



LISTEN to me!

Brain development and its consequences for young people's behaviour

Presentation for International Nurse Specialist Group-Cystic Fibrosis (INSG-CF)
In Göteborg , June 11, 2014)

By Kristina Berg Kelly, associate professor Göteborg University

kristina@bob-kelly.se

The objectives for this lecture

1. To be acquainted with core aspects of brain development during adolescence
2. How to apply this knowledge to support your patients in an age appropriate manner

This is a true story

What was the riskiest thing
you did as a young person?

Discuss with your neighbor!

3 main activities rearrange the brain

1. The gray substance decreases

Synaptic pruning

”Use it or loose it!”

2. White substance increases

Myelinisation

- highways instead of small winding roads

Improves speed and efficacy

3. Select locations develop intensely



I. Gray substance

Consists of the brain cells proper/the neurons, and their connections/the axones

The number of neurons and their connections increase during the childhood

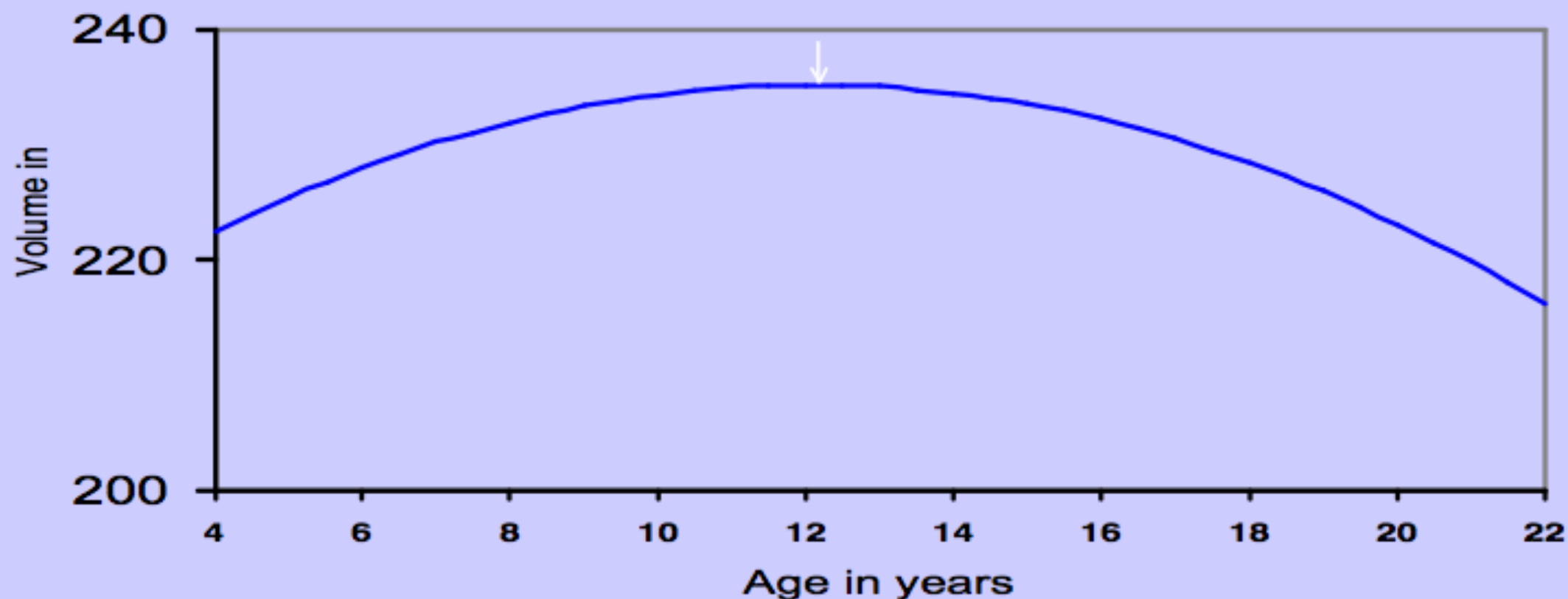
BUT decreases during adolescence:

”Pruning“

”Use it or loose it“

Brain Development in Healthy Children and Adolescents: Longitudinal and Cross-Sectional Data (243 Scans from 145 Subjects) [Giedd et al]

