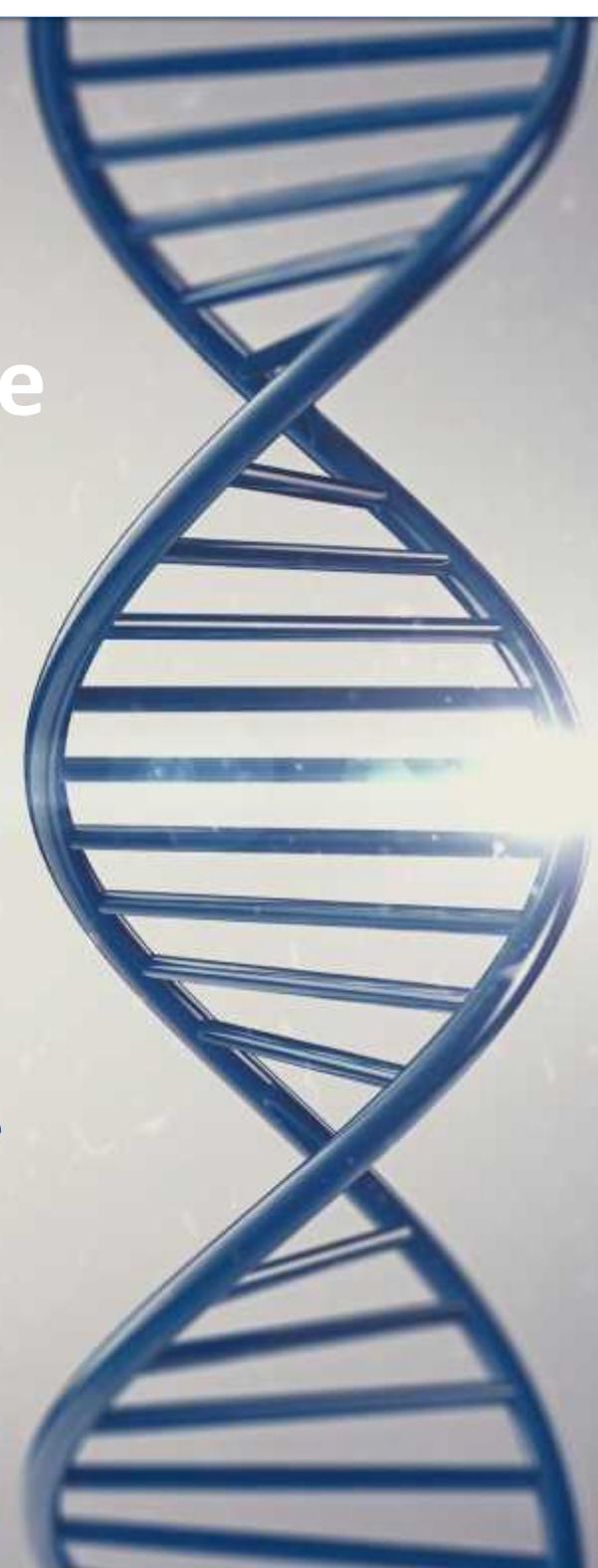
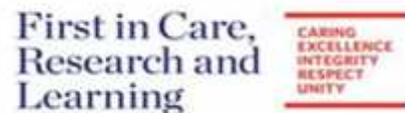


# Improving clinical management and quality of life in mid to late stage Huntington's disease

*How research can inform clinical practice  
and vice versa*

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MELBOURNE HEALTH



# Evidence Based Practice

- Clinical practice assessments, guidelines, interventions and treatments should be evidence based wherever possible
- This means utilising the results and outcomes from quality research publications to form the basis of standard clinical practice

<u>Level I:</u>	Systematic Review of all RCT's or clinical practice guidelines based on SRs
<u>Level II:</u>	At least one well-designed Randomized Controlled Trial (RCT)
<u>Level III:</u>	Well-designed controlled trials without randomization, quasi-experimental
<u>Level IV:</u>	Well-designed case-control and cohort studies
<u>Level V:</u>	Systematic reviews of descriptive and qualitative studies
<u>Level VI:</u>	A single descriptive or qualitative study
<u>Level VII:</u>	The opinion of authorities and/or reports of expert committees

- Where is the research often lacking?

