

Introduction

It was better when I was a kid. We climbed trees and played soccer and rugby on the road. We dumped our bags after school and played outside for hours before dinner. The only difference on weekends was that we did it for longer. In summer we played cricket and swam, and in winter it was rugby. All year round we cycled, ran, tagged, tackled, climbed, jumped, kicked and caught. Without exaggeration we played everything and we did it all without shoes and without an adult in sight. We made our own rules and resolved conflicts by ourselves. This is not just childhood at its best it is also development precisely as the mind and body requires it. By the end of childhood every kid in our neighbourhood had all the skills, and our bodies were metabolically and biomechanically efficient. Environments and lives have changed, much of it for good reason, but almost all of it with a big cost: Inactivity and incomplete stimuli. Children now sit when previously they ran. Many children don't run at all let alone play sport. The point is that while our lives have changed, our needs have not. Our gym environment is designed to redress as much of what's missing as possible. We have a clear objective which is to engender a foundation of stable, low cost basic movement patterns and strong and resilient bodies.

First principle: **Enhance efficiency and resilience**

Physical strength is the product of muscle acting about a joint. Our big joints (ankles, knees, hips, and shoulders) are complex and highly mobile (inherently unstable). Inherent instability (needed to permit multidirectional movement) requires stabilising structures. Joints are arranged into an underlying layer of connective tissue and muscles, that stabilise joint position and motion, and an outer layer of much larger muscles, that are designed to act across the joint to move the limbs. However, if the stabilising tissues do not do their job, then the most basic requirement that the joint remain stable will fall to the large mover muscle, and in this way diminish force for movement. The reverse can also occur. Confusion (of muscle function) at the level of a single major joint is common and it impairs efficiency; too much energy is spent stabilising joints rather than producing force for movement.

Simple or basic movements, such a squatting, require joints to work together to allow for the efficient transmission of force from the big muscles to the ground or surface of an object. There are many muscles/ joints involved in even very simple movements. A small degree of inefficiency across a pattern has the potential to raise energy cost significantly, and that is the basic explanation behind laboured or uncoordinated movement – too much energy is taken up trying to stabilise the body. This provides us with a primary goal for strength conditioning: *To raise efficiency by lowering the energy cost of movement.* Regardless of how strong or weak a movement pattern is, any energy saving, small or large, automatically increases available power. Intuitively, a harmonious mechanical system produces less wear and tear so the same process, of raising biomechanically efficiency, also *increases resilience to stress.*

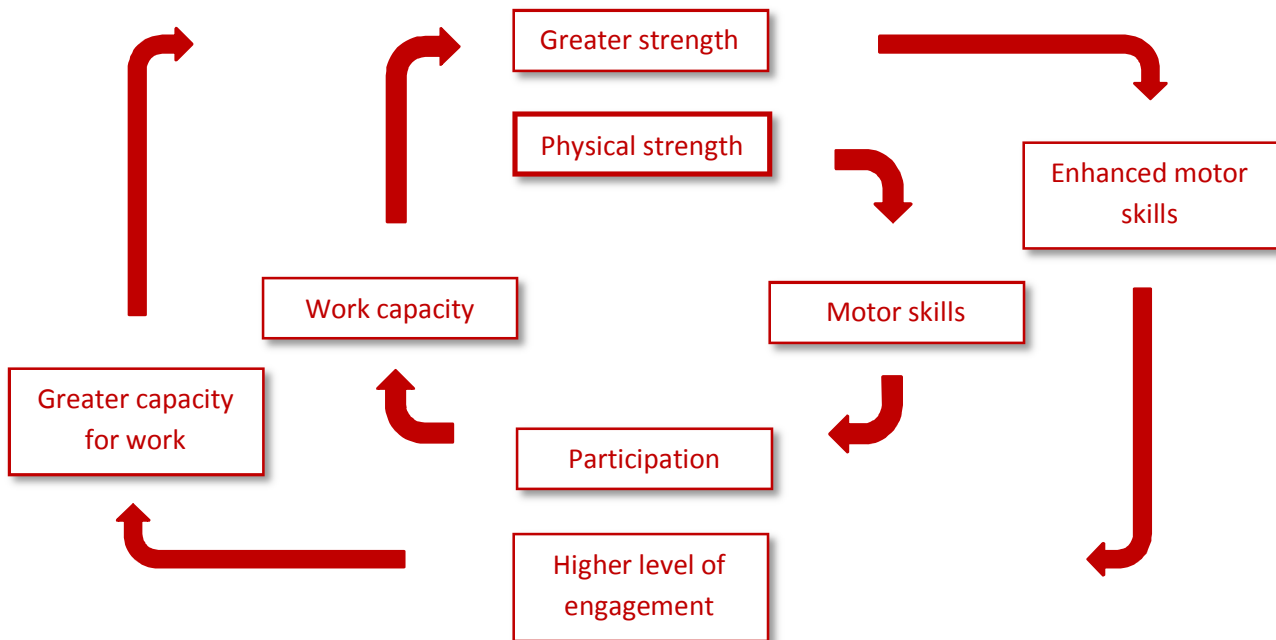
Second principle: Develop a complete set of motor/ movement skills

The anatomy of our bodies also provides us with basic or fundamental movement patterns that underpin the development of contextualised (sports-specific) movement. We are born with certain basic skills. From a very young age these skills, such as squatting and standing, are strengthened and serve as the basis for the acquisition of more specialised or contextual capacities. There are two very important facts arising from this pattern of development:

1. Vertical integration - capacities and motor skills are vertically acquired. Special skills are comprised of simple elements
2. Carry-over - a deficit or imperfection in a basic skill will impair the development and performance of a more specialised skill

The musculoskeletal structure and resilience of the human body along with motor or movement skills are part of a circular or mutually dependent process – the extension or enhancement of one factor facilitates the development of another. This process begins at the time we start moving independently as infants. Physical strength depends on stimulation through movement; and movement skills utilise the resources of the musculoskeletal system. Vicious cycles positively underpin high performance/ sporting excellence and negatively in the case of many gait and musculoskeletal abnormalities.

Generalised process for the development of capacity from a foundation of strength and skill:



Third principle: **Build with Constancy, Consistency, & Capacity (the three C's)**

If we practice something often enough it becomes easier. We have all experienced this. It happens for three reasons: More energy is stored or allocated, our brains improve the organisation of muscles (motor learning), and also when weak muscles are stimulated to become stronger (especially stabilisers). The first response represents the conventional notion of improved fitness. The latter outcomes are of special importance because they are vital training targets for children before adolescence (puberty) begins. They are the basis of improved movement efficiency or economy. The combination of constant (day to day) work with a high quality or consistent stimulus causes the body to adapt to reduce the energy cost of movement. This permits more work to be done which, in turn, elevates the strength and motor skill stimulus (diagram above).

A low cost, highly efficient process can also be operated at a higher rate. A high rate of work output means a higher power output. Capacities, such as speed, agility, and quickness are examples of high power output. Taken together, constancy and consistency of effort create a foundation in children (and adults) for the development of work capacity and basic and contextualised skills such as speed, agility, and quickness. Remember also that movement efficiency is a significant determinant of injury-risk. The take home message about work capacity is that it depends on achieving a stable work habit with small incremental increases in demand over months and years. The first steps in long-term physical and athletic development involve establishing constant (everyday) and consistent (repeated excellence) practice of basic skills.