Frontal Gray Matter



2. White substance - Myelin

Myelin covers long nerve fibers- the axons
increases transmission speed

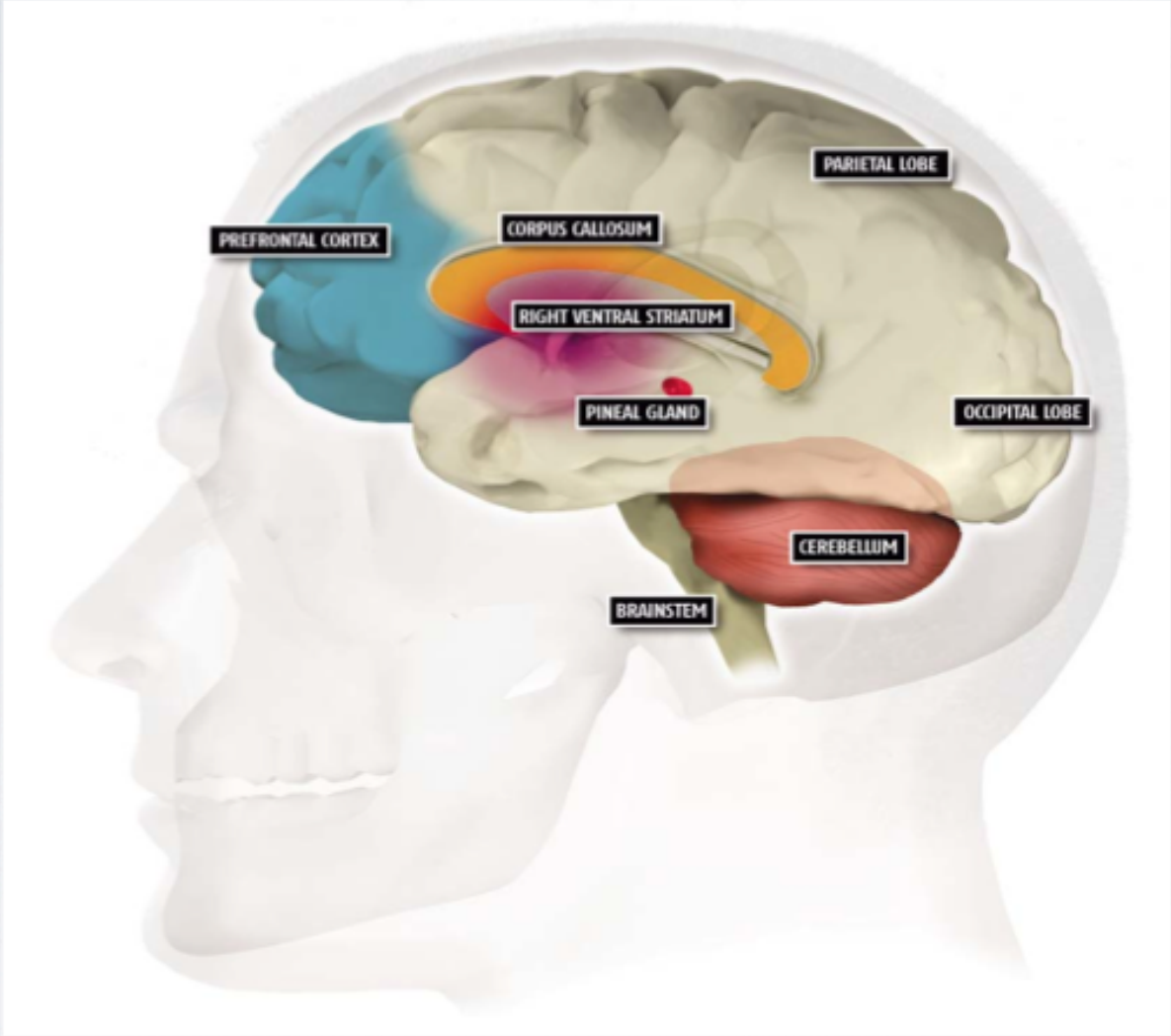
This activityh goes on most of your life
but has its maximum speed during childhood and puberty

During 10-20 years of age: the myelinisation
procedes from the back to the front of the brain

the frontal lobe is the last station

creates the highways of the brain

increases the cognitive capacity of the brain



3. The “emotional” brain

Related to the pubertal development at 10-15 years

The second period in life with maximal sensitivity to
steroids

Affects paraventricular nuclei, basal ganglia, the limbic
systems, amygdala and nucleus accumbens

Causes strongly increased emotional intensity

3. The “emotional” brain

Sensation seeking
Increased awareness
Anxiety and Easily scared
Disgust
Shame
Anger and aggressiveness:
Happiness, joy
Reward, comfort
Sexuality



3. "Sensation seeking"

Young people react more intensely to big awards than adults or children do

But small rewards give less reactions

Dopamine -driven: – increased sensitivity to dopamine

Consequences: prefers immediate rewards to those which give rewards later.