In diseases/disorders that affect smaller numbers of people, or are associated with specific (often minority) ethnic groups.

In mid to late stage disease care and management – research is often focussed on cures predominantly

# Clinical Research

- Driven by: clinical need + gaps in literature
- Occurs in a clinical setting
- Uses 'real' patients, often in their 'traditional' treatment environment
  
- Often level III to VI research: controlled case studies, file audits, pre-post treatment reviews, practice analysis and systematic reviews of clinical research literature
  
- Is Clinical Research worth it?

***Some research/evidence is better than none***

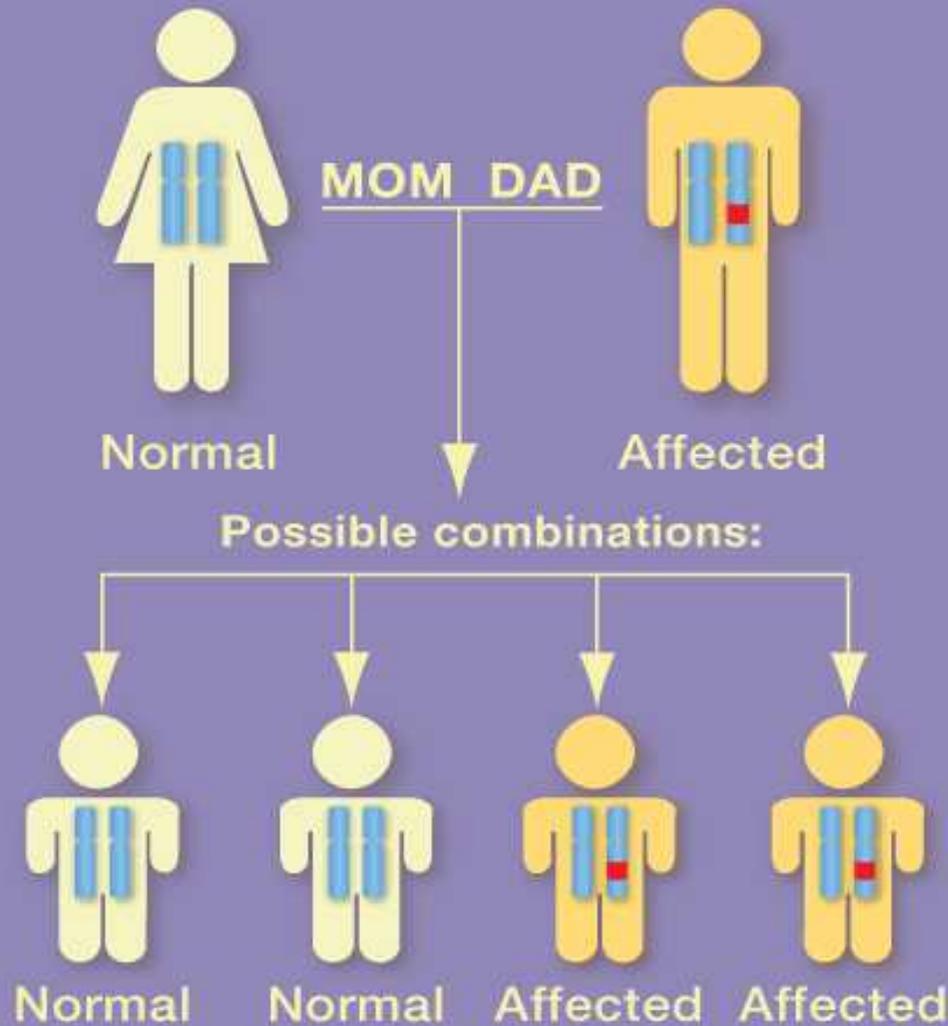
***It may be the best that can be achieved on the budget, resources and access that is available***



# Huntington's Disease

- Rare, hereditary, neurodegenerative condition, 50% chance of inheritance
- Expansion of CAG triplet repeat in the huntingtin gene (4p16.3)
- Leads to an increase of a polyglutamine protein that becomes neurotoxic
- Medium spiny neurons affected, basal ganglia, cortex and hippocampus
- Movement disorder: chorea, gait balance, motor control
- Psychiatric disturbance: dysphoria, agitation, irritability, apathy, anxiety,
- Cognitive impairment: psychomotor slowing, language and executive impairment
- Onset of symptoms usually occurs in adulthood or middle age
- Significant problems with relationships, accommodation and functioning
- Progresses over the course of 10 to 20 years and is fatal
- No cure for HD, or effective treatment

