



Developmental Delay & Neuroregression

Dr Lisa-Renée Sharpe

Consultant General Paediatrics & Community Child Health
Royal London Hospital

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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



Gross motor



Fine motor & vision



Speech, language & hearing



Social, emotion,
behavioural
interaction

Developmental Milestones & Delay

Milestone = Median age skill acquisition
(50% population)

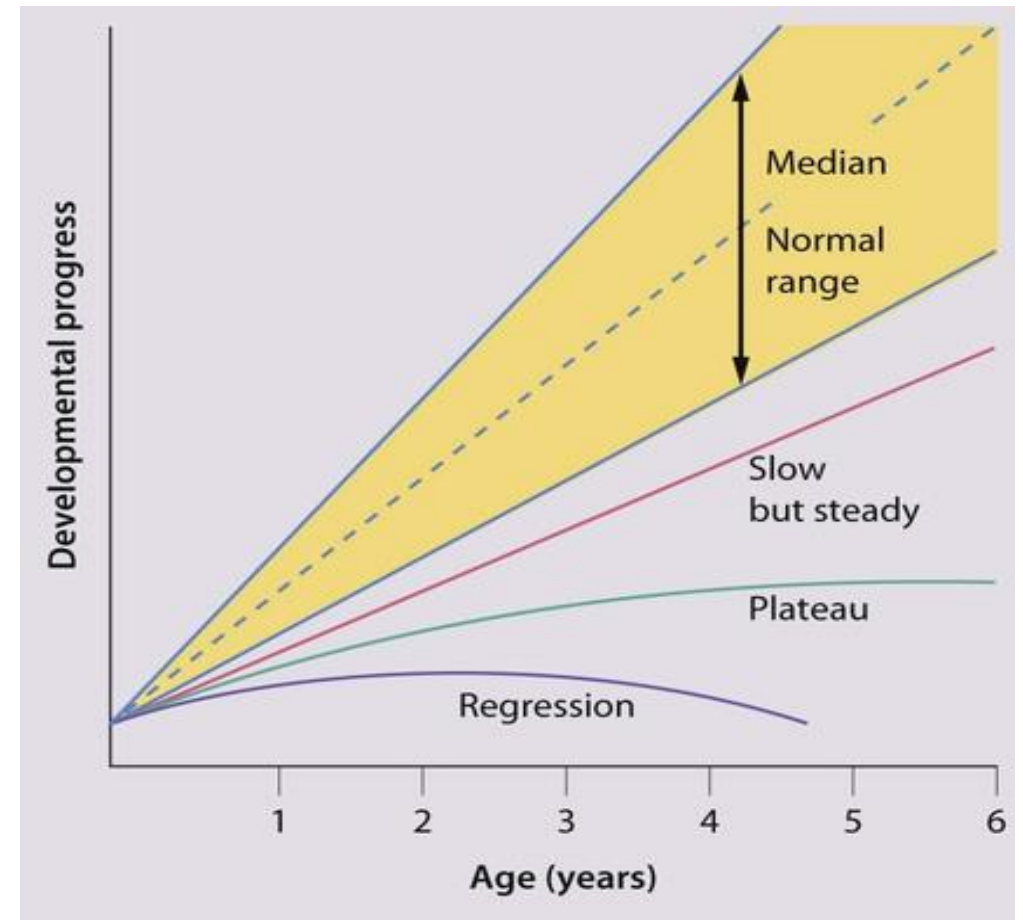
Significant delay = Limit age (2SD)

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?



Red Flags - Developmental Delay

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

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

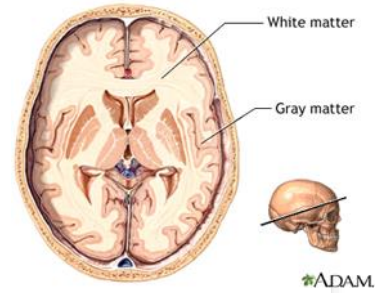
Always:



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**

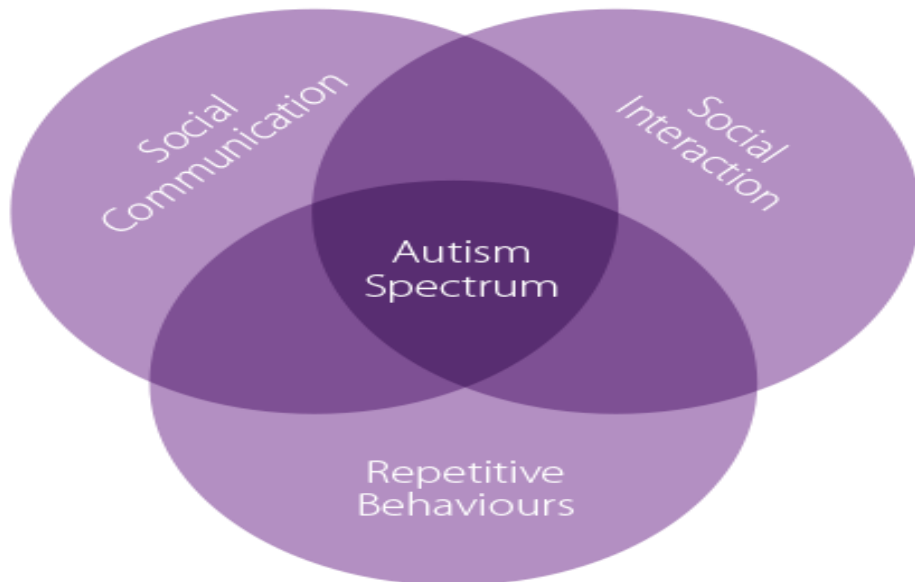
- Inherited - Genetic
- Metabolic
- Storage disorders, Mitochondrial
- Grey / White Matter

→ **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

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?

- 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

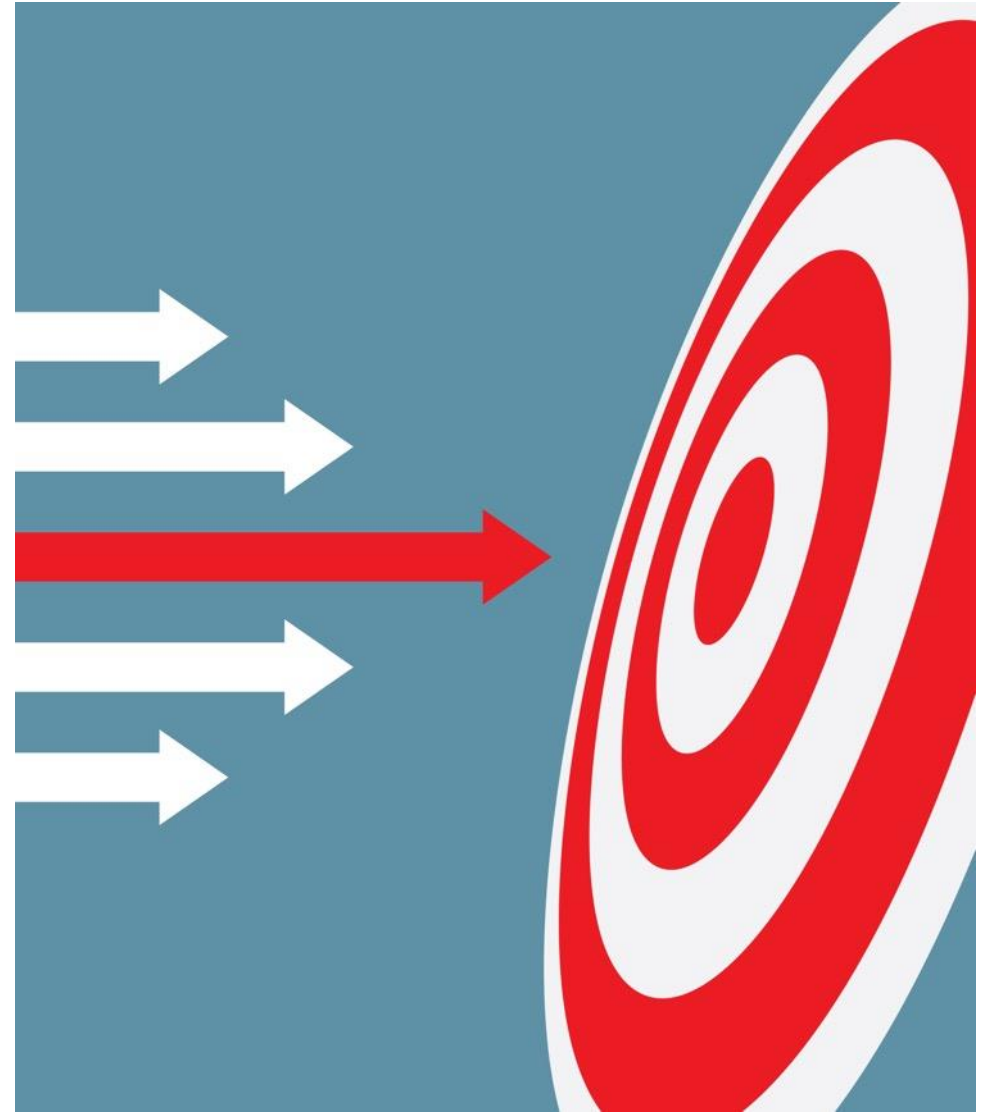


Baseline Investigations Global Delay

- 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?