3. The “ social” brain – social competence

To be accepted by select peers is of main importance

Getting feed back from your peers and others

A strong feeling of being ”on stage”

Terrible to make a fool of yourself

Abstract thinking: You feel alone. Nobody understands you. You are unique

Gender differences

Unbalanced..

The supercharged emotional system
The frontal cortex has not yet taken charge



YP are similar to sports cars...





Talk with your neighbors:
recall one patient whose
behavior shocked you
or was nothing you had expected

3. The frontal/prefrontal lobe develops at 15-23

The control tower of the brain

Or the secretary

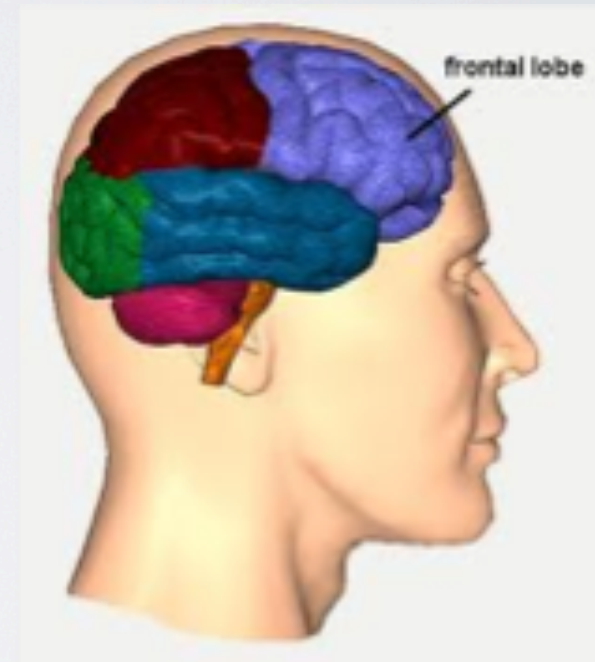
Planning, Logistics

Decision making

Getting it done

Evaluates consequences

Common sense



Rishtagande, rubbad balans



Adolescent risk taking

Grey, white & dopaminergic pathway changes *increase vulnerability to risk taking*



Diagnosed at age 18 months. Lives with both biological parents and an older brother

Standard treatment with daily inhalations morning and night , physiotherapy with breathing exercises and jogging one hour with her father after school every day, a diet with extra vitamins and lipids, and pancreatic enzymes . During the last year she has been given antibiotic inhalations frequently. Her lung function is deteriorating more so than earlier

Pia has always been very cooperative with her treatment , but recently she objects to the supervision of her parents, ad particularly the jogging. They have listened and allowed her considerably more freedom. But this has resulted in the signs of lung infections

Pia insists that she is old enough manage her own treatment, she knows what to do and she knows how important the treatment is. No more parental supervision!

Pia 12 years old with CF

Biological devt	Puberty maturation Secondary sexual characteristics developed at end of period. Changed body image
Cognitive & emotional devt	Mostly concrete thinking but abstract thinking accelerates. Fantasies and dreams Omnipotence and invulnerability Intense emotions
Social arena involved	Discussions, argumentation, particularly with parents. Revolting against parents, mainly verbally
Sexuality	Exploring one's own body

Linda was diagnosed when 4 years old.

She has had standard treatment Everything went well up to Linda was 14 years old.

Her parents divorced at that time,

Linda now lives with her mother who is on sick leave for depression. Linda's lung function has deteriorated. She claims that she does what she is supposed to do.

