of low side effect profile, once-a-day dosing, and safety in the event of overdose. Of these drugs, fluoxetine has a much longer half-life. If a patient develops an unpleasant side effect it will take longer to wear off. On the other hand this may make it a good choice for patients who sometimes forget to take their medicine.

Table 12:

**Key Points In The Treatment Of Depression**

- Avoid overinterpretation of symptoms.
- Depression is very common in HD. Have a low threshold for diagnosis and treatment.
- HD patients are sensitive to side effects. Start medications at a low dose and increase gradually.
- Ask about substance abuse.
- Ask about suicide.

The SSRIs are sometimes stimulating and most patients should take them in the morning rather than at bedtime. Initial side effects may be GI upset or diarrhea, and increased anxiety or insomnia (although, if they are part of a depression, these symptoms will eventually respond to the treatment). SSRI-induced insomnia may respond to 25–50mg of trazodone (Desyrel) qhs. A small number of patients will develop sexual problems on SSRIs, particularly anorgasmia or ejaculatory delay. These symptoms are highly dependent on the dose. Some people have asserted that SSRIs, particularly fluoxetine, cause violence or suicide in psychiatric patients. There is no valid evidence to support this claim.

Patients with HD are sensitive to the potential side effects of CNS drugs. Any new drug should be started carefully, and increased gradually. Sertraline 25–50mg, paroxetine 10mg, or fluoxetine 10mg are appropriate starting doses. If well tolerated, the dose can be increased after a few days or a week to sertraline 50–100mg, paroxetine 20mg, or fluoxetine 20mg. Most patients will respond to these doses, but sometimes higher doses will be necessary. As we will discuss, SSRIs may also be particularly useful for some of the more nonspecific psychiatric symptoms found in patients with HD, such as irritability, apathy, and obsessiveness.

Other, newer antidepressants we have used with success in patients with HD include buproprion (Wellbutrin), venlafaxine (Effexor), and nefazodone (Serzone). These all require dosing several times a day. A new formulation of venlafaxine, Effexor XR, may be given once a day, and nefazodone is sometimes given in a single bedtime dose, despite the short half-life. It is often difficult for depressed patients, especially those with cognitive impairment, to adhere to a complex medication regimen. Therefore these drugs may not be good first choices if there is no responsible family member who will help make sure that the patient takes his medicine.

Tricyclic antidepressants (TCAs) such as Nortiptyline (Pamelor), Imipramine (Tofranil) or Amitryptiline (Elavil) remain an important class of drugs for depression in HD. They can be given once a

day (usually at bedtime because of sedative properties). Common side effects of TCAs include constipation, dry mouth, tachycardia, and orthostasis. We tend to favour nortriptyline over the others because of the relatively low incidence of these side effects and because of the well-established range of blood levels which have been associated with efficacy. It is not necessary to reach the target blood level if the patient has already responded to a lower dose, but the availability of meaningful blood levels for the TCAs can serve as a useful check of compliance, and a reassurance that a patient's dose is optimal. Since TCAs can worsen conduction delays, an EKG is indicated prior to treatment if the patient's cardiac status is unknown. TCAs are extremely dangerous in overdose. As little as a week's supply may be fatal if taken at once. They are a poor choice in patients with a history of deliberate overdoses and may have to be dispensed only a few pills at a time if this is a concern.

Table 13:
## Medications Used To Treat Depression

| Class | Medication | Starting Dose | Maximum Dose | Adverse Effects |
|---|---|---|---|---|
| SSRIs | Fluoxetine | 10–20mg | 60–80mg | insomnia, diarrhea, GI upset, restlessness, weight loss |
| | Sertraline | 25–50mg | 200mg | similar |
| | Paroxetine | 10–20mg | 40–60mg | similar, more sedation |
| Tricyclics | Nortriptyline | 10–25mg | 150–200mg | dry mouth, blurry vision, constipation, hypotension, tachycardia, sedation |
| Other | Nefazodone | 50–100mg | 450–600mg | sedation, nausea, dry mouth, dizziness, constipation |
| | Buproprion | 100–200mg | 300–450mg | seizures, agitation, dry mouth, insomnia, nausea |
| | Venlafaxine | 25–37.5mg | 225mg | hypertension, nausea, headache, constipation |

If the patient's depression is accompanied by delusions, hallucinations, or significant agitation, it may be necessary to add an antipsychotic medication to the regimen, preferably in low doses to minimize the risk of sedation, rigidity, or parkinsonism. If the neuroleptic is being used for a purely psychiatric purpose, and is not required for suppression of chorea, the physician may want to prescribe one of the newer

agents such as risperidone (Risperdal), olanzepine (Zyprexa), or quetiapine (Seroquel). These drugs may have a lower incidence of side effects and appear to be just as effective. Among the older neuroleptics, high potency agents such as haloperidol (Haldol) or fluphenazine (Prolixin) tend to be less sedating, but cause more parkinsonism. Lower potency agents such as thioridazine (Mellaril) may aid with overactivity and sleeplessness, but tend to be constipating and can cause orthostasis.

Benzodiazepines, particularly short acting drugs such as lorazepam (Ativan) may be another good choice for the short-term management of agitation. In any case neuroleptics and benzodiazepines used for acute agitation should be tapered as soon as the clinical picture allows.

Table 14:
**Some Antipsychotic Medications Used In HD**

| Medication | Starting Dose | Maximal Dose | Side Effects |
|---|---|---|---|
| Fluphenazine | 0.5–2.5mg | 20–30mg | sedation, parkinsonism, dystonia, akathisia, hypotension, constipation, dry mouth, weight gain |
| Haloperidol | 0.5–2.5mg | 20–30mg | same |
| Risperidone | 0.5–1mg | 4–6mg | less parkinsonism, less dystonia |
| Olanzapine | 2.5–5mg | 15–20mg | less parkinsonism, less dystonia |
| Quetiapine | 25–50mg | 500–750mg | less parkinsonism, less dystonia |

Electroconvulsive therapy (ECT) has also been found effective in depressed patients with HD. This treatment should be considered if a patient does not respond to several good trials of medication, or if an immediate intervention is needed for reasons of safety. For example a severely depressed patient may be refusing food and fluids, or may be very actively suicidal. ECT may be particularly effective in treating delusional depression.

Depressed patients should always be asked about substance abuse. Substance abuse, particularly of alcohol, can be both a consequence or a cause of depression, makes treatment difficult or impossible if not addressed, and significantly increases the risk of suicide.

## *Suicide*

Depressed patients should always be asked about suicide, and this should be regularly reassessed. It is a misconception that suicidal patients will not admit to these feelings. The question should be asked in a non-intimidating, matter-of-fact way, such as “have you been feeling so bad that you sometimes think life isn’t worth living?” Or, “have you even thought about suicide?”

If the patient acknowledges these feelings, the clinician needs to ask more questions to evaluate their severity and decide on the best course of action. Are the feelings just a passive wish to die or has the patient actually thought out a specific suicidal plan? Does the patient have the means to commit suicide? Has she prepared for a suicide, such as by loading a gun or hoarding pills? Can the patient identify any factors which are preventing her from killing herself? What social supports are present? Some patients, although having suicidal thoughts, may be at low risk if they have a good relationship with their doctor, have family support, and have no specific plans. Others may be so dangerous to themselves that they require emergency hospitalization.

