

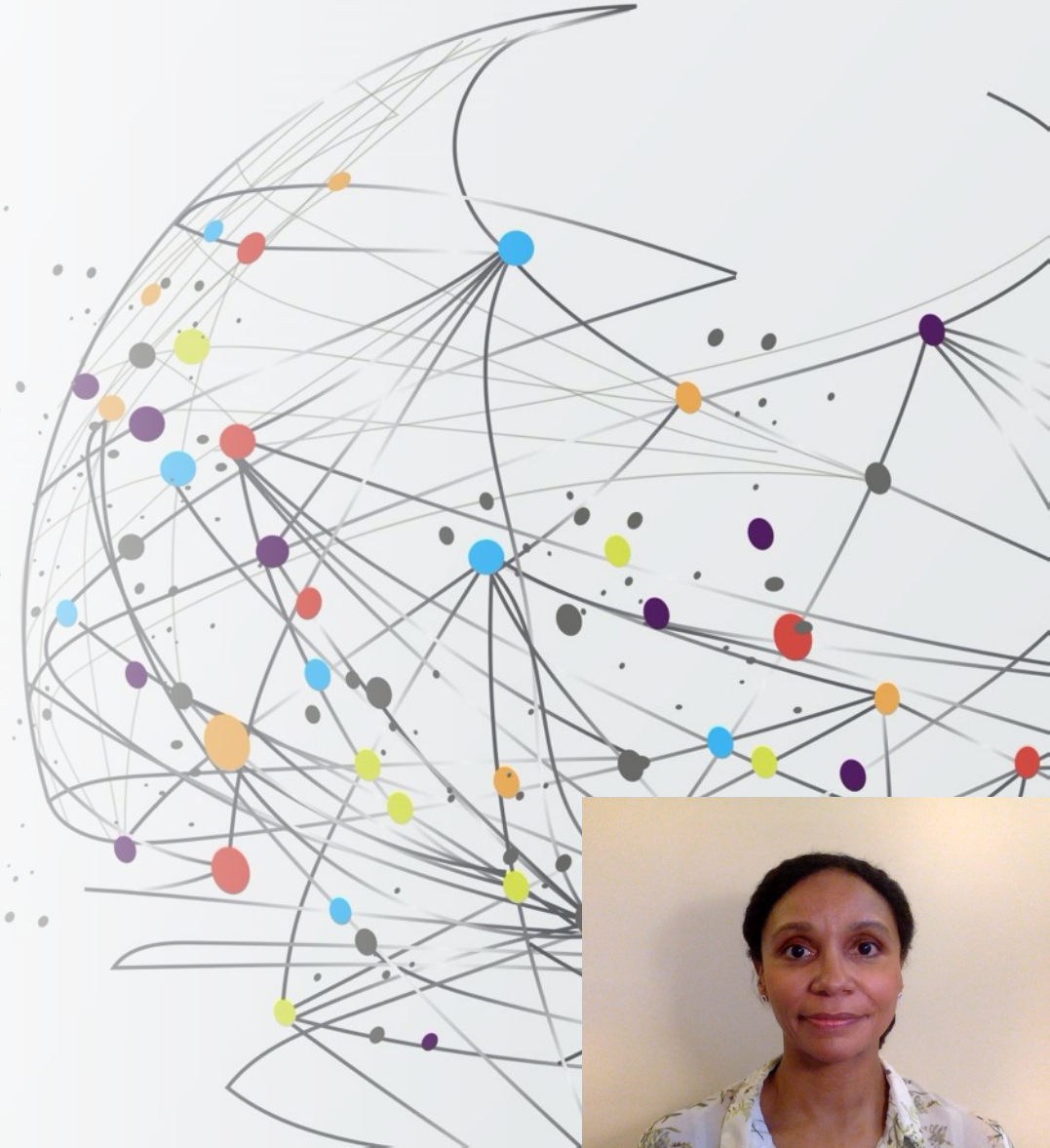


# Developmental Delay & Neuroregression

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# Content

- Development, delay & milestones
- Red-flags & neuro-regression
- Assessment
- Investigations, referrals & MDT care
- Learning Points
- Resources



