FUNCTIONAL NEUROLOGICAL DISORDER

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OBJECTIVES

- To provide an update on current knowledge, theories and evidence related to FND
- To review those presentations most seen in Primary Care
- To review diagnostic principles
- To review the role of the GP for this group
- To review current treatment principles and strategies
- Presentation of case studies

WHAT IT IS FND?

…A DISORDER OF THE VOLUNTARY MOTOR OR SENSORY SYSTEM, WHICH HAS BEEN LINKED TO CORRUPTION OF PRE-CONSCIOUS PHASES OF MOTOR PLANNING.

STONE, BURTON & CARSON, 2020

THE CHEQUERED HISTORY OF FND

Previously known as Hysteria in the 1800's… wandering womb

Charcot took the stance that it was an unknown physical ailment affecting the nervous system

Termed Conversion disorder by Freud, who posited that psychological trauma was "converted" into physical symptoms as a result of repression

The more recent convergence of neurology and psychiatry have allowed the symptoms to be studied across disciplines with an appreciation of complementary models of neural and psychological interaction

Perez et al, 2021

Previously used terminologies

Functional overlay - Presence of pathophysiological deficit or condition with additional oversensitive, exaggerated or non-consistent symptoms

Conversion disorder - Voluntary motor or sensory function affected. Associated with psychological factors or previous psychological trauma

Somatisation - Presence of multiple symptoms including one conversion neurological symptom

Psychogenic- suggests psychological causation of movement disorder

Dissociation- This includes Depersonalisation & Derealisation

Functional- Broad term suggesting non-structural deficit

www.neurosymptoms.org

RELEVANCE IN PRIMARY CARE

2nd most common reason to see a neurologist after headache

8,000 new diagnoses of FND are made per year in the UK

Disproportionately affects women 3:1 although as age of onset increases the proportion of men increases

Can occur across all ages (not common under 10)

Comorbid neurological conditions occur in approx 20% of cases

Commonly repeat presentation to GP with several symptoms that initially may appear unrelated

Lack of specialist services in secondary care – more people seeking repeated support from primary care

Bennett et al, 2021

PRESENTATIONS SEEN IN PRIMARY CARE

- **GAIT/ BALANCE DISORDER** – WALKING ON ICE, JERKY MOVEMENTS, DRAGGING THE LEG
- **FUNCTIONAL WEAKNESS-** APPEARANCE OF WEAKNESS OR PARALYSIS OF LIMB OR BODY PART. OFTEN SEEN AS COLLAPSING WEAKNESS OR MAY PRESENT AS A STROKE MIMIC
- **FUNCTIONAL TREMORS-** OFTEN WORSE WHEN FOCUSED ON SELF OR LIMB
- **FUNCTIONAL DYSTONIAS** – MAY DEVELOP SECONDARY TO PREVIOUS TRAUMA OR INJURY
- **NON-EPILEPTIC/ DISSOCIATIVE SEIZURES-** MAY BE MISDIAGNOSED AS EPILEPSY IN A&E
- **CONSTANT VAGUE DIZZINESS** - NOT CONGRUENT WITH INNER EAR PATHOLOGY OR BPPV
- **REPORTED LOSS OR CHANGE OF SPEECH, MEMORY OR COGNITIVE PROCESSING** BUT PERFORMS WELL DURING AUTOMATIC TASKS
- PATIENTS WITH KNOWN DIAGNOSIS SUCH AS STROKE, MS, PD, MAY HAVE **SYMPTOMS THAT ARE NOT CONSISTENT WITH DISEASE PRESENTATION**

GILMOUR ET AL, 2020

THEORIES AND RESEARCH

Alterations in neural circuits

- Functional tremor or functional dystonia:

Hypoactivation of the right Temperoparietal junction. Causing a mismatch between willing of movement and production of movement. Representing alterations in Self-agency of movement.

Bennett et al, 2021

- Dissociative symptoms:

Limbic/ paralimbic circuit disruption (amygdala, periaqueductal gray, anterior cingulate cortex, insula, hypothalamus) is identified in dissociative presentations

- Weakness or paralysis

Increased limbic- motor connectivity is theorised to represent increased heightened limbic control over motor behaviour

eg; loss of movement/ loss of motor control when over regulated

Drane et al, 2020

- **IMPAIRED OR INEFFICIENT ATTENTIONAL SHIFTING**

SOME FND SYMPTOMS EMERGE FROM AN EXCESSIVE FOCUS ON THE BODY'S INTERNAL STATE. IN SOME PEOPLE THIS HYPER- FOCUS IS MORE IMPLICIT AND INVOLUNTARY.