Although there have been cases of non-depressed patients with HD harbouring chronic suicidal feelings, we feel that most, if not all, suicidal patients with HD suffer from Major Depression and can be treated successfully. So as not to miss such cases, it is helpful to think of all patients with HD who are suicidal as depressed until proven otherwise. If the clinician is unsure, the patient should be treated presumptively. This is not to say that a person with HD, particularly early in the course of the disease may not express a fear of becoming helpless one day, or a desire not to live past a certain degree of impairment. A physician should listen supportively to these concerns, realizing that most patients will be able to adapt if they are not suffering from depression.

## *Mania*

While depression is the most common psychiatric problem in HD, a smaller number of patients will become manic, displaying elevated or irritable mood, overactivity, decreased need for sleep, impulsiveness, and grandiosity. Some may alternate between spells of depression and spells of mania with times of normal mood in between, a condition known as bipolar disorder. Patients with these conditions are usually treated with a mood stabilizer. Lithium is probably still the most popular mood stabilizer for people with idiopathic bipolar disorder, but we have not found it to be as helpful in patients with HD. It is not known why this is the case. Lithium has a narrow therapeutic range, particularly in patients whose food and fluid intake may be spotty, but there may be some other aspect to the mood disorders found in HD patients which make them poor lithium responders.

We recommend beginning with the anticonvulsant divalproex sodium (Depakote) or valproic acid (Depekene) at a low dose such as 125 to 250mg po bid and gradually increasing to efficacy, or to reach a blood level of 50–150mcg/ml. A dose of 500mg po bid is fairly typical, but some patients will require as much as several grams per day. Another anticonvulsant, carbamazepine (Tegretol), is also an effective mood stabilizer. This can be started at 100–200mg per day, and gradually increased by 100mg/day to reach an effect or a therapeutic level of 5–12mcg/ml, which may require a dose of 800–1200mg/day. Therapeutic ranges for these drugs were established on the basis of their anticonvulsant properties, so it is important to remember that a patient may show a good psychiatric response below the minimum “therapeutic” level (but generally should not exceed the maximum level in any case). Both drugs carry a small risk of liver function abnormalities (particularly divalproex sodium) and blood dyscrasias (particularly carbamazepine), and so

LFTs, and CBC should be routinely monitored every few months and clinicians should be alert for suggestive symptoms. Valproic acid may cause thrombocytopenia, and both drugs are associated with neural tube defects when used during pregnancy.

Manic patients with HD who have delusions and hallucinations may require a neuroleptic, and patients who are very agitated may need a neuroleptic or a benzodiazepine for immediate control of these symptoms. As discussed for depression, the doctor may wish to prescribe one of the newer antipsychotics which have fewer parkinsonian side effects, such as risperidone, olanzepine, or quetiapine. In cases of extreme agitation, a rapidly acting injectable agent, such as droperidol (Inapsine) or lorazepam may be necessary. Finally, ECT is known to be a very effective treatment for idiopathic mania and should be considered when other treatments fail, or when the individual is extremely dangerous.

Table 15:
**Medications Used For Mania In HD**

| Medication | Starting Dose | Maximal Dose | Side Effects |
|---|---|---|---|
| Neuroleptics (see table 14) | see table | see table | see table |
| Divalproex sodium | 250mg | 500–2000mg | G.I. upset, sedation, tremor, liver toxicity, throbocytopenia |
| Carbamazepine | 100–200mg | 1200–1600mg | sedation, dizziness, ataxia, rash, bone marrow suppression |

## *Obsessive-Compulsive Disorders*

Obsessions are recurrent, intrusive thoughts or impulses which are experienced as being senseless, at least initially. A compulsion is a repetitive performance of the same activity, a stereotyped routine which must be followed, often in response to an obsession, such as handwashing because of an obsessive concern with germs. Obsessions are usually a source of anxiety and the patient may struggle to put them aside, whereas the acting out of compulsions generally relieves anxiety and may not be as strongly resisted.

True Obsessive-Compulsive Disorder (OCD) is rare in HD, but HD patients often display an obsessive preoccupation with particular ideas. Patients may worry about germs or contamination, or engage in excessive checking of switches or locks. Sometimes patients will become fixated on an episode of being wronged in the past (e.g. fired from a job, divorced, driver's license revoked), and then bring it up constantly, or become preoccupied with some perceived need, such as a desire to go shopping, or to eat a certain food.

Serotonergic antidepressants are used to treat OCD and may ameliorate obsessions and compulsions in HD patients that do not meet the criteria for the full syndrome. The use of the tricyclic antidepres-

sant clomipramine (Anafranil) has largely been superceded by the SSRIs fluoxetine, sertraline, paroxetine and fluvoxamine (Luvox) which have milder side effects and lower lethality in overdose. Patients may require higher doses than those needed for depression, e.g. 40–60mg of fluoxetine. For relentless perseverative behaviour unresponsive to these agents, one might consider neuroleptics, keeping in mind that the newer, atypical drugs may be better tolerated.

## *Schizophrenia-Like Disorders*

Schizophrenia and schizophrenia-like conditions are much less common than affective disorder in HD. The new onset of delusions and hallucinations should prompt a search for specific causes or precipitating factors, including mood disorders, delirium related to metabolic or neurologic derangements and intoxication with or withdrawal from illicit or prescription drugs.

Once these possibilities of mood disorder, drug intoxication, and delirium have been considered, neuroleptics may be employed for HD patients with schizophrenia-like syndromes. The doses used for treatment of psychosis may be somewhat higher than those used for treatment of chorea. As mentioned before, if neuroleptics are not needed for the control of involuntary movements, patients may do better on newer agents such as risperidone, olanzepine or quetiapine which do not cause as many extrapyramidal side effects. Some patients will respond completely and others only partly, reporting that “voices” have been reduced to a mumble, or becoming less preoccupied with delusional concerns. Patients with delusions will rarely respond to being argued with, but a clinician may certainly express skepticism regarding a delusional belief and explain to the patient that it may be the product of a mental illness. Caregivers should be encouraged to respond diplomatically, to appreciate that the delusions are symptoms of a disease, and to avoid direct confrontation if the issue is not crucial.

## *Delirium*

Delirium, an abnormal change in a patient’s level of consciousness, may result from a variety of toxic, structural or metabolic causes. Delirious patients may have waxing and waning of consciousness, may be agitated or lethargic, and frequently have disturbed sleep. Patients in the later stages of HD, are particularly vulnerable to delirium. Common causes of delirium in HD include prescription medications, particularly benzodiazepines and anticholinergic agents, alcohol or illicit drugs, and medical problems such as dehydration and respiratory or urinary tract infections. It is important to ask about over the counter medicines such as cold tablets and sleep aids, which patients and families may forget to mention. Subdural hematoma, due to a recognized or unrecognized fall should also be considered if the patient suffers a sudden change in mental status. Delirium can also come about gradually as an underlying problem worsens. For example, a dehydrated patient may no longer be able to tolerate his usual medication regimen.

Delirium can also be mistaken for a number of other conditions in HD. As mentioned previously, it may be accompanied by hallucinations or paranoia. Clinicians usually expect delirious patients to exhibit agitation or hyperarousal and may overlook the delirious patient who is somnolent or obtunded. Such patients may seem depressed to their families, but when questioned will not report a low mood.