# Autosomal Dominant Inheritance

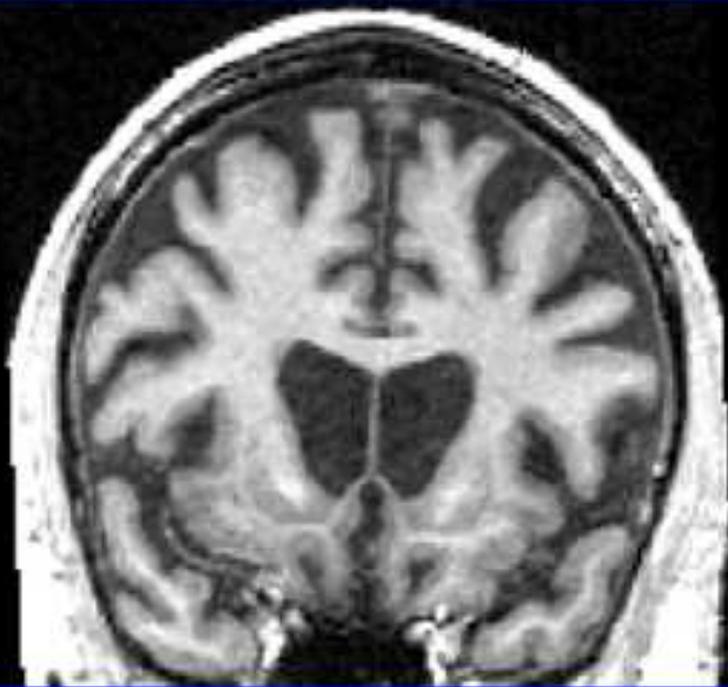


-  Chromosome with normal copy of gene
-  Chromosome with defective copy of gene

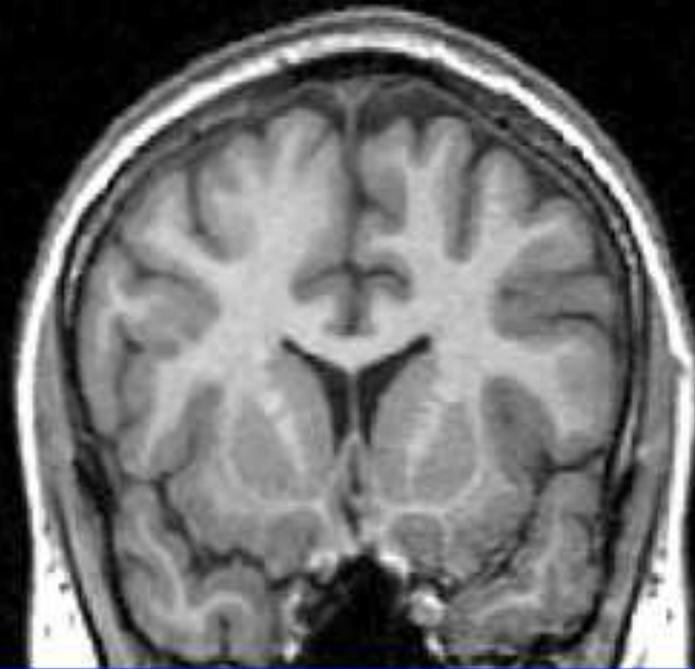
Each child inherits a normal copy from Mom and either a normal or a defective copy from Dad.

## MRI findings in HD

HD



Normal



# Clinical Issue - Aggression

- Approximately 5 patients with HD residing in inpatient unit at any one time
- Mid to late stage HD
- High levels of aggression
- Verbal aggression and physical aggression to people and furniture
- Co-patients, staff, family members at high risk of assault
- Significant impact on well-being of staff and patients

# Questions to Answer

- How common is Aggression in HD?
- What can we do to reduce it?