# Developmental Delay

- **Childhood Development**

- Functional skill acquisition (0-5years)
- Sequence: key domains

- **Delay = slow attainment/not reaching milestone**

- Common problem 5-10% children

- **Global delay = significant in 2+ domains**

- 1-3% children
- Inborn errors of metabolism - rare **important** cause 1-2%



# Neurodevelopment

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Gross motor



Fine motor & vision



Speech, language &  
hearing



Social, emotion,  
behavioural  
interaction



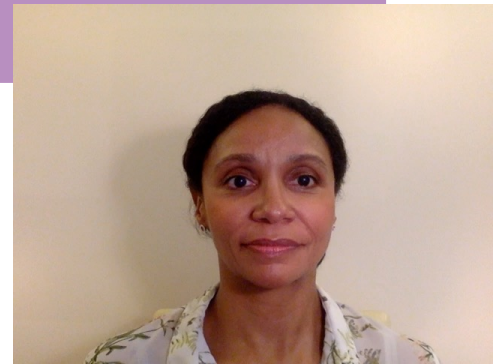
## Developmental Milestones & Delay

Milestone = Median age skill acquisition  
(50% population)

Significant delay = Limit age (2SD)

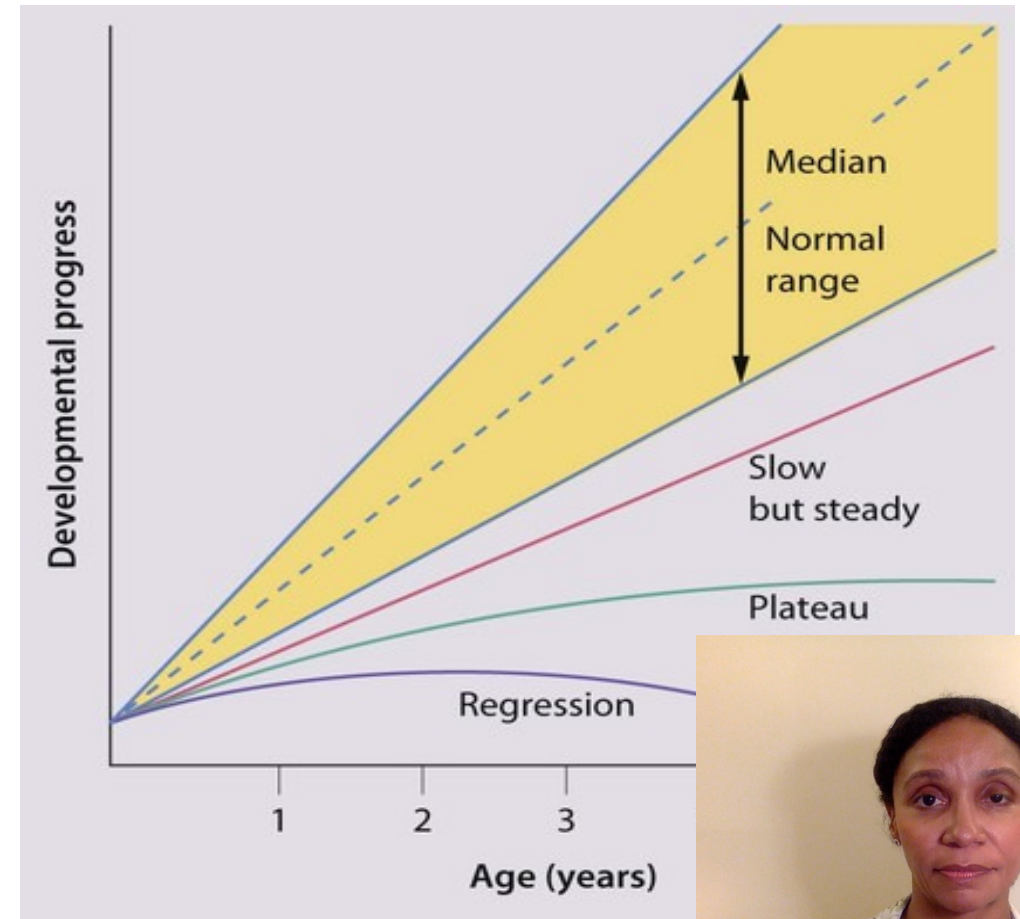
Not achieved by Limit age →  
Assessment + Investigation + Intervention

Early recognition key - improve outcomes!



# Delay & Regression

- Single domain v. global ?
- Mild v. severe?
- Associated features
  - e.g. abnormal neurology?
- Limit ages?
- Plateau?
- Regression = loss milestones / skills?