Physicians should consider a diagnosis of delirium whenever confronted with an acute behavioural change in someone with HD and should review the medication list, examine the patient, and obtain necessary laboratory studies, including a toxicology screen if indicated. Identification and correction of the underlying cause is the definitive treatment for delirium. Low doses of neuroleptics may be helpful in managing the agitation of a delirious patient temporarily.

## Psychiatric Symptoms not Belonging to a Specific Diagnostic Category

Patients with Huntington disease may suffer from a variety of emotional symptoms which do not fit any specific psychiatric diagnosis, but may nevertheless be a source of distress and a focus of treatment including irritability, anxiety and apathy. Some of these symptoms are related to the disease itself, and others can be seen as a response to changing circumstances, such as a patient who becomes anxious about going to the market because her involuntary movements attract attention. Patients with HD may undergo personality changes, becoming irritable, disinhibited, or obsessional. In some cases these changes represent an accentuation, or coarsening of personality characteristics the person already had. Other times they will be a radical departure from the patient's usual state, which can be very distressing to families. Families should be reassured, as patients can usually be helped by better communication, environmental interventions, and judicious use of medications.

### *Irritability*

Irritability is a common complaint from persons with HD and their families. It is often associated with a depressed mood, but may also result from a loss of the ability of the brain to regulate the experience and expression of emotion. Irritability in persons with HD may take the form of an increase in the patients' baseline level of irritability, or there may be episodes of explosiveness as irritable responses to life events become exaggerated in intensity and duration. Other patients may not be irritable under most circumstances, but will develop a kind of rigidity of thinking which will cause them to perseverate relentlessly on a particular desire or idea, becoming progressively more irritable if their demands are not met. One woman, for example, insists on having ten or twelve varieties of juice in the refrigerator at all times and was markedly irritable during a recent visit to the clinic. Her husband had started the car to drive to the clinic and had refused to go back into the house to get her another glass of juice. Hours later she was still dwelling on it and kept interrupting the interview to say that she wanted to go home to have a drink.

Irritability in HD may have a variety of triggers and exacerbating causes. It is important to understand it in context and avoid premature use of medications. One must first understand exactly what the informant means by saying the patient is irritable or agitated. Does the patient appear restless? Is the patient yelling or verbally abusive? Is there potential for violence? Many factors can precipitate an irritable episode, such as hunger, pain, inability to communicate, frustration with failing capabilities, boredom, and changes in expected routine. Family members and caregivers should learn to respond diplomatically, appreciating the patient's irritability as a symptom. Confrontations and ultimatums should be avoided if the issue is not crucial.

The environment should be made as calm and structured as possible. Some families achieve this more easily than others. Family settings in which there are children and adolescents, unpredictable working hours, noise, or general chaos may lead to irritability and aggressiveness in persons with HD. Caretaker and family support groups can provide emotional support and are a forum for sharing strategies that members have found useful in their own households.

When irritability is severe, or enduring, or is expressed physically, patients are often described as agitated. A great deal of overtreatment, particularly with neuroleptics, stems from continuous use of a drug for an episodic problem. It is always necessary to revisit the situation and see whether the drug has actually reduced the frequency of outbursts. For episodic outbursts, success often results from combining drug therapy with a careful analysis of the context and precipitants of the outburst.

Nevertheless, we have found a number of medications helpful in treating enduring irritability. Patients may respond to antidepressants, particularly the SSRIs (sertraline, fluoxetine, and paroxetine) even if they do not meet all the criteria for major depression. The optimal doses for treating irritability are not known but one should start at a low dose and increase gradually as in the treatment of depression (see Table 13). These agents may be particularly useful when the irritability seems tied to obsessions and perseveration on a particular topic. As in the treatment of depression, improvement may not occur for several weeks. Mood stabilizers such as divalproex sodium and carbamazepine have also been helpful and could be administered as outlined for bipolar disorder (see Table 15). Low dose neuroleptics may be helpful, particularly the newer, "atypical" ones which have fewer side effects. Long-acting benzodiazepines, such as clonazepam (Klonopin), starting at low doses, e.g. 0.5mg/day, have also been helpful. The clinician must carefully monitor patients treated with these agents, as overdosing can lead to falls or aspiration.

Table 16:
## Coping Strategies For Irritability

- Restructure the person's expectations and responsibilities to manage frustration. The environment should be as calm and structured as possible.
- Respond diplomatically, acknowledging the irritability as a symptom. Confrontations and ultimatums should be avoided unless the issue is crucial.
- Try to identify circumstances which trigger temper outbursts, and redirect the person away from the source of anger.
- Family and caretaker support groups can provide valuable emotional support and are good places to learn and share effective strategies.

## *Apathy*

Table 17:
**Coping Strategies For Apathy**

- Use calendars, schedules and routines to keep the person busy.
- Do not interpret lack of activity as "laziness."
- Patients may not be able to initiate activities, but may participate if encouraged by others.
- Gently guide behaviours, but accept "no."

Apathy is common in HD and is probably related to frontal lobe dysfunction. Apathetic patients become unmotivated and uninterested in their surroundings. They lose enthusiasm and spontaneity. Performance at work or school becomes sluggish. The symptom of apathy can be very troubling to families, if they see the active person they knew slipping away. It can be a source of conflict for caregivers, who know the person is physically capable of activities but "won't" do them.

Families need much education and support in this regard and should learn to practice a combination of exhortation and accommodation. While apathetic patients have trouble initiating actions, they will often participate if someone else suggests an activity and works along with them to sustain energy and attention. For example, a man with HD had always loved fishing, but when his brother came to take him fishing for his birthday he wanted to stay home in front of the television. The brother insisted, and when they left the house, he had a good time fishing all day. When he returned, he immediately turned the television back on.

Apathy can be hard to distinguish from depression. Apathetic patients, like those with depression, may be sluggish, quiet, and disengaged. They may talk slowly, or not at all. By and large apathetic patients will deny being sad, but in distinguishing the two it is important to ask not only about the patient's mood, but about other depressive symptoms as well, such as a change in sleeping or eating patterns, feelings of guilt, or suicidal thoughts. Neuroleptics and benzodiazepines can cause or worsen apathy. The need for these medications should be reexamined if the patient is apathetic.

Depressed patients with apathy should be treated aggressively for their depression, which may cause the other symptoms to remit. It can be very difficult to distinguish depression from primary apathy, but patients with primary apathy sometimes respond to psychostimulants such as methylphenidate (Ritalin), pemoline (Cylert) or dextroamphetamine (Dexedrine). These medicines are highly abusable and may exacerbate irritability. They should be used with caution. It may be more prudent to make a trial of a non-sedating antidepressant, such as an SSRI, first even if the patient does not seem to meet the criteria for depression, as these agents have also occasionally been helpful.

## *Anxiety*

Patients with HD are vulnerable to anxiety because of life circumstances, but also because of physical changes in the brain. Patients may develop a social phobia related to embarrassment about visible symptoms. As thought processes become less flexible, patients may be made anxious by trivial departures from the usual routine. Patients may worry for days in advance about what to wear when going to the hairdresser or whether to attend a family function.