# Step 1: Systematic Review

Thorough, systematic search of literature, collating all available research, and can include a meta analysis of data (if appropriate)

- No existing systematic review, or treatment guidelines for aggression in HD
- Initial thorough (non systematic) review of the literature
- Formalised a systematic review methodology, and re-ran the search of the literature to capture all articles

## Aims

- 1) Review the published evidence on rates of aggression in Huntington's disease and identify correlating factors as well as behavioural, situational or environmental antecedents for this behaviour.
- 2) Review the published evidence on treatment strategies for aggression in HD, including both pharmacological and nonpharmacological interventions.

# ... major findings

## Aim 1

- Rates of Aggression in HD: 22 to 66 percent (14 studies)
- Types: Verbal = Physical > Furniture/objects
- Correlating Factors: May be more common in males, those who fall often, have OCD symptoms and suicidal ideation
- Antecedents for Aggression: No empirical data

## Aim 2

- Treatment studies: No randomised controlled trials  
1 small group study, case series and case study reports  
Methodological problems with all (19 studies)
- Medications: Antipsychotics, antidepressants, beta-adrenergic blockers, movement disorder medications  
Due to very poor study design and lack of statistical analysis in most, no medication could be recommended.
- Non medication Rx: 1 case study of behaviour modification/support  
Small study of a multi-sensory environment

# Step 2: Practice Analysis

Thorough clinical assessment and documentation of clinical case work or processes, applying critical thought and utilising existing literature

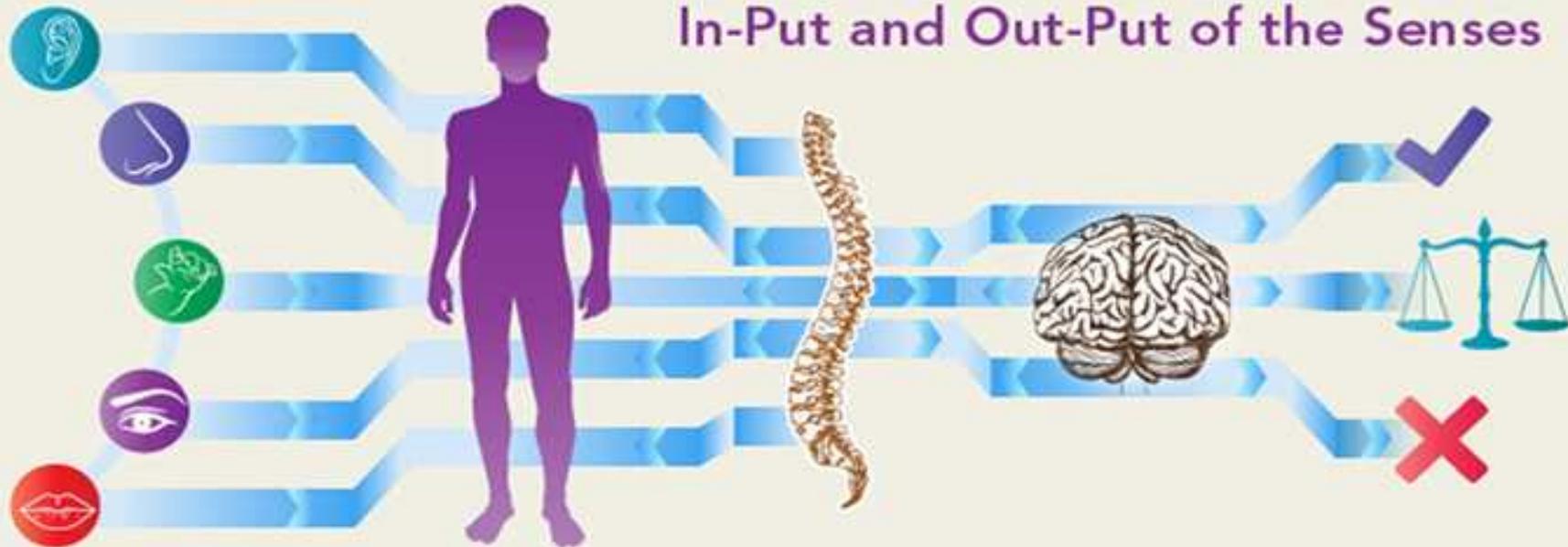
- Case series of two HD clients with significant levels of aggression
- Occupational Therapy Intervention: Sensory Modulation
- Rationale: Sensory processing abnormalities observed in HD
- Standard sensory modulation assessment measures had to be modified due to the HD clients' significant levels of cognitive impairment
- Sensory sensitivities/under-responsiveness assessed for and then equipment/modifications employed to address these.

