Ideas and practical recommendations on using race analysis data in training Age Group swimmers.

Benefits:

- By introducing these new variables (other than the traditionally accepted volume and intensity) into training athletes you add a new dimension to their development;
- As a result of multi-dimensional training your athletes will experience an increased learning curve – swimmers are constantly learning something new about performance and process;
- You will successfully avoid staleness and monotony of training;
- Your training program will become increasingly more relevant to competitive performance. You receive and provide constant feedback about quality of execution measurable against a model of race performance;
- You "cross all T's" in your training design by ensuring that your swimmers develop variety of skills relevant to competitive performance.

Some advise on utilizing ***tempo*** in training:

Preface: increasing tempo is a very challenging task and it involves systematic coaching work over the course of the season on daily basis. It requires neural "re-wiring" of the existing motor patterns, and development of "new chassis" capable of functioning efficiently on higher tempo. Adjust your expectations of how much faster turn over you can expect at the end of the season, 2-3 cycles per minute increase per season is an outstanding coaching /athletic achievement. Provided that the swimming technique is intact.

- *"Bingo"*. Use this game/exercise with younger swimmers. You will need a stopwatch that has splits memory. Specify a range of tempo you want your swimmers to swim at, i.e. 1.05-1.15 sec. per cycle. It is important that your swimmers understand what is a *stroke cycle* and that the *seconds per cycle* has inverse relationship with *tempo:* when arms are moving faster, the time per cycle is decreasing, and vise versa.

  Send off 3 swimmers at a time (number of swimmers depends on your timing skills). Time 1 cycle for each swimmer, and separate cycles by about 2 seconds so you can distinguish between the measured tempo and breaks. Send off the next group of swimmers, when ready. When all swimmers completed 25, tell them their tempo and shout "*Bingo*" when they hit the desired range. It will help if you get excited when someone does it right: your enthusiasm sends a clear message to your swimmers that it is exactly what you wanted. If someone swum with too fast or too slow tempo, say just that so the kids clearly understand what they need to do to get it right.

- *Tempo matching 25's with various strokes*. Level of complexity here is more advanced. You can use this exercise with older, more experienced swimmers. Ask swimmers to swim a 25 using 2 strokes (ea approx 12.5) and match the *tempo* of the second 12.5 with the first 12.5. You should vary strokes, as well as rotation axis (i.e. 12.5 fly, 12.5 back), etc. As the tempo matching skills improve, you can raise the challenge and specify the intensity of 25's.
- *Descending* 25s/50's etc. *by Tempo*. This exercise is done as the usual descending sets. However, instead of time, swimmers aim to descend tempo. It is very important provide feedback to your swimmers in order for them to make appropriate adjustments;
- *Same as the previous,* but descending is set by certain increments to the racing tempo. You must know your swimmers' racing tempo in order it to be race relevant;
- *Tempo Ascending sets*: when tempo progresses from highest to lowest. This is also excellent for cool-down sets at the end of practice.
- Establish control sets, where you ask swimmers perform at the specific tempo. First introduce *tempo as* a single focal element. Increase complexity by adding also time expectation, and/or perhaps stroke counts, as *tempo* skills improve;
- Include swim sets at the lowest possible tempo without loosing dynamics of the stroke. Milt Nelms refers to those as "*Alpha-rates*". Swimming at "*Alpha-rates"* expands the dynamic range of tempo, thus presents new learning opportunities for your athletes to improve their swimming skills;
- Introduce development of race strategies based on rhythm (*tempo*), when each lap is executed at the optimal tempo to achieve fastest velocity.
- It is advisable to monitor *DPC* (distance per cycle) while developing tempo. *DPC* tends to decrease with the increase of Tempo, and vice versa. In a rather simplistic but accurate formula, the fastest swimming speed is the result of the optimal relationship between *tempo* and *DPC*. This relationship is rather unique to each swimmer and it is fluid. It may change with age, biological growth and development, new skills development/loss and other factors. Therefore, it is highly recommended to continue experimentation in training and racing with these two major components of velocity, constantly looking for the optimal relationship between *DPC / tempo*.

Some ideas on **Turns**:

Preface: Turns are serial movements (cyclical movements are repetitive – like swimming) and serve as transitions points between laps. Created swimming velocity can be lost entirely at transitions due to poor skills of turns, or it can be sustained (great efficiency).

It is important to convey the message to your athletes that turns are not subject to effort in a swim set: swimming intensity (descending, all out swims, recovery swims etc.) should not affect the quality of turns. Swimmers tend to get sloppy on turns when swimming easy or slow.

- After the basic movements were taught, it is time to integrate turns into swimming. It happens often that swimmers can do really excellent turns as a

single task, and fail to maintain turn quality when the complexity of tasks increased (for example: swim+ turn or fast swim + many turns) the turns become much too slow, sloppy and executed with distorted form.

- Turns don't always have to be "faster": it is our contention that they have to be fast enough (within observed ranges) but performed with the least possible energetic cost to swimmers. Much faster turns can drain more energy, therefore may not be as effective.
- Some ideas to practice turns, (I am assuming that they were already taught). Set the pace: practice slow and correct turns, as well as much "faster than usual" turns. Slowing down and speeding up provides additional learning opportunities.
- Swim short / fast repeats from "Aussie" turns;
- 30 yards, 55 yards swims: kick very fast from the flags into the wall while sculling, perform a turn and continue swimming with given intensity
- Ask your swimmers to do all turns completely under water while warming up. (You can also alternate flipturns or open turns underwater). It is important that no body parts are touching the surface of the water.
- "3 second pause" turns: swim backstroke or freestyle into a wall, flip turn, when feet touched the wall, remain at the wall underwater for 3 seconds (time can vary), in full control, check the posture, depth, then push off, execute clean breakout and continue to swim.

Some random thoughts on the issues discussed here:

- First things first. You have to collect some race data for your swimmers to use it effectively in practice;
- Before you attempt to explain the meaning and significance of data to your swimmers, it has to make sense to you;
- Your swimmers should have a basic understanding of Tempo, DPC (distance per cycle), turn time and how those race components affect the final time;
- Your accurate feedback is essential to learning and achievement of desired results;
- We learned from observation and experimentation that swimmers race with tempo that is approximately 10% below their maximal. Therefore, it is advisable to experience the upper level tempo in practices to familiarize with the movement required patterns;
- Frequency of "hits" to those skills in training ensures skill acquisition, advancement and ultimately mastery. Patience during early stages of focused development of tempo and DPC is essential;
- Implement those components in your training with consistency and simplicity;
- Prepare your workouts in advance to ensure that all components are in place and distributed equally within your weekly / monthly cycle.
- Race time is just a "composite" measure, and does not reveal the process of "how" it was accomplished;

- If a swimmer always swims his / her race exactly the same way, the result will be also exactly the same. Something HAS to change in the race to cause improvement;
- Your swimmers develop racing skills whether you are systematically including them in your training or not. However, their choices are often random and misguided. With your guidance of their choices they have greater chances for success.
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