In addressing anxiety, attempts should be made to decrease the complexity of the patient's environment. Stopping a job that has become too difficult may result in a remarkable decline in symptoms. Assisting the caregiver in establishing a predictable routine for the patient is helpful. Some caregivers find it useful to refrain from discussing any special events until the day before they are to occur. Patients who are very fearful of going to the doctor may need to be told only that they are going on an errand until they reach the clinic.

Some patients will not improve with counselling and environmental interventions and will require pharmacotherapy. The clinician should first assess whether the anxiety is a symptom of some other psychiatric condition, such as a major depression. Patients with obsessive-compulsive disorder may be made anxious by obsessions about danger or "germs," or if their rituals are interrupted.

Panic disorder, although uncommon in HD, is a highly treatable condition. It is characterized by the acute onset of overwhelming anxiety and dread, accompanied by physiological symptoms of rapid heartbeat, sweating, hyperventilation, lightheadedness, or paraesthesias. Panic attacks usually last only fifteen or twenty minutes, may begin during sleep, and may result in syncope. Suspected panic attacks require a good medical work-up, because most of the other possible explanations for the symptoms represent highly dangerous conditions. Once these other causes have been ruled out, the usual treatment consists of SSRIs, sometimes temporarily supplemented with benzodiazepines. SSRIs are usually mildly stimulating and may need to start at a lower dose than that used for depression.

Benzodiazepines should be used judiciously in anxious persons with HD because of the vulnerability of these patients to delirium and falls and because of their potential for abuse, especially in patients whose judgement may already be impaired. PRN medications may have to be controlled by a family member. Some patients will respond to the non-benzodiazepine anxiolytic buspirone, which can be started at 5mg two to three times per day and advanced to 20–30mg per day in divided doses.

## *Sexual Disorders*

Many patients with HD become uninterested in sexual activity. Others may continue to enjoy healthy sexual activity well into the course of the illness. Occasional patients may desire and pursue excessive sexual activity or engage in inappropriate sexual behaviours, such as public masturbation, or voyeurism. The spouse, usually the wife, may be distressed and fearful because the individual with HD may become aggressive if sexual demands are not met. Spouses may be afraid to talk about the problem unless interviewed alone.

Interventions are difficult in these circumstances, probably because of the patient's impaired judgement and the strength of the drive. Open communication about sex between the doctor and the family can help to destigmatize this sensitive topic. With open discussion among the parties, distressing sexual behaviours can sometimes be adapted into more acceptable acts. Patients engaging in these behaviours should be assessed and treated for comorbid conditions, such as mania. We have found antiandrogenic therapy helpful in a few of these cases.

# *Other Issues*

## DRIVING

All patients with HD eventually lose the ability to drive. This can be a severe blow for some patients, who see driving as a sign of competence and a way of maintaining independence. In many cases, patients, with the help of their families, will realize the time has come and will voluntarily stop driving, often before their physician has come to this conclusion. Other times, however, the issue of driving can become a source of contention between patients, families, and physicians.

People with HD can be divided into groups on the basis of their driving abilities. Some mildly affected patients may have no significant problems and simply need to remain alert and not drive when very tired, after drinking, or under hazardous conditions. Most moderately to severely affected patients are not safe behind the wheel. A large number of patients occupy the middle ground; they may have mild symptoms, but the safety of their driving is uncertain. The physician should ask family members who have driven with the patient for their impressions, and should inquire about recent accidents and traffic citations, including those that were "someone else's fault." Some patients minimize their disability. A formal driving evaluation, at an occupational therapy or rehabilitation centre may be available and can help both physician and patient by providing objective information about the individual's performance.

In a situation in which a patient has become a hazardous driver and is unwilling to stop, or lacks insight into the degree of impairment, the doctor must intervene forcefully for the protection of the patient and others. We have found it useful at such times to give the patient a "doctor's order" rather than a suggestion, and to tell the patient that the instruction to stop driving will be documented in the record.

Some provinces may require physicians to notify the appropriate government department if a patient is no longer safe to drive. Family members can report a patient who is dangerous and will not listen to reason. This is a very unpleasant responsibility, but it must be shouldered. In some provinces, these reports may be made anonymously at times, to preserve harmony.

## Smoking

Smoking sometimes becomes a problem for people with HD, for two reasons. Changes in the person's behaviour related to disinhibition, personality changes, and perhaps boredom may turn smoking into a consuming passion, leading to irritability and even violence if thwarted. Simultaneously chorea, impairment of voluntary movements, impaired judgement, and diminished capacity for self observation may make the act of smoking unsafe. A variety of approaches have been helpful in decreasing the behaviour and improving safety. Non-pharmacologic interventions include the establishment of smoking schedules and general safety measures such as ensuring that the patient does not smoke in bed, limiting smoking to rooms without rugs, and use of adaptive devices, such as a flexible tube smoker or a "smoker's robot," available through rehabilitation supply and safety product catalogs (see Appendix 3).

We have also used nicotine patches with some success. The goal is not necessarily to wean the patient completely off cigarettes or patches, but to decrease the drive for cigarettes, and the periods of nicotine withdrawal, which may worsen irritability. A variety of the antidepressant buproprion has also recently been marketed for use in smoking cessation and may be worth a try.

## Sleep Disorders

Sleep disturbance is a common problem in Huntington disease, and can be due to a variety of causes. A complaint of sleeplessness may be due to a mood disorder, either depression, or, less commonly, mania. In these cases, treatment of the mood disorder should lead to a normalization of sleep. The clinician should conduct a careful interview and speak to the patient's family to rule out this possibility.

Good sleep hygiene is also important. Patients who do not have enough to do, and whose days are insufficiently structured may develop a reversal of the sleep-wake cycle in which they nap most of the day, and are then awake at night. This pattern tends to reinforce itself and can be hard to interrupt. Helpful strategies include sleeping consistently in a room which is not used for wake-time activities, having a regular bedtime and waking time, and enrolling in a day program, which keeps the patient occupied and prevents daytime napping. In the later stages of illness, patients may have an increased need for rest and daytime napping may be entirely appropriate, as long as the patient is sleeping at night.

Some patients will require pharmacologic treatment of their insomnia. We would caution against long-term use of benzodiazepine or barbiturate hypnotics because of the potential for tolerance, dependence, and delirium and usually prefer to use a small dose of a sedating antidepressant such as trazodone (Desyrel), beginning at 25–50mg and increasing to about 200mg as necessary. Sedating tricyclics such as doxepin (Sinequan) or amitriptyline (Elavil) can also be employed, but are highly dangerous in overdose.

It is not entirely true that chorea ceases when patients are asleep. Sleep studies conducted in patients with refractory insomnia have suggested that some HD patients have restless sleep because of a large amount of involuntary movements at night. The patient himself will often be unaware of these

nighttime movements, but they will often be reported by the spouse or caregiver. A small dose of fluphenazine, haloperidol (0.5–2mg) or clonazepam (0.5–1mg) at bedtime, may suppress the movements sufficiently to allow more restful sleep. Polysomnography or referral to a sleep disorder center may be helpful in these difficult cases.

Painful leg cramping caused by dystonia and spasticity can also disrupt sleep. Treatment with a muscle relaxant, such as baclofen may relieve the problem.