# What Is SPD

Sensory Integration or **Sensory Processing Disorder (SPD)** is when there is a dysfunction in the way the nervous system receives messages from the senses and turns them into responses. Whether you are eating chicken nuggets, sitting in class listening to the teacher or coloring with a crayon, your successful completion of the activity requires processing sensation or sensory feedback.



## In-Put and Out-Put of the Senses



1. Outside world (environment) enters inside world (body, CNS) through the sensory receptors
2. The peripheral nerves take the info to the spinal cord
3. The info goes then to the brain via nerve tracts
4. Over-arousal: superfluous sensory info passes through the brain "filter" causing excitement, confusion, and distractibility
5. Under-arousal: insufficient sensory info gets processed in the brain, causing absence of mind, delay, and accidents

# ... major findings

## Case 1 Female 22 years: “Carrie-Anne”

**Table 1.** Carrie-Anne’s sensory assessment results and treatment plan.

Sensory assessment results	Sensory modulation difficulties	Sensory modulation strategies	Behaviours post sensory modulation
Sensorily under-reactive to touch	<ul style="list-style-type: none"> <li>● Layering of clothes</li> <li>● Intrusiveness</li> <li>● Standing close to others</li> <li>● Agitation</li> </ul>	<ul style="list-style-type: none"> <li>● Weighted blanket, positioned from shoulder to hip, lying prone on her bed</li> <li>● Use of the vibrating massager</li> <li>● Manicures</li> </ul>	<ul style="list-style-type: none"> <li>● Sleepy state</li> <li>● Less vocal</li> <li>● Decreased agitation</li> <li>● Decreased intrusiveness</li> <li>● Capacity to maintain focus in an activity</li> </ul>
Sensorily under-reactive in gustatory processing	<ul style="list-style-type: none"> <li>● Complaints about food being bland</li> <li>● Complaints of hunger</li> <li>● Seeking of food outside meal times</li> <li>● Verbal aggression</li> <li>● Physical aggression</li> </ul>	<ul style="list-style-type: none"> <li>● Family were asked to bring in favoured foods</li> <li>● Condiments were provided (appropriate to cultural background)</li> </ul>	<ul style="list-style-type: none"> <li>● Reduced complaints regarding food</li> <li>● Reports of feeling more satisfied with food</li> <li>● Mild irritability</li> </ul>
Sensorily under-reactive in proprioception	<ul style="list-style-type: none"> <li>● Layering of clothes</li> <li>● Continual changing of clothes</li> <li>● Continuous wandering</li> <li>● Moving of furniture</li> </ul>	<ul style="list-style-type: none"> <li>● Weighted blanket used when walking around the unit</li> <li>● Sensory-motor activities; playing with the Nintendo Wii, gardening and walking</li> </ul>	<ul style="list-style-type: none"> <li>● Reduction in wandering</li> <li>● Reduction in layering of clothes</li> <li>● Reduction of moving of furniture</li> <li>● Increased ability to engage in an activity</li> </ul>
Sensorily over-reactive in visual processing	<ul style="list-style-type: none"> <li>● Verbal aggression</li> <li>● Complaints to staff of ‘mess’ in the environment</li> <li>● Moving of furniture</li> </ul>	<ul style="list-style-type: none"> <li>● Staff assisted in reducing clutter in Carrie-Anne’s bedroom</li> <li>● Community visits to low stimulus shopping areas only</li> </ul>	<ul style="list-style-type: none"> <li>● Less complaints of ‘mess’</li> <li>● Increased ability to engage in community access</li> </ul>

