



## THE ADOLESCENT BRAIN AND BEHAVIOUR EXPLAINED

Research now supports what parents have long known; that an adolescent's brain is different to an adult's brain! Until recently it was thought that the major 'wiring' of the brain was completed by as early as three years of age and that the brain was fully mature (in growth) by the age of 10 or 12.

However, the use of MRI (Magnetic resonance imaging) shows that the greatest change to the parts of the brain in the areas of self-control, judgment making, emotions and organisation occurs between puberty and adulthood. These developments in MRI also informed us that a teen's brain develops somewhat unevenly, from back to front. This may help explain their endearingly quirky behaviour but also makes them prone to risk-taking.

Adults use various parts of their brain to evaluate choices and make decisions; however it would appear that the teenage brain doesn't function like that. If you think about the brain as an entertainment system – in teenagers it still needs wiring up. The 'loose wires' mean that the speaker system (for instance) doesn't connect with the DVD player, which is yet to be formulated with the television, and the remote control is missing!

The 'remote control' is the prefrontal cortex – this section of the brain weighs outcomes, forms judgments and controls impulses and emotions. This part of the brain also helps us understand each other. The prefrontal cortex communicates with all the other sections of the brain through connections called synapses. (The wires of the entertainment system).

This section of the brain experiences a growth spurt between the ages of 11 – 12 and then undergoes a period of pruning and strengthening from the age of about 13 to the mid-twenties. (That's why it is so important to encourage teens to have a range of healthy activities, as during that time the brain cells and neural connections (transformers) that get used the least get pruned away and die off; those that get used the most get stronger).

Ironically, this is the period when the brain is rapidly changing and most vulnerable to outside influences – such as poor peer friendships, engaging in risk taking behaviours, or experimenting with drugs or/and alcohol. Why? One reason may be because the prefrontal cortex isn't fully mature, and is therefore prone to being overpowered by the emotional or motivational regions of the brain which are more mature. Scientists believe this aspect of teenage brain development explains why young people sometime use poor judgments and lack good impulse control. This part of the brain does not fully mature until the mid-twenties.





It is as if, while the other parts of the teen brain are shouting, the Prefrontal Cortex is not quite ready to play referee. This can have noticeable effects on adolescent behaviour. You may have noticed some of these effects in your teen:

- difficulty holding back or controlling emotions,
- a preference for physical activity,
- a preference for high excitement and low effort activities (video games, sex, drugs, rock 'n' roll),
- poor planning and judgement (rarely thinking of negative consequences),
- more risky, impulsive behaviours, including experimenting with drugs and alcohol.

The development of the adolescent brain and behaviour are closely linked. Surging hormones can shift your teen's emotions into overdrive, leading to unpredictable outbursts and poor planning or prioritising.

One of the slower processes of brain development is empathy, fairness and a full understanding of ethics. Young people are often unable to read and understand emotions in the faces of others. Human beings tend to accept what enters their immediate experience and reject that which does not. Because of the huge changes happening in the teenage brain, it's possible that a decision your teen makes now may affect them for life. Just sharing that fact with them may help them to stop and think before they take any chances, and even inspire them to make more healthy choices.

#### **BRAIN REGIONS AND FUNCTIONS:**

**FRONTAL LOBE** = self-control, judgement, emotional regulation, (restructured in teen years)

**CORPUS CALLOSUM** = intelligence, consciousness and self-awareness (reaches full maturity in 20's)

**PARIETAL LOBES** = integrate auditory, visual and tactile signals (immature until age of sixteen)

**TEMPORAL LOBES** = emotional maturity (Still developing after sixteen)

#### **SLEEP**

Our bodies produce a chemical called melatonin. This is referred to as a 'darkness hormone' and helps us to fall asleep. In a typical adult the body starts to release melatonin at around 10pm. For a typical young person this chemical does not start to kick in until about 3 hours later at around 1am.