## INCONTINENCE

Most patients with advanced HD are incontinent, although this may be minimized with regular toileting. Although urinary urgency, leading to intermittent incontinence may occur earlier in the course of the disease, this is not a typical finding, and should be evaluated further before attributing it to HD alone. Causes may include neurogenic bladder, urinary tract infections, urinary retention due to anticholinergic drugs or tricyclic antidepressants leading to overflow incontinence, sedation or immobility caused by neuroleptics or sedatives, depression, dementia, or mechanical problems. Urologic consultation may be helpful in defining the nature of the bladder dysfunction and obtaining specific recommendations.

## DISABILITY

The progressive nature of Huntington disease will eventually force patients to retire from employment. Unfortunately, many patients' job performance will already have begun to deteriorate before they have received a diagnosis, or before they have made the connection between HD and the problems they are having at work. The actual difficulty is most often a problem of organization, flexibility, and the speed of mental information processing, but the patient may appear careless or lazy, may be irritable at work, or may even be suspected of being intoxicated. This may lead to an individual being disciplined, passed over for raises or promotions, or even fired for cause when in fact the problem is a medical disability due to HD.

Therefore, early identification of HD-related problems at work is very important, for the purposes of securing accommodations at work, and eventually disability. There may also be issues of work safety. A physician or social worker may be able to help the individual inform superiors at work of the nature of the problem, decide when to take retirement, and navigate the disability application process. In our experience, many employers are sympathetic once informed, and have provided less stressful work environments and assistance with disability retirement.

We have included a sample disability letter in Appendix 5. HD is a complex condition and the patient may be unable to work, but may not have a single sign or symptom which, by itself, would qualify her for disability. Therefore, disability letters must be comprehensive, must stress functionality, and should include specific examples of dysfunction at work. Because of the particular nature of the dementia found in HD, routine IQ test scores may not be relevant to the level of impairment because they do not reflect the

organizational and task-switching problems found in Huntington disease. Tests specifically directed toward executive function will better identify HD-related cognitive deficits.

## End of Life Issues

It is important to discuss issues related to the end of life before someone with HD loses the ability to communicate. By discussing the expected changes in advance patients can plan for the support that they and their families will need, and can have a discussion with their family and physicians about which medical treatments and interventions they think they would like to undergo, and which they would prefer to have withheld when they reach the late stages of the disease. By the late stages of HD affected individuals will have little control over voluntary movements and may not be able to walk, talk, or eat. Chorea may be suppressed, or may be severe. Death, when it comes, is usually due to the consequences of the immobility, general debilitation, and malnutrition. Pneumonia, and heart failure are typical immediate causes of death.

Table 18:
**End Of Life Issues**

- In-home versus outside care
- Gastrostomy tube feeding
- Life sustaining emergency measures (e.g. CPR, intubation)
- Use of antibiotics to treat infections
- Other specific care issues (e.g. treatment of other ongoing health problems)
- Guardianship, substituted consent, and “living wills”
- Autopsy/ brain donation for research

Huntington disease patients and their families have a number of important decisions to make about this phase of the illness. The first concerns where the patient will be cared for. Some people wish to spend their last months at home, and receive terminal care in this setting, but others require the services of a long-term care facility for the final phase of their illness. This may make the patient more comfortable and relieve stress on the family. Patients and their families must decide which treatments they want if they become acutely ill, such as antibiotics for pneumonia, or CPR for a cardiac arrest. Patients who are unable to swallow will die if not given food and fluids by other means, but with a gastrostomy tube they may live for years. Improved caloric intake can increase resistance to infections, improve physical appearance, and is sometimes associated with a decrease in chorea. Others may not desire such an intervention, depending on their view of the quality of life at that time and their individual spiritual beliefs.

There are different legal mechanisms in every province by which patients can make their wishes known in advance, but it must be stressed that there is no substitute for good communication directly between patients, their families, and their doctors. The process should start early, so that difficult topics can be introduced gradually, in an unhurried manner, and so that the conversation can take place while the patient retains the ability to communicate.

It is also important to readdress these issues periodically. An advance directive reflects a person's ideas at one discreet interval, often several years in the past. For example a blanket statement such as “I would never want a feeding tube,” made shortly after the diagnosis of HD, may be revised as the patient and family gradually adapt to increasing disability.

One must avoid overgeneralizations about “end-stage HD.” An intervention that is right for one person may not be right for another. For example, many patients who can no longer eat safely are still able to talk and are fully aware of their surroundings. In one instance a man was told that placement of a gastrostomy tube would reduce the number of aspiration pneumonias from which he suffered. He replied that eating was one of his few pleasures and he preferred to take this risk, knowing that it might shorten his life. In another instance, a teenaged girl with juvenile onset HD had become very rigid and was unable to eat. A ward of the state, she was initially denied a gastrostomy tube by her official guardian who believed that such interventions were “futile” and “only prolong suffering.” This decision was reversed when her foster mother strenuously pointed out that the girl was in no pain, was enjoying activities and family life, could still talk, and in fact had been asking for the tube all along. For other individuals, the issue of a gastrostomy tube does not arise until the patient no longer seems aware of his surroundings. In this circumstance, it often seems best to a family not to prolong the process artificially, but to support the patient’s comfort and let him die a natural death.

It is our hope that when death does come to a person with HD, that this person’s family will consider making a gift of brain tissue to one of the projects that study such material, which are listed in Appendix 1. We hope that, where possible, patients and families will discuss this decision with each other in advance and will also inform the staff of long-term care facilities and hospices of their intentions ahead of time. The cost of autopsy and transportation to and from the funeral home are usually born by the institution receiving the donation, and the brain can be removed quickly so as not to delay burial and in such a way that it does not show and will not interfere with viewing. These generous gifts, made at a sad time, may give the person’s death great meaning. Each one moves us closer to the day when no one will have to die from Huntington disease.

# *Appendix 1*

## VOLUNTARY AGENCIES

Huntington Society of Canada
151 Frederick Street
Suite 400
Kitchener, Ontario
N2H 2M2

tel: 1 800 998-7398
fax: (519) 749-8965
email: info@hsc-ca.org
web site: www.hsc-ca.org

Huntington Society of Quebec
505, boul. de Maisonneuve Ouest,
bureau 900
Montreal, Québec
H3A 3C2

tel: (514) 282-4272
fax: (514) 282-4242
email: shq@total.net
web site: www.hsc-ca.org

Huntington's Disease Society of America
158 West 29th Street, 7th Floor
New York, New York
10001-5300

tel: 1 800 345-4372
fax: (212) 239-3430
email: curehd@idt.net
web site: www.hdsa.org

International Huntington Association
Callunahof 8
7217 ST Harfsen
The Netherlands

tel: +31 573-431595
fax: +31 573-431719
email: iha@huntington-assoc.com
web site: www.huntington-assoc.com

## Brain Tissue Bank

Canadian Brain Tissue Bank
Toronto Western Hospital—Western Division
Bathurst Wing 4-69
399 Bathurst Street
Toronto, Ontario
M5T 2S8

tel: (416) 978-7950
fax: (416) 978-7935

## DNA Bank

Canadian Centre for Molecular Medicine and Therapeutics
University of British Columbia
950 West 28th Avenue, Room 3024
Vancouver, BC
V5Z 4H4

tel: (604) 875-3535
fax: (604) 875-3819

# *Appendix 2*

## PREDICTIVE TESTING CLINICS

Predictive testing clinics perform the genetic test for HD and offer genetic counselling. Before testing, a genetic counsellor helps the individual explore reasons for taking the test, and prepare for receiving the results. After testing, counselling is geared to offering support and assistance in understanding the impact of either negative or positive test results on the individual and the family.