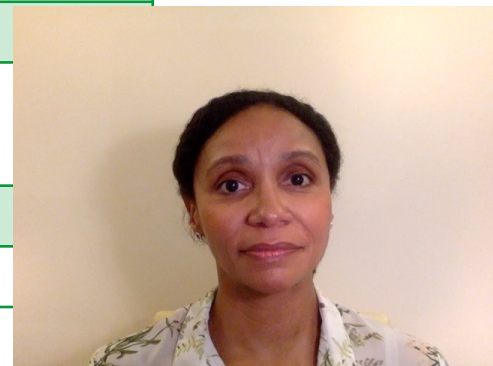


Ref Developmental problems and the child with spe



# Red Flags - Developmental Delay

<b>Modality</b>	<b>Skill</b>	<b>Median age acquired</b>	<b>Limit Age</b>
<b>Gross Motor</b>	<b>Sitting without support</b>	6-8 mo	<b>9 mo</b>
	<b>Walking</b>	12 mo	<b>18 mo</b>
	Run, jump	2.5 yrs	4 yrs
<b>Fine Motor &amp; Vision</b>	<b>Fixing and following</b>	6-8 wks	<b>3 mo</b>
	Transferring toy	7mo	9mo
	<b>Hand dominance</b>	18 mo	<b>&lt;12mo</b>
<b>Hearing, Speech &amp; Language</b>	<b>Startles to loud noises</b>	newborn	<b>1-2 wks</b>
	<b>Clear words/understanding</b>	12mo	<b>18mo</b>
	<b>2 words together</b>	20-24 mo	<b>&gt;2yrs</b>
<b>Social, emotional, behaviour</b>	<b>Shared enjoyment</b> (using eye contact or facial expression)	3-6mo	<b>9mo</b>
	Symbolic play (eg cuddle doll)	1.5-2 years	2-2.5 yrs
	<b>Interactive, pretend play</b>	2.5 years	<b>3 years</b>



# Causes Developmental Delay

- **Genetic / chromosomal**
- **Structural malformations**
- **Syndromes**
- **Acquired**
  - Perinatal
  - Infection, injury, inflammation, tumour
- **Cerebral palsy**
- **Seizure disorder**
- **Metabolic**
  - Hypothyroidism
- **Neuromuscular disorders** (0.3:1000)
  - DMD, SMA, Congenital myopathy
  - Spinal cord lesions, e.g. spina bifida
- **Progressive neurodegenerative conditions** (regression)
- **Social**
  - Neglect /adverse childhood experiences
- **Idiopathic**





# Neuroregression

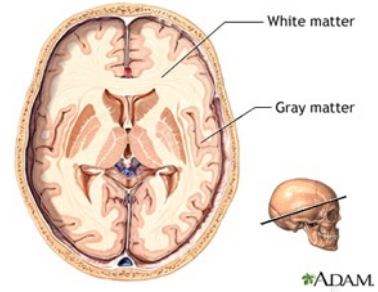
Always:



Progressive neurologic deterioration



# Causes Neurodevelopmental Regression



- **Without neurodegenerative process:**

- Poor seizure control
- Drug-related
- Severe systemic illness
- Mental health
- Neglect
- Autism Spectrum Disorder

- **With neurodegenerative or metabolic process**

- Inherited - Genetic
- Metabolic
- Storage disorders, Mitochondrial
- Grey / White Matter

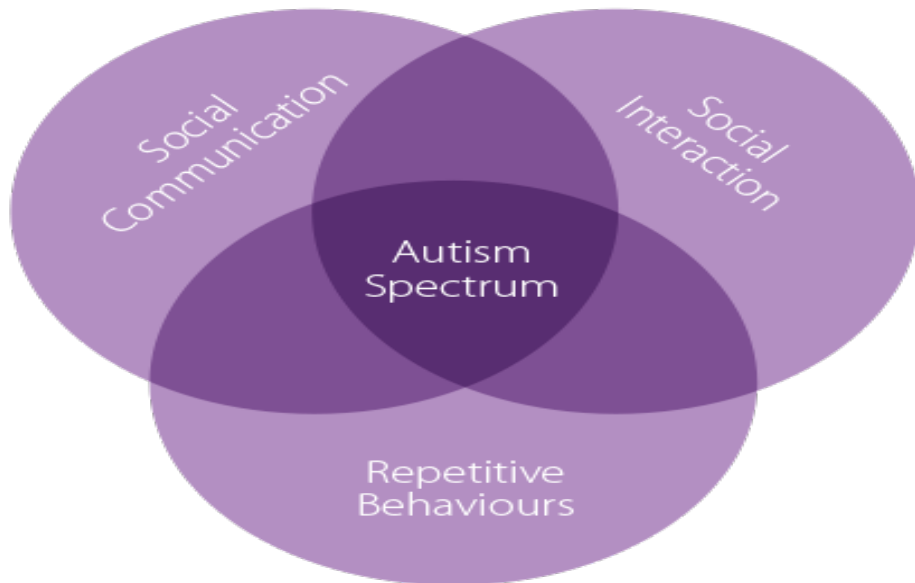
→ **Early recognition and referrals key**