Therefore the majority of young people simply have a problem with going to sleep at what a parent may feel is a reasonable time. It is hard to say why this chemical is released later in the day with young people. There is a view that playing computer games, texting and watching television can cause the delay, but there appear to be few studies available that compare today's melatonin release times, with before computer games etc. became as widely available and played as they are today. The other school of thought is that it is just part and parcel of a young person going through puberty.

Sleep is crucial for young people – it is while they are snoozing at night that they release a hormone that is essential for the growth spurt during puberty. As well as the role it plays in brain development, sleep also plays an important role in our brain's day-to-day ability to function. While going through puberty a young person actually needs more sleep than the average adult or younger child to cope with all the changes that are taking place within their body. This is one of the key reasons why young people tend to catch up on their sleep whenever they get a chance, for example at weekends. Your average young person needs around 8 ½ – 10 hours' sleep per night. This means that if they wake up at 7 o'clock in the morning they need to be asleep between 9.30 – 11pm in order to get the right amount. That's not always easy as that is a few hours before melatonin kicks in!

It can be difficult to encourage young people to keep to a regular bedtime, but it's important to try. Experts have linked a lack of sleep to problems with behaviour, concentration and achievement at school. A lack of sleep can contribute to weight gain too, because it inhibits the production of appetite-controlling hormones.

It is important that parents have empathy when it comes to young people and sleep. There's a biochemical reason why a young person is more wakeful at night and sleepy in the mornings, so don't shout or tell them off as they really cannot help it. Instead try to help your young person understand that they need a good night's sleep and support them in developing a good healthy sleeping routine. Remember, habits learned in adolescence often become lifetime habits, so make sure they learn good sleep habits early and they'll last a lifetime.



STOP

**SOME HEALTHY SLEEP HABIT TIPS**

- **A PROBLEM SHARED:** Talk to your young person about anything they're worried about. This may help you and them to put their problems into perspective and sleep better.
- **EMPHASISE TO YOUR YOUNG PERSON THE IMPORTANCE OF SLEEP:** It has proven advantages for memory and performance. A minimum of eight to nine hours' good sleep on school nights is recommended for young people
- **EXERCISE FOR BETTER SLEEP:** it's official, regular exercise helps you sleep more soundly as well as improving general health. A young person should be aiming for at least 60 minutes of exercise every day, including activities such as fast walking and running.
- **CUT OUT THE CAFFEINE TO BEAT INSOMNIA:** suggest that your young person drinks less caffeine (contained in drinks such as cola as well as tea and coffee). Too much caffeine stops them falling asleep and prevents deep sleep.
- **DON'T BINGE BEFORE BEDTIME:** Let young people know that eating too much or too little close to bedtime may prevent sleep due to an overfull or empty stomach. This can be a cause of discomfort throughout the night.
- **BEDTIME ROUTINES ARE A GREAT SLEEP AID:** encourage your young person to have a bedtime routine. Doing the same things in the same order an hour or two before sleep time can help them drift off to sleep.
- **IS THE BEDROOM SLEEP-FRIENDLY?** Ensure a good sleeping environment, ideally a room that is dark, cool, quiet, safe and comfortable.
- **BAN SCREENS IN THE BEDROOM:** If possible, don't have a TV or computer in the bedroom as the light from the screen interferes with sleep. A music system is preferable.
- **GET A COMFY BED:** Ensure the young person has a comfortable bed or mattress. Is it time to get a new one or bigger one?
- **TRY AND DISCOURAGE "CATCH UP" SLEEP SESSIONS:** Catching up on sleep at weekends may seem like a good idea but the long lie-ins further disrupt the body clock.
- **DIM THE LIGHTS:** artificial light disrupts sleep patterns. When light dims in the evening, we produce melatonin which tells our bodies it's time to sleep. But bright room lighting, TVs, consoles and computers can all emit enough light to stop the natural production of melatonin, tricking our bodies into staying awake. It might be worth investing in thicker curtains or a blackout blind to help insulate against the light of summertime early mornings (and late evenings).
- **OPEN THE CURTAINS:** get natural sunlight in the morning – to switch off melatonin, increasing alertness.