# ... major findings

## Case 2 Male 31 years: “Christopher”

**Table 2.** Christopher’s sensory assessment results and treatment plan.

Sensory assessment results	Sensory modulation difficulties	Sensory modulation strategies	Behaviours post sensory modulation
Sensorily over-reactive in auditory processing	<ul style="list-style-type: none"><li>● Verbal aggression</li><li>● Physical aggression</li><li>● Throwing of furniture</li><li>● Attempts to remove the television</li></ul>	<ul style="list-style-type: none"><li>● The weighted blanket was offered while seated in the common area</li><li>● A vibrating massager was used to rub Christopher’s back and eventually offered to him for independent use</li><li>● A click-clack ball was offered to him to squeeze</li><li>● The television and radio volume was reduced</li><li>● Christopher was removed from the noisy environment into the communal garden area</li></ul>	<ul style="list-style-type: none"><li>● Immediate cessation of vocalisations</li><li>● Decreased risk of aggression</li><li>● Increased ability to engage in occupations, such as newspaper reading</li></ul>

*Qualitatively, both interventions appeared to be effective....*

# Step 3: Empirical Case Study

Carefully controlled and evaluated study of the effectiveness of an intervention for an individual client. Robust statistical study design (multiple pre-post evaluation measures).

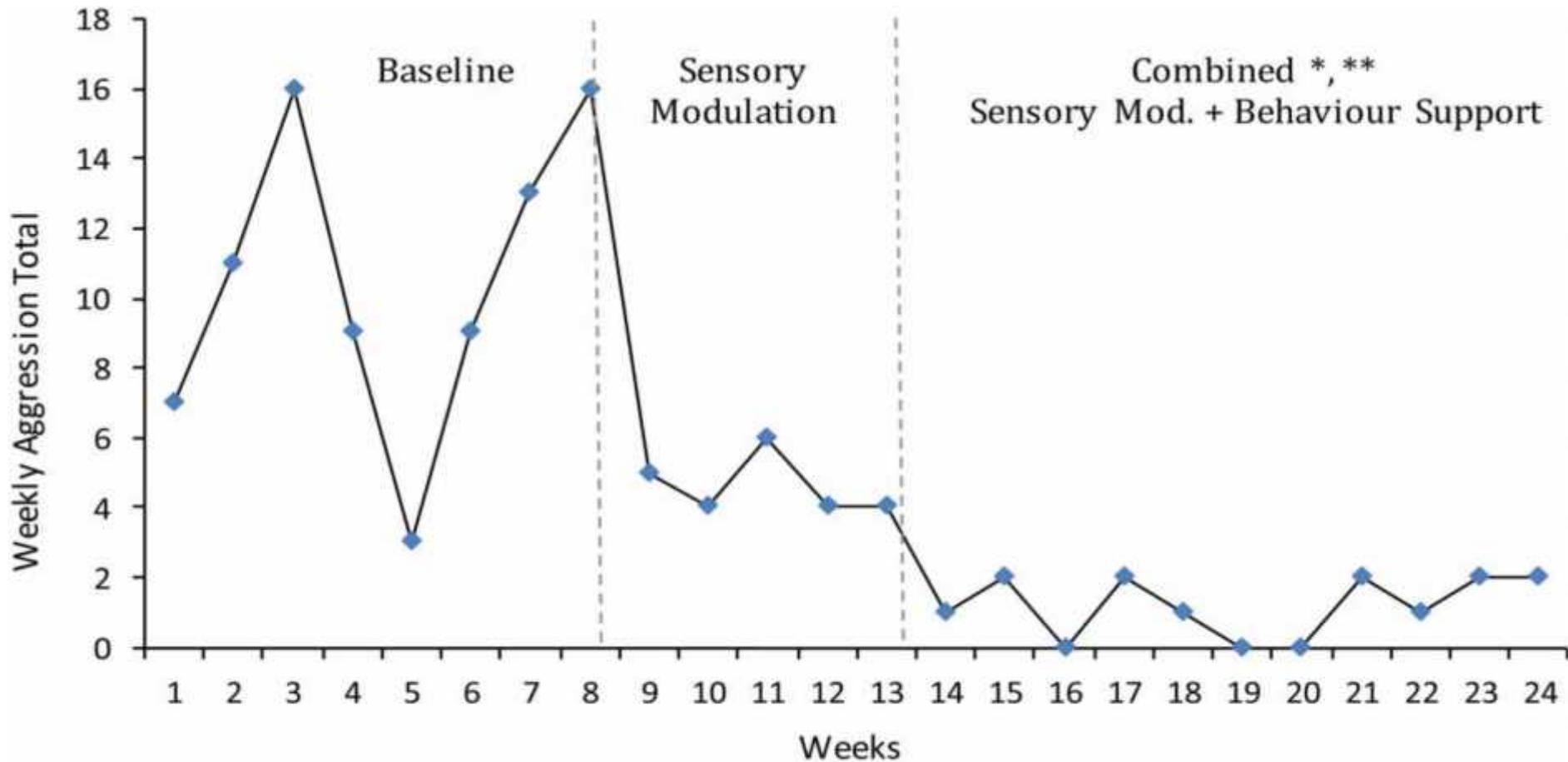
“Christopher”

