adolescent education

Learn, share & grow.

GROWTH | MATURATION | DEVELOPMENT

GROWTH

Growing is typically all that children want to do, grow taller, be stronger, faster and more like an adult.

As health professionals, carers, parents, teachers and coaches, understanding what is happening in these years of BIG growth changes, can enhance understanding of injuries in this population.

Adolescent years are a UNIQUE time of life; this newsletter will outline some of the changes during these formative years and how these relate to care roles.

Adolescents is the second time in life where the human body will undergo rapid vertical growth and HUGE brain changes with a dramatic increase in hormone production and influence.

Firstly, to outline useful language around this time of life:

Adolescents is defined by the 'World Health Organisation' as a phase of ***enormous physical and psychological changes, spanning between the years of 10-19 years of age***. "Youth" is defined as 15-24-year age group and these two age groups combined form "young people".

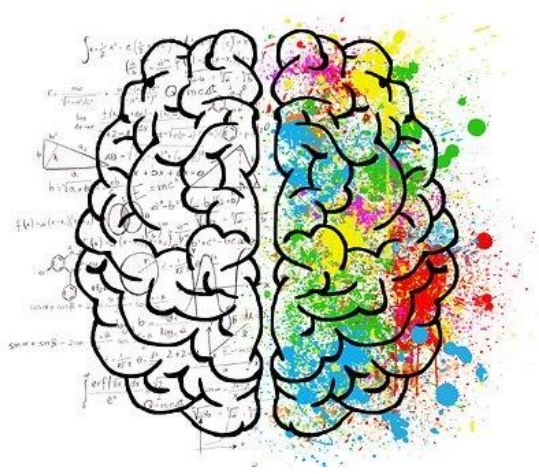
During the "adolescence" phase of life an individual develops across many fronts, with the appearance of secondary sex characteristics (puberty) to sexual and reproductive maturity, the development of mental processes, adult identity and the transition from total socio-economic and emotional dependence to relative independence. The body also undergoes enormous growth, and maturation of the musculoskeletal system, it is noteworthy that many of these body systems can continue maturation and development into mid 20's, however, adolescence is a time of the most rapid phase of change. These growth changes affect the individual differently and whilst there are many gains to celebrate, there are deficits to understand.

Puberty onset symbolizes the maturation of the hypothalamic-pituitary-adrenal axis and gonadal axis of the neuroendocrine system and can be assessed using the Tanner Stages of Puberty. Developed in the 1970's by Dr Tanner, there are 5 stages of maturation, based on growth of secondary sex characteristics. Whilst as a physiotherapist we do not objectively assess this, knowledge of these 5 stages as a reference point for adolescents builds a greater understanding of the physiological changes at play. Knowledge of Tanner Stages allows for better understanding of the physiology of the body beneath the injuries we see and the musculoskeletal changes that occur during these phases. With this knowledge we are better equipped to understand the growth elements of our adolescents and educate them on their bodies during this unique time of life.

So what changes ……..

Chloe Priest

GROWTH



BRAIN

Brain development is HUGE, during this phase of life they are developing a sense of ***independence*** and throughout this process they undergo a period of intense identification with their peers. Identification and acknowledgement of this is important, they are seeking to understand themselves in reference to their peers.

Linking adolescents with others who are experiencing the same injury or assisting them to feel ***connected to their peers*** despite a shift in ability to participate in sport at times of injury is important.

Understand what this injury means to them in the form of their ***identity*** and acknowledge that their sport may have been 'who they were'. Voicing that acknowledgement may help them to discuss this internal issue. Helping them map out a pathway back to their sport maybe helpful OR directing them to other appropriate psychological services may also be helpful in their journey.

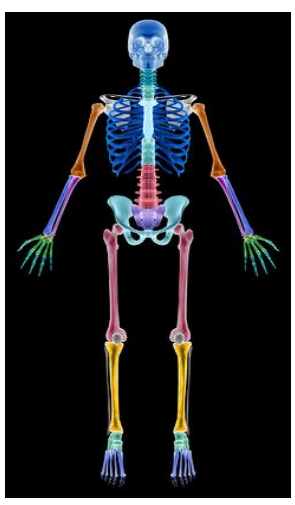
When pain or disability extends past the expected timeframes for recovery, understand that other ***psychosocial factors*** may be complicating their return to activity and injury resolution.

Finding ***goals*** that are meaningful to them and assisting them to map out their pathway for physiotherapy management implementation is helpful over ***parent nagging.*** Educate them on their body, what is happening and why.

When assessing adolescents, practitioners should pay close attention to ***body language*** and remember they typically have a heightened sense of social anxiety to personal scrutiny. Always ***protect their modesty*** and be guided by them, often parents say 'they are ok in their bra' however, often this is not the case.

References:

- Check out Sarah-Jane Blakemore TedTalks
- The Brain, The Story of You, David Eadleman, Patheon Books, USA, 2015
- The Teen Years Explained – Johns Hopkins Uni



MUSCULOSKELETAL SYSTEM

Feet first….. the growth of feet happens first, typically in ***Tanner Stage II***, you may notice that their feet look completely out of proportion to their body all of a sudden. This is also a time when 'Sever's Disease' and other apophyseal foot injuries become prevalent.

Next to grow, typically in ***Tanner Stage III for girls and boys***, is growth of the long bones. Towards the end of Tanner Stage III boys will reach their peak height velocity and this will happen to girls in early Stage III.

In these middle years of adolescents, prevalence of long bone fractures rises as bones are busy gaining length but are not comparatively as dense. We also see a rise in ***avulsion fractures***, which is particularly more prevalent in males, this may coincide with rapid increase in muscle strength with testosterone gains in late Tanner Stage III in to Stage IV.

Movement also changes as we grow through adolescents.

Girls in Tanner Stage III, show a considerable ***loss in pelvic stability***, which may directly influence patellofemoral pain experienced by adolescent girls, they may also experience an increase in knee laxity.

Just to add to poor knee control in adolescent girls is the relative lack in hamstring strength, girls become quadricep dominant.

When considering the factors of; loss of pelvic stability, reduction in hamstring strength, increased internal rotation of the femur in landing strategies and increased knee laxity there is no wonder why we see so many knee complaints and knee injuries in adolescent females.

On the plus side of this phase and potentially also the pre-adolescent phase, we can influence bone density, we have a ***unique window to load the bones*** and this can influence bone health positively for life.

Lastly the ***spine and pelvis*** hit their growth phase, and in males the pelvis may continue to have open growth plates until mid 20's. Thus, thinking about large loads and change of direction torsion forces through the pelvis as this phase of development are important.

Many males and females in sport are playing in opens after the age of 18 or 20, these bodies have often not finished their growth and maturation, yet they are often training with physical adult demands.

It is also worth noting here the differences between individuals; their age and Stage of Puberty, there are vast differences in strength, weight and speed, particularly in the male population.

Throughout ***periods of growth***, these bones and areas of the body are more ***susceptible to injury and overload***. For example, we see Sever's Disease in Tanner Stage II with active apophysis in the feet, Osgood schlatters disease in long bone growth years, anterior knee pain in Tanner stage III girls and pars fractures typically in the years of spine growth. Obviously there are always outliers but understanding the Stages of Puberty and relating that to the adolescent in front of you can be helpful in diagnosis and management.

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