- **CHANGES TO INTEROCEPTION**

INTEROCEPTION IS THE PROCESS BY WHICH THE NERVOUS SYSTEM SENSES, INTERPRETS AND INTEGRATES THE BODY'S INTERNAL MAP ACROSS CONSCIOUS AND UNCONSCIOUS PROCESSES.

IN SOME FND PATIENTS, ABNORMAL INTEROCEPTIVE AWARENESS HAS BEEN IDENTIFIED WITH AMPLIFICATION OF NORMAL BODY SIGNALS AND PROCESSES.

DRANE ET AL, 2020

- **PERCEPTUAL INFERENCE AND PREDICTIVE PROCESSING ERRORS**

- A PERSON GENERATES BELIEFS OR EXPLANATIONS ABOUT CAUSES AND EFFECTS OF EVENTS OCCURRING IN AND OUTSIDE OF THE BODY.
- SOME FND FEATURES ARE CHARACTERISED BY THE DEVELOPMENT OF ERRONEOUS PERCEPTUAL INFERENCE ABOUT SENSORIMOTOR AND EMOTIONALLY DRIVEN PHENOMENA.

DRANE ET AL, 2022

- THE OPPOSITE OF PHANTOM LIMB SYNDROME CAN OCCUR WHEREBY THE PATIENT DOES NOT PROPERLY SENSE A LIMB THAT IS THERE
- PHYSICAL BODY EVENTS SUCH AS PAIN, INJURY, MIGRAINOUS SYMPTOMS AND PHYSIOLOGICAL STRESS ARE MORE LIKELY TO DETERMINE THE SITE AND NATURE OF FND SYMPTOMS, POSSIBLY DUE TO FAULTY PREDICTIVE PROCESSING.

BENNETT ET AL, 2021

AREAS FOR FURTHER RESEARCH

- LINK BETWEEN ASD AND FND
- LINK BETWEEN STRESS HORMONES AND NEURAL CIRCUITS
- LINK BETWEEN SEX HORMONES AND FND

DIAGNOSIS

- FND should be diagnosed by someone with specific expertise in the diagnosis of neurological conditions
- Recommendation is to refer all patients with a suspected diagnosis of FND to secondary care
- The diagnosis may be raised as a possibility with the patient in primary care
- FND can be diagnosed and treated in presence of comorbid, pathophysiologically defined disease
- Psychological stressors are important risk factors but are neither necessary nor sufficient for the diagnosis
- Don't presume FND just because a presentation is unusual. There are many odd and unusual symptoms of other neurological conditions
- FND is a diagnosis of inclusion of positive signs.

Stone, Burton & Carson, 2020
Bennett et al, 2021

THE ROLE OF THE GP

- Identification of potential FND features through patient history and examination
- Referral to secondary care (Neurology)
- Advocate for clients- they are often discharged from services with no treatment
- Become aware of services available: locally, tertiary services and national initiatives
- Avoid multiple referrals to several disparate services
- Awareness of current approaches for treating FND
- Discourage patient over- reliance on passive treatments that focus on treatment of impairments or that can be overly compensatory

SUBJECTIVE HISTORY

Symptoms	Ability	Onset
Patients with FND often have multiple symptoms. Ask about motor and sensory symptoms, fatigue, pain, sleep disturbance, memory, and dissociative symptoms	Ask patients to describe a typical day, to build a picture of how disabled they are. This can also help determine whether there may be comorbid depression or anxiety	Look particularly for physical triggering such as injury, migraine or syncope. Previous adverse experiences are a risk factor, but may not be present

Stone, Burton & Carson, 2020

POSITIVE FEATURES OF FND

Incongruency

not congruent with known neurological disorders/ human anatomy

Inconsistency

distracted v focused attention

Entrainable symptoms

Symptoms that can be altered/ entrained

in the assessment

The impact of perceived effort

Dizziness when focused on head movement but no report of dizziness when immersed in task

Hoover's sign

Observation or report of seizures

longer duration (>90 secs), memory of seizure, side to side head or body movement, absence of injury, tightly closed eyes