→ **Prompt management + MDT Care**



# Autism Spectrum Disorder

- Common 1-2:100
- Triad impairments
- Features present <3 years old



- 10-20% Genetic
- Multifactorial
- Delay +/- regression
- Rett syndrome
  - 1:10,000, X-Linked
  - Loss language & motor, microcephaly (1yr)
  - Feeding, seizures, hand-wringing (2-3 yrs)
- Childhood disintegrative disorder
  - 1.7:100,000
  - N early devel
  - Abrupt later onset
  - Language, social, motor



# Presentations to General Practitioners

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## **Parent**

Concerns regarding  
child's development  
or behaviour

## **GP**

Identify delay when  
child brought for  
different reason

## **Health Visitor**

Raise concern  
or refer





## Easy Questions – Telling Answers

- What is your child good at / find tricky?
- How does s/he move?

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- Handle objects or toys?
- Talking / non-verbal & understanding you?
- Any concerns about seeing, hearing?
- What/ who does s/he play with?
- Does s/he have friends?
- Behaviour?
- Learning or gaining skills?
- Any loss of skills?
- <https://mrcpch.paediatrics.co.uk/development/>



## History in a Limited Consultation Time



Past Medical History:

Congenital infections, prematurity, HIE, jaundice

Significant infections (eg meningitis), traumatic head injury

Feeding & Growth

Developmental Milestones: Acquisition/ loss

School performance & Mental Health

Family history: Consanguinity, infant deaths

Social history: CP Plan, LAC



# Examination

The value of experience is  
not in seeing much, but in  
seeing wisely.

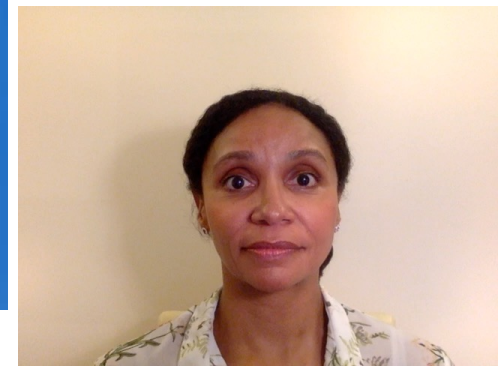
William Osler

- **Observation & Play**
- **Examination:**
  - Wt. Ht. & HC - plotting centile
  - Dysmorphia
  - Gait, floppiness, stiffness, hand dominance
  - Systemic - cardiac, organomegaly, spine, skeletal
  - Developmental abilities (motor, speech, language, hearing, vision, social interaction)



# Developmental assessment

- MRCPCH Developmental assessment page  
<https://mrcpch.paediatrics.co.uk/development/>
- Developmental Tools





