Strength & Conditioning Fundamentals to Improve Performance
Long Term Development of Junior Athlete Through to Senior Ranks
What Can A strength Program Achieve?

1. Improve speed - enhanced stretch shortening activity and reduced contact time with the ground
2. Increase balance and co-ordination
3. Improve strength and power
4. Decrease skinfolds
5. REDUCE the likelihood of injury
6. Biomechanical Support
7. Improved mobility and flexibility
Strength and Conditioning Development

- Technical changes
- Postural changes/core development
- Power Development-RFD
- Reactivity-Ground Contact Time. Enhancement of ssc
Methods of Improving Performance to support Training gains

- Effective periodised strength programs can lead to
- Increased power production in stride length
- Increased running economy
- Ability to maintain stride length and stride frequency for longer at a given pace *Fleck, JSCR-2008*
Factors To Consider When Designing A Program

1. Training history of the athlete - background and experience
2. Injury history of the athlete - recurrent injury problems, weaknesses, technical problems
3. Profile of the athlete - aerobic, anaerobic profile, body comp, fibre type etc
4. Time constraints and integration with full training program
5. Long term development plan of the athlete and what stage they are at
6. Specificity and transfer of exercises to skill of the event
Factors relating to triathletes

- Multi Disciplined sport - swim, bike, run
- Technical, functional and skill level of the athletes do not always match physiological development
- Athletes have the engines but not able to express due to poor technical models
- Volume of training can lead to flexibility and mobility issues which can compromise lifting technique and increase risk of injury
- High level of fatigue due to the nature of training
Factors relating to triathlete

- Skill acquisition demand is high. Patterns and skills developed as younger athletes are hard to change.

- Spending time developing fundamental skills and functional skills will allow access of physiology in a safer manner.

- Enabling athlete to stay healthy while taking on the training load is crucial to an athlete's long term success.

- Key when developing young athlete to spend a significant amount of time ensuring the fundamentals are in place.

- Short term gain/success does not necessarily transfer to a long senior career.
Phases of Development

General Strength
- Fundamental Movements
- Basic Technique
- Bodyweight
- Circuits
- Basic Reactivity drills

Strength/Power
- Force development
- Fatigue resistance
- Reactivity
- SS Cycle-jumps

Sports Specific
- Plyometric Drills
- Bounds
- Hill Sprints
- Medball/Hills
Preparation Phase

Triathlon Training Plan

Preparation phase

Aims of phase:

General Strength

- Intra/inter muscular co-ord
- Increase muscle stiffness
- Increase rate of force production
- Develop reactivity

Variables – reps, sets, %1rm, exercise selection, recovery between sets, time under tension
Sample Preparation Phase

- Sample preparation phase session/concurrent phase- all components trained simultaneously at all times only intensity and volume vary

- Warm Up-Mobility and flexibility circuit

- Intro to reactivity- skipping, lateral hops, multidirectional hops

- Strength development- Squats, step ups, lateral lunges, walking lunges, sldl, dead lift, hip thrusts, pull ups, I,Y,T,s, Rows etc. 3-4 sets 8-10 reps

- Strength Endurance Circuit- lunges, squats, squat jumps, burpees, 30s work 30s recovery 6-8 exercises 2/3mins recovery

- Rehab circuit/Core- dependent on functional screen
Preparation phase

Burpees

1 2 3 4 5 6 7
Fundamental Phase of Training

- Increase rate of force development—amount of force that can be developed at early phase of muscle contraction
- Increase muscle stiffness—muscle tendon units acting as stiff springs—hip, knee ankle
- Increase power production
- Introduce Plyometrics—increase speed and force of muscular contractions
- Postural/Injury prevention Strategies—core, prehab, activation strategies
Strength and Conditioning Development

- Sample Session
- Warm up- Mobility/Flexibility
- Reactivity/ Power Development Hops, bounds, medball throws, multidirectional jumps,
- Power exercises- Weighted Squat jumps, explosive step ups, Hill sprints, Hill Bounds. Medball Overhead throws
- Skill development- running drills, bike drills
- Injury prevention work-Rehab/prehab for highlighted areas of concern
Specific Phase-Supporting Higher Intensity of Training

- Aims of phase-
  - Peak Power transferable to disciplines-swim Bike and run
  - Maintenance of Strength Levels
  - INJURY prevention- balance, stability, proprioception,
  - Reactivity, Muscle stiffness
  - Discipline specific skills
Competition phase is a delicate balance of trying to maintain strength gains and improvements in power while recognizing the need for the athlete to have increased recovery and a need in training for more event specific training.

