Part 1: Understanding the Basics of Physical Growth and Development

Topic Questions:
1. Why does a coach need to understand growth and development?
2. What are the average maturational parameters?
3. What are the identifying characteristics of early versus late maturers?
4. What are the potential negative outcomes for both early and late maturers?

Why Study Growth and Development?
Growth and development is a topic that often is not well understood by new coaches. This chapter identifies critical elements of athlete development in a variety of sport science disciplines (i.e., physiology, psychology, growth and development, sociology) in order to arm the coach with knowledge to work more effectively with young people.

First, here are two basic assumptions that serve as the underlying rationale for addressing growth and development:

1. No two individuals are exactly alike.
2. Individuals change in relatively predictable ways as they get older.

Specifically, while no two young swimmers are identical, their physical, psychological, social and physiological development follows a similar pattern. Using this knowledge of the predictable aspects of the developmental process will aid in understanding and training young swimmers and will help to place their behaviors, needs, thoughts and capabilities in context.

Complete textbooks are written on development in each area. We asked experts to identify and explain a few critical elements of athlete development deemed to be crucial information for coaches. On the following pages are the discipline specific summaries of athlete development along with recommendations for applying the information.

What is the Maturational Process?
It is important to remember that a child is not just a miniature adult. Children develop in sequential and predictable ways from young children into fully grown adults.

- During the childhood phase prior to puberty, children, on average, grow about 2.5 inches per year and gain about 5 pounds per year.
- Peak height velocity of growth (the "adolescent growth spurt") occurs during puberty/adolescence.
- Girls reach peak growth spurts between ages 11-13 and boys between ages 13-15.
- Adolescent awkwardness due to rapid physical growth affects performance.
- Tracking of "outstanding" kids in elementary school found that only 25% were still rated as "outstanding" in later years, suggesting that early success does not predict later success.
- Gender differences in physical growth and in the timing of the growth spurt contribute to the overall difference in the height and body shapes of females and males. These changes are out of the athletes’ control but may impact performance.
- The rate of growth is similar for males and females. At some points of maturation, girls grow even faster than boys. However, boys have more growth at the end of maturation.

While individuals develop in similar ways, the timing of this maturation process can vary greatly. In fact, at any one chronological age, individuals can vary by as much as five years biologically. This means that with two swimmers who are chronologically 12 years old, one may be biologically 10 years old and the other 15 years old. In spite of this huge difference in physical maturity, these differences are often not recognized in training and competition expectations.

Identifying early maturers and late maturers
One way of trying to identify the kids who are going to be early maturers and late maturers is just by eyeballing them. In childhood, early maturers tend to be taller, heavier, and have more muscle mass than their peers. Alternately, late
maturers are generally shorter and very light and lean in childhood. Late maturers may also be fairly tall but lean and without muscle mass. Very often, the late maturers end up being taller as adults because they are in the childhood growth phase longer. In the end, final height depends on individual genes. A good starting point is to look at the biological parents to predict athletes’ heights.

Another way to identify early maturers and late maturers is to track the athlete’s growth. On average, children grow 2.5 inches a year and gain about 5 lbs. a year until they hit their growth spurt. For girls, this growth spurt occurs roughly around age 12-13 and around age 14-15 for boys. If the growth spurt occurs earlier than this average, you have an early maturer, if it occurs later, you have a late maturer. It is important that young athletes have regular physical check-ups to ensure that growth is on track. Excessive weight gain or loss should be addressed by a physician.

Potential Negative Outcomes

In and of itself, being an early maturer or a late maturer is not a concern. However, the potential short term and long term ramifications if one ignores maturational differences are of concern.

Early maturers, who hit their growth spurt prior to their same aged peers, tend to have an advantage in sports, especially sports requiring speed, power and endurance where body mass is helpful. For biological reasons, not because of greater talent or ability, they are often able to outperform their peers. In childhood, they have much early success for which they receive reinforcement and recognition and, therefore, tend to initially stay with the sport.

Into high school there may be problems as the early maturers, who are used to experiencing success, get frustrated because now peers are catching up with them. Others may ridicule and tease them because they are not experiencing the same outcome success and assume it is because they are not training hard or not putting forth the effort. Part of the dropout from sport we see around age 14 is due to early maturers leaving the sport out of frustration when they are not experiencing the same success as they did when they were younger. In reality, it’s the physical changes that are occurring in their peers that are allowing others to catch up with them.

With late maturers, there is a different set of issues. The late maturing kids often experience early failure because they are at a biological disadvantage that affects performance outcomes. They are not as physically strong or developed as their peers. In training, even though they may be working as hard, they often can’t keep up which is a huge source of frustration. This may lead to ridicule or embarrassment. These late maturers, who are not demonstrating success relative to their peers, may not get the coaches’ attention, encouragement or recognition that the more successful early maturers are getting.

Unfortunately, in developmental sport programs, late maturers often are not given the time to allow their physical maturity to catch up and their skills to develop. Instead, these children may leave the sport early because of lack of success and extreme frustration. This seems to hit late maturing boys the hardest because they are at an extreme disadvantage. Ironically, they may have the potential to be better athletes but they must be kept involved at the younger ages to make sure they continue with their skill development.