### *ALBERTA*

Edmonton
Dr. John Stephen Bamforth
University of Alberta Hospitals
Clinical Sciences Building
4th Floor, Room 117
8440 - 112th Street
Edmonton, AB T6G 287
Tel: (403) 492-4077
Fax: (403) 492-6845

Calgary
Dr. Oksana Suchowersky
Division of Medical Genetics
Alberta Children's Hospital
1820 Richmond Road SW
Calgary, AB T2T 5C7
Co-ordinator: Linda MacLaren
Tel: (403) 229-7371
Fax: (403) 229-7624

### *BRITISH COLUMBIA*

Vancouver
Dr. Michael R Hayden
Department of Medical Genetics
University of British Columbia
RM F168-2211 Wesbrook Mall
Vancouver, BC V6T 2B6
Co-ordinator: Elisabeth Almqvist
Tel: (604) 822-7738
Fax: (604) 822-7970

Victoria
Dr. Patrick MacLeod
Medical Genetics
Victoria General Hospital
35 Helmcken Road
Victoria, BC V8Z 6R5

Tel: (250) 727-4461
Fax: (250) 727-4295

## *MANITOBA*

Winnipeg
Dr. Cheryl Greenberg
Department of Paediatrics
Room 231 - Children's Hospital
685 William Avenue
Winnipeg, MB R3E 0W1
Tel: (204) 787-2499
Fax: (204) 787-1419

## *NEWFOUNDLAND*

St. John's
Newfoundland & Labrador
Medical Genetics Program
Janeway Child Health Centre
Janeway Place
St. John's, NF A1A 1R8
Co-ordinator: Marian Crowley / David McGregor
Tel: (709) 778-4363
Fax: (709) 778-4190

## *NOVA SCOTIA / NEW BRUNSWICK / PRINCE EDWARD ISLAND*

Halifax
Dr. J.P. Welch
Atlantic Research Centre – Medical Genetics
IWK Grace Health Centre
5850/5980 University Ave
Halifax, NS B3J 3G9
Co-ordinator: Heather Hogg
Tel: (902) 428-8754
Fax: (902) 428-8709

## *ONTARIO*

Hamilton
Dr. Don Whelan
Department of Paediatrics & Human Genetics
McMaster University Medical Centre
1200 Main Street West
Hamilton, ON L8N 3Z5
Co-ordinator: Debbie Eisenberg
Tel: (905) 521-5085
Fax: (905) 521-2651

Kingston
Dr. Mohamed Khalifa
Division of Medical Genetics
Department of Paediatrics
Queen's University
20 Barrie Street
Kingston, ON K7L 3N6
Co-ordinator: Ruth Lokkesmoe
Tel: (613) 545-6310
Fax: (613) 548-1348

London
Dr. Hubert Soltan
Regional Medical Genetics Centre
Children's Hospital of Western Ontario
800 Commissioners Road East
London, ON N6A 4G5
Co-ordinator: Cathy Corley
Tel: (519) 685-8140
Fax: (519) 685-8214

Mississauga
Ms. Anaar Sajoo
Medical Genetics
Credit Valley Hospital
2200 Eglinton Avenue West
Mississauga, ON L5M 2N1

Tel: (905) 813-4104
Fax. (905) 813-4347

North Bay
Ms. Francine Robert\Kim MacDonald
North Bay & District Health Unit, Genetics Program
681 Commercial Street
North Bay, ON P1B 4E7
Tel: (705) 747-1400
Fax. (705) 747-8252

North York
Dr. Wendy Meschino / Anne Summers
Clinical Genetics Diagnostic Centre
Room 392 - North York General Hospital
4001 Leslie Street
North York, ON M2K IEI
Co-ordinator: Andrea Shugar
Tel: (416) 756-6345
Fax: (416) 756-6727

Oshawa
Dr. H. Allen Gardner
Director of Genetic Services
Oshawa General Hospital
24 Alma Street
Oshawa, ON LIG 2B9
Co-ordinator: Maureen Johnstone
Tel: (905) 576-8711
Fax: (905) 721-4736

Ottawa
Dr. Alasdair Hunter / Judith Allenson
Division of Genetics
Children's Hospital of Eastern Ontario
401 Smyth Street
Ottawa, Ontario K7H 8L1
Co-ordinator: Claire Goldsmith
Tel: (613) 737-2275
Fax: (613) 738-4822

Peterborough
Peterborough Country Health Unit
Genetics Program
129 - 380 Armour Road
Peterborough, ON K9H 7L7

Sault Sainte Marie
Helen Kwolek / Lori Russon
Genetics Clinic
Algoma Health Unit
Civic Centre
99 Foster Drive
Sault Sainte Marie, ON P6A 5X6
Tel: (705) 759-5281 x353
Fax: (705) 759-1534

Sudbury
Ms. Heather Hare, BSc / Valerie Allison, RN / Dolores Fortier, RN
Genetic Counselling Services
4 Boland Avenue
Sudbury, ON P3E IX7
Tel: (705) 675-4786
Fax: (705) 675-7911

Thunder Bay
Ms. Cathy Gillies / Linda Spooner / Jan Swain
Genetic Counselling Services
Thunder Bay District Health Unit
999 Balmoral Street
Thunder Bay, ON P7C 4X8
Tel: (807) 625-5900
Fax: (807) 623-2369

Timmins
Ms. Michelle Caron-Heroux / Guylaine Malette-Robichaud
Porcupine Health Unit
Genetics Department
Bag 2012 - 169 Pine Street South
Timmins, ON P4N 8B7
Tel: (705) 267-1181 x364
Fax: (705) 264-3980

## *QUEBEC*

Chicoutimi
Mme Claude Provost
Genetic Counsellor
Hôpital de Chicoutimi
305 St. Vallier
Chicoutimi, PQ G7H 5H6
Tel: (418) 541-1000 x22153
Fax: (418) 541-1138

Montreal
Dr. David Rosenblatt
Division of Medical Genetics
Department of Medicine
McGill University
1650 Cedar Ave
Montreal, PQ H3G 1A4
Co-ordinator: Suzanne Dufrasne
Tel: (514) 937-6412
Fax: (514) 934-8273
Co-ordinator: Lidia Kasprzak
Tel: (514) 843-1449
Pager: (514) 988-6700
Fax: (514) 934-8273

## *SASKATCHEWAN*

Saskatoon
Dr. Eli Lemire
Department of Medical Genetics
Royal University Hospital
Room 515, Ellis Hall
University of Saskatchewan
Saskatoon, SK S7N OXO
Co-ordinator: Sharon Cardwell
Tel: (306) 655-1692
Fax: (306) 655-1736

This list of predictive genetic testing centres is maintained for information purposes only. Inclusion in the list does not constitute an endorsement or recommendation by the Huntington Society of Canada.