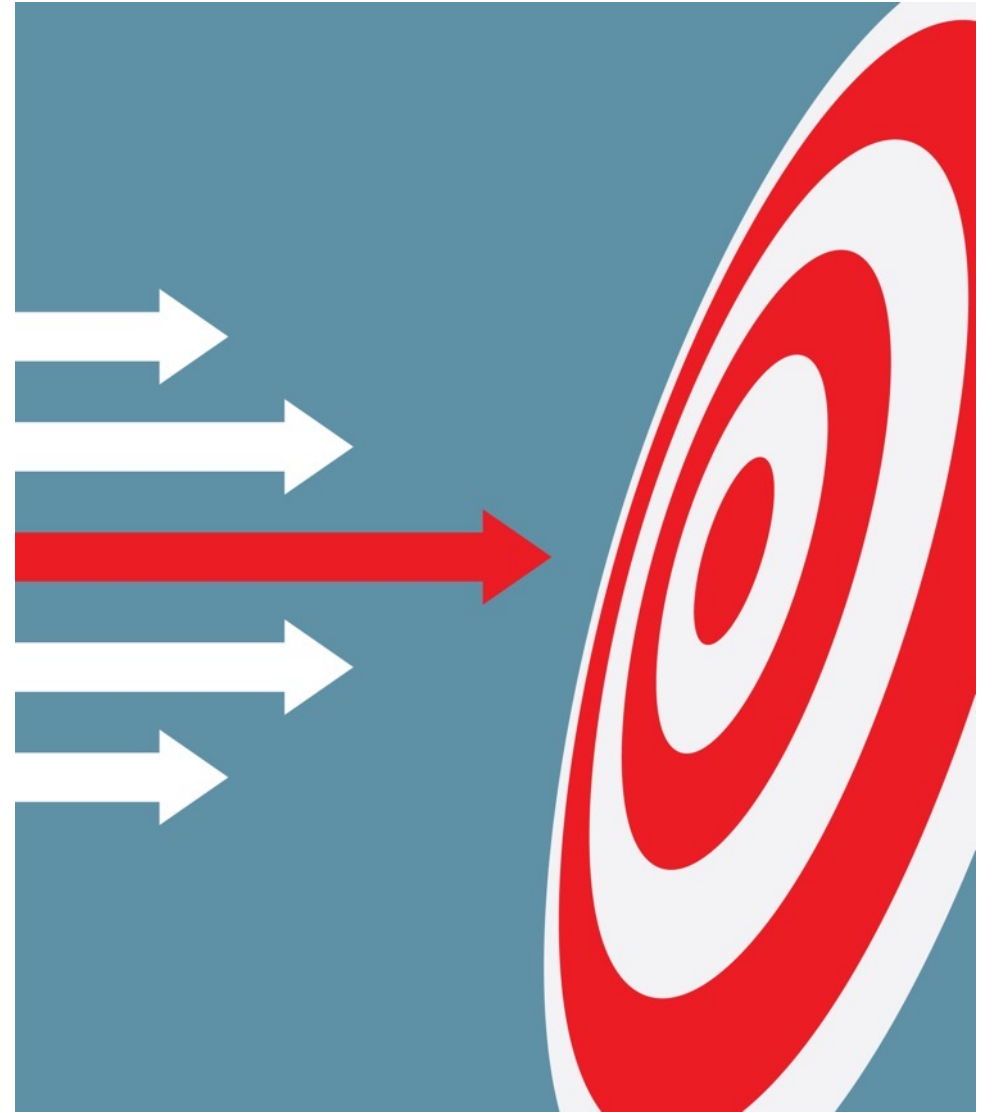
# Baseline Investigations Global Delay

- FBC, ferritin
- Urea & electrolytes
- Bone profile & Vitamin D (nutrition)
- Liver function tests (metabolic)
- CK (DMD, myopathy)
- Thyroid function tests
- Check neonatal blood spot result
  - Congenital hypothyroid + metabolic (PKU, HCU)



# Referrals

- **Single domain mild**
  - →Therapist (Speech and Language, Physiotherapist)
  - →Hearing/ Vision
- **Single domain significant / Global delay**
  - → Community Paediatrics + baseline invx
  - →Therapist + Hearing/ Vision
- **Any delay *with* abnormal neurology/seizures/ significant motor/regression**
  - → General Paediatrics / Neurology
  - → May need Rapid Access/ acute
  - → **Regression = urgent referral**



# Neurodisability & Complex Needs

## - What happens after you refer?

- LTV + Recurrent chest infections
- Secretion mx
- Saliva mx
- Feeding PEG + constipation
- Tone mx
- Posture, pain + hips
- Supportive MDT care:
  - Community Paediatrician
  - Medical & Surgical Specialties, Genetics, Palliative Care
  - AHPs, Nurses, School, Social Worker
  - Social Care, Respite, Community Supports



# Learning Points

- Developmental delay is common
  - Understand development & milestones
- Early recognition delay or regression
- Red flags - not to be missed
  - Refer urgently for neuro-regression
- Assessment
  - History, examination & developmental
- Early referrals = timely investigations and MDT Care
  - Improve quality of life & outcomes



# Resources

- **MRCPCH Developmental Station Guides**
  - Development One Page Guide <https://mrcpch.paediatrics.co.uk/development/>
  - Common Conditions <https://mrcpch.paediatrics.co.uk/development/developmental-common-conditions/>
  - Videos <https://mrcpch.paediatrics.co.uk/development/development-videos/>
- **Red Flags Early Identification Guide for Children (birth -five years)**
  - <https://www.childrens.health.qld.gov.au/wp-content/uploads/PDF/red-flags-a3.pdf>



Thanks. Questions?