The mother has given up trying to monitor Linda's treatment

The father is worried, but Linda refuses to see him

Linda: " This is my time to enjoy life"

Consequently Linda spends a lot of time with friends. Alcohol? Drugs? Unsafe sex? Her school work is also deteriorating according to the teachers

Linda 16 years old with CF

Biological devt	Body composition develops towards adult characteristics
Cognitive & emotional devt	Who am I ? Identity devt at peak. . “Being on stage” Abstract thinking accelerates., Emotionally charged and rarely able to consider consequences. Role playing and experimenting
Social arena involved	Who am I? Where do I fit in ?Peers are main concern. Intense social networking. Dating and sex Am I OK? Trying out different social groups - often simultaneously
Sexuality	Exploring sexual activities

Ready for sexual exproation

Roy 18 years old with CF

Roy was diagnosed at 14 years of age and has had standard treatment since then. But his lung function has deteriorated quickly

- Roy is the only child, but he is also the only paternal and maternal grandchild. He is doing well at school, has lots of friends and a girl-friend
- But he “forgets” his appointments, he does not come to the physiotherapist, the nurse or the doctor. He” forgets”
- But eventually, when he finally appears, he is very pleasant and charming, says yes to everything, and gives promises, but you know from experience that he will not comply

Biological devt	Body composition develops towards adult characteristics; the X and the Y
Cognitive & emotional devt	The future becomes real. Long term planning possible. Self criticism. Desperation and hopelessness common particularly with dire outlooks
Social arena involved	Content of intimate relationship becomes important. Realistic vocational planning. Concern with outcome of chronic illness. Looks for support, information and advice in an adult way
Sexuality	Ready to try permanent engagement with someone
	Ready for sexual exploration

	Early adolescence 10-13/14 yrs	Middle 13-17 yrs	Late 17- 23yrs
Biology	Puberty occurs Secondary sex characters	Body composition changes towards adult body	Adult body; the X and the Y
Cognition Identity Autonomy Emotions	Mainly concrete thinking. Fantasy and dreams Omnipotence and invulnerabilty	Who am I? Identity devt intense. “Being on stage” Abstrac thinking accelerates. Emotonally charged . Rarely able to consider consequences. Role playing and experimenting	Able to grasp the future which becomes real.Starts to understand consequences. Long term planning is becoming possible, Self criticism and hopelessness common among vulnerable youth
Social arena	Family the main area of interaction, argjueing and and conflicts, as a safe way to promote identity	Who am I ?Am i OK? Where do I fit in? Peers are the main concern. Often trying different social groups, sometimes simultaneously Trusted adults are OK	The content of relatoinships becomes important.. Again able to return to parents and trusted adujts for advice and support
Sexuality	Exploring of own body	Dating. . Exploring different sexual activities	Ready for more permanent engagement based on common interests .

Check “your” patient. Use your
experience and the bio-
psychosocial scale
Come with suggestions

ANATOMY OF A
TEENAGER'S
BRAIN

THE
BIRDS
AND THE
BEE'S
LOBE

RÉBELLION
CENTER

SUPER TURBO
RÉBELLION
CENTER

SELF
IMAGE

PRONE TO
BRUISING

INTERNET
ADDICTIONS
GROWING

FITTING-
IN
GLAND

CENTER OF
UNIVERSE
CENTER

EVERY EPISODE
OF THE
SIMPSON'S

PEER
PRESSURE
RESISTANCE

PERSONALITY
FLUCTUATOR

INDESTRUCTIBILITY
CORTEX

"COOL"
GAUGE

SLANG
DECODER

MEMORY
FOR MUSIC

LOVE
FOR
PARENTS

SLAM
DOOR
REFLEX

CAR
KEYS
CRAVING

ABILITY
TO BE
SEEN IN
PUBLIC WITH
PARENTS

JUDGEMENT
GLAND

MEMORY
FOR CHORES,
HOMEWORK, ETC.

SLAMBO
PARENTS
DISDAIN

ALL THE
ANSWERS



Om föräldrastilar



BALANS

utbildningar från Sanofi

Parenting styles

according to Laurence Stenberg 2009

	Demanding Firm	Not demanding Not firm
Empathetic Warm	authoritative	indulgent
Not empathetic Not Warm	authoritarian	neglectful

The objectives for this lecture

1. To be acquainted with core aspects of brain development during adolescence
2. How to apply this knowledge to support your patients in an age appropriate manner
3. Please write down one new thing you will start to practice when you come home!

3.

Klara, färdiga, gå!



Thank you!

2014-01-31

Kristina@bob-kelly.se

1