# *Appendix 3*

## REHABILITATIVE/ADAPTIVE EQUIPMENT AND PRODUCT INFORMATION

### *CHAIRS*

Broda Seating
72 Victoria Street South
Kitchener, Ontario N2G 2A9
(519) 578-9630
(800) 668-0637 (Canada and US)
*Specialized HD chairs*

Furnco Healthcare, Inc.
PO Box 831
Orillia, Ontario L3V 6K8
(705) 329-2711
*Q-foam chairs, walkers, and miscellaneous adaptive equipment*

Gunnel, Inc.
8440 State Street
Millington, MI 48746
(517) 871-4529
(800) 551-0055
*Gunnel Custom Recliner; customized wheelchairs*

Hill Rom
1069 State Bank 46 East
Batesville, TN 47006
(800) 445-3730
*Customized wheelchairs*

Kirton Healthcare
23 Rockwood Way
Haverhill, Suffolk CB9 8PB
United Kingdom
01440 705352
*Halesworth chair*

Lazy Boy Recliners
Local Lazy Boy furniture dealer
*Luxury lift power recliners*

May Corporation
250 Prairie Center Drive, Suite 211
Minneapolis, MN 55344
(612) 944-6450
(800) 525-3590
*Posture Guard (wheelchair with body guard); customized wheelchairs*

PDG, MedBloc
700 Ensminger Road, U112
Tonawanda, NY 14150
(888) 433-6818
*Bentley Chair*

Piccard Medical Corp.
PO Box 170
Weyerhauser, WI 54895
(800) 858-2633
*Customized wheelchairs*

Schwartz Medical
1032 Stuyvesant Avenue
Union, NJ 07083
(908) 687-1122
1 (800) 4SCRIPT
*Customized wheelchairs*

## *Bedding, Padding, Low Beds, Bed Enclosures*

Ele-Bumpers
PO Box 612
Felton, CA 95018
(408) 335-3166
*Bed padding*

NOA Medical Industries
1601 Woodson
St. Louis, MO 33114
(800) 368-2337
*Low beds*

Profex Bumper Pads
PO Box 16043
8013 Maryland Ave.
St. Louis, MO 63105
(800) 325-0196
*Foam products; adaptive equipment*

Safe Keeper
4477 Harlen Street
Wheat Ridge, CO 80033
(303) 423-6613
*Bed enclosure*

Vail Products
235 First Street
Toledo, OH 43605
(800) 235-VAIL
*Bed enclosure*

## *Walking Devices*

Sunrise Medical
12800 Wentworth Street
Atleta, CA 91331
(818) 504-2820
(800) 255-5022
*Grandtour walking device, rolling walker, standard walker, canes, adaptive equipment*

Guardian Products
4175 Guardian Street
Simi Valley, CA 93063
(800) 423-8034
*Walkers; adaptive equipment*

Sammons Preston
PO Box 5071
Bolingbrook, IL 60440
(800) 323-5547
*Strider walker, standard walker; adaptive equipment*

## *Rehabilitation Aids and Safety Products*

Access to Recreation
2509 East Thousand Oaks Blvd., Suite 430
Thousand Oaks, CA 91362
(800) 634-4351
*Adaptive equipment for recreation and activities of daily living*

Alimed
297 High Street
Dedham, MA 02026
1 (800) 225-2610
*Adaptive equipment*

North Coast Medical
2509 E. Thousand Oaks Blvd., Suite 430
Thousand Oaks, CA 91362
(800) 634-4351
*Adaptive equipment*

J.T. Posey Co.
5635 Peck Road
Arcadia, CA 91006
(800) 44-POSEY
*Positioning devices; adaptive equipment*

Skil-Care
29 Wells Ave.
Yonkers, NY 10701
(800) 431-2972
*Positioning devices; safety products*

Smith & Nephew Rolyan
N93 W14475 Whittaker Way
Menomonee Falls, WI 53051
(800) 558-8633
*Padding materials; adaptive equipment*

## *Food Preparations*

## *Food Thickeners:*

Diafoods Thick-It Food Thickener
Milani Foods, Inc.
2325 Armitage Ave.
Melrose, IL 60160
(708) 450-3189 and toll-free (800) 333-0003

Consist-Rite
Donmar Foods
210A Denison Street
Markham, Ontario L3R 1B6
(416) 475-6530

Thick ‘N Easy Instant Food Thickener
American Institutional Products, Inc.
PO Box 5387
Lancaster, PA 17601

## *Cookbooks:*

*The Thick ’N Easy Recipe Book*
American Institutional Products, Inc.
PO Box 5387
Lancaster, PA 17601

*Blending Magic*
Bernard Jensen Prodcuts
PO Box 8
124 East Cliff Street
Solana Beach, CA 92075

*Non-Chew Cookbook*
J. Randi Wilson, 1985

## *Food Moulds:*

Culinary Purée, Inc.
6001 Felstead Road
Evansville, Indiana
47712
1 800 981-7744

## *Information and Supplies for Puréed Foods:*

PK Company
198 Mammoth Road #4
Lowell, MA 10854

# *Appendix 4*

The following rehabilitation survey, developed by Lori Quinn, Ed.D., P.T., New York Medical College, may be helpful in assessing a patient's ability to perform activities of daily living (ADL), either in the home or in a long-term care setting, and also in recommending adaptive equipment where necessary.

## Sample Rehabilitation Survey
## Huntington Disease Program

Name:_____ Date: _____

Indicate amount of caregiver assistance, current equipment used, and safety or other concerns involved for each ADL activity. Place a check (✔) next to the recommended equipment and list specific instructions or recommendations on provided lines.

Bathing _____
_____

- ❑ Tub seat _____
- ❑ Shower bar _____
- ❑ Non-slip mat _____
- ❑ Sponge mitt _____
- ❑ Scrub sponges _____

Dressing _____
_____

- ❑ Elastic waists _____
- ❑ Pull over shirts _____
- ❑ Ring zipper pull _____

Shoes (Donning/Doffing) _____

_____

- ❑ Supportive sneakers _____
- ❑ Velcro straps _____
- ❑ Elastic shoelaces _____
- ❑ Long handled shoehorn _____
- ❑ Referral to orthotics clinic (heel lift, molded inserts) _____

Kitchen _____

_____

- ❑ Extra long mitts _____
- ❑ Pre-made foods _____
- ❑ Utility cart _____
- ❑ Milk carton holder _____
- ❑ Keep most used items at waist level or below _____

Eating/Drinking _____

_____

- ❑ Straw (one-way) _____
- ❑ Weighted spoon/fork _____
- ❑ Cup with lid and straw _____
- ❑ Food guard _____
- ❑ Non stick dycem _____
- ❑ Weighted cup _____
- ❑ Inner lip plate _____

Walking/Balance_____

_____

- ❑ Ankle weights _____
- ❑ Rolling/standard walker _____

- ❑ Rollator (3 or 4 wheels) _____
- ❑ Cane (straight) _____

Chair/Seating

_____

_____

- ❑ Sit in supportive chair with sturdy seat and back when eating, drinking, smoking _____
- ❑ Horizon or Broda chair, tilt-in-space with maximal padding _____
- ❑ Self propelling wheelchair _____
- ❑ Recliner chair _____

Environmental adaptations (layout of room, padding on furniture, rugs, etc.)

_____

_____

Other Recommendations

- ❑ Ankle/wrist weights _____
- ❑ Smokers aid _____
- ❑ Writing grip _____
- ❑ Weighted pen _____

_____

_____

_____

Signature, Title

# *Appendix 5*

## Sample Disability Letter

The following is intended as a guide to the areas that typically should be addressed in a disability application, whether the physician is completing a standard form or writing a generalized letter. Not all sections will apply to every individual with HD.