Perez et al, 2021

Positive diagnostic signs

Functional limb weakness

Hoover's sign: Hip extension weakness that improves with contralateral hip flexion against resistance

Hip Abductor Sign: Abduction weakness that improves with contralateral hip abduction against resistance

Functional movement disorders

Functional dystonia typically presents with a fixed position, usually a clenched fist or inverted ankle

Functional facial dystonia presents with episodic contraction of platysma or orbicularis oculi

Left wrist tremor stops or entrains when copying examiner's movements with right hand

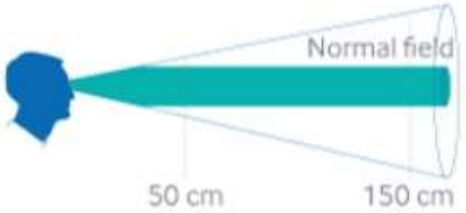
Functional or dissociative seizures

Should be diagnosed on the basis of finding characteristic features in the subjective account and observed description of the attacks, such as:

- Eyes tightly closed
- Tearfulness
- Longer than 5 minutes
- Side to side head shaking
- Hyperventilating

Ask patient if they would be willing to have their attacks video recorded by a family member

Functional visual signs



A tubular visual field defect at 50 cm which is the same width as at 150cm

Visual field spiralling caused by progressive constriction of vision during the test

Stone, Burton & Carson, 2020

TREATMENT AND REHABILITATION

- USUALLY REQUIRES MDT APPROACH
- GP SHOULD BE SEEN AS PART OF THE MDT
- SOME PRESENTATIONS REQUIRE PRIMARILY A PHYSICAL REHABILITATION APPROACH
- SOME PRESENTATIONS REQUIRE PRIMARILY A NEUROPSYCHOLOGICAL APPROACH
- MOST REQUIRE A COMBINATION OF APPROACHES
- CO-MORBID CONDITIONS AND SYMPTOMS SHOULD BE MANAGED EXPLICITLY.

REHABILITATION STRATEGIES

- **MANAGING ILLNESS BELIEFS**
- EXPLAIN SYMPTOMS
- LINK TO ANALOGIES THAT THE PATIENT CAN UNDERSTAND
- USE POSITIVE SIGNS AS A WAY DEMONSTRATING TO THE CLIENT THE THINGS THEY CAN DO AND NOT FOCUSING ON UNHELPFUL MOVEMENT
- UTILISE ASPECTS OF CBT- EXPLORING AND ADDRESSING UNHELPFUL MOVEMENT BEHAVIOURS OR BELIEFS
- USE OF BEHAVIOURAL EXPERIMENTS IN EXPOSURE TO NEW MOVEMENTS
- FOSTER A "CAN DO" THERAPY ENVIRONMENT
- REDUCE ANTICIPATORY RESPONSES – PRESENT MOMENT AWARENESS, MEDITATION, BREATHING AWARENESS

GILMOUR ET AL, 2020

REHABILITATION STRATEGIES

- **REDUCE SELF-FOCUS AND STIMULATE AUTOMATIC MOVEMENT**
- FOCUS IS ON ACTIVITY AND PARTICIPATION AND LESS ON PHYSICAL IMPAIRMENT
- EXPLORE FACTORS WHICH MAY INFLUENCE THEIR MOVEMENT- DISTRACTION, ENTRAINMENT, AUTOMATIC MOVEMENT
- BUILD UP COMPONENTS OF MOVEMENT IN STAGES USING MASTERY AND GRADED TASKS.
- ENSURE TASKS ALLOW FOR BUILDING OF SELF- EFFICACY
- USING BIOFEEDBACK OR CUES- MIRRORS, PRESSURE OR ELECTRICAL BIOFEEDBACK, TARGETS, GAMES
- GRADED EXPOSURE/ GRADED DESENSITISATION – WORKS WELL WITH PAIN, SENSORY DISTURBANCE, DISSOCIATION.