- Very high levels of aggression (verbal, physical, furniture) on admission
- Able to get data on rates of aggression for both a baseline phase (pre-intervention) phase, and during the interventions through systematic audit of electronic hospital medical record.
- Provided data on the efficacy of the sensory modulation intervention and then the impact of an adjunct behaviour support plan.

BSP:      Triggers for aggression – meal times, communication difficulties,      personal care, being given medication, being closely watched.

Interventions: Communication guide, meal guidelines (eat alone,      unassisted), sensory modulation items to reduce agitation early.

# Collated weekly total rates of aggression



\* Significantly different from Baseline Phase

\*\* Significantly different from Sensory Modulation Phase

# ... major findings

- 5 week Sensory Modulation intervention showed a trend towards decreasing depression, relative to the 8 week baseline phase,  $p = 0.06$ .
- 11 week Sensory Modulation + Behaviour Support intervention was effective at reducing aggression, compared to baseline and SM alone,  $p = 0.0014$ .
- The interventions were effective on all forms of aggression – Verbal, Physical and to property/furniture.
- The interventions were sustainable and could be continued long-term
- Suggest that non-pharmacological individualised therapy interventions may be effective at reducing aggressive behaviour in moderate-advanced HD.

# Step 4: Large Scale Data Audit

Systematic audit of clinical data for the purposes of gaining information to address a specific research question.

- Large gap still remaining in the literature: What are antecedent/triggering factors for aggression in HD?
- 10 clients with HD admitted to the BDU in the 4 years since the introduction of electronic medical records
- We conducted a large scale data audit of the medical records of these clients for the first 90 days of their admission, and recorded and coded all episodes of aggression during this period.
- 900 days of clinical data, systematically double audited

Table 2: Episodes of Aggression by Type from OAS-MNR audit

Total Episodes	237
<i>Verbal Aggression Total</i>	88
1. Makes loud noises, shouts angrily, is not directed at an individual	35
2. Mild insults directed at another person, not including swearing/offensive comments	34
3. Swearing or threats clearly directed at others or self	12
4. Clear threats of violence directed at others or self	6
5. Multiple types of Verbal Aggression Combined	1
<i>Physical Aggression Against Other People Total</i>	80
1. Threatening gesture clearly person directed, swings at people, grabs clothes, spitting	28
2. Strikes, kicks, pushes, pulls hair - without significant injury	47
3. Attacks others causing mild-moderate injury, bruises, sprains, welts	5
4. Causes severe physical injury (broken bones/internal injury)	0
<i>Physical Aggression Against Objects Total</i>	13
1. Slams doors, scatters clothing, makes a mess in response to clear antecedent	4
2. Throws objects down, kicks furniture without breaking it, marks the wall	7
3. Breaks objects, smashed windows	1
4. Sets fire, throws objects dangerously, others at risk of being hit regardless of intention	1
<i>Physical Aggression Against Self Total</i>	0
1. Picks/scratches skin, pulls hair, hits self - with no minor injury	0
2. Bangs head, hits fist into object, throws self on floor/into objects, without serious injury	0
3. Inflicts small cuts, bruises or minor self-burns	0
4. Mutilates self, deep cuts, internal injury, fracture, loss of consciousness/teeth	0
<i>Mixed Episodes Total</i>	56
1. Verbal Aggression + Physical Aggression Against Other People	36
2. Verbal Aggression + Physical Aggression Against Self	0
3. Verbal Aggression + Physical Aggression Against Objects	8
4. Physical Aggression Against Other People + Physical Aggression Against Objects	7
4. Other mixed episodes (e.g. three types of Aggression)	5