*Adapted from the Baltimore Huntington's Disease Center at The John Hopkins Hospital, Baltimore, MD.*

Dear _____:

This report is to provide medical support for the disability application of _____ who has Huntington disease (HD).

Mr./Mrs./Ms. _____was seen in our clinic for the first time on _____, and clinically diagnosed as affected with Huntington disease on _____. Symptoms began in _____. We have followed him/her yearly since _____, and are confident of the diagnosis based upon clinical observations, his/her positive family history of an affected _____, and DNA CAG triplet repeat expansions which confirm that he/she has the mutation that causes Huntington disease.

HD is an inherited neuropsychiatric disorder that is progressive and terminates in death of the affected person. Recovery or remission never occur. Diagnosis is based upon clinical symptoms, a positive family history, and DNA testing. An MRI done on _____ reports "_____." Autopsy of the brain following death will provide further confirmation of the clinical diagnosis.

Treatment is ineffective in terms of progression of the disease. Incapacitation occurs relatively early in the course of this debilitating illness with progression to total disability and dependency for all activities of daily living. There are 3 characteristic clinical features: 1) loss of ability to control bodily movements, 2) loss of ability to think and act quickly, to learn new material and to remember, and 3) apathy and severe depression, often resulting in suicidal behaviour. Patients also exhibit poor social judgement and may be irritable and aggressive.

When last examined on _____, Mr./Mrs./Ms. _____ had abnormal eye movements, slow/dysarthric speech, poorly coordinated finger-thumb tapping, and rapid alternating movements.

He/she has increased risk for falling secondary to his/her impaired voluntary movements and his/her significant chorea as well as his/her disrupted gait. The Activities of Daily Living Examination revealed that the patient is slow and clumsy, and has begun to spill things and drop objects. Because of his/her HD, the patient cannot learn new information which makes job training and rehabilitation more difficult. Apathy and severe chorea have resulted in more time spent in sedentary activities. If left alone, he/she does nothing. Unless medications are distributed or monitored by a caretaker, he/she frequently forgets to take them. He/she is no longer capable of preparing meals without help, keeping up with home maintenance or repairs, or making rational decisions about spending. Although he/she lives alone/with spouse, he/she experiences increased difficulty getting through the simplest of tasks.

He/she has great difficulty initiating and completing projects. He/she is tired and lethargic as a result of the disease, and his/her concentration and attention are grossly diminished. He/she also finds it very difficult to think through problems.

As for the sensory examination, Romberg and cranial nerves are not affected in Huntington disease.

Mr./Mrs./Ms. _____ last worked on _____. His/her difficulties on the job were first noted in _____. At that time, he/she _____. Although his/her intelligence is judged to be (low average/average/high average) _____, his/her insight is grossly impaired.

Mr./Mrs./Ms. _____ has/has not suffered from depression associated with HD since _____. Depression is usually quite common in this population. This disorder has/has not been treated successfully with _____ since _____. Although the treatment has provided some symptomatic relief, it has not improved the patient's ability to function. The progression of his/her neurological and cognitive decline will worsen without remission for the duration of his/her life.

He/she is not a candidate for vocational training now, or at any time in the future because, like all patients with HD, he/she has progressive cognitive and neurological degeneration and is unable to learn new tasks. Neurologically, fine and gross motor task performance is unsafe and ultimately impossible due to poor motor coordination. These patients are at high risk for accidents, especially in manual labor jobs, as a result of this neurological deterioration.

In summary, this _____ year old male/female was well until _____ when HD began. He/she has been unable to work since _____ because of the motor impairment, cognitive inefficiency and psychiatric features mentioned above. We hope you will grant disability to this fatally ill individual. If you wish further information, please call _____.

# *References and Additional Reading*


1. Brandt, J. and Butters, N. 1996. Neuropsychological characteristics of Huntington disease, in I. Grant (Ed). *Neuropsychological assessment of neuropsychiatric disorders*. 2nd edition, Oxford University Press: New York.

2. Folstein M.F., Folstein S.E., McHugh P.R. 1975. "Mini-Mental State": A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res*, 2:189-198.

3. Folstein, S.E. 1989. *Huntington's Disease: A Disorder of Families*. The Johns Hopkins University Press: Baltimore.

4. Folstein S.E., Jensen B., Leigh R.J., Folstein M.F. 1983. The measurement of abnormal movement: Methods developed for Huntington disease. *Neurobehav Toxicol and Teratol*, 5:605-609.

5. Harper, P.S. 1996. *Huntington's Disease*, 2nd Edition. WB Saunders: London.

6. Huntington Study Group. 1996. Unified Huntington disease rating scale: Reliability and consistency. *Movement Disorders*, 11:136-142.

7. MacDonald, M.E. and Gusella, J.F. 1996. Huntington disease: translating a CAG repeat into a pathogenic mechanism. *Current Opinion in Neurobiology*, 6:638-643.

8. Matiss, S. 1988. Dementia Rating Scale (manual). Psychological Assessment Resources: Odessa, FL.

9. Nance, Martha A. 1996. Huntington Disease - Another Chapter Rewritten. *American Journal of Human Genetics*, 59:1-6.

10. Paulsen, J.S. 1999. *Understanding Behaviour in Huntington Disease*. Huntington Society of Canada.

11. Ross, C.A. 1997. Intranuclear neuronal inclusions: A common pathogenic mechanism for glutamine-repeat neurodegenerative diseases? *Neuron*, 19: 1147-1150.

12. Ross, C.A., Margolis, R.L., Rosenblatt, A., Ranen, N.G., Becher, M.W., and Aylward, E.A. Reviews in molecular medicine: Huntington disease and a related disorder, dentatorubral-padoluysian atrophy (DRPLA). *Medicine*, 76:305-338.

13. Rubinsztein, D.C. and Hayden, M.R. 1998. *Analysis of Triplet Repeat Disorders.* Bios Scientific Publishers: Oxford.

14. Wells, Robert D., Warren, Stephen T., Sarmiento, M., Eds. 1998. *Genetic Instabilities and Hereditary Neurological Diseases*. Academic Press: San Diego.

Huntington Society of Canada
151 Frederick St., Suite 400
Kitchener, Ontario  N1R 7G6
Tel: (519) 749-7063  Fax: (519) 749-8965
Toll free in Canada: 1-800-998-7398
Email:  info@hsc-ca.org
Web site: www.hsc-ca.org

Huntingtonâ€™s disease is a neurodegenerative disorder inherited in an autosomal dominant fashion that results in involuntary movements, psychiatric symptoms, and cognitive dysfunction. The illness...Â  Rosenblatt A, Ranen NG, Nance MA, Paulsen JS: A Physicianâ€™s Guide to the Management of Huntingtonâ€™s Disease, edn 2. New York: Huntingtonâ€™s Disease Society of America; 1999:41. The management of Huntingtonâ€™s disease is reviewed by a group of experienced clinicians who address the full range of issues encountered by patients and families. Very useful sections on behavioral and environmental strategies for caregivers are included.Google Scholar. 14. Jenson P, Fenge K, Bolwig TG, et al.