GILMOUR ET AL, 2020

PRINCIPLES OF GOOD THERAPY PRACTICE

- BUILD TRUST AND RAPPORT- DON'T RUSH THIS OR SACRIFICE IT IN SEARCH OF OBJECTIVE OUTCOMES
- EXPLANATION AND EDUCATION
- AVOIDANCE OF PASSIVE TREATMENTS
- WEAN OFF AIDS WHERE POSSIBLE
- CONSIDER A TREATMENT CONTRACT
- ADDRESS PAIN AND FATIGUE
- INVOLVE FAMILY AND CARERS AS APPROPRIATE
- ACKNOWLEDGE PSYCHOLOGICAL FACTORS WHEN SIGNIFICANT OR APPROPRIATE
- DEVELOP A RELAPSE PREVENTION OR MANAGEMENT PLAN WITH THE CLIENT
- RECOGNISE THAT SOME PEOPLE WILL NOT IMPROVE- IRRESPECTIVE OF TREATMENT OFFERED

CASE STUDY 1: 18-YEAR-OLD FEMALE

REASON FOR REFERRAL:

- 2-YEAR HISTORY OF TREMORS, TICS, AND DISSOCIATIVE SEIZURES
- PROGRESSED TO LEG WEAKNESS AND LOSS OF WALKING
- FATHER CARRYING HER UP AND DOWN STAIRS
- USING CRUTCHES TO SWING AROUND HOUSE
- WHEELCHAIR OUTDOORS

AT THE TIME OF PHYSIO ASSESSMENT:

- LIVED WITH PARENTS AND SIBLING
- RECENT ASD DIAGNOSIS WITH ARFID IDENTIFIED
- BULLIED AT SCHOOL
- STUDYING FOR A LEVELS
- REPORTED RECURRENT SHOULDER AND HIP DISLOCATIONS
- OPEN EPISODE WITH COMPLEX CARE TEAM

CASE STUDY 1- CONTINUED

- **PHYSIO ASSESSMENT:**
- POSITIVE FEATURES OF FND IDENTIFIED:
- ENTRAINED TREMOR THROUGH TAPPING
- ABLE TO STAND AND WEIGHT BEAR IF DISTRACTED
- OBSERVED SEIZURE- TICS AND TREMOR WORSEN PRIOR TO SEIZURE NO LOSS OF CONSCIOUSNESS, CONTROLLED DESCENT TO FLOOR.

- **IMMEDIATE ACTIONS:**
- LIAISED WITH REHAB CONSULTANT AND NEUROLOGIST FOR INVESTIGATION OF FND FEATURES AND RECURRENT DISLOCATIONS
- LIAISON WITH COMPLEX CARE SERVICE FOR PSYCHOLOGICAL SUPPORT, OT SUPPORT AND DIETIETIAN SUPPORT

CASE STUDY 1- CONTINUED

- **PHYSIOTHERAPY TREATMENT:**
- MAKE MOVEMENT FUN AND REDUCE ANTICIPATORY FEAR
- GRADED EXPOSURE TO TASKS IN STANDING- REACHING INTO CUPBOARDS, KICKING BALL, COOKING PREP, GRADUALLY REDUCE HAND SUPPORT ON WORKTOP
- BALANCE PAD TO STIMULATE AUTOMATIC REACTIONS- PROGRESS TO OBSTACLE COURSE WHILE HOLDING OBJECTS
- PROGRESSED TO PRACTICE OF STAIRS AND OUTDOOR STEPS AND PROGRESSED TO OUTDOOR WALKING
- IDENTIFIED JOINT HYPERMOBILITY/ ?EDS- COMMENCED JOINT PROTECTION WORK, STRENGTHENING AND REFERRAL FOR LYCRA GARMENTS.

CASE STUDY 1: CONTINUED

- **OUTCOMES:**
- SUPPORT WORKER EMPLOYED THROUGH LOCAL COUNCIL
- WALKING 1 MILE OUTDOORS
- ABLE TO ASCEND AND DESCEND FULL FLIGHT OF STAIRS
- USING WHEELCHAIR FOR LONGER OUTDOOR DISTANCES
- REGULAR STRENGTH TRAINING PROGRAMME AT HOME WITH REDUCED JOINT DISLOCATIONS
- COOKING WITH PARENTS AT HOME
- TRIAL AT UNIVERSITY BUT NOT ABLE TO MAINTAIN –OPEN UNIVERSITY FROM HOME

