



■ Dr Aju Abraham

# Your teenager is not just a small-sized adult

Many parents tell me that they know what's best for their teenage child, but they get frustrated when their teenager is unable to follow their advice that seems very logical and reasonable. Having gone through all the initial stages in life themselves, it often seems clear to parents that if their teenager takes their advice, his or her future would be a lot brighter and secure. However, things are not as simple as it seems when it comes to helping your teenager and knowing what may be best for your child is often not enough to help them progress through the complicated transition from childhood to adolescence and adulthood. Quite often I see parents starting to treat their adolescent child as a young adult without realising that an adolescent is not just a small sized adult. There has been a lot of research done in this area and scientists now believe that an adolescent's brain is different from an adult's brain, which makes them think very differently from an adult. Until about 10 or 15 years ago most scientists believed that the major connections within and between various structures in the brain were completed in early childhood. Now with the emergence of modern imaging techniques such as fMRI, there is strong evidence from the research done in the last decade showing that the human brain goes through various changes from gestation through to early adult life. Let us look at some of the information that is available at present regarding the differences between an adolescent and an adult brain.

Neurons (brain cells) begin developing very early in gestation and migrate to specialised areas of the brain by birth. Whilst most of the structures within the brain are evident at birth, the connections between those structures are not fully formed until later on in life. There are various maturation processes that occur in the brain from a few weeks of gestation through to early adult life

such as formation of synapses, pruning and myelination. Formation of synapses (connection between the nerve endings of 2 nerve cells) and the process of pruning (clearing away of the unused connections of the brain) are completed usually around the adolescent period. Whilst myelination of the nerve cells start from the later part of gestation, it is accelerated from the adolescent period and goes on in some cases until the early 30's. When a child is born it is the grey matter (formed of the nerve cell body) which predominates compared to the white matter (formed of the myelin sheaths of the nerve cells). The Grey matter which is the thinking part of the brain increases over time, peaking around 12-16 years of age. As



a child matures the quantity of grey matter will begin to decline as the unused connections are taken off in the pruning process. This is accompanied by an increase in white matter which occurs when myelination of the nerve cells occur. Before the white matter comes along, the communication within and between the different structures of the brain is inefficient. It is the myelin sheath of the nerve cells which act as an insulation facilitating the communication between different areas of the brain. During this stage your child's decision making capacity increases as there are more efficient connections between different parts of the brain and you see that your child starts thinking in a more efficient and sophisticated way. This process of myelination is earliest in the areas of the brain that are responsible for sensations and movement and the latest in the areas of the brain that

influences self-control, judgment, emotions, organization, decision making, risk assessment, weighing up the pros and cons, understanding different perspectives and intricacies in communication etc. This may help to explain certain teenage behaviour that adults can find mystifying, such as poor decision-making, recklessness, and emotional outbursts.

Adolescents and adults also differ in their ability to read and understand the emotions connected to facial expressions during communication. Research has shown that adolescents and adults use different regions of the brain in responding to certain tasks. Compared to an adult the adolescent's frontal lobes (executive centre of the brain) are less active and their amygdala (emotional centre of the brain) is more active. As a result a teenager could often misread the parents who are trying to communicate with him or her regarding a situation. This is because in teenagers, it is the emotional centre of the brain which is the primary influence behind their response to the situation, resulting in emotional & impulsive reactions and reckless behaviours. It is difficult for parents to understand this, as their response to the same task comes from the executive centre of the brain giving them the judgment, insight and reasoning power behind their decisions. This explains why adolescents often fail to pay attention to parent's warnings about their choices. That is, they may not be able to accept a point of view from their parents although it seems very logical and reasonable.

Now that you have understood the differences between a teenage brain and an adult brain, in my next column I will write about how you can address this mismatch whilst communicating with them.

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