Balance in the program is key and is variable throughout the competition season.

Depending on the racing schedule of the athlete and the strength training history each athlete’s s&c program should look quite different.
Strength and Conditioning Development

- Conditioning - plyos, fatigue resistant circuits, anaerobic development and power may take the form of a hill sprint/circuit session

- Injury prone athletes would still incorporate rehab programs - maintaining general strength levels

- Medball, hops, bounds jumps may be incorporated as activation session before track sessions or runs

- Core/prehab programs may act as warm up activation for swim sets.

- Each program should be very specific to the every changing needs of an athlete throughout the comp season
Profiling The Athlete

- Field Testing that allows you assess factors relevant to performance and injury prevention
- Develop a profile of the athlete and identify strengths and weaknesses
- Allows you determine if specific interventions have made the expected improvements
- Evaluate the effectiveness of the training response and give a snapshot of areas of level of conditioning of the athlete
Test Selection

- Dependent on

- Equipment available-jump mat, fitrodyne, force plates etc

- For coaches most of this equipment is not freely available need on field inexpensive methods of monitoring athlete performance

- Condition of tests is that they are repeatable and follow the same protocol each time i.e 24h rest before, same warm up, performed under same conditions, marked by the same person to ensure validity of the tests
Functional Movement Screen

- Ranking and grading screen that documents movement patterns key to normal function (Cook, 2004)
- From the functional movement screen you get a functional movement score that can be used to document the athletes progress
- Exercises prehab/rehab can then be selected to improve athletes score and as a consequence athletes functional movement which is key to long term development of the athlete
Functional screening exercises

- Over head squat
- Inline lunge
- Hurdle Step over
- Press up
- All fours core
- Shoulder mobility
- Straight leg raise
Tests

- 45cm double leg jump – land and hold (measure bilateral ecc control)
- 30cm single leg hop and stick (unilateral eccentric control)
- Full Wall slide- thoracic control
- Dead bug roll (core control)
- Single leg squat- unilateral strength over 3 joints
- During this movements looking for ankle position, knee position, hip movement (flexion/extension, shifting of weight) shoulder position
Tests

- Power
- 5 x standing long jumps
- Overhead shot put throw for distance
- Single leg cable row/press (rotational core)
- Reactive strength index- Drop jump *height/contact time*
- *X pull ups  X push ups*
Frequency of Tests

- These tests can be done by individual coaches every 5/6 weeks as a measurement of improvement in the athletes.

- Information provided from the tests should act as a guideline in writing the strength and conditioning program.

- Information from the functional movement tests should act as a guideline for all prehab/rehab type work and skill work which can be incorporated into warm ups cool downs.
Sample Session

- 16yr old female athlete 1st year S&C (swim,bike,Run)

- Prehab - Glute activation circuit sets of 30 clams, clam holds, toe taps, adductor raises, single leg hip lifts, band walks, x2/3

- Landing prep - double leg jump, stick landing, double leg jump single leg landing, lateral hop and hold, step off box 15cm stick landing, skipping

- “Main lifts” band body weight squats x 15, press ups x 8, running drill x 3 sets, side lunges, inverted row x10, IYT band work

- Main lifts can be done as circuit or broken into groups with longer recovery

- Finish with core circuit - planks, side planks, reverse planks 30s building to 90s
Conclusion

- Strength and Conditioning can be used as an important tool to aid the development of the athlete.

- The focus should always be on the skill of the movement and the basics should be in place before moving onto more complex movements.

- Up-skilling the athlete and providing them with fundamental movement patterns will lead to a greater return when introducing more complex exercises.