Table 3: Antecedents observed directly before an aggressive episode from OAS-MNR audit

<i>Antecedent</i>	<i>N</i>
Physical guidance with personal care	84
No recorded antecedent	42
Other (expressing delusions, paranoia, falls, visitors, watching TV etc)	25
Given food/meals	19
Request specifically denied by other person	16
Obviously agitated or distressed	16
Given direct verbal prompt to comply with instruction	11
Given drink	10
Physical guidance with transfers	9
Given medication	8
Direct response to other clients verbal behaviour	6
Any other verbal interaction	5
Structured activity	2
Community access	2
Activity group	2
Noisy environment	2
Purposeful behaviour is ignored by person to whom it is directed at	2
Given item e.g. therapy materials	1
Direct response to physical aggression of others when directed at them	1
Given verbal guidance/advice to assist completion of task/activity	1
Given verbal/visual feedback about performance	1
Physical guidance/facilitation to complete a task	0
Direct response to physical aggression of others directed at another person	0
During restraint	0
Had epileptic fit in last 24 hours	0

Two or more antecedents were recorded for 26 episodes

Table 4: Most Common Antecedents for Aggression by Individual Client

Client number (total episodes)	Antecedent	% of total episodes
1 (24)	No obvious antecedent	66.7
	Given verbal guidance with task/activity	4.2
	Direct response to other clients verbal behaviour	4.2
	Any other verbal interaction	4.2
2 (55)	Given food/meals	21.8
	Obviously agitated or distressed	12.7
	Physical guidance with personal care	12.7
	Given medication	9.1
3 (14)	Other	43.9
	Given direct verbal prompt to comply with instruction	21.4
	Request specifically denied by other person	14.3
	Purposeful behaviour ignored/played down by person it is directed at + obviously agitated/distressed	14.3
4 (0)		
5 (38)	Physical guidance with personal care	84.2
	Physical guidance with transfers	15.8
	Given medication	2.6
6 (8)	Given drink	37.5
	Given food/meals	25.0
	Request specifically denied by other person	25.0
	Given medication	12.5
7 (30)	Physical guidance with personal care	30.0
	Request specifically denied by other person	30.0
	No obvious antecedent	20.0
	Other	16.7
8 (2)	Physical guidance with personal care	50.0
	No obvious antecedent	50.0
9 (43)	Physical guidance with personal care	74.4
	Other	9.3
	Physical guidance with transfers	7.0
	No obvious antecedent	7.0
10 (23)	No obvious antecedent	26.1
	Physical guidance with personal care	17.4
	Direct response to other clients verbal behaviour	17.4
	Other (all delusions)	17.4

# ... major findings

- In Brain Disorders inpatient setting the incidence of aggression high – 90%
- Personal care was the most common trigger, overall
- Inter-individual variation in susceptibility to various triggers – so individualised assessment and interventions plans are likely to be the most successful.

# Step 5: Practice Analysis

Initiative to address nutritional and gustatory needs of Huntington's clients who spend many years on modified diets.

- Main concerns:  
Taste fatigue, food was unappealing and indistinguishable, clients removed from engaging with food through meal preparation, proper meal choices, special occasion foods

Initiative (1): To enhance enjoyment of texture modified diets

- All pureed/minced meals tasted and least appealing removed from menu
- Sauces introduced to increase both flavour and choice
- A new pureed dessert was sourced for dessert nights and special occasions

## Initiative (2): Special Activities for Individuals Eating a Modified Diet

- “Foodies Group” clients on a modified diet participated in a fortnightly group
- Watched the preparation of meals and assisted where possible
- Allowed to see and smell the food being made
- Then eat the food once prepared
- Interaction with co-clients and staff encouraged
- Pictures of the sessions used later to facilitate communication with NOK.

# Research Series Overall Conclusions

- Significantly increased our understanding of aggression in HD
- Rates, types, correlating factors and antecedents
- Indicated that non-pharmacological interventions can be effective at reducing aggression
- Enabled us to contribute to the knowledge base in this area
- Improved the clients engagement with food and gustatory processing
- Provided them with a wider range of flavours and choice with their menus

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