CASE STUDY 2: 67-YEAR-OLD FEMALE

- **REASON FOR REFERRAL:**
- 5-YEAR HISTORY OF LEFT SIDE LOWER BACK AND HIP PAIN
- LONGSTANDING EPISODIC BACK PAIN FOLLOWING CHILDBIRTH
- GRADUAL CHANGE IN POSTURE WITH COLLAPSING WEAKNESS, PELVIC DYSTONIA AND SPASMS WHEN STOOD AND MOVING
- USING MOBILITY SCOOTER OUTDOORS AND CRUTCHES
- SEEN BY SEVERAL CONSULTANTS OVER LAST 5 YEARS AND EVENTUALLY DIAGNOSED WITH FND
- NO TREATMENT OFFERED LOCALLY
- PAID PRIVATELY TO SEE NEUROLOGISTS AND PHYSIO
- CURRENTLY WAITING MDT SPECIALIST CLINIC

CASE STUDY 2 - CONTINUED

- **PHYSIOTHERAPY ASSESSMENT:**
- IDENTIFIED BRIEF PERIOD OF STRESS AT THE TIME SYMPTOMS STARTED
- HYPERVIGILANCE AND HYPERAWARENESS OF POSTURE AND MOVEMENT
- BOOM AND BUST PATTERNS OF ACTIVITY
- SECONDARY STRESS RESPONSE- HYPERVENTILATION, SWEATING AND REPORTING FEELING LIGHTHEADED WHEN STOOD OR MOVING
- COLLAPSING OF LEFT SIDE OF PELVIS WHEN STOOD AND WALKING BUT ABLE TO OVERRIDE THIS IF SKIPPING, WALKING BACKWARDS OR STEPPING OVER OBSTACLES
- ABLE TO ENTRAIN/ ADAPT THE DYSTONIA IF HOLDING SOMETHING ON THE LEFT SIDE

CASE STUDY 2 – CONTINUED

- **PHYSIOTHERAPY TREATMENT:**
- DISCUSSION AND EDUCATION ABOUT HYPERVIGILANCE OF SYMPTOMS AND OF PHYSIOLOGICAL STRESS RESPONSE, ANTICIPATORY FEAR
- INTRODUCTION TO PRESENT MOMENT AWARENESS AND BREATHING AWARENESS
- PACING, PLANNING AND PRIORITISING
- USE OF BREATHING AWARENESS WHEN STOOD AND MOVING AND UTILISING THE BODY FUNCTIONALLY
- FOCUS ON FUNCTIONAL GOALS AND PARTICIPATION

CASE STUDY 2 – CONTINUED

- **OUTCOMES**
- HAS BEEN ON HOLIDAY
- MEDITATING DAILY
- NOT USING CRUTCHES AS MUCH
- MOVING DAILY FOR ACTIVITY AND PARTICIPATION RATHER THAN TO "FIX" THE MOVEMENT
- USES STRATEGIES STILL TO REDUCE IMPACT OF DYSTONIA AND WEAKNESS WHEN STOOD- TENDS TO DISTRACT HERSELF WHEN MOVING NOW OR GIVES HERSELF SPECIFIC TASKS/ CHALLENGES

FURTHER READING AND REFERENCES

- WWW.NEUROSYMPTOMS.ORG
- WWW.FNDSOCIETY.ORG
- WWW.FNDHOPE.ORG

- BENNETT, K. ET AL. A PRACTICAL REVIEW OF FUNCTIONAL NEUROLOGICAL DISORDER (FND) FOR THE GENERAL PHYSICIAN CLINICAL MEDICINE 2021 VOL 21, NO.1 28-36

- DRANE, D.L.ET AL. A FRAMEWORK FOR UNDERSTANDING THE PATHOPHYSIOLOGY OF FUNCTIONAL NEUROLOGICAL DISORDER CNS SPECTR.2020 SEP 4; 1-7

- GILMOUR, G.S. ET AL MANAGEMENT OF FUNCTIONAL NEUROLOGICAL DISORDER JOURNAL OF NEUROLOGY 2020; 267: 2164-2172

FURTHER READING AND REFERENCES

- STONE, J. BURTON, C. & CARSON, A. RECOGNISING AND EXPLAINING FUNCTIONAL NEUROLOGICAL DISORDER BMJ 2020; 371:M3745 HTTPS://DOI.ORG/10.1136/BMJ.M3745

- PEREZ, D.L. ET AL. DECADE OF PROGRESS IN MOTOR FUNCTIONAL NEUROLOGICAL DISORDER: CONTINUING THE MOMENTUM JNNP 